MEDITERRANEAN ENVIRONMENTAL
TECHNICAL ASSISTANCE PROGRAM

MEDITERRANEAN
ACTION PLAN

Sub-regional Workshop

Environmental Performance Indicators

Cairo, 8-10 November 1998

Record of the Workshop

UNOPS

Egyptian Environmental
Affairs Agency

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Part 1 : Summary

The present record summarises the discussions held during a Workshop on Environmental Performance Indicators (EPI) held at Cairo[1] in Egypt from the 8th to the 11th November 1998 on the initiative of PAM/Blue Plan, with financial contributions from the METAP and LIFE programmes, in co-operation with the Egyptian Environmental Affairs Agency, and CEDARE.

The workshop brought together some thirty experts representing five Mediterranean countries (Egypt, Cyprus, Jordan, Syria, Palestinian Authority) and had the benefit of technical back-up from two French experts, an expert observer from the Rabat seminar, an expert from the World Bank and three Blue Plan experts. It was part of the follow-up to the Regional Meeting on EPIs held in Beirut in December 1997 and it will be complemented by two more workshops of the same type in two other Mediterranean sub-regions.

After a reminder of the context, of some definitions, methods and an awakening to the usefulness and limitations of applying Environmental Performance Indicators through a few examples, the workshop allowed above all the common problems for the four countries, as well as a minimum set of EPIs for monitoring them to be defined, for four priority subjects in the Mediterranean.

The subjects touched upon in the presence of the experts appointed by the 4 countries were: air pollution (local and global), solid waste and water, as a resource in terms of quantity and quality.

The definition of common problems and the selection of a restricted number of indicators by subject allowed a list of twenty or so priority indicators for these 4 subjects to be arrived at.

The workshop, in addition to the preparatory questionnaires for it (sent out to the countries and analysed by Blue Plan), also allowed the availability of data for calculating these indicators to be assessed.

The experts nevertheless stressed the need to carry this work further at the level of each country; this is in order to set the tools required for their application to work and for their calculation on a permanent basis. Recommendations were formulated to this end which begin with raising the awareness of decision-makers.

The workshop demonstrated the usefulness of a uniform approach in the Mediterranean on EPIs (harmonisation of lists and definitions) which must take place over time.

The Workshop Timetable and the list of participants are supplied as an appendix.

[1] Hotel Sheraton Al Gezirah, Cairo.

Part 2 : A Record of the Workshop

1 Session n°1 : Opening and Introduction

1.1 Introduction

After a welcome address to all participants, Mister Fawzi, Head of the environmental management sector of the Egyptian Environmental Affairs Agency, introduced the Workshop by strongly focusing on the importance of environmental issues for all the countries in the region. Indicators are strategic tools for the improved monitoring of environmental problems and strategies . Mr. Sabet, Director of CEDARE, insisted also upon the importance of this subject. Mrs Tehmina Aktar drew a quick overview of the history of the METAP programme and its achievements since 1990. The METAP programme is now in its third phase, and aims through the environmental performance indicators project at developing the capacity to use and devise indicators, alongside a continual sharing of knowledge and expertise.

1.2 Historical Background and Context

The general context of the project and a presentation of the different parties - Mediterranean Action Plan (MAP)/Blue Plan, and METAP- are set out in the appendix to this record.

After thanking the representative from Egypt, CEDARE, METAP and all participants, Aline Comeau, the Scientific Director of Blue Plan, provided a brief historical background to the work on Environmental Performance Indicators, further to Mrs Tehmina Aktar's presentation to explain where we stand today, and what progress has taken place. The item set out in the Appendix: "Historical Background" summarises the different phases of this project.

This joint activity by METAP and MAP/Blue Plan was initiated through a regional workshop in Damascus in January 1996. This workshop focused mainly on the definition and agreement of a common conceptual framework for indicators ; participants there recognised the usefulness of the Pressure -State - Response framework of OECD. This first workshop was useful for identifying parties' needs and in drawing up a schedule of activity for the coming years.

As a consequence, a second regional workshop was organised in December 1997 in Beirut to continue the activity of identifying and selecting relevant environmental performance indicators for the monitoring/assessment of the main issues and national policies, and also at local level within project frameworks. This workshop was very productive and came out with a first list of relevant indicators for the follow-up of 4 issues: management of water resources, water demand management, industrial pollution, and solid waste. This workshop was also an opportunity to test the World Bank approach to identifying environmental performance indicators within the framework of technical projects.

The Beirut Workshop recommended deeper study, at sub-regional and national level, using experts in each topic, of the set of indicators in order to agree upon a common set, with a procedure for definition and calculation. This is the goal of the three workshops which have been organised from September to date:

- in Rabat, from the 26th to the 28th September 1998 a gathering including Morocco, Tunisia, Algeria, and Lebanon,
- in Cairo, from the 8th to the 10th of November a meeting with Egypt, Syria, Jordan, Cyprus, and the Palestinian Authority, with a Lebanese observer from the Rabat workshop.
- in Split, from the 26th to the 28th November for Croatia, Slovenia, Albania, and Turkey, with an Egyptian observer from the Cairo workshop.

1.3 Objectives and Workshop Organisation

As a continuation of the work at Beirut, the Workshop aimed at a deeper understanding of the relationship between : issues → indicators and at a better assessment of the conditions necessary for the calculation of such indicators.

Consequently, four topics were considered from amongst the three METAP III priorities: air pollution, solid waste, water resources and demand (quantitative aspects and qualitative aspects).

The workshop goals were several :

EPI AT NATIONAL LEVEL:

This concerned favouring exchanges on common issues, between managers for the 4 subjects coming from various Mediterranean countries, validating the relevance of a set of indicators for the monitoring/ assessment of these issues, selecting a small number of them and lastly appraising the conditions for their calculation.

> *Working in small groups was suggested, including specialists in each subject coming from the 4 countries represented.*
>
> *Group discussions followed an approach described later on and were enriched by a questionnaire sent out previously to participants by Blue Plan.*

EPI AT PROJECT LEVEL :

This concerned awakening participants to the uses of EPI in the various stages of project cycles.

> *This activity formed the subject of a plenary session (cfr. session 5).*

Furthermore, group work was preceded by a brief reminder about EPIs (in order to make all participants agree on a common vocabulary and conceptual framework, and to re-position the exercise within the context of current initiatives), and by the account of three concrete experiments on the use of EPIs in the field of air (ATMO index in France), landfill management (in France), and the management of irrigation efficiency (unit demand index in Cyprus).

1.4 Presentation of Participants

The workshop brought together 32 participants from Egypt, Jordan, Syria, Palestine and Cyprus, a Lebanese who had participated in the Rabat Workshop, and three experts invited from France and Egypt. Three persons from Blue Plan were facilitating the discussions with the help of Mrs Lamia Chamas from Lebanon and Mr. Hamilton from the World Bank. A detailed list of participants is provided in the Appendix.

Sitting at a round table, most participants insisted on their interest in the work on Environmental Performance Indicators, and their willingness to put the use of indicators in everyday management of environmental problems into practice.

2 Session n°2 : A Reminder about Environmental Performance Indicators (EPI)

2.1 A Reminder about EPI

Aline Comeau (PB) briefly summed up the basic concepts on Environmental Performance Indicators and the OECD reference framework adopted during previous workshops (Damascus 96, and Beirut 97). A focus paper was handed out in the session. The main definitions and functions which the indicators must comply with, in order to be useful for the monitoring/assessment of issues can be restated here.

Definitions and Main Functions of Environmental Indicators

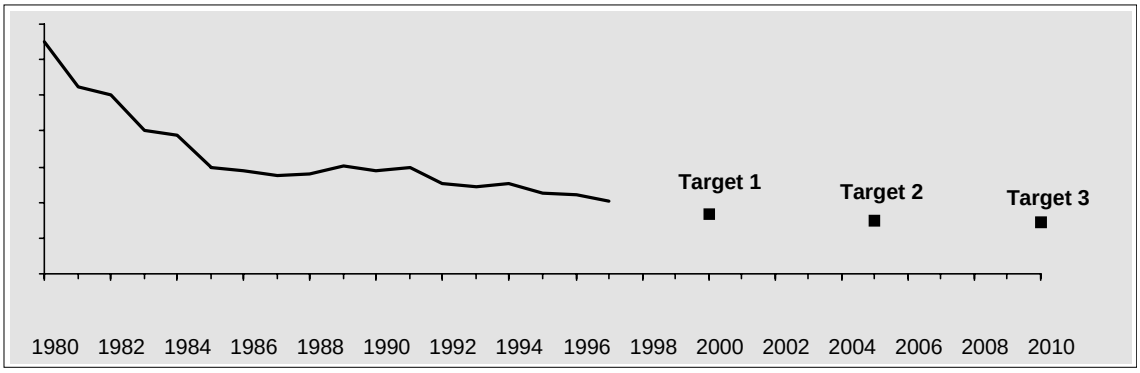
Indicator: A parameter, or a value derived from parameters, which points to, provides information about, describes the state of a phenomenon/environment/area, with a significance extending beyond that directly associated with a parameter value.

Major functions of indicators:

- to assess conditions and trends over time,
- to compare places and situations,
- **to assess conditions and trends in relation to goals and targets**,
- to provide early warning information,
- to anticipate future conditions and trends.

Sources : OCDE ; Gallopin in ICSU-SCOPE, 1997

In the last years, the emphasis in the use of indicators has shifted from *descriptive* indicators useful to show trends in degradation or improvement of a situation to ***performance indicators***, that show not only trends but **distance to a set goal or target.**



Source : OCDE

This target associated with a time schedule may be as specified in policy, or a reference value such as a WHO guideline for safe levels of pollution concentrations in water or air.

The selection criteria for developing and choosing one type of indicator or another, refer to three aspects : policy relevance, analytical soundness and measurability. The major factor for identifying a good indicator is checking that it allows relating the issue to actions taken.

Necessary Properties for Indicators	
Policy Relevance	• Indicators should be easy to interpret, • They should show trends over time, • They should be responsive to changes in the environment and related human activities, • They should refer to a threshold or a reference value against which conditions can be compared (for performance indicators).
Analytical Soundness	• Indicators should be theoretically well founded in technical and scientific terms.
Measurability	• Indicators should be calculated from data that is readily available or made available at a reasonable cost; • Data should be documented and of known quality; • Data and indicators should be updated at regular intervals in accordance with reliable procedures.
Analytical Soundness	• Indicators should be theoretically well founded in technical and scientific terms.
Measurability	• Indicators should be calculated from data that is readily available or made available at a reasonable cost; • Data should be documented and of known quality; • Data and indicators should be updated at regular intervals in accordance with reliable procedures.

Various approaches are used to present in sequence a set of indicators that can assist the analysis and understanding of environmental problems. Choosing a conceptual framework and keeping track of it is more important than the conceptual framework itself.

The conceptual framework that was agreed upon in the previous workshop on the performance assessment program (PPM) is the Pressure State response framework (PSR) of the OECD. It is widely used internationally to classify environmental

indicators. In fact, it is simple and effective : it shows the sources of environmental stress (pressure P); the state of the natural resources (state S) and the responses by society to reduce the pressure (responses R) ; this framework is flexible and can be applied to a number of environmental issues.

It was used to classify problems and indicators during the workshop.

Apart from the present workshop that focused on environmental performance indicators (and so related to objectives in environmental policy), it is important to recall the existence of many on-going initiatives in the Mediterranean, especially those concerning sustainable development indicators. These indicators have a wider scope and cover socio-economic aspects in addition to the environmental field. The main initiatives current in the Mediterranean on this subject are described in the Appendix under " Context ".

2.2 Presentation and Examples of EPI Use

For the sake of pragmatism, it was deemed useful to introduce the themed sessions with a description, in plenary session, of three concrete examples of the use of EPIs in France and in Cyprus.

2.3 Air Pollution, Population Communications: the ATMO and Ozone Indexes

A NETWORK FOR AIR QUALITY

Mr. Géraud, from the Qualitair 06 network (France), first of all described the monitoring system set up gradually in the region of the Alpes Maritimes (history, institutional and technical organisation).

The Qualitair 06 network works 24 hrs a day, thanks to a network of 12 fixed stations[2]. Major pollutants continuously measured by the network are : CO, SO_2, particulates, O_3 and NOx. Ozone is mainly measured in the Mediterranean basin in summer.

Investment costs in this type of network are high : about 500,000 FF for a central position, 50,000 FF/station for the on-line acquisition unit and 80,000 FF in average for each analyser. This does not include the cost of fitting out premises.

The running costs of a network of this kind (12 stations, and 4 staff) must not be under-estimated: they come to 3 million Francs per annum. These are borne by various sources of funding including a State aid (from special taxation on industrial emissions).

Network efficiency depends on the appropriate *siting of the measuring stations* and *regular calibration of measuring instruments*. The siting choice of a fixed station must, in addition, be based on a deep knowledge of the following criteria: weather conditions, the relief, the movement of air masses, the probable various sources of emission (industry, transport). Analyses of population densities, traffic flows and population types are also necessary.

[2] Most of them are « base » stations.

THE OZONE INDEX AND ATMO INDEX

Two EPIs were presented , used in major French cities: the ATMO index and the O_3 concentration index.

O_3 concentration gives rise to communications made to the public when it exceeds certain thresholds. At 180µg/m3 and only when this value is reached at two fixed stations at least, the population which is most vulnerable to respiratory problems (children, the aged, pregnant women) is invited to stop carrying out sporting activity. At 360µg/m3, traffic is restricted and the whole population is concerned.

O_3 is a good tracer because it reveals the presence of NOx, poorly burned hydrocarbons, VOMC and VONMC (Volatile Organic Methane Compounds and Volatile Organic Non Methane Compounds).

In order to meet the demand for information from politicians and the public at large, a simple summary indicator for air quality has been devised by a working group for France. This is the ATMO index, which takes several pollutants into account (O_3, SO_2, NOx, particulates) and weighted according to their level . This indicator can only be any of 10 values between 1 and 10. It is calculated on an hour basis**.** Beyond certain values set for the pollutants included in the index, there can be an obligation, for public local authorities, to inform the population or regulate traffic (See Appendix for more details).

This indicator is calculated daily from the maximum value for the average maximum amount of each pollutant and selecting the most restraining pollutant. It is published in the press and is accessible by telephone, Minitel or Internet.

This is a good example of a summary indicator which brings together several parameters, and which facilitates an understanding by the public at large and the comparison of regulatory thresholds.

2.4 Waste Management : Using EPIs to Manage Waste in Landfill

Mr. Duval from a Firm of Consulting Engineers, ICE Ingénierie Conseil Environnement in France, presented management tools for landfill. In sanitary landfill, indicators for local goals can be devised.

The focus of monitoring should be the major pollution sources from a landfill such as lixiviates, bio-gas and harmful side-effects: landscape changes, noise, odours, light waste as plastic bags being blown away, and animals such as birds, insects or rats. Reducing these environmental problems involves implementing certain controls for landfill: a laboratory to analyse waste entering the site, a treatment unit where waste is stabilised with chemical compounds, a cell system to allow waste dumps to be retraced, water-proof membrane installations, a bio-gas and lixiviates collection system etc.....

The efficiency of these controls can be measured using EPIs: the amounts of bio-gas recovered, compacting efficiencies, surface exchanges between waste and the soil and water cycle. Bruno Duval presented three water cycle EPIs :

- **effective rainfall**: this is the difference between total rainfall and evapo-transpiration. Effective rainfall depends on climate. In France, it is often equal to lixiviate volumes. In any case, effective rainfall is the most significant component of lixiviates.
- **amount of waste water**. It varies from 0 to 100 l/t.

- **ratio of the volume of lixiviates to the volume of effective rainfall**. It varies between 0.10 to 0.50. This indicator gives data on landfill management. In sanitary landfill, this ratio will be low, whereas in uncontrolled tipping, it will be very high. The amount of lixiviates can be calculated as follows: it equals the (effective rainfall + waste water amount - amount of variation in water quantity). If the measured amount of lixiviates is different from the calculated lixiviates, it implies there is a risk of lixiviate "release".

Other EPIs are used for other types of waste management practices (incineration plants, composting and recycling) but their application is most obvious for sanitary landfill.

2.5 Water Efficiency in Irrigation, Tools for Tracking Progress.

Mr. Papadopoulos, from the Agricultural research institute in Cyprus, presented his experience of irrigation efficiency control in Cyprus and referred also to case studies from other countries of the sub-region.

Firstly, the reasons why and how behind the shift of Cyprus's water management strategy from supply development to demand management were explained. It is now considered that as water is a valuable commodity, and a finite resource, use should therefore be efficient and effective in all sectors and particularly in agriculture.

Water supply started in Cyprus with an intensive policy of water development using dams. Today all water in Cyprus is collected and transported in closed pipes with a 90% efficiency of conveyance. Later, the most sophisticated methods of irrigation were developed in order to optimise the use of every drop of water.

Today the strategy is to go further and to encourage the rational use at farm level. This requires a change in irrigation systems, but mainly in management practices (cropping patterns, irrigation and fertilisation scheduling). In **Cyprus a good indicator of efficient irrigation** is the **yield for a certain crop per m³ consumed**. It also indicates reduced pollution risks, as there is less drainage and leakage of agro-chemicals. It is essential to measure the quantity of water that enters the field in order to start the process and to measure progress.

This implies intensifying agriculture. This also implies a new social contract for scientists aimed at : preserving the environment, increasing yields, and improving quality. Four areas are available for development in the countries facing scarcity, and with a significant irrigation sector : water use efficiency, effective water use, fertigation, use of poor quality water, use of waste waters.

In the discussion that followed the presentation, Egyptian experts highlighted their specific experience, since their strategy is also to use every drop of water, and reuse it as many times as possible. They are taking action to reduce the amount of fertilisers in water. But we should not forget that water is also a social asset and this limits the potential for effective use !

The three examples above show the practical usefulness of Performance Indicators, but also the need to carefully define target values or performance criteria in order to measure whether or not there has been progress.

3 Session 2 : Organisation and Working Methodology for the Thematic Groups

After this general restatement of the definition and practical uses of EPIs, the session carried on with a discussion on the organisation of work in thematic groups.

Four work-groups of a dozen people were set up over two half-days[3] (group 1: air pollution; group 2: waste management ; group 3: water demand and resources; group 4: water pollution).

The aim of the work-groups was to select an initial set of Environmental Performance Indicators which best matched the issues of the subject in the Mediterranean and to analyse the terms for their calculation.

The work-groups also had the aim of identifying steps to be taken and requirements for achieving the practical set-up of this series of thematic indicators for raising the awareness of decision-makers or for informing the public.

The pre-workshop questionnaire, drawn up by Plan Bleu, had the goal of structuring group discussions around the various following stages, for each of the 4 subjects:

1) Exchanges on problems and current strategies (1h)
   - presentation by one country of its main problems and current national strategy :

Country :	**Issue**
Egypt	waste management
Syria	water pollution
Jordan	air
Palestine	water resources
Cyprus	water resources (in plenary session)

   - Debate on the " common " problems as they arise from various responses on the questionnaires.
2) Discussion on the **relevance** of the proposed set of indicators (30 mins)
   - Does the list cover and describe the problems encountered?
   - Does the list describe strategies/ responses?
   - Suggestions for adding or deleting indicators
3) **Selection** of 5 prime indicators (30 mins)
4) Discussion on the **5 selected indicators** : (1hr)
   - Are the definitions put forward in the questionnaires clear ?
   - Is the data available , over the short, medium or long term ? ,
5) **Necessary action** for the calculation of these 5 indicators (30 mins)
6) **Conclusions and recommendations** (30 mins) : actions needed to achieve the calculation of these indicators.

[3] See the composition of groups at the start of part 3.

4 Sessions 3, 4 and 6 : Thematic Groups

In order to reflect the quality and intensity of debate, detailed records are provided in Part 3 below ; these records include also the main points discussed in the plenary session after each group presentation (session 6).

In groups 3 and 4 (and this could be applied to all the groups) the participants insisted on the need of considering some prerequisites before choosing EPI, such as :

- **effective institutions equipped** with relevant management tools including policies, action plans and a proper legal framework
- **the assurance of the availability of financial resources** which enables the implementation of the above mentioned policies and plans. Reference should be made to indicator No 9 (group 4) which measures expenditure on water resource protection which includes action to prevent, mitigate and treat.

The following table summarises the final set of indicators selected as they arose from each group sessions:

SET OF PRIME SELECTED INDICATORS PER THEME :

INDICATOR	PSR Type	N° of the Quest. (*) sheet	Number of values provided in the quest.
Air (group1)			
GHG emissions	P	1	8
SOx, NOx, PMS	P	3.4	10
Energy Intensity	E	7	11
Frequency of Excesses over Norm	E	9	0
Excessive Respiratory Disorders	R	10	0
% of Clean Fuels in Total Fuel Consumption		-	-
Solid Waste (group2) :			
Municipal Solid Waste Generation	P	1	7
Collection Rate	P	3	2
Destination of Collected Municipal Waste	R	4	6
Hazardous Waste Generation	P	8	1
Cost Recovery	R	-	-

(*) N° of the sheet : refers to the previous questionnaire (see list in Appendix) for new indicators, a new indicator sheet should be drawn up.

Set of prime selected indicators per theme :

INDICATOR	PSR Type	N° of the sheet Quest. (*)	Number of values provided in the questionnaire
Water resources and demand (group3)			
On-farm Irrigation Efficiency	P	10	0
Fresh Water Final Consumption Index	P	12	1
Water Supply Source Diversification Index	R	14	1
Drinking Water Demand Efficiency	P	15	2
Water Unit Productivity Index	P	17	-
Water Quality (group4)			
Water Quality Indicator	E	1	0
Agro-Chemicals Use Indicators	P	2'	25
Drinking Water Supply with quality standard	P	5	1
Waste Water Collection and Treatment Indicator	R	6'	8
Industrial Waste Water Treatment	R	8	1

(*)N° of the sheet : refers to the previous questionnaire (see list in Appendix) for new indicators, a new indicator sheet should be drawn up.

1 Session n°5 : Environmental Performance Indicators in Projects

1.1 Use of EPIs in Following-up Environmental Projects

Kirk Hamilton (World Bank) presented the methodological framework used by the World Bank for integrating Environmental Performance Indicators in the monitoring/assessment of projects.

Reference was made to the document distributed during the Workshop entitled " Performance Indicators for Projects on : Framework and Examples from METAP ", which relates the most recent views on this matter, and presents seven sample projects.

Project level indicators can have many uses, including : planning, forecasting and early warning during implementation, assessing results, benchmarks, quality control etc.

The most commonly used projects indicators concern inputs, outputs and risks. This is not our purpose here, as the focus is put mostly on the purely environmental features of the projects. Projects can be varied, for example : institutional strengthening, water supply and sanitation, management of natural resources, pollution abatement, waste management etc.

This wide variety of projects implies that there is no single list of project-level indicators that will be universally applicable. There are, however, broad principles that can be applied in indicator development from the early stages of project planning. These principles, combined with a simple framework, comprise the basic tool-kit for project level indicators. These are : relevance, linkage, selectivity, spatial and temporal coverage, practicality, and client ownership.

Projects are generally divided into components or sub-projects. The performance of each component can be measured thanks to a specific tailored set of EPIs. Two major types of indicators are: impact indicators (which relate to the stated objectives of a project), and outcome /output indicators (which measure the achievement of specific components goals).

One example of an ongoing METAP project was presented to illustrate the proposition: a water and sanitation service project in Gaza. The overall objective of the project was presented, its various components, and a suggestion for impact and outcome indicators.

In the discussion the importance of focusing on the problem that the project aims at resolving was pointed out, in order to choose the most relevant indicators. The usefulness of an environmental performance evaluation of indicators was also questioned. However, it was concluded that EPIs were tools to link a project's manager and client together, and for measuring how far we are from the target.

1.2 Looking at Waste Management Practice in Egypt Through a Set of Indicators

Mrs. Iskandar presented a very rich analysis of the solid waste problem in Cairo and Sinai and its management today. She illustrated each step with a set of indicators.

To describe the problem in Cairo, she provided figures on how much waste is produced (9000 tons of refuse a day made up of 46 % organic and 54 % non organic waste), how much is collected and by whom, how much is recovered and reused, and how much ends up in landfill.

The informal sector plays a major role in waste management as it collects 1/3 of all waste and employs 40 000 people. Every ton of garbage collected by the informal sector creates about 2 jobs in the collection trade, 4 jobs in sorting, 2 in processing, 2 in manufacturing, and one in the trading sector. Therefore, Cairo's garbage has a potential of creating jobs !

The informal sector sorts and recycles nearly 80% of the inorganic material as " raw material for manufacturing ". The **cost recovery is an important indicator here** especially in the informal sector as millions are invested for manufacturing and selling on recycled products. There is also a cost recovery from the household.

An interesting experience was also recounted: waste management in Sinai, a very sought after tourist resort. There has been an agreement between a local NGO working

with the informal sector, the local authority, the main hotels and the Bedouin population to define a common waste management strategy. The result was very effective through primary sorting into " organic - non organic " in hotels. It was possible to apply the two major users of waste: organic waste for animals of the Bedouin and inorganic for the NGO for recycling with only a limited portion going to sanitary landfill.

A major conclusion is that the waste management is no longer a question of technology but of the choice of the relevant one, and of developing human resources and participation. Based on these findings, it has been proposed to hold a national awareness raising campaign in Egypt to improve sorting at source within all households, but only into " organic and non organic" material . The " Two bins " campaign.

This presentation was an excellent illustration of the use (and limits) of Performance Indicators in project implementation and public awareness; there is also a need for devising integrated (socio-cultural-economic -environmental) indicators showing the complex reality.

2 Session n°7 : Conclusions and Recommendations

2.1 Debate on Workshop Results

After presentations by and debate about the four working groups, a general debate ensued on the practical use of EPIs based on the workshop results, and on the problems and limitation to implementation. Discussions were very full, so only a few ideas are recorded below.

In Mr Fawzi's opinion, the preparatory questionnaire was very useful, and it is now essential that participants in each country complete their answers when they receive the Blue Plan evaluation on what was good, what was missing, and what is still needed. He also focused on the importance of disseminating the workshop results. This depends on each participant. The same comment was made by Palestinian representatives as Environmental authorities are not alone in being involved in the issues raised.

Lamia Chamas, acting as a witness to the Rabat workshop which brought together the North African countries and the Lebanon, compared Rabat's achievements to the Cairo ones. These could be summarised as follows:

- The same common problems came out of both workshops and water issues were the most lively topic.
- Waste management and air pollution were discussed a lot in Rabat, but in Cairo, it was less emphasised. This could be due to language barriers and also to the levels of political awareness on these two issues in the North African countries.
- A lot of emphasis was put in Rabat on the problem of the reliability of data collection networks on all issues but especially for water and air issues. This problem did not come out in the Cairo Workshop. This could be due to a lack of time to address calculation methods.

This last comment raised additional views from the participants. Mr. Abu Ghabyed, from Palestine, noticed the wide-ranging nature of the responses provided by countries and it seems that harmonisation between countries is necessary; this will require a

great deal of time. It is also important to question techniques and methods of data collection, and calibration approaches.

2.2 Main Findings

Ms. Comeau summarised the main achievements of the workshop. Despite the short timescale, it was possible to agree on common issues between the 5 represented countries in the field of air pollution, water pollution, waste and water resources.

It was also possible to select 21 prime indicators out of the 50 proposed indicators for monitoring these aspects, using a common basis and a very interesting and fruitful discussion.

Out of these 21 indicators, only 3 are completely new, compared to the list submitted in the preliminary questionnaires (see in Appendix). Most of them (2/3) were also chosen in the Rabat Workshop, showing that they are very basic indicators.

Mr. Tsiourtis, from Cyprus, emphasised that a major step forward was being made in the workshop itself. For example on the water question, the major response is that this is not a technical problem but that management has to be improved. We succeeded in speaking the same language: protecting the environment.

Mr. Al Mhaidi summarised the ideas that came out of the 4 working groups on the action necessary for following up at national and regional level. Ms. Lamia Chamas stated that similar recommendations came out in the Rabat Workshop and proposed to add one idea from Rabat : to draw up a brochure or pamphlet in order to inform stakeholders and to stress on the strategic use of indicators for policy implementation.

There was a full debate on the future role of EPIs: a strategic tool for technicians, for policy-makers; a good opportunity for building up a national environmental data base or for environmental data harmonisation between countries at a sub-regional scale. However, as pre-requisites for this, certain difficulties have to be solved: data quality and especially standardisation which cannot be imposed on any country.

In order to achieve these objectives, Mr. Tsiourtis asked for the definition of a focal point for each country and for the setting of a timetable. Mr. Fawzi proposed that the country team of the Cairo Workshop should act as focal points. This will be done in Egypt.

Mr. Hamilton stated the significant achievements made in the on-going process since Damascus. He expressed the requirement to focus efforts at national level and on decision-makers. Dr. Sayed Abou El Seoud called for more research and financial assistance.

Ms. Aktar agreed with Mr. Hamilton about the importance of achieving progress in the process of EPIs since Damascus and recalled the large part they held in the last METAP meeting in Paris. She confirmed METAP's interest for following up on this programme and stressed the need to reach the public, the media and decision-makers.

2.3 Recommendations and Follow up Action

On the basis of the discussions, the following set of recommendations was adopted :

AT NATIONAL LEVEL

- Reviewing and completing the questionnaire on the 5 selected indicators for each of the 4 issues
- Assessing the political relevance of the selected set of indicators taking sub-regional achievements into account; national workshops could be organised for this purpose (with media and Blue Plan presence, as a platform for exchanges, with decision makers,.....)
- Assessing methodologies, data availability, accessibility and frequency for these selected indicators
- Whenever possible, collecting data, calculating and publishing the selected indicators
- Defining the main acceptable values
- Testing the feasibility of implementation on a regular basis
- Keeping designated follow up experts

AT REGIONAL LEVEL

- The importance of standardising procedures
- Exchanges between existing networks, participants at different workshops at regional and national level
- Organising site visits (air pollution, waste management)
- Evaluating the possibilities for implementation

THANKS :

In conclusion, Mr. Fawzi and Ms. Aktar expressed their thanks to all participants and to Blue Plan for organising the workshop. Mrs. Comeau thanked the Egyptian authorities for their welcome and assistance, CEDARE for their logistics support and input, METAP for supporting this activity, the invited experts for sharing their experience and above all the participants for their preliminary work and intensive and fruitful participation.

Part 3 : Detailed Records of the 4 Thematic Groups

The detailed records and findings of the 4 group discussions are shown below.
A summary of the 4 preliminary questionnaire answers (presented by Blue Plan during the group sessions) is provided in the Appendix.

LIST OF PARTICIPANTS IN THE 4 THEMATIC GROUPS

NAME	First Name	COUNTRY	Group3 Water	Group2 Solid Waste	Group1 Air	Group4 Water Pollution
CHAWAF	Sadallah	SY	X			*
ABAZID	Roula	SY		X	X	
SAFARJALANI	Abdelrazzak	SY	X		R	
AMER	Kamel Mostafa	EG	R			X
Sayed Abou EL SEOUD	Nefisa	EG		*	X	
ABDEL KHALEK	Mohamed Ahmed	EG	X			X
ABU-GHARBEYEH	Musa	PA	*			X
ABU SHANAB	Mahmoud	PA	X		X	
AL HMAIDI	Mohammad	PA		X		R
TSIOURTIS	Nicos	CY	X			X
KOULLAPIS	Georgios	CY		R	X	
PAPADOPOULOS	Ioannis	CY	X			X
HAMDAN	Husni	JO	X			X
ALZABIN	Hail	JO		X	X	
KHASHASHNEH	Mohammed	JO		X	*	
KHATAB	Ahmed	JO	X			X
GERAUD	Michel	FR		X	X	
MIRAN	Patrice	PB		X	X	
DUVAL		PB		X		X
VALLEE	Domitille	PB	X			X
COMEAU	Aline	PB	X			X
CHAMAS	Lamia	LB		X	X	
FAWZI	Mohamed	EEAA				
SABET	Kamal	CEDARE				
ABDEL KADER	Adel Farid	CEDARE				
ISKANDAR KAMEL	Laila	C.I.D.		X	X	

NAME	First Name	COUNTRY	Group3 Water	Group2 Solid Waste	Group1 Air	Group4 Water Pollution
AKHTAR	Tehmina	METAP				
THOMPSON	Lorra	METAP				
HARRIS	Katie	METAP	X			X
HAMILTON	Kirk	METAP/WB	X		X	
Total			12	11	12	11

* Introduction to the Issue

R: Reporter

1 Summary of Group 1 on Air Pollution

Chairman : Dr. Nefisa Sayed ABOU EL SEOUD (Egypt)

Reporters: Dr. Nefisa Sayed ABOU EL SEOUD (Egypt)
Mr. Abdelrazzak SAFARJALANI (Syria)

1.1 Problems and Issues

After recalling objectives and the discussion methodology, the Chairman asked Mr. Mohamed Khashashneh to present the main problems and the national strategy in Jordan.

PRESENTATION

Mr Khashashneh began by describing the location, topography, climate, temperature, population, natural plants and agricultural areas of Jordan. Then he stated the main air pollutants in Jordan as being Total Suspended Particulates (TSP), SO_2, H_2S, CO, HC, NOx, agricultural pesticides, Pb, noise and odours. The most important sources are: stationary sources, mobile sources and natural ones. Agencies involved in monitoring air quality in Jordan are : the General Corporation for Environment Protection, the Meteorological Department, the Ministries of Health, Energy and Mineral Resources and NGOs.

Jordan's strategy is based upon the legal framework, which is made up of the environmental law enacted in Jan. 1 1996. This approach consists of:

- Establishing a national air quality centre,
- Measuring atmospheric pollutants,
- Establishing an air pollution database,
- Implementing standard criteria,
- Supporting research necessary to draw up future policies,
- Training technical staff working for the concerned agencies.

After this presentation, Mr Patrice MIRAN from Blue Plan presented the most heavily emphasised common issues as they arose from the country's answers to the questionnaire [4], which are:

- Climatic change is not a fundamental problem.
- High levels of NOx, SOx, PSM in urban areas.
- Respiratory disorders, as the first impact observed.
- Development of renewable energies, as the first political response.

He added to this list the two following political responses which were pointed out in the questionnaire, but with less emphasis than the development of renewable energies : the establishment of air measuring networks and the development of clean fuel use.

[4] See Appendix

The discussions that followed ended up by adding three more issues that could be illustrated by indicators: land use planning (i.e. the establishment of industrial areas outside residential districts and the distance between home and work), industrial processes and trans-boundary air pollution.

GENERAL ISSUES

PRESSURE	STATE	RESPONSE
NOx, SOx, SP emissions		Air quality measurement
	Respiratory Disorders	Clean fuels
Climate change and trans-boundary air pollution		Renewable energies land use planning and industrial processes

1.2 Choice of Six Prime Indicators

After the issues were set out, Mr. Miran presented the list of indicators from the questionnaire and the group tried to connect them to the issues mentioned above. Following discussions, the six following indicators were selected :

- **GHG emissions :** national man-made aggregated emissions of main greenhouse gases (GHG) : carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_20), (in 10^9grammes of CO_2-equivalent/year):
- **SOx, NOx, SP emissions** : national man-made emissions of :
  - sulphur dioxide (SOx) (in equivalent tonnes of SO_2/year)
  - nitrogen oxides emissions (NOx) (in equivalent tonnes of NO_2/year)
  - suspended particulates (in tonnes/year)
- **Energy intensity :** primary energy consumption per unit of Gross Domestic Product ; (in tonnes of oil equivalent per GDP unit).
- **Frequency of excesses over national standards :** for various pollutants : ozone, particulates, NOx, SOx... (in %)
- **Excessive respiratory disorders due to air pollution** : such as NOx, SOx, O3 and particulates.(in % of total respiratory disorders).
- **Part of clean fuels in total fuel consumption :** New indicator.

INDICATORS

PRESSURE	STATE	RESPONSE
GHG emissions		Energy intensity
SOx, NOx, SP emissions		Proportion of clean fuels in total fuel consumption
	Excessive respiratory disorders	Air quality

1.3 Calculation

Before identifying action necessary for following up, the group checked data availability for each of these indicators:

DATA AVAILABILITY

Indicator	Egypt	Palestine	Jordan	Syria
GHG emissions	D.P.A	D.N.A	D.A since 1994	D.P.A
SOx, NOx, SP	D.P.A	D.A but estimates since 1997	D.A since 1989 (hot spots)	D.A since 1985
Energy intensity	D.A	D.A since 1997	D.A	D.A since 1992
Frequency of excess over nat. standards	D.P.A	D.N.A	D.A	D.A
Excessive respiratory disorders	D.P.A in some cities	D.P.A	Estimates only	D.N.A
% of clean fuels in total fuel consumption	D.P.A especially for unleaded gasoline	D.N.A	D.A	D.N.A

* D.A: data available ; D.N.A: data not available, D.P.A: data partially available

When data is identified as partially available, it means that it is based on estimates and/or there are no chronological series and/or it is geographically limited.

1.4 Action Required for Following-up

The group then indicated the actions needed for the calculation of each indicator:

NECESSARY ACTION

Indicator	**Action Required**
GHG emissions	Jordan proposed to use the IPCC/OECD guidelines. Palestine and Syria agreed.
SOx, NOx, SP	Easy to calculate
Energy intensity	Palestine stressed the need to calculate this indicator based on consumption; all the present countries agreed
Frequency of excess over national standards	2 problems came out and remained open for further discussion: * Which standards to select once measurement networks have been established (O_3 concentration level, ATMO index,..) ? * What information to provide to the public when standards are exceeded ?
Respiratory disorders	Syria suggested emphasis on research in the fields of occupational medicine and environmental health. Calculation of this indicator requires improvements to health records
% of Clean fuels/ total fuel consumption	Clean fuels include unleaded gasoline, compressed natural gas (CNG), liquefied petrol gas (LPG), and low sulphur fuel. All participants agreed with this definition.

1.5 Conclusions and Recommendations

It was recommended that on-site visits of air quality measurement networks be organised in order to illustrate the practical use of these indicators and to better examine the application of methodologies recommended during this workshop.
In order to ensure the proper continuity of work, it would be preferable if this could be done using the same team of experts present at this workshop.

1.6 Plenary Session Debate on Group Work (session 6)

After the presentation of these findings in the plenary session, the discussion began with a question about Cyprus' participation. It was pointed out that Cyprus had not designated any air expert.

The significance of the proposed site-visits was discussed. The main purpose of this proposal was to ensure the application of knowledge.

Mr Géraud emphasised the necessity to obtain continuous measurements over 12 months/year before being able to use the indicator related to the frequency of excess over standards.

The Palestinian delegation raised the problem of trans-boundary air pollution. This problem, as Mr Hamilton stated, is taken into account through the implementation of an air quality measurement network.

2 Summary of Group 2 on Solid Waste Management

Chairman : Lamia CHAMAS (Lebanon)
Reporter: Georgios KOULLAPIS (Cyprus)

2.1 Problems and Issues

After recalling objectives and the discussion methodology, the Chairman asked Dr. Nefisa Abou El SEOUD to present the main problems and national strategy in Egypt.

PRESENTATION

Solid waste management is an important issue in Egypt. It is becoming an increasing concern at all levels due to its socio-economic and environmental impact. Municipal solid waste is generated from different sources: household, institutions, street sweepings, gardens, demolition and construction waste. The rate of generation of Municipal Solid Waste (MSW) in urban areas ranges from 0.4-1.3 kg/capita/day. MSW management includes: collection, transportation, treatment and disposal with some sorting and recycling. Agencies involved in this system are governmental (local administration, cleansing and Bentification[5] Authorities) and non-governmental (private, informal systems, NGO's).

The Egyptian solid waste strategy is based on two approaches to treatment besides raising efficiency of the collection system:

1- Composting

2- Sanitary landfills

The strategy for hazardous and hospital wastes is incineration and secured landfills for the future.

After this presentation, Mr Patrice MIRAN from Blue Plan presented the most heavily emphasised common problems as they arose from the country's answers to the questionnaire [6] which are:

1- Increases in municipal solid waste production.

2- Unknown hazardous waste production.

3- The high proportion of organic components.

4- Dumps, as the main destination of collected municipal solid wastes.

5- No policy for waste reduction at source.

6- Setting up sanitary landfills.

[5] Definition Bentification :Authorities : authorities in charge of funding urban facilities
[6] See Appendix

The discussions that followed resulted in adding additional issues to the list mentioned above, which are:

1- The role of the informal sector

2- Choice of technology

3- Accuracy of Data

4- Separate collections

5- Size of the area occupied by dumps

6- Cost recovery and budget allocation

7- The legal framework

8- Information on economic opportunities in the field of waste minimisation and recycling

GENERAL ISSUES

PRESSURE	STATE	RESPONSE
Increase of municipal solid waste production	The high proportion of organic components	No policy for waste reduction at source
Unknown hazardous waste production	The role of the informal sector	Setting up sanitary landfill sites
Dumps, as the main destination of collected municipal solid wastes	Composition of municipal solid waste	Choice of technology
Size of area occupied by dumps	Data accuracy	Separate collection
		Cost recovery and budget allocation
		Legal framework
		Information on economic opportunities in the field of waste minimisation and recycling
		Increasing the role of NGOs and the public sector

2.2 Choice of Five Prime Indicators

After the issues were set out, the group tried to connect them to the list of indicators and to retain the most important ones. Following discussions the following five indicators were selected :

- **Municipal solid waste generation :** municipal waste generation issued by households, various institutions such as hospitals and hotels, and some scattered sources, on a weight basis, at the point of production (in tonnes/year/inhabitant).
- **Collection rate of municipal waste:** proportion (in percentage or volume) of municipal waste production entering channels of treatment/storage organised by local authorities. (in tonnes/year)
- **Destination of collected municipal waste :** shares of various waste destinations : to landfill, incineration and recycling (in %).
- **Hazardous waste generation :** the annual production of hazardous waste (industrial, medical,...) according to the definition of the Basle convention (in tonnes/year)
- **Cost recovery** : new indicator, which measures the share of expenses that is covered by taxes/charges paid by the waste generators (in %)

INDICATORS

PRESSURE	STATE	RESPONSE
Municipal solid waste generation		Collection rate of MW
		Destination of collected municipal wastes
Hazardous waste generation		Cost recovery of waste management system

2.3 Calculation

DATA AVAILABILITY

Indicator	Cyprus	Egypt	Jordan	Palestine	Syria
Municipal solid waste generation	D.A from 1993 till today	Local D.A from 1985 National estimations from 1985	D.A for last 5 years	D.N.A on national level Gaza strip, actual measure-ments for last 2 years *Ongoing process of National Data Bank	D.A on national level for 1997 D.A for Damascus for last 10 years
Collection rate	D.A last 6 years	D.A only for urban areas, mainly big cities	D.A for main towns last 5 years	D.N.A *Ongoing process	D.A for 1997
Destination of collected Municipal waste	D.A last 6 years	D.A for urban areas	D.P.A last 2 years	D.A in Gaza Strip for last 2 years	D.A
Hazardous waste generation	D.A last 6 years	D.A (hospital wastes) estimates for the other sources	D.N.A	D.N.A *Ongoing process	D.A only for medical wastes in Damascus for 1998
Cost recovery	DPA	DPA	DPA	DPA	DPA

*D.A: data available ; D.N.A: data not available, D.P.A: data partially available

All participants agreed on the definition of the indicators as stated in the questionnaires.

Regarding the new indicator **"Cost recovery of waste management system"**, the participants defined it as follows:

It is the proportion of direct capital expenses related to the solid waste system recovered by the system itself.

2.4 Action Required for Following-up

The problems connected with calculation were not detailed enough because of the lack of time, and it was recommended that this should be the subject of the next workshop.

2.5 Conclusions and Recommendations

It will be essential to organise on-site visits to illustrate the practical aspects of the use of these indicators.

In order to ensure the continuity of this work the same team of people should follow up this matter with the help of international organisations like Blue Plan, METAP, CEDARE and others.

2.6 Plenary Session Debate on Group Work (session 6)

After the presentation of these findings in the plenary session, Dr. Fawzi put the emphasis on the NGOs' and the private sector's roles, which allow only a supervisory assignment to the State, by reference to Egyptian experience.

Most of the countries present answered that the major role played by NGOs in municipal waste collection was specific to Egypt. Mr. Sha'alan described the Palestinian private sector role in environmental facilities and concluded that it was not always successful.

Mr. Ossama Salem stressed the lack of a regulatory framework.

Mr. Tsiourtis (Cyprus) requested information on the environmental impact of landfill.

3 Summary of Group 3 : Water Resource and Demand Management

Chairman : Mr Tsiourtis, Cyprus
Reporter : Mr Kamel Mostafa Amer, Egypt

3.1 Problems and Issues

After a brief reminder of the objectives and the methodology for discussion by D. Vallée, the Chairman gave the floor to Mr. Musa Abu Gharbeyeh to present the main problems and strategies for water management in the Palestinian Authority.

PRESENTATION

After describing the natural context of water shortage and the main sources of water, Mr. Abu Gharbeyeh analysed the major problems faced by the Palestinian Authority. These are :

- increasing water depletion, due to groundwater over-exploitation;
- water pollution which is a major concern, and obvious quality deterioration;
- inefficient water use especially from springs;
- limited access to water resources due to political constraints (no access currently to the Jordan River);
- spatially unbalanced distribution of water,
- the need to improve data information systems and
- an old and badly maintained network (inefficient conveyance : high leakage).

Currently, the Palestinian Authority is outlining its national water policy. Focus is put on the following items: the need to strengthen control over water resources, especially regarding water rights ; the necessity of recognising the value of water in sustaining human life, human health and the Environment ; the requirement for water supplies and developments to comply with water resource strategy constraints.

After the presentation, Domitille Vallée set out the main common issues which were highlighted in answers to the questionnaire[7] from 3 countries. The debate with national experts from the 5 countries allowed this initial understanding of the situation to be revised and completed.

GENERAL ISSUES

The discussion showed that water scarcity levels in all the 5 countries were rising, and strong increase in water demand, notably due to rapid population growth, industrial development and higher standard of living was adding particular stresses.

The potential for further water resource development has been almost fully applied. However, there is room for progress, thanks to non-conventional water supplies (re-use, desalination,...), and for improvements in water use efficiency (not only in agriculture but also in the other sectors) .

[7] See appendix

GENERAL ISSUES

PRESSURE	STATE	RESPONSE
• Increase in water demand – Population growth – Globalisation – Increase in withdrawals with over-exploitation of aquifers • Overall inefficient use of water (domestic, and especially agriculture,...) – Subsidies	• Water is finite and scarcity levels are increasing – (influencing factors: climatic seasonal fluctuations -rainy seasons and droughts) • Water quality deterioration • Ensuring sustainability (renewability of water resources)	• Shared management of common resources • Improved groundwater recharging • Water management should be improved – Improved irrigation and drainage systems (methods, efficiency,...) – Re-using water (agricultural drainage and waste water) – Applying a cost recovery strategy • Intensifying agriculture : with the goal of effective water use (optimising yields/unit of water, fertiliser, .) • Increasing agriculture to feed people with better use of rainfed agriculture

During the debate several terminology problems were raised, such as: efficiency, renewable resources, exploitable resources,...

After an extensive discussion on common issues, the group worked on issuing a list of indicators and selecting the most relevant ones. The group came to the conclusion that this set of indicators was meant to be used as a means of evaluating environmental performance at national level, and should not be considered as a way of comparing situations in different countries.

It is useful to have some descriptive indicators, such as indicator N°1 " exploitable water resources per capita ", in order to obtain a clear insight into the situation in a country but it has to be borne in mind that population is the only vector of change and therefore will not be influenced by a change in water management strategy.

In the opinion of the group, environmental performance indicators for water management should stress factors influenced by water management practice. Based on this view, the five most relevant prime indicators were carefully selected.

3.2 Choice of 5 Prime Indicators

After discussing the relevance of the list of indicators proposed in the questionnaire, the group tried to narrow down its choice by focusing on the indicators which contribute to a better illustration of the set of issues. The following 5 indicators were selected :

- **Indicator 10 " On-farm Irrigation Efficiency** " which is defined as the total (on-farm) efficiency of each type of irrigation (surface , sprinkler, micro,...), weighted by the percentage of each irrigation method area.

The way of calculating efficiency for each method should be very clear and well defined. Nevertheless, it should be taken into account that the overall efficiency of an irrigation system is very important for accounting for the efficiency of conveyance (which is not measured in indicator 10).

- **Indicator 12 " Fresh Water Final Consumption** " which is defined as the ratio between total final consumption and renewable natural water resources (total average internal and external annual flows).

  The final consumption is sum of all net consumption uses for various sectors (irrigation, municipalities, industry, power cooling, etc.). It represents the difference between total withdrawals from natural resources and total inland discharges.

  This indicator should be interpreted in relation with indicator No. 14.

- **Indicator 14 " Water Supply Source Diversification Index** " is defined as the percentage of water demand covered by non-conventional supply sources (re-use of waste water and agricultural drainage water ; desalination, imports ...).

  A missing factor which has to be taken into account is the " Multiplier Coefficient " that is how many times the water is being re-used along the system. For example, in Egypt, the multiplier coefficient can reach 3, through consecutive re-use of agricultural drainage water.

- **Indicator 15 " Drinking Water Demand Efficiency "** is defined as the ratio of total drinking water produced, distributed and paid for, to the total volume of water produced.

  This indicator should deal with not only rural but also urban areas. It integrates technical and economic efficiency.

- **Indicator 17 " Water Unit Productivity Index** " is defined as the volume of irrigation water required to produce a unit weight of a certain crop.

  It is recommended that this indicator be used for comparing different cropping patterns, on a regional level, in the case of limited water resources. This could assist in planning a national strategy.

  It is of great benefit to relate this indicator to the value of the production for a certain crops by assessing the revenues per water unit ($ / m^3). Care should be taken to feed the poor.

  Extensive research work should be applied to calculating the data required for this

INDICATORS

PRESSURE	STATE	RESPONSE
• 12 : Final Water Consumption Index		• 10 : On-Farm Irrigation Efficiency • 15 Drinking Water Demand Efficiency
		• 14 : Water Supply Sources Diversification Index
		• 17 : Water Unit Productivity Index

3.3 Calculation

It should be noted that the 5 chosen indicators are relatively easy to calculate. However, each indicator very much needs to be carefully drawn up (definition, explanation, data needed, calculation,...), especially numbers 15 and 17, which require special research.

DATA AVAILABILITY IN VARIOUS COUNTRIES

Indicator°	ALREADY AVAILABLE INDICATORS	INDICATORS NEEDING MORE DATA AND DEFINITION
10	• On-Farm Irrigation Efficiency • *(Cy, Sy, Jo)*	• *Pa, Eg*
12	• Fresh Water Final Consumption Index • *(5 Countries)*	• Finalising harmonisation definitions
14	• Water Supply Sources Diversification Index • *(Eg, Pa, Cy)*	• Precise terminology • *Jo, Sy*
15	• Drinking Water Demand Efficiency	• *(5 countries)*
17	• Water Unit Productivity Index	• *(5 countries)*

It was pointed out that data is not always reliable.

Despite this question of data " availability ", the first step along the way to calculating indicators should be to define them more precisely, and to use agreed terminology. For instance the interpretation of a term like " demand " has different meanings for individuals with different backgrounds ; that is why definitions should be clarified. In the questionnaires, demand was to be understood as " use " rather than " requirements " or « needs ».

3.4 Follow-up Actions and Recommendations :

- Disseminating the outcome of the 3 sub-regional workshops.
- Drawing up the definitions, and especially for the 5 selected indicators, should be finalised at **regional** level through different means such as: a limited (1-day) regional workshop, existing networks (SEMIDE), internet meetings, e-mail, and mail. This task should be finalised before any further data collection takes place. It should be preceded by extensive work involving experts on the topic.
- This could be followed by work at **national** level to :
  - increase public awareness of the usefulness of such indicators,
  - assess the feasibility of a first set of environmental performance indicators taking into account sub-regional achievements,
  - announce the list of chosen indicators to be used as reference environment performance indicators,
  - collect data, calculate and publish selected indicators,
  - establish an information system (database and organisation) for working with the selected indicators
  - identify the constraints and the means for regularly up-dating these indicators.

This national work could start with pilot countries in each of the 3 sub-regions.

3.5 Plenary Session Debate on Group Work (session 6)

After the presentation of these findings in the plenary session, participants emphasised that further work was required to make the indicator definition more precise.

4 Summary of Group 4 " Water Pollution "

Chairman : Mr. Tsiourtis, Cyprus
Reporter : Mr. Mohammad Al Hmaidi, Palestine

4.1 Problems and Issues

The discussion was introduced by a detailed presentation on Syria.

NATIONAL PRESENTATION

M. Saad Allah Chawaf gave a description of the water pollution problems in Syria with first of all, a reminder of major background information on population, institutional frameworks etc.

Then the water management organisation system was presented together with the major missions of the Ministry of irrigation, and the directorates for water control and for water resources.

Major sources of pollution were highlighted by comparing the relative volumes of sewage and the industrial discharges in different towns. It was also stressed that agro-chemicals are considered as a source of pollution. But no measurements have yet been taken on diffuse pollution from agriculture.

Figures were given for pollution quantities in seven locations along the Barada river, crossing Damascus city. The example of chlorine concentration that has been increasing between 1980 and 1992, and the variation of the BOD over the same period of time were also referred to. Additional information was presented on nitrates, conductivity, suspended solids, PH, dissolved oxygen and temperatures for 1985.

A reference was made to the various laws and standards in Syria, but unfortunately all is not yet completely implemented.

Two aspects of the strategy were referred to: work is under way to complete sewage collection with the final goal of treating all sewage at a later stage. Furthermore, it was stressed that Syria is in the process of extending its quality monitoring system in terms of frequency, as well as by including new parameters such as heavy metals (for monitoring every 3 months).

After the presentation, Domitille Vallée presented the **main common issues of the region** from the answers of 2 countries to the preparatory questionnaire (Palestine, Egypt)[8].

COMMON ISSUES

There was a **general acceptance** of the summary of the common issues.

Details were added to the issues identified in the summary and additional issues were raised including:

[8] See Appendix

- other sources of pollution such as : intensive animal farming, trans-boundary pollution (carried by either air or water), and related to solid waste (through direct disposal in a body of water or through leakage).
- pollution of water storage due to the lack of sanitary facilities and the lack of public awareness.
- insufficient public awareness campaigns
- the lack of capacity building for system maintenance,
- the lack of compliance with regulations and standards,
- the inefficient use of irrigation and fertigation management which results in the excessive application of agro-chemicals and excessive use of water.
- lack of process technology upgrading (clean production etc.)

GENERAL ISSUES

PRESSURE	STATE	RESPONSE
• Main source of pollution is **domestic** waste water discharges • Excessive loads of **agro-chemicals** • Toxic **industrial** discharges, especially when there is no pre-treatment. • Other sources of pollution : – Transboundary sources (air and water) – Solid waste disposal (direct and leakage) – Intensive animal farming • Over-exploitation of groundwater which may lead to salinisation	• **Overall degradation of natural water** and the quality of supply sources ; • Contamination of water distribution and storage system • Eutrophisation of water in some sources • **lack of compliance with regulation** and standards and the lack of regulation in some cases • Health impact of water quality degradation (water borne diseases)	• **Management to be improved** – priority given to the development of waste water treatment plants. – lack of maintenance of both drinking water and sanitation systems – insufficient spending and lack of cost recovery systems – lack of capacity building for operation and maintenance • lack of a water quality monitoring network and measurement of diffuse pollution • Inefficient irrigation and fertigation management • lack of technology improved processes (clean technologies) • lack of public awareness campaigns

RELEVANCE

After some debate, it was agreed that the goal was to issue indicators reflecting the water pollution issues regardless of water uses. Therefore three major issues are to be evaluated :

- Sources of pollution ;
- Quality degradation or improvements of natural resources and supply sources ;
- Management efficiency in handling the issues.

The relevance of the indicators proposed in the questionnaire was discussed and it was stated that they do not cover the various additional sources of pollution, but they do take into consideration strategies and policies already implemented or proposed in the different countries. Based on this, indicators were evaluated.

Before choosing the 5 prime indicators, it was agreed that some of the proposed indicators can be considered as a prerequisite for dealing with issues :

1. **Working functional institutions** equipped with the relevant management tools including policies, action plans and a proper legal framework.
2. **Significant policies** can be listed as being: water pollution prevention, operational maintenance besides operating cost recovery principles.
3. Important **management tools** may also include decision-taking support systems, monitoring systems, information and data, tariff systems, capacity building programmes or plans, and environmental awareness campaigns.
4. The **legal framework** refers to the relevant laws and regulations which aims at pollution prevention quality standards. Emphasis was put on implementation and compliance.
5. The **assurance of the availability of financial resources** which facilitates the implementation of the policies and plans mentioned above. Reference should be made to indicator No 9 which measures expenditure on water resource protection and includes prevention, mitigation and treatment action.

4.2 Choice of Five Prime Indicators

An initial statement was that all indicators were important and relevant. However, due to the previously accepted decision to limit the list of indicators to 5, efforts were made to group indicators together or eliminate some of them on proper justification.

- **Indicator " Water Quality Indicator** " is defined as the concentration of a given parameter in surface or groundwater compared to the standards used in that country.

  This indicator can be examined with two goals:

  - The first one is measuring the priority parameters which relate to environmental and health impacts such as : BOD, Dissolved Oxygen, E. Coli, parasites, nitrates, salinity... The selection of parameters and their related reference values are to be decided by each country depending on their specific issues.
  - The second one is assessing overall resource quality using a synthetic water quality index (such as the ATMO index used for air quality in France presented during the workshop). This requires defining a classification system for quality which is based on three sets of parameters including physical, chemical and biological characteristics.

    Obviously the same water quality indicator can be used to assess the quality of water allocated for different uses and it should be compared with the standards for each water use.

- **Indicator 2' " Agro-Chemical Use** " is defined as the overall load of agro-chemicals per unit area (hectares) of cultivated land.

  Fertilisers and pesticides are the major agro-chemicals affecting the quality of water bodies when applied excessively.

  All the group stressed the need for more work on more relevant indicators measuring excess agro-chemical input.

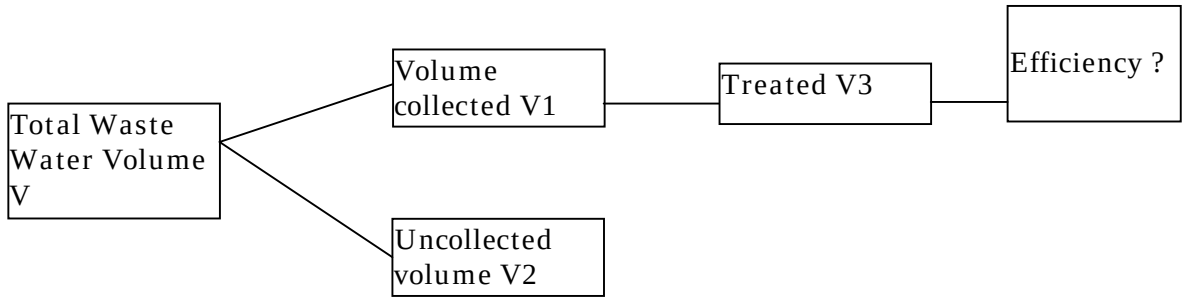
- **Indicator 5 " Drinking Water Supply with Quality Standards** " is defined as the share of the population connected to the public distribution system receiving water that is no in compliance with locally used standards.

  This indicator can be looked at with the aim of measuring **priority parameters** which relate to health impacts such as : BOD, E. Coli, nitrates and salinity... The selection of parameters and related reference values are to be decided by each country depending on their specific issues.

  This indicator can only be measured if we first know the drinking water distribution rate " Indicator n° 4 ".

- **Indicator 6' " Waste Water Treatment index** " is defined as the volume of treated waste water over the total volume of waste water produced.

  This indicator is the result of the multiplication of indicator n° 6 " Population with Access to Basic Sanitation " and n° 7 " Waste Water Treatment Index ". It was felt necessary to clarify the steps taken to arrive at this indicator using the following diagram:



V = V1 + V2

Indicator n°6 =V1 / V ;

Indicator n°7 = V3/V1

and the selected indicator n° 6' = V 3 / V= Indicator n°6* Indicator n°7

It should be noted that this indicator is a step towards measuring pollution prevention initiatives but it does not allow the assessment of treatment system efficiency.

- **Indicator n° 8 " Industrial Waste Water Treatment** " is defined as the ratio between the total quantity of treated industrial effluent over the total quantity of industrial water produced.

It was agreed that another proposed definition based on the ratio of the number of industrial plants using pre-treatment of effluent to the total number of industrial plant can be misleading, as it can hide the magnitude of pollution produced by one industry.

The set of indicators can be summarised in the PSR framework as follows:

INDICATORS

PRESSURE	STATE	RESPONSE
• (See Indicator n°4 Group 3 " Over-Exploitation Index ")	• Indicator 1 " Water Quality "	• Indicator 6' "Waste Water Collection and Treatment Index "
• Indicator 2' " Agro-chemical Use "	• Indicator 5 " Index of Distributed Water Compliance with Quality Standards "	
		• Indicator 8 " Industrial Waste Water Treatment "

After debate on the definition of indicators, it was clear to everyone that further work should be carried out at national level to deepen the understanding of each indicator in order to be consistent with national views.

4.3 Calculation

After a brief reminder of assessments of data availability for the calculation of indicators based on the two countries' answers, this issue was discussed amongst the 5 countries in the group and resulted in the following :

DATA AVAILABILITY

INDICATOR	DATA AVAILABLE	NOT YET AVAILABLE
1 " Water Quality "	for all countries	
2' " Use of Agro chemicals "	Egypt, Jordan, Cyprus, Palestine (use of internationally banned pesticides)	Syria (more studies are needed to gather data)
5 "Compliance of Drinking Water Distributed "	Jordan, Cyprus, Syria	Egypt, Palestine (lack of national standards)
6' "Waste Water Treatment "	for all countries	
8 " Industrial Waste Water Treatment "	Egypt (only for major industries)	for the other countries, it is difficult to gather this data. There is need for further work.

This is a positive assessment showing that the 4 out of the 5 selected indicators could be easily calculated. However, it should be stressed that **data accuracy** should be reviewed and **data frequency** in order to "reflect trends " should be considered.

4.4 Action Required for Following-up

As the major goal is to evaluate the improvement of the water management in its quantitative (group 3) and qualitative (group 4) aspects, all the following actions are listed :

AT NATIONAL LEVEL

- Reviewing and completing the questionnaire on the 5 selected indicators, assessing data availability, accessibility, accuracy and frequency.
- Defining maximum acceptable values or quantified objectives for each selected indicator bearing in mind the usefulness of national guidelines and standards to that purpose. It is understood that some countries are still in the process of defining their national guidelines and standards.
- Assessing the relevance of the methodology applied and the indicators selected with national stakeholders in a national workshop. It was indicated by the group that the presence of a Blue Plan representative could be useful. A national workshop can be used as a platform for exchanges and for raising awareness on the usefulness of indicators in national overall environmental strategies.
- Testing the feasibility and prospects of implementing the previous indicators using one of them as a pilot case.

AT REGIONAL LEVEL

- The importance of standardisation of procedures in the process of sampling and calibration was stressed. It was strongly emphasised that this would facilitate the exchange of information between countries.
- This exchange should take advantage of networks already existing (SEMIDE, ...) and be channelled through them. It was requested that Blue Plan facilitate this process. In addition, CEDARE, as a regional organisation, offered to contribute to exchanges, especially on information systems, and widening dissemination of activities to additional partners. They also plan to work on environmental indicators in two years time.
- Related activities of other organisations should be made available to participating countries to avoid possible duplication or confusion. Again Blue plan was requested to collect and distribute such information.

4.5 Conclusions and Recommendations

The outcome of this workshop should be made available to international partners, all METAP countries (and within them to various stakeholders), and first of all to the participants of the proposed Split Workshop.

For the sake of continuity and for improvement, it was suggested that countries should retain the designated experts and personnel for following up this work.

4.6 Plenary Session Debate on Group Work (session 6)

After the presentation of these findings in the plenary session, Dr Fawzi presented Egypt's ability to re-use industrial waste water.

Part 4 : Workshop Evaluation

During the last session of the workshop, the participants were kindly requested to complete an evaluation form concerning the workshop.

The main results of this evaluation are summarised below on the basis of 16 fulfilled evaluation forms.

OBJECTIVES : WERE THEY ATTAINED ?

Yes	No
16	

WORKSHOP SESSION EVALUATION

Session	Clarity			Utility			Length		
	1	*2*	*3*	*1*	*2*	*3*	*1*	*2*	*3*
session 1	1	3	12	1	6	9		5	11
session 2		3	13		5	11		6	10
session 3	1	4	10	1	4	10		7	7
session 4		3	10	1	3	9		6	8
session 5		3	10	1	5	6		7	16
session 6		2	14	1	2	12		6	10
session 7		0	13		4	9		2	11

1: low; 2: average; 3: good

Most of participants think that the objectives of the workshop were attained, though for some countries preparation time was too short. They mentioned the choice of 5 or 6 prime indicators in each group and asked for a follow up on these activities. In general the organisation and harmony in sessions has been satisfactory.

It was very interesting to learn from countries experiences.

The organisation was good, but hotel facilities rather poor.

CLARITY, USEFULNESS AND LENGTH ASSESSMENT

In general all sessions have been appreciated, though there was a lack of time for working groups and discussions because of active participation.

Sessions were logically organised and breaks very well placed.

ACTIVITIES THAT CAN BE IMPROVED

Preparatory working documents must be sent to all administrations concerned especially in the host country, in due time in order to be filled out properly[9].

Distribution of all documents could have been done before starting to be read by participants in order to deepen comprehension during discussion.

GAPS

The precise definition of indicators and measured parameters for controlling indicators is to be deepened.

Documents distributed in working groups should have been given to all participants and not only to those belonging to the working group

SUGGESTIONS

Participants suggested that designated experts participate in the next workshops in order to ensure actual good following-up of activities for drawing-up future policies in those countries.

The next regional workshops should be longer (at least 5 days) as EPIs need much more time for definition. For Arabic speaking countries one could try to use the Arabic language or invite a professional moderator.

Apparently there is demand for presentations by specialists in every group for each particular aspect put forward during the workshop. Key participants should be included in future meetings.

[9] The Blue Plan precise that the questionnaires were sent in the end of August 1998 to the country METAP-Focal Point

Part 5 : APPENDICES

PART 5 : APPENDICES LIST

APPENDIX 1 : Agenda

Sub-regional Workshop on « Environmental Performance Indicators»

Cairo, 8-10 November 1998
Agenda

Sunday 8/11/98	**Monday 9/11/98**	**Tuesday 10/11/98**
9h00 ***S1 - Opening and Introduction*** Welcome and introduction - Blue Plan - EEAA - Cedare Context, objectives and overall Workshop organisation (MAP/Blue Plan/METAP) Round table	***9h00-10h00*** ***Continuation of groups 2 and 3*** ***11h00*** ***S4 - Thematic Groups (Follow- up)*** S4 Group 1 : Air Pollution / Group 4 : Water pollution	***9h00*** ***S6 - Conclusions of the 4 thematic groups*** Presentation and discussions (15 minutes/group)
10h00 - Coffee break	**10h30 - Coffee break**	**10H30 - Coffee Break**
10h30 ***S2 - Environmental Performance Indicators (EPI)*** 1. Conceptual Frame for EPI 2. Practical examples of EPI: Air : ATMO index Solid waste Water efficiency 3. Working method for thematic groups	***11h00*** ***S4 - Thematic Groups (Follow-up)*** Group 1 : Air Pollution / Group 4 : Water pollution	***11h00*** ***S7 - Conclusions*** Conclusions and recommendations Evaluation
12h30 - Lunch	**13h00 - Lunch**	**13h00 - Lunch**
14h00 ***S3 - Thematic Groups (2/2)*** Group 3 : Water resources / Group 2 : Solid waste	***14h30*** ***S4 - Thematic Groups (Follow-up)*** Group 1 : Air Pollution / Group 4 : Water pollution	
16h00 - Coffee Break	**16h00 - Coffee Break**	
16h30-18h30 ***S3 - Thematic groups (follow-up)*** Group3 : Water resources / Group2 : Solid waste	***16h30-18h00*** ***S5 - Project EPI*** Conceptual frame for Environmental Performance Indicators in projects Examples	

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UNDP

Appendix 3 : context of the Programme Performance and Monitoring System (MAP/METAP) on Environmental Performance Indicators

THE MEDITERRANEAN ACTION PLAN AND THE BLUE PLAN

The **Mediterranean Action Plan** (MAP) has been active since 1975 in formulating and adopting a series of legally binding agreements. With its Regional Activity Centres, including the Blue Plan, it recommends measures through which individual Mediterranean countries can address resource degradation and pollution.

After the Earth Summit in 1992, significant efforts have been made to integrate Sustainable Development concerns in the Mediterranean region:

- a Mediterranean Environment and Development *Observatoire* was initiated by the Blue Plan with the European Union's assistance in 1993;
- an Agenda MED 21 was prepared in 1994, with an important involvement of the civil society;
- sustainable development principles were taken into account in the amended Barcelona Convention and Phase II of MAP was endorsed in 1995, at the time of MAP's twentieth anniversary;
- the related Protocoles were also renewed especially that related to land-based sources while new Protocols were signed concerning protected areas and biological diversity as well as hazardous waste;
- the Mediterranean Commission for Sustainable Development (MCSD) was established in 1996.

Within this context, **indicators** are considered as important tools for decision making, and constitute a major component of the *Observatoire*, the Agenda MED 21 and the Commission (MCSD). Once the launching phase of the *Observatoire* (1993-1996) was completed, the Contracting Parties to the Barcelona Convention requested the Blue Plan to replace the work initiated on environmental indicators within the frame of Sustainable Development Indicators in the Mediterranean region. Later on, this subject was also considered as a priority concern for the MCSD.

Since the work on indicators requires "downstream" and "upstream" complementary activities, the Blue Plan has strengthened co-operation with Eurostat on environmental statistics, with the European Environment Agency on indicators for State-of-the-environment reporting, with OECD and the French Institute for Environment on indicators framework and presentation aspects, and finally with METAP on "Environmental Performance Indicators".

METAP III

METAP is a cooperation programme among the four partner organisations, the European Commission, the European Investment Bank, the United Nations Development Programme, and the World Bank. METAP was created in 1990 as a partnership between donors and 13 countries on the southern and eastern rims of the Mediterranean. The program is part of the broader process of collaboration and co-operation taking place in the region with the Mediterranean Action Plan (MAP), and, globally, the Blue Plan was precursor to the EPM (Environmental Program for the Mediterranean). These previous initiatives had stressed that the Mediterranean's natural resource degradation and pollution problems are regional in scope.

Since 1990, METAP has contributed in bringing together the southern and eastern countries of the Mediterranean to better address those common environmental problems. During the first two phases of the program (1990-1995), METAP provided assistance to the Mediterranean countries for carrying out pre-investment activities for priority environmental projects, formulating sound policies, and building the necessary institutional capacity to implement them. Funds were mobilised to support nearly 100 technical assistance activities which have helped the developing countries of the region initiate environmental action.

The **third phase of the program** (1996-2000) was officially launched in April 1997. METAP III incorporates a country driven approach to developing and managing the METAP portfolio of individual country activities and of regional initiatives.
METAP III technical and financial assistance focuses on three **priority areas** of environmental management in the region:

- integrated water and coastal resources management,
- addressing emerging pollution problems at "hot spots",
- capacity building and participation.

The portfolio proposition for each country emphasises in-country strengthening capacity to identify and prepare investments in those priority areas.

Gradually, METAP functions are being transferred to the region. A Regional Facility has been established at Cairo, consisting of a Project Preparation Unit (PPU) and a Capacity Building Unit (CBU), together with the UNDP Regional Bureau for Capacity Building (RBCP). These units comprise international and regional staff and provide continuing support in policy formulation, project preparation, institutional building, and regional co-operation.

In designing METAP III, attention was directed towards ensuring the **complementarity of the program's activities** with other important and inter-related initiatives taking place in the Mediterranean region, especially with MAP and the preparation of National Environmental Action Plans.

- METAP complements MAP through its capacity building activities in coastal zone management, pollution control, and the formulation of monitoring and performance indicators.
- National Environmental Action Plans (NEAPs) have been completed or are under preparation in nearly every developing country of the Mediterranean. These initial plans constitute the first systematic framework for reviewing and establishing environmental priorities. Together with Sustainable Development Strategies, they are central to the development process. Their periodic evaluation and revision must also take place in order to incorporate changing priorities and needs as new problems

arise. Moreover, most countries have numerous sectoral and local plans that are generally not put together in the context of a sustainable development strategy.

METAP III focuses on programs that co-ordinate and build on existing NEAPs and sustainable development strategies so that priority policies are defined, options for resource requirements and mobilisation are provided, and performance indicators are developed and monitored.

A Program Performance Monitoring system has been incorporated into METAP's implementation phase to help countries monitor progress in achieving their environmental objectives for which they already have made national and international commitments.

THE COOPERATION MAP - METAP : THE PROGRAM PERFORMANCE MONITORING SYSTEM

The performance monitoring system is based on four premises:

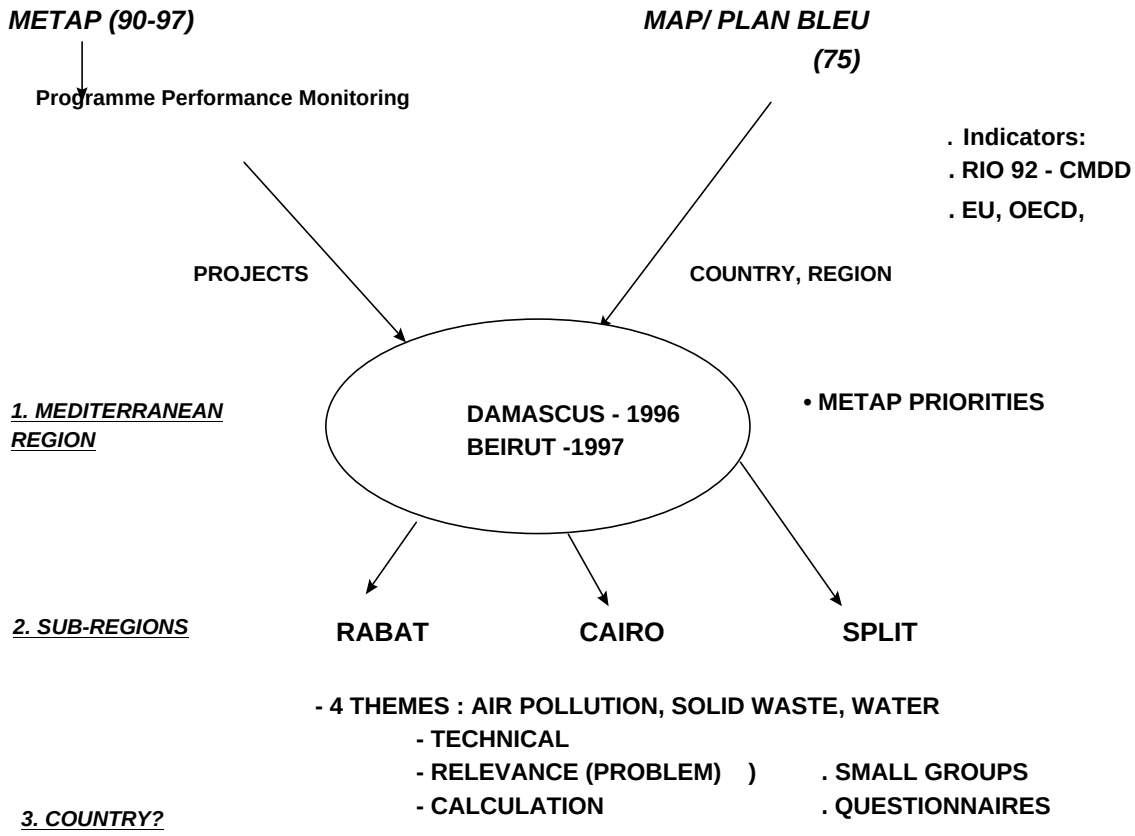
- performance monitoring is not a conditionality for METAP financing; rather, it is a gauge of each country's progress;
- participation in the performance monitoring system will be tailored and paced according to country-specific conditions and resources;
- the proposed system is largely based on existing resources, institutions, and other performance monitoring activities;
- the process will yield capacity building and information systems benefits from a collaborative, interactive, and regional approach.

Environmental and programme performance monitoring is therefore a specific field of co-operation between the Blue Plan, on behalf of the Mediterranean Action Plan, and METAP.

With the exception of Jordan and Palestine, **MAP** and **METAP** work with and for the same countries, mostly the same national agencies and often the same persons. Moreover, they usually concentrate their efforts on similar problems and projects. Therefore, for the sake of synergy, in order to avoid or reduce duplication, and to come out with more and better added-value, METAP and MAP have decided to co-operate on this important question of Environmental Performance Indicators that will obviously benefit from other indicator activities within METAP partners, as well as within the Mediterranean Action Plan, especially the *Observatoire* and the MCSD.

In addition to providing information on environmental targets and progress achieved, the **objective** of this regional initiative is to provide the incentives, impetus and resources for countries to ultimately build and own an efficient monitoring system, in particular the emerging network of national environmental *observatoires*, that would support both their national and regional environmental management systems.

Appendix 4 : History of the Programme Performance and Monitoring System :



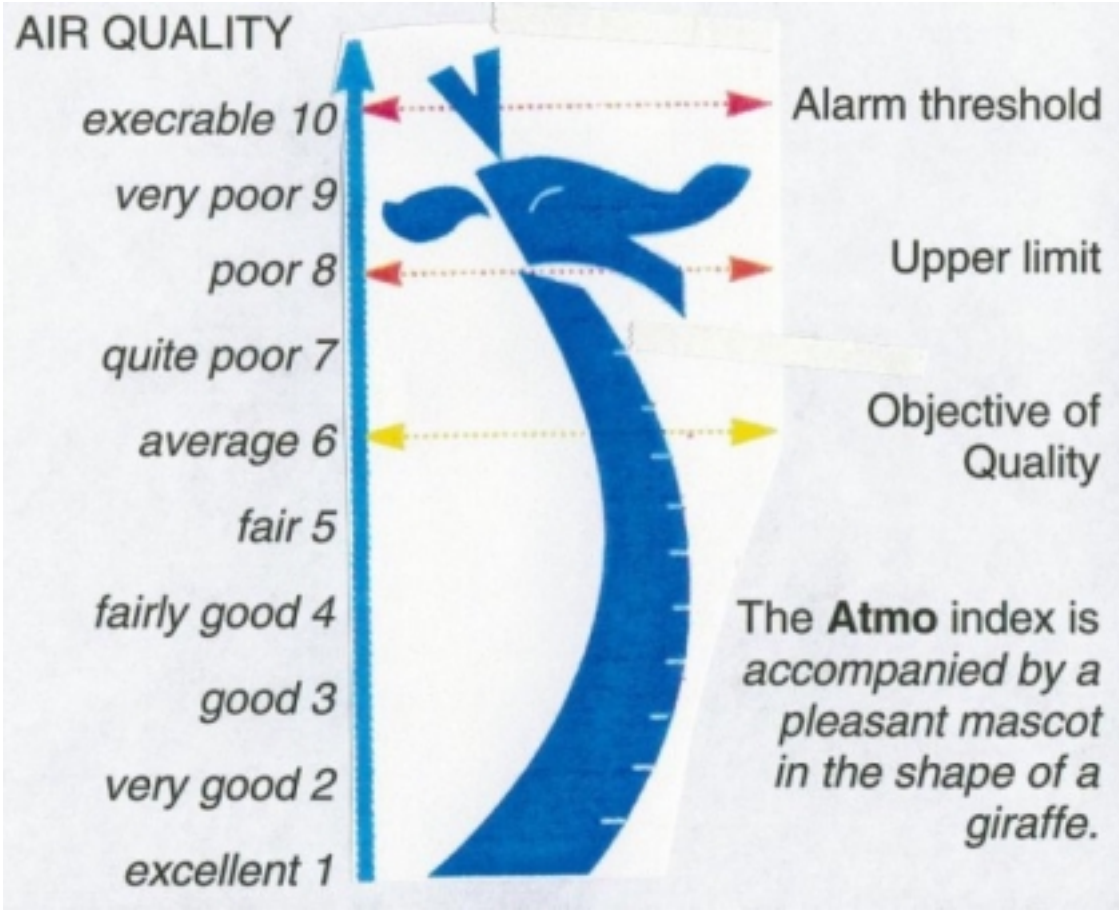
Appendix 5 : ATMO Index for air quality monitoring

INFORMATION ON AIR QUALITY IN FRANCE

Today, the population's demands for information on air quality is becoming ever stronger. Air quality monitoring bodies ensure the distribution of the aggregated results of their measurements by means of newspapers, local television and radios stations, the publishing of regular bulletins or via a minitel service. The Ministry of the Environment and the ADEME are responsible for the distribution of national summaries.

The Atmo index, daily information on the quality of air in your conurbation.

Calculated every day by members of the **Atmo** team, the **Atmo** index allows overall air quality in a conurbation to be identified along a scale from 1 to 10. It is built up from four sub-indices on the following indicators: Sulphur Dioxide (SO_2) Nitrous Oxide (NO_2), Ozone (O_3) and particulates. The **Atmo** index is the highest of these 4 sub-indices.



A National Database on Air Quality

The National Database on Air Quality (B.D.Q.A.) managed by ADEME, brings together all the measurements collected by the **Atmo** network. This data allows the creation of national summaries on air quality, which will soon be available on minitel *3614 Envir* and Internet *www.environnement.gouv.fr*.

Information in the Case of Peak Pollution

In addition to the regular summaries on air quality, the law on air and rational energy use of the 30th December 1996 requires public information whenever high concentrations, called alarm thresholds, are exceeded.

When one or more alarm thresholds are exceeded, the Préfet shall put in action a protection plan by degrees in accordance with the concentrations of pollutants reached.

This plan usually includes three levels. The data, supplied to the population by the Préfet or by the air quality monitoring body and relayed by the media include in particular information about the concentrations observed and their forecast changes, areas particularly implicated and appropriate advice to persons at risk (for example limiting physical exertion).

The authorities shall make know to the public the measures chosen to improve the situation; closure of certain industrial facilities, restrictions to car traffic, making public transport free of charge,...

Appendix 6 : List of Proposed Indicators in the Questionnaires

The list of indicators proposed in the questionnaires as starting point for group discussion is reminded below :

CHAPTER 1 : AIR INDICATORS

Indicators	PSR Type	Sheet N°
GHG Emissions	P	1
Proportion of arable land located at altitude levels of < 5m above sea level	S	2
Sulphur oxide emissions	P	3
Nitrous oxide emissions	P	4
Distribution of emissions over various economic sectors	P	5
Work-home distance	P	6
Energy intensity : Primary energy consumption/Gross Domestic Product (GDP)	P	7
Consumption of CFC and chlorine bromine derived products	P	8
Frequency of excesses over norms	S	9
Excessive respiratory disorders due to air pollution	S	10
Role of renewable energies in energy balance	R	11
Role of road transport in total transport availability	R	12
Density of quality measurement network	R	13
Expenditures devoted to air pollution abatement	R	14

CHAPTER 2 : WASTE INDICATORS

Indicators	PSR Type	Sheet N°
Municipal solid waste production	P	1
Composition of municipal waste production	P	2
Collection rate of municipal waste	R	3
Destination of collected municipal waste	R	4
Proportion of deposits in packaging prices	R	5
Proportion of sanitary landfill	R	6
Existence of national regulations on waste management	R	7
Hazardous waste production	P	8
Area covered by contaminated sites	E	9
Expenditure on waste treatment	R	10

CHAPTER 3 : WATER RESOURCES INDICATORS

Indicators	**PSR Type**	**Sheet N°**
Exploitable water resources per capita	S	1
Wetland areas/ total area	S	2
Dam silting indicator	S	3
Aquifer over-exploitation index		4
Density of hydrological measurement networks	R	5
Per capita water demand	P	6
Water demand per sector of use	P	7
Domestic consumption of water per capita	P	8
Agricultural water demand per irrigated hectare and per crop type	P	
Industrial water demand per sector	P	
Irrigated arable land	P	9
Share of water demand per sector	R	
Irrigation efficiency	R	10
Exploitation index = Withdrawals of ground and surface water / total available freshwater	P	11
Fresh Water final consumption index = Final consumptive use / total available	P	12
Index of depletion of dam sites	R	13
Index of diversification of water provisioning sources (reuse, desalinisation, imports)	R	14
Economic efficiency index for drinking water demand = Volume of drinking water invoiced / volume of drinking water produced	R	15
Regulations to limit withdrawals from natural ressources	R	
Existence of economic tools to recover the water cost in the various sectors (price and/or charges)	R	

CHAPTER 4 : WATER POLLUTION INDICATORS

Indicators	PSR Type	Sheet N°
Water quality: Biochemical oxygen demand in water bodies	S	1
Use of agricultural pesticides	P	2
Use of fertilisers per hectare	P	3
Drinking water distribution rate	R	4
Index of distributed water conformity to quality standards	S	5
Population with access to basic sanitation	R	6
Wastewater treatment index	R	7
Industrial wastewater treatment	R	8
Expenditure on water resource protection	R	9

Appendix 7 : Synthesis of questionnaire answers

The present Appendix summarises the main answers to the preliminary questionnaires sent before the workshop. This summary was distributed and presented by the Blue Plan during the groups sessions in order to enrich discussion. It does not include the comments and changes introduced during the session (for this, see Part 3).

1 Synthesis of Questionnaire on Air Pollution

Three countries answered our questionnaire : Egypt , Syria and Palestine

1.1 Outlook

Air pollution is considered as a major issue by all countries.

They already set-up air quality monitoring systems and calculated their GHG emissions (except Palestine)

Fixed monitoring stations networks are set up only in Egypt. In Syria and Palestine there is no intention to imitate them. In these last countries, mobile monitoring stations carry out limited measurements. For GHG emissions, the IPCC/OECD guidelines are the reference which facilitates comparisons.

Pollutants emitted by countries are very similar in composition to the ones emitted by the Northern Mediterranean countries but at minor levels and with a greater part of sulphur compounds .

The most important emitting sectors are : transports , energy and then waste.

As regard to GHG emissions, budget is classic: CO2 is, quantitatively the most important gas.

1.2 Impacts

Respiratory disorders represent the first quoted impact. All the countries mentioned it as a key point. Unfortunately, only few data is available. Palestine gave the percentage of respiratory disorders out of total diagnosed cases and Syria the number of respiratory diseases. Only 2 surveys are quoted in responses to our questionnaire.

Concerning global warming impacts none of the questioned countries provides the requested geographical information (i.e. proportion of arable lands at altitudes of < 5 meters). It doesn't appear as a fundamental problem.

1.3 Responses

For GHG emissions, no abatement policy is presented. This is understandable because of the low contribution of these countries to global emissions.

As regard to local emissions Egypt decided to decrease the importance of road in urban transport and to develop renewable energies. In Egypt and Syria, clean fuel use is encouraged .

No quantified target is quoted.

1.4 Indicators

Indicators	Type	Sheet N°	EG priority	SY priority	PA priority	CY priority	JO priority	Total priority	EG value	EG value	SY value	PA value	CY value	JO value	Value
GHG Emissions	P	1			1			1	1	1		0			8
Proportion of arable land located at altitude levels of < 5m above sea level	S	2						0	0	0	7	1			1
Sulphur oxide emissions , PMS	P	3						0	1	1	0	1			9
Nitrous oxide emissions	P	4			1			1	0	0	7	1			1
Distribution of emissions over various economic sectors	P	5						0	0	0	0	1			1
Work-home distance	P	6						0	0	0	0	1			1
Energy intensity : primary energy consumption/Gross Domestic Product (GDP)	P	7			1			1	0	0	9	2			11
Consumption of CFC and chlorine bromine derived products	P	8						0	0	0	10	0			10
Frequency with which standards are exceeded	S	9						0	0	0	0	0			0
Excessive respiratory disorders due to air pollution	S	10						0	0	0	0	0			0
Role of renewable energies in energy balance	R	11						0	0	0	0	1			1
Role of road transport in total transport availability	R	12						0	0	0	0	1			1
Air quality measurement networks density	R	13						0	0	0	0	0			0
Expenditures devoted to air pollution abatement	R	14						0	0	0	3	0			3
Part of clean fuels in total fuel consumption								0	0	0	0	0			0

2 Synthesis of Questionnaires on Municipal and Hazardous Waste

Three countries answered our questionnaire : Palestine, Egypt and Cyprus.

2.1 Outlook

Our regional outlook is globally shared, at the exception of informal economy question, the importance of which has not been mentioned.

Technical resources needed by improvement of landfill management are not quoted.

Authorities responsible for collection and treatment are municipalities in the framework established by national bodies (departments of environment and local government).

Desegragation of some indicators is required (as, for instance, de-composition of hazardous waste production in different sectors : hospital, industry and sludge)

2.2 Waste production and treatment

Hazardous waste production is provided by Egypt and Cyprus while, in Palestine, different sources of production are identified.

Considering Municipal Solid Waste (MSW), Palestine has available data for the last two years but does not provide it. In Egypt the MSW level is quite high (around 1 kg/per capita/day in Cairo in 1996) and has increased very quickly (for instance, in Giza, it has raised from 700 g/per capita/day in 1985 to 900 in 1996).

National figures are estimated from local ones.

Organic part is very important (more than 67 % in Alexandria in 1985 but only 24 % for Cyprus in 1993).

Collection is rather usual in urban areas but remains relatively low (68 % in Cairo in 1988, no data for Palestine). In Palestine, there is no separation and health care waste is collected together with industrial waste through the domestic waste stream.

Dumping sites are the main destination of collected MSW : around 75 % in Cyprus, 80 % in Egypt, 100 % in Palestine. However, it is interesting to note that in Egypt, composting facilities represent the second destination after dumping sites (for instance 27 % in Alexandria) and that in Cyprus 10 % of paper and cardboard production, 5 % of metal cans are being collected for recycling

2.3 Responses

None of the questioned countries develop any waste source reduction policy. Incineration (except Cyprus) of hazardous waste is developed in Egypt but for MSW this solution is considered too expensive.

In Egypt and Cyprus, as well as in Palestine, establishment of sanitary landfills is planned.

2.4 Indicators

Indicators	Type	Form. N°	EG priority	SY priority	PA priority	CY priority	JO priority	Total priority	EG value	SY value	PA value	CY value	JO value	Value
Municipal solid waste production	P	1	1		1	1		2	6		0	1		7
Composition of municipal waste production	P	2	1		1	1		2	2		0	2		4
Collection rate of municipal waste	R	3	1		1	1		2	2		0	0		2
Destination of collected municipal waste	R	4	1		1	1		2	2		1	3		6
Proportion of deposits in packaging prices	R	5						0	0		0	0		0
Proportion of controlled landfill	R	6						0	0		1	1		2
Existence of national regulations on waste management	R	7						0	1		0	1		2
Hazardous waste production	P	8	1		1	1		2	1		0	0		1
Area covered by contaminated sites	E	9						0	0		0	0		0
Expenditure on waste treatment	R	10						0	0		0	0		0
Volume treated in sanitary landfill/ total volume produced								0	0		1	0		1
Recovery rate of collection and treatment cost								0	0		0	0		0

3 Synthesis of Questionnaires on Water Resources and Demand Management

This synthesis prepared the 3/11/98 is based on the answers received from Egypt, Palestine, and Cyprus. The indicators sheets were only partially analysed.

3.1 Outlook

The main points of the outlook presented in the preparatory document are shared by the countries. Major issues can be summarised as follow :

- Supply management focuses on the **prevention of shortage of exploitable resources** (in quantity and quality) and the **diversification** of supply sources.
  - water resources are irregular in time and space, and drought increases the uncertainty of availability.
  - There is hardly any economically, and ecologically renewable resources left in the sub-region that are not already exploited (surface water mobilised and groundwater pumped).
  - Water Pollution, drought, exaggerated demands with over-exploitation practices and the willingness to answer to ecological constraints reduce even more the amount of **exploitable resources** in quantity and quality.
  - Being limited in the options for using conventional resources, as new development is more difficult and costly, many countries are striving to develop new sources of supply, mainly by wastewater and drainage water reuse, desalination.
- Hope therefore resides in **improved demand management** within the water management strategy.
  - water demands are increasing in all sectors of use.
  - A major part of water supplies are badly or little used especially in the irrigation sector. Savings are possible but requires revision of water strategies.
  - strategies are primarily concerned with supply increase. It is mostly in situation of crisis that water demand management is considered. Limited long term planning and projects are proposed on water demand control and reduction in water management.
  - There is little financial means to enhance participation and awareness of stakeholders and public (recover of O&M costs for example from the users) in the agricultural sector. .

3.2 Impacts

From the questionnaire answers, the following ideas can be highlighted.

Long term water resources management requires a clear **assessment of water currently available**, taking into account the socio-economical and environmental contraints and management criteria. Droughts are important factors.

In order to achieve water demand management, the key challenge for the Mediterranean is to **finalise and implement the institutional reforms of the water sector** and strengthen water authorities capacities together with real financial means for their stability. Furthermore, it is necessary to enhance public awareness and create incentives for local partnerships.

Both management aspects are possible only if there is a control and clear rules defining rights upon the resources or allocation when these are shared resources.

These major issues for water management could be summarised in the PSR framework as followed.

MAIN ISSUES

PRESSURE	STATE	RESPONSE
• growth in water demands and emissions in all sectors and potential conflicts of allocation	• increasing water shortages worsen by droughts events	• priority put on development of supply - first with further mobilisation - then increase waste water reuse, desalination or imports
• increasing withdrawal with over exploitation of aquifers	• overall degradation of natural resources and supply sources in **quantity** and **quality ;** risk of exhaustion of groundwater	• few measures (and rights) for controlling both allocation and withdrawal
• misuse of water especially by agriculture	• degradation of wetlands • **what is really exploitable ?**	• partial measures to improve water use efficiency in the various sector • lack of financial means for O&M of water supply and waste water mgt in each sector (recovery of costs)

3.3 Responses

MANAGEMENT PRIORITIES

In most country, the first priority is given to satisfy the public water supply requirements, the second one to water development and allocation. Cyprus has developed a strategy for water demand management for all sectors as the country has been facing critical drought situation for few years. In Palestine, it appears extremely important to get water rights and achieve sovereignty over the resources for a better management.

INSTITUTIONS IN CHARGE

These country have a central administrative structure that deals with almost all aspects of water management (mobilisation, distribution, research, construction) : ministry of Public Works and water resources in Egypt, Ministry of irrigation in Syria, Ministry of agriculture, natural resources and environment in Cyprus, Ministry of public works in Jordan. In Palestine, the Palestinian Water Authority have recently been established and is a responsible of all water aspects but its activities are limited by the current status of shared water resources.

MONITORING AND INFORMATION SYSTEMS

The situation is very varied according to the countries, it is mostly focused on river water flows, water levels in boreholes and reservoirs. In Cyprus and Egypt, there is a well developed monitoring systems. Palestine has for now only random measurements as it does not have control upon the resources.

PLANNING

Mots of the country have or are developing water development strategies (framework strategy for water resources in Egypt, Master plan in Cyprus). In Palestine, it is in development under the authority of the Palestinian water authority still very young (1995), it is delayed as the issue of water rights on shared resources has not been solved..

LEGISLATION

Mots of the countries aim at reaching an integrated management strategies but Egypt and Cyprus do not yet have a framework law on integrated water management but a set of relevant regulations. In Palestine, the legislation is being prepared.

TABLE 1: MAIN EXISTING LEGISLATIVE TOOLS

Country	Framework law	Water legislation enabling		
		The monitoring of water withdrawals	***The control of demands for the different sectors of use***	***The pollution control***
CY	Water Works law, 1928		Cap 342, Cap 351	
SY			Law on irrigation systems,	
GZ	Preparation ongoing			
EG			1984 law on drainage and irrigation and its 1994 amendment 1982 law regulating water used for drinking water and domestic use	1982 Law on Nile and waterways protection against pollution 1994 Law on environment

ECONOMIC ELEMENTS

It is difficult to estimate the spending for water resources and demand management in the three countries at all the sectors (state, local authorities, enterprise and users). But, the weight of water management in the country economy is important. In Egypt, the overall cost of water allocation in the different sector is 186.5 million US $.

Cost of water supplied in the different sectors is estimated.

For drinking waters, prices intend to recover part of water supply service costs in Cyprus but also sewerage in Egypt. It is considered that in general existing price tariff do not encourage water conservation and are generally inadequate to recover operation and maintenance costs due to high level of unaccounted waters. In Palestine, a unified tariff system is being developed for both the west bank and Gaza strip.

For agriculture, there are diverse situation. In Cyprus and Palestine, water is free for the private pumping but farmers pay the investments, and charged for public distribution (but it is low). In Egypt there is no price for agricultural waters .

IMMEDIATE PROJECTS AND QUANTIFIED OBJECTIVES

Current projects in water management focus on improving supply. No objectives on unitary volumes and losses reduction are proposed.

In Palestine it is estimated that to achieve complete coverage of urban supply in west bank and gaza strip in 2010 requires a total investment of 800 million USD ; with an intermediate milestone of 360 million USD investment in 2000.

In Egypt, Agriculture is the major water user. There is an ambitious plan for expanding the cultivated area by more than 2.5 million acre by 2010 that requires an additional water of 15 BCM/yr. To achieve this a number of objectives are set for 2000,

- fresh water releases to the sea will be reduced to 0.3 hm^3/yr.
- Agriculture drainage water reuse will be maximised
- groundwater extraction will reach 4.9 hm^3/yr to recover drainage water infiltrated.
- Improved efficiency of water used in both agriculture and urban sectors.

In Cyprus, projects look at supply strategies of irrigation and drinking sector : renewable resources, waste water reuse, and desalinated waters.

3.4 Prime indicators

RELEVANCE

The major policy objectives that come out of the previous summary are :

- preserve available water resources and diversify supply sources
- control water demands in the different sectors and especially agriculture

Constraints for assessment appear to be

- The availability of networks system could delay measurement of some indicators (PA). Egypt has an extensive system but data is dispersed among the responsible ministries.
- The institutional capacity to act upon water resources or demands, and lead integrated management.

Most of the indicators are considered relevant to assess progress towards these objectives. The rating is very varied depending on the country. Palestine has stressed upon all the indicators of water demands. In the table thereafter appear only the maximum relevance to assess the problem(4. Very good).

The experts agree with the definition proposed in the questionnaire but Cyprus indicate that some definitions should be clarified.

LIST OF INDICATORS FOR ISSUES AND PERFORMANCE MONITORING

INDICATORS	RELEVANCE	PSR [10] Type	Sheet N° (*)	Calculation
• **Water resource and ecosystem conservation**				
Exploitable water resources per capita,	EG, CY	S	1	yes
Wetland areas (including RAMSAR sites)/ total area	EG	S	2	partial
Dam silting indicator		S	3	partial
Aquifer over-exploitation index			4	no
Density of hydrological measurement networks	EG	R	5	partial
• **Demand control**				
Per capita water demand	EG, PA, CY	P	6	yes
Water demand per sector of use	PA	P	7	yes
Domestic consumption of water per capita	PA	P	8	partial
Agricultural water demand per irrigated hectare and per crop type	PA	P		
Industrial water demand per sector		P		
Irrigated arable land	EG, PA	P	9	yes
Share of water demand per sector (agriculture, leisure, industry) covered by waste water		R		no
Irrigation efficiency per type of irrigation: surface, sprinkler, micro	PA	R	10	no
Exploitation index = Withdrawals of ground and surface water / total available freshwater	EG, PA, CY	P	11	partial
Water final consumption index = Final consumptive use / total available	PA, CY	P	12	no
• **Management framework for water availability and demand**				
Index of depletion of dam sites		R	13	no
Index of diversification of water provisioning sources (reuse, desalinisation, imports)	EG	R	14	no
Economic efficiency index for drinking water demand = Volume of drinking water invoiced / volume of drinking water produced	PA	R	15	partial
Regulations to limit withdrawals from natural resources	EG, PA	R		
Existence of economic tools to recover the water cost in the various sectors (price and/or charges	EG, PA	R		

(* see questionnaire form)

[10] [10] P: Pressure ; S: State ; R: Response

PRIORITY AND CALCULATION

Time limitation in the preparation of the questionnaire lead to incomplete answers from the countries. But it has been proposed to complete the work after the seminar.

The regulatory and economic aspects are considered as important aspects to monitor. These are qualitative information mostly.

The quantitative indicators selected in priority are related to **water demand** management.

According to the information provided and the preferences given in the answer to the questionnaire, the following indicators appear in priority (cited at least by two countries).

A summary table on the number of data available from the country answers to the questionnaire is presented below.

DATA PROVIDED IN THE QUESTIONNAIRE

Indicators	EG value	SY value	PA value	CY value	JO value
Exploitable water resources per capita	11		2	1	
Wetland areas (including RAMSAR sites)/ total area	11		0	0	
Dam silting indicator	10		0	0	
Aquifer overexploitation index	0		1	1	
Density of hydrological measurement networks	11		0		
Per capita water demand	2		8	1	
Water demand per sector of use	10		29	3	
Domestic consumption of water per capita	0		2	1	
Agricultural water demand per irrigated hectare and per crop type	0			1	
Industrial water demand per sector	0				
Irrigated arable land	0		2	1	
Share of water demand per sector (agriculture, leisure, industry) covered by waste water	0			0	
Irrigation efficiency	0		0	0	
Exploitation index	0		2	1	
Fresh Water final consumption index = Final consumptive use / total available	0		0	1	
Index of depletion of dam sites	0		0	1	
Index of diversification of water provisioning sources (reuse, desalinisation, imports)	0		0	1	
Economic efficiency index for drinking water demand = Volume of drinking water invoiced / volume of drinking water produced	0		1	1	
Regulations to limit withdrawals from natural resources	1		0	1	
Existence of economic tools to recover the water cost in the various sectors (price and/or charges)	1		1	1	

note : Egypt : nb of value 11, it is the same figure given for ten years or 11 years ; Cyprus, other did not have time to fill the indicators sheet of the questionnaire

4 Synthesis of Questionnaires on Water Pollution

This synthesis prepared the 30/10/98 is based on the answers received from Egypt and Palestine.

4.1 Outlook

The experts agree on the general assessment proposed in the preparatory document.

- the major sources of pollution are the urban waste waters often untreated. The existing treatment plants are often ineffective due to the lack of maintenance.
- the second major concern is the agricultural non point pollution due to excessive use of fertiliser and pesticides.
- the industrial pollution is also a concern especially in Egypt were 125 industrial plants are located in the Nile Valley where they discharge 0.72 ton per day of heavy metals.

Measures are taken in the country to prevent pollution, rehabilitate existing systems and develop needed sewers but it requires important financial means.

4.2 Impacts

ON HEALTH

Mismanagement of waste water and the low level of collection and treatment lead to risks for the population. No data is yet available on water diseases. In Palestine 71% of waste water goes in cesspools, and in wadis. Less than 5 % of the collected waste water is treated.

Waste water is reused for irrigation but it is often not treated. Contamination of soils and crops is another important health issue.

ON WATER RESOURCES, ESPECIALLY GROUNDWATER

Waste waters are discharged directly into the wadies or on/in the soil. Problems of groundwater contamination arise. Saline intrusion due to over-exploitation and saline soils is also reported and affect even more groundwater. This is particularly serious in Palestine where groundwater is the major source of water and the costs of rehabilitation of contaminated groundwater are very high, often impossible in the short term. It is estimated that 55 % of the water produced in the gaza strip is of poor quality. The salinity in most wells in the south is higher than 2,500 ppm and in some areas it can reach 7,000 ppm.

4.3 Responses

INSTITUTIONS IN CHARGE

Quality aspects of water resources are under the supervision of various public bodies : the environment administration, the water administration and health body. There is therefore scattered information and action means.

MONITORING AND INFORMATION SYSTEMS

There is no regular monitoring of water quality and of the efficiency of waste water collection and treatment systems. Data are collected with specific objectives in the framework of projects. In Egypt, eleven more or less regular water quality monitoring programs can be identified. The most important ones are looking at has 7 different monitoring systems for water quality and discharges monitoring

Data are difficult to obtain as there are scattered, and they are restriction of exchange of data among administrations.

MANAGEMENT PRIORITIES

Top priorities to be regularly monitored are the following :

- long term protection of water resources ; therefore preventing quality degradation of the natural water resources (Indicator 1; 2; 3)
- compliance with quality standards for water use ; prevention of health risk and pollution hazards (indicator).

PLANIFICATION

- In Egypt, strategic measures were taken for the different pollution sectors.
  - For example, for agriculture, subsidies were removed and restrictions were proposed for use of pesticides as well as integrated pest management strategies.
  - in the urban sector, the plan proposes extension of sewers to serve more than 85% of Cairo and 80 % of Alexandria in a five years period.
  - in the industrial sector, pollution abatement strategies are taken, in particular constraints for new industries on the location, treatment facilities are put.
- There is no specific document in Palestine but the waste water sector should be managed according to the National Palestinian General policy by the local authority with the PEnA and PWA.

LEGISLATION

Situation are very diverse depending on the country. In Egypt, three major laws are available : the most important are the river Nile protection Law (law 48, 92) regulating discharges into the river, the irrigation and drainage law (law 12, 1984) regulating the use of water, the environmental law (law 4, 1994) setting priority strategic targets for water quality management.

Until now there are no palestinian standards. there have been developped by the Palestinian Standard institute but not yet enforced by law. Draft law is still being examined.

ECONOMIC ELEMENTS

It is difficult to get an overview of the spending in this sector. But it is estimated to be very high in Egypt in each ministries involved. The Egyptian government has spent over the last 15 years 484 billion Egyptian pounds on development projects and environment.

For the moment there is no systems of cost recovery for waste water management. But it is foreseen in Palestine.

IMMEDIATE PROJECTS AND QUANTIFIED OBJECTIVES

In Palestine, major efforts is put on developing a sewage treatment scheme with all the technical, economical, institutional, educational set up. In Gaza area control of groundwater quality is essential. Therefore new bore-holes are forbidden in overdrawn areas, for the others a permit and licence fee is requested.

In Egypt, major action have been taken to reduce use of pesticides. First subsidies on fertilisers and pesticides were removed. As a result the use of nitrogen fertiliser declined from 2.6 million tons in 1991/1992 to 731000 tons in 1992/1993. Other measure were taken

In Egypt, it is planned to increase the % of population with access to drinking water from 70% in 1996 to 85 % by 1998, and to a 100 % by 2000. 100% of the Village and rural areas should be equipped with sewerage systems by 2017.

4.4 Prime indicators

RELEVANCE

- All the indicators are considered relevant by the Palestinian and Egyptian experts. Stress is put on the indicators related to treatment and pollution risks.

LIST OF PRIORITY INDICATORS FOR MONITORING PROBLEMS AND PERFORMANCE

INDICATORS	**RELEVANCE**	PSR[11] type	Sheet N°	Calculation
Water quality: Biochemical oxygen demand in water bodies	PA	S	1	partial
Use of agricultural pesticides	PA, EG	P	2	partial
Use of fertilisers per hectare	PA, EG	P	3	no
Drinking water distribution rate	PA, EG	R	4	yes
Index of distributed water conformity to quality standards		S	5	partial
Population with access to basic sanitation	PA, EG	R	6	
Wastewater treatment index	EG	R	7	
Industrial wastewater treatment	EG	R	8	
Expenditures on water resource protection		R	9	

One of the major difficulty for the calculation of these indicators is the access to relevant data sets. In Palestine, information is scattered in various institutions and access is restricted. The Palestinian National Water Authority is aiming at organising information on water.

REMARKS ON INDICATORS

Indicator 1 : EG : propose to add two parameters : dissolved oxygen and turbidity

Indicator 2 : EG : it is necessary to discriminate indicators and stress those with strong impacts and long term resilience in the natural media and water resources.

Indicator 3 : EG : the indicator do not consider the efficiency in use within a pest management strategy. Proposal for a better indicator ?

Indicator 7 : EG and PA : This indicator do not show the efficiency of waste water treatment. Most of the existing treatment plant are inefficient or overloaded. Therefore it is important to revise the treatment index by the index of efficiency.

CALCULATION

Time limitation in the preparation of the questionnaire lead to incomplete answers from the countries. But it has been proposed to complete the work after the seminar.

Thereafter is presented a summary table on the number of data available from the country answers to the questionnaire.

[11] P : Pressure; S : State; R : Response

DATA PROVIDED IN THE QUESTIONNAIRE

INDICATORS	EG value	SY value	PA value	CY value	JO value
Water quality: Biochemical oxygen demand in water bodies	0		0		
Use of agricultural pesticides	21		4		
Use of fertilisers per hectare	0		0		
Drinking water distribution rate	7		2		
Index of distributed water conformity to quality standards	0		1		
Population with access to basic sanitation	7		2		
Wastewater treatment index	7		1		
Industrial wastewater treatment	1		0		
Expenditures on water resource protection	6		0		
Pollution flows (DBO, DCO,)	18				
Recovery rate of water treatment and protection	0		2	1	
Collective treatment efficiency	0			0	