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MED POL-Phase III

**PROGRAMME FOR THE ASSESSMENT AND CONTROL OF POLLUTION
IN THE MEDITERRANEAN REGION**

(1996-2005)

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PREFACE

In 1992, the Bureau of the Contracting Parties asked the Secretariat to organize the preparation of an in-depth evaluation of the MED POL Programme by scientists/experts external to the MAP Office with a view of using this evaluation in the drafting of the Phase III of MED POL. Five consultants worked during 1993 and an evaluation was prepared and presented to the Eighth Ordinary Meeting of the Contracting Parties in October 1993 (UNEP(OCA)/MED IG.3/Inf.6). During the latter Meeting the Contracting Parties also formally agreed that a Phase III of MED POL should be prepared covering the period from 1996 to 2005 and, to this effect, they set a number of basic objectives and principles which should be used for its preparation (UNEP(OCA)/MED IG.3/5, Annex IV).

The meeting of experts on the preparation of MED POL-Phase III was held in Izmir from 20 to 23 June 1994 with the partial financial support of the Government of Turkey. Twenty experts from the Mediterranean and elsewhere attended the meeting, together with representatives of United Nations agencies and international organizations (UNEP(OCA)/MED WG.75/3). The meeting, after reviewing and discussing the achievements and shortcomings of Phases I and II of the MED POL Programme, prepared a draft MED POL-Phase III Programme, which was submitted for approval to the Joint Meeting of the Scientific and Technical Committee and the Socio-Economic Committee (Athens, 3-8 April 1995). Due to lack of time, this document was not considered by the Joint Meeting and delegations were requested to provide comments to the Secretariat in writing. After reviewing the comments received and taking into account the results of the informal consultation meeting on MED POL-Phase III (Athens, 13-15 December 1995), the document was revised to bring it in line with the Action Plan for the Protection of the Marine Environment and the Sustainable Development of the Coastal Areas of the Mediterranean (MAP-Phase II), approved by the Contracting Parties in June 1995. Finally, the revised document was submitted to the Meeting of the MED POL National Coordinators (Athens, 18-22 March 1996), who discussed in detail its content and agreed on a number of changes. The present document is the text agreed by the National Coordinators and is now submitted to the MAP Focal Points for approval.

1. BACKGROUND

1.1 The MED POL Programme, designed initially as the environmental assessment component of the Mediterranean Action Plan, has been operational since 1975. Its first phase (MED POL-Phase I) was implemented from 1975 until 1980 and it comprised seven basic baseline studies covering the major marine pollution problems in the Mediterranean. In 1981, the Contracting Parties to the Barcelona Convention approved a new ten-year long-term programme (MED POL-Phase II, 1981-1990) which included two main components, monitoring and research. In 1991, the Contracting Parties decided to extend MED POL-Phase II until 1995. In 1995, it was further extended to 1996 to allow the completion of the programme as well as the formulation of the next phase.

1.2 In fact, during the implementation of MED POL-Phase II, the need was felt to bring the MED POL Programme closer to the other components of the Mediterranean Action Plan and in particular to the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources, which entered into force in 1983, and the more recent Coastal Areas Management Programme (CAMP). As a result, preparations were made to refocus the MED POL Programme and thus prepare a new phase of the programme (MED POL-Phase III, 1996-2005). In addition, global events such as the Rio de Janeiro Summit, Agenda 21 and the Contracting Parties meeting in 1995 outlined a different and more integrated dimension in the approach to marine pollution control programmes, i.e. towards sustainable development.

1.3 As early as 1989, a meeting of experts took place to evaluate the main pollution data gathered until then through MED POL (UNEP(OCA)/MED WG. 5/3). Four experts prepared specific reports on sources of pollution (UNEP(OCA)/MED WG.5/Inf.3), micro-organisms in coastal areas (UNEP(OCA)/MED WG.5/Inf.4), heavy metals in coastal and reference areas (UNEP(OCA)/MED WG.5/Inf.5) and petroleum and chlorinated hydrocarbons in coastal and reference areas (UNEP(OCA)/MED WG.5/Inf.6), which presented the available data, showed the existing gaps, and made suggestions for the improved collection and use of data.

1.4 In addition, several meetings and consultations took place within and outside the Secretariat with the scientific community and the United Nations bodies involved in the Programme; in particular, large forums such as the ICSEM/IOC/UNEP Workshops on pollution of the Mediterranean Sea were utilized to discuss with the scientific community the major achievements and shortcomings of the Programme and to propose new approaches. Two review papers, "Monitoring Strategies of Marine Pollution" and "Pollution Problems in the Mediterranean and Relevant Research Strategies", were presented and widely discussed during the Xth CIESM/IOC/UNEP Workshop held in Perpignan (1990). The papers summarized and critically analysed the work carried out within the framework of MED POL in the field of monitoring and research and proposed follow-up activities. During the XIth CIESM/IOC/UNEP Workshop on Pollution held in Trieste (1992) another review paper "The Data Quality Assurance Programme of MED POL" presented the new strategy of MED POL as to data quality assurance and the prospects in the specific field. Discussions on the subject of the new phase of MED POL were also held in the course of all Inter-Agency Advisory Committee Meetings of MED POL.

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2. INTRODUCTION

2.1 The organization of a programme for monitoring of the sources, levels and effects of contaminants, as well as the research related to this monitoring, was one of the cornerstones of the Mediterranean Action Plan (MAP) adopted by the governments of the Mediterranean countries in February 1975. With the adoption, in 1976, of the Barcelona Convention by the same governments, and the subsequent adoption of the Protocols to this Convention, the objectives and methodologies of the programme were gradually modified in order to respond to the expanding goals set by the governments.

2.2 The declared objectives of the first phase of the Programme, MED POL-Phase I (1975-1980), were:

- to formulate and carry out a coordinated pollution monitoring and research programme taking into account the goals of the Mediterranean Action Plan and the capabilities of the Mediterranean research centres to participate in it;
- to assist national research centres in developing their capabilities to participate in the Programme;
- to analyse the sources, levels, pathways, trends and effects of pollutants relevant to the Mediterranean Sea;
- to provide the scientific/technical information needed by the Governments of the Mediterranean States and the EEC for the negotiation and implementation of the Convention and its related Protocols; and
- to build up consistent time-series of data on the sources, pathways, levels and effects of pollutants in the Mediterranean Sea and thus contribute to the scientific knowledge of the Mediterranean Sea.

2.3 While the first phase of the Programme focused on strengthening national capabilities in order to enable all countries to participate in the Programme and on the development of methodologies needed to implement it, the next phase of the Programme¹ (MED POL-Phase II, 1981-1996) had more general and broader objectives to provide the Parties to the Barcelona Convention with:

- information required for the implementation of the Convention and the Protocols;
- indicators and evaluation of the effectiveness of the pollution prevention measures taken under the Convention and the Protocols;
- scientific information that may lead to eventual revision and amendment of the relevant provisions of the Convention and the Protocols, and for the formulation of additional protocols;
- information that could be used in formulating environmentally sound national, bilateral and multilateral management decisions essential for the continuous socio-economic development of the Mediterranean region on a sustainable basis; and

¹ *Long-term programme for pollution monitoring and research in the Mediterranean (MED POL)-Phase II.* UNEP Regional Seas Reports and Studies No. 28. Rev.1. UNEP, 1986.

- periodic assessment of the state of pollution of the Mediterranean Sea.

2.4 During the second phase of MED POL:

- the gains of the first phase were consolidated by considerable strengthening of national institutional capabilities through: training; provision of equipment; development of suitable sampling and analytical techniques, quality assurance programmes including intercalibration exercises, equipment maintenance and other forms of assistance;
- the monitoring of the levels and effects of contaminants was intensified, and gradually focused on monitoring related to compliance with the pollution control measures adopted by the Contracting Parties, through agreements with governments involving about 80 national institutions in practically all Mediterranean countries;
- the research programme contributing to the improved understanding of the requirements for pollution control measures was considerably broadened, and implemented through more than 500 research contracts with national institutions in practically all Mediterranean countries;
- a detailed survey (inventory) of pollutants from land-based sources, as defined by the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources (LBS Protocol), was initiated;
- consistent databases resulting from monitoring, research and survey activities, and other sources, were built-up and used in the preparation of studies, analyses and assessments of specific environmental pollution problems;
- a regional assessment of the environmental state of the marine and coastal environment was prepared (1989 and 1995);
- a regional assessment of the possible implications of expected climate changes was prepared (1992 and 1995), and 11 detailed site-specific studies were carried out on the implications of these changes, with concrete recommendations for the possible mitigation of the negative effects;
- in-depth analyses ("assessment documents") of 13 specific problems related to the control of individual contaminants (or group of contaminants) covered by the LBS Protocol were prepared and used as the basis for the formulation of control measures subsequently adopted by the Parties to the Convention; and
- significant input was made from all activities listed above into the Coastal Area Management Programme (CAMP) carried out within the framework of the Action Plan.

2.5 The Eighth Ordinary Meeting of the Contracting Parties to the Barcelona Convention (Antalya, 12-15 October 1993) reaffirmed the objective of the Mediterranean Action Plan (MAP) since its establishment to act as an instrument of regional cooperation covering the concerns both of the environment and of development, and approved a set of recommendations (UNEP(OCA)/MED IG.3/5, Annex IV) on the general strategy to be followed in MAP, as well as the action to be taken under specific components of MAP in order to implement this strategy.

2.6 Recognizing that:

- in line with UNCED and Agenda 21, further emphasis is to be given to those MAP activities contributing to the implementation of the sustainable development concept; and that
- MED POL, as the scientific and technical component of MAP, provides the scientific basis for decision-making related to marine pollution in the region in the process of achieving sustainable development;

recommendation 7.2 of the Antalya meeting called for the development of MED POL-Phase III and specified the fields in which it should assist the Contracting Parties, with the following overall objectives:

- organization of a Mediterranean coordinated marine pollution monitoring and research programme, concentrating on contaminants and pollutants affecting the quality of the marine and coastal environment, as well as the health of man and of the living resources in the Mediterranean and interpretation/ assessment of the results of the programme as part of the scientific basis for decision-making in the region;
- generation of information on the sources, levels, amounts, trends (trend monitoring) and effects of marine pollution, development of capabilities for assessing the present and future state of the marine environment within the Mediterranean region as an additional component of the scientific basis upon which the formulation of proposals for preventive and remedial action can be based;
- formulation of proposals for technical, administrative and legal programmes and measures for the prevention and/or reduction of pollution;
- strengthening and, when necessary, development of the capabilities of the national institutions, in accordance with the circumstances and the country requesting it, so as to implement monitoring and research of pollution of the marine environment; and
- assistance, as appropriate, to Contracting Parties for the implementation of the recommendations adopted with a view to the assessment of their effectiveness; this assistance will allow the competent authorities to verify the recommendations adopted taking into account data of a satisfactory standard.

2.7 The Ninth Ordinary Meeting of the Contracting Parties (Barcelona, 5-8 June 1995) approved the Action Plan for the Protection of the Marine Environment and the Sustainable Development of the Coastal Areas of the Mediterranean (MAP-Phase II). Chapter 3 of MAP-Phase II, which deals with the assessment, prevention and elimination of marine pollution, gives the framework for MED POL-Phase III. In addition, the adoption of the amendment to the 1980 LBS Protocol by the Conference of Plenipotentiaries held in Syracuse on 6-7 March 1996, also provides MED POL with the legal framework of pollution control for the Mediterranean, thus indicating the main programme strategy to be followed.

2.8 The main strategic change in the MED POL Programme is therefore the shift of the emphasis from pollution assessment to pollution control, which brings the programme close to the objectives of the LBS Protocol and MAP-Phase II and makes it an effective tool for achieving sustainable development. The Programme also includes monitoring for compliance purposes, especially as far as the control measures adopted are concerned.

3. OBJECTIVES OF MED POL-PHASE III (1996-2005)

3.1 The objectives of MED POL-Phase III were formulated taking into consideration the experience gained during MED POL-Phases I and II, as well as the documents adopted by the Ninth Ordinary Meeting of the Contracting Parties (Barcelona, 5-8 June 1995), namely, MAP-Phase II, the Barcelona Resolution, the Priority Fields of Activities (1996-2005) and the amended Barcelona Convention and Protocols.

3.2 The ultimate and overall objective of MED POL-Phase III (1996-2005) is the elimination of pollution² of the Mediterranean Sea from all activities that cause such pollution, in particular land-based activities, through the full implementation of the LBS Protocol. MED POL-Phase III provides the basis for action related to assessment, prevention and elimination of marine pollution and relates such action to other components of MAP-Phase II in the perspective of sustainable development.

The specific objectives of MED POL-Phase III are in particular:

- (a) the assessment of all (point and diffuse) sources of pollution, the load of pollution reaching the Mediterranean Sea, and the magnitude of the problems caused by the effect of contaminants on living and non-living resources, including human health, as well as on amenities and uses of the marine and coastal regions;
- (b) assistance to countries, including capacity-building, in the development and implementation of national action plans for the elimination of marine pollution, in particular from land-based activities;
- (c) the assessment of status and trends in the quality of the marine and coastal environment as an early warning system for potential environmental problems caused by pollution;
- (d) the formulation and implementation of action plans, programmes and measures for the prevention and control of pollution, for the mitigation of impacts caused by pollution and for the restoration of systems already damaged by pollution; and
- (e) the monitoring of the implementation of the action plans, programmes and measures for the control of pollution and the assessment of their effectiveness.

3.3 In view of the broad cross-sectoral mandate of MED POL with heavy emphasis on pollution control from all sources, in particular from land-based sources and activities, and taking into account the fact that the control of marine pollution is one of the central issues to be resolved within the framework of MAP-Phase II in order to enable the sustainable development of the Mediterranean region, the new phase of MED POL will require intensified interaction between MED POL and practically all other components of MAP, and with the Coastal Area Management Programme (CAMP) in particular. Therefore, in outlining the possible elements

² In the context of this document, "pollution of the marine environment" is interpreted according to the definition adopted in the United Nations Convention on the Law of the Sea and in the Barcelona Convention (as amended in 1995) as:

the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.

of MED POL's new phase, an attempt is made in the present document to link the specific objectives and activities proposed for MED POL-Phase III with those adopted for the other components of MAP-Phase II.

3.4 In addition to reflecting the links between MED POL-Phase III and the other components of MAP-Phase II, the Programme was also prepared with due regard for the concepts and recommendations contained in Agenda 21 as they bear on activities relevant to MED POL, specifically those contained in Chapter 17 of Agenda 21³.

3.5 The stated goals shall be achieved through the implementation of interdependent and linked (see Figures 1 and 2) activities grouped in three basic MED POL-Phase III programme elements (assessment of pollution-related problems; pollution control; and supporting measures), all contributing to the ultimate goal of MED POL-Phase III and MAP-Phase II. The rationale of these activities, their specific objectives and means of implementation are described in Sections 5-8 of the present document.

3.6 The development of suitable measures for the prevention, abatement and control of pollution from all sources, and continuous assessment of the effectiveness of their implementation, are the central goals of the new phase of MED POL. All other activities are subsidiary to these goals and contribute to their more efficient achievement. By concentrating on these goals, MED POL-Phase III is expected to provide critically important inputs into practically all other components of MAP-Phase II, notably CAMPs (giving due consideration to pollution problems associated with coastal development), and thus make a significant contribution to the sustainable development of the Mediterranean region.

³ Chapter 17 of Agenda 21, adopted by the United Nations Conference on Environment and Development (Rio de Janeiro, 3-14 June 1992), lists 33 objectives and more than 180 types of activity that are recommended under the heading *Protection of the oceans, all kind of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection, rational use and development of their resources.*

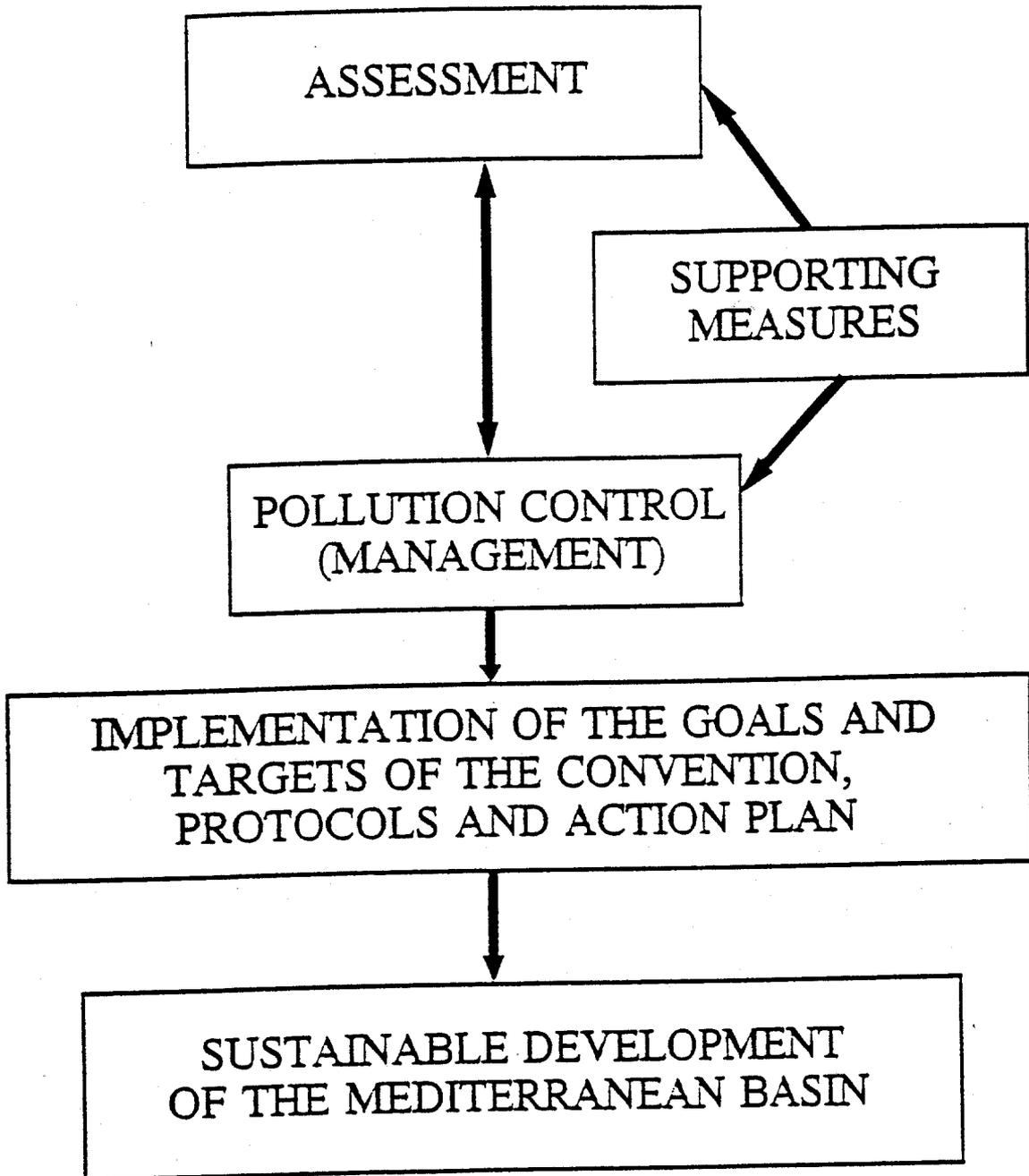


Figure 1: Relationship of MED POL-Phase III to the goals of the Mediterranean Action Plan emphasizing the feed-back relationship between assessment and pollution control.

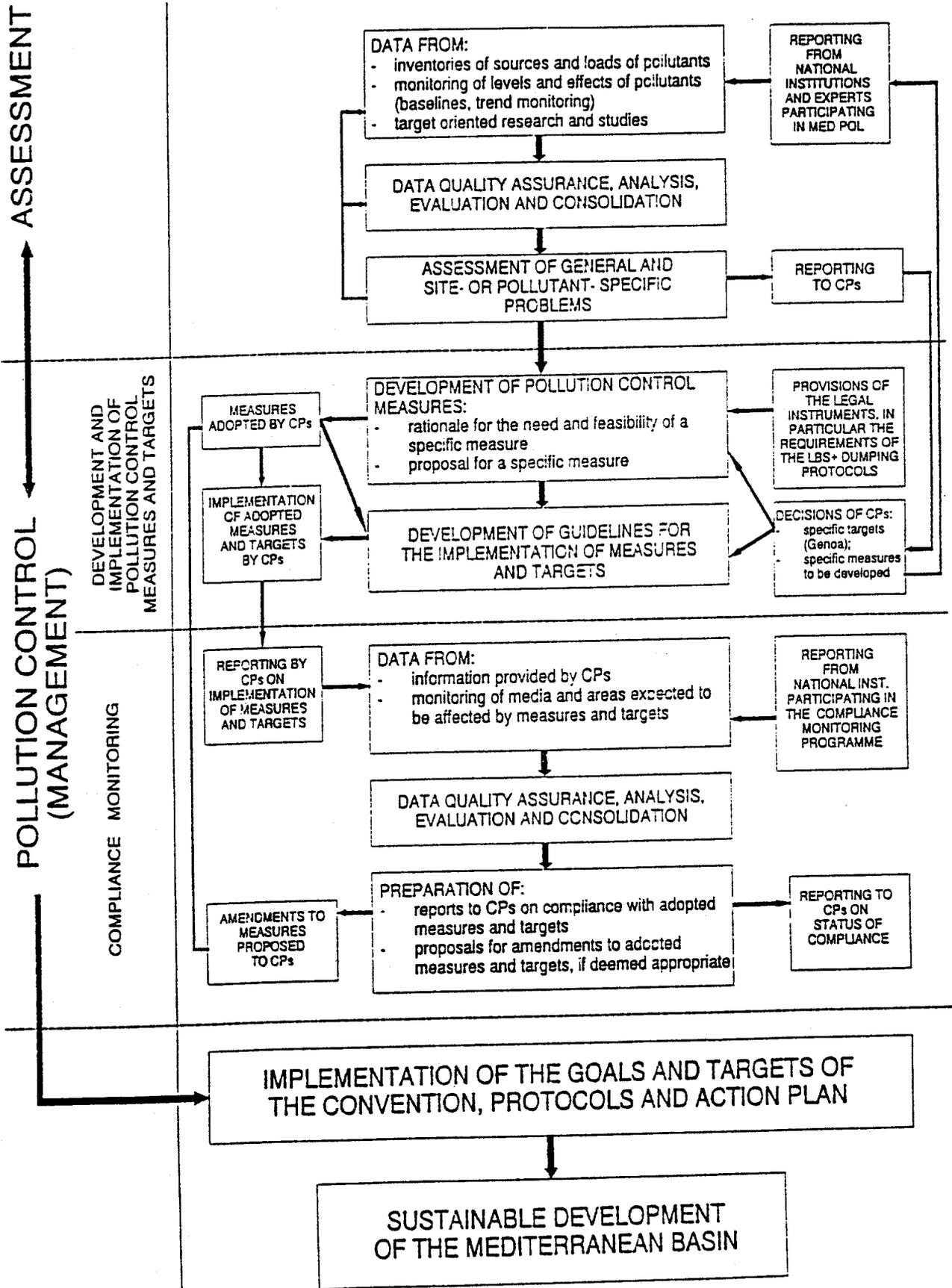


Figure 2: Simplified flow chart showing the more important links between the substantive activities of MED POL-Phase III.

4. MODALITIES OF COOPERATION BETWEEN THE CONTRACTING PARTIES AND THE SECRETARIAT REGARDING MED POL

4.1 In order to ensure the efficient coordination of national efforts related to MED POL and a streamlined communication channel between the *Secretariat of MAP* and the national structures designated by the Contracting Parties to participate in MED POL, each Contracting Party designates a person or office as the *National Coordinator for MED POL*. Their mutual responsibilities shall be as follows:

Responsibilities of the National Coordinators for MED POL

4.2 The National Coordinators for MED POL should actively promote MED POL-related activities in their respective countries and should maintain close and continuous contact with the MED POL Collaborating Institutions, other national agencies involved in the implementation of MED POL, as well as the Secretariat. In order to maximize the National Coordinators' efficiency, the Contracting Parties should establish, as appropriate, national mechanisms (e.g. Intersectoral Coordination Committees, Technical Committees, Scientific Advisory Groups) to assist the National Coordinators in the fulfilment of their duties. Furthermore, the Contracting Parties should endeavour to involve the National Coordinators in MAP-related decision-making at the highest possible levels⁴.

4.3 Responsibility for implementing MAP II of the Barcelona system lies with the MAP Focal Points and consequently also the implementation of MED POL. It is the responsibility of the MAP Focal Points to assist MED POL National Coordinators in the implementation of MED POL.

4.4 The specific responsibilities of the National Coordinators shall be:

- (a) to ensure the implementation of all activities of the national monitoring programme of MED POL covering compliance and trend monitoring;
- (b) to ensure selection and designation of *National MED POL Collaborating Institutions* and coordinate their activities relative to all MED POL activities;
- (c) to serve as the channel for all formal communications between the Secretariat and the National MED POL Collaborating Institutions, while for technical matters Institutions may be contacted directly by the Secretariat;
- (d) to ensure the collection and evaluation of the data and information provided by the National MED POL Collaborating Institutions and to transmit these data and information annually, as well as their evaluation, to the Secretariat according to agreed formats and schedules;
- (e) to ensure preparation and submission of reports on dumping activities relevant to the Dumping Protocol and on implementation of the LBS Protocol;

⁴ Should the Contracting Parties establish National Committees for MAP, the National Coordinators for MED POL should be members of such Committees.

- (f) to organize the preparation of national surveys and/or inventories of point and non-point land-based sources of pollutants relevant to the LBS Protocol, including those relevant to airborne pollutants;
- (g) to organize the preparation of national reports on the state of the marine and coastal environment areas, to be prepared every four years with the first report being prepared by the year 2001;
- (h) to follow the progress achieved in the implementation of national MED POL-related activities and to report to the Secretariat thereon according to agreed formats and schedules;
- (i) to participate in or be represented at the meetings of the MED POL National Coordinators; and
- (j) to review the MED POL-related technical and policy documents and proposals prepared by the Secretariat before their submission to the Contracting Parties, and to advise the Contracting Parties and the Secretariat on how to handle these documents and proposals.

Responsibilities of the National MED POL Collaborating Institutions

4.5 As far as the national monitoring programmes are concerned, individual responsibilities shall be determined by the National Coordinators for MED POL in consultation with the Secretariat, as appropriate; such responsibilities shall be reflected in the monitoring agreements signed between the Secretariat and the National Coordinators for MED POL, as appropriate. The Institutions shall report to the Secretariat through the respective Coordinator according to agreed formats and schedules, and shall participate in the ongoing mandatory Data Quality Assurance programmes organized by the Secretariat.

Responsibilities of the Secretariat

4.6 The specific responsibilities of the Secretariat shall be:

- (a) to coordinate and harmonize the work carried out within the framework of the agreed national MED POL programmes in close cooperation with specialized bodies of the United Nations system supporting or participating in the Programme; this shall be done in close consultation and cooperation with National Coordinators for MED POL, National MED POL Collaborating Institutions, MAP's Regional Activity Centres and international and intergovernmental specialized organizations;
- (b) to evaluate and analyse the data stored in the Secretariat's database received through the National Coordinators for MED POL;
- (c) to organize Data Quality Assurance programmes with or through the relative competent United Nations specialized agencies participating in the Programme, as appropriate;
- (d) to organize and implement training and capacity-building activities when needed and requested by developing countries;

- (e) to convene the periodic meetings of the MED POL National Coordinators, the Advisory Group of Experts for MED POL and any other *ad hoc* groups of experts called to:
 - assist in the analysis, evaluation, and integration of data and information made available through the National Coordinators for MED POL or other sources; and
 - review and advise on the technical and policy documents prepared by the Secretariat and the United Nations specialized agencies;

- (f) to prepare, jointly with or through the relevant competent United Nations specialized agency or agencies participating in the Programme, whenever appropriate, technical and policy documents, including guidelines, for the Contracting Parties based on data and information received through the National Coordinators for MAP, through MED POL Collaborating Institutions, through other research Institutions and open scientific literature. These technical and policy documents include:
 - reports on the state and trends in the environmental quality of the marine and coastal areas; and
 - proposals for action plans, programmes and measures for pollution control, including those that may prevent or abate the environmental degradation of these areas, or contribute to the restoration of the areas affected by degradation; and

- (g) to provide the Contracting Parties, and other interested bodies with information available on the state of the Mediterranean environment.

5. ASSESSMENT OF POLLUTION-RELATED PROBLEMS

Basis for action

5.1 A scientific assessment of pollution-related problems of the Mediterranean region is one of the basic prerequisites for development of a rational approach towards the sustainable development of the region. Such an assessment, together with information provided through the other components of MAP-Phase II, is the sound foundation for the decisions and recommendations of the Contracting Parties to the Convention to adopt action plans, programmes and measures suitable and applicable in the Mediterranean region⁵.

Objectives

5.2 The specific objectives of this programme element shall be:

- (a) to identify the sources, assess the present levels and keep under periodic review the trends in the load of contaminants reaching the Mediterranean Sea from marine and land-based sources including point and non-point sources and airborne contaminants. This will constitute an inventory of sources of pollution required as basic information for the implementation of the LBS and other Protocols⁶;
- (b) to assess, in areas under direct influence of pollution sources (e.g. coastal waters, estuaries), the levels and trends of contaminants and their potentially harmful effects on marine life and human health, and the negative effects on fisheries and aquaculture⁶;
- (c) to assess, in areas not under direct influence of identifiable point or non-point sources of pollution ("reference areas"), the magnitude of parameters which may serve as indicators for the general trend in the environmental quality of larger areas⁶;
- (d) to evaluate the anthropogenic loads of pollutants and to assess their potential harmful effects on the marine environment, taking into consideration and comparing (on a sub-regional basis) with background levels of relevant substances;
- (e) to identify and assess potential short- and long-term threats to the Mediterranean environment;
- (f) to provide the Contracting Parties, and other interested parties, with information available on the state of the Mediterranean environment.

Activities

5.3 The stated objectives shall be achieved through:

- (a) monitoring/studies/surveys, as appropriate, of levels, loads, pathways, and distribution of contaminants and their effects;
- (b) monitoring of trends in the levels and effects of contaminants⁷ (see Annex);

⁵ Articles 5, 6, 7, 8 and 11 of the Barcelona Convention (1995).

⁶ Paragraph 17.35 of Agenda 21.

⁷ Article 12 of the Barcelona Convention (1995).

- (c) target-oriented research in support of monitoring activities⁸;
- (d) analysis and evaluation (at a national, sub-regional or regional level) of pollution related data from surveys, baseline studies and monitoring organized within the framework of MED POL;
- (e) preparation of reports on the assessment of specific pollution-related problems of the Mediterranean region including recommendations for action, if deemed appropriate⁹;
- (f) preparation of national reports on the state of the marine and coastal environment, to be prepared every four years with the first report being prepared by the year 2001;
- (g) preparation of short and concise reports on the state of pollution of the Mediterranean environment for each meeting of the Contracting Parties, specifically highlighting the changes and trends identified since the submission of the last report¹⁰; and
- (h) preparation by the Secretariat for the 2001 meeting of the Contracting Parties, of a consolidated report on the state of the Mediterranean environment¹¹.

5.4 The monitoring shall concentrate on the assessment of trends in pollution-related problems in order to provide a solid basis for the appraisal of the environmental health of the Mediterranean as a whole, and to serve as an early warning system for the problems that may be encountered in the future (see Annex), as well as the preparation of inventories of point and non-point sources of pollution, particularly the land-based sources, and the monitoring of the pollution loads reaching the Mediterranean from these sources.

5.5 In some instances, data from monitoring programmes alone will not be sufficient for the assessment of pollution-related problems and their long-term implications. Therefore, in such cases, monitoring data will have to be supplemented by well-defined target-oriented research as indicated by the Contracting Parties.

5.6 Although the overall assessment for the Mediterranean will be organized by the Secretariat of MAP, there is also a need for national assessments in order to decide on national management measures.

⁸ Article 13.3 of the Barcelona Convention (1995).

⁹ The recommendations may lead to the development of proposals for concrete pollution control measures, as described in Section 6A of the present document.

¹⁰ Paragraph 17.106 (d) of Agenda 21.

¹¹ Reports of this nature were published in 1990 and 1996.

Means of implementation

5.7 The assessment of pollution-related problems will require a high degree of coordination and close cooperation between the Secretariat of MAP¹², the National Coordinators for MED POL, the National MED POL Collaborating Institutions, the specialized agencies of the United Nations system supporting or participating in MED POL, as well as other specialized intergovernmental and international organizations¹³. The modalities of their cooperation are described in Section 4 of the present document.

5.8 Data and information relevant to the monitoring of trends in the levels and effects of contaminants, as well as to the inventories of pollution sources and loads (paragraphs 5.3(a) and (b) and 5.4), will be generated and provided to the Secretariat by the National MED POL Coordinators and by the National MED POL Collaborating Institutions as described in Section 4.

5.9 Target-oriented research (paragraphs 5.3(c) and 5.5) will be based on research projects selected by the Secretariat in cooperation with the relative United Nations specialized agency participating in the Programme. For such projects, research contracts will be signed by the Secretariat or agency and the National MED POL Collaborating Institutions, in consultation with the relevant National Coordinators for MED POL. The Collaborating Institutions may receive financial support from the Trust Fund to cover part of the cost of the research carried out by them.

5.10 Assistance to developing countries will be needed in the form of training of their national experts and technical assistance (equipment, consumables, Data Quality Assurance) to their national institutions, in order to enable them to participate effectively in the programme element¹⁴.

¹² In the context of this document, UNEP's Coordinating Unit for the Mediterranean Action Plan in Athens is identified as the Secretariat of MAP.

¹³

- United Nations Environment Programme (UNEP)
- Food and Agriculture Organization of the United Nations (FAO)
- United Nations Educational, Scientific and Cultural Organization (UNESCO)
- World Health Organization (WHO)
- World Meteorological Organization (WMO)
- International Atomic Energy Agency (IAEA)
- Intergovernmental Oceanographic Commission (IOC)
- World Conservation Union (IUCN)

¹⁴ Article 13.3 of the Barcelona Convention (1995).

6. POLLUTION CONTROL

6.1 A scientific assessment of pollution-related problems of the Mediterranean region is only the first step towards action to prevent, abate and control pollution and its effects. Therefore, the substantive focus of MED POL-Phase II gradually shifted from assessment of the problems related to pollution to the development of proposals for concrete pollution control measures. Taking into account the data and information obtained in the previous phases of MED POL and relying on a permanent system for keeping the present assessment up to date through activities envisaged in Section 5 of the present document, MED POL-Phase III will further emphasize the development of action plans, programmes and measures for the control of pollution and compliance with those adopted by the Contracting Parties, as its central activities.

A. Development and implementation of pollution control measures¹⁵

Basis for action

6.2 Pollution from land-based sources was recognized in the very early stages of MAP as the major problem for the Mediterranean region. The adoption of the LBS Protocol (1980), its entry into force (1983), and its amendment (1996), provided the legal basis for the development of action plans, programmes and measures for the control of pollution from land-based sources and activities in accordance with the Protocol.

6.3 Although the control of pollution from land-based sources remains a major objective of MAP-Phase II, the control of pollutants from other sources and activities is not neglected, as exemplified by the adoption of protocols associated with the Barcelona Convention which deal with pollution from dumping and emergency situations, as well as with offshore exploration and exploitation¹⁶.

¹⁵ In the context of this document, *pollution control measures* are broadly interpreted as a combination of technical (technological), economic, legal and administrative policies, measures and practices contributing to the:

- prevention and mitigation of pollutants' impact on human health and on the quality of the marine and coastal environment, including their living and non-living resources, and amenities;
- general decrease of pollution load reaching the Mediterranean Sea;
- rehabilitation of marine and coastal environment damaged by the present impact of pollution; and
- achievement of sustainable development.

¹⁶ *Protocol concerning Cooperation in Combating Pollution of the Mediterranean Sea by Oil and Other Harmful Substances* (adopted in 1976, entered into force in 1978); *Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft* (adopted in 1976, entered into force in 1978, amended in 1995); *Protocol for the Protection of the Mediterranean Sea against Pollution resulting from Exploration and Exploitation of the Continental Shelf, the Seabed and its Subsoil* (adopted in 1994).

Objectives

- 6.4 The specific objectives of this programme element shall be:
- (a) to develop action plans, programmes and measures for the control of pollution as required by the Barcelona Convention and its Protocols and by the decisions and recommendations of the Contracting Parties; and
 - (b) to implement the action plans, programmes and measures for the control of pollution adopted by the Contracting Parties.

Activities

- 6.5 The stated objectives shall be achieved by:
- (a) providing an assessment of the magnitude and intensity of the problem, which is to be tackled by the measures ("assessment document"), including a scientifically sound rationale for pollution control measures, taking into account ecotoxicological criteria and the precautionary principle¹⁷;
 - (b) formulation of proposals for action plans, programmes and measures for the control of pollution, taking into account article 4.4 of the Barcelona Convention (1995)¹⁸ and the feasibility of implementing the measures in the Mediterranean region;
 - (c) formal adoption of the proposed action plans, programmes and measures, or of their amended versions, by the Contracting Parties;
 - (d) development of technical guidelines for the implementation of adopted action plans, programmes and measures; and
 - (e) implementation by the Contracting Parties of the adopted action plans, programmes and measures for the control of pollution.

Means of implementation

6.6 A high degree of cooperation and coordination will be required among the Secretariat, the Contracting Parties, the National Coordinators for MED POL, as well as the relevant Regional Activity Centres of MAP, the specialized agencies of the United Nations system (see footnote 13) as well as the relevant international and intergovernmental organizations to implement the activities listed above.

¹⁷ Article 4.3 of the Barcelona Convention (1995).

¹⁸ Article 4.4 of the Barcelona Convention (1995) states that:
In implementing the Convention and the related Protocols, the Contracting Parties shall:

- (a) adopt programmes and measures which contain, where appropriate, time limits for their completion;
- (b) utilize the best available techniques and the best environmental practices and promote the application of, access to and transfer of environmentally sound technology, including clean production technologies, taking into account the social, economic and technological conditions.

6.7 The priorities for the formulation of action plans, programmes and measures, as well as the timetable for the development of proposals, shall be determined by the Contracting Parties.

6.8 Based on the decisions of the Contracting Parties, the Secretariat will coordinate the preparation of the assessment documents, the formulation of proposals for action plans, programmes and measures, and the technical guidelines for their implementation.

6.9 Consultants and *ad hoc* meetings of experts may be used by the Secretariat for the preparation of the assessment documents, the proposals for action plans, programmes and measures, and the guidelines for their implementation.

6.10 The meetings of the MED POL National Coordinators shall review, and revise as necessary, the drafts of the assessment documents, the proposals for action plans, programmes and measures and the guidelines for their implementation, before they are submitted for the consideration of the Contracting Parties.

6.11 The implementation of the adopted action plans, programmes and measures shall be the responsibility of the individual Contracting Parties¹⁹.

6.12 Assistance shall be provided through the Secretariat to developing countries requesting training of their national experts, or technical and legal advice to their national institutions, in order to ensure timely and effective implementation of the adopted action plans, programmes and measures for the control of pollution²⁰.

B. Compliance control

Basis for action

6.13 Compliance with the provisions of MAP-Phase II, the Barcelona Convention and its Protocols (in particular the LBS and Dumping Protocols), and specifically with the decisions and recommendations adopted by the meetings of the Parties to the Convention²¹, is the key to successful environmental protection of the Mediterranean Sea. The most relevant decisions and recommendations pertinent to the abatement, prevention and control of pollution are:

- (a) the relevant targets of the Genoa Declaration, adopted by the Contracting Parties in 1985²², to be achieved as a matter of priority during the second decade of the Mediterranean Action Plan;

¹⁹ Regarding potential financial support for the implementation of the adopted measures, see paragraph 7.8.

²⁰ Article 13.3 of the Barcelona Convention (1995), and Article 10 of the LBS Protocol (1996).

²¹ Article 27 of the Barcelona Convention (1995).

²² Genoa Declaration. UNEP(OCA)/IG.56/5.

- (b) the specific action plans, programmes and measures adopted by the Contracting Parties in the context of the implementation of the LBS Protocol²³; and
- (c) the relevant decisions of the Contracting Parties and especially paragraph 6 of the Barcelona Resolution adopted by the Conference of Plenipotentiaries (Barcelona, 9-10 June 1995).

Objectives

6.14 The specific objectives of this programme element shall be:

- (a) to monitor, on a continuous basis, the implementation and to assess the effectiveness of the implementation of action plans, programmes and measures for the control of pollution adopted or recommended by the Contracting Parties;
- (b) to identify problems experienced by the Contracting Parties in the implementation of the action plans, programmes and measures, and formulate proposals that may assist in overcoming those problems²⁴; and
- (c) to keep the Contracting Parties regularly informed about the status of the implementation of the adopted action plans, programmes and measures²⁵.

Activities

6.15 The stated objectives shall be achieved through:

- (a) analysis and evaluation at a national, subregional or regional level of data and information generated by the Contracting Parties on the status of implementation of the adopted or recommended action plans, programmes and measures for the control of pollution²⁶;
- (b) compliance monitoring programmes²⁷ carried out by National MED POL Collaborating Institutions (see Section 4 and the Annex);
- (c) analysis and evaluation of data and information received through the National Coordinators for MED POL from national compliance monitoring programmes (see Section 4);

²³ The common measures adopted so far are included in MAP Technical Reports Series No. 95.

²⁴ Paragraph 17.25 (b) of Agenda 21.

²⁵ Paragraph 17.35 (b) of Agenda 21.

²⁶ Article 26 of the Barcelona Convention (1995); Articles 4, 5 and 6 of the Dumping Protocol (1995); and Article 13 of the LBS Protocol (1996).

²⁷ Article 12 of the Barcelona Convention (1995), and Article 8 of the LBS Protocol (1996).

- (d) target-oriented research in support of national compliance monitoring programmes²⁸; and
- (e) preparation of consolidated reports for the Contracting Parties on the status of the implementation of the action plans, programmes and measures, including recommendations on the ways and means to improve the efficiency of their implementation.

6.16 The type of data and information that will be expected from the Contracting Parties, may include, *inter alia*:

- (a) the status of the adopted or recommended action plans, programmes and measures (paragraph 6.13(b)) in relation to the relevant national legislation and national administrative procedures and practices²⁹;
- (b) information on the permits issued for dumping of waste³⁰;
- (c) the experience gained with the implementation of the action plans, programmes and measures for the control of pollution and dumping permits, and the permits provided for by the LBS Protocol;
- (d) the results of the time series of measurements and observations (see Annex) regarding the levels and effects of contaminants in media directly affected by the measures (e.g. effluent waters, recipient waters);
- (e) the major marine and land-based sources of marine pollution (including airborne) on the national territories, including coastal waters, and estimates of the amounts of contaminants reaching the marine environment from these sources; and
- (f) with regard to land-based pollution, information relevant to the monitoring of the status of the biological diversity, and on threats to specially protected areas, which may come from sources of pollution outside their control³¹.

Means of implementation

6.17 The Secretariat will coordinate all activities envisaged under the programme element. Close cooperation with and among the Contracting Parties and their institutions designated to participate in the programme element is the basic prerequisite for its successful implementation.

²⁸ Article 13.2 of the Barcelona Convention (1995), and Article 9 of the LBS Protocol (1996).

²⁹ Article 27 of the Barcelona Convention (1995) and Article 13 of the LBS Protocol (1996).

³⁰ Articles 5 and 6 of the Dumping Protocol (1995).

³¹ Article 21 of the SPA protocol.

6.18 Data and information on the status of the adopted or recommended action plans, programmes and measures, and on the experience gained with their application (paragraphs 6.16(a), (b) and (c)) will be provided to the Secretariat by the Parties to the Convention, or on their behalf by the designated National Coordinators for MED POL, without cost to the Trust Fund.

6.19 Data and information on the results of the time series of measurements and observations, and on the marine and land-based sources of pollution (paragraphs 6.16(d) and (e)) will be provided to the Secretariat by the Contracting Parties through the National Coordinators for MED POL. The costs involved are expected to be shared between the Trust Fund and the relevant national institutions on the basis of agreements between the Secretariat and the relevant national authorities (see Section 4).

6.20 Target-oriented research (paragraph 6.15(d)) will be based on research projects selected by the Secretariat in cooperation with the relevant United Nations specialized agency participating in the Programme. For such projects, research contracts will be signed by the Secretariat or agency and the National MED POL Collaborating Institutions, in consultation with the relevant National Coordinators for MED POL. The Collaborating Institutions may receive financial support from the Trust Fund to cover part of the cost of the research carried out by them.

6.21 Assistance shall be provided through the Secretariat to developing countries requesting training of their national experts, or technical advice or assistance (equipment, consumables and Data Quality Assurance³²) to their national institutions participating in monitoring the effectiveness of the implementation of pollution control measures and reporting on national compliance with these measures.

³² See paragraph 7.7 and the Annex.

7. SUPPORTING MEASURES

7.1 References have been made in Sections 5 and 6 of the present document to some of the measures supporting the substantive MED POL activities, but in view of their importance for the MAP as a whole, they are described in these sections of the document in a more comprehensive way.

A. Assistance (capacity-building)

Basis for action

7.2 MED POL-Phase III cannot be implemented in a meaningful way without a strong national institutional basis supported with adequate financial resources, equipment and experts. While the situation in developed countries of the Mediterranean region seems adequate to deal with the implementation of the MED POL Programme, the capacity of the developing countries will need further strengthening.

Objective

7.3 The objective of the programme element is:

- to facilitate the full participation of all Contracting Parties in MED POL, including the implementation of the action plans, programmes and measures for the control of pollution and the recommendations adopted by the Contracting Parties³³.

Activities³⁴

7.4 The stated objective shall be achieved by providing countries requesting assistance with:

- (a) technical advice on the most suitable institutional arrangements that may be needed for the implementation of the MED POL programme;
- (b) advice and technical assistance in all aspects of design and implementation of national MED POL programmes;
- (c) advice on legal³⁵, technical³⁶ and fiscal³⁷ policies, strategies, and practices that may contribute to the implementation of the action plans, programmes and measures for the control of pollution and targets adopted by the Contracting Parties;

³³ Paragraphs 17.6 (k), 17.9, 17.14, 17.17, 17.23, 17.35 (f), 17.38 (f), 17.40 and 17.104 of Agenda 21.

³⁴ References to the legislative authority for specific assistance measures are given in the relevant paragraphs of Sections 5 and 6 of the present document.

³⁵ E.g., review of the adequacy of existing national legislation, proposals for adjustments in national legislation, proposals for new legislation.

³⁶ E.g., clean production technologies, minimization of waste.

³⁷ E.g., user fees, charges for violating pollution control measures, pricing policies and practices, fiscal incentives, possible loans and grants from international financial institutions.

- (d) individual and group training (e.g. seminars, workshops) of national experts (administrators, technicians, scientists) in all subjects related to the MED POL Programme;
- (e) equipment and material donated to the National MED POL Collaborating Institutions;
- (f) guidelines, manuals, documents and reference publications relevant to the implementation of the MED POL Programme; and
- (g) assistance in maintaining the analytical equipment used in national pollution monitoring programmes.

Means of implementation

7.5 Provision of the assistance shall be coordinated by the Secretariat, involving as necessary the relevant RACs of MAP, the specialized agencies of the United Nations system, as well as other international and intergovernmental organizations and programmes ready to offer or provide such assistance. The cost of the assistance will normally be at the expense of the Trust Fund, but the Secretariat will also solicit direct bilateral assistance (without cost to the Trust Fund) from countries and financial institutions ready to provide such assistance.

7.6 Assistance may also be provided by the Secretariat to the MED POL National Coordinators needed to fulfil their role as defined in Section 4.

7.7 Activities related to Data Quality Assurance (DQA)³⁸ will continue to be provided to MED POL Collaborating Institutions through the appropriate United Nations specialized agencies. The DQA programme will include all the elements necessary to achieve good quality data. Such elements cover all aspects of the monitoring programme ranging from sampling to data interpretation. The DQA programme should be mandatory and form an integral part of each national monitoring programme (see Annex, paragraphs 10 and 11).

7.8 The implementation of MED POL may be eligible for financial support (loans or grants) from international or regional financial institutions and mechanisms on a regional or country basis. The Secretariat will explore the possibilities for such support and will assist interested and potentially eligible countries to formulate project proposals aimed at accessing these resources³⁹.

³⁸ Data Quality Assurance is a mechanism for ensuring that the quality of the data is sufficiently reliable for its intended application.

³⁹ The Global Environment Facility (GEF), the European Union and the World Bank's Mediterranean Environment Programme are at present the three most promising mechanisms that may support MED POL-related activities.

B. Data and information management⁴⁰

Basis for action

7.9 The nature and quality of data and information provided through MED POL is of crucial importance for the soundness of the scientific and technical rationale underlying the decisions of the Contracting Parties. Therefore, great emphasis should be placed on appropriate data and information management procedures and techniques.

Objectives

7.10 The management of MED POL data and information shall have a twofold objective:

- (a) to make available to the Contracting Parties on a continuous basis reliable data and the information required for the development and effective implementation of action plans, programmes and measures for the control of pollution; and
- (b) to assist all components of MAP, and the Coastal Area Management Programmes (CAMPs) in particular, with data and information on the sources, levels (concentrations), trends and effects of contaminants in the Mediterranean region.

Activities

7.11 The stated objectives shall be achieved through the following activities of the Secretariat:

- (a) collection of data and information resulting from MED POL activities;
- (b) quality control (validation) of collected data and information;
- (c) storage of validated data and information in appropriate databases maintained at the Secretariat or in the country concerned;
- (d) analysis and reduction, if appropriate, of the validated data at a national or regional level;
- (e) preparation of synthesis reports (evaluations) on general and specific MED POL related issues; and
- (f) distribution (exchange) of data, information and synthesis reports to the Contracting Parties and their subsidiary bodies, RACs, National Coordinators for MED POL, National MED POL Collaborating Institutions, meetings organized within the framework of MAP, and other individuals and organizations, as appropriate, and in accordance with the policy that will be adopted by the Contracting Parties (see paragraph 7.14).

⁴⁰ Data and information management in the context of this document is understood as involving acquisition, quality control, analysis, evaluation, storage, retrieval and exchange (dissemination) of data and information.

Means of implementation

7.12 The National Coordinators for MED POL and the National MED POL Collaborating Institutions shall be the primary source of data and information supporting the development and implementation of MED POL.

7.13 The collection, quality control, analysis and evaluation of the data and information will be carried out nationally with the help of the Secretariat if needed, or by the Secretariat (with the help of the relevant organizations of the United Nations system, outside experts, and *ad hoc* meetings of experts, as necessary), for data stored at the Coordinating Unit.

7.14 The Secretariat's databank will include only data useful for the establishment of trends. The Secretariat, with the assistance of relevant experts, will develop a proposal for data and information distribution policy to be submitted for adoption to the Contracting Parties. The guiding principle of that policy should be that access to the data and information received by the Secretariat will normally be free for the parties involved in MED POL.

7.15 The reports of the Secretariat to the Contracting Parties will be transmitted through the subsidiary bodies of the Contracting Parties.

C. Coordination and cooperation

Basis for action

7.16 MED POL, as one of the basic and most complex MAP activities, linked with virtually all other MAP activities, requires a well-coordinated approach in order to ensure the harmonious cooperation and interaction of, and inputs from, the various actors contributing to its implementation.

Objective

7.17 The objective to be achieved through the coordination of MED POL activities is:

- to ensure the full implementation of Contracting Parties' decisions relevant to MED POL through the highest degree of efficient cooperation among the Secretariat, national structures, international organizations, and individuals participating in the implementation of MED POL⁴¹.

Activities

7.18 The stated objective shall be achieved by:

- guidance provided directly or indirectly by the Secretariat to all parties involved in MED POL; and
- close cooperation among all parties involved in MED POL.

⁴¹ Paragraph 17.10 of Agenda 21.

Means of implementation

7.19 The Secretariat shall coordinate all MED POL activities, in close cooperation with the National Coordinators for MED POL⁴², the national MED POL Collaborating Institutions, the specialized agencies of the United Nations system, as well as other international and intergovernmental organizations ready to offer or provide support.

7.20 The Meeting of the MED POL National Coordinators, as the subsidiary body of the Contracting Parties, will continue to review periodically the progress of MED POL, evaluate its results and advise the Contracting Parties on the strategies to be followed for its implementation.

7.21 The Advisory Group of Experts for MED POL will advise the Secretariat and the Meeting of National Coordinators on the scientific and technical aspects of the design, development and implementation of the MED POL programme, as well as on the review of its accomplishments. The Group could be assisted, for specific subjects, by additional specialists.

7.22 The MED POL National Coordinators may establish *ad hoc* expert groups to advise them on specialized topics.

7.23 The coordination of the inputs from the specialized organizations of the United Nations system into MED POL will continue to be ensured through direct working level contacts with these organizations and periodic Inter-Agency Advisory Committee (IAAC) Meetings on MED POL.

7.24 The periodic meetings of the heads of RACs with the Secretariat will continue to be used to ensure: (a) the coordination between complementary activities of MAP implemented by the Secretariat and the respective RACs; and (b) the inputs of MED POL into activities carried out by RACs.

⁴² The modalities of cooperation are described in Section 4.

8. IMMEDIATE PRIORITIES FOR THE IMPLEMENTATION OF MED POL-PHASE III

8.1 In view of the fact that MED POL-Phase III encompasses a wide range of important activities that require urgent implementation, the MED POL budget should be increased substantially. However, since such an increase does not appear feasible through the MED Trust Fund, it is considered necessary to seek outside funding (see paragraph 7.8). Until such outside assistance is possible, it is recommended that, during the initial stage of its implementation, the MED POL Programme concentrate on a number of priority activities.

8.2 The following activities (not in order of priority), which are in line with the Priority Fields of Activities adopted by the Contracting Parties (Barcelona, 1995), are recommended:

- (a) Formulation, including the setting of priorities, and implementation of regional, subregional and national action plans, programmes and measures for the control of land-based pollution.

The implementation of the LBS Protocol will be the cornerstone of MED POL-Phase III. This implementation will be based on national and regional action plans, programmes and measures. In order to formulate such action plans, programmes and measures, MED POL-Phase III will establish the priorities in accordance with those set out in the annexes to the LBS Protocol, taking into account the characteristics of substances provided in Annex I to the Protocol.

- (b) Formulation and implementation of a programme of coastal zone trend monitoring on a regional basis.

On the basis of the experience gained through MED POL-Phases I and II and in view of the objectives of MED POL-Phase III, national monitoring programmes will have to be designed or redesigned in order to satisfy national needs and enable the results of the programme to be used as a management tool for controlling marine pollution. A number of fixed coastal stations from the national programmes will be selected for inclusion in a regional monitoring network for the establishment of trends in the Mediterranean. This programme will provide information that can be used for the assessment of the overall quality status of the Mediterranean Sea, as well as for the effectiveness of control measures taken.

- (c) Identification of sources (especially major "hot spots") and assessment of loads of pollution.

The preparation of inventories of point and non-point sources of pollution, particularly the land-based sources, and the monitoring of the pollution loads reaching the Mediterranean from these sources, is considered a high priority since such information is necessary for making management decisions. Within this context, a list of major pollution "hot spots" in the Mediterranean will be prepared and relevant action plans (with economic aspects and timetables) for reduction and elimination of pollution will be developed and implemented.

- (d) Assistance to countries for the formulation, development and implementation of national monitoring programmes.

Although considerable progress was achieved during MED POL-Phase II, in many cases, national monitoring programmes have not yet produced the expected results, either because the programme was not designed properly or was not implemented fully (temporal and spatial gaps) and the data were not of the required quality. Through MED POL-Phase III, assistance will be provided for the formulation of appropriate monitoring programmes to developing countries requesting it, as defined in paragraph 7.4.

- (e) Assistance to countries (including capacity-building) for the implementation and enforcement of adopted pollution control measures.

It is clear that without the proper implementation of the control measures the success of the programme will be jeopardized. In accordance with paragraph 6.12, assistance will be provided to facilitate the implementation and enforcement of measures to developing countries requesting it as defined in paragraph 7.4.

- (f) Eutrophication and biological effects to be considered as priority subjects for research.

From MED POL-Phase II results it appears that eutrophication is becoming a major problem at regional level. As a result, special attention should be given to this problem and extra efforts are required for its solution. Being very complex and involving a number of processes, more research is required to understand its causes, effects, geographical distribution and trends and eventually propose remedial action.

The Contracting Parties (Antalya, 1993) have decided to introduce monitoring of biological effects in the MED POL Programme. This is not possible unless reliable techniques that can be used routinely are developed. Research is required to assist in the final selection of the techniques and in developing and testing the methodologies.

ANNEX

**MONITORING OF THE LEVELS AND EFFECTS OF CONTAMINANTS
IN THE CONTEXT OF MED POL-PHASE III**

1. Two basic types of monitoring are identified within the framework of the MED POL-Phase III Programme: compliance and trend monitoring. Surveys will also be carried out in order to complement the monitoring data and facilitate decision-making for management purposes.
2. Compliance monitoring is defined as the collection of data through surveillance programmes to verify that the regulatory conditions for a given activity are being met e.g. concentration of mercury in effluents. In the case of identifying an instance of non-compliance, appropriate enforcement can be established which can be escalated until compliance is achieved.
3. Trend monitoring is defined as the repeated measurement of concentrations or effects over a period of time to detect possible changes with time. This type of monitoring will provide information that can be used for the assessment of the state of the environment and the effectiveness of pollution control measures taken. If the effectiveness of measures is deemed inadequate, additional activities may be initiated such as the formulation of new measures or the revision of existing ones, etc.
4. Depending on the matrices and parameters included in the programme, monitoring will be carried out for the following purposes:

Compliance monitoring

- **Compliance monitoring of health-related conditions** (eg. sanitary quality of bathing areas and waters used for aquaculture, quality of seafood). This type of monitoring has a national significance, but data may also be used for regional assessments;
- **Compliance monitoring of effluents** to determine whether the adopted common measures concerning concentrations of contaminants in effluents (e.g. mercury, cadmium) are complied with; and
- **Compliance monitoring in "hot spot" areas** to determine whether the environmental quality objectives or limit values set are complied with (e.g. DDT in water).

Trend monitoring

- **Coastal zone trend monitoring**, through a regional network of selected fixed coastal stations, of parameters that contribute to the assessment of trends and the overall quality status of the Mediterranean Sea. As explained under Section 8, this type of monitoring will be carried out on a regional basis;
- **Trend monitoring in "hot spot" areas** (intensively polluted areas) and high risk areas that are likely to become heavily polluted, are subject to harmful seasonal phenomena such as algal blooms, or where control measures have been taken. This type of monitoring will be designed as necessary at the subregional level, and will be carried out on a national basis, and the data will be utilized for taking management decisions at a local level, including the assessment of the effectiveness of the control measures taken;

- **Trend monitoring of loads** (e.g. from land-based sources of pollution in general or from identified sources, pollutants transported by atmosphere, pollutants carried by rivers) and assessment of loads originating from non-point sources. Data from this type of monitoring will be utilized locally but also for regional assessments; and
 - **Trend monitoring of biological effects** at different organizational levels, including molecular, cellular, physiological, behavioural, community and ecosystem levels, can also be used as an early warning system. This type of monitoring can be included in national monitoring programmes as well as in the regional trend programme.
5. In addition, surveys will be carried out to complement the monitoring data:
- surveys of health-related effects (e.g. occurrence of illnesses in bathers exposed to contaminated waters and sand and in consumers of seafood) will be carried out on a routine basis;
 - surveys of point and non-point land-based sources of pollution needed for the development, compilation and maintenance of inventories, will be carried out; and
 - baseline and trend surveys through international and multinational cruises of the whole Mediterranean Sea will be conducted at periodic intervals (once every five or ten years) in order to contribute to the assessment of the overall quality status of the Mediterranean Sea.

Matrices to be monitored

6. The matrices (one or several) included in monitoring programmes will depend on the objective and purpose of the monitoring. The most common matrices which could be included in monitoring programmes are:
- (a) effluents reaching the marine environment from industrial plants, municipal sewerage systems and agriculture drainage channels;
 - (b) waters, sediments and biota (which also include individuals, populations and communities of marine mammals and sea birds) of marine coastal zones and estuaries which are, or are likely to be, under the direct impact of identifiable point or non-point source(s) of pollution;
 - (c) atmosphere through which pollutants may enter the marine environment and thus affect its quality; and
 - (d) humans who may be affected by pollutants through direct or indirect exposure to polluted marine media, or products (e.g. food) derived from such media.

Parameters or indicators to be monitored

7. Parameters or indicators to be monitored will vary from case to case, i.e. will be site and problem specific. They may include one or several of the following types of physical, chemical or biological parameters or health-related indicators:
- physical and chemical properties of the monitored abiotic media;
 - the concentration of a specific chemical compound or group of compounds in a given matrix;

- marine ecosystem health on molecular, cellular, individual organism, community and ecosystem levels (e.g. bioassays, teratogenic or genetic changes if appropriate, biomarkers, histopathology, physiology, population structure);
 - sanitary quality of media used by people (e.g. microbiological quality of bathing waters), or for food production (e.g. quality of waters used for and by aquaculture);
 - ecological effects of coastal aquaculture (land-based and marine facilities);
 - health effects on humans exposed to contaminated media (e.g. bathers) or products (e.g. contaminated shellfish) derived from such media;
 - marine litter.
8. In case of compliance monitoring, the selection of the parameter(s) to be monitored is determined by the pollution control measure whose compliance is being monitored.

Programme design⁴³

9. For both compliance and trend monitoring, it is essential that the question being posed is both testable and specific, i.e. within a statistical context. The question must relate to a specific environmental compartment, i.e. water, suspended material, sediment or biota. The sequence then is:

- to identify meaningful levels of change and the confidence limits of that change that are to be detected (e.g. with what precision can a 20 per cent loss in number of species of a benthic sediment-living community be detected?);
- to obtain knowledge of spatial and temporal variability of the element being sampled from a desk study or pilot study;
- application of power analyses is essential in order to rationalize the programme⁴⁴;
- selection of elements of the programme taking into account logistic constraints⁴⁵;
- define data quality objectives and decide *a priori* on the statistical methods to be applied in analysing the data; and
- to select sampling sites and sampling frequency based on the foregoing information.

Data Quality Assurance Programme

10. Following the design of a scientifically-based national monitoring programme, a Data Quality Assurance (DQA) programme is required to ensure data reliability. The required quality

⁴³ See Guidelines for monitoring chemical contaminants in the sea using marine organisms. UNEP Reference Methods for Marine Pollution Studies No. 6.

⁴⁴ See Peterman, R.M. and M'Gonigle, M., Statistical Power Analysis and the Precautionary Principle, Marine Pollution Bulletin, Vol. 24, No. 5, pp. 231-234, 1992.

⁴⁵ See also new experimental designs (Underwood, Aust. J. Mar. Sci. 1993).

assurance must address all aspects of the programme, including:

- trained staff;
- appropriate facilities, sampling and measurement equipment and other consumables;
- regular calibration, maintenance, and servicing of the equipment;
- sampling that conforms to sampling design (see paragraph 9);
- sample handling procedures, including, for example, transportation, preservation, storage, tissue dissection, bone grinder, homogenization, sub-sampling (sub-sampling includes all steps up to the measurement);
- regular checks of accuracy and precision of routine measurements, by analyses of appropriate reference materials (when available) and the documentation of the results on control charts;
- external quality assessment (e.g. participation in intercomparison exercises);
- standard operating procedures (written protocols with precise descriptions of all elements of the measurements and quality control procedures);
- record of all calculations such as data translation and transcriptions prior to final documentation (record books and/or computers);
- data evaluation procedures (e.g. converting data into a report).

11. The results obtained by sampling, measurement and observation must be of adequate quality not only analytical (accuracy and precision) but also meet the requirements of the objectives⁴⁶ and be comparable on a Mediterranean-wide basis. Failure to include DQA information with the submission of monitoring data will mean that the data may not be included in the MED POL database and therefore will not be considered in the overall evaluation. The results must be reported to the Secretariat according to agreed formats and schedules, in order to satisfy the reporting requirements. The Secretariat will assist countries in the interpretation of data.

⁴⁶ The experience with quality assurance programmes, largely based on the practices of MED POL, is described in *Contaminant Monitoring Programmes using Marine Organisms: Quality Assurance and Good Laboratory Practice* (Reference Methods for Marine Pollution Studies No.57, UNEP, 1990).