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MEDITERRANEAN ACTION PLAN

Meeting of Government-designated Experts to examine
a Strategic Action Programme to Address Pollution from
Land-based Activities

Ischia, Italy, 15-18 June 1997

DRAFT INVESTMENT PORTFOLIO FRAMEWORK

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1. INTRODUCTION

This Report is prepared in response to the Terms of Reference which set out the following aims:

1. To prepare an Investment Portfolio comprising the estimated cost of priority interventions (projects, measures, programmes and studies) targeted to the pollution "hot spots" identified and analysed in the Regional Report on Hot Spots and the Transboundary Diagnostic Analysis Report.
- b. The Investment Portfolio will rely on estimated cost data and indicative prioritisation on proposed actions, generated and made available primarily by the country reports and will reflect the economic implications of the Strategic Action Plan to a degree of detail consistent with the specification of the proposed actions and the available cost and other data.
- c. The Investment Portfolio will organise investment cost information by priority, geographic area and functional category to show the resources required for implementation, outline funding options and define the broad benefits for the purpose of justifying the required investment, attract donor support, secure national participation and ensure investment activity and a follow-up programme.

2 MEDITERRANEAN HOT SPOTS: AN OVERVIEW

2.1 An overall picture from the Country Reports

The catalogue of Hot Spots shown below summarise the information contained in the individual Country Reports¹ and highlights the proposed remedial actions and their estimated costs. It pulls together the available information in order to provide the starting point to the development of the Investment Portfolio which is the subject-matter of this Report. The identification of the Hot Spots, the list of remedial actions and the cost estimates are taken from the Country Reports without further research.

The Country Reports (presented at the meeting held for this purpose in Athens 7-9 of April, 1997) were prepared on the basis of common questionnaires containing a set of criteria applied to all the countries included in the Project. The methodology for the identification of the Hot Spots and some elaboration of the country-level data on the land-based pollution sources associated with the identified Hot Spots are provided in the **Regional Hot Spots Report**.

Based on the data extracted from the Country Reports, the following annotated catalogue is constructed showing the identified Hot Spots together with the proposed investments and estimated costs. The countries are listed in alphabetical order.

¹ Country Reports were submitted for Albania, Croatia, Cyprus, Greece, Lebanon, Malta, Italy, Israel, Slovenia, Syria and Turkey. List of Hot Spots and estimated costs for remedial actions were submitted for France, Lybia, Morocco and Tunisia. No cost information was submitted for Egypt and Algeria.

ALBANIA

- Dures
- Vlora
- Dures chemical factory
- Vlora PVC factory

Proposed investments include:

WWTP and reconstruction of sewerage systems, sanitary landfill of mercury and toxic solid wastes, study of pollution source in (Drini) river basin and management plans and capacity building for coastal zone management and monitoring programmes for the sensitive areas

133.5
Mill.
US\$

ALGERIA

- Oran Ville
- Rouiba
- Ghazaouet
- Alger
- Mostraganem
- Bejaia
- Annaba
- Skikda

NA

CROATIA

- Kastella Bay
- Split
- Shibenik
- Zadar
- Pula
- Rijeka Oil Refinery
- Kastella Bay (Kaltenberg)
- Zadar (tannery)
- Rijeka
- Dubrovnik
- Zadar (Adria)

Proposed investments include:

WWTP construction, reconstruction and extensions, sanitary landfill, and coastal zone management plans and monitoring programmes for the sensitive areas

170.0
Mill.
US\$

CYPRUS

- Limassol (Old Port area)
- Limassol
- Vassiliko (Cement factory)
- Larnaca (Oil Refinery)

Proposed investments include:

WWTP, extension of sea outfall, installation of cement factory filters, separation of contaminated materials and incineration facility

6.6
Mill.
USD

EGYPT

- El-Manzala
- Abu-Qir Bay
- Rashied
- El-Mex Bay
- Alexandria
- Damietta

Proposed investments include:

WWTP construction and rehabilitation (El-Mazala)

NA

FRANCE

Hot Spots

- Marseille
- Toulon
- Cannes
- Freiju

Proposed investments include:
Secondary WWTP

200.0
Mill.
USD

GREECE

Hot Spots

- Thermaikos Gulf
- Inner Saronic Gulf
- Patraikos Gulf
- Pangasilikos Gulf
- Herakleon Gulf
- Elefsis Bay
- NW Saronic Gulf
- Larymna Bay
- Nea Karvali Bay

Proposed investments include:
Expansion of industrial effluent and WWTP, industrial feasibility studies, treatment plant and sea outfall (Patraikos gulf), secondary treatment plant (Inner Saronic gulf)

207.4
Mill.
US\$

ITALY

Hot Spots

- Porto Marghera
- Genova
- Augusta
- Brindisi
- Gela
- La Spezia
- Milazzo
- Gulf of Napoli
- Ravenna
- Taranto
- Rosignano Solvay
- Bari-Barletta
- Livorno
- Manfredonia
- Ancona-Falc.

Proposed investments include:

- > Harbour/Industrial Sector
 - Installation of Vessel Traffic Service and Harbour Approach Control - Revised plan for product separation harbour facility (chemical, non-chemical, oil) - Protected connection system for vessel operation
 - Slop collection facility - Change of oil pipeline - Change of coastal anti-fouling system - Industrial organic coastal landfill - Ship emissions treatment plants - Agrofarming study - Canning industry study
- > Municipal Sector
 - Coastal cities sewerage system - WWTPs - WWT programme for Emilia-Romania coastline including monitoring

1,288
Mill.
US\$

ISRAEL

- Haifa Bay
- Akko
- Nahariya
- Gusg Dan
- Ashdod
- Haifa Bay Industries

Proposed investments include:
WWTP construction and upgrading

129.0
Mill.
US\$

LEBANON -Greater Beirut -Jounieh -Saïda-Ghaziye -Tripoli -Batroun Selaata	<u>Proposed investments include:</u> WWTP construction, industrial wastes master plan and capacity building actions	405.1 Mill. US\$
LYBIA -Zanzur -Tripoli -Bengazi -Zawia -Tobruk	<u>Proposed investments include:</u> Industrial effluent TP maintenance, WWTP maintenance and extension (Bengazi & Tripoli)	16.6 Mill. US\$
MALTA -Weid Ghammieg -Cumnija -Ras il-Hobz	<u>Proposed investments include:</u> WWTP construction and extension (Weid Ghammieg)	48.0 Mill. US\$
MOROCCO -Tanger -Tetouan -Nador -Al Hoceima	<u>Proposed investments include:</u> Domestic and industrial WWTP construction and extension (Nador)	54.0 Mill. US\$ (dom WWTP only)
SLOVENIA -Izola -Delamari -Piran (submarine outfall)	<u>Proposed investments include:</u> WWTP extension and construction of sewerage systems (extension in Delamari) and management plan for Dragonja and Dmca river basins	42.0 Mill. US\$
SYRIA -Tartous -Lattakia -Banias -Jableh	<u>Proposed investments include:</u> WWTP construction, industrial wastes master plan and capacity building actions	197.3 Mill. US\$
TUNISIA -Gaber -Lake of Tunis -Lake Bizarte -Sfax South -Ghar El-Melh	<u>Proposed investments include:</u> WWTP construction and extension, industrial WWTP construction, recycling or fluorine recovery facility & phosphogypsum disposal site (Gabes fertilizer ind.), feasibility study for treatment of exhaust gas (Sfax-South fertilizer ind.), construction of recirculation canal (Ghar El-Melh industries)	298.0 Mill. US\$

TURKEY

- Izmir
- Icel Bay
- Antalya
- Hatay
- Tarsus
- Adana
- Antakya
- Iskenderun
- Kirikhan
- Dortyol
- Erdemli
- Silifke
- Osmaniye

Proposed investments include:
WWTP construction and sewerage
construction and extensions

774.5
Mill.
US\$

2.2 Proposed Investments and Actions

The following observations emerge from a review of the above catalogue and draw attention to key characteristics of the proposed investments:

1. Wastewater treatment plants (WWTP) represent the predominant remedial action proposed reflecting the predominance of municipal and industrial wastewater as the main land-based source of coastal pollution risk.
2. A more diverse set of proposed actions is put forward for **Italy** due to the broader industrial base of the Italian economy and the greater diversity of activities associated with the Italian harbours. 13 of the 15 Italian Hot Spots are harbour areas while the 4 leading Hot Spots are harbours of regional and international importance (Porto Marghera-Venice, Genova, Augusta and Brindisi). The bulk of the proposed investments for Italy include facilities and measures to improve industrial and harbour operation practices while the municipal wastewater management sector investment is a relatively small part of the package.
3. Generally, cost information on investment actions for municipal wastewater pollution risks is more developed compared with similar information on the industrial sector. The need for research, feasibility studies and costing on industrial sector actions is recognised but does not emerge as a key concern in terms of remedial action. Industrial feasibility studies are proposed for a few countries including **Italy, Greece, Tunisia, Lebanon and Cyprus**.
4. Actions for institutional strengthening and capacity building are support activities for sustainable environmental management. This approach is more clearly reflected in the investment proposals for **Albania, Croatia and Slovenia** and to some extent for **Greece, Lebanon and Syria**. Despite widespread awareness of the importance of monitoring and coastal zone management capacities, project requirements for institutional improvements seem to be under-represented in the proposed investment priorities.

2.3 Estimated Costs

The available cost information is summarised in Table 1 below to show the overall estimated cost by country. The total estimated cost comes up to 3,970.0 Million US\$.

Table 1

Estimated investment Costs (Million US\$)

Albania	133.5
Algeria	NA
Croatia	170.0
Cyprus	6.6
Egypt	NA
France	200.0
Greece	207.4
Italy	1,288.0
Israel	129.0
Lebanon	405.1
Lybia	16.6
Malta	48.0
Morocco	54.0
Slovenia	42.0
Syria	197.3
Tunisia	298.0
Turkey	774.5
Total *	3,970.0 Million US\$

* Note: This amount shows the estimated cost of projects for which cost information was provided in the Country Reports.

2.4 What do the estimated costs show

2.4.1 Type of investment

Of the total amount of 3,970 Million US\$, about 1,552 Million (39 per cent) is proposed for WWTP construction, reconstruction and extensions, about 230 Million (6 per cent) is proposed for the treatment of industrial effluent, about 1,055 for joint industrial and municipal treatment plants (27 per cent), about 1,108 Million for the Harbour and Industrial sector in Italy (just under 28 per cent) and only 25 Million (well under 1 per cent) explicitly for feasibility studies, management plans and capacity-building actions. The composition of the type of investment

reflects partly the focus placed on the municipal and industrial sources (being the immediate sources of pollution risks) and partly the lack of information on industrial sector investments and the diffuse nature of actions understood as comprising "capacity-building investment".

2.4.2 Geographical distribution

The geographical distribution of the total estimated investment requirements clearly follows the size and industrial base of the countries involved. Italy, Turkey and Lebanon together account for 2,467.6 Million or just over 60 per cent of the total. Italy accounts for a third of the total and Turkey for nearly a fifth of the total. Lebanon, although a small country, accounts for another tenth due to the recent war-related environmental degradation.

2.4.3 Rough Cost Approximations

The estimated costs are very broad approximations being part of the information base provided in the Country Reports. The cost information does not allow breakdowns, has gaps and possible inaccuracies for purposes of rigorous project analysis or cross-country comparisons. At this stage of the Project, given the extremely limited time available for research, only rough estimated costs were aimed at to show the likely overall order of magnitude of the cost of proposed remedial actions. However, they serve the purpose of further use for the development of an Investment Portfolio Strategy which, among other things, will narrow down the subsequent research effort for more focused costing and data refinement at a later stage for the required pre-investment appraisals.

2.4.4 Need for Further Estimates

It is evident that accurate and more comprehensive cost data will be needed as part of the follow-up activities in the context of further analysis of priority actions including issues of cost-effectiveness and more detailed project identification, both essential elements for strengthening the scope of economic analysis in the formulation and implementation of the environmental action plan for the Mediterranean.

2.4.5 Need for "Resource-consciousness"

The importance of cost information in this context does not only depend on its accuracy. These initial cost estimates are a "first-shot attempt" to apply cost considerations to this activity which includes screening of proposed actions and guidelines for implementation choices. Part of the purpose of developing an Investment Portfolio Strategy is to introduce "resource consciousness" in the Regional Strategic Environmental Action Plan. "Resource consciousness", in this context, means closer project identification, concern for cost-effective options and a capacity for raise questions of *how* to take decisions on options and approaches which are technically and socially appropriate to particular country situations. This point of view is central to environmental investment planning where increased investments need to be diverted from other commercial sectors on the basis criteria which include identification of cost-effective projects. Issues for more detailed appraisal will be more sharply revealed as a result of the preparation of this Investment Portfolio Strategy.

3. NEED FOR AN INVESTMENT STRATEGY

3.1 From estimated costs to the formulation of an Investment Strategy

Apart from data gaps, costs need to be related to **wider economic and environmental considerations** before used for action planning purposes. The main task at this stage is the

interpretation and use of the available cost data to construct elements for integrating the proposed remedial environmental action within an action-oriented investment strategy for future investment decision-making. The development of an investment strategy involves various levels of analysis each requiring increasingly more and better data according to the degree of detail needed. So far, costs show an approximate set of financial requirements added up to give total amounts of estimated investment requirements. Raw cost information needs to be analysed in relation to the impacts of the present pollution risks and the "value" of the benefits expected from the proposed investments in terms of the future reduction of these impacts on resources such as human health, aquatic life, economic and social welfare, recreation activity, other beneficial uses and quality of drinking water. This approach is instrumental for effective mobilisation and use of financial resources for a particular action plan.

Generally, benefits are derived from the reduction or avoidance of pollution impacts on resources with social economic and environmental value. This will be done below by looking at the reported impacts of the Hot Spots revealed by the graded effects on Human Health, Aquatic Life, Economy and Welfare, Recreation, Other Beneficial Uses and Quality of Drinking Water on which information was collected and reported on the basis of the questionnaires.

4. IMPACTS

Environmental impacts are the triggering factors for environmental investment. Environmental investment, on the other hand, is justified mainly by the impacts which signify degradation of resources which if avoided or reduced will produce benefits to society and to the various stakeholder in society. Because environmental resources are often used (and misused) outside a market context, their value is under-rated and, therefore, the benefits from their conservation or better use practices are often qualitative and, in reality, greater than the streams of monetary revenues arising from the "use value" of resources within a commercial context. This broader definition of benefits to include the conservation of resource for their existence or "non-use value" is central to the justification of environmental investments.

The environmental impacts of the identified Hot Spots are analysed in the Country Reports and the Regional Hot Spots Report. It is necessary to bring up and highlight the main conclusions from these data. The relevant information which needs to be highlighted refers to the **effects of the identified Hot Spots on key environmental resources to which remedial actions and investment are proposed to be directed**. This information is put together in two stages:

First, in Table 2 which catalogues all the Hot Spots by country according to the common scoring system applied (summarised in Box 1) to identify the most seriously affected Hot Spots, and, **second**, in Table 3 which presents the available information constructed to show **the type and degree of the effects**.

BOX 1 Ranking of Hot Spots

A ranking system from 1-6 must be followed to show the severity of each of the effects on the identified hot spot. It will be required to prepare a table on the priority hot spots by evaluating them using the following criteria:

. The risk exerted by the point sources with effects on:

- public health
- drinking water quality
- recreation
- other beneficial uses
- aquatic life (including biodiversity)
- economy and welfare (including marine resources of economic value)

should be graded as follows:

- 1 for no effect
- 2 for slight effects
- 3 for moderate effects
- 4 for major effects
- 5 for severe effects
- 6 for extreme effects

In order to weigh the risk in an equal manner, a multiplier depending on the importance of the effect on the several issues should be applied to the grade:

- 1.0 for public health
- 0.9 for drinking water quality
- 0.8 for recreation
- 0.8 other beneficial uses
- 0.7 for aquatic life including biodiversity
- 0.7 economy and welfare including marine resources of economic value

Source: Annex VIII "Outline of the Report on Hot Spots" (Identification of Pollution: Hot Spots and Sensitive Areas, Guidelines for the Questionnaires), Report, Ad Hoc Consultation Meeting of Regional Experts on the Mediterranean GEF Project, Athens, 14-16 January, 1997.

Table 2 immediately shows two important points: **First** (horizontally) the ranking of Hot Spots in each country and **second** (vertically) the cross-country or regional profile of the most serious Hot Spots classified according to their weighted score. As regards the second point, the Hot Spots standing out as the most serious are:

- With score 25.0-26.1
El-Manzala (Egypt) and **Izmir** (Turkey)
- With score 20.0-24.9
Kastella Bay and **Split** (Croatia), **Abu-Qir Bay** (Egypt) **Greater Beirut** (Lebanon)
Hanzur (Lybia) **Tanger** (Morocco), **Weid Ghammieh** (Malta), **Porto Marghera-Venice** (Italy), **Haifa**, **Akko**, **Nahariya** (Israel), **Tartous**, **Lattakia**, **Banias** (Syria), **Gabes**, **Lake Tunis** (Tunisia), **Icel**, **Antaiya**, **Hatay**, **Adana**, **Tarsus**, **Antakya** (Turkey)
- The other Hot Spots fall in the other 3 categories with descending weighted score.

Table 2

Catalogue of Hot Spots by country and degree of pollution risk (Weighted total score)

Country	25.0 - 26.1	20.0 - 24.9	15.0 - 19.9	10.0 - 14.9	Below 10.0
Albania				Durres, Vloza, Drini river, Mati river, Semani river, Shkumbini river, Durres ex chemical factory	Vloza ex PVC factory
Algeria					
Croatia		Kastella bay, Split	Shibenik, Zadar, Pula, Rijeka oil ref., Kaltenberg, Rijeka, Adria, Cokery,	Dubrovnik, Tannery, Krka river,	Neretva river
Cyprus				Limassol old port, Vassiliko cement plant	Limassol sewerage sea outfall, Larnaca ref.
Egypt	El-Manzala	Abu-Qir bay	El Mex bay, Alexandria, Rashied, Damietta		
Greece			Thermaikos gulf, Inner Saronic gulf, Patraikos gulf,	Pagasetikos gulf, Heraklion gulf, Elefsis bay	
Lebanon		Greater Beirut,	Jounieh, Saïda-Ghaziye, TripoliBatroun-Selaata		
Lybia		Hanzur	Tripoli, Benzazi, Zawia, Tobruk		
Morocco		Tager	Tetouan, Nador	Al Hoceima	
Malta		Weid Ghammieg	Cumnija, Ras il-Hobz		

Table 2 (continued)

Country	25.0-29.4	20.0-24.9	15.0-19.9	10.0-14.9	Below 10.0
Italy		Porto Marghera (VE),	Genova, Augusta-Mellini, Brindisi, Milazzo, La Spezia, Golfo di Napoli, Ravenna, Taranto, Gela, Rosignano Solvay, Bari-Barletta, Livorno	Manfredonia, Ancona	
Israel		Haifa bay (domestic), Akko, Nahariya	Gush Dan, Ashdod	Haifa bay (industrial)	
Slovenia			Rizana river, Izola	Delamaris, Badasevica river	Dragonja river, Drnica river
Syria		Tartous, Lattakia, Banias	Jableh		
Tunisia		Gabes (industrial), Lake of Tunis (industrial),	Lake Bizerte (industrial & municipal), Ghar El Melh, Sfax-South (industrial), Gabes (municipal), Sfax-South, (municipal)		
Turkey	Izmir	Icel, Antalya, Hatay, Adana, Tarsus, Antakya	Iskenderun, Kirikhan, Dortyol, Erdemli, Silifke, Osmaniye		

This is only part of the definition of priority for action. To get closer to the important question of the resource which will be saved by the proposed environmental investment we need to give particular attention to the "effects" parameter revealed by the available information. This is shown in Table 3 which is an annotated version of Annex 2. Although it is very difficult in practice to distinguish among related environmental resources, it is useful to utilise the available data and trace the type of resources on which the pollution effects are most severe. This is shown in Table 3 below. **The data show that Human Health Effects, Aquatic Life Effects and Economic Welfare Effects are by far the most frequently reported "severely affected" environmental resources.**

Table 3

Type of resource on which pollution effect / impact in the identified Hot Spots is shown to be severe (ranked in terms the frequency of "Severe Effects")

Public Health	Aquatic Life	Economy & Welfare	Other beneficial Uses	Recreation	Quality of Drinking Water
23	23	21	7	5	2

It is evident that the investment strategy with the highest benefit is likely to be that which directs actions and funds towards the projects addressing the "severe effects" which are reported to be the Human Health Effects, the Aquatic Life Effects and the Economy and Welfare Effects. These three main effects may be seen to correspond broadly to the social, environmental and economic impacts of pollution.

A further crucial element to be included in the Investment Portfolio Strategy is the issue of the Transboundary aspect which identifies as priority actions those which address Hot Spots reported to have significant Transboundary Effects.

5. INVESTMENT PORTFOLIO SCENARIOS

5.1 "Do nothing"

Taking no action is evidently the highest-cost option from the environmental and social point of view, which should be excluded at the outset. Marine pollution from municipal and industrial wastewater, agricultural runoff, discharges of ships and uncontrolled disposal of solid wastes is a major pollution threat in the Mediterranean. Apart from the environmental costs, the strong economic-environmental linkages underlying the regional economy due to the importance of environment-related sectors such as tourism, fisheries and agriculture also imply direct economic losses in these sectors. Available information² for the region as a whole indicates the following:

- More than 70 percent of municipal wastewater is untreated and discharged in coastal areas from short marine outfalls. Hazardous industrial wastes also reach the coastal environment either directly or through municipal sewerage systems. It is estimated that about 25 percent of total pollution in the Mediterranean is located in the northwestern part of the sea coming

² The State of the Marine and Coastal Environment in the Mediterranean Region, MAP Technical Report Series No. 100, 1996, and The Environmental Program for the Mediterranean, The World Bank and The European Investment Bank, 1990.

from France, Italy and Spain. Another 35 percent is found in the Adriatic originating from Italy. The southern part pollution is much less but risks are serious due to the high proportion of untreated discharges.

- A sampling of 150 beaches in France, Italy, Spain and Greece in 1988 showed a quarter of them with pathogens exceeding safe levels. Massive eutrophication in the northern Adriatic Sea occurs from nutrients reaching the coast through rivers. Some of the impacts are already evident; pollution and over-exploitation have reduced fish yields and the region is now a net importer of fish.
- In the next 2-3 years the number of international tourists in the various countries of the Mediterranean is expected to reach 200 million a year. The coastal environment and the quantity of fish are some of the major factors in the comparative advantage of the region in tourism and its significance as a income earner.
- Social consequences are equally important. The increasing population concentration in coastal areas, apart from adding to pollution, means exposure to health hazards affecting mostly the poorer sections of the population and the rural migrants living in the overcrowded "informal" neighbourhoods of coastal settlements without infrastructure services. The Blue Plan estimates that the coastal population of the Mediterranean will double in the next 25 years reaching 150 million, no doubt including a large section of low income families.
- According to a recent study³ of pollution in the Middle East and North Africa region indicates that in Egypt poor sanitary conditions and hygiene, combined with particulate and lead pollution account for an estimated 6.1 million days of diarrhoea in the Cairo area; up to 5,500 deaths per year would be saved if safe water and sanitation services were provided. In Algeria in areas with iron, steel and fertilizer industries the incidence of respiratory infections among school children is observed to be up to 65 per cent higher than in other non-industrialised regions of the country.
- In the same region, foreign exchange earnings from tourism and travel reached over 10 billion USD in 1993-4, more than double the average yearly earnings of the past decade. Income from tourism and travel, relative to merchandising exports including oil are 60 per cent for Egypt, 35 per cent for Morocco and 30 per cent for Tunisia. Municipal and industrial wastewater discharges combined with other sources of environmental degradation (degrading historic monuments, air pollution, poor sanitary conditions and inadequate collection of disposal of urban solid wastes) are likely to reduce tourism earnings by 1-2 billion USD in the near future.

The lack of environmental cost/benefit studies is a major problem accounting for the absence of information on the quantifiable costs of environmental degradation. Published information sources acknowledge the estimation difficulties and resort to qualitative references to environmental damages and impacts which, although they sharpen the awareness of the extent of the sources and consequences of pollution risks, nevertheless confirm the lack of economic costs including the social (distributional) implications of the impacts of these costs. Given the prevailing cost-of-impacts data limitations, statements concerning the environmental costs of inaction can only be fragmentary and incomplete. One particularly sound report on the Mediterranean fishery sector⁴ expresses the point quite clearly illustrating the general situation on this issue: *"Considerable difficulties are associated with estimating losses due to human*

³ World Bank Environmental Strategy for North Africa and the Middle East, World Bank, 1995.

⁴ Fishery Transboundary Diagnostic Analysis, FAO, 1997.

interventions in the Mediterranean environment, including the costs and benefits of different actions. These mainly stem from the fragmentary nature of the data base, and here fisheries is no exception. One of the priorities for action in the fisheries sector is in fact to collect data that will allow an indicative idea of the benefits of management action, and the losses associated with inaction. In relation to the problems of making financial statements on management issues at this point in time, there is a need for basic analytical tools to support the decision-making process for managing fisheries on the basis of economic and eventually social considerations." (Fisheries Transboundary Diagnostic Analysis: Mediterranean Fishery Component, FIRM (FAO), April, 1997).

Despite data and methodological limitations, it is useful to note some broad quantitative information extracted from publications which show in economic terms at least part of the resource losses associated with existing environmental risks in the Mediterranean:

Tourism: Estimated cost of environmental impacts 25.0 billion US\$
-Harmful chemical and biological effects 1.0 billion
-Air pollution and traffic jams 1.2 billion
-Nature and biodiversity 2.0
-Other nature disaster 20.5 billion
-Social risks 0.2 billion
(Source: TDA for the Mediterranean, Tourism report, April, 1997)

Estimated loss of foreign exchange earnings due to environmental degradation 1-2 billion US\$
(Source: World Bank, Middle East & North Africa Environmental Strategy, 1995)

Fisheries: Market value of fishery production at risk if no management actions are taken 3.8 billion US\$ annually
(Source: TDA Fishery component report -FAO),
pollution and over-exploitation have reduced fish yields and the region is now a net importer of fish.
(Source: The State of the Marine and Coastal Environment in the Mediterranean Region, MAP Technical Report Series No. 100, 1996).

Human Health: Estimated 6.1 million days of diarrhoea due to pollution in the Cairo area; up to 5,500 deaths per year would be saved if safe water and sanitation services were provided. In Algeria in areas with iron, steel and fertilizer industries the incidence of respiratory infections among school children is observed to be up to 65 per cent higher than in other non-industrialised regions of the country. (Source: World Bank, Middle East & North Africa Environmental Strategy, 1995).

5.2 "Try to do everything"

At the other end of the scale, despite the evident urgency for actions focused on hot spot situations, the high investment cost, the variability of the Hot Spots in terms of source, consequence and transboundary effects, the institutional and legal pre-requisites for the most effective use of national and international financial resources, require definition of priorities. Trying to tackle all the Hot Spots, even over a period of time, is as likely to lead to inaction due to limited justification for an equal attention to all the Hot Spots and the consequent failure to attract investment funds over and above the modest national budget allocations. There is also the question of the need for additional data for clearer identification of Hot Spots and the associated remedial actions. Screening is essential in order to build up a coherent framework

for an outline Investment Portfolio. Screening calls for the need to apply a sharper focus on priorities based on the resources which are subject to severe effects and the Hot Spot areas responsible. This approach leads to the a more targeted scenario aiming to get at the major effects first as shown below.

5.3 "Focus on major effects first and on tools for sustainable management"

5.3.1 Major Effects Hot Spots

Given the need to focus on major environmental effects first, it follows that first actions should be targeted on interventions proposed to address the most severe impacts on those resources with the highest incidence of "severe effects" (those with a score 6). Public health, Aquatic Life and Economy and Welfare are the resources most frequently suffering "severe effects" (Table 3).

This scenario maximises the benefits of investments by saving the most threatened resources. The following prioritisation indicates the target areas by country grouped according to the environmental resource on which action is directed.

There is an additional important merit attached to this prioritisation: Projects and project areas are linked up with identifiable benefits. Otherwise, investments would be seen to address "pollution" without a focus on the specific resource that would benefit from the intervention. It is important to attempt, within the scope of the available data, to correlate investment costs with the benefits which justify the allocation of funds for such action.

Public Health

Croatia: Kastella Bay, Split, Cokery, Tannery,

Egypt: Damietta, El-Manzala, El-Max, Abu-Qir

Italy: Porto Marghera (VE), Bari

Greece: Thermaikos, Inner Saronic

Israel: Haifa

Lebanon: Greater Beirut

Malta: Wied Ghammieh, Cumnija

Syria: Lattakia

Tunisia: Gabes, Sfax-South

Turkey: Izmir, Icel, Hatay, Adana

Aquatic Life

Egypt: El-Mazala, Abu Qir

Italy: Port Marghera (VE), Genova, Augusta, Brindisi, La Spezia, Milazzo, Tanando, Ravenna, Gela, Rosigniano, Livorno

Israel: Haifa, Gush Dan

Malta: Wied Ghammieh

Tunisia: Gabes, Sfax-South Ghar El-Melh

Turkey: Izmir, Icel, Antalya, Hatay

Economy & Welfare

Croatia: Pula, Rijeka, Rijeka Ref., Zadar, Shibenik, Split, Kastella Bay, Dubrovnic

Egypt: Abu Qir

Greece: Thermaikos, Elefsis

Israel: Haifa, Gush Dan, Ashdod

Malta: Weid. Ghammieh

Morocco: Tanger, Tetouan

Syria: Banias

Turkey: Izmir, Antalya, Hatay

Other Beneficial Uses

Egypt: El-Mazala, AbuQir

Israel: Haifa, Akko, Hahariya

Lebanon: Greater Beirut, Tripoli

Recreation

Israel: Haifa, Akko, Nahariya

Lybia: Tripoli, Zanzur

Quality of Drinking Water

Egypt: Rashied, Damietta

The above prioritisation would be difficult to do if it had to rely on the ranked table showing Hot Spots in descending order of **total** weighted score assigned to each Hot Spot; three main problems would arise:

- **first**, where to draw the line in defining the priority Hot Spots;
- **second**, funding would depend entirely on availability, for example the first 5; or 10, or 15 without taking benefits into account;
- **third**, investment results and justification would be limited to generalities concerning "addressing Hot Spot pollution problems".

5.3.2 Regional Sustainable Environmental Management Programmes

The priorities suggested above are only part of the required actions; they all (except for Italy) concern more or less sectoral projects in the form of wastewater facilities. Sustainable management need to be addressed also. Location-specific, sectoral and discrete wastewater facilities represent "front line" initiatives for addressing risk situations. **Pollution control strategies are most effective when they are planned and implemented within an integrated environmental management programme which includes efforts focused on the need to ensure sustainable resource use and sound management.** The essential elements for sustainable environmental actions should include activities targeted on:

- **Capacity-building**
- **Integrated Coastal Zone Management**
- **Public Participation, and**
- **Investment Planning**

The linkages between wastewater projects and integrated environmental management should be an important element in the planning for strategic actions for the Mediterranean environment. The following notes seek to strengthen this element and explain the inclusion of such programmes in the investment portfolio.

The quality of the environment in any part of the world reflects past and current practices in the "utilisation" of the environment by individuals, industrial and business organisations and public agencies in response to growing social and economic pressures for development. However, environmental degradation is not confined to low-income Mediterranean developing economies which need to stimulate employment generation in order to cope with rapid urbanisation and growth of informal settlements. Higher-income Mediterranean economies face equally serious degradation problems arising from income-induced increase in the use of materials, water, chemicals and technology placing equally strong pressures on the environment. Environmental protection requires integrated policies and institutions capable of actions to regulate production, distribution, consumption and disposal practices within a broader-based coastal zone strategy.

Capacity building for Integrated Coastal Zone Management. The capacity to plan and initiate environmental actions across a wide range of activities is a gradual process based on a prior commitment to economic and social development policies built on cross-sectoral linkages and an effective networking effort across agencies and policies. Capacity building is needed to increase awareness of the economic and social value of environmental resources likely to ensure that industrial and municipal organisations, consumers and policy-makers will not either disregard or give low priority to environmental risks.

Public Participation -Stakeholders. Environmental management actions concern, affect and benefit different sectors and population groups in different ways. Initiatives to address pollution impacts should draw public support from all interest groups or stakeholders whose role and pattern of participation should be identified and stimulated prior to implementation. Public agencies, private sector business groups, NGOs, professional experts, donors and ordinary beneficiaries are key role players with both common and divergent concerns that have to be reconciled and directed towards agreed action priorities. To achieve this, it is important to design integrated strategies based on a common language expressing the visions of all stakeholders. It is just as important to "empower" the poorer sections in society so that their voice is heard as it is to stimulate the mobilisation of private enterprise so that investment behaviour conforms to sustainable practices.

Investment Planning as a tool for Resource Mobilisation. Until recently, investment planning and economic analysis were considered marginal to environmental action plans. The reason was the priority given to scientific research to establish problems, causes and consequences before implementation action could be undertaken. When the focus is on environmental action within national, regional and global institutional contexts, financial resource mobilisation is central to the concern for directing investments in support of the desired environmental actions. The flow of funds is not only constrained by the lack of national budget funds; equally important constraints are institutional limitations including ill-defined priorities, adherence to sectoral approaches and unclear vision for action. The need for integrated environmental planning approaches, incorporating economic and financial approaches within the planning process, serves, among other things, to strengthen institutional capacities and to build up a common framework for communication on goals, objectives, constraints and visions essential for increasing resource availability for environmental programmes. Investment planning sharpens the focus of policy-makers on the need to adopt "resource-consciousness" as a planning tool and to appreciate the magnitude and nature of the "unpriced" benefits of environmental investment, such as health, biodiversity, amenity and welfare, extending beyond the stream of cash revenues accruing from the investments.

6. PROPOSED INVESTMENT PORTFOLIO STRATEGY

6.1 Two-pronged Investment Portfolio

The proposed Investment Portfolio comprises two main related clusters of investments:

- **investment projects targeted on Hot Spots**, consisting of
 - . first priority projects
 - . second priority projects
- **regional management programmes**, consisting of integrated actions related to transboundary actions, such as capacity building, coastal zone management, public participation, tourism, fisheries, tourism.

Table 4

Proposed Investment Portfolio

A. Hot spot projects

	Est. Cost Mill. US\$	Expected Benefits
<u>First Priority Projects</u> Areas CROATIA: Kastella Bay, Split, Cokery, Tannery EGYPT: Damietta, El-Manzala, El-Max, Abu-Qir ITALY: Port Marghera, Bari GREECE: Thermaikos, Inner Saronic ISRAEL: Haifa LEBANON: Greater Beirut MALTA: Weid Ghammieh, Cumnija SYRIA: Lattakia TUNISIA: Gabes, Sfax-South TURKEY: Izmir, Icel, Hatay, Adana	1,051.3	Improvement of the marine and coastal environment with main benefits to public health in Hot Spot locations with severe public health impacts
ITALY: Genova, Augusta, Brindisi, La Spezia, Milazzo, Tanando, Ravenna, Gela, Rosigniano, Livorno ISRAEL: Gush Dan TUNISIA: Ghar El-Melh TURKEY: Antalya, Hatay	913.5	Improvement of marine and coastal environment with main benefits to aquatic life in Hot Spot locations with severe aquatic life impacts
CROATIA: Pula, Rijeka, Zadar, Shibenik, Dubrovnic GREECE: Elefsis ISRAEL: Ashdod MOROCCO: Tanger, Tetouan SYRIA: Banias	218.9	Improvement of marine and coastal environment with main benefits to economy and welfare in Hot Spot locations with severe economy and welfare impacts
ISRAEL: Nahariya LEBANON: Tripoli	144.5	Other beneficial use benefits
LYBIA: Zanzur	0.1	Recreational benefits
EGYPT: Rashied	NA	Drinking water quality benefits
Estimated Cost of First Priority Projects	2,328.3	

B. Regional Management Programmes

Programme	Proposed Actions	Est.Cost. Mill US\$	Benefits
Coastal Zone Management	> Preparation and adoption of a MAP framework protocol on implementation of ICZM	0.280	Strengthening the legal and institutional framework for ICZM at national and regional level
	> Development of regional strategies for ICZM	0.150	
	> Implementation of two regional and sub-regional ICZM projects on transboundary-related issues	0.500	
	> One coastal and one insular area cost/benefit ICZM study	0.200	Upgrading, strengthening and harmonising the ICZN implementation machinery in the region
	> Pilot river basin management project including transboundary affected coastal area	0.400	
	Total Coastal Zone Management	1,530	

Programme	Proposed Actions	Est. Cost Mill. US\$	Benefits
Public Participation	> National studies in all countries to identify amendments to existing legislation to improve information access and participation opportunities	0.090	Adequate access to information and effective participation
	> Introduction of legislation making environmental legislation open to the public	0.090	
	> Preparation of printed material and TV spots on citizen rights and information sources	0.060	
	> Critical review of EU experience on scope and use of directives on environmental information access	0.020	
	> Introduction of legislation for NGOs participation in policy-making bodies and implementation	0.060	Ensuring adequate participation of the public in the decision-making process
	> Increasing capacity for NGO participation in environmental protection activities	0.060	
	> Publications promoting communication on issues and ideas relevant to all actors	0.040	
	> Setting up consultation process on new development projects	0.040	
	> Open access of citizens and NGOs to courts of all levels	0.040	Improving public access to legal institutions for citizen action
	> Public information on procedures in support of legal rights to court appeals against decisions of State and Municipal authorities	0.040	
	> Establishment of Mediterranean legal service for local level advice	0.040	
	> Establishment of funding mechanisms at national and local level for participation activities	0.040	Financial support to NGO activities
	> Tax exemptions of private donations to env. NGOs	0.020	
	> Funding of the work of the MCSD Working Group on Public Participation		
	Total Public Participation	0.560	

Programme	Proposed Actions	Est. Cost Mill. US\$	Benefits
Fishery	> Institutional and communication capacity building	0.258	Improved capacity for
	> dissemination of information tools	0.100	.responsible
	> improvement of policy design methods (reconcile top-down bottom up)	0.140	management
	> fisheries monitoring, control and surveillance (MCS) system (nat level)	0.120	.communication
	> info and data collection network	0.120	between
	> international organisations schemes for management advice	0.250	fishermen and
	> international management body	0.400	experts
	> Coordinated international systems of MCS and registry of fleet	0.120	.enforcement of
	> Research on fisheries	2,550	regulations
	> Research environmental fisheries impacts	0.400	.sub-regional
	Total Fishery	4,458	cooperation

All programmes total

6,548

Table 5

Summary table of estimated investment cost
of projects and programme (million US\$)

A. Hot Spot Projects	
First Priority Projects	2,328.3
Second Priority Projects	1,641.7
Total	3,970.0
B. Regional Management Programmes	6,548.0
Estimated total	10,518.0 Million US\$

7. BENEFITS

7.1 A Cost/Benefit Approach

There are many ways to approach estimated investment costs. The financial approach assesses costs relative to availability of fund, or "can we afford to pay the cost". This is an inappropriate approach mainly because it does not take into account the benefits of allocating the required funds to specific purposes. The economic approach assesses costs in relation to benefits showing "whether it is worth paying the cost". There is still however, the financial question of how to mobilise funds to implement priority actions. The cost/benefit approach is

particularly appropriate in the context of environmental actions due to the diverse, long-term and social nature of benefits which are known to exceed by far the costs. In addition, a cost/benefit approach is more effective in mobilising funding sources for environmental actions because it focuses on the justification of environmental investment programmes which is central to the effort to attract funds from donors committed to sustainable environmental management.

Often, it is not possible to show the total value of benefits in money terms due to data and methodological constraints including the facts that benefits from environmental investments are essentially qualitative. They may be quantified on the basis of sufficient data, specific type of analysis and effort needed to unravel specific qualitative, productivity or behavioural changes arising from investment. Quantification is even more difficult when the available information defines investment in general terms. Clear definitions of benefits and, furthermore, estimation of their value also involve choices of valuation methods according to local conditions and the quality of socio-economic data.

It is, therefore, not possible to show the monetary value of the benefits to accrue from future investment estimated at 10.5 billion US\$. At this stage of this Project the available data are less than adequate to allow quantification. This task should be looked at more closely in the follow-up stage after the investment options and priorities have taken a shape and form according to the conclusions of this phase of work (See Chapter 10.0). It is important to note that this report does give a focus on the definition of benefits, as shown in the proposed Investment Portfolio Strategy, a task made possible as a result of a particular treatment of the available data and the particular approach taken to the analysis aimed at the identification of the "severe effects" of the Hot Spots and the environmental resource "severely affected" by pollution. This approach enables correlation of Hot Spot investment actions to defined benefits such as Human Health, Aquatic Life, Economy and Welfare, etc. Deeper work on the evaluation of benefits pre-supposes a more specialised investigation based on the groundwork achieved in this report. A broad outline of some of the analytical concepts and valuation techniques are listed below in 7.3 for better clarification of the scope of the effort usually required for the estimation of environmental benefits.

It is relevant to refer to environmental cost/benefit data developed from two case recent studies in the Mediterranean⁵ to show the conclusions reached and some of the broad cost/benefit comparisons estimated by these important studies

7.2 Environmental Cost/Benefit Case-Studies in the Mediterranean: An Illustration

7.2.1 The Island of Rhodes Case Study

The study of the benefits of measures for the reduction of the environment impacts from land-based sources of pollution on the coastal environment of the **Island of Rhodes in Greece** demonstrates the uses of the results of a cost/benefit approach to environmental investment.

The Island of Rhodes has experienced rapid tourism growth leading to emerging pressures on the coastal environment. Over 1 million tourists visit the island every year bringing pressure to bear on the northern part of the coastal zone which concentrates over 85% of the Island's tourist accommodation capacity of about 70,000 beds. Prospects for future environmental impacts have stimulated policy and investment responses by the local and national authorities. The cost/benefit approach Case Study is central to the effort to strengthen

⁵ Costs and Benefits of Measures for the Reduction of Degradation of the Environment from Land-Based Sources of Pollution in Coastal Areas (**Case Study of the Island of Rhodes and Case Study of the Bay of Izmir**), MAP Technical Report Series No. 72, 1973.

programme development and justify the priority assigned to investment allocations to environmental management expenditure.

For the use of a cost/benefit approach, appropriate estimation techniques have been used for assessment of environmental costs arising from activity and assessment of benefits accruing from investment in wastewater treatment plants and associated coastal zone management and environmental pollution control. The study had to overcome the specific data problems concerning difficulties of identifying, analysing and measuring actual and potential environmental impacts. Despite the elusive character of environmental costs and benefits, monetary measurement has been attempted for the purpose of approximating the size of impacts in terms of a common unit of value.

On the cost side, the Rhodes Case Study identified and estimated environmental costs in terms of four indicators: (i) loss of tourist revenue, (ii) degradation of the beach, (iii) health hazards, and reduction of residential amenity. Costs were expressed in monetary values through estimates of market and market-related variables including: (i) changes in production (for losses of tourist revenue), (ii) cost of rehabilitation (for restoring the quality of the beach) (iii) direct household expenditure (for the cost of health treatment), and (iv) changes in urban land productivity (for changes in property values). **The monetary costs were estimated at about \$ 15.2 million a year, within a range of approximation of 25%, representing roughly 3% of the Island's estimated Gross Domestic Product. Loss of tourist revenue amounted to 8.1 million a year, reduction of urban residential land values 3.5 million a year, beach degradation 2.7 million a year, and health costs only 0.9 million a year.**

On the benefit side, the Rhodes Case Study examined environmental investment in the Central Sewerage System over the period 1988-91 and planned investment up to 1999 and estimated for both the direct and indirect benefits expected from the investment. The direct benefits comprised two main categories: (i) the expected increase in tourist revenues from improved coastal zone management and (ii) cost savings associated with the pre-investment system of sewage removal and disposal by carrying vehicles. The indirect benefits concerned general improvements in the island's environment and particularly in the level of residential amenities from reduced odour, car traffic and noise expected to have positive effects on property values. The main areas to accrue benefits are the island's "hot spots" to be served by the Central Sewerage System.

The Case Study shows that, excluding significant qualitative benefits which are harder to measure, the value of the measurable benefits mentioned above far exceeds the investment cost. From a total investment of 94 million US dollars in the wastewater treatment plants, annual benefits of 21.2 million US dollars were estimated, equal to a present value of 200 million US dollars, reflecting a benefit /cost ratio of well over 2. It is estimated that 45% of the benefits accrue to expected property value increases, 35% to cost savings and 20% to future tourist revenues.

7.2.2 The Izmir Bay Case Study

Izmir is an important industrial, commercial and cultural focal point. The region around Izmir produces 15 per cent of Turkey's agricultural output with 30 per cent of the land in the region used for agriculture. The harbour's storage capacity is estimated at 200,000 tons with 25 per cent of Turkey's exports and 55 per cent of its imports passing through the port. Tourism is also an important activity with up to 300,000 tourists annually either visiting or passing through Izmir. Urbanisation, industrial activity and agriculture create heavy impact on the water quality of the Bay and the coastal environment. The Bay is heavily polluted.

It was possible to calculate the costs and benefits of two scenarios based on the re-establishment of quality of the Bay's waters with tourism development only but maintaining the existing industrial, transport and agricultural infrastructure of the region. These two scenarios considered are: one conservative with tourism in the future developing slower than the expected tourism growth rate for Turkey as a whole; the second a progressive scenario with future tourism in the region growing in line with national growth rate. Other expected benefits include health, fishing salt production and recreation. In both scenarios the expected stream of benefits, discounted for 1990 values at 8 per cent, exceeded the expected discounted costs. In the conservative scenario the benefits exceeded the cost by a factor of one and in the progressive scenario by a factor of eight. The total discounted clean-up cost for the period 1990-2025 would amount to 1.5 billion USD. On the other hand, benefits in the conservative scenario would total 4.8 billion USD (3.4 billion USD from tourism, 0.8 billion USD from salt production, 0.2 billion USD from recreation); under the progressive scenario the benefits would be substantially higher of 10.2 billion USD (8.0 billion USD from tourism, 1.4 billion USD from salt, 0.4 billion from recreation).

In addition there is the existence value of the clean Bay with its ecology which has a value for the inhabitants and the nation as a whole but for which no generally accepted valuation exist. Using property prices in similar coastal areas with good water quality, allowing for income differences, property prices would double if the Bay's environment is re-established. This value was estimated for 1990 at 10 billion USD.

Both case studies were able to show that benefits exceeded the estimated investment costs by a factor between two and eight.

7.3 An agenda for further study

The fact that estimation methods may sometimes give only approximate money value to environmental costs and benefits does not mean that environmental costs and benefits do not exist or that their importance to the planning and policy making process is marginal. Often environmental benefits cannot be directly calculated from market behaviour and several techniques are used to approximate social losses from pollution and benefits from recovering such losses through people's preferences and responses to changes in environmental conditions. Commonly used valuation techniques fall into various categories as briefly outlined below:

The most frequently used valuation techniques look at how environmental changes affect directly observable behaviour valued in actual markets. They include effects on health, effects on production, averted investment and penalties.

- **Damage Cost Valuation:** Reduction in income based on product market prices, increase of medical costs and indirect costs from illness. "Dose-response" functions relate to responses to pollution concentrations and the concentrations are calculated from discharge or emission loads and dispersion studies. For example, SO₂ and NO_x particle emissions affecting health, crop yields, foregone earnings due to illness, forest growth, material damages, etc.
- **Averted or Defensive Investment Valuation:** The cost of investments made to prevent, remedy or compensate for effects of pollution on victims of pollution. For example, cost to farmers for the extra effort, land or fishing boats to compensate for reduced yield, noise abatement using insulation, the extra cost of purifying polluted water.
- **Legal Liability Valuation:** Damage penalties levied according to law enforcement indicates the value to society of environmental quality.

A second cluster of techniques seek to value intended actions in markets. They mainly include replacement cost and "shadow projects."

- **Replacement Cost Valuation:** Costs of discharge or emission reduction or costs of "shadow projects" (shadow projects are alternative measures to reduce pollution to the same recipient). For example, national or regional assessments of total or marginal costs to meet the pollution reduction goals prescribed by internationally or regionally conventions/agreements.

If direct market valuation is impossible, use of indirect information is attempted to arrive at implicit values. They usually include Travel cost measurements and property values.

- **Travel Cost Valuation:** Travel costs to reach a recreational site reveals its minimum value to the visitors.
- **Real Estate Pricing Valuation:** Housing prices influenced by the presence of pollution.

When market data cannot be used, a group of techniques aim to collect data through hypothetical market situations using surveys to assess preferences. They include assessments of stakeholder' willingness to pay or to accept compensation.

- **Experimental Data Valuation:** Field studies data estimating people's preferences for environmental quality through measurements of willingness to pay (WTP) for environmental improvements, or willingness to accept (WTA) compensation for environmental pollution damage. Example, WTP to avoid chronic or acute illness, WTP to preserve endangered species and aquatic life.

A further note should be added with regard to the value of environmental resources. Environmental resources are known to have both "use" and "non-use" values. Commonly, environmental valuations may only capture the increase in the "use" values of environmental conditions reflected in, for example, increase in production (fishery, tourism, agriculture), wages, health, house prices, recreation revenues, etc., while "non-use" values such as the existence of clean sea, the existence of a lagoon, aquatic life or biodiversity are sometimes ignored or under-rated. Environmental economics studies should take into account **total value** comprising use and non-use benefits and values.

8. FUNDING ISSUES: BASIC ELEMENTS

It is useful to touch on funding issues and give some general considerations for further elaboration. Although the first consideration in analysing investment costs is to compare them with benefits, it is crucial to identify some of the main elements for the financial strategy. If a rough classification of the type of actions and their costs is attempted some basic funding and recovery possibilities may become clearer. Investments which are capable of generating money revenues (subject to affordability and other social policies) are opportunities for **private sector involvement** either directly or through cross-subsidisation methods. Private sector participation is not only necessary for funding purposes but desirable as a component of capacity building and public participation. The importance of identifying the projects with capital recovery potential (such as wastewater treatment plants - WWTP) is to suggest funding opportunities and constraints for further consideration. **The total cost of over 10 billion US\$ is misleading if understood as the total requirement for grant finance.** Many investments included in the portfolio may withstand suitably adjusted commercial loan terms or at least selected components of them. Many projects will require concessionary finance and grant funds.

Type of Projects			
	Public Health Projects	Aquatic Life Projects	Economy & Welfare Projects
Benefit category	Social benefits	Environmental benefits	Economic benefits
Beneficiaries (bens)	> residents > national popul > reg popul	> national popul > regional popul > inter community	> industrial and business community > local & nat popul
Cost Recovery options	> partial direct recovery from local bens > govt subsidy > large regional programme assistance	> indirect recovery (tourism) > large inter & reg programme assistance	> large recovery from business sector (charges/levies) > programme assistance to selected countries

Such considerations should be taken into account in developing a funding strategy because **different costs should be funded differently according to affordability and cost-recovery criteria not possible to define at present**. Not all the costs will be undertaken by public authorities, private (corporate) capital should be leveraged to various degrees in response to specific conditions and concessions associated with donor sources. The implication is that the capital investment cost of WWTPs may be unaffordable to many poor countries but the implementing authority can repay a loan for the cost out of the stream of user charges. Also, the business sector beneficiaries of WWTPs services which improve economic activities (tourism, industry, recreation) may withstand higher than average charges in order to lower the charges on the poor (cross-subsidisation) or to contribute towards Coastal Zone Management Programmes.

Out of the total estimated investment cost of over 10 billion US\$, an amount of just under 4 billion mainly concerns wastewater treatment plants and associated facilities, and 6 billion regional sustainable management programmes. This means that WWTP investments will at some point recover their cost. Regional programmes are not economic assets and are unlikely to create direct revenues, they should be funded as regional cooperation programmes which themselves will create social benefits and some revenues in tourism and other sectors consuming environmental services.

The matrix shown above puts together some guidelines for the approach to the funding options for the proposed actions. Much further work is needed to flesh out the implications.

9. USE OF THE INVESTMENT PORTFOLIO

9.1 Main elements for further use

An investment portfolio is a framework for guiding investment choices and decisions usually within changing environmental and socio-economic conditions. It is a process that leads to the demonstration of the economic implications of environmental actions rather than a final statement for a single use. This present investment portfolio should be used as a guide to

ensure that development of those elements that create the scope for deeper environmental-economics analysis in the light of funding and justification requirements at the regional and national level arising at successive stages in the future. The following elements outlined in this investment portfolio are pinpointed as guidelines for future work:

Raw cost information is insufficient to support investment decision-making. **Costs need to be related to wider economic and environmental considerations** before used for action planning purposes. The interpretation and use of estimated costs requires construction of investment strategy and a basis for options for future investment decision-making. This report shows how cost information should be analysed in relation to pollution impacts and benefits expected from the proposed investments to reduce impacts on resources such as human health, aquatic life, economic and social welfare, recreation activity, other beneficial uses and quality of drinking water. This approach should be used to make cost information meaningful for effective mobilisation and financial resource planning.

Investment planning has many levels of analysis and data needs. The framework used in this report **outlines possible approaches and suggests guidelines** adaptable to specific contexts in which follow-up work will be needed in support of implementation of priority actions. It provides the context for undertaking further analysis for sharper project identification and evaluation appreciating the parameters which have to be taken into account.

It shows how **cost, impact, benefit and funding issues may be brought together** to facilitate the development of locally relevant and nationally specific investment portfolios. It clarifies that benefits are derived from the reduction or avoidance of pollution impacts on resources with **social economic and environmental value**. This perception allows further work looking at the environmental impacts as they relate to valuable resources such as Human Health, Aquatic Life, Economy and Welfare, Recreation, Other Beneficial Uses and Quality of Drinking Water rather than mixing and generalising environmental information rendering difficult the identification of benefits from actions to address pollution risks.

The investment portfolio framework developed in this report should help improve the approach to environmental investment and **the justification for increasing financial resources for the environment**. It is important to remember that environmental resources are often used (and misused) outside a market context and therefore their value is under-rated. The **total benefits** from their conservation through better use practices should be taken into account (and when possible qualitative) in justifying the viability of environmental actions. This broader definition of benefits to include the conservation of resource for their existence (or non-use value) is one of the key elements to be used for the development of detailed project proposals put up for donor or national budget support.

In the follow up work in response to specific evaluation and investment planning needs, it is useful to focus not only on the availability of fund, or "can we afford to pay the cost of environmental action plans" but primarily on **"whether it is worth paying the cost"** relative to the expected benefits. This will create the need to show the total value of benefits which is typically many times greater than financial costs.

The cost/benefit approach is particularly appropriate in the context of environmental actions due to the diverse, long-term and social nature of benefits which are known to exceed by far the costs. In addition, a cost/benefit approach is more effective in mobilising funding sources for environmental actions because it focuses on **the justification of environmental investment programmes** which is central to the effort to attract funds from donors committed to sustainable environmental management.

Primarily, the importance of an investment portfolio lies in incorporating investment planning and economic analysis in environmental action plans. The added value of this integration is to support resource mobilisation and direction of local, national, regional and international opinion to needs for environmental action and cooperation. Funding requirements and investment options are best discussed in the light of scenarios showing to the decision-makers, NGOs and international institutions the urgency for actions in risk areas and the respective cost/benefit positions. Integrated environmental planning approaches, incorporating economic and financial concerns within the planning process, serves, among other things, to strengthen institutional capacities and to build up a common framework for communication on goals, objectives, constraints and visions essential for gathering official and popular support behind environmental proposals.

10 GAPS, PROBLEMS AND FOLLOW-UP

Three overlapping areas of work are identified:

(a) Project and programme specification, including the following tasks:

- to look much more closely and critically at the **first priority projects** with particular attention given to the main regional Hot Spots such as Izmir, Abu Qir, Porto Marghera and Manzala. The proposed interventions should be clearly specified, the technological options involved critically examined;
- to concentrate on the **industrial sector**, on which data are limited, carry out feasibility studies to explore opportunities for the design and implementation of incentives and measures to improve technology and promote cost-effective pollution abatement methods;
- to focus on the **socio-economic context** of the primary Hot Spot areas and identify the population, employment, social and cultural structure of the areas for better analysis and sharper understanding of the impacts and benefits underlying the proposed interventions;
- to examine critically the basic **economic policies** applied in selected groups of countries with important regional Hot Spots (for example, Italy, Turkey, Egypt) to catalogue economic measures (subsidies, loan priorities, taxes, etc.) encouraging directly or indirectly pollution as part of export, import substitution, rural development policies and specific assistance to particular development projects (energy, agriculture, transport, tourism). Economic policy biases and distortions are often serious background sources of pollution behaviour difficult to identify if "point sources" are divorced from the rest of the economic policy context;
- to review opportunities for the **mobilisation of private sector resources** and the scope for the use of incentives, measures and inducements for influencing private sector decisions and behaviour related to the environment;

(b) Appropriate cost/benefit study, including the following tasks:

- to develop a **practical framework for cost/benefits study** of the main priority projects and programmes based on regionally relevant valuation techniques, issues and data, utilising to the maximum the few existing case studies;

- to derive useful **guidelines and a brief manual** for the application of cost/benefit approaches suitable to the environmental challenges, institutional setting, socio-economic policies and local/national differences prevailing in the region;
- to prepare more **accurate cost estimates** for priority projects to be used for pre-investment analysis necessary for detailed financing proposals submitted to interested donors;
- to identify more sharply and **measure the main benefits** to accrue from the implementation of the key priority projects, including proposals for overcoming data and specific measurement problems;
- to prepare a more **detailed investment portfolio** focusing on the cluster of priority projects and programmes aiming at the incorporation of elements concerning the social justification for donor support, the beneficiary population, funding and investment recovery mechanisms and national participation capabilities.

(c) Financing capabilities at the regional and national level, including the following tasks:

- to collect information on regional multi-lateral and bi-lateral funding sources and national expenditure on environmental programmes for the purpose of identifying "national" and "incremental" investment needs;
- to analyse affordability and cost-recovery issues in relation to the diversity of national economic and social conditions which may entail specific country-based social impacts on the poor from the implementation of capital-intensive environmental facilities and the consequent introduction of user charges.

ANNEX 1

COUNTRY AND HOT SPOTS	Weighted score	Type of investment	Cost Million USD
ALBANIA			
Durres	13.3	WWTP	48.0
Vlora	13.3	WWTP	48.0
Vlora disused factory site	11.4	sanitary landfill of mercury	2.0
Durres disused factory site	11.4	sanitary landfill of toxic solid wastes	2.5
Drini river Mari river Semani river Shkumbini river	11.2	Study of pollution source in river basin	2.0
Sensitive Areas			25.0
Kuna-Vain lagoon		WWTP	
Kuna-Vain lagoon Karavasta lagoon Nata lagoon		Management plans	6.5
Coastal zone		Capacity building	1.5
Country Total			133.5

CROATIA			
Split & Kastella Bay	21.7	WWTP	66.0
Shibenik	18.8	WWTP	30.0
Pula	17.5	WWTP	30.0
Rijeka Refinery	16.9	sanitary landfill	8.0
Adria industries	15.9	WWTP rehabilit.	2.0
Rijeka	15.2	WWTP extension	25.0
Cokery industries	15.2	WWTP	1.5
Tannery industries	12.1	WWTP rehabilit.	1.5
Kuka river	10.4	Management plan	1.5
Sensitive Areas			
Malonstonski Limski Kornati Mljet Krka estuary		Management Plans and Monitoring programme	4.5
Country Total			170.0

CYPRUS			
Limassol old port industrial area	12.6	WWTP	3.1 Million
Limassol domestic sewerage treatment plant sea outfall	8.9	Extension of sea outfall	2.0 Million
Vassiliko cement factory	11.9	Installation of filters	0.5 Million
Larnaca Petroleum refinery	8.1	Separation of contaminated materials and incineration facility	1.0 Million
Country total			6.6

EGYPT			
El-Manzala	26.1		
Abu-Qir Bay	24.9		
El-Mex Bay	19.1		
Alexandria	17.8		
Rashied	16.3		
Damietta	16.0		
Country total			

FRANCE			
Marseille		Secondary WWTP	110.0
Toulon		Secondary WWTP	40.0
Cannes		Secondary WWTP	32.0
Freijus		Secondary WWTP	18.0
Country total			200

GREECE			
Thermaikos Gulf	19.5	WWTP extension and feasibility study	40.6
Inner sanonic Gulf	18.8	WWTP	130.0
Patraikos Gulf	17.9	WWTP and sea outfall	15.0
Pangasilikos Gulf	13.7	WWTP extension	8.0
Gulf of Herakleon	12.9	Industrial feasibility studies	0.3
Elefsis bay	12.6		0.6
NorthWestewrn Saronic bay	11.2		0.3
Larymna bay	11.2		0.3
			0.3
			1.0
			11.0
Country total			207.4

LEBANON			
Greater Beyrut	24.9	WWTP	140.0
Jounieh	19.9	WWTP	62.6
Saida-Ghaziye	19.3	WWTP	44.0
Tripili	18.9	WWTP	126.0
Batroun Selaata	16.8	WWTP	6.0
Sensitive Areas			
Sour	13.2	WWTP	19.0
Byblos	12.0	WWTP	7.5
Country total			405.1

LYBIA			
Zanzur	21.0	Industrial effluent TP maintenance	0.1
Tripoli	19.0	WWTP maintenance	12.0
Bengazi	17.0	WWTP extension	1.0
Zawia	15.0	WWTP maintenance	2.0
Tobruk	15.0	WWTP maintenance	1.5
Country Total			16.6

MALTA			
Weid Ghammieg	21.9	WWTP	36.0
Cumnija	18.1	WWTP	8.0
Ras il-Hobz	17.9	WWTP	4.0
Country total			48.0

ITALY			
Venive (Porto Marghera)	21.9	Harbour/Industrial Sector	
Genova	16.7	- Installation of Vessel Traffic Service and Harbour Approach Control 6.0 Million - Revised plan for product separation harbour facility (chemical, non-chemical, oil) (160 Mill. for each big harbour) 800 Million - Protected connection system for vessel operation (0.5 Mill. each) 2.5 Million - Slop collection facility (5.0 Mill. for each harbour) 25 Million - Change of oil pipeline (50.0 Mill. for each big harbour) 250.0 Million - Change of coastal anti-fouling system (0.1 Mill. per plant/year) 2.5 Million - Industrial organic coastal landfill 16.0 Million - Ship emissions treatment plants 5.0 Million - Agrofarming study 0.32 Million - Canning industry study 0.5 Million	
Augusta-Mellini	16.6		
Brindisi	16.5		
Milazzo	16.0		
La Spezia	16.0		
Gulf of Napoli	15.9		
Taranto	15.8		
Ravenna	15.8		
Rosignano Solvay	15.6		
Bari-Barletta	15.5	Municipal Sector	
Livorno	15.2	- Coastal cities sewer system (7.0 for each city) 70.0 Million - WWTP 10.0 Million - WWT programme for Emilia-Romania coastline including monitoring 100.0 Million	
Manfredonia	13.3		
Ancona-Falc.	13.1		
Country Total			1,288

ISRAEL			
Haifa bay	24.9	WWTP	80.0
Akko	21.4	WWTP upgrade	10.0
Nahariya	21.4	WWTP	18.0
Gush Dan	18.8	Feasibility study	1.0
Ashdod	15.8	WWTP	20.0
Country total			129.0

MOROCCO			
Tanger	21.0	Domestic WWTP Industrial TP	28.0 NA
Tetouan	19.0	Domestic WWTP Industrial TP	20.0 NA
Nador	15.0	Domestic WWTP Industrial TP	NA NA
Al Hoceima	13.0	Domestic WWTP Industrial TP	6.0 NA
Country total			54.0 (Domestic WWTP only)

SLOVENIA			
Rizana river (& Koper town)	18.2	Industrial & Domestic WWTP	16.0
Izola	15.3	Industrial & Domestic WWTP	12.0
Demalaris	14.2	Industrial WWTP	2.5
Piran	10.7	Domestic wastewater outfall	8.5
Badaserika river	10.4	To be served by Rizana river facility	
Dragonja river	8.9	river basin management plans	1.5
Drnica river	8.9		1.2
Coastal area		industrial wastewater management plan	0.3
Country total			42.0

SYRIA			
Tartous	23.6	WWTP	41.0
Lattakia	22.5	WWTP	73.0
Banias	20/5	WWTP	35.6
Jableh	18.8	WWTP	41.7
Coastal area		Capacity building action	1.0
Sensitive Areas			
Umit Tiur	Protection and management area programme		5.0
Arwad island			
Wadi Quandeel			
Lattakis beach			
Ras El-Fassouri			
Country total			197.3

TUNISIA			
Gaber	22.2	Industrial effluent TP	102.0
Lake Tunis	21.2	Industrial effluent TP	50.0
Lake Bizarte	18.5	Industrial effluent TP	38.0
Sfax - South	18.1	Industrial effluent TP	NA
Ghar El-Melh	17.7	Domestic & industrial WWTP	4.0
Gaber	17.7	Domestic WWTP	30.0
Lake Bizarte	17.7	Domestic WWTP	39.0
Lake Tunis	14.0	Domestic WWTP	5.0
Sfax - South	13.8	Domestic WWTP	30.0
Country total			298.0

TURKEY			
Izmir	25.8	Industrial & domestic TP	78.5
Icel	24.5	Industrial & domestic TP	97.0
Antalya	23.8	WWTP	136.0
Hatay	23.6	Industrial effluent TP	NA
Adana	23.1	Domestic WWTP	100.0
Tarsus	21.3	Domestic WWTP	76.5
Adana	21.1	Industrial effluent TP	NA
Antakya	20.7	Domestic WWTP	80.0
Iskenderun	19.7	Domestic WWTP	13.5
Kirikhan	17.3	Domestic WWTP	36.0
Dortyol	17.1	Domestic WWTP	42.0
Erdemli	17.1	Domestic WWTP	52.0
Silifke	16.4	Domestic WWTP	40.0
Osmaniye	15.6	Domestic WWTP	23.0
Country total			774.5

Summary Table: Estimated Investment Costs (Million USD) (Based on information provided by the Country Reports)	
Albania	133.5
Croatia	170
Cyprus	6.6
Egypt	NA
France	200.0
Greece	207.4
Italy	1,288.0
Israel	129.0
Lebanon	405.1
Lybia	16.6
Malta	48.0
Marocco	54.0
Slovenia	42.0
Syria	197.3
Tunisia	298.0
Turkey	774.5
Total	3,970.0

ANNEX 2

Catalogue of Hot Spots by country showing the degree of pollution effects and the resource affected

Country	Severe Effects	Extreme Effects	Major Effects
ALBANIA 8 Hot Spots			REC 6 (Durrës, Vlorë, Drini, Mati, Semani & Shkumbini Rivers) PH 4 (Durrës, Vlorë, Durrës & Vlorë ex-factories)
ALGERIA			
CROATIA 14 Hot Spots	EW 8 (Pula, Rijeka, Rijeka Ref., Zadar, Shibenik, Split, Kastella bay, Dubrivnic) PH 4 (Cokery, Tannery, Split, Kastella bay)	PH 2 (Zadar, Sibenik) REC 1 (Cokery) OBU 1 (Adria)	REC 7 (Pula, Rijeka, Rijeka Ref, Zadar, Sibenik, Dubrovnic, Krka river) PH 2 (Pula, Rijeka) AL 3 (Pula, Cokery, Zadar)
CYPRUS			
MOROCCO 4 Hot Spots	EW 2 (Tanger, Tetouan)	PH 2 (Tanger, Tetouan)	OBU 2 (Tetouan, Nador)
EGYPT 6 Hot Spots	PH 4 (Damietta, El-Manzala, El-Mex, AbuQir) QDW 2 (Rashied, Damietta) AL 2 (ElManzala, AbuQir) OBU 2 (ElManzala, AbuQir) EW 1 (AbuQir)	REC 2 (ElManzala, ElMex) PH 1 (Rashied) OBU 1 (ElMex) EW 1 (ElManzala)	QDW 1 (ElManzala) AL 1 (Rashied)

Country	Severe Effects	Extreme Effects	Major Effects
ITALY 15 Hot Spots	AL 11 (P.Marghere, Genova, Augusta, Brindisi, La Spezia, Milazzo, Tarando, Ravenna, Gela, Rosignano, Livorno) Public Health 2 (P.MARGHERE, Bari-Barletta)	PH 3 (Augusta, Tarando, Brindisi) OBU 2. (P.MARGHERE, Genova) EW 2 (P.MARGHERE, GNapoli)	REC 4 (P.MARGHERE, GNapoli, Gela, Ancona) EW 3 (Genova, La Spezia, Ravenna) OBU 3 (La Spezia, Brindisi, Ravenna) PH 2 (Rosignano, Manfredonia) AL 1 (Ancona)
LYBIA 5 Hot Spots	REC 2 (Tripoli, Zanzur)	REC 3 (Zawia, Bengazi, Tobruk)	AL 2 (Tripoli, Zanzur) PH 1 (Zanzur)
GREECE 9 Hot Spots	PH 2 (Thermaikos, Inner Saronic) Economy & Welfare 2 (Thermaikos, Elefsis)	EW 2 (Inner Saronic, Northwestern Saronic)	EW 5 (Patraikos, Pangasitikos, Heraklion, Larymna, Nea Karvali)
ISRAEL 6 Hot Spots	EW 3 (Haifa, Gush Dan, Ashdod) Recreation 3 (Haifa, Akko, Nahariya) Other Beneficial Uses 3 (Haifa, Akko, Nahariya) Aquatic Life 2 (Haifa, Gush Dan) Public Health 1 (Haifa)	EW 2 (Akko, Nahariya) AL 2 (Akko, Nahariya) OBU 1 (Gush Dan)	PH 2 (Akko, Nahariya) REC 2 (Ashdod, Haifa) AL 1 (Haifa)

Country	Severe Effects	Extreme Effects	Major Effects
LEBANON 5 Hot Spots	<u>OBU 2</u> (GrBeirut, Tripoli) <u>PH 1</u> (GrBeirut)	<u>REC 3</u> (GrBeirut, Jounieh, Tripoli) <u>EW 3</u> (Jounieh, SaidaGhaziye, Batroun Selaata) <u>PH 2</u> (Batroun Selaata, Tripoli) <u>AL 2</u> (Jounieh, SaidaGhaziye)	<u>PH 3</u> (Jounieh, Batroun Selaata, Sour) <u>AL 3</u> (GrBeirut, Tripoli, Batroun Selaata) <u>REC 3</u> (SaidaGhaziye, Sour, Byblos) <u>OBU 2</u> (SaidaGhaziye, Batroun Selaata)
MALTA 3 Hot Spots	<u>PH 2</u> (Wied Ghammieh, Cumnija) <u>EW 1</u> (Wied Ghammieh) <u>AL 1</u> (Wied Ghammieh)	<u>EW 2</u> (Cumnija, Ras ilHobz) <u>PH 1</u> (Ras ilHobz) <u>AL 1</u> (Ras ilHobz)	<u>AL 1</u> (Cumnija) <u>REC 1</u> (Wied Ghammieh) <u>OBU 1</u> (Wied Ghammieh)
SLOVENIA 7 Hot Spots		<u>REC 3</u> (Rizana river, Izola, Delamaris) <u>EW 1</u> (Rizana river) <u>AL 1</u> (Rizana river)	<u>EW 1</u> (Izola) <u>REC 1</u> (Piran) <u>AL 1</u> (Delamaris) <u>OBU 1</u> (Rizana river)

Country	Severe Effects	Extreme Effects	Major Effects
SYRIA 4 Hot Spots	PH 1 (Latakia) <u>EW 1</u> (Banias)	REC 2 (Tartous, Latakia) EW 2 (Tartous, Jableh) OBU 2 (Tartous, Latakia) AL 1 (Tartous) PH 1 (Tartous)	QDW 4 (Tartous, Latakia, Banias, Jableh) AL 2 (Latakia, Banias) OBU 2 (Banias, Jableh) PH 1 (Jableh)
TUNISIA 5 Hot Spots	<u>AL 3</u> (Gabes, SfaxSouth, Ghar ElMelh) <u>PH 2</u> (Gabes, SfaxSouth)	EW 4 (Gabes, L Tunis, LBizerte, SfaxSouth) REC 2 (Gabes, L Tunis) PH 2 (L Tunis, LBizerte)	PH 4 (Gabes, L Tunis, SfaxSouth, Ghar ElMelh) REC 3 (L Tunis, LBizerte, Ghar ElMelh) AL 2 (LBizerte, Ghar ElMelh)

Country	Severe Effects	Extreme Effects	Major Effects
TURKEY 13 Hot Spots	<u>PH 4</u> (Izmir, Icel, Hatay, Adana) <u>AL 4</u> (Izmir, Icel, Antalya, Hatay) <u>EW 3</u> (Izmir, Antalya, Hatay)	PH 4 (Icel, Antalya, Tarsus, Antakya, Iskenderun) QDW 3 (Antakya, Adana, Kirikhan) EW 3 (Icel, Adana, Tarsus) AL 3 (Tarsus, Antakya, Iskenderun)	EW 6 (Antakya, Iskenderun, Kirikhan, Dortyol, Erdemli, Osmaniye) QDW 8 (Icel, Adana, Tarsus, Antakya, Dortyol, Erdemli, Silifke, Osmaniye) OBU 4 (Icel, Hatay, Adana, Tarsus) REC 3 (Antakya, Adana, Antakya) AL 5 (Adana, Kirikhan, Dortyol, Erdemli, Silifke) PH 1 (Adana)

Type of resource on which pollution effect / impact in the identified Hot Spots is shown to be severe (ranked in terms of the frequency of Severe Effects)				
Public Health	Aquatic Life	Economy & Welfare	Other beneficial Uses	Recreation
23	23	21	7	5
				2

Public Health

Croatia: Cokery, Tannery, Split, Kastella bay, Egypt: Damietta, El-Manzala, El-Max, Abu-Qir
Italy: Porto Marghera (VE), Bari Greece: Thermoikos, Inner Saronic Israel: Haifa Lebanon: Greater Beirut Malta: Weid Ghammieh, Cumnija
Syria: Latakia Tunisia: Gabes, Sfax-South Turkey: Izmir, Icel, Hatay, Adana

Aquatic Life

Egypt: El-Mazala, Abu Qir Italy: Port Marghere (VE), Genova, Augusta, Brindisi, La Spezia, Milazzo, Tanando, Ravenna, Gela, Rosigniano,
Livorno Israel: Haifa, Gush Dan Malta: Wied Ghammieh Tunisia: Gabes, Sfax-South Ghar El-Melh Turkey: Izmir, Icel, Antalya, Hatay

Economy & Welfare

Croatia: Pula, Rijeka, Rijeka Ref., Zadar, Shibenik, Split, Kastella bay, Dubrovnic Egypt: Abu Qir Greece: Thermoikos, Elefsis Israel: Haifa,
Gush Dan, Ashdod Malta: Weid Ghammieh Morocco: Tanger, Tetouan Syria: Baniyas Turkey: Izmir, Antalya, Hatay

Other Beneficial Uses

Egypt: El-Mazala, AbuQir Israel: Haifa, Akko, Hahariya Lebanon: Greater Beirut, Tripoli

Recreation

Israel: Haifa, Akko, Hahariya Lybia: Tripoli, Zanzur

Quality of Drinking Water

Egypt: Rashied, Damietta