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List of Acronyms

AoC -	Areas of Concern
BAT -	Best Available Technology
BB -	Baseline Budget
BEP -	Best Environmental Practice
BOD -	Biochemical Oxygen Demand
BP/RAC -	Blue Plan / Regional Activity Centre
Cd -	Cadmium
Cr -	Chromium
CP/RAC -	Clean Production / Regional Activity Centre
CPs -	Contracting Parties
CT -	Clean Technology
Cu -	Copper
DSS -	Decision Support System
EQC -	Environmental Quality Criteria
EIA -	Environmental Impact Assessment
EU -	European Union
FAO -	Food and Agricultural Organization of the United Nations
FFEM	Fond Français pour l'Environnement Mondial
GEF -	Global Environment Facility
GIS -	Geographic Information System
GPA -	Global Programme of Actions to Address Pollution from Land-based Activities
HCB -	Hexachlorobenzene
Hg -	Mercury
HM -	Heavy Metals
ICAM -	Integrated Coastal Area Management
ICS/UNIDO	International Centre for Sciences and High Technology of the United Nations
ICZM -	Industrial Development Organisation
IRBM -	Integrated Coastal Zone management
LBS -	Integrated River Basin Management
LBSP -	Land Based Sources of pollution
MAP	Protocol on Land Based Sources of pollution
MED POL -	Mediterranean Action Plan
MED UNIT -	Programme for the assessment and control of pollution in the Mediterranean
METAP	the Coordinating Unit of the Mediterranean Action Plan
MOED -	Mediterranean Environment Technical Assistance Programme
NAP -	Minimization Opportunities Environmental Diagnosis
NDA -	National Action Plan
NGO -	National Diagnostic Analysis
NDA -	Non - Governmental Organization
OBB -	National Diagnostic Analysis
OECD -	Observable Baseline Budget
OD -	Organization for Economic Cooperation and Development
PAHs -	Operational Document
PAP/RAC -	Polycyclic Aromatic Hydrocarbons
Pb -	Priority Actions Programme / Regional Activity Centre
PCB(s) -	Lead
POP(s) -	polychlorobiphenyls
PPP -	Persistent Organic Pollutants
PR -	Pollution Prevention Plan
PRTR -	Production Ratio
SAP -	Pollutants Release and Transfer Register
SPA/RAC	Strategic action programme
TBDA -	Specially Protected Area / Regional Activity Centre
TPB -	Transboundary Diagnostic Analysis for the Mediterranean sea
Zn -	Substances Toxic, Persistent and liable to Bioaccumulate
WB -	Zinc
WHO -	World Bank
WW -	World Health Organization
	Waste Water

EXECUTIVE SUMMARY

In conformity with the recommendation of the Eleventh Ordinary Meeting of the Contracting Parties (Malta, 1999) to MAP/MED POL to start the process of updating the Strategic action programme (SAP) by taking into account developments in the scientific, technical, economic, environmental and legal fields in order to ensure effective implementation of the SAP, the Secretariat prepared the present document entitled "Operational Document for the implementation of the Strategic action programme to address Pollution of the Mediterranean Sea from land-based activities", which aims at guiding the Mediterranean countries in the long-term implementation of the SAP.

In preparing the document, the Secretariat took into account its objectives, target audience and expected use as well as the technical nature of targets and activities envisaged by SAP, their scientific base, complexity and long term character.

In the intention of the Secretariat, the document proposes a concise, transparent and cost effective strategy and work plan, flexible enough to be applicable in the region under differing conditions prevailing in individual countries, and which could ensure a relative homogeneity in the implementation processes of the SAP.

Part I of the document describes the conceptual framework for the implementation of the SAP. It includes objectives, principles and approaches which take into consideration the lengthy period of the implementation of the SAP as well as the different levels of socio-economic development, of technical, scientific and administrative competency, of different cultural values and environmental priorities prevailing in the region. It also describes the activities to be implemented, their work plan and timetable.

Part II describes the institutional arrangements that are suggested in order to increase the prospects of success of the SAP. It includes a description and definition of the nature and the role of the bodies that could coordinate the SAP activities at the national and regional levels and the "support structures" (the SAP incubators) that could ensure the successful dissemination and assimilation of the tasks by the local stakeholders. The need to monitor the progress of all the activities that are being carried out in each country is also taken into account as well as the evaluation of the outputs. The document also takes into full consideration the need to make use as much as possible of the existing bodies and structures both at the regional and the national levels and proposes new bodies only when strictly necessary. While the proposed structures are to be considered flexible and adaptable to the existing situations, the roles and the functions that should ensure a proper coordination and implementation of the activities are considered essential and should be agreed upon.

Part III examines the original SAP structure, chapter by chapter, and indicates how and when the main activities of the SAP could be implemented by the countries or by the Secretariat with the aim to reach the objectives and the goals of the Programme within the agreed time frame. However, when dealing with the expected pollution reductions (see Chapter "Industrial Development"), more emphasis is given to the discussion on the approach and methodology which is proposed in order to meet the agreed objectives, rather than to the review of the specific target dates which may be still left for discussion when adopting biennial work plans at each Contracting Parties Meeting.

In particular, the document proposes to consider a step-by-step mechanism for the pollution reductions envisaged in the SAP, as follows:

- identification of a national baseline emission budget with reference to the year 2003 for each SAP target pollutant;
- identification of the ratio “release/production” for each targeted pollutant in order to track the pollutant reduction for individual activities;
- implementation of BEP and BAT as part of a Pollution Prevention Plan in industrial sites involved in the SAP process;
- implementation of Environmental Impact Assessment (EIA) for all new projects related to the SAP targets and objectives.

As to the reduction of municipal pollution (see Chapter “Urban Development”), considering that the SAP does not tackle measurable targets, it is proposed to consider that:

- the quality of any urban effluents discharged into the sea should be in compliance with the existing national standards or, as appropriate, with any relevant standards provided by competent regional or international bodies or organizations such as UNEP/MAP, WHO, EU, etc.;
- the Urban Solid Waste Management system (USWM) implemented under the SAP activities should be compatible with the guidelines that would be provided by the Secretariat or, as appropriate, any relevant USWM system;
- the quality of the ambient air should be in compliance with the national Ambient Air Quality Standard or, as appropriate, with WHO guidelines for ambient air quality.

PREFACE

This document was prepared by MAP/MED POL, as part of the preparatory activities for the implementation of the Strategic Action Programme to Address Pollution from Land-based Activities (SAP).

The Strategic Action Programme was adopted by the Tenth Ordinary Meeting of the Contracting Parties to the Barcelona Convention, held in Tunis in 1997. The programmatic basis for its formulation was the Global Programme of Actions to Address Pollution from Land-based Activities (GPA), adopted in Washington in 1995 as well as the amended Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-based Sources and activities, signed by the Contracting Parties in 1996.

The main objective of SAP is to promote and provide support to the Mediterranean countries for the formulation, adoption and implementation of relevant national plans, as well as a scientifically-based long-term programme of targets to be achieved and actions to be implemented at national and regional levels. In addition to activities directly addressing pollution, the Programme envisages the implementation of respective capacity building actions, provision of external support according to available sources, implementation of the participatory principle, and of procedures for monitoring, evaluation, reporting, feedback information and readjustments. Due to the complexity and significance of the targets and actions envisaged, as well as the resulting financial, institutional and organizational implications, the implementation of SAP requires careful planning, harmonization and integration at the national and regional levels.

The formulation of comprehensive and realistic National Action Plans (NAPs) to address pollution from land-based activities, based on the agreed principles and targets, is the major national instrument for the implementation of SAP.

Taking into the account the above, the need was felt to prepare a guiding document, presenting concrete operational aspects and recommending arrangements and measures needed for the process of implementation of SAP. The document, as recommended by the Contracting Parties in Malta in 1999, takes into consideration possible future developments which may be taking place at the regional and national levels in the technical, scientific, legal and policy fields.

Accordingly, the present document, structured in three Parts, elaborates the operational aspects of the implementation of SAP. Part I includes the conceptual framework, strategic actions, phasing and workplan. Part II presents the needed/recommended institutional arrangements. Part III presents baseline criteria and technical instructions and information, mostly related to pollution reductions and sources of pollution.

The first draft of the present Operational Document (UNEP(DEC)/MED WG.185/3) was presented to Government-designated Experts at the Consultation Meeting to Review the Operational Aspects of the Implementation of the SAP held in Catania on 28-30 March 2001. The Meeting reviewed the content of the document and suggested a number of minor modifications which were taken into account by the Secretariat when preparing the present version of the document. The present document is expected to be reviewed by the MED POL Coordinators and recommended to be transmitted to the Contracting Parties for formal approval.

PART I - THE CONCEPTUAL FRAMEWORK

1. ELEMENTS OF THE OPERATIONAL DOCUMENT

1.1 Objectives

The main objective of the Operational Document is to provide assistance to the Mediterranean countries, aiming at the implementation of SAP and to recommend strategies and procedures for actions at the national level by:

- identifying the actions needed for a step-by-step implementation of SAP, including their sequence and the resulting workplan and timetable,
- elaborating proposals for a convenient and efficient institutional set up which could ensure the sustainability of the implementation of SAP, and
- providing the Mediterranean countries with scientifically-based technical guidelines and information for the implementation of activities envisaged by SAP.

In addition, the Operational Document identifies activities at the regional level to be implemented in order to support, assist and harmonize the national activities by interrelating and integrating them.

1.2 Principles and approaches

When elaborating the document, the following criteria were applied:

- principles and standard procedures of project management, in particular those related to large and complex multilateral projects and programmes
- the actual MAP institutional arrangements, rules of procedure and formats, the arrangements and procedures in individual countries, and their interrelation with MAP
- technical instructions and information were elaborated so as to allow understanding, formulation and planning of national and sub national activities; the detailed instructions will be elaborated as part of the capacity building programme
- the GEF project "Determination of priority actions for the further elaboration and implementation of the Strategic Action Programme for the Mediterranean Sea", to be implemented in the 2001-2003 period, is to be understood as a capacity building tool, to help the countries increase their specific capacities and elaborate the respective NAPs

In addition, the following approaches were taken into account:

- transparent and as simple as possible procedures and arrangements were recommended, likely to be applicable in the majority of countries, and in particular in the developing ones
- new institutional / organizational schemes were envisaged only where considered indispensable
- other, adapted solutions to be applied by individual countries, if needed and as appropriate
- Terms of Reference (TOR) for the elaboration of major national documents envisaged by SAP are to be prepared timely and used as reference for the elaboration of respective training activities
- the national teams / bodies to implement the activities and/or prepare the documents envisaged by SAP are nominated by national authorities on the basis of respective TOR prepared by MED POL and jointly agreed upon.

The Operational Document was formulated using as inputs:

- MED POL Phase III Programme
- the 1996 revised LBS Protocol
- the SAP document and the relevant conclusions of the Contracting Parties
- national and regional analyses of the Hot Spots and Sensitive Areas
- the Transboundary Diagnostic Analysis for the Mediterranean Sea
- the GEF Project document "Determination of priority actions for the further elaboration and implementation of the Strategic Action Programme for the Mediterranean Sea", and
- the contextual framework provided by the Global Programme of Actions to Address Pollution from Land-based Activities (GPA).

Target groups and use of the document

The Operational Document is intended to be used by:

- responsible national authorities and bodies
- National MAP Focal Points (NFPs)
- National MED POL Coordinators
- all national SAP related institutional arrangements, national teams and institutions to be involved in the process
- all MAP components, teams, experts and professionals involved in the long-term implementation of SAP

In applying the Operational Document at the national level, its content should be interpreted in a flexible way, taking into account the relevant national conditions and specificities, respecting at the same time as much as possible the targets and activities envisaged by SAP.

It is expected that the effective application of an Operational Document by countries could create prerequisites and strengthen the prospective for further external support during the implementation phase of National SAP Action Plans (NAPs).

2. ACTIVITIES, PHASING AND WORKPLAN

2.1 Milestone activities

All SAP targets and activities are summarised in Annex I to this document. However, it is necessary to identify some essential elements of the operational process which can be considered as milestone activities envisaged by SAP which determine the phasing of the SAP implementation process. These activities are:

- meeting the prerequisites for the implementation of the SAP
- updating of National reports on Hot Spots and Sensitive areas
- preparation of National Diagnostic Analyses (NDA)
- preparation of sectoral programmes
- preparation of National Action Plans (NAP),
- gradual, step-by-step implementation of NAPs,

The following activities are also envisaged:

- assistance and support to be provided throughout the process.
- review of the implementation process (every 5 years)
- review of the NAPs and guidelines (every 5 years)
- SAP update according to upcoming international conventions and programs (every 5 years)

When analyzing the strategy for the implementation of these activities, the national and regional levels should be distinguished.

2.1.1 Activities at national level, envisaged by SAP

Meeting the prerequisites

These activities belong to the final part of the initiation phase of the entire SAP process and are related to:

- analysis and approval of the principles of implementation of the SAP presented in the Operational Document,
- their adaptation, if needed, according to national conditions, and
- making the needed institutional arrangements.

Updating of National reports on Hot Spots and Sensitive areas

These reports, prepared earlier as part of the SAP, should be taken into consideration as basis for further actions. Due to the need for more accurate and precise related data and information for the preparation of NAPs, their updating, in particular regarding estimated associated costs, prioritizing, and a more in-depth elaboration are recommended by SAP.

Preparation of National Diagnostic Analyses (NDA)

NDA is defined by SAP as one of two major inputs for the preparation of each NAP. The basic objective of NDA is to identify and assess the national conditions and issues, including: problems, contaminants, physical alterations and destruction of habitats, sources of degradation, significance of impacts, and areas of concern. In addition to the general information about NDA presented in SAP, more specific Terms of Reference will be prepared and discussed at a regional workshop.

Preparation of sectoral programmes and other analyses

Sectoral programmes should be prepared, starting in the year 2001, by small national teams, for all the sectoral groups defined by SAP:

- sewage management
- urban solid waste
- air pollution from mobile sources
- pollution caused by Hg, Cd, Pb
- organohalogens: halogenated aliphatic hydrocarbons, halogenated aromatic hydrocarbons, chlorinated phenolic compounds, organo halogenated pesticides
- wastewater and solid waste from industrial installations, which are sources of organics.

Further to the technical instructions and recommendations presented in the Part III of this document, detailed instructions for the elaboration of these programmes will be prepared and presented timely.

In addition, the following issues envisaged by SAP, should be analyzed and elaborated:

- updating and adoption of national regulations on sewage discharges
- establishment of systems for authorization for works likely to cause degradation
- phasing the use of nine pesticides
- prohibition of manufacture, trade and new uses of PCBs
- ratification / applying of the Hazardous Waste Protocol, and
- ratification of the LBS Protocol.

Preparation of National Action Plans (NAP)

National Action Plans should be developed, reviewed and adopted. Their preparation should start after the completion of the sectoral programmes. Targets and activities identified by SAP should be respected as much as possible.

The basic objectives of NAPs are to:

- formulate principles, approaches, measures, priority actions and deadlines for the implementation of SAP within the national framework
- prepare the resulting Investment Portfolio (IP)
- define the baselines and the priority activities for issues/actions of a transboundary nature
- identify NGOs' and stakeholders' role in the process, and
- different monitoring and reporting system

It is understood that NAPs should be prepared on the basis of national sectoral programmes. Further to the general instructions on preparation of NAPs, included in SAP, detailed instructions and Terms of Reference will be prepared timely and presented as part of the respective training activities.

When preparing NAPs, national teams are expected to apply sustainable, pragmatic and integrated environmental management approaches, using the methodologies of Integrated Coastal Area Management (ICAM), of Integrated River Basin Management (IRBM), land- and sea-use planning as tools, the Pollution Prevention Plans (PPP) for the use of Best Available Technologies (BAT) and Best Environmental Practices (BEP).

The process of preparation of NAPs, and of sectoral programmes, will be supported by MAP/MED POL and the GEF SAP project. Training and technical assistance will also be provided by the competent MAP RACs, in particular by CP/RAC, PAP/RAC and SPA/RAC, in close coordination with MED POL.

Once prepared, NAPs will have to be officially adopted by the relevant national authorities and bodies, in order to ensure the necessary legal basis, resources and institutional arrangements for their implementation.

The process of adoption of NAPs is country specific. The official adoption of the respective NAP will be one of prerequisites for international funding and assistance.

Monitoring, evaluation and reporting on the progress of the adoption procedure should be included in the NAPs as part of the overall procedure.

Implementation of NAPs, as a long term programme

The implementation of the adopted NAPs will be supported by national measures and actions and international assistance, in line with the criteria of interested donor organizations / programmes and other relevant international organizations. MAP/MED POL will act as the relevant MAP responsible body and as a clearing house.

2.1.2 Activities at regional level, identified by SAP

As a follow up to the targets at regional level, in chapters 6 - 9 the SAP identifies the respective regional activities to be implemented in order to achieve those targets.

They include 70 different activities, which may be grouped as follows:

- a) preparation of guidelines for selected priority issues
- b) preparation of guidelines for applying BAT and BEP
- c) preparation and adoption of environmental quality criteria and/or standards and common measures
- d) promotion and support for exchange of information and experience on selected priority issues
- e) preparation of information documents and reports
- f) development of programmes on ICAM, IRBM
- g) provision of assistance (preparation of projects seeking international funding, training)
- h) participation in programmes related to SAP, implemented by other international organizations:
 - on sustainable agriculture and rural development (FAO)
 - on implementation of Pesticide Risk Reduction Project (OECD/FAO)
 - developing PRTRs.

It is understood, as defined by SAP and relevant MED POL documents, that the above regional activities will be implemented and harmonized with the respective national ones.

2.1.3 Other activities at regional level, related to SAP

The activities of MAP/MED POL and of other international actors involved also result in additional regional activities closely related to SAP and directly and indirectly contributing to its implementation. These activities are:

- a) general guidance and coordination
- b) provision of scientific, technical, organizational and logistical assistance and support, including streamlining of assistance and support through other activities or projects (MAP RACS, MEDPOL, GEF, the Euro-Mediterranean cooperation and other EU programmes, FFEM, RETAP, etc.)
- c) definition and establishment of regional institutional arrangements and provision of information, and
- d) monitoring, evaluation and reporting to CPs on progress of SAP implementation.

2.2 Phasing of the SAP implementation process

The phasing of the SAP implementation process is based on a step-by-step approach in which the activities are listed respecting the technical logics, interdependence and implementability, and securing the needed harmonization of the national and regional levels.

The phasing of the SAP implementation process is described in Table 1 and in a simplified flowchart (Fig. 1).

Table 1

Phasing of the SAP implementation process

Phase	Milestone activities	Note
<u>Prerequisites</u>		
	- (MED POL Phase III) - LBS Protocol	(Adopted) (Signed, not yet entered into force)
	- National Reports on Hot Spots and Sensitive areas - SAP	(Prepared) (Prepared, approved)
1. <u>Initiation</u>		
	- Operational Document, draft - Operational Document, revised draft	MED POL MED POL Coords., MAP NFPs
	- Approved Operational Document	CPs
2. <u>Formulation of NAPs</u>		
Preparation of inputs	- Updating of National reports on Hot Spots and Sensitive areas - Preparation of NDAs - Preparation of sectoral programmes	(National authorities and MED POL) " "
Preparation of NAPs	- Preparation of NAPs - Adoption of NAPs - Adoption of list of priorities - Adoption of workplan and timetable	" (to be defined by national authorities) (national authorities) "
3. <u>Implementation of NAPs</u>		
	- Gradual implementation of NAPs according to list of priorities - Provision of assistance and support	(According to NAP and targets defined by SAP and NAP) (National support, MED POL and international sources)

<u>4.Review and Update processes</u>	<ul style="list-style-type: none"> -fifth year review of SAP implementation process -fifth year update of the SAP according to the development international conventions 	(MED POL and national authorities)
<u>5. Transversal activities</u>	<ul style="list-style-type: none"> - Participatory activities - Monitoring, evaluation, reporting - Readjustment of NAP, if needed 	<p>(Following SAP and NAP provisions)</p> <p>(Targets identified by SAP and NAP)</p> <p>(According evaluation of results and reports)</p>

2.3 Framework workplan and timetable

The long-term character of the SAP and the fact that achievement of its individual targets in each country still has to be defined in each NAP, impose limitations when trying to design a general workplan and timetable for the implementation of SAP.

Nevertheless, a framework timetable is presented in the SAP when defining deadlines for the achievement of individual targets. The tables presented in Annex I to this document are an elaboration of that timetable, disaggregated per issues and individual targets. Having been adopted at the regional level by adopting the SAP, it is recommended to use these Tables as guidance when defining temporal aspects within NAPs.

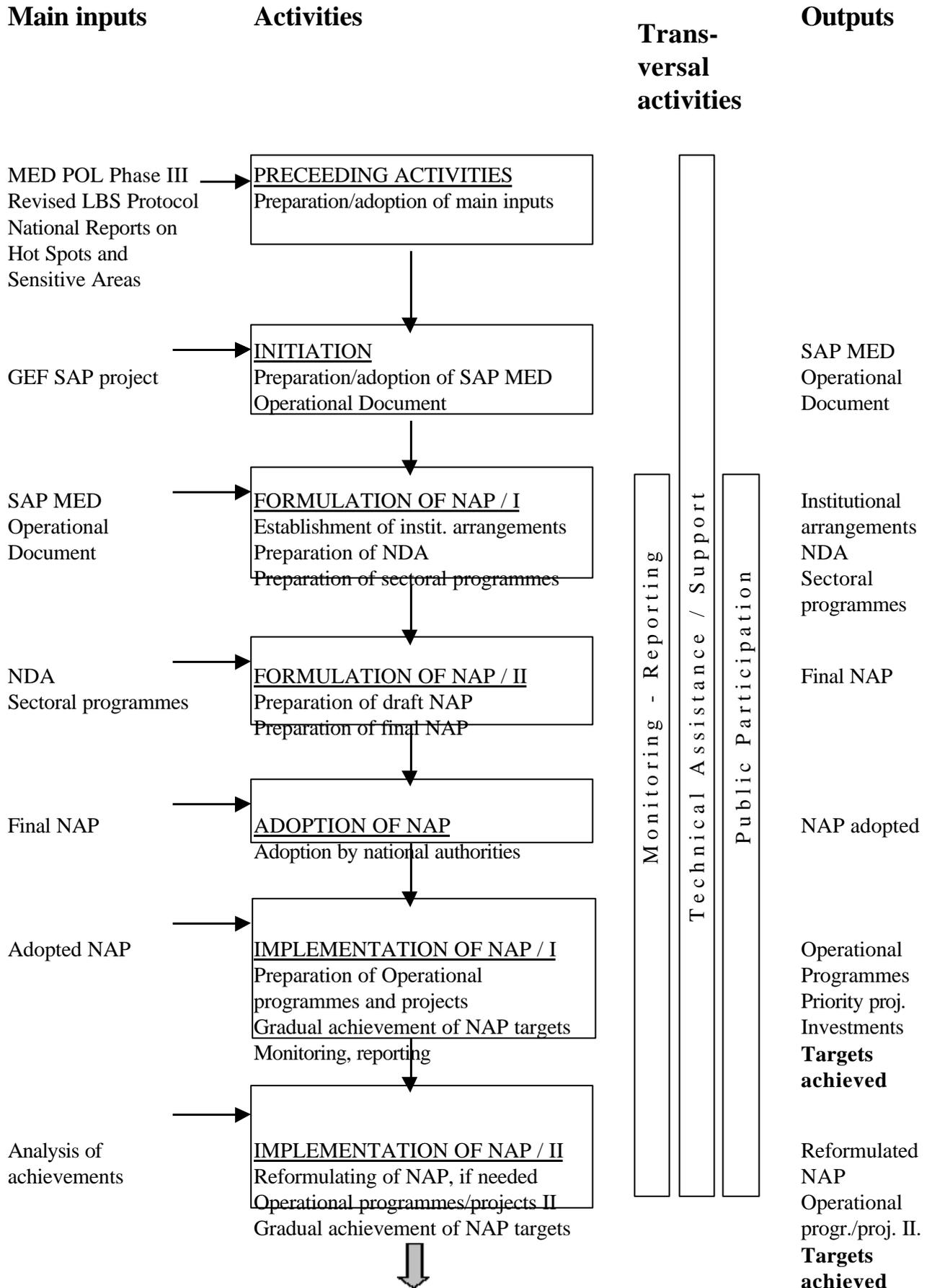


Figure 1 Flowchart of the SAP Implementation process

In addition, a tentative overall workplan and timetable concerning the Initiation phase and Preparation of NAPs, is presented in Table 2 below, to be discussed at the regional and national levels.

Table 2

Tentative workplan and timetable for the implementation of SAP

No. Phase/stage	Activity	Deadline
1. Initiation	Preparation of draft Operational Document	Feb. 2001
	Presentation, discussion, final version of document	Feb-June 2001
	Approval by CPs	Nov. 2001
	Establishment of respective institutional arrangements, at regional level at national level	Dec. 2001 June 2002
2. Formulation of NAPs		
a) Preparation of inputs	Updating of hot spots and sensitive areas	Dec. 2002
	Provision of instructions and assistance	continuous
	Preparation of NDAs	Dec. 2002
	Preparation of sectoral programmes	Dec. 2002
	Participatory activities	continuous
b) Preparation of NAPs	Preparation of NAPs	Sept. 2003
	Reporting to CPs	Nov. 2003

Adoption of NAPs and the following stages to be defined by each NAP, respecting targets defined by SAP and NAP

PART II - THE INSTITUTIONAL FRAMEWORK

1. THE INSTITUTIONAL ARRANGEMENTS

1.1 Basic considerations

Institutional arrangements are crucial elements of any complex programme. In case of SAP, its specific complex, multidisciplinary and long term character, and the resulting heavy financial implications, pose high requirements on the needed institutional arrangements. Poor results or failure of a number of large national or international programmes in most cases have in the past been attributed, at least partly, to inadequate institutional arrangements applied.

With regard to SAP and this Operational Document, two aspects are considered: general requirements for institutional arrangements of large programmes, valid also for the SAP, and the specific aspects of SAP implementation.

1.1.1 General requirements for large programmes' institutional arrangements

The following should be considered as a non exhaustive list of requirements. In principle, the institutional arrangements for large programmes should be:

- workable, logical and transparent, with well defined responsibilities, competencies, interrelations and flows of communication and information
- efficient and cost-effective
- complying and compatible with the broader legal, administrative and institutional framework
- capable to provide for multidisciplinary, and integration at horizontal and vertical levels, including all actors, disciplines, decision making and implementing sectors and levels
- complying with the principle of participation, including all relevant stakeholders, the affected and/or interested public, NGOs, the scientific community
- flexible enough to undergo the adjustments during the implementation process, according to changing conditions and needs (for long term projects)
- capable to include levels appropriate to the "weight" of the project; larger and "heavier" the project the higher level of membership to be secured
- supported / assisted / operated by competent, capable and fully available decision makers / membership / staff; the best designed arrangement will fail would this requirement not be met
- ensuring the country's ownership of the programme (for programmes funded by donors)

1.1.2 Specific aspects of SAP institutional arrangements

The specific institutional arrangements of the SAP implementation are related to the nature of activities to be implemented. Requirements related to the initiation and the formulation of NAP phases differ widely from those related to the implementation phase. In addition, transversal activities, in particular targeted monitoring, require specific institutional and other arrangements and capacities.

The arrangements during the initiation and formulation / adoption phase of NAPs should focus on:

- scientific / technical aspects of implementation of the respective activities (see Table 1 and 2)
- coordination and harmonization of all simultaneous and consecutive activities
- the procedure of the adoption of NAP and of its integration into national planning and development process, and
- coordination of activities and interaction with the regional structures and donors

When approaching the implementation phase, the institutional arrangements should be gradually refocused at:

- the decision making process related to individual investment projects
- formulation and implementation of investment projects envisaged by NAPs
- international cooperation, mobilization of national resources and provision of external funding sources. In addition, the same as for the first period:
- coordination of activities and interaction with the regional structures and donors.

Furthermore, specific national conditions, such as already existing institutional arrangements, differences in: governmental and administrative structures; degree of decentralization; organization of infrastructure and services' systems; the present practice related to participatory activities, the implementation capacity and availability of funds; - all call for a flexible approach when designing the national SAP institutional arrangements. Therefore, the arrangements recommended must be understood as framework ones, to be adapted according to individual national conditions, but still capable to satisfy the needed interactions at regional / MAP level.

1.2 Identification of actors

The institutional arrangements (Fig. 2) envisaged by the Operational Document, include the identification of responsible actors, description of their role and interrelations, hierarchy, flow of information, responsibilities, etc. and call for:

- definition of levels
- identification of actors, responsible, affected, or likely to be involved
- elaboration of specific (new) institutional arrangements, to be established, if needed, and
- definition of interrelations, flows of communication and information, and reporting.

The levels dealt with by the present Document, are:

- the regional / MAP level
- the national level, including the local level.

Error! Not a valid link. **Figure 2 Institutional arrangements for the implementation of SAP: the general scheme**

a) Existing institutional arrangements at MAP level are:

- MAP MED Unit
- MED POL
- other MAP components, RACs: CP/RAC, PAP/RAC, SPA/RAC
- MAP consultants and experts

b) International / regional actors, as identified by SAP:

- the GEF SAP project
- other donors, if any (e.g. European Commission, FFEM, METAP, ICS/UNIDO, etc)
- regional / international NGOs.

c) Existing institutional arrangements at national level are:

- the National Coordinator for MED POL
- the Ministry / authority responsible for MED POL
- other national ministries, responsible for / to be involved in the implementation of SAP: Finance, Land-use Planning, National Planning Office or Authority, Health and Sanitation, Water / Forestry/ Irrigation, Agriculture and Fisheries, Maritime affairs, Science and Technology, Public Works, others, according to national conditions
- national institutions and scientific/technical structures
- major stakeholders, to be identified at national and local levels: Chambers of Industry and Commerce, Associations of industrial sectors, Maritime Associations, Associations of Cities and Settlements, etc.
- specialized and competent national NGOs, and
- national experts, consultants

d) New structures needed

Concerning new structures, the approach applied by the Operational Document is to make use as much as possible of the existing structures, avoiding the establishment of new ones whenever possible. Applying such approach, the only new bodies needed would be:

- at regional/MAP level:
 - the MAP/Donors Steering Committee,
- at national level:
 - a high level National SAP Steering Committee (the GEF project envisages an interministerial body)
 - the National SAP/MED POL Coordinator,
 - a National SAP "incubators" (see 1.4.3)

The description of the role and responsibilities of the existing and new institutional arrangements within the SAP/NAP framework is presented in the two sections below.

1.3 Functions to be carried out

The SAP institutional set-up should provide for a smooth, effective and cost efficient implementation of the following major functions:

- a) "coordination"
- b) technical function
- c) the "control" function
- d) the financial function

1.3.1 The "coordination" function

The coordination functions, which should relate a) to interactions among MAP and the national level, b) among MAP and institutions involved at the regional level, and c) among all institutional elements at national/local levels, should imply the following tasks:

- overall supervision and guidance
- coordination and harmonization of activities, and of all elements of the institutional set up
- measures aiming at:
 - (i) integration of SAP into the decision making process and the implementation procedures at various levels
 - (ii) inclusion of SAP in the national planning system and in national development plans
- communication among various elements of the institutional set-up, and
- flow of information.

The overall **supervision and guidance** belong:

- to MAP MED Unit and **MED POL** at the regional level
- to the **National SAP interministerial committee** at the national level

Coordination and harmonization of activities belong:

- to **MED POL** at the regional level
- to the **National SAP/MED POL Coordinator** at national level

Measures related to integration belong at the national level to the National SAP interministerial committee, in addition to all high level authorities involved in SAP related decision making, planning and development processes.

Referring to **communication and flow of information**, the major responsibility is attributed to the **MED POL** and to the **National SAP/MED POL Coordinator**, but it is evident that all elements of the institutional set-up must be involved and share that responsibility.

1.3.2 The technical function

This function includes:

technical supervision, guidance, assistance and support to be provided at the regional level by:

- MED POL
- MAP RACs
- the GEF SAP project structures (for the period 2001-2003), and
- other international organizations and donors

technical functions at national level, to be implemented:

- by the **National SAP/MED POL Coordinator**, who provide technical instructions and assistance to organizations and teams as part of the national SAP incubators, and
- by the **National SAP incubators**, who formulate and prepare the implementation of all technical activities

participatory activities at national and sub national levels, to be formulated and implemented by **National SAP interministerial committee** and the relevant sections of the **National SAP incubators**.

scientific and professional feedback:

- at **national level**, to be provided by the sections of the **SAP incubators**, to the **National SAP Steering Committee**
- at regional level, to be provided by the **National SAP/MED POL Coordinator** to **MAP/MED POL** and the Contracting Parties
- the long term technical assistance in the "post-GEF project process" will be provided by **MAP**, to be possibly supported again by GEF, the Euro Mediterranean Partnership and other potential partners and donors.

1.3.3 The "control" function

This function includes:

- progress monitoring and supervision
- compliance monitoring
- evaluation,
- reporting, and
- public information on progress achieved.

This section of the Operational Document presents the general aspects of the "**control**" function, while the technical aspects are presented in detail in Part III of the document.

Progress monitoring will be achieved by all components of the institutional set up, and will be based on the assessment of the implementation of the activities envisaged by SAP NAP, and by relevant sectoral workplans, time tables and budgets. It will be implemented according to the hierarchy defined in section 1.4 of the document.

Compliance monitoring will take into consideration the "**national pollutant budget approach**" (see part III, chapter 3). Quantification of targeted pollutants of a pollutant

released after taking the respective measures, listed in the NAPs, will be made. Due to the scientific and technical aspects of this function, competent and qualified institutions and teams will be needed; possibly by the **national SAP incubators**. MED POL will **assist** countries in identifying the compliance and non-compliance with the targeted budget for any pollutant considered by SAP. Technical aspects of compliance monitoring are presented in the Part III of the document. Compliance monitoring should be achieved by an **accredited national body** in cooperation with MED POL.

Evaluation is related to both progress and compliance monitoring. It is understood that on the basis of the results of both progress and compliance monitoring, a joint evaluation has to be made at national as well as at the regional levels. While the process of national and sub national / sectoral evaluation will have to be defined following national mechanisms, the regional evaluation will be prepared by MED POL.

As to the reporting function, all elements of the national SAP system will report on a **half-yearly base**, if not requested otherwise, to the National SAP/MED POL Coordinator. The National SAP/MED POL Coordinator will present regular half-yearly reports to the National interministerial committee. MED POL will prepare the regional report and present it to the respective bodies: the half yearly reports to the MED Unit, the biennial reports to the meeting of National Coordinators for MED POL, the meeting of MAP NFPs, and to the respective Ordinary Meeting of the Contracting Parties.

The public information system could envisage publishing of progress and results achieved at national and regional levels in a dedicated web site. This would enable the contracting parties and all involved, including donors and the international community, to exchange information and experience regarding SAP and NAPs activities, and ensure the needed transparency of the process at both national and regional levels. NGO's should play a considerable role in this issue.

1.3.4 The financial function

The implementation of this function is of paramount importance for the entire process. Two essential aspects are dominating within this function: mobilization of resources and securing the long-term sustainability of the process.

Mobilization of resources relates to both national and international funds.

National resources should be looked for in relation with national commitments, to be justified by expected benefits, improved conditions of life, better services, and increased economic and development potential resulting from the targets achieved. Governments, local authorities, the general and directly affected public, the expected global "greening" of industry and trade, direct and indirect interests of major stakeholders, should be the levers and motivation for mobilization of sources at national level. These resources should be in accordance with SAP principles and obligations, as stated in the SAP document and adopted by the Contracting Parties. NGOs and the general public should play a major role in the process of mobilization of national resources, with the assistance of the respective segments of the national SAP incubators.

The **National SAP interministerial committee** will be the national SAP/NAP related bodies primarily responsible for the process of mobilization of national resources, as well as other responsible national bodies and ministries. Since it might be assumed that the international support in many cases will be conditioned with an adequate national counterpart contribution, **MAP and MED POL** will assist this process as appropriate.

The mobilization of national resources for the implementation of SAP/NAP should include various sources, such as:

- budgets: national, sub national, local ones
- economic incentives
- taxes, polluters' fees
- credits, national and international, to be returned by increased price of better quality of services
- national donors
- public raising fund campaigns
- other sources

The analysis of potential national sources and design of the fund mobilization system will be one of the crucial activities to ensure the long-term implementation of SAP and will be initiated by PAP/RAC as part of the GEF project and later implemented by competent national authorities and organizations.

External, international resources might be sought at various bodies/programmes, such as:

- GEF
- the Euro Mediterranean Partnership
- other EU programmes and projects
- UNDP
- bilateral and multilateral assistance
- international donors,
- etc.

A substantial involvement will be ensured by **MAP/MED POL** in the process of seeking international funds for the implementation of NAPs through the **MAP/Donors steering committee** (ref. 1.4.1, f).

1.4 Role and responsibilities of actors

1.4.1 Actors at MAP level

In the context of the implementation of SAP (Fig. 3), the role and responsibilities of actors at MAP level will be in accordance with their regular mandate, competencies and hierarchy.

The Ordinary Meetings of the Contracting Parties will be regularly informed on the progress of implementation of SAP and NAPs through respective national reports prepared by National SAP/MED POL Coordinators and by regional reports, to be prepared by MED POL. Following the standard procedure, national progress reports and the regional one will be previously presented at the respective meetings of the National Coordinators for MED POL and of MAP NFPs. The Ordinary Meetings of the Contracting Parties will discuss and evaluate the reports and the progress made, and adopt the respective recommendations and activities to be implemented within the MAP biennial programme and budget.

MED Unit will implement the overall coordinating role and guidance, and will be directly involved, if needed and as appropriate, in particular when concluding agreements or other arrangements with international actors outside MAP .

The MED POL Programme will play the role of the MAP Implementing Agency for SAP.

MED POL will exercise a catalytic role in the countries by providing the assistance that would enable them to achieve the SAP targets and monitor the outputs. Accordingly, MED POL will be in direct contact with the National SAP/MED POL coordinator in respecting countries, to provide the necessary information, assistance and coordination elements which in turn would be disseminated inside the country in order to reach all the national and local major actors and partners of SAP.

MED POL will be operationally responsible for the follow up to the implementation of the SAP, by:

- harmonizing and following up SAP-related national activities
- coordinating and harmonizing the SAP activities within the GEF project
- formulating, planning and implementing activities related to capacity building,
- providing assistance and support to individual countries
- assisting countries when applying for international support
- preparing and disseminating documents envisaged by SAP to be prepared at regional level
- monitoring of progress, evaluating, formulating draft proposals and recommendations, and reporting to CPs
- establishing contacts with potential donors, developing proposals for donors involvement and coordinating donors' activities

MAP RACs will provide the needed technical expertise and assistance, according to their field of compliance.

Activities to be implemented by RACs will be overall harmonized by MED POL, respecting the relevant RACs mandates and competencies.

MAP consultants, experts . The technical, legal and institutional support to MAP/MED POL will be ensured by a pool of experts to be identified throughout the region. The experts together with the MAP/MED POL will prepare, in a harmonized form, the support documents to be presented to the Contracting Parties regarding the technical, legal and institutional issues of the SAP. Consequently, MAP consultants and experts will act according to the respective TOR and contracts, on a case by case and output basis under the supervision of the relevant MAP component.

A MAP / Donors Steering Committee may be established after the identification of potential donors to be involved in the long-term implementation of SAP. Under the coordination of MED POL, the role of the committee would be to review and analyze specific regional and/or national activities and projects and consider possible funding. The identification of potential donors will be made in agreement with the Contracting Parties. The logistical support to the Committee would be provided by MED POL.

1.4.2 International actors outside MAP

The GEF SAP project

This project will be implemented according to the signed Project document, under the technical responsibility of the Project Manager located at the MAP MED Unit. The project aims at preparing the basis for the implementation of SAP/NAPs activities. It will provide countries with needed tools (regional guidelines, training, strategies, ...) to enable them to initiate the long-term SAP/NAP process and consequently to achieve the priority objectives. The GEF SAP project activities will lead to the preparation of NAPs. The GEF SAP project is based on the following principles:

- The preparation of NAPs is the milestone activity towards the proper implementation of SAP.
- the elaboration of NAP is a bottom up process; needs and targets have to be identified at local levels by local stakeholders, such as industries, municipalities, NGOs, and other partners, with the assistance of national SAP incubators;
- a critical issue in the process might be the availability of needed data and information; to overcome this obstacle, the GEF SAP project will support the preparation of National SAP Diagnostic Analyses (NDAs)
- gathering data and generating information could enable the SAP incubators to create national data banks, to be later on periodically updated and used for SAP/NAP implementation.

The Euromediterranean partnership is considered as one of the major policies that could assist the sustainable development in the Mediterranean region. The economic and social/cultural dimensions of this partnership would catalyse and facilitate the implementation of the regional environmental policies and consequently the SAP.

The economic dimension has two tiers: (i) bilateral and (ii) regional. The bilateral relationship, which is the channel for 90% of the MEDA resources (approx. 2 billion ECU) includes well defined environmental dimensions.

Other international organizations and donors

Other international actors and donors will act according to individual arrangements made with MED POL or according to the arrangements established within the MAP / Donors Steering Committee, in agreement with the Contracting Parties.

MAP/Donors Steering Committee - its role and functions are defined under 1.4.1, f).

1.4.3 Actors at national level

The role, responsibilities and position of national actors involved in SAP will be as follows:

The National SAP/MED POL Coordinator is considered as the executive actor of the SAP and will be appointed by the interministerial committee. The National SAP/MED POL Coordinator will be responsible for:

- promotion, assistance and logistic support to all national bodies and teams involved in SAP/NAP activities
- coordination and follow up of all national SAP/NAP related activities
- identification of national experts, bodies, teams, institutions and members of the national SAP incubators

- acting as Secretary of the National SAP interministerial committee
- flow of information and communication from MAP/MED POL and the GEF SAP project to national bodies and *vice versa*
- cooperation with MED POL and the GEF SAP Project, concerning all SAP related activities, and in particular related to the provision of assistance and support to national bodies and SAP related activities, when requested and as agreed upon
- monitoring the progress of relevant national activities, evaluation and reporting to MAP/MED POL and the National SAP interministerial committee on a half-yearly basis.
- transfer of information and initiatives for decisions and actions to be made / implemented by other responsible ministries and authorities for issues related to SAP/NAP
- identification and involvement of major stakeholders, NGOs, scientific community and local authorities, and their involvement in the SAP/NAP process, as appropriate
- coordination with MAP/MED POL and the GEF SAP project, provision of mutual support, and participation in SAP related activities at regional/MAP level.

The National SAP interministerial committee will act as a policy making body and will involve national ministries and bodies either directly responsible or related to SAP/NAP activities. Members of the Committee will be, as possible, high level executives, authorized for evaluation and decisions on major issues at national level, related to SAP/NAP. Due to the long-term nature of the SAP/NAP process, and heavy financial and other implications of NAP implementation, it might be desirable that the Committee be nominated by an as high as possible national authority. Detailed aspects of the role, mandate and competencies of the Committee are country specific, and would cover the following:

- identification and nomination of, guidance and logistical support to, national SAP incubators and all teams involved in SAP/NAP activities
- nomination of, provision of instructions and guidance to the National SAP/MED POL Coordinator
- formulation of proposals for national SAP/NAP related policies and strategies, to be discussed by the National SAP interministerial committee, adoption and implementation of policies within its mandate, transfer of policy proposals to other authorized bodies
- implementation of initiatives and actions aiming at achieve the needed integration of the SAP/NAP activities into the national planning process, decision making process and national development plans

NATIONAL SAP INTERMINISTERIAL COMMITTEE

It is expected that the responsibilities of the Committees in all countries will include, among others, the following:

- formulation of high level policies, strategies and issues related to SAP/NAP
- formulation of recommendations to the National SAP/MED POL coordinator and to other responsible and/or involved bodies
- evaluation and approval of the progress achieved, identification of problems met and formulation of recommendations for further measures and actions.

The National SAP interministerial committee will meet at regular intervals, yearly or half-yearly, with extraordinary meetings if needed. The National SAP/MED POL Coordinator may act as the Secretary of the Committee.

The National SAP "incubators"

The SAP incubator is a **national entity** that provides a range of technology, scientific and management services to support the implementation of the SAP activities and ensure their implementation

The SAP incubator would act as a **consultative** and "technical think-tank" body for the SAP national activities. It would elaborate and perform its activities in close coordination with the SAP national coordinator.

Since the SAP incubator will provide a wide range of **multidisciplinary** activities, local scientific and technical institutions could be the most relevant on site bodies that could set up and ensure the proper management of the SAP incubator.

MONTPELLIER MÉDITERRANÉE TECHNOPOLE

Three universities, seven specialized colleges and a number of research laboratories are supporting the activities of "Montpellier Méditerranée Technopole" in different fields of expertise. Two thousand scientists and technicians work for the pole agriculture, food and environment. In the field of environment, the incubator provides a wide range of assistance in the area of water resources, effluents treatment, marine and lake environment.

It is expected that the SAP incubator would play a major role in:

- acting, in coordination with the national SAP/MED POL coordinator, as the national SAP interlocutor for the Secretariat for technical issues
- assisting the interministerial committee in the management and implementation of the SAP activities
- providing multidisciplinary consultation services to the SAP national and local partners
- assisting the SAP partners in the elaboration and implementation of SAP/National Action Plans and priorities list of actions (fig.3)
- ensuring the dissemination and propagation of the information provided by the Secretariat at the national and local levels;

The structure and composition of the National SAP incubator will be country specific to be defined and adopted by the National SAP interministerial committee and national SAP/MED POL coordinator, following the recommendations of MED POL, as appropriate. Although it might be assumed that the following will have to be taken into account:

INCUBATORS IN ISRAEL

In Israel the incubators programme was first implemented in 1991. All the Incubators are hosted in research and development bodies. Six percent of the incubators are specialized in environment

- the institutional set up of the SAP incubator should reflect the technical needs that SAP partners would be looking for (fig. 6 shows an example)
- the number of SAP incubators that could be set up depends on the extent of the activities located in coastal areas that would be included in the SAP

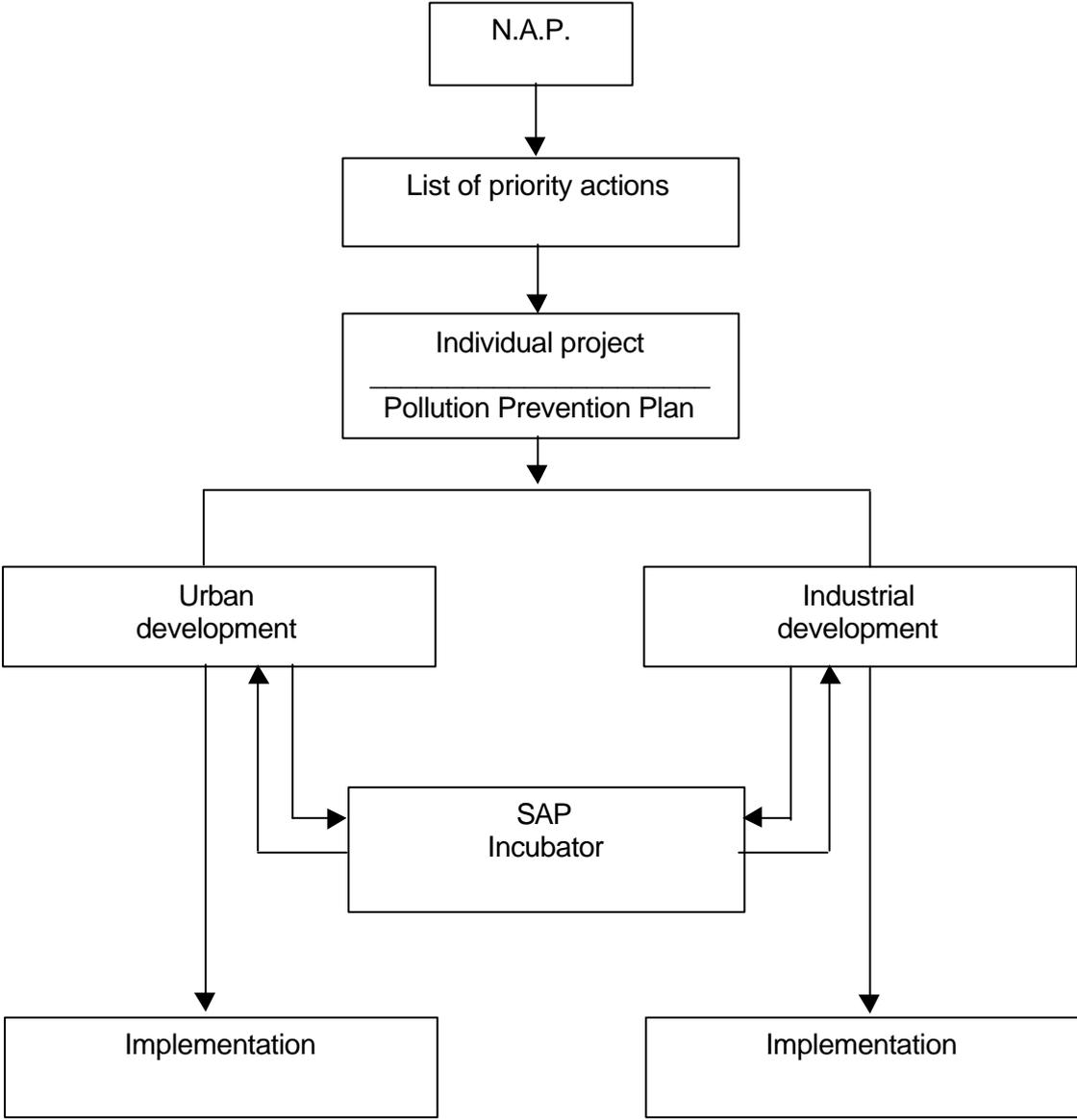


Figure 3 Integration of SAP incubator in the process of implementation of SAP-NAP

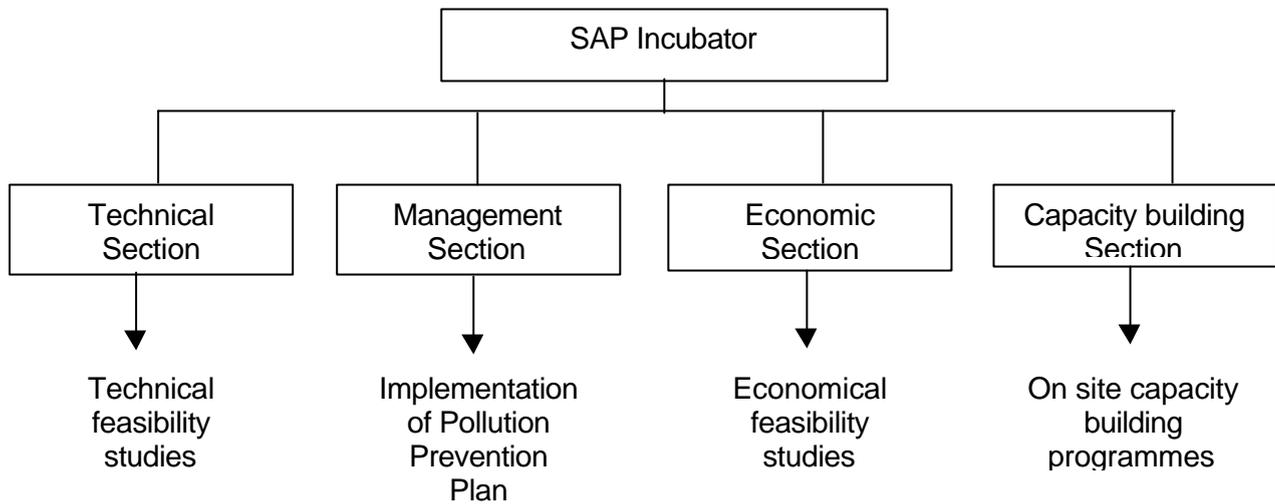


Figure 4 Institutional set up and duties of the SAP incubator

Part III - TECHNICAL ASPECTS

1. INTRODUCTION

The Strategic Action Programme (SAP) specifies the main land based pollution issues in the Mediterranean and indicates the desired targets to be reached to resolve these issues within a specific time frame. To this end the SAP also indicates the necessary pollution control, reduction and elimination measures that should be taken at the national and regional level and establishes a general schedule and time frame for their implementation.

The SAP is expected to be implemented over a long-term period, i.e. up to 2025. While the ultimate date of 2025 should be strictly maintained and considered the main policy decision behind the SAP, the other intermediate dates contained in the text should be considered as a concrete objective but could at the same time be regularly verified and possibly adjusted taking into account the technical, scientific and policy developments occurring in the region. To this end, the Secretariat will present at each Contracting Party Meeting a detailed work plan for the implementation of the SAP for each two-year period examined by the Contracting Parties. This procedure was adopted in Malta in 1999.

In preparing this document, careful account was taken of the provisions of the amended LBS Protocol and the Barcelona Convention; the objectives, goals and activities of the Mediterranean GEF Project; and the links with recently approved and ongoing relevant international legal texts. The present document is therefore expected to assist the Countries in providing a concrete perspective on how all the activities of the SAP could be implemented over the period specified in the original SAP, of about 25 years.

2. URBAN ENVIRONMENT

Municipal sewage

Regional Actions

Updating and adoption of guidelines for sewage treatment and disposal, environmental quality criteria and standards.

The preparation of guidelines for sewage treatment and disposal will commence in 2001 and will be carried out with the assistance of Mediterranean experts. The existing environmental guidelines for domestic wastewater management (UNEP and WHO) will be taken into consideration in the preparation of the guidelines. The need for separate treatment of municipal and non-compatible industrial waste in order to conform to the provisions of the LBS Protocol will also be addressed. An experts consultation meeting will convene to review and approve the technical details of the selected draft guidelines, prior to submission to the Meeting of MED POL National Coordinators for formal approval by 2003. The approved guidelines will then be submitted to the Meeting of the Contracting Parties for adoption.

This activity will be supported by the Mediterranean GEF Project, which includes the preparation and adoption of guidelines for sewage treatment and disposal under Regional Co-operative Actions.

The development of programmes for sharing and exchanging technical information and advice.

Regional workshops and experts exchanges could be carried out in consultation with relevant regional and international Organisations and experts. While regional and national workshop on managerial issues concerning the operation of wastewater treatment facilities will be regularly carried out in the framework of the compliance component of the MED POL Programme, a number of activities among those listed here below could be selected and carried out by 2005:

- Regional workshop on the reuse of treated effluents aiming at the conservation of water resources, including appropriate design of treatment plant and processes for the control of the quality of influent waste-water;
- Regional workshop on the environmentally sound disposal and/or uses (composting, land-filling etc.) of solid/semi-solid wastes (including sewage sludge) from the treatment process;
- Regional workshop and exchange of experts on the combined treatment of domestic and compatible industrial effluents and the segregation and separate treatment of polluting rainwater.

The promotion of research programmes to identify and validate sewage treatment technologies

Limited grants could be provided for research projects on sewage treatment technologies for application in Mediterranean countries, as part of the MED POL Phase III Programme, to relevant Mediterranean research institutes in consultation with the MED POL National Coordinators. In order to be most effective research could possibly focus on technologies for solving sewage treatment requirements in Mediterranean areas which are considered as problematic due to their characteristic land morphology or siting with respect to the general urban planning scheme. The following two research topics are therefore proposed to be tackled in 2002-2003:

- Research on alternative sewage treatment technologies for problematic areas due to their characteristic land morphology (for example the mountain villages of islands);
- Research on alternative sewage treatment technologies for problematic areas due to their location outside the city urban planning scheme.

National Actions

When preparing the SAP, special emphasis was given to the need to properly tackle the issue of sewage pollution at the national level, considered one of the most important regional problems. In this context, the Mediterranean GEF Project is expected to substantially contribute to the creation of a technical, institutional and financial basis to the long-term solution of sewage pollution in the region. The preparation of pre-investment studies foreseen by the Project starting in 2001, which will also include hot spots due to municipal pollution, will in fact represent the first step for long-term investments, along with the preparation of National Action Plans which should also necessarily include the issue of urban pollution. The implementation of the national activities related to the elimination of municipal pollution implies the mobilization of large amounts of funds which, on the medium and long-term, should be found in national budgets. However, the involvement of financial institutions and donors in the formulation process as well as the future implementation of the Mediterranean GEF Project

will provide the countries with additional future opportunities and perspectives. Countries should however consider as immediate priority the implementation of a number of policy action (e.g. promoting and updating related legislation) which will show their concrete intention to meet the targeted objectives.

Updating and adoption of national regulations on sewage discharges to the sea and rivers

In view of the expected entry into force of the LBS Protocol, national regulations on sewage discharges into the sea and rivers are expected to be updated taking into account the provisions of the Protocol, particularly Annex II and, where appropriate, the common measures on sewage discharges into the sea and rivers already adopted by the Contracting Parties. Regional guidelines for sewage treatment and disposal, which will be prepared during the 2001-2003 biennium, will assist Mediterranean countries to establish national legislation according to existing conditions. The work of updating the national regulations should start in 2002. Parties requiring assistance in the formulation of updated regulations will be eligible for expert legal and/or technical assistance to be provided through the Secretariat as part of the MED POL Programme. A report on initial progress achieved should be presented at the 2003 Contracting Parties Meeting.

The development of National Plans and Programmes for the environmentally sound management of sewage

This issue should be tackled in the framework of the preparation of National Action Plans foreseen to be initiated during the period 2001-2003 as part of the implementation of the Mediterranean GEF Project. Following the identification and assessment, through the preparation of a National Diagnostic Analysis, of national problems related to the environmentally sound management of sewage, a list of activities to be included in national programmes will start to be prepared in 2001/2002, containing the actions required to reach the respective regionally adopted targets. The programmes will consist of actions necessary to fulfill the relevant provisions adopted on a regional level such as regional plans, guidelines, common measures, environmental quality criteria, emissions limits etc.

National programmes for the environmentally sound management of sewage are expected to include:

- The connection, by 2005, of all coastal cities and urban agglomerations of more than 100.000 inhabitants to a sewer system as well as the disposal of sewage in conformity with a national regulation system;
- The location of coastal outfalls so as to obtain or maintain agreed environmental and health quality criteria;
- The promotion of primary, secondary and where appropriate and feasible tertiary treatment of municipal sewage;
- The satisfactory operation and maintenance of sewage treatment facilities;
- The reuse of treated effluents for the conservation of water resources, accompanied by infrastructural measures, treatment at source and the segregation of industrial effluents, where required;
- The appropriate design of treatment plants and controls of the quality of influent wastewaters in accordance with national regulations, for the beneficial reuses of sewage effluents and sludges;

- The environmentally sound treatment of combined domestic and compatible industrial effluents;
- The separate collection of rain water and municipal waste water and treatment of the first rain water considered particularly polluting;
- The environmentally sound disposal and/or use (composting, landfilling etc.) of sewage sludge;
- The prohibition of sludge discharge into water in the Protocol Area;
- The organisation of sufficient training and educational programmes for local administration to operate and maintain sewage treatment facilities;
- The promotion of training programmes on the environmentally sound treatment of municipal sewage discharged to rivers, estuaries and the sea, or other solutions appropriate to specific sites;

Assistance in the development and implementation of National Programmes for the environmentally sound management of municipal wastewater will be provided through the Secretariat as part of the Mediterranean GEF Project.

Urban solid waste in coastal areas

Regional Actions

In the year 2000, the MED POL Secretariat has started working on the issue of solid litter management, and in particular with the launching of a project covering the assessment of coastal and marine solid litter. The project, assisted by data and information collected from countries and other sources, will continue and will contribute in the year 2001 to the implementation of the related activities foreseen in the Mediterranean GEF Project which aim at formulating regional action plans for the management of urban and industrial waste. Although the activity launched by MED POL covers only partly the issue of urban litter management (i.e. the coastal and marine litter), the results of the project are expected to cover a very important component of the issue.

The formulation and adoption of guidelines for environmentally sound and economically feasible systems of solid waste collection and disposal

Guidelines for environmentally sound and economically feasible systems of solid waste collection and disposal, also incorporating the principles of non-hazardous material recycling and reuse, will be drafted by 2001 with the assistance of Mediterranean experts. An experts consultation meeting will convene to review and approve the technical details of the draft guidelines prior to submission to the Meeting of MED POL National Coordinators for approval by 2003. The approved guidelines will then be submitted to the Meeting of the Contracting Parties for formal adoption.

This activity will be supported by the Mediterranean GEF Project, which includes the preparation and adoption of guidelines for the disposal of urban solid waste under the Regional Co-operative Actions.

The development of programmes for the reduction and recycling of urban solid waste

Effective waste reduction policies and policies for the re-use and recycling of recyclable non-hazardous wastes could also be promoted through regional workshops and experts exchanges, in consultation with country representatives and with the assistance of experts from relevant regional and international Organisations.

Of the following activities proposed here below, some of them could be selected and carried out in the period 2003-2005:

- Workshop on the re-use and recycling of recyclable non-hazardous materials;
- Experts exchanges on the organisation of selective garbage collection systems;
- Experts exchanges on the determination of the environmentally sound location of solid waste disposal sites.

National Actions

The development of national plans and programmes for the reduction at source and environmentally sound management of urban solid waste;

The establishment, by 2005, of environmentally sound and economically feasible systems of collection and disposal of urban solid waste in cities and urban agglomerations of more than 100,000 inhabitants;

The promotion of urban solid waste reduction and recycling

The above issues, will be carried out as part of the formulation of National Action Plans to be prepared by countries in the framework of the GEF Project. Following the identification and assessment, through the preparation of a National Diagnostic Analysis, of national problems related to the environmentally sound management of urban solid waste, a list of activities to be included in national programmes will start to be prepared in 2001, containing the actions required to reach the respective regionally adopted targets. The programmes will consist of actions necessary to fulfill the relevant provisions adopted on a regional level such as guidelines, common measures, environmental quality criteria, emissions limits etc.

National programmes for the reduction at source and environmentally sound management of urban solid waste are expected to include the establishment, by 2005, of environmentally sound and economically feasible systems of collection and disposal of urban solid waste in cities and urban agglomerations of more than 100,000 inhabitants. In doing so, the creation of selective garbage collection systems, the environmentally sound location of urban solid waste disposal sites and the promotion of urban solid waste reduction and recycling should be taken into account as well as the implementation of national training programmes on effective waste reduction policies and on the environmentally sound management of urban solid waste, including options for recycling and environmentally sound elimination.

Air pollution

The activities agreed upon in the SAP in relation to air pollution are mostly concerned with air quality in cities and do not fall within the specific competence assigned by the Contracting Parties so far to any component of MAP. In trying to meet the agreed targets, the countries should therefore be in close contact with the regional and international competent

Organizations and Convention Secretariats for the implementation of programmes and measures foreseen by the existing legal instruments such as the EU Directives and the Kyoto Protocol. Concerning the related issue of climate change, the Secretariat will continue to follow the development at the scientific and policy level and will regularly report to the Contracting Parties on Mediterranean-related issues.

The following actions were agreed to be implemented as part of the SAP until the year 2025:

Regional Actions

Formulation and adoption of air quality objectives for atmospheric pollutants (2005)

National Actions

The development of national plans and programmes to control air pollution from mobile sources.

The preparation of national programmes for the control of air pollution from mobile sources are expected to include:

- Measures to promote and provide incentives for public transportation;
- Measures for the promotion of improved traffic management, giving priority to the use of public transport;
- Measures for the promotion of lead-free petrol, also containing low level aromatic hydrocarbons;
- Measures for the improved inspection and maintenance of vehicles and the replacement of old-technology vehicles through economic incentives;
- Measures to promote increased regional and domestic introduction of natural gas in order to substitute high sulphur fuel oil with natural gas;
- Measures to promote the introduction of gaseous fuel or other alternative forms of energy to substitute diesel fuel in public transportation, particularly buses;
- Measures to support and encourage the participation of public transport services in the above activities.

3. INDUSTRIAL DEVELOPMENT

When examining the overall commitments of the SAP related to "industrial development" it appears that many questions would need to be answered before the elaboration of any concrete operational process. The approach followed in the preparation of this chapter is therefore to propose for discussion a number of operational models and principles which should eventually be followed by the countries with the Secretariat assistance for the implementation of the required action. Once the principles of operation are agreed upon, individual action will be examined and adopted at each Contracting Parties Meeting.

The National Budget approach

In chapter 5.2. of the SAP, the targeted reductions of discharges or releases of pollutants implicitly call for the elaboration of collective commitments or "budget commitments" without mentioning the level at which the budget should be estimated i.e. regional or national.

Applying a **regional** budget approach would mean that "Mediterranean countries shall reduce by (x%) their aggregate releases of a targeted pollutant by the year (y) with reference to a regional baseline budget for each targeted pollutant"

The regional approach would imply a differentiated commitment between the Mediterranean countries for each targeted pollutants in which each party is responsible for its level of releases. This approach would imply negotiations for the identification of the regional budget baseline for each targeted pollutant which is considered technically and economically unfeasible under the actual Mediterranean context.

Applying a **national** budget commitments approach would mean that "each Mediterranean country shall reduce by (x%) their aggregate releases of a targeted pollutant by the year (y) with a reference to a national baseline budget for each SAP targeted pollutant"

Following a national approach, the equity between Parties would govern the long-term implementation of the SAP commitments.

In order to apply this approach:

1. each Party could set up its own national "baseline budget" for each targeted pollutant, with the assistance of the Secretariat as needed;
2. the "national baseline budget" for a SAP targeted pollutant would be the sum of the individual releases;
3. any Party may transfer internally release reduction targets between different activities generating the same targeted pollutants according to the socio-economic and environmental priorities prevailing in the country.

The Secretariat's opinion is that all Mediterranean countries are technically capable to set out their relative "baseline budget" for each SAP targeted pollutants and eventually meet the "industrial development" commitments of the SAP. This process would also be assisted by the implementation of the GEF/MED project to be carried out in the next three years.

This operational document therefore suggests to consider the "national baseline budget" approach to implement the SAP industrial development commitments. To this end, the Secretariat has developed an operational methodology that would assist the countries in the implementation of the SAP "industrial development" commitments.

Accordingly, Contracting Parties would provide the Secretariat by 2003 the national "baseline budget" (B.B.) considering the year 2003 as the base year for each SAP targeted pollutant to be able to monitor changes in subsequent years. The B.B. would be estimated

following the National Diagnostic Analysis that Contracting Parties have to prepare through the GEF/MED activities. The methodology for the evaluation of B.B. could be based on the information given in the technical annex provided by the Secretariat (see Annex II). The Secretariat together with the Contracting Parties shall regularly review and, as appropriate, revise the technical guidelines considering the scientific technical developments related to the issue and the progress in regional and international conventions negotiations that could have impacts on the SAP.

The adoption of the budget approach should implicitly include a monitoring process to verify the case of compliance and non-compliance which is described in Part II (chapter 1.3.3).

The Secretariat will assist the Contracting Parties through the "SAP incubators" in elaborating the convenient procedures for the identification of the compliance and non-compliance cases taking into account the proposed monitoring process and the general reporting system adopted by Contracting Parties for Barcelona Conventions and its Protocols.

The information submitted by the countries would be reviewed by Secretariat through national and, as appropriate, regional expert. The Secretariat will prepare a report to the Conference of the Parties, assessing the implementation of the commitments and identifying any potential problem and factor influencing their achievements.

According to this approach and referring to chapter 5.2. of the SAP, a "national baseline budget" would be identified for:

Persistent Organic Pollutants

- 1) The twelve substances identified by the LBS Protocol as organochlorines are divided into four groups:
 - (i) Pesticides: DDT, aldrin, dieldrin, endrin, chlordane, heptachlor, mirex, toxaphane and hexachlorobenzene
 - (ii) Industrial chemicals: PCBs
 - (iii) Unwanted contaminants: hexachlorobenzene dioxins and furans
 - (iv) Poly aromatic hydrocarbons
- 2) Heavy metals and organometallic compounds:
 - (i) Mercury, cadmium, lead
 - (ii) Organomercuric, organolead and organotin compounds
 - (iii) Zinc, copper and chromium

Organohalogen compounds:

- (i) Halogenated aliphatic hydrocarbons such as chlorinated solvents: trichloroethane, dichloroethane and trichloromethane, chlorinated paraffins.
- (ii) Halogenated aromatic hydrocarbons such as: chlorobenzenes, polychlorinated naphthalens, polybrominated diphenyl ethers and polybrominated biphenyls.
- (iii) Chlorinated phenolic compounds
- (iv) Organohalogen pesticides

Radioactive substances

Nutrients (biodegradable organic matter, nitrogen and phosphorus compounds and suspended solids from anthropogenic industrial and agriculture sources released through:

- (i) Industrial waste water generated by foods and beverages, textiles, tanneries and leather finishing, paper and paper pulp, phosphatic fertilizers and pharmaceutical industries
- (ii) Agriculture activities
- (iii) Atmospheric emissions especially NO_x and NH₃

Hazardous wastes for those listed in the annexes of the Basel Agreement and:

- (i) Obsolete chemicals that include stocks of banned organochlorine compounds such as dieldrin, DDT and out-of-date chemicals
- (ii) Used lubricating oil
- (iii) Batteries: traditional zinc-carbon, alkaline, mercury, silver oxide, zinc, lithium and nickel-cadmium batteries; lead acid, nickel iron and nickel-cadmium accumulators

As a complement to the above, the following actions were also agreed to be implemented as part of the SAP until the year 2025.

Regional Actions

To facilitate and promote access, in particular for countries in need of assistance, to new and innovative technologies relevant to each selected land-based source and activity, including those causing physical degradation and the destruction of habitats.

To promote new information technologies that facilitate the transfer of knowledge within countries and between States, including, in particular, from developed countries to countries in need of assistance.

In order to implement these activities, a closer cooperation will be established between MED POL and CP/RAC. In particular, CP/RAC will be asked to include in its 2002-2003 work plan the preparation of an inventory of relevant new and innovative technologies which should be kept regularly updated and made widely available making use of more advanced information technologies such as internet. The Secretariat could also encourage and support, by possibly making use of the Mediterranean Commission on Sustainable Development (Thematic Group on Industry) the establishment of collaborative arrangements between national institutions and industries of technologically more advanced countries and those countries in need of assistance, with the aim to facilitate and promote access to clean technologies.

To prepare a general manual with guidelines on implementing cleaner technologies, cleaner production and cleaner materials.

A number of guidelines will be prepared on implementing cleaner technology during the period 2001-2003 in cooperation with CP/RAC as part of the Mediterranean GEF Project. The guidelines to be prepared as part of the long-term implementation of the SAP include:

- guidelines for the application of BEP and if possible BAT to control point source emissions of dioxins and furans from industrial installations;

- guidelines for the application of BEP and BAT in industry and other relevant activities linked to point and diffuse sources of PAH emissions;
- guidelines for the application of BAT and BEP to control discharges, emissions and losses into the environment of mercury, cadmium and lead from relevant industrial installations;
- guidelines for BAT and BEP for the control of the discharge, emissions and losses of organometallic compounds from relevant industrial installations;
- guidelines for the application of BAT and BEP to control discharges, emissions and losses of zinc, copper and chromium from relevant industrial installations;
- guidelines for the application of BAT and BEP to control the discharges, emissions and losses of organohalogen compounds from relevant industrial installations;
- guidelines for the application of BAT and BEP in industrial installations which are sources of BOD, nutrients and suspended solids;
- guidelines for the application of BEP (including good agricultural practices) for the rational use of fertilizers and to reduce unnecessary inputs of nutrients into the environment from agriculture.

Such guidelines should be prepared by 2005 by CP/RAC and should be integrated into a general manual to be widely distributed.

To prepare a general manual with guidelines on introducing alternatives to priority POPs.

A document providing technical information on the nine pesticides and PCB substitutes and on the environmentally sound disposal and progressive elimination of the nine pesticides and PCBs will be prepared by 2003 in cooperation with the relevant international bodies and Organizations.

To formulate and adopt, as appropriate, environmental quality criteria and standards for point source discharge of pollutant from industrial sources.

In view of the expected entry into force of the LBS Protocol, national regulations on industrial wastes discharges into the sea and rivers are expected to be updated taking into account the provisions of the Protocol, particularly Annex II and, where appropriate, the common measures on pollutant discharges into the sea and rivers already adopted by the Contracting Parties. Regional guidelines for industrial effluent treatment and disposal, which will be prepared during the 2001-2003 biennium, will assist Mediterranean countries to establish national legislation according to existing conditions. The work of updating the national regulations should start in 2002. Parties requiring assistance in the formulation of updated regulations will be eligible for expert legal and/or technical assistance to be provided through the Secretariat as part of the MED POL Programme. A report on initial progress achieved should be presented at the 2003 Contracting Parties Meeting.

To prepare guidelines for the national use of fertilizers and losses of nutrients from agriculture activities

The FAO has developed programmes for the sustainable agriculture and use of fertilizers in rural areas. MED POL, with the cooperation of FAO, would facilitate the

implementation of these programmes in the Mediterranean region. Workshops will be organised for this purpose.

To prepare a Mediterranean strategy for the management of hazardous wastes.

This strategy will be based on the principles of prevention, reduction and re-use and the application of BAT and BEP for disposal. The regulation of transport of hazardous wastes will be taken into account according to the Protocol of Hazardous Wastes and Basel conventions.

National Actions

To make an inventory for industrial point sources and the uses and quantities of industrial pollutants.

At the national level, this action is considered as a milestone in the SAP implementation process. It could be implemented with the assistance of MED POL and CP/RAC taking into consideration the regional guidelines and the National Diagnostic Analysis that would be achieved under the GEF project by 2003. The following inventories should be performed:

- a) Industrial point sources
- b) POPs and PAHs
- c) Organometallic compounds
- d) Pesticides
- e) Obsolete chemicals
- f) Luboil
- g) Batteries

To reduce and/or phase out discharges and emissions of industrial pollutants by promoting the implementation of environmental management and application of BEP and, if possible, BAT in industrial installations that are sources of pollutants.

The SAP has emphasised the application of BEP and BAT and promotion of environmental management under the SAP principles and Obligations that countries should consider to prevent, abate, combat and eliminate industrial releases. In this context, the GEF project is expected to provide by 2003 the countries with detailed guidelines listed under the regional actions that would be performed by MED POL with the cooperation of CP/RAC. Also, assistance in the application of these principles will be provided through the Secretariat and experts visits as part of the GEF project during the period 2001-2003.

To adopt national programmes for reduction of releases of industrial pollutants.

National actions include the adoption of national programmes for the reduction of HCB, Dioxins, furans, organohalogen compounds, heavy metals (Mercury, Cadmium, Lead) and Radioactive substances. These programmes will be carried out as part of the formulation of National Action Plans to be prepared by countries in the framework of the GEF project. Following the preparation of the National Diagnostic Analysis, a priority list of actions will be included in the national programmes by 2003. These activities will be supported by the Secretariat and regional activities that would assist the countries in the implementation of this action.

To regulate releases of chemicals

This action includes the adoption by the countries of the Common measures adopted by Contracting Parties in 1990 to regulate the emissions of pollutants into the Mediterranean sea for the following:

- 0.5g Hg/t of chlorine produced (brine recirculation) or 5g Hg/t of chlorine produced (lost brine technology) and if possible 2g of mercury from total releases from chloralkaly industry.
- Maximum concentration released of 0.2 mg/l of cadmium and cadmium compounds
- Maximum concentration released of 1.0 mg/l for zinc and 0.5 mg/l for copper
- 1kg of AOX (absorbable organic halogen) per tonne of pulp produced from paper and paper pulp industry.

It is expected that countries would reach these levels of releases by 2025 and following the implementation of environmental management plans, BEP and BAT according to the guidelines that would be provided through the GEF project in 2001 and by regional actions. In doing so, countries should include by 2003, in their National Action Plans, the priority actions to be implemented to reach the relatives emission levels stated in the SAP and the common measures.

To prepare National strategy and plans for the management of hazardous waste.

The ratification of the Hazardous Wastes Protocol is considered as a milestone in the implementation of the proposed activities at the national level. The NAPs for hazardous wastes would be the elements for the elaboration of the regional strategy for the management of these wastes.

4. PHYSICAL ALTERATIONS AND DESTRUCTION OF HABITATS

The activities included in this section are directly related to the preservation of coastal habitats and biodiversity and the implementation of coastal zone management and should be considered in the wider context of the over all implementation of the objectives of the Barcelona system. It is suggested however to take into account the targets and the activities agreed upon when preparing National Action Plans to address pollution from land-based activities to be prepared during the period 2001-2003 as part of the activities of the Mediterranean GEF Project. In particular, among the activities to be carried out at the national level, the undertaking of EIA and the establishment of a system of previous authorization are especially relevant to the provision of the LBS Protocol and should be necessarily taken into account in preparing National Action Plans.

Regional Actions

To formulate guidelines for the preservation of habitats and normal ecosystem functions in coastal areas, particularly in the context of integrated coastal zone management.

To develop programmes for integrated coastal zone management.

National Actions

To support programmes for integrated coastal zone management.

To undertake studies on the potential effects on the environment or Environmental Impact Assessment according to the importance of the physical alterations and the destruction of habitats related to management projects.

To establish a system of previous authorization by competent national authorities for works which cause physical alterations of the natural state of the coastline or the destruction of coastal habitats.

5. MONITORING

Marine pollution monitoring activities have been among the basic activities of MED POL since its inception and are continuing, further developed, in its Phase III. However, the SAP introduces new types of monitoring not covered until now, which have to be taken into account at the regional and national level in order to meet the SAP targets and objectives. They are examined here below with the indication of how the related activities could be implemented.

Regional Actions

To prepare guidelines for local air pollution monitoring programmes in cities and urban agglomerations exceeding one million inhabitants.

The guidelines should be prepared by making use of already existing technical documents and reports as well as international laws and regulations set by the competent regional and international Organizations and bodies such as WHO and the EU. If so decided by the Contracting Parties, the Secretariat, in cooperation with WHO, could prepare draft guidelines and submit them for consideration.

To develop guidelines for river pollution monitoring programmes

To promote the establishment of permanent registers of river quality and quantity accessible to all Parties for selected rivers (about fifty).

With the extension of the coverage of the 1996 amended LBS Protocol to include the hydrographic basin of the Mediterranean, specific programmes related to assessment and control of river pollution are going to be implemented through MED POL starting from 2001. Work on the preparation of the above guidelines will start by 2001 with the assistance of regional experts. An experts consultation meeting will convene to review and approve the technical details of the selected draft guidelines prior to submission to the Meeting of MED POL National Coordinators for formal approval by 2003. The approved guidelines will then be submitted to the Meeting of the Contracting Parties for formal adoption.

This activity will be supported by the Mediterranean GEF Project, which includes the preparation and adoption of regional guidelines for river pollution monitoring under Regional Co-operative Actions.

Starting in 2002-2003, information on the quality and quantity of fifty selected rivers will be collected from national authorities, regional and international sources (EEA etc.) to form a

register, which will be submitted through the Secretariat, to the meeting of the Contracting Parties.

To promote the establishment of a data bank on socio-economic indicators related to sea and river quality and pollutant fluxes associated with the Geographic Information System (GIS).

The work on the preparation of indicators already started in 2000 in the framework of the Mediterranean Commission on Sustainable Development in cooperation with MED POL in relation to water pollution. During 2002/2003 relevant information will start being collected from international and national sources to create a data bank to feed the approved indicators related to sea and river quality and pollutant fluxes. The secretariat will be responsible for the management of the data bank.

To promote the establishment of an inventory of major point atmospheric sources following EMEP/CORINAIR guidelines.

Starting from 2002-2003, information on coastal atmospheric pollutant emissions by source in the Mediterranean will be collected from countries by the Secretariat, taking into consideration EMEP/CORINAIR guidelines. An inventory of Mediterranean atmospheric emissions will be created and submitted to the meeting of the Contracting Parties.

National Actions

The establishment of inspection systems to ensure compliance with the conditions laid down in the authorisations and regulations.

As a follow up to the Art. 6 of the 1996 amended LBS Protocol calling for the establishment of systems of inspection, extensive work is being carried out by MED POL to assist the countries in meeting the requirements of the Protocol. Two Workshops were convened in 1999 and 2001 to assess the status of such systems country by country and to formulate a specific capacity building programme. An informal regional network on compliance and enforcement was created and will work with the secretariat in formulating, approving and implementing such programme starting from 2002. Regional guidelines for an environmental inspection system will also be prepared in the framework of the Mediterranean GEF Project by 2003.

The establishment of monitoring programmes to evaluate the effectiveness of actions and measures implemented under this Programme.

This action will continue to be implemented according to the provisions of the LBS Protocol and relevant ongoing MED POL Phase III activities related to compliance monitoring, to be included by countries in national monitoring programmes.

The establishment and improvement of local air pollution monitoring programmes as a priority in cities and urban agglomerations exceeding one million inhabitants.

This action could be implemented by the countries in cooperation with the competent regional and international bodies such as WHO and EU, taking into consideration the regionally adopted guidelines for air pollution monitoring programmes in cities and urban agglomerations exceeding one million inhabitants to be prepared (see Air Pollution above).

The establishment and improvement of local and national monitoring programmes to control and assess effluents discharge and to assess the quality of the marine environment.

This action will continue to be implemented according to the provisions of the LBS Protocol and relevant ongoing MED POL Phase III activities, related to compliance, trend and biological effects monitoring, to be included by countries in national monitoring programmes.

The establishment and improvement of river pollution monitoring programmes.

This action will be implemented, starting from 2002-2003, taking into consideration regionally adopted guidelines for river pollution monitoring programmes and a regional plan for the establishment of regional pollution monitoring, reporting and data quality assurance programmes for rivers to be prepared in the framework of the Mediterranean GEF Project by 2003.

The establishment of permanent registers of river quality and quantity accessible to all Parties on selected rivers (about fifty).

Starting from 2002-2003, information on the quality and quantity of fifty selected rivers will be collected from national authorities, in order to form a register, which will be submitted through the Secretariat, to the meeting of the Contracting Parties. Expert technical assistance could be provided through the MED POL Programme Secretariat in the implementation of this action.

The establishment of a data-bank on socio-economic indicators related to sea and river quality and pollutant fluxes associated with the Geographic Information System (GIS).

Starting from 2002-2003, relevant information will be collected from national authorities to create a data bank to feed socio-economic indicators related to sea and river quality and pollutant fluxes (see related regional above).

To improve the inventory of major point atmospheric sources following EMEP/ CORINAIR guidelines.

Starting from 2002-2003, information on atmospheric pollutant emissions by source would be collected by national authorities taking into consideration EMEP/ CORINAIR guidelines and submitted to the Secretariat. An inventory of Mediterranean atmospheric emissions could be created following the guidelines adopted at a European level for the creation of the CORINAIR inventory (see related regional action above).

6. CAPACITY BUILDING

The capacity building activities of the SAP aim to improve, *inter alia*: the scientific base, environmental policy formulation, professional human resources, institutional capacity and capability, both public and private, the implementation of environmentally sound technologies, the implementation of policies for cleaner production and technical cooperation, including cooperation in the fields of technology transfer and know-how. The activities referred to can be grouped into two categories:

- To support, promote and facilitate programmes of assistance in the area of scientific, technical and human resources;

- To support, promote and facilitate, as appropriate, the capacity to apply, develop and manage access to cleaner production technologies as well as the best available techniques (BAT) and the best environmental practice (BEP).

The activities to be implemented for each category are to be considered at both national and regional level. All the competent MAP structures will be used for their implementation.

To support, promote and facilitate programmes of assistance in the area of scientific, technical and human resources.

Regional Actions

To support the establishment of networks to improve the exchange of experience among Mediterranean experts, especially in the field of the priorities established in the SAP to prevent marine degradation.

The establishment of Mediterranean networks of experts involved in the priority areas for action determined in the SAP could be facilitated through technologies such as the Internet. Starting in 2002-2003, a description of the actions and targets of the SAP could be included in the information provided in the UNEP/MAP web-site, as well as the relevant activities of experts, to improve the exchange of experience.

To formulate and support programmes of cooperation for capacity building and the development of institutions, including relevant technology and management training, human resources (scientific and technical personnel) and public education. These programmes should give assistance to, inter alia, environmental impact assessment, sustainable development planning, environmental auditing and management, environmental education, etc.

The long-term implementation of the SAP by the countries is conditional to the establishment of a solid institutional and scientific/technical basis in each country. The Mediterranean GEF Project was formulated on that assumption and, as a result, represents the major available source to carry out the necessary regional and national capacity building programme. During the period 2001-2003, as part of the Project, regional (training for trainers) and national training courses will be organized on environmental auditing and management; environmental education; pollution monitoring and inspection; cleaner production techniques and practices; operation and maintenance of waste water treatment plants; river pollution monitoring; and Integrated Coastal Zone Management.

To formulate and implement in the framework of MED POL capacity-building programmes related to the assessment and control of marine pollution.

Regional and national training programmes will continue to be implemented according to the provisions of MED POL capacity building activities to be included in national monitoring programmes. One regional training course and a number of national training courses on pollution monitoring and inspection will also be organised as part of the Mediterranean GEF Project, in the biennium 2002/2003.

To assist in the formulation of projects eligible to be financed by international financial donors.

The Secretariat will provide continuous support to national authorities requesting assistance in the formulation of projects eligible to be financed by international financial donors. This process, already started during the formulation period of the Mediterranean GEF Project, will continue in particular in the light of the expected results of the pre-investment studies for pollution hot spots to be carried out by 2003 as part of the Project.

To assist and advise on policies, strategies and practices that may contribute to the implementation of the measures and targets included in the SAP.

Assistance to countries on policies, strategies and practices towards the implementation of the SAP will be provided in particular in 2001-2003 for the preparation of National action Plans foreseen by the Mediterranean GEF Project.

To prepare a general manual with guidelines on urban policies directed towards energy saving, non-polluting forms of transport, waste management, the sustainable use of water and the creation of town amenities.

Taking into consideration the need to incorporate the principle of sustainable development in the implementation of the SAP, and to assist the Mediterranean countries in doing so, a general manual with guidelines on urban policies directed towards energy saving, non-polluting forms of transport, waste management, the sustainable use of water and the creation of town amenities could be prepared, starting in 2002-2003, making use of the relevant work of the Mediterranean Commission on Sustainable Development.

To prepare a river monitoring manual by the year 2000.

The material of the training courses on river pollution monitoring will form the basic material for the preparation of a river monitoring manual by 2003 in the framework of the MED POL Programme.

To prepare guidelines on linking socio-economic indicators to water quality indicators through GIS to check pollution control.

The preparation and testing of indicators (see chapter on monitoring) will be followed and further developed aiming by the year 2005 to enable their use to confidently assess quality and quantity of water pollution. Guidelines could be prepared to that end. If approved by the Contracting Parties, during the biennium 2004-2005 MED POL will include this activity in its work plan.

To support, promote and facilitate, as appropriate, the capacity to apply, develop and manage the access of cleaner production technologies as well as the Best Available Techniques (BAT) and the Best Environmental Practice (BEP).

Regional Actions

To facilitate and promote access, in particular for countries in need of assistance, to new and innovative technologies relevant to each selected land-based source and activity, including those causing physical degradation and the destruction of habitats.

To promote new information technologies that facilitate the transfer of knowledge within countries and between States, including, in particular, from developed countries to countries in need of assistance.

In order to implement these activities, a closer cooperation will be established between MED POL and CP/RAC. In particular, CP/RAC will be asked to include in its 2002-2003 work plan the preparation of an inventory of relevant new and innovative technologies which should be kept regularly updated and made widely available making use of more advanced information technologies such as internet. The Secretariat could also encourage and support, by possibly making use of the Mediterranean Commission on Sustainable Development (Thematic Group on Industry) the establishment of collaborative arrangements between national institutions and industries of technologically more advanced countries and those countries in need of assistance, with the aim to facilitate and promote access to clean technologies.

To prepare a general manual with guidelines on implementing cleaner technologies, cleaner production and cleaner materials.

A number of guidelines will be prepared on implementing cleaner technology during the period 2001-2003 in cooperation with CP/RAC as part of the Mediterranean GEF Project (see page 39).

To prepare a general manual with guidelines on introducing alternatives to priority POPs.

A document providing technical information on the nine pesticides and PCB substitutes and on the environmentally sound disposal and progressive elimination of the nine pesticides and PCBs will be prepared by 2003 in cooperation with the relevant international bodies and Organizations.

The establishment of networks to improve the exchange and transfer of (information on) environmentally sound technologies among Mediterranean experts, especially in the field of the priorities established in the SAP to prevent marine degradation.

The establishment of Mediterranean networks of relevant experts will be promoted and facilitated through the existing CP/RAC Focal Points. It could be facilitated through technologies such as the Internet.

To enhance the access to and transfer of patent-protected environmentally sound technology, in particular to developing countries.

To promote collaborative arrangements between enterprises of developed and developing countries for the development of clean production technologies.

To promote joint ventures between suppliers and recipients of technologies, taking into account policy priorities and objectives of developing countries.

To assist and advise on environmental aspects of current technologies that may contribute to the implementation of the measures and targets included in the SAP.

In close cooperation with CP/RAC, and by possibly using also the opportunity given by the work of the Mediterranean Commission on Sustainable Development, the Secretariat could undertake to communicate regularly to international funding agencies, national

authorities, private companies and industry of more technologically advanced countries, the requirements of developing countries in order to implement the actions related to the SAP and the provisions of the LBS Protocol.

The Secretariat could encourage and promote the establishment of collaborative arrangements between national institutions and industries of technologically advanced countries and those of countries in need of assistance, with the aim to facilitate and promote the development of clean technologies in industries/countries requiring assistance.

A first step could be the creation of an inventory of perspective recipient and donor countries for the promotion of the transfer of clean technology among Mediterranean countries.

The purpose of this inventory would be to identify countries in need of clean technology transfer to implement the provisions of the LBS Protocol and the specific activities identified in the SAP, as well as to identify those countries willing to enter into bilateral cooperation, to transfer clean technology, in countries requiring such assistance.

In relation to this activity, national reference centres for "technology assessment" could be identified by Mediterranean countries, by 2005, for the evaluation of technologies, particularly those intended for transfer to developing countries. These centres would function in cooperation with the Clean Production Regional Activity Centre, making provisions for the participation of NGOs, and private sector experts.

MED POL will be responsible for the preparation of this inventory in cooperation with the CP/RAC, which will be initiated from the year 2003. This inventory will be updated on a yearly basis and made widely available to all Mediterranean Countries.

To assist and advise on the preparation of reports that are required for the LBS Protocol.

As part of the MAP Reporting System which will be completed in 2001, covering reporting requirements and formats for all the Protocols to the Barcelona Convention, specific formats were prepared also for the 1995 LBS Protocol. Once adopted, the system may require the provision of technical assistance for its application. Starting from 2002, MED POL will include in its work plan assistance to countries for reporting the implementation of the LBS Protocol.

In parallel, but directly related to the LBS Protocol, specific formats will be prepared by 2001 for reporting trend, compliance and biological effects monitoring data resulting from national monitoring programmes and guidelines will be prepared to implement the public tracking and reporting systems of pollutants, known generically as Pollutant Release and Transfer Registers (PRTR).

7. PUBLIC PARTICIPATION

Regional Actions

To identify potential roles for Non-Governmental Organizations in the implementation of the SAP and to ensure that all relevant IGOs and NGOs have appropriate access to information concerning the SAP and its application

NGOs will play an important role in advising on the means to incorporate the principle of sustainability, pollution prevention and control, the application of BEP and where required

BAT, in policies, strategies and practices contributing to the implementation of the measures and targets included in the SAP. To this end all relevant IGOs and NGOs will have adequate access to information and meetings concerning the SAP and its application. Cooperation with experts from environmental agencies and NGOs could be strengthened, in order to assist in providing continuous assistance and advice to national authorities on policies, strategies and practices that may contribute to the implementation of the measures and targets included in the SAP in the most environmentally sound manner.

A first activity in this direction will be the organisation of a workshop in the year 2002, which will be supported by the Mediterranean GEF Project, to reach a decision on the contents of a regional programme for public participation in the implementation of the SAP. This workshop will focus on the role of NGOs and the provision of information to the general public.

To implement coordinated information campaigns and special activities on environmental protection.

This activity will be carried out in the framework of ongoing and planned activities of MAP concerning public awareness and participation, particularly in view of MAP's Strategy on Information and Public Awareness. Public awareness initiatives could also emphasize the change in the strategy for the protection of the Mediterranean environment brought about by the new LBS Protocol.

To continue and expand publication and distribution of brochures, leaflets, posters, reports, newsletters and other information materials, as well as the use of the media in all its forms

This activity will be carried out in the framework of ongoing and planned public information activities of the Mediterranean Action Plan, while also emphasizing in all public awareness initiatives the change in the strategy for the protection of the Mediterranean environment brought about by the new LBS Protocol.

To enhance and strengthen the exchange of information and experience on the environmental problems of the region, and to develop cooperation in this field.

This action will be implemented in the framework of ongoing and planned activities of MAP concerning public participation, particularly in view of MAP's Strategy on Information and Public Awareness. The Secretariat will continue to regularly publish reports on the state and trends of the Mediterranean Environment, which will be made available to the Parties and to the general public. The designation of National Focal Points for Information could substantially contribute to a capillary distribution of information throughout the countries.

8. REPORTING

Regional Actions

To prepare and apply a unified reporting system on the application of the provisions of the Convention, the Protocols and the SAP.

A unified reporting system on the application of the provisions of the Convention and the Protocols is being prepared by the Secretariat and will be completed in 2001. In view of the complexity of the SAP and the evident difference in nature of the action contained therein (e.g. policy action, reduction measures, implementation of action plans, etc.) it was not considered

appropriate to include SAP activities in the MAP Reporting System. While reporting on industrial pollution reductions is self contained in the reduction process and methodology proposed (see chapter on Industrial Development), specific formats for reporting progress on other SAP activities will be developed during the biennium 2002-2003 in cooperation with the UNEP/GPA Coordinating Office as a result of the First Intergovernmental Review Meeting on the implementation of the GPA which will be held at the end of 2001.

To collect information on the levels and trends of loads of pollution reaching the Mediterranean Sea.

This action will continue to be implemented through the ongoing activities of MED POL which are included in national monitoring programmes (see chapter on Capacity Building).

To collect information on the state of the treatment and the disposal of liquid and solid wastes in the Protocol Area and to present such information to the Contracting Parties.

Information on the state of the treatment and the disposal of liquid and solid wastes in the Protocol Area will be regularly collected from national authorities and international sources and submitted to the Contracting Parties as part of the MED POL work plan. A report on the state of sewage treatment plants in the region was prepared in 2001 and could be updated in early 2004.

To publish a report on the State and Evolution of the Mediterranean Environment at regular intervals .

An information document on the state, pressures and trends of the Mediterranean Environment was prepared in 2000 by the European Environment Agency (EEA) on the basis of data collected from MED POL and Blue Plan activities. A summary document on Mediterranean land-based pollution was published by MAP in 2001. It is intended to continue to prepare at regular intervals information documents on the state of the Mediterranean environment.

To develop public tracking and reporting systems of pollutants, known generically as Pollutant Release and Transfer Registers (PRTRs), in cooperation with the OECD.

According to UNCED's Agenda 21, industries should provide data on the pollutants they release, specifically those needed for the assessment of potential risks to human health and the environment. These data should be made available to national authorities, international bodies and other interested parties involved in hazard and risk assessment. One type of data referred to are emissions data which could be brought together in a Pollutant Release and Transfer Register (PRTR).

During the biennium 1999-2000, MED POL initiated the process of preparing PRTR in one country as a model for the region. During 2001 one additional country will be selected for implementing PRTR. During the biennium 2002-2003, guidelines will be prepared for a larger involvement of countries in the process and a regional trainer training course will be organised. It is expected that by 2003 countries would all agree to participate in the process.

9. PREPARATION OF NATIONAL ACTION PLANS

The formulation of National Action Plans (NAPs) represents the operational long-term result of the Strategic Action Programme, as the National Action Plans are supposed to make

use of the results of the individual activities identified in the SAP. According to the Programme, in fact, the Contracting Parties will develop or review and adopt, within five years at the latest, National Action Plans addressing pollution from land based sources, through the adoption of the targets and activities identified in the SAP and through taking action to implement these programmes. With the assistance of the Mediterranean GEF Project, the process of preparing National Action Plans will initiate in 2001 and will be completed in 2003. National Action Plans are expected to be fully operational by 2005.

National Action Plans will focus on sustainable, pragmatic and integrated environmental management approaches and processes, such as integrated coastal area management, harmonized, as appropriate, with river basin management and land-use plans.

Following the preparation of a national diagnostic analysis, to identify and assess national problems and issues, in 2001 sectoral programmes will start to be prepared containing the actions required to reach the respective regionally adopted targets. The programmes, to be prepared by small national working teams, will consist of actions necessary to fulfil the relevant provisions adopted on a regional level such as regional plans, guidelines, common measures, environmental quality criteria, emissions limits, capacity building activities, etc. National experts will then on the basis of the sectoral programmes start to prepare in 2002-2003, in consultation with MAP, the National Action Plans, which will be submitted to national authorities for formal adoption.

This activity will be supported by the Mediterranean GEF Project, which includes the provision of support to inter-ministerial committees of the countries in the development and implementation of individual National Action Plans.

In the countries where National Environmental Action Plans (NEAPs) have been adopted, the National Action Plans for LBS must be consistent with the NEAPs.

ANNEX I

SAP: SELECTED AREAS AND CATEGORIES - TARGETS AND ACTIVITIES A SUMMARY

1. SAP - AN OVERVIEW

One of the prerequisites for the implementation of this Operational Document is that all those responsible and directly involved - experts, professionals, staff and executives at various levels and in different scientific and technical disciplines - are well acquainted with and competent on issues dealt by SAP.

Nevertheless, it seems advisable to present an overview of SAP, summarizing and extrapolating the elements relevant for the formulation and implementation of the activities. In addition, such an overview, together with the Executive Summary of the document, might be used as information for high level decision makers.

1.1 The structure and contents of SAP

The SAP document might be presented as structured in five major parts:

- an introductory part: introduction, objectives, principles, obligations and priorities for action
- targets and activities for areas: (i) Urban environment, (ii) Industrial development and (iii) Physical alterations and destruction of habitats
- accompanying activities and provision of assistance: (i) Monitoring, (ii) Capacity building, (iii) Public participation and (iv) Reporting,
- instructions and information: (i) Guidelines for the preparation of NAPs, (ii) Investment Portfolio and Mobilization of Financial Resources, and
- a concluding part, related to: Gaps, Problems and Follow up.

1.2 SAP: adoption, linkages, principles and obligations, priorities for action

The SAP document was adopted by the Tenth Ordinary Meeting of the Contracting Parties, held in 1997 in Tunis. Its formulation and adoption were linked with:

- the revised LBS Protocol, signed in 1996 in Syracuse, as the legal and contextual basis
- GPA, defining the global framework and context
- the regular MED POL programme, the implementation of SAP being its integral part, and
- Conventions: (i) on the Law of the Sea, (ii) on Biological Diversity, (iii) on Climate Change, and the legal instruments/measures adopted by the Contracting Parties.

The implicit long-term objective of SAP is to facilitate the implementation by the Contracting parties of the provisions of the LBS Protocol Reduction.

Its specific objectives are related the implementation of the following major activities:

- formulation of principles, approaches, measures, timetables and priorities for action
- preparation of the Priority Investment Portfolio
- analysis of baseline and additional actions related to transboundary problems
- identification of elements and preparation of guidelines for the formulation of NAPs
- identification of the role and involvement of NGOs and stakeholders in its implementation.

The SAP document is addressed to all Contracting Parties, proposing common objectives, targets and actions, understanding that ways to achieve targets might be different for individual countries.

When implementing SAP, the countries are expected to apply the following principles and approaches: the precautionary principle, the polluter pays principle, undertake EIA, accord priority to integrated pollution control, promote ICZM, elaborate and implement regional and national action plans, adopt priorities and timetables according to Annex I of the Protocol, take into account BAT and BEP, undertake relevant preventive measures, ensure public access to information, ensure reporting on toxic emissions.

The priorities for action will be identified by taking into account: (i) significance of degradation of the marine environment, (ii) significance of perturbation of the biological diversity, (iii) the land-based origin of causes, and (iv) the transboundary nature of causes and impacts.

1.3 SAP: targets and activities for selected areas and categories of pollutants

Targets and needed activities at regional and national level are identified by SAP, structured in three areas and a number of categories within each area:

a) Urban environment:

- (i) Municipal sewage
- (ii) Urban solid waste
- (iii) Air pollution

Issue	Targets		Regional activities	National activities
	2005	2025		
Municipal sewage	dispose sewage from cities > 100000 in conformity with LBS	dispose all sewage in conformity with LBS	<ul style="list-style-type: none"> - update guidelines - develop programmes for EST for sewage treatment - promote research programmes 	<ul style="list-style-type: none"> - update national regulations - develop national plans and programmes for the environmentally sound management of sewage <ul style="list-style-type: none"> - connection to sewer - outfalls siting - tertiary treatment - good housekeeping - reuse of treated wastewater - separate collections - reuse of sludge - prohibit discharge of sludges into sea water
Urban solid waste	solid waste management system in cities > 100000	solid waste management for all urban agglomerations	<ul style="list-style-type: none"> - guidelines for SWM - develop reduction of recycling 	<ul style="list-style-type: none"> - national plans for reduction and recycling - national SWM systems for cities > 100000
Air Pollution	cities > 100000 ambient air	cities ambient air quality conform	<ul style="list-style-type: none"> - formulate and adopt air quality objectives 	<ul style="list-style-type: none"> - promote traffic management

Issue	Targets		Regional activities	National activities
	2005	2025		
	quality conform to standards	to standards		<ul style="list-style-type: none"> - lead free petrol - inspection of vehicles - use of national gas - public transport

b) Industrial development:

- (i) Toxic, Persistent and Liable to Bioaccumulate substances - TPBs: Persistent Organic Pollutants (POPs); Heavy metals Hg, Cd, Pb and Organo metallic compounds;
- (ii) Other Heavy metals: Zn, Cu, Cr
- (iii) Organo halogen compounds
- (iv) Radioactive substances
- (v) Nutrients and suspended solids, including municipal sewage, industrial waste water, impacts from agriculture and atmospheric emissions, and
- (vi) Hazardous waste

Issue	Targets			Regional activities	National activities
	2005	2010	2025		
1) Industrial pollution		50% reduction of TPB	Point sources discharge and emissions conformity with LBS & standards	<ul style="list-style-type: none"> - guidelines for WWT - EQO for point sources - information programme - research programme - guidelines for BEP, BAT - environmental management 	<ul style="list-style-type: none"> - inventory of point sources - national regulations - priority to SME - environmental management
2) TPB - POPs	50% reduce of inputs collect and dispose all PCBs	Phase out inputs of POPs		<ul style="list-style-type: none"> - provide technical information - guidelines for BEP and BAT - emission values for point source discharges for PAH 	<ul style="list-style-type: none"> - inventory of POPs and PAHs - phase out use of pesticides - safe disposal of PCBs and pesticides - reduce emissions of HCB, dioxins, furans
		25% reduction of PAH inputs	phase out inputs of PAH		<ul style="list-style-type: none"> - apply BEP & BAT
- Heavy metals (Hg, Cd, Pb)	50% reduction		phase out discharges emissions		<ul style="list-style-type: none"> - apply BAT & BEP - national programmes

Issue	Targets			Regional activities	National activities
	2005	2010	2025		
			& losses		- adopt emissions of 0.5 g Hg/t of chlorine or 5 g Hg/t depending on process 2 g Hg total releases
- organo Hg, Pb, Tin compounds	phase out organo Hg	50% reduction of discharges	phase out organo Pb, organo Sn	- guidelines for BAT & BEP - EQO and standards	- inventory of organometallic - phase out the use of organotin as antifouling and cooling systems - apply BAT & BEP and environmental management
- zinc, copper, chromium		reduce discharges	eliminate discharges	- guidelines for BAT & BEP - EQO and standards	- adopt 1 mg/l of zinc 0.5 mg/l of copper releases into the sea - apply BAT, BEP and environmental management
3) - Organohalogen compounds - Halogenated Aromatic hydrocarbons - Halogenated aliphatic hydrocarbons - Chlorinated phenolic compounds - Organohalogen pesticides		reduce discharges	eliminate discharges	- guidelines for BAT & BEP - EQO and standards	- apply BAT, BEP and environmental management - adopt 1 kg/t of pulp of AOX release - inventory of pesticides - adopt national programmes for reduction - reduce uses of chlorinated solvent - reduce and control use of 2.4D and 2.5T and chlorophenols - participate in regional and international related programmes
4) Radioactive substances			eliminate inputs	- information system	- environmental management of radioactive waste - apply BAT, BEP to reduce input - reporting
5) Nutrients and suspended solids		50%	all waste	- guidelines for BAT & BEP	- reduce discharge

Issue	Targets			Regional activities	National activities
	2005	2010	2025		
- Urban and industrial waste water		reduction form industry	disposed according to LBS protocol	- EQO and standards	- environmental management of waste water - apply tertiary treatment - good housekeeping - reuse of treated waste water - environmental management of sludges
- Agriculture			reduce inputs	- guidelines for rational use of fertilizers and losses of nutrients - participate to FAO related programmes	- assess fertilizers - assess quantities of ma.... - rational use of fertilizers - good agriculture practices - participate to FAO related programmes - implementation of convention on desertification
-Atmo-spheric emissions					
6) Hazardous wastes		20% reduction of generation of hazardous waste 50% safely disposed	dispose in safe environmental sound manner	- prepare Mediterranean strategy for management of hazardous wastes - adopt common antipollution measures	- national strategy for the management of hazardous wastes - national plans for management of hazardous wastes - envir. sound disposal of hazardous wastes - ratify hazardous wastes protocol
- Obsolete chemicals	collect and dispose in a safe environmental mannger			- programmes for information exchange	- training programmes for recycling, collection treatment, disposal - inventories
- Luboil	50% collect and dispose in a safe environmental manner			- adopt standards for PCB content (50 mg/kg)	- inventories - pilot programmes for recycling, collection treatment, disposal

Issue	Targets			Regional activities	National activities
	2005	2010	2025		
- Batteries		20% reduction of generation 50% disposed in an environmental manner	dispose all batteries in an environmental manner		- nation inventories - pilot programmes for recycling, collection treatment, disposal - special programmes for public and military sectors

c) Physical Alterations and Destruction of Habitats:

A total of 38 targets are proposed, most of them with defined time horizons for their achievement (years 2005, 2010 and 2025); some targets being of and on-going or permanent character. In addition, relevant activities needed to achieve the set up targets are proposed, 38 of them at regional and 80 at the national levels.

The majority of targets are defined by % of reduction or elimination of the relevant emission for respective category or group of emissions, or by phasing out polluting activities or full compliance with the LBS Protocol, related to various pollutants and or sources.

The relevant activities at regional level are predominantly related to: (i) preparation of respective guidelines for environmentally sound disposal or management, (ii) establishment of Environmental Quality Criteria, emission standards, ..., (iii) development and implementation of technical programmes for exchange of experience and provision of information, (iv) implementation of research programmes for validation of technologies, (v) preparation of guidelines for respective BAT, BEP and clean technologies, (v) participation in selected activities, being implemented by other international organizations (FAO, OECD, others), etc.

Activities to be implemented at national level are predominantly related to: (i) establishment or updating of respective national regulations, according to the LBS Protocol and common measures, (ii) development of specific national (sectoral) plans, (iii) % reduction or total elimination of respective types of discharges, pollutants, polluting activities, (iv) promotion of selected and or specific measures and procedures (public transport, use of environmentally sound fuels and petrol, participation of selected stakeholders, etc.), (v) preparation of inventories of discharge / emission sources / polluting industries, vs. selected areas (hot spots, areas of concern, critical habitats), (vi) application of Environmental Audits, BEP and BAT, etc.

1.4 Accompanying activities and provision of assistance

Accompanying activities include: monitoring, capacity building, public participation and reporting.

Monitoring activities, related to the implementation of SAP are organized within the framework of MED POL Phase III Programme, adopted in 1996. The respective targets proposed are related to the establishment of: (i) programmes for monitoring inputs of priority pollutants, (ii) permanent river water quantity/quality registers, (iii) inspection systems, and (iv)

programmes for monitoring discharges and emissions of priority pollutants; all including also monitoring of the quality of the marine environment.

The respective actions at regional level envisage preparation of guidelines, and establishment of a relevant data base and GIS for sea and river quality and pollutant fluxes. Actions at national level envisage the establishment of respective inspection systems, establishment of monitoring programmes and of a relevant database / GIS.

Capacity building activities include support, promotion and facilitation of programmes of assistance (i) in the area of scientific, technical and human resources, and (ii) related to the capacity to apply, develop and manage clean production technologies, BAT and BEP.

The activities related to capacity building at regional level envisage: (i) establishment of relevant network(s), (ii) formulation of and support to capacity building programmes, training and public education, (iii) assistance in formulation of projects for international funding, (iv) preparation of manuals: on relevant urban policies, on socio-economic indicators linked with water quality indicators, on cleaner technologies, on introduction of alternatives to priority POPs, and (v) promotion of collaborative arrangements, joint ventures, provision of assistance and advice.

Public participation. For the implementation of this vital aspect of SAP, following targets are proposed: provision of access to information to general public and stakeholders, facilitation of public access to SAP activities, and mobilization and involvement of major stakeholders in the process. The respective activities are related to: identification of potential role of NGOs in the process and their involvement as appropriate; implementation of coordinated information campaigns, publication and dissemination of informative materials and use of media; promotion and strengthening of exchange of information and experience among stakeholders.

Reporting. According to the LBS Protocol, regular two-yearly reporting by Contracting Parties is envisaged. The activities at regional level are related to: preparation and use of a unified reporting system, collection of information on pollution trends and loads; publication at regular intervals of reports on the State and Evolution of the Mediterranean Environment; and, development of Pollutants Release and Transfer Register (PRTR).

1.5 Technical instructions and information

Instructions and information are presented in two chapters:

- Guidelines for the preparation of NAPs, and
- Investment Portfolio and Mobilization of Financial Resources.

Guidelines for the preparation of NAPs provide general information and instructions related to:

- objectives, principles and obligations, to be considered at national level
- preparation of NDAs
- establishment of national priorities for action
- relevant institutional aspects, including authorization or regulation procedures
- monitoring, enforcement, capacity building, public participation and reporting.

In addition, guidelines recommend relevant targets and activities, harmonized with those formulated in the preceding parts of SAP.

The chapter on Investment Portfolio and Financial Resources presents and/or elaborates:

- Mediterranean Hot spots and Sensitive areas, including proposed investments and estimated costs, as presented by national reports
- Investment Portfolio scenaria
- Activities proposed and associated costs, separately for: Hot spots, Sensitive areas, Cities, and for the Regional Sustainable Environmental Management Programme (the latter including capacity building, National Plans and Programmes, cleaner production, monitoring and evaluation, and information and public participation.

A number of tables provides information and data related to:

- Major problems and their root causes (from TBDA for the Mediterranean sea)
- Hot spots and Sensitive areas (from respective country reports)
- Estimated investment costs for Hot spots, Sensitive areas (on the basis of country reports)
- Real costs for environmental neglect (World Bank)
- Tentative ten years investments required (World Bank)
- Required emission reduction in cities at risk, and associated costs (EU)
- List of proposed activities and associated costs for: Hot Spots; Sensitive areas; Cities; Capacity building; Preparation of national programmes; Application of BAT/BEP/Cleaner production; Monitoring and enforcement; and Public participation - all prepared by the Secretariat-, and
- Estimated costs for activities from 1988 to 2008, also prepared by the Secretariat.

The scale of financial implications of the implementation of SAP might be illustrated by following estimates presented in cited tables:

- | | |
|------------------------------------------------------|------------------------------------|
| - estimated costs for 10 years investments required: | 60 - 80 bill. US \$ (WB) |
| - estimated cost for Hot spots | 6 bill. US \$ (countries' reports) |
| - estimated cost for activities till 2008: | 10 bill. US \$ (Secretariat) |

Issues related to mobilization of financial resources are presented, proposing actions at national level, those related to mobilization of potential external resources - including an exhaustive list of potential funding sources - and proposing establishment of clearing house mechanisms.

1.6 Gaps, Problems and Follow up

Finally, the SAP document emphasizes the need for considering gaps and problems, related to the formulation and implementation of NAPs, as well as those related to financial estimates presented.

Emphasizing that SAP envisages a very comprehensive and ambitious programme addressing pollution from LBS, gaps are identified, related to:

- a) project and programme specification: (i) recommending a critical approach and re examination of the Hot spots / Sensitive areas catalogue, (ii) calling to focus on socio-economic aspects of Hot spot areas, for a better analysis and understanding of pollution impacts and benefits from applying SPA, (iii) calling for a critical examination of national policies, affecting the environment in Hot spots / Sensitive areas, and (iv) review of opportunities for mobilization of private sector resources

- b) preparation of cost benefit studies: (i) development of a practical framework for studies for major priority projects, (ii) preparation of more accurate costs estimates, (iii) identification of expected benefits, and preparation of more detailed Investment Portfolios, and
- c) funding capabilities at regional level: calling for information on multilateral and bilateral funding sources and for analysis of affordability and cost recovery aspects of implementation of NAPs.

Follow up. The concluding statement emphasizes that SAP is only the starting point of the process, the follow up to be planned by a step-by-step approach.

Related to the follow up, reference is made to the 1997 GEF grant, including possible activities, allowing the start of the SAP process.

Meanwhile, in 1999 a full GEF project "Determination of priority actions for the further elaboration and implementation of the Strategic Action Programme for the Mediterranean Sea" was prepared, concerning preparatory activities leading to:

- the preparation of pre-investment studies for reluctant pollution hot spots
- the adoption and implementation of: regional Guidelines and plans for selected sensitive areas
- development of a SAP for the protection of biodiversity in the region
- enhancement of public participation and institutional capacities
- development of economic instruments for sustainable implementation of SAP, and
- development of NAPs for the implementation of SAP.

The cost of the project totals 12 mill US \$, the GEF contribution being 51% of it.

ANNEX II TECHNICAL INFORMATION FOR POLLUTION REDUCTION

1. INTRODUCTION

The concept of budget is implicitly contained in the SAP since countries have the same commitments regarding SAP targets. Therefore, the equity approach is governing throughout the SAP in terms of commitments and expected benefits.

It is therefore implicit that countries will, as a result of pollutant release reductions committed to under the SAP provisions, provide real, measurable and long term benefits to the whole Mediterranean sea

The elaboration of a national budget for each SAP target would enable countries to redistribute their release commitments in ways that preserve the collective total budget. In other words, the budget for each SAP target is a 'Country Portofolio' for each targeted pollutants.

Two elements should be considered under the budget approach: the Baseline Budget and the certification.

1.1 The Baseline Budget (B.B.)

A baseline budget should be elaborated and defined for each targeted pollutants according to which the achievement is to be measured and certification subsequently applied (see 1.2). It is proposed that countries would consider the sum of releases of a targeted pollutants from substantial sources as a baseline budget.

The Observable Budget Baseline (OBB) for an individual SAP target is calculated from "observable" real data generated in time $(t_0 + x)$ ($x=1,2,3,\dots$ years) that would be compared to the BB for a SAP target at time (t_0) .

The BB as it was stated would be the sum of the releases (R) from different point sources that would reach the Mediterranean sea.

$$\begin{aligned} \text{BB} &= (R_1 + R_2 + R_3 \dots R_n) t_0 & t_0 &= \text{base time} \\ \text{OBB} &= (R_1 + R_2 + R_3 \dots R_n) t_{0+x} & t_{0+x} &= \text{base time} + \text{number of years} \end{aligned}$$

Within this framework the OBBs are determined on the basis of real projects that a country has implemented rather than any uncertain assumption of projects that might be implemented in the future; with OBB estimated at different periods (t_0+x) , certification process could proceed.

OBBs are dynamic in the sense that they change from year to year reflecting the changes in a country as a result of the implementation of the SAP. It is important to note that once a budget for a defined (t_0+x) is certified, the baseline against which releases are measured is fixed to the OBB existing at its certification date. Figures 5 & 6 show a schematic presentation of BB and OBBs concepts.

According to these figures the values of OBB_x should decrease if countries have performed a successful implementation of the SAP activities with the timeframe adopted through the NAPs and the SAP. In the vice-versa situation, the values of the OBB_x would be constant or higher than the B.B. if countries have not implemented the SAP activities

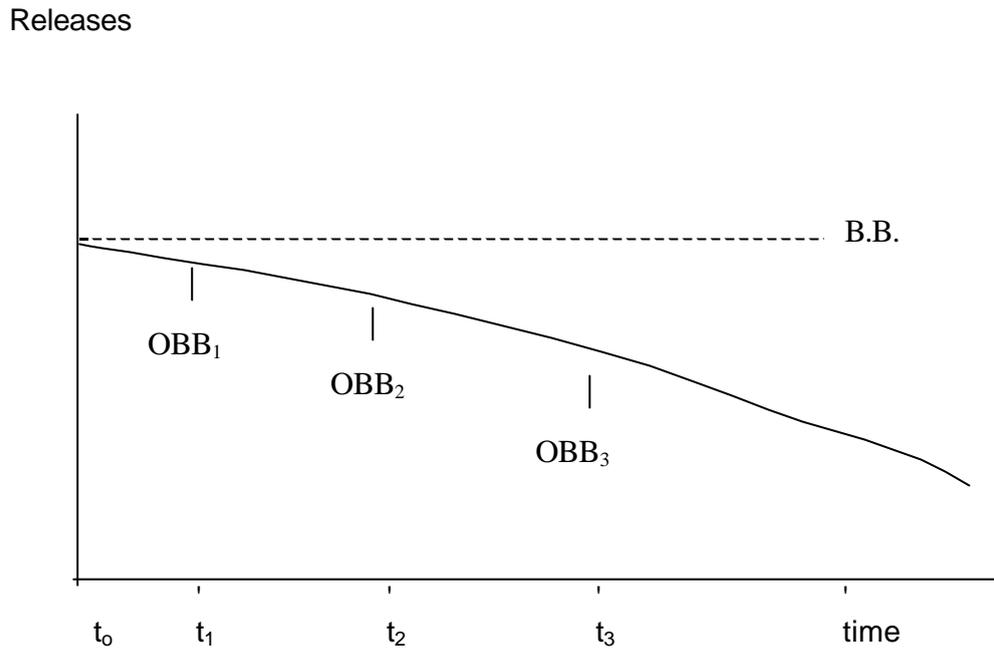


Figure 5 Schematic figure describing the BB and OBBs concepts

Accurate measurements of the national OBBs should be seen rather as a long term goal to be achieved in parallel with the supporting various and regional SAP activities and equivalent to the budget reduction included in the SAP.

The BB concept will need to be reviewed in any case after a first stage of projects is implemented.

Each party shall submit to the Secretariat, not later than 2003, its national BB for each targeted pollutants.

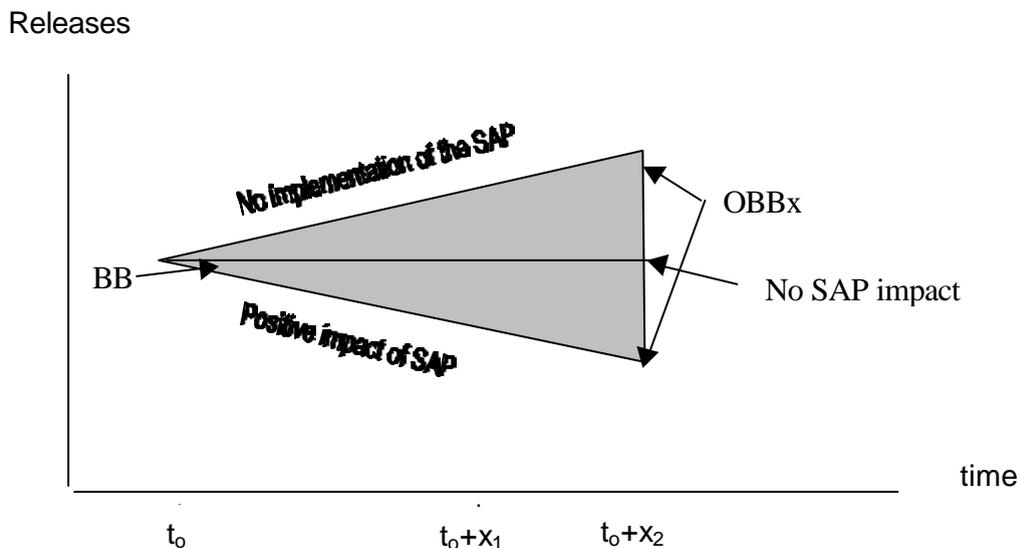


Figure 6 Different types of scenarios for OBB

EXAMPLE

Baseline Budget for chromium

The major sources of chromium released into the Mediterranean sea from "BANABOU" coastal region are five tanneries. The quantities of chromium released in 1994 are as follows:

R1 = 15,000 kg/y
R2 = 12,000 kg/y
R3 = 8,500 kg/y
R4 = 21,500 kg/y
R5 = 17,800 kg/y

If 1994 is considered the base year, the estimation "chromium baseline budget" would be:

\hat{O} releases 1994 = 74,800 kg/y

In 1996, no pollution previons plan, thus the "observable chromium baseline budget" would be OBB_{Cr} 1996 = 74,800 kg/y or higher.

After implementation of a pollution prevention plan in three tanneries and keeping the same level of releases in the two others, the observable releases in 1999 are as follows:

R1 = 8,500 kg/y
R2 = 12,000 kg/y
R3 = 5,000 kg/y
R4 = 18,000 kg/y
R5 = 17,800 kg/y

The OBB_{Cr} for 1999 would be:

$OBB_{Cr} = \hat{O}$ releases = 61,300 kg/y

This type of estimation could be extended to cover the national releases.

1.2 The certification

The certification process is a tool to monitor and follow up the reduction of releases at the level of individual project and of national Observable Baseline Budget (OBB). A project would only be certified if it reached a certain level of release reduction, determined in advance, in the NAP and could lead to the fixed national OBB for a SAP target (Fig. 9).

The certification could be applied at two levels:

- a. Certification at a project based. The adoption of the pollutant releases per unit of production (P.R.P.) would facilitate the control process to national authority, the industry and the certification bodies.
- b. National Observable Budget Baseline (OBB) certification with reference to the B.B. adopted.

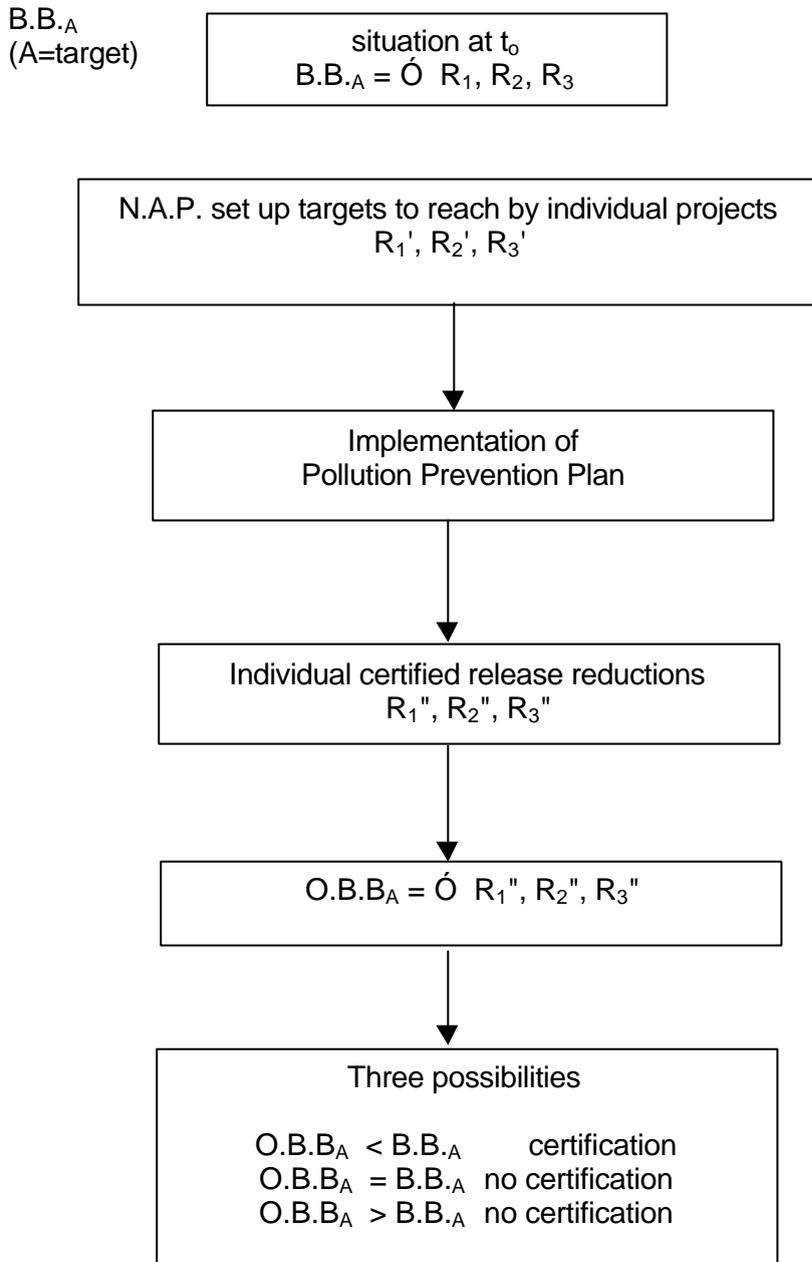


Figure 7: Flow chart indicating the certification process

2. IDENTIFICATION OF A BASELINE TO TRACK THE ACHIEVEMENT OF INDIVIDUAL SAP TARGETS

The commitments defined under the "Industrial Development Activities" of the SAP are targeted reductions of the discharge of a given pollutant by a specific time.

In order to implement these targeted reductions there is a need to identify and establish a pollutant discharge basis at the level of each discharge point and consequently at the national and regional levels, i.e. a baseline.

This baseline should be established to track changes in pollutant releases per unit of production (P.R.P.) for industrial activities, that would be the results of the implementation of the SAP.

This baseline would enable:

- a. to assess changes in pollutants release before and after the implementation of a Pollution Prevention Plan (P.P.P.) (see chapter 3).
- b. to identify differences in pollutants release or discharge per unit of production or capita for facilities or cities producing similar products.
- c. to assess the compliance or non compliance of a discharge to relevant standards.

One of the most important steps in the implementation of P.P.P. is in fact to identify the correct means of measuring the performance of a process or/and unit.

Thus, the unit of production must be carefully chosen, it must be related directly to the product being measured and must be closely related to the waste being targeted.

On the other hand, comparing the pollutant generated from year to year can be useless and misleading if there is a significant change in the levels of production in industrial facilities.

In this context, production ratio (PR) could be used to normalize changes in production levels. PR is the ratio of production level for the base year to the production level for the subsequent year. This factor would be used when comparing SAP target pollutant generated between two years.

2.1 The Unit-of-Product

A unit-of-product is used to adjust the overall measure of changes in chemical use or waste generation. If a firm has made no pollution-prevention improvements, adjusted P.P.P. measures should show no change in waste generation per unit-of-product. If successful pollution-prevention changes have been implemented, adjusted figures should show a decrease in waste generation per unit-of-product.

EXAMPLE

In 1995, an electronic company has generated 12,000 kg of trichlorethane to remove oil from 10,000 electronic circuits. After making several BEP and BAT through a pollution prevention plan the company generated, in 1999, 8,000 kg of trichlorethane waste to remove oil from 15,000 electronic circuits.

Thus it is possible to measure the impact of pollution prevention plan by using the unit of product ratio which is:

$$\frac{\text{number of circuits degreased in 1999}}{\text{number of circuits degreased in 1995}} = \frac{15,000}{10,000} = 1.5$$

Now if no pollution prevention plan changes have been made, the quantity of waste generated would be:

$$\begin{array}{l} \text{(production ratio) x (Qt of wate generated in 1995)} \\ 1.5 \quad \quad \quad \times \quad \quad \quad 12,000 \quad \quad = 18,000 \text{ kg} \end{array}$$

In fact, the quantity of waste generated in 1999 is 8,000 kg. Thus the total reduction in waste generation due to pollution prevention plan is 18,000 - 8,000 = 10,000 kg

Using unit of product to track the pollution prevention plan changes

Another way to track the changes is to assess whether the amount of change of waste per "circuit" produced has changed. The calculation would be:

$$\begin{array}{l} \text{Qt of waste generated} = \frac{12,000}{1,000} = 1.2 \text{ kg} \\ \text{per circuit in 1995} \end{array}$$

$$\begin{array}{l} \text{Qt of waste generated} = \frac{8,000}{15,000} = 0.53 \text{ kg} \\ \text{per circuit in 1999} \end{array}$$

Thus the company has made a reduction of waste generation by 0.62 kg/circuit produced.

2.2 Choosing a Unit-of-Product

The goal to keep in mind when choosing a unit-of-product is to select one that is well correlated to chemical use or waste generation. This means that waste per unit-of-product is constant whatever the level of production, e.g., when production increases, generation increases proportionally and waste per unit-of-product remains constant. Line A in Figure 8 depicts this linear relationship between waste and production data. Mathematically, the slope of the line (W/P) is constant. Under this assumption, if a P.P.P. change were implemented, the change would lead to a new relationship data-represented as Line B in Figure 8.

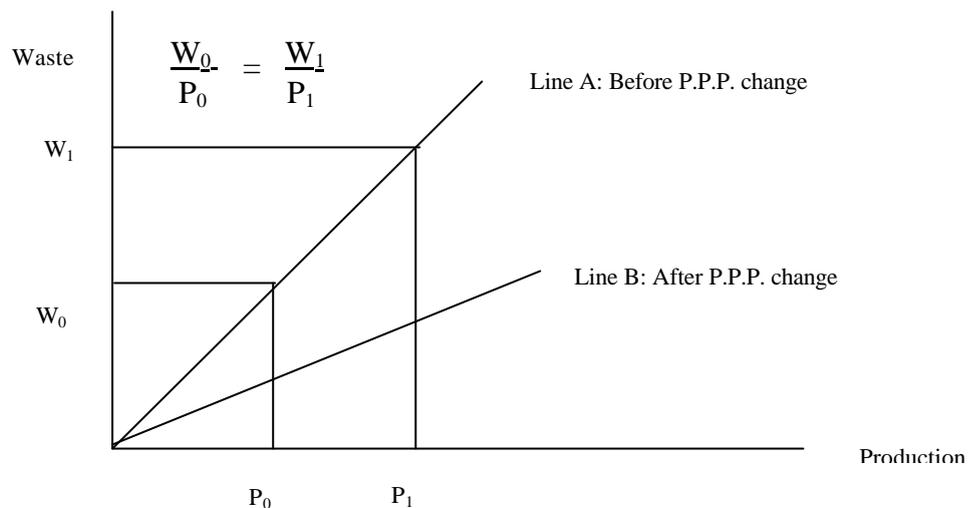


Figure 8 Well-correlated unit-of-product relationship between waste and a related unit-of-product before and after P.P.P. improvements

A poorly correlated unit-of-product will not measure P.P.P. progress adequately. For example, when production doubles, waste generation does not increase proportionally. This means waste per unit-of-product is not constant but depends on the level of production. As a result, a poor unit-of-product will under- or over-estimate P.P.P. progress. Figure 9 represents a poorly correlated unit-of-product where there is a random relationship between waste and production. The waste per unit-of-product ratio (W/P) is different for most points. There is no consistent, predictable relationship between waste and the unit-of-product. Thus, variations in the W/P ratio cannot be said to be attributable to P.P.P. efforts.

Identifying a well-correlated unit-of-product will be easiest in cases where:

- There are few uses of a chemical at the site. The greater the number of uses, such as the case where a cleaning solvent is used in six different sites around the plant, the more difficult it is to find a measure of production that correlates with the waste stream containing this chemical.
- There is little variation in the products manufactured by using the chemical. Variation in product types (such as printed circuit boards and subassemblies) and attributes (such as surface area, geometric shape, or substrate type) makes finding a unit-of-product more complex since each attribute can affect waste generation differently.
- There is little change in processes. Constantly changing processes make measurement from year to year more difficult. Firms with less variable production find it easier to find a unit-of-product since processes and products remain relatively constant from year to year.

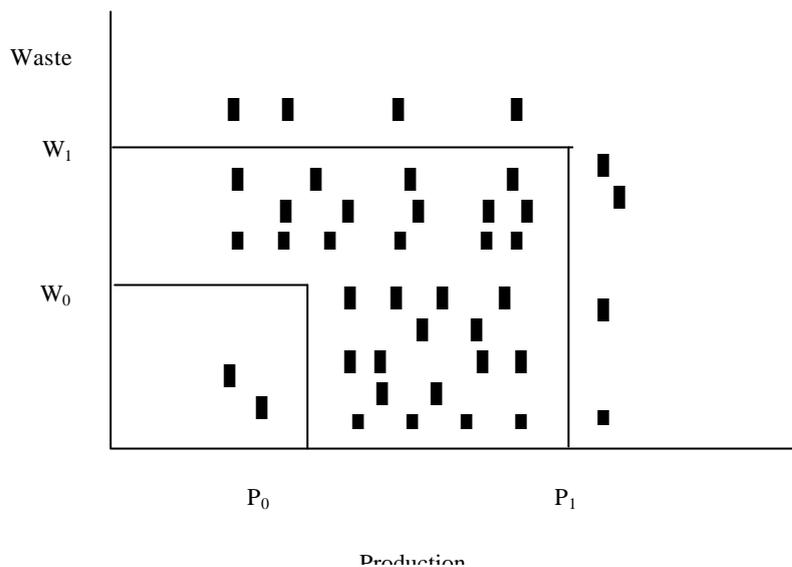


Figure 9 Plot of production and a waste that is not strongly correlated to production. No relationship can be detected

Choosing a well-correlated unit-of-product is further confounded by one important constraint - are the data available? Firms can only choose potential units-of-product from those for which the company has historical data or is willing to collect new data. This is an obvious but very real constraint since many candidates are not traced on a regular basis.

2.3 Analyzing the Unit-of-Product

How can an environmental professional choose a unit-of-product that is well correlated to a given chemical's use or waste generation? Two analytical methods are presented here - graphical analysis and regression analysis.

Graphical analysis is used to qualitatively assess a unit-of-product. Graphical analysis methods include the preparation of histograms, time-series plots, and scatter plots. Graphical analysis is also a preliminary step when performing regression analysis. See Figure 10.

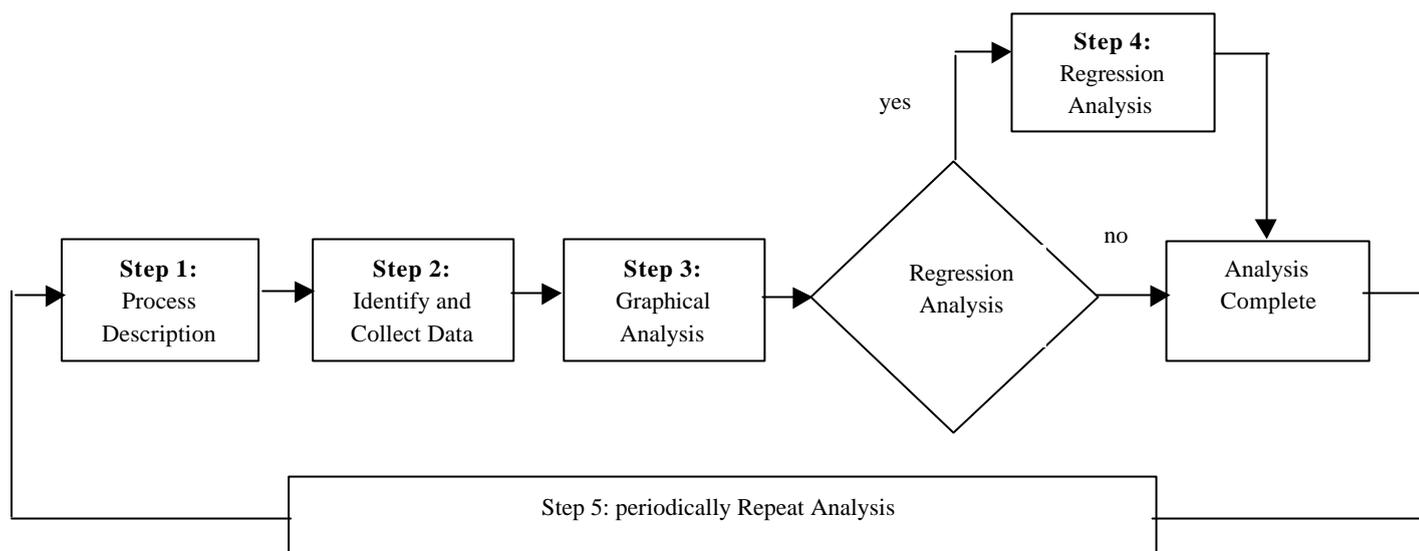


Figure 10 Five steps for unit-of-product analysis

Regression analysis is used to evaluate a unit-of-product quantitatively. Regression analysis involves calculations to determine the degree of correlation between chemical and production data. Whether graphical methods alone are used or graphical and regression methods are used together, a multistep data collection and analysis process should be followed when evaluating a unit-of-product, as follows.

Step 1. Process Description [MOED]*

The purpose of this step is to map out the process under investigation. This step involves drawing a flow diagram, tracing the chemical's path through the process, and noting chemical inputs, outputs, and conversions. The level of complexity of the flow diagram will vary depending on the level of accuracy one needs for the analysis.

Step 2. Identify and Collect Time Consistent Data

To analyse a unit-of-product, it is necessary to have time-consistent chemical and production data. The term "time consistent" means that the chemical data and production data must correspond to the same time period, e.g., daily pounds of xylene used and daily square feet painted. Analysis cannot be performed on data from different times, e.g., daily square feet painted and weekly pounds of xylene used.

Chemical data can be found in process engineering records, materials accounting records, or process control charts. Production data are typically found in production logs. The data set should cover an adequate number of time periods to allow trends and relationships to be apparent. We recommend attempting to have at least 30 time periods (e.g., 30 days or 30 weeks) in the analysis data set. More time periods are preferable because more data points improve the accuracy of the analysis.

* refer to chapter 3.3

Analysis will be improved where there is some variation in production levels during the time periods being investigated. This is because data trends are easier to see when the data are not entirely clustered around one set of values.

If regression analyses are to be used to analyze the data, the data should be collected over a time period during which there were no major changes to the production process. For a regression analysis to be meaningful, it requires data from a process that has performed consistently. This consistency requirement makes the use of quarterly or monthly data undesirable in regression analysis since it is likely that some major change to the process would have occurred over a 30-month or 30-quarter time period.

More often than not, firms find that they can use chemical use data (as opposed to waste data) to evaluate their unit(s)-of-product. Chemical use data can be monitored on a real-time basis- but waste volumes are difficult to monitor in this way. Waste data are typically calculated once a year for reporting purposes. Waste data are also often estimated from material balance calculations rather than measured directly. For example, while it is difficult to measure weekly waste generation (emissions) from solvent degreaser, directly measuring solvent use is relatively straightforward. Further, using waste inventory data for the purposes of unit-of-product analysis can be problematic. This is because waste inventory data often lag behind actual waste generation, and data about offsite shipments often reflect more information about the waste hauler's schedule than about waste generation rates.

Step 3. Graphical Analysis

Graphical analysis allows one to see data patterns and is a relatively simple way to look at the fit between measures of production and chemical data. Specifically, plots of production and chemical data allow one to see:

- Distribution of the data (i.e., normal, bimodal, etc.) and trends in the data;
 - Extreme data points or outliers (e.g., very high or very low values); and
 - Data entry errors (errors are easiest to spot when they have extreme values).
- Graphical analysis tools include histogram plots, scatter plots, and time-series plots.

Step 4. Regression Analysis

After completing a graphical analysis, firms can choose to review the data further by performing a regression analysis. Whereas graphical analyses provide a qualitative sense of the correlation between production and chemical data, regression analyses provide a quantitative measure of the correlation between production and chemical data. Whether a firm chooses to perform a regression analysis depends on whether the firm:

- Has the resources (expertise and software) to analyze the data,
- Wants a quantitative measure of whether its unit(s)-of-product are well correlated, and
- Finds the qualitative graphical analysis results inconclusive.

If the company performs regression analysis, it must determine whether to use simple linear regression or multiple regression methods. Simple linear regression can be performed

with most hand-held calculators or spreadsheet software programs. Simple linear regression is appropriate when examining the correlation of a single unit-of-product (e.g., square feet plated). Multiple regression is used when examining whether some unit-of-product combination (e.g., square feet plated, amp hours, and number of parts) correlates with chemical data. In general, multiple regression analysis is much more complex than simple linear regression.

Step 5. Repetition

Once the analysis is complete, it should be repeated periodically (especially after major changes to the process) to make sure the chemical and production data are still correlated.

3. POLLUTION PREVENTION PLANS (P.P.P.) IN INDUSTRY

3.1 Introduction

The SAP states under chapter 3 "Principles and Obligations" that Parties shall take into account the Best Available Techniques (BAT) and Best Environmental Practices (BEP) and clean technology and preventive measures to reach the SAP targets and to reduce to a minimum the risk of pollution.

Since the BAT and BEP concepts are flexible terms and subject to different perception and controversial discussion, it would be preferable to integrate these concepts under a much wider pollution prevention concept. Such a concept, if properly implemented, could lead to a better implementation of the LBS and SAP obligations and probably would include other substantial concepts to reduce the releases of pollutants such as "minimization at sources", etc.

To meet these objectives a Pollution Prevention Plan should be elaborated at the level of the industries that would be involved in the activities included in the NAP's.

3.2 Pollution Prevention Plans (P.P.P.) in industry

Integrating Pollution Prevention with Business Planning

In general companies are experienced with developing long-term business plans to ensure their future growth and success. Developing a business plan involves identifying the company's strengths, the competition's weaknesses, and potential markets where these differences can be capitalized on. Performance goals are set on the basis of the characteristics of the markets identified and this information is used to create strategies for manufacturing and marketing that will possibly achieve the company's goals.

A pollution prevention plan should be integrated into a business plan. The pollution prevention plan focuses on developing and then profiting from the company's good environmental performance. By thinking of pollution prevention in terms of business planning and efficient resource management, it becomes easier for employees to see why pollution prevention is good business. When a company eliminates a hazard or a waste, it also eliminates the costs and risks associated with them. Companies that do this will also be able to promote their "clean" products and take advantage of market resistance to products perceived to harm people and the environment. They will also minimize the costs of public and regulatory burden.

Recognizing Pollution Prevention Opportunities

Pollution can be prevented in many different ways. All these methods can be organized into five categories. They are:

- chemical substitution
- material flow
- process control
- automation
- technology

These categories will likely overlap with each other as they are examined and implemented. Using these categories will help during the options analysis step in the pollution prevention planning process.

Chemical Substitution

Chemicals may be substituted that are less hazardous and polluting. This can be viewed in three different ways. First simple substitution can directly impact the level or hazard of the pollutant. Second, less hazardous carrier or solvent chemicals can be used. The third situation involves chemicals that are changed during the process into a more hazardous polluting material. Whenever chemicals are substituted it will affect other parameters of the process. Equipment may have to be modified, the process itself may need to change, training on how to handle the new chemical may be needed.

Material Flow

Tracking and controlling how a chemical flows through a facility and its processes is an important way to prevent pollution. Material flow includes activities like water conservation practices, inventory control, efficient use of chemicals and storage.

Process Control

Process control is about people and ensuring that jobs are done properly so that waste and pollution are minimized. It involves examining the system and work environment to see if it allows employees to do the job effectively. Key elements in process control are written procedures and documentation of completed tasks, training and auditing to prove that jobs are being done correctly.

Automation

Especially for redundant and repetitive procedures, automation can be used to eliminate human error or inaccuracies in process performance. It may decrease worker exposure to hazardous chemicals. Automated processes can be controlled or programmed to easily test and improve a process to minimize waste.

Technology

The most creative and radical way to prevent pollution is to change the technology that is used to make a product. This will involve all four of the other ways to prevent pollution. It may mean a totally new mindset in how to do something. It may mean using no chemicals at all, instead using mechanical methods to accomplish what chemicals had done. Due to the changes in employee roles and responsibilities that accompany a technology change, it may be the most difficult but is often the most effective way to prevent pollution.

How to write a Pollution prevention plan

Companies should elaborate a pollution prevention plan according to the following:

Basic Requirements of a Plan

Required contents of pollution prevention plans include:

A **policy statement** expressing management support for eliminating or reducing the generation or release of toxic chemicals (pollutants) at the facility.

A description of the **current processes generating or releasing toxic chemicals (pollutants)** that specifically describes the types, sources, and quantities of toxic chemicals (pollutants) currently being generated or released by the facility.

A description of the **current and past practices used to eliminate or reduce the generation or release of toxic pollutants** at the facility and an evaluation of the effectiveness of these practices.

An **assessment of the technically and economically practicable options** available to eliminate or reduce the generation or release of toxic chemicals (pollutants) at the facility, including options such as changing the raw materials, operating techniques, equipment and technology; personnel training; and other practices used at the facility.

A **statement of objectives and a schedule for achieving those objectives.** Companies to express objectives in numeric terms wherever technically and economically feasible. Otherwise, non-numeric objectives can be stated; however, they must include a clearly stated list of actions designed to lead to establishing numeric objectives as soon as they become feasible.

Getting Started

The implementation of the plan must be customized to each individual facility situation. Many aspects of a business such as capitalization, number of employees, organizational structure and location may be considered when integrating pollution prevention into a business.

One of the required first steps in starting a pollution prevention program is to gain management support for the effort. Once management recognizes the advantages of pollution prevention, commitment should be forthcoming for implementation.

Depending on the size of a business, one person or a team may be the focal point for implementing pollution prevention. In any case, the following should be done to get pollution prevention activity started.

- a) Understand and document operations so that inefficiencies, as indicated by the amount of waste or pollution generated, are identified. This includes identifying the hidden costs and overhead of waste and pollution.
- b) Based on the understanding of a business's situation and with management's input, develop a policy for efficient use of resources. This policy should be as specific as possible and should set a standard for all future environmental planning and action.
- c) Based on the policy, develop company or facility-wide goals for pollution prevention activities
- d) Inform and educate all employees of the intent and goals of the pollution prevention program.

Use a Team

A team approach is recommended for addressing pollution prevention, and those on the team must have the influence or be given the authority to make things happen. In an ideal situation, a member from each level of management and a member from each production/functional division would be part of the team. The team should be kept in a manageable size (5 to 8 members) by recruiting interested members from key functions playing roles such as:

- **Accounting**
- **Engineering/Design**
- **Finance**
- **Health and Safety**
- **Maintenance**
- **Production**
- **Purchasing**
- **Research and Development**
- **Sales**

Determine the Baseline

Any benchmark or baseline should be expressed as a pollution / production ratio. It will also be used to determine the cost of the pollution per unit of product.

A baseline needs a relevant unit of product for each product that is manufactured with the chemicals being studied. The unit of product must be an accurate measure of a characteristic of the product. If a process is used for the same part all the time, then number of pieces will make a good unit of product. However, if the process works on several parts, then a more specific measure will be needed, such as surface area or weight.

The Production Ratio

It is necessary to develop a basis of comparison for chemical waste generated in the production process over time. Simply comparing waste generated from year to year can be misleading if there was a significant change in the levels of production involving the chemical

being targeted. Production ratio (PR) is used to normalize changes in production levels. It is calculated by dividing the production level for the reporting year by the production level for the previous year. Once a production ratio is determined, it is used as a factor when comparing target chemical waste generated between the two years.

3.3 Minimization Opportunities Environmental Diagnosis (MOED)

Either during or after a team has been organized, the performance of the current manufacturing processes must be determined. As a minimum, the processes that use or generate chemicals are targeted for pollution prevention. This will be critical for the team to calculate a baseline for future comparisons and must be done prior to options analysis. An important first step is to decide the accurate and relevant units of measurement for the processes involved (UNEP/MAP/CP 2000).

Data Gathering for Current Operations

For each and every process that uses a chemical information related to the chemical's waste generation and releases must be gathered and verified. This information must be comprehensive in order to be as accurate and useful as possible. It should include information related to the product being manufactured, the process, the volume produced, and all associated costs.

Product Data - There should be a description of the product(s) or service(s) related to the chemical being addressed. This may include information about desired quality and the reason why the product manufacture requires the use of a chemical. Customer input may be desired or required for specifications. Pollution prevention planning is a good way to question the design of a product and ask why the chemical is needed.

Process Data - In order to further pinpoint how and why a chemical waste is being generated, process information must be gathered. Data on the process should include a description of the major steps. Finding out how employees are involved in the process is often helpful. This can include information on employee function, training and safety/health considerations. Also, obtain whatever documentation is available about the process such as vendor literature, chemical analysis, preventive maintenance schedules, equipment specifications, etc. Any or all of the information will be needed for the options analysis step that studies the alternatives for making the process more efficient, thereby using less raw material or generating less waste or pollution.

Chemical Handling Data - Because waste can be generated as a result of transfers and spills, data should be gathered on how chemicals are stored, transferred, packaged and otherwise dispensed. These operations may be a part of the manufacturing process or they may be auxiliary operations that occur elsewhere in the facility.

Cost Data- During option analysis, in order to calculate the costs, savings and payback of any pollution prevention changes must be gathered on all operations that involve the chemicals in question. Many hidden costs in the use of a chemical are instituted in overhead or department charges. However, these numbers must be isolated and identified in order for the option analysis to be comprehensive.

Some costs to consider are those related to "environmental compliance." This includes compliance issues such as analysis of waste, treatment of waste, license fees and the cost of disposal. As burdensome as these costs might be, they are only a fraction of the cost to manage chemicals.

Determine and Analyze Alternatives

Once there is a good baseline of how the present processes generate waste or pollution and how much it costs, options for reducing these may be explored. The analysis of these options can be done concurrently with the gathering and analysis of the data, but a meaningful options analysis will need the data analysis done and a baseline determined before the options can be effectively screened.

Decision Support System

Options analysis is the heart of the pollution prevention planning process. All other steps and all benefits will be affected by how well this step is done.

Options analysis should include an examination of all the methods of pollution prevention. Looking at substitutes for the chemical, how the chemical moves through the manufacturing system, how a process is performed, automation and alternative technologies for the manufacture of the product.

This analysis could be achieved using the computer simulation tools which solve material and energy balance to revamp existing plants according to environmentally sound and viable solutions, analyzing what-if scenarios for best technologies and risk analysis for particular situations.

Just like costs associated with current manufacturing processes that are determined in the baseline research, costs will be associated with each pollution prevention idea and should be considered during options analysis. Among these include costs for design, testing and implementation. These should be weighed against the savings that would result if the option is selected. Savings can come from reductions in chemical purchases, compliance costs and disposal costs. Changes in labor cost should also be taken into account.

After a complete options analysis, the option(s) that meet the criteria for acceptance should get a final verification for feasibility. The reasons that the other options were not selected should be obvious at the conclusion of the analysis. Each step of the options analysis needs to be documented, including whether options are rejected on technical or economic grounds. By maintaining records of all options that have been explored and why some were rejected, it will be easier to revisit these should future developments (Fig. 11).

Set Objectives for Implementation

Once the most promising option(s) has been chosen for implementation, objectives should be determined and should state the planned reduction in a waste generation for the chemical involved considering the waste generation per unit of production as major criteria.

The objectives should state schedule for planned reductions using timeline or other tool to clarify when implementation is planned. They should state the organization changes that would occur, the benefits and the cost savings, also other tangible and intangible benefits.

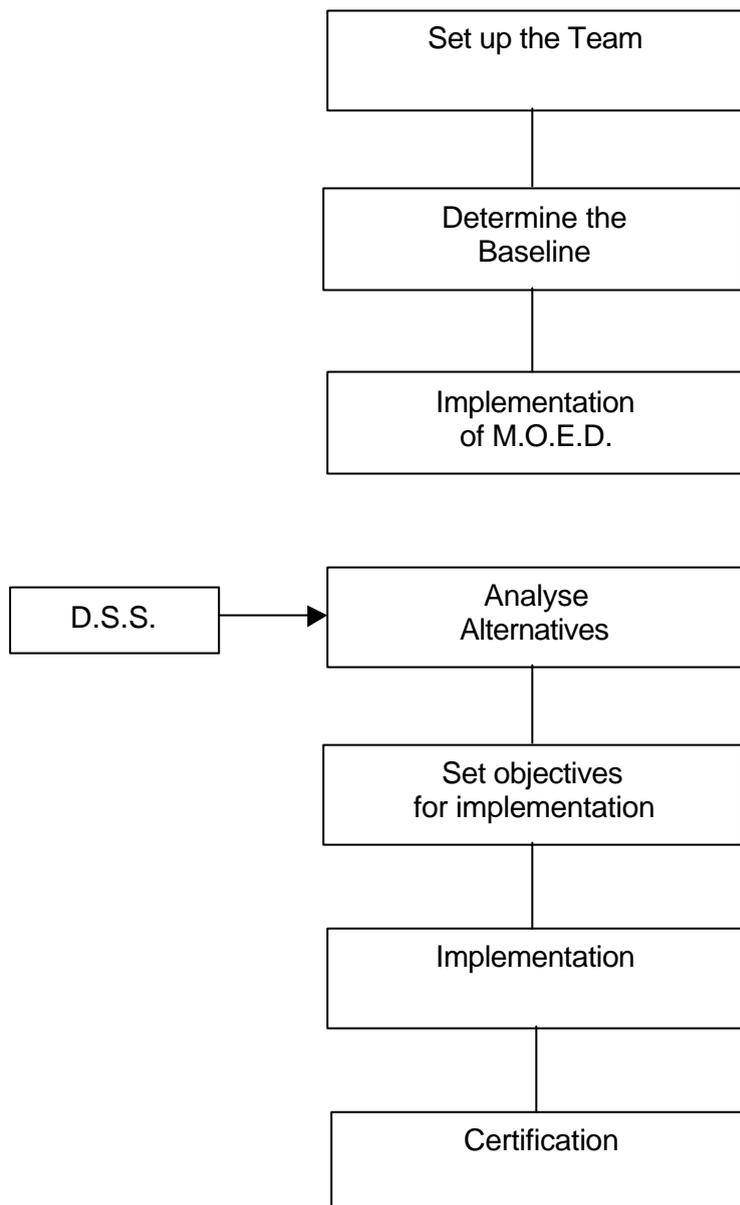


Figure 11 Description of the major steps for the implementation of P.P.P.

4. ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Environmental Impact Assessment is an essential element in the process of implementation of the SAP. It concerns mainly any new project that would have any impact on the SAP targeted pollutants and subsequently on the estimation of baseline budget and observable baseline budgets (OBB).

In fact, the execution and commissioning of any type of project that might influence the targeted pollutants, i.e. a project or activity that would release a targeted pollutant would have an impact on the O.B.B.

In order to minimize or avoid any impact on the O.B.B. of new project, a SAP oriented E.I.A. study should be performed to quantify its impacts on the O.B.B.

This document will not elaborate in detail the methodological aspects of the implementation of EIA. The following document is suggested as reference for the relevant technical details:

- An approach to environmental impact assessment for projects affecting the coastal and marine environment. UNEP Regional Seas Reports and Studies, No. 122.

BIBLIOGRAPHY

ESCWA (2000), Expert group meeting on coordination of technology policies to increase productivity and competitiveness within global context. Beirut, 1-3 November 2000

UNDP (1998), Issues & Options. The clean Development Mechanism

UNEP (1995), Global Programme of Actions to Address Pollution from Land-based Activities (GPA), adopted in Washington in 1995

UNEP (1999), Strategic Action Programme to address Pollution from Land-based Activities, UNEP, Athens, 1999 (SAP MED)

UNEP/GEF (2000), Determination of priority actions for the further elaboration and implementation of the Strategic Action Programme for the Mediterranean Sea, UNEP/GEF, Nairobi, 2000 (the GEF SAP project)

UNEP/IE (1996), Monitoring Industrial emissions and waste. Technical report No. 27

UNEP/IE (1996), Industry Environmental Compliance. Technical report No. 36

UNEP-MAP (1995), Mediterranean Action Plan Phase II and Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and its Protocols. Informal document, UNEP, MAP, Athens, 1995

UNEP/MAP (1995), Guidelines for Integrated Management of Coastal and Marine Areas - with special reference to the Mediterranean Basin, UNEP Regional Seas Reports and Studies, No. 161, PAP/RAC (MAP/UNEP), Split, 1995

UNEP/MAP (1996), Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources and Activities, approved by the Contracting Parties in 1996

UNEP/MAP (1999), Report of the 11th Ordinary Meeting of the Contracting Parties to the Convention for the Protection of the Mediterranean sea against pollution and its Protocols

UNEP/MAP (1999), MED POL Phase III programme for the assessment and control of pollution in the Mediterranean region

UNEP/MAP (1999), Formulation and implementation of CAMP projects, Operational Manual, MAP- PAP/RAC, Athens-Split, 1999

UNEP/MAP (2001), Combating land-based pollution in the Mediterranean, Athens 2001

UNEP/MAP/CP (2000), Minimisation Opportunities Environmental Diagnosis

UNEP/MAP/PAP (1999), Conceptual Framework and Planning Guidelines for Integrated Coastal Area and River Basin Management, Priority Actions Programme (MAP/UNEP), Split, 1999

USEPA (1997), Developing and using Production. Adjusted Measurements of Pollution Prevention

UNEP Regional Seas Report and Studies (1990), An approach to environmental impact assessment for projects affecting the coastal and marine environment