



UNITED NATIONS ENVIRONMENT PROGRAMME  
MEDITERRANEAN ACTION PLAN



# PROMOTING CLEANER PRODUCTION in the Industrial Sector



Regional Activity Centre  
for Cleaner Production

TOWARDS SUSTAINABLE DEVELOPMENT IN THE MEDITERRANEAN





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## THE MEDITERRANEAN ACTION PLAN (MAP)

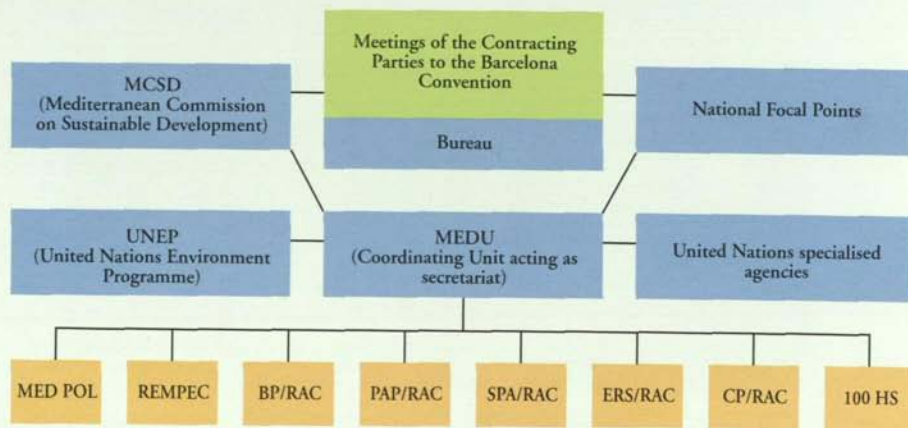
The Mediterranean Action Plan forms part of the United Nations Environment Programme and brings together 20 coastal countries bordering the Mediterranean Sea in a spirit of cooperation and activities: Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Morocco, Slovenia, Spain, Syria, Tunisia and Turkey, as well as the European Union. Its objective is the protection and improvement of the environment based on principles of sustainable development.

These 20 Mediterranean countries and the European Union are Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention), the legal framework of MAP. The Convention acts through its Protocols, the Mediterranean Commission on Sustainable Development, Regional Activity Centres and programmes such as MED POL. The Protocols are legally binding instruments that each deal with a specific issue with regard to environmental protection. They enter into force when they have been ratified by six Contracting Parties (15 Parties in cases of amendment).

As for pollution from industrial sources, the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources and Activities and the Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal are the most relevant Protocols.

The Mediterranean Commission on Sustainable Development (MCSD) was created in 1996 as an advisory body for the purpose of presenting proposals to the Contracting Parties and the MAP Secretariat in order to promote development. MCSD has 36 members: 21 representatives of each Contracting Party to the Barcelona Convention and 15 representatives of local authorities, business groups and NGOs working in benefit of the environment and sustainable development.

The Regional Activity Centres (together with MED POL and the Programme for the Protection of Coastal Historic Sites) are the operational units of MAP. Each works in a specific subject area with the work of the Cleaner Production Regional Activity Centre (CP/RAC) being promotion of the prevention and reduction of industrial pollution at the source.



<sup>1</sup> MED POL: Programme for the Assessment and Control of Pollution in the Mediterranean Region.

REMPEC: Regional Marine Pollution Emergency Response Centre for the Mediterranean.

BP/RAC: Blue Plan Regional Activity Centre.

PAP/RAC: Priority Actions Programme Regional Activity Centre.

SPA/RAC: Specially Protected Areas Regional Activity Centre.

ERS/RAC: Environment Remote Sensing Regional Activity Centre.

CP/RAC: Cleaner Production Regional Activity Centre.

100 HS: Programme for the Protection of Coastal Historic Sites.

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## ■ PREFACE

Dear reader,

This publication focuses on the Mediterranean Action Plan's concerns and achievements in the field of industrial activities and their impact on the environment and sustainable development in the region, as well as the need, and the benefits, of cleaner production.

Special attention has been devoted here to the double challenge facing the industrial sector: how to further grow in a scenario characterised by increasing competitiveness, while applying sustainable and environmentally sound methodology of business management, based on cleaner production, that has proved to be more efficient and beneficial both for the environment and for the process of production and use of resources.

The publication is part of a series of seven, having the common denominator of informing you about the Mediterranean region leading commitment towards sustainable development. Others focus on saving biodiversity as part of our life heritage; protecting the region from maritime accidents and illegal discharges from ships; working for a sound coastal management; the MAP legal framework, and the up-dated review of the MAP and its achievements towards sustainable development.

Two further publications complete the series. These deal with reducing land-based pollution, which represents over 80 per cent of all sources of pollution in the Mediterranean Sea, and the MAP operational strategy for this purpose.

You may take this as a chance to become even more involved in our activities and commitments to sustainable development for the sake of our present and that of future generations.

Lucien CHABASON,  
Coordinator  
Mediterranean Action Plan

Víctor MACIÀ,  
Director  
Regional Activity Centre for Cleaner Production

# 1. ENVIRONMENTAL PRESSURE OF INDUSTRIAL ACTIVITIES IN THE MEDITERRANEAN

The heterogeneity of the countries that form the Mediterranean region makes this area one of the most diverse socio-cultural mosaics on the planet. A diversity reflected by different levels of economic growth, technology and industrialisation that each of the countries has reached and the degree of intensity of the impact of economic activities on the environment.

The growth of economic activity in the regions surrounding enclosed and semi-enclosed seas produce a heavy environmental impact that should be minimised, even to guarantee that activity, because degradation of the ecosystem is associated with depletion of resources.

In the case of industrial activity, which represents 33 per cent of the economic activity in the region and is the second most important economic sector after tourism, progress inevitably must provide for a combination of environmental aspects with the social and economic aspects leading to overall improvement.

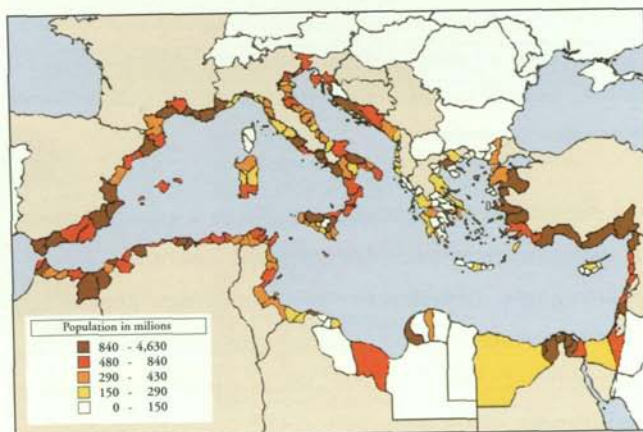
Industrial growth occurred first in the northern part of the Mediterranean with the development of basic and manufacturing industries then later in the countries in the southern part, although France, Italy and Spain still represent 97 per cent of the value added by the manufacturing industry.

Similar to what occurs with the distribution of population or the growth of tourism, industrial activity is concentrated in coastal areas, superposed to human settlements,

which affect processes of degradation suffered by ecosystems, degradation of the coastal front or direct degradation of the marine environment. Given that the configuration of the physical setting is unchangeable, the main activity that can be carried out in order to stop degradation of the natural environment and promote sustainable economic development in the region is minimisation of the environmental impact of economic activities in an integrated and multi-disciplinary way.

A study prepared by the Blue Plan Regional Activity Centre<sup>2</sup> on the region estimates that the stable population will pass from 380 million inhabitants in 1990 to be-

POPULATION DENSITY IN MEDITERRANEAN COASTAL AREAS



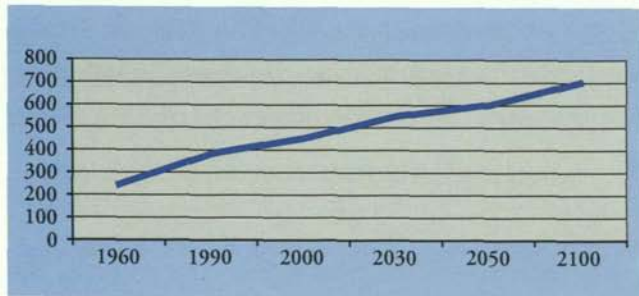
Source: Blue Plan database.

<sup>2</sup> La démographie en Méditerranée. Situations et projections. Plan Bleu, 2001.

tween 520 and 570 million in 2025, 40 per cent of which will be concentrated on the coast<sup>3</sup>. A fact that together with a gradual increase in tourism will cause a resulting increase of infrastructure, pollution, exploitation of natural resources and alteration of the physical environment. Given these projections, a series of activities to guarantee the sustainability of the region are needed.

Owing to the characteristics of the area, measures to reduce the environmental impact of industrial activity are equally diverse. While many sectors continue to rely on downstream solutions, such as treatment of wastewater or

POPULATION GROWTH IN THE MEDITERRANEAN REGION



Source: Blue Plan database.

the filtering of atmospheric emissions, a growing group of industries in several Mediterranean countries is incorporating into its productive philosophy new approaches aimed at preventing and reducing pollution at the source, thus optimising the use of resources and increasing competitiveness.

Despite the need for data and precise measurements for all the countries in the region, the Programme for the

Assessment and Control of Pollution in the Mediterranean Region (MED POL) has identified "hot spots" in which are concentrated most of the industrial pollution and some business sectors that contribute the largest percentage of pollution (chemical, petrochemical, metallurgical, waste treatment, regeneration of solvents, treatment of surfaces, manufacture of paper, paint and plastics, textile dyes and the tanning sector). To this should be added the impact of agro-industry, an activity that is expected to be multiplied by five in the countries in the southern and eastern part of the basin.

Of all the substances that industry emits, the persistent organic pollutants (POPs) are the most harmful for health, marine ecosystems and biodiversity, because they are toxic, persistent and bioaccumulative. Although there are many POPs that affect the environment, there are twelve that require special attention. These include dioxins and furans, generated by several industrial processes, PCBs and hexachlorobenzene, which have several industrial uses, and pesticides.

Some industrial activities consume large amounts of water, especially the agro-industrial sector, the iron and steel industry and the paper sector. Industrial consumption of water in the Mediterranean countries totals about 14,000 cubic metres per year. Although three quarters of this water is consumed by industries in the northern part of the Mediterranean, the effect is worse in areas with less available water<sup>4</sup>.

<sup>3</sup> Protecting the Mediterranean from land-based pollution. UNEP/MAP, 2001.

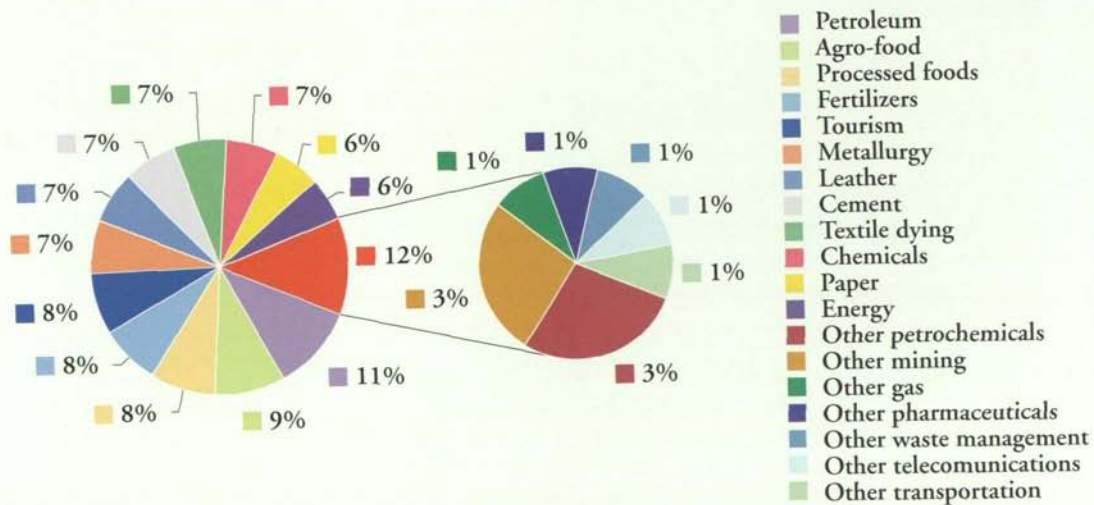
<sup>4</sup> Protecting the Mediterranean from land-based pollution. UNEP/MAP, 2001.



The report on pollution from land-based sources in the Mediterranean carried out in 1996 by the World Health Organisation under the MED POL programme showed that pollutants of the 66 million cubic metres of untreated industrial wastewater that are dumped directly into the sea, largely through rivers, produced 36 per cent of the Biological Oxygen Demand, 30 per cent of the Chemical Oxygen Demand, 3 per cent of the nutrients,



INDUSTRIAL SECTORS IN THE MAP COUNTRIES



Source: Status of Cleaner Production in the MAP Countries. CP/RAC, June 2001.

92 per cent of the phenols, 7 per cent of the mercury, 37 per cent of the lead, 40 per cent of the chrome, 24 per cent of the zinc and 100 per cent of the mineral oils of the total pollutants emptied into the Mediterranean each year<sup>5</sup>.

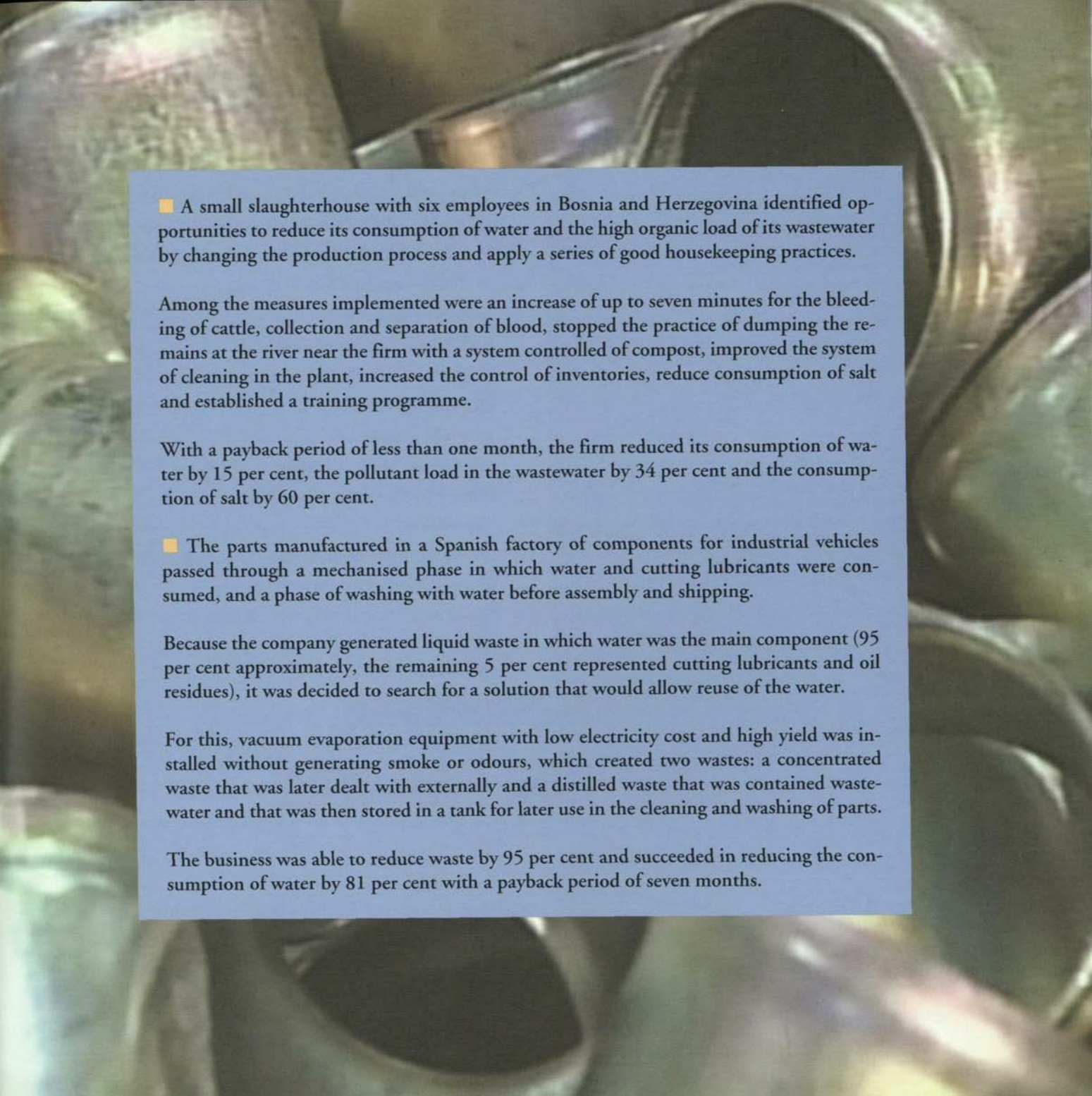
Nonetheless, given such heterogeneity, it is possible to establish a series of joint strategies that allow all countries and societies to deal jointly, coordinately and effectively with the challenges of the future raised by the sustainable development of the region.

<sup>5</sup> Protecting the Mediterranean from land-based pollution. UNEP/MAP, 2001.

#### ECONOMIC SECTORS IN THE MEDITERRANEAN

Country	Agriculture (% GDP)				Industry (% GDP)				Services (% GDP)			
	1979	1989	1998	1999	1979	1989	1998	1999	1979	1989	1998	1999
Albania		32.3	54.4	52.6		44.8	24.5	26		22.9	21	21.4
Algeria	10.9	14.9	12.1	11.4	50.5	41.6	47.3	50.7	38.9	43.5	40.6	37.9
Bosnia and Herzegovina			15.8	15.8			27.8	27.8			56.4	56.4
Cyprus	10.2	6.9			33.2	26.6			56.5	66.5		
Croatia			8.9	8.6			32.4	32			58.7	59.4
Egypt	20.9	19.7	17.5	17.4	35.8	32.8	31.5		43.3	52.3	50.2	51
Spain		4.8				35.3				59.8		
France	4.8	3.5			34.7	29.3			60.6	67.2		
Greece	12.7	12.8			25.7	21.9			61.6	65.3		
Israel												
Italy	6.3	3.5			39.8	34			54	62.5		
Lebanon			12.8	13			27.4	25			59.7	62
Libya	1.8				72.9				25.3			
Malta	3.9	3.7			42.6	40.2			53.5	56		
Monaco												
Morocco	17.9	17.2	17	14.8	32.7	32	31.9	32.7	49.4	49.6	51.1	52.6
Slovenia			4				38.6				57.4	
Syria		23.7	32.4	30.4		23.7	16.9	17.3		52.6	50.7	52.3
Tunisia	13.5	12.9	12.4	12.9	28.9	31.1	28.4	28.2	57.6	55.9	59.1	59
Turkey	27.9	17.4	18.5	15.8	23.8	32.8	25	24.3	48.3	49.8	56.5	60
Average	11.8	13.33	18.73	19.27	38.23	32.77	30.15	29.33	49.90	54.4	51.03	51.2

Source: World Development Indicators. World Bank, April 2001.



■ A small slaughterhouse with six employees in Bosnia and Herzegovina identified opportunities to reduce its consumption of water and the high organic load of its wastewater by changing the production process and apply a series of good housekeeping practices.

Among the measures implemented were an increase of up to seven minutes for the bleeding of cattle, collection and separation of blood, stopped the practice of dumping the remains at the river near the firm with a system controlled of compost, improved the system of cleaning in the plant, increased the control of inventories, reduce consumption of salt and established a training programme.

With a payback period of less than one month, the firm reduced its consumption of water by 15 per cent, the pollutant load in the wastewater by 34 per cent and the consumption of salt by 60 per cent.

■ The parts manufactured in a Spanish factory of components for industrial vehicles passed through a mechanised phase in which water and cutting lubricants were consumed, and a phase of washing with water before assembly and shipping.

Because the company generated liquid waste in which water was the main component (95 per cent approximately, the remaining 5 per cent represented cutting lubricants and oil residues), it was decided to search for a solution that would allow reuse of the water.

For this, vacuum evaporation equipment with low electricity cost and high yield was installed without generating smoke or odours, which created two wastes: a concentrated waste that was later dealt with externally and a distilled waste that was contained wastewater and that was then stored in a tank for later use in the cleaning and washing of parts.

The business was able to reduce waste by 95 per cent and succeeded in reducing the consumption of water by 81 per cent with a payback period of seven months.

## 2. TOWARDS CLEANER AND MORE EFFICIENT PRODUCTION

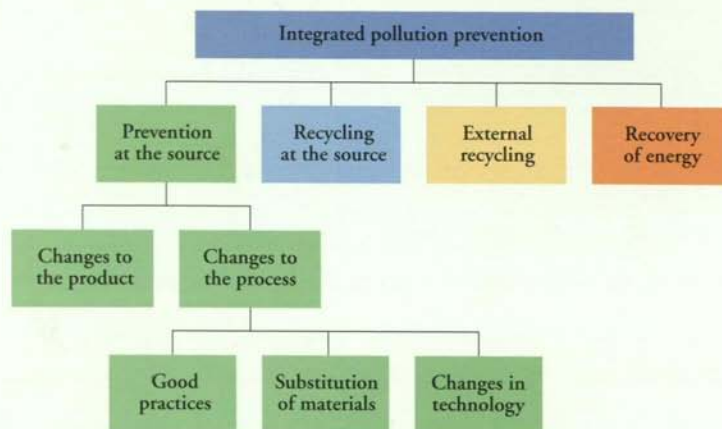
The development of industrial activity in the Mediterranean region presents opportunities and has limits for taking into account the environment in its processes. Limits because growth must fit within a scenario of increasing competition in which greater efficiency of processes and the use of resources is going to be required, and opportunity because implementation of environmentally sustainable industrial methods has become one of the most effective business development instruments.

Until only a few decades ago, industry remained on the margin of any environmental consideration in drafting negotiation strategies for which fulfilment of environmental obligations was the only incentive for reduction of pollutants generated by this activity. This

concept of respect for the environment through all legal obligation implies a series of expenses that provide value to a business only because they avoid possible sanctions.

In reply to these unsustainable systems of production, foreign to environmental prevention, cleaner production is a business and environmental strategy that proposes the adoption of new management systems that allow optimisation of processes, obtaining an increase in production, generating economic benefits through savings and improving the corporate image of companies. This strategy not only affects the processes but also covers products and services.

Far from being understood as a method for controlling pollution or a prescriptive regimen for meeting envi-



ronmental legislation, cleaner production offers unexpected opportunities for business efficiency with regard to the use of resources.

Cleaner production provides invigorated dynamism to a business, because pursuing environmental excellence and the continual improvement of an activity

Cleaner production proposes practical solutions that increase the efficiency of a business and reduce the risks to health and the environment associated with its operations. During implementation of a cleaner production project, the study of the technical and economic viability of the opportunities that can occur throughout the process to guarantee its profitability are key.

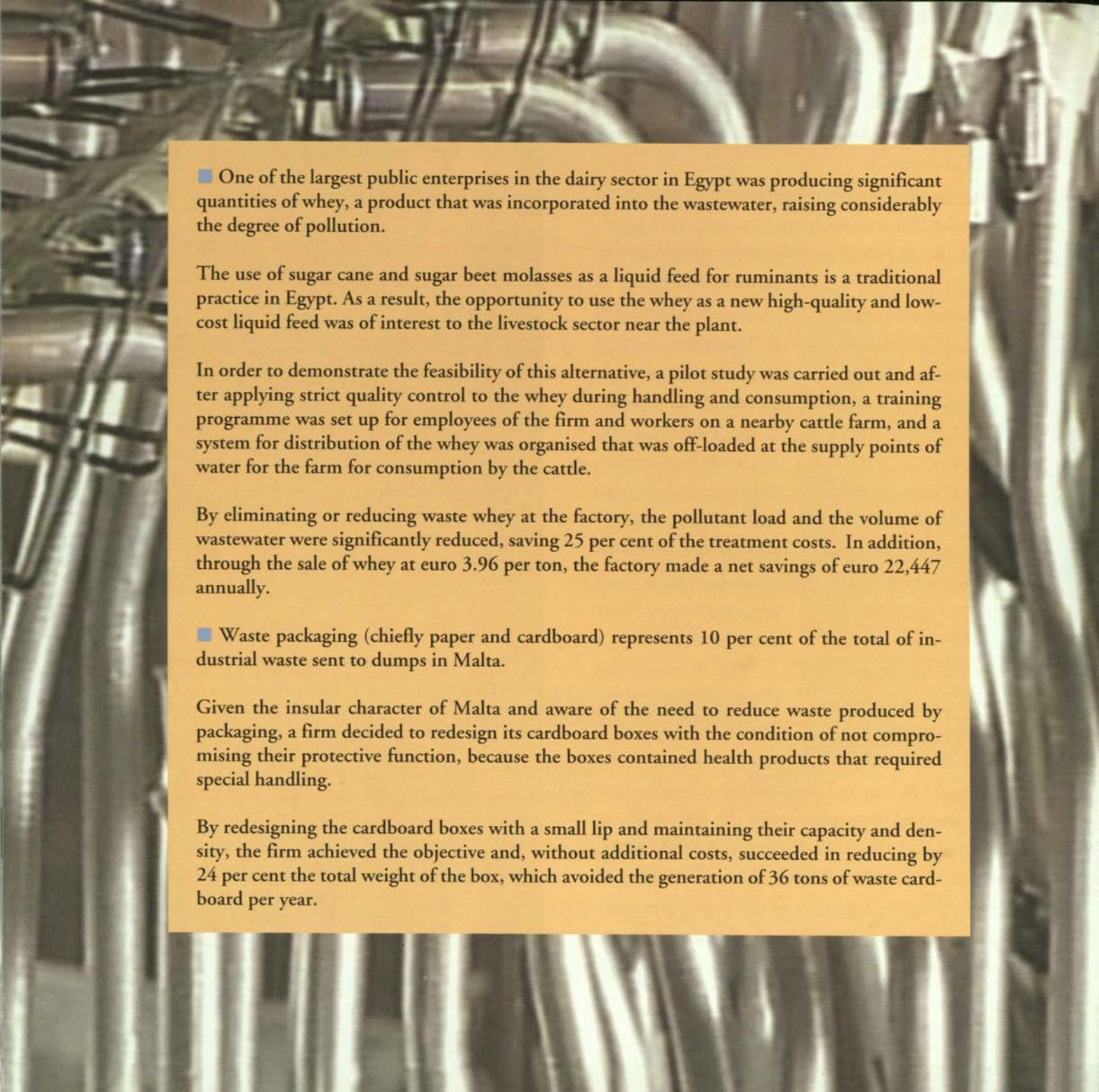
leads to adjustment to market requirements and becoming increasingly sensitive to environmental protection.

For example, internal recycling, implementation of new technologies, substitution of raw materials or application of good housekeeping practices contribute to this.

The Protocol for the Protection of the Mediterranean Sea against Pollution from

Land-based Sources and Activities revised in Syracuse in 1996 promoted the application of the Best Available Techniques, which should be dynamic and should evolve in function of the technologies and scientific advances that promote reduction of the impact produced by industrial activities, but without neglecting economic and social factors.





■ One of the largest public enterprises in the dairy sector in Egypt was producing significant quantities of whey, a product that was incorporated into the wastewater, raising considerably the degree of pollution.

The use of sugar cane and sugar beet molasses as a liquid feed for ruminants is a traditional practice in Egypt. As a result, the opportunity to use the whey as a new high-quality and low-cost liquid feed was of interest to the livestock sector near the plant.

In order to demonstrate the feasibility of this alternative, a pilot study was carried out and after applying strict quality control to the whey during handling and consumption, a training programme was set up for employees of the firm and workers on a nearby cattle farm, and a system for distribution of the whey was organised that was off-loaded at the supply points of water for the farm for consumption by the cattle.

By eliminating or reducing waste whey at the factory, the pollutant load and the volume of wastewater were significantly reduced, saving 25 per cent of the treatment costs. In addition, through the sale of whey at euro 3.96 per ton, the factory made a net savings of euro 22,447 annually.

■ Waste packaging (chiefly paper and cardboard) represents 10 per cent of the total of industrial waste sent to dumps in Malta.

Given the insular character of Malta and aware of the need to reduce waste produced by packaging, a firm decided to redesign its cardboard boxes with the condition of not compromising their protective function, because the boxes contained health products that required special handling.

By redesigning the cardboard boxes with a small lip and maintaining their capacity and density, the firm achieved the objective and, without additional costs, succeeded in reducing by 24 per cent the total weight of the box, which avoided the generation of 36 tons of waste cardboard per year.

### 3. CLEANER PRODUCTION AND THE MEDITERRANEAN ACTION PLAN

The Mediterranean Action Plan (MAP) considers cleaner production as one of the priority strategies to ensure that economic sectors incorporate environmental variables into management processes through the application of more ecologically sound techniques.

In this regard, the Protocol for the Protection of the Mediterranean Sea from Pollution from Land-based

The Mediterranean Action Plan considers cleaner production as one of the most effective strategies for improving the quality of the environment in industry and moving towards sustainable development in the region.

Sources and Activities emphasises the need to establish and apply plans to avoid, reduce, combat and eliminate pollution in the Mediterranean Sea region, giving priority to the gradual elimination of the

contribution of toxic, persistent and bioaccumulative substances. It also underlines the need to implement programmes that propose the Best Available Techniques and Best Environmental Practices in each sector of industry, having recourse to cleaner production techniques and exchanging experiences.

The Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal adds the need to

adopt all relevant measures for reducing and, whenever possible, eliminating the generation of this type of waste, and cooperate in the development and application of measures that make it possible, emphasising the ability to apply cleaner production in the production processes.

Several units of MAP promote among their activities prevention of pollution at the source, particularly MED POL programme and CP/RAC.

Nonetheless, taking into account the disparate lev-

#### THE PROTOCOL FOR THE PROTECTION OF THE MEDITERRANEAN SEA AGAINST POLLUTION FROM LAND-BASED SOURCES AND ACTIVITIES

The Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources and Activities, adopted in 1980 and revised in 1996 at the Conference of Plenipotentiaries at Syracuse, extends protection of the Mediterranean Sea beyond the area of water and provides a link between a source of pollution of greater importance for the control and improvement of the marine environmental variables: the human activities (residential and economic)

.../...

.../...

carried out on land, but whose effects can be identified in coastal areas and on the high sea.

The signing of the Protocol was one of the high-points in the history of the Mediterranean Action Plan, providing the required legal basis for carrying out activities with regard to land-based sources.

The original version of the Protocol entered into force on 17 June 1983, but the revised Protocol has still not entered into force.

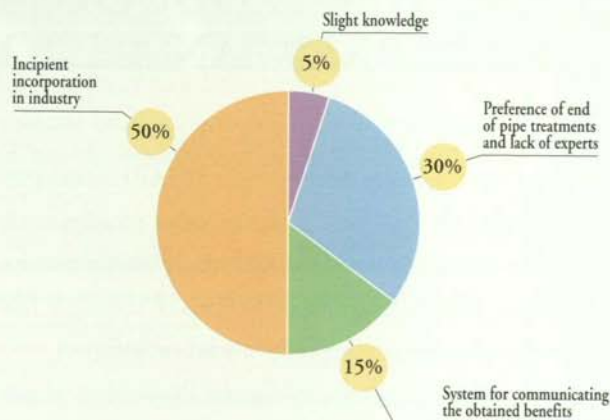
In its article 8, the Protocol stresses the importance of prevention when it declares that the Contracting Parties to the Barcelona Convention "shall take all appropriate measures to prevent, abate, combat and to the fullest possible extent eliminate pollution of the Mediterranean Sea Area and to draw up and implement plans for the reduction and phasing out of substances that are toxic, persistent and liable to bioaccumulate arising from land-based sources".

els of development in the region, the degree to which cleaner production is implemented varies considerably from one country to another.

While in some places there is limited application of the principles and advantages of the reduction of pollution at the source and continue giving priority to the use of downstream technologies, there is growing incorporation of the concepts of cleaner production in industry<sup>6</sup>.

In many cases, large industries have begun to implement cleaner production systems, while SMEs<sup>7</sup> and fam-

#### LEVEL OF IMPLEMENTATION OF CLEANER PRODUCTION



Source: Status of Cleaner Production in the MAP Countries. CP/RAC, June 2001.

ily-run and small-scale industries often do not have the knowledge and mechanisms to gain access to cleaner and more efficient techniques. Nonetheless, the SMEs play a strategic role in the transition towards sustainable industrial development. For them, daily activities, the limited availability of technical and economic resources, their activity in markets that do not always recognise good environmental management as a factor in competitiveness make cultural change towards prevention of pollution more difficult. As a result, the possibility of making specific efforts based on regulations, the development of incentives, the creation of mechanisms for agreement and training must be considered.

<sup>6</sup> The baseline study Status of Cleaner Production in the MAP Countries carried out by the Cleaner Production Regional Activity Centre will show the evolution of the policy and industrial activity toward sustainability in future updates.

<sup>7</sup> Small and medium-sized enterprises.

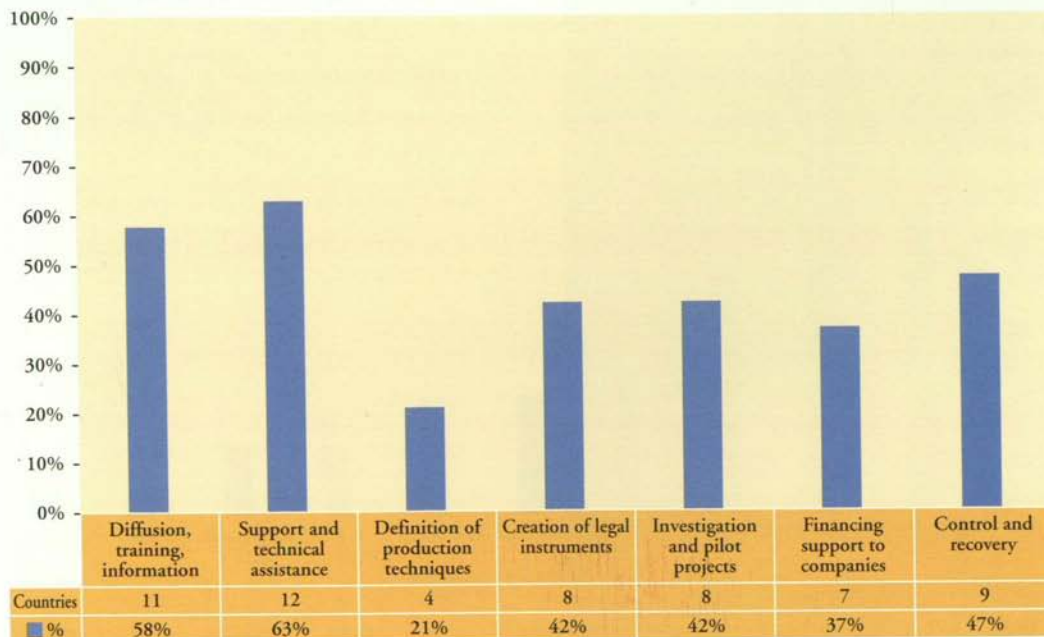


The study “Status of Cleaner Production in the MAP Countries”, published in June 2001, uses five approaches to study the degree of implementation of cleaner production in the MAP countries:

- Awareness, information and training;
- Creation of institutions and plans;
- Reinforcement of the legal framework;
- Cleaner production tools at the service of enterprises;
- Availability of economic instruments.

The experts that work with industry, whether from environmental administrations, cleaner production centres, business associations, chambers of commerce, consultants or others carry out an essential task by showing companies the advantages of cleaner production with regard to other more obsolete and expensive strategies and techniques. The strengthening of a pool of experts in cleaner production that are aware of the specific conditions of the Mediterranean region is one

FUNCTIONS OF CLEANER PRODUCTION AGENTS



Source: Status of Cleaner Production in the MAP Countries. CP/RAC, June 2001.

of the priority objectives of the Cleaner Production Regional Activity Centre (CP/RAC) in facilitating sustainable development in the region.

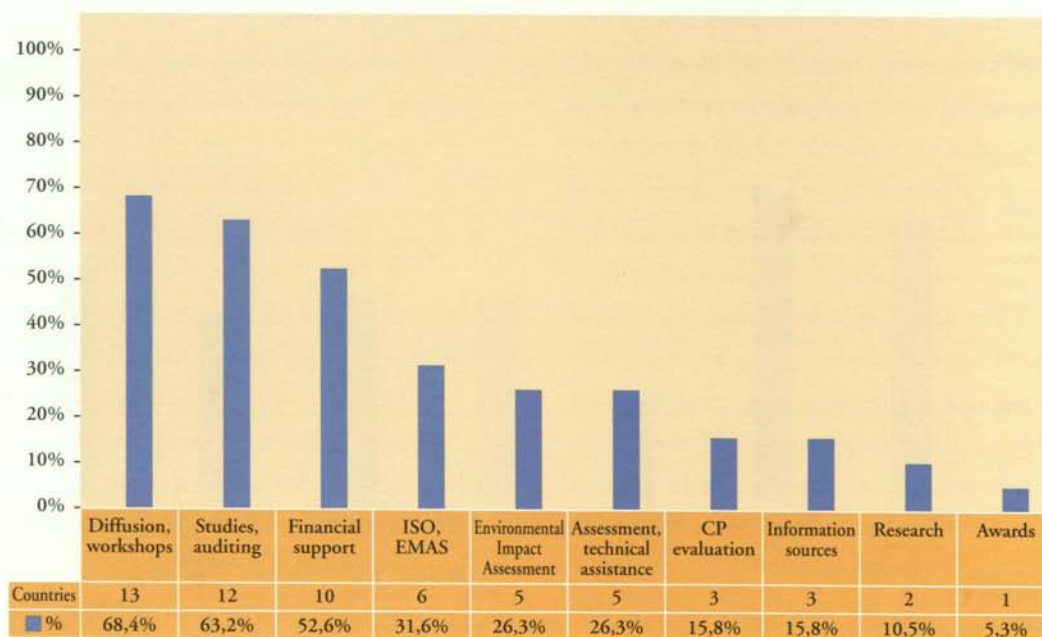
As for the creation of institutions and plans, approximately eight of the twenty MAP countries have specific cleaner production centres, although in all countries there are institutions that partially promote the application of cleaner production as another of their functions for environmental protection.

In cases where there is no specific institution, the

agents that promote cleaner production are various: ministries, business associations, chambers of commerce, NGOs and even private companies.

Although in half of the MAP countries cleaner production criteria have been taken into account for drafting specific laws and in fourteen countries there are procedures for granting licences and carrying out studies on environmental impact that permit introduction of cleaner production, the degree of implementation is not homogeneous, often for lack of economic resources.

#### TOOLS AND ACTIVITIES



Source: Status of Cleaner Production in the MAP Countries. CP/RAC, June 2001.

The tools to promote cleaner production are also used with various degrees of intensity.

In 63 per cent of the countries, diagnostics, audits or pilot projects are carried out.

As for the financing mechanisms, several countries have

Business management defines an environmental policy, orients and promotes efforts and activities to promote sustainable environment development. Without its full and active participation, any action aimed at introducing a new culture of prevention and reduction of pollution at the source will be unsuccessful.

economic instruments that permit the creation of incentives and the financing of projects aimed at introducing environmental improvements in industry, although, in most cases, they are limited budgetary allocations that depend on external financing.

There is also an increase of mechanisms for consensus building and voluntary agreement among associations and administrations.

There is also an increase of mechanisms for consensus building and voluntary agreement among associations and administrations.



## 4. THE CLEANER PRODUCTION REGIONAL ACTIVITY CENTRE (CP/RAC)

With its headquarters in Barcelona, the Cleaner Production Regional Activity Centre (CP/RAC) provides technical support to the Contracting Parties and institutions and through them to businesses that wish to promote less-polluting and more eco-efficient techniques and practices in their activity.

Among the operational aspects, each Contracting Party to the Barcelona Convention designates a representative, National Focal Point (NFP), who together form an active network for promoting the transfer of knowledge in the region.

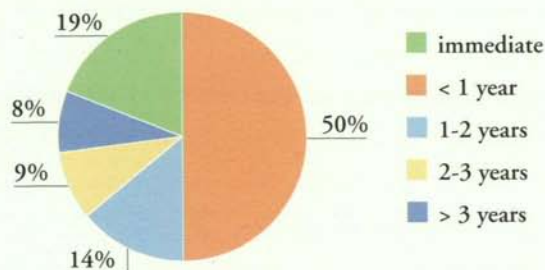
The activities of CP/RAC are aimed at spreading information about opportunities and promoting techniques that permit preventing pollution at the source produced by the industrial activity in the Mediterranean, with the understanding that environmental excellence is also the direction of economic profitability and include assistance, spreading, transfer and exchange of information regarding cleaner production techniques, training and participation in cooperation projects.

ACTIVITIES CARRIED OUT BY THE CP/RAC\*

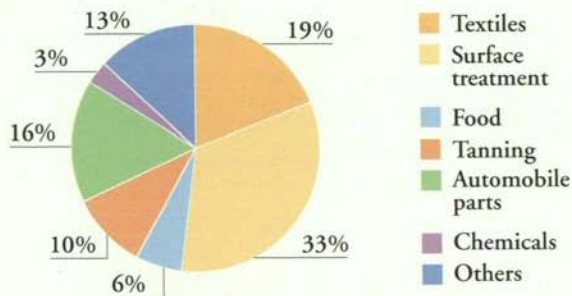
<b>Information</b>	Bulletin CP News	10
	MedClean case studies	32
	Brochures	10
	Videos	2
	Technical publication	2
<b>Studies</b>	General	2
	Technical and sectorial	8
	Methodological guides	3
	Database of Mediterranean experts	> 100 entries

\* As of 31 January 2002.

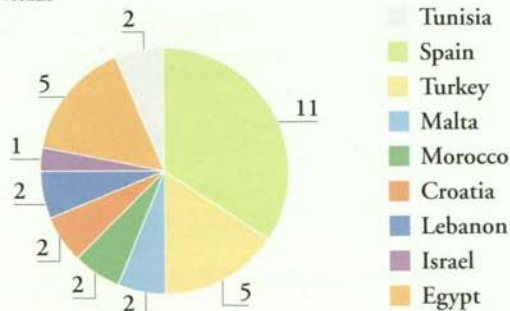
PAYBACK PERIOD OF IMPLEMENTED OPPORTUNITIES



INDUSTRIAL SECTORS



COUNTRIES



## STATUS OF CLEANER PRODUCTION IN THE MEDITERRANEAN ACTION PLAN COUNTRIES

In order to gather information on the initiatives that reward the prevention of pollution at the source and analyse the status of processes for minimising waste in industries in the Mediterranean region, the CP/RAC prepared the study "Status of Cleaner Production in the Mediterranean Action Plan Countries".

This work focuses on the agents that operate in the region, within the legal framework that cover them, in the plans and programmes, as well as in the tools and activities implemented.

Before publication, the study was reviewed during a meeting of experts organised for this purpose. This publication will be revised and brought up to date in future editions, in light of the changes and evolution inherent to the region and improvements that gradually will be incorporated into the study.

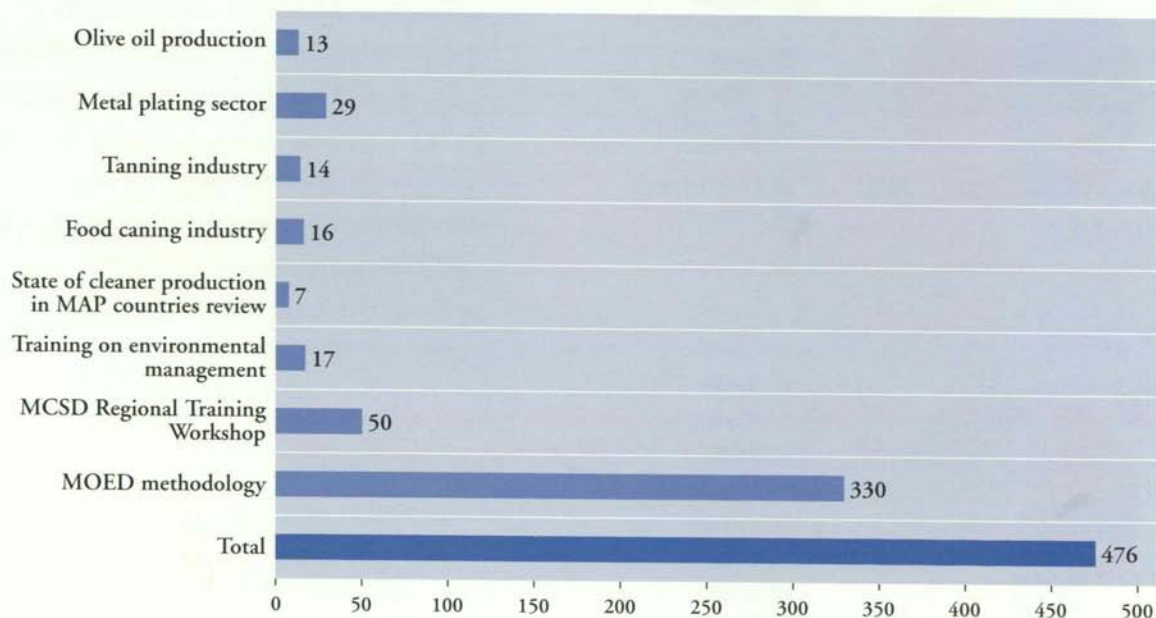
## ENVIRONMENTAL MANAGEMENT POLICIES AND METHODS FOR PROMOTING CLEANER PRODUCTION

Through two courses, experts and officials of the environmental administration from several Mediterranean countries (Albania, Algeria, Bosnia and Herzegovina, Croatia, Egypt, Israel, Lebanon, Libya, Malta, Syria, Tunisia and

Turkey) received training and assistance for drafting strategies and mechanisms of environmental management.

In addition, three working sessions were organised aimed at technical training in environmental management and eco-efficiency in Syria, Tunisia and Turkey. During each of these meetings about 50 professionals from the environmental sector participated.

PARTICIPANTS IN SEMINARS AND WORKSHOPS ORGANISED BY CP/RAC UP TO DECEMBER 2001



## ■ FROM CCPI TO CEMA

Created in 1994 by the Ministry of the Environment of the Government of Catalonia, the Centre for Cleaner Production Initiatives (CCPI) became a specific unit within the Management Programme for Toxic and Hazardous Wastes with the purpose of promoting the principles and advantages of reducing pollution at the source among businesses.

In 1995, the governments of Spain and Catalonia signed an agreement of cooperation in order to promote the use of cleaner technologies in Spanish industry through CCPI. The activities carried out as the result of that agreement are approved by a Bilateral Monitoring Commission, which approves and supervises activities.

In that same year, and at the IX Meeting of the Contracting Parties to the Barcelona Convention, the Government of Spain proposed to the Mediterranean Action Plan (MAP) that the CCPI become the Cleaner Production Regional Activity Centre (CP/RAC). This offer was accepted at the Extraordinary Meeting of the Contracting Parties held in Montpellier in 1996.

In 1998, in order to better carry out its role, CCPI was given its own legal status and was registered as a corporation with public capital. Two years later, in 2000, its name was changed to the current Centre per a l'Empresa i el Medi Ambient

(Centre for the Enterprises and the Environment - CEMA).

CEMA plays a triple role: in Catalonia and as part of the Ministry of the Environment of the Government of Catalonia, working directly with industries and business sectors; within Spain, as institution of technical support to the Ministry for the Environment; and at the level of MAP as CP/RAC.

The work programme of CP/RAC is set by the Bilateral Monitoring Commission, formed by representatives of the governments of Spain and Catalonia taking into account the recommendations of the meetings of the Contracting Parties of the Barcelona Convention.

The regular activities of the CP/RAC are financed by the Government of Spain. The participation of CP/RAC in other MAP activities and special activities are carried out using a mixed system of financing with a specific contribution in each case.



## MOED, THE KEY TO CLEANER PRODUCTION

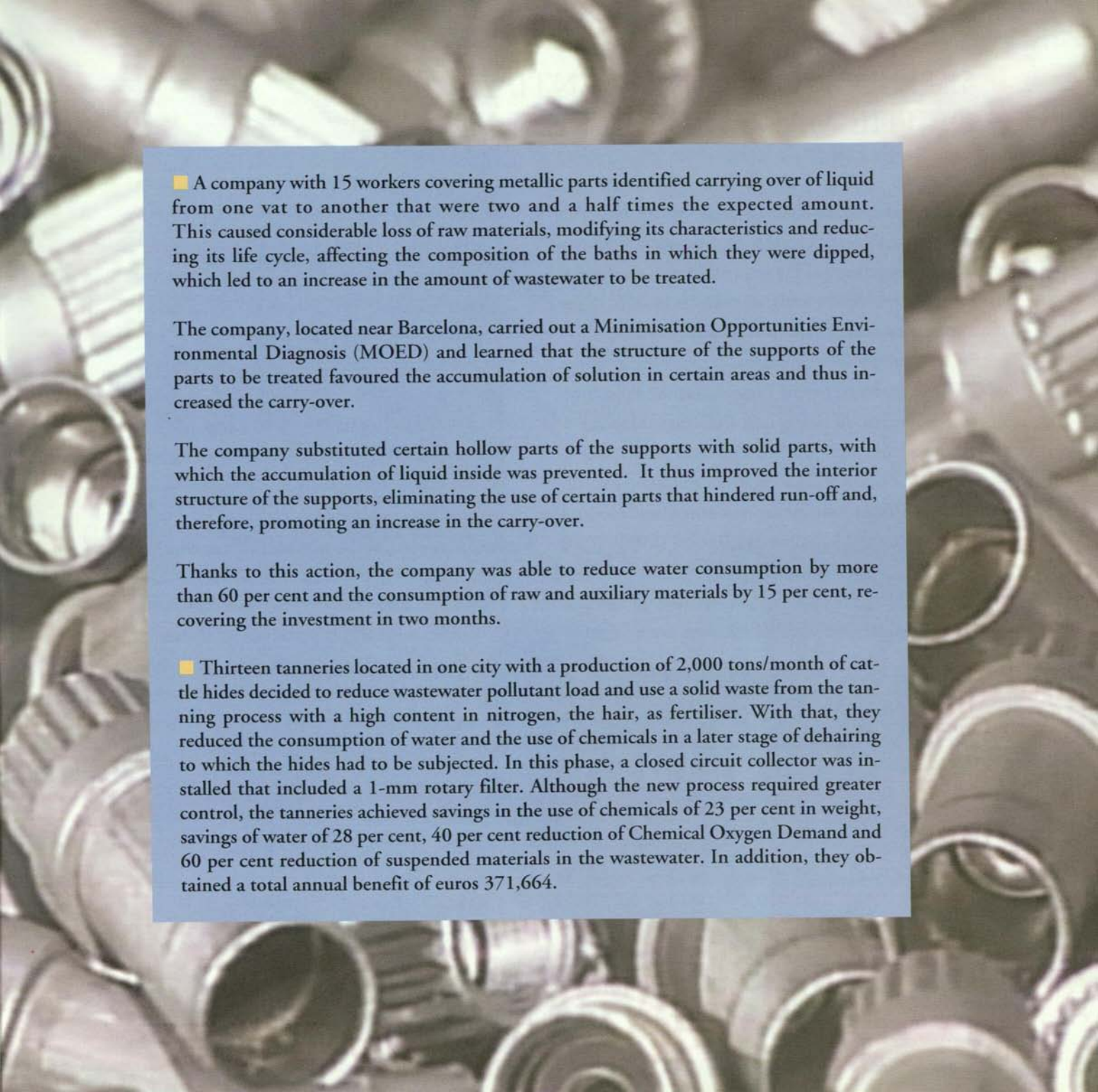
It is impossible to manage correctly what is unknown or poorly measured. Thus, evaluation of an industrial activity is the initial and required step to identifying opportunities for improvement and optimisation.

With the Minimisation Opportunities Environmental Diagnosis (MOED), a methodology developed by CP/RAC, businesses can detect possible opportunities for preventing and reducing pollution at the source and obtain sufficient data to orient their policies toward cleaner practices and techniques, and that are technically and economically viable.

The Centre per a l'Empresa i el Medi Ambient has carried out in Catalonia more than 300 studies using this methodology, with decreases of pollution greater than 30 per cent of reduction of wastewater, 24 per cent reduction of waste and a savings of 26 per cent in water and 14 per cent of raw materials on an average.

In order to spread information about the methodology used for a MOED and share the practical experience obtained, CP/RAC has been carrying out at the same time a large effort of training and the training of trainers.





■ A company with 15 workers covering metallic parts identified carrying over of liquid from one vat to another that were two and a half times the expected amount. This caused considerable loss of raw materials, modifying its characteristics and reducing its life cycle, affecting the composition of the baths in which they were dipped, which led to an increase in the amount of wastewater to be treated.

The company, located near Barcelona, carried out a Minimisation Opportunities Environmental Diagnosis (MOED) and learned that the structure of the supports of the parts to be treated favoured the accumulation of solution in certain areas and thus increased the carry-over.

The company substituted certain hollow parts of the supports with solid parts, with which the accumulation of liquid inside was prevented. It thus improved the interior structure of the supports, eliminating the use of certain parts that hindered run-off and, therefore, promoting an increase in the carry-over.

Thanks to this action, the company was able to reduce water consumption by more than 60 per cent and the consumption of raw and auxiliary materials by 15 per cent, recovering the investment in two months.

■ Thirteen tanneries located in one city with a production of 2,000 tons/month of cattle hides decided to reduce wastewater pollutant load and use a solid waste from the tanning process with a high content in nitrogen, the hair, as fertiliser. With that, they reduced the consumption of water and the use of chemicals in a later stage of dehairing to which the hides had to be subjected. In this phase, a closed circuit collector was installed that included a 1-mm rotary filter. Although the new process required greater control, the tanneries achieved savings in the use of chemicals of 23 per cent in weight, savings of water of 28 per cent, 40 per cent reduction of Chemical Oxygen Demand and 60 per cent reduction of suspended materials in the wastewater. In addition, they obtained a total annual benefit of euros 371,664.

## 5. THE CP/RAC: AN ESSENTIAL PART OF THE MAP STRUCTURE

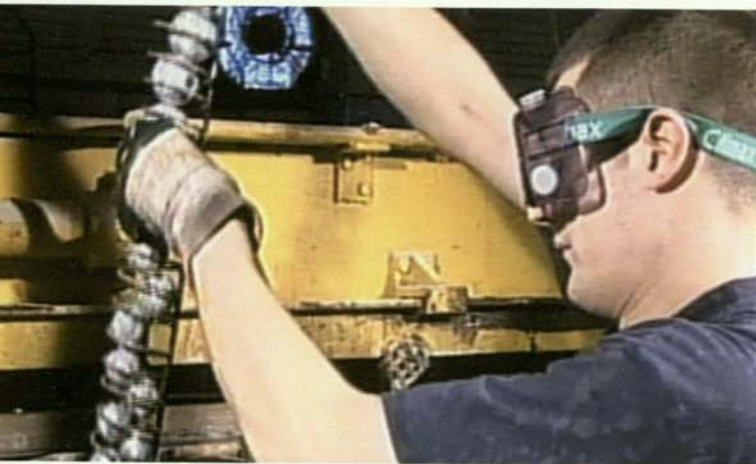
Several management units of the Mediterranean Action Plan (MAP) work together to promote the protection and improvement of the environment in the region. The sum of these efforts leads, on many occasions, to the required interaction of various tools and activities.

Focused primarily on industrial activity, the activities of CP/RAC are based on the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources and Activities. As a result, it participates in the Strategic Action Programme, an initiative coordinated by the Programme for the Assessment and Control of Pollution in the Mediterranean Region (MED POL) for implementation of that Protocol.

In 1996, the Mediterranean Commission on Sustainable Development (MCSD) was created as an advisory

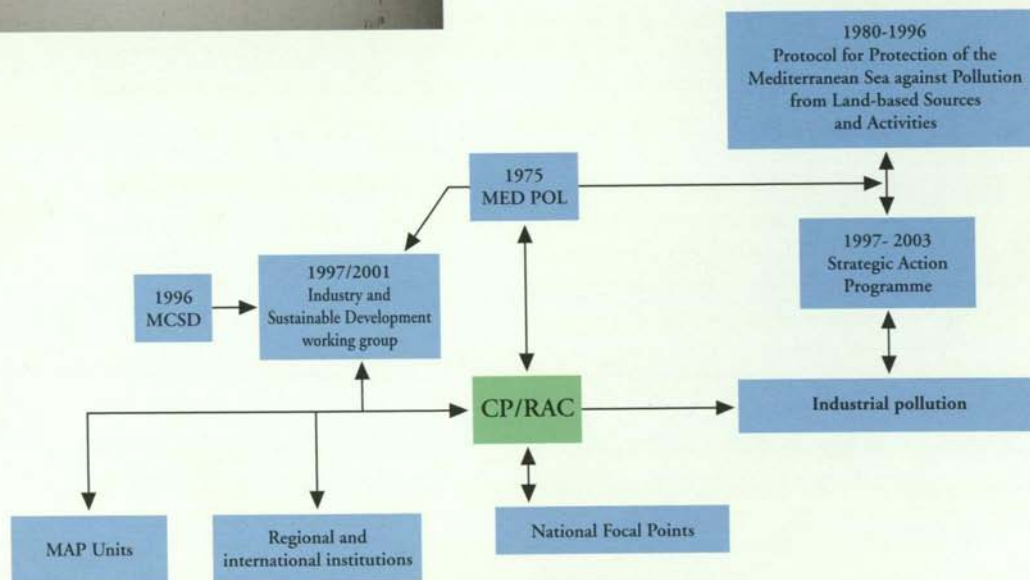
■ One of the activities of CP/RAC within the Strategic Action Programme is the preparation of regional guides and plans that gather together Best Available Techniques and Best Environmental Practices and that can serve as reference documents for the drafting of national plans and programmes for prevention of pollution.

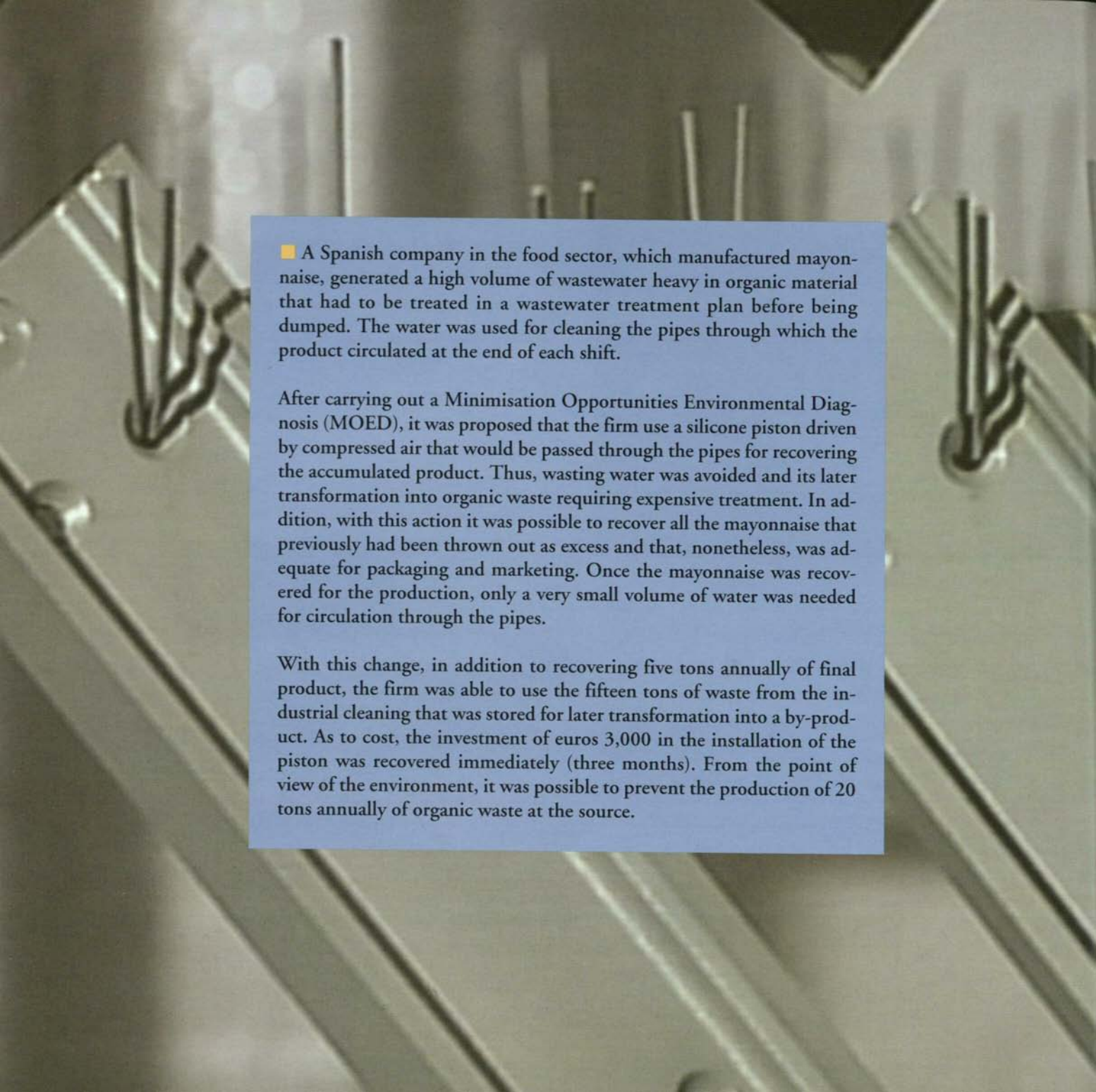
- Regional guide for implementation of Best Available Techniques, Best Environmental Practices and cleaner technologies in industry.
- Regional guide for implementation of Best Available Techniques and Best Environmental Practices in industries that generate wastewater with a high content of nutrients, suspended solids and Biological Oxygen Demand.
- Regional guide for implementation of Best Environmental Practices in the use of fertilizers in agriculture.
- Regional Action Plan for reducing hazardous waste generated by industry.





body with the objective of presenting proposals to the Contracting Parties and the MAP Secretariat for the promotion of sustainable development. CP/RAC has been, together with MED POL, the technical support unit for the “Industry and Sustainable Development” working group, created under MCSD in order to fulfil its objectives.





■ A Spanish company in the food sector, which manufactured mayonnaise, generated a high volume of wastewater heavy in organic material that had to be treated in a wastewater treatment plan before being dumped. The water was used for cleaning the pipes through which the product circulated at the end of each shift.

After carrying out a Minimisation Opportunities Environmental Diagnosis (MOED), it was proposed that the firm use a silicone piston driven by compressed air that would be passed through the pipes for recovering the accumulated product. Thus, wasting water was avoided and its later transformation into organic waste requiring expensive treatment. In addition, with this action it was possible to recover all the mayonnaise that previously had been thrown out as excess and that, nonetheless, was adequate for packaging and marketing. Once the mayonnaise was recovered for the production, only a very small volume of water was needed for circulation through the pipes.

With this change, in addition to recovering five tons annually of final product, the firm was able to use the fifteen tons of waste from the industrial cleaning that was stored for later transformation into a by-product. As to cost, the investment of euros 3,000 in the installation of the piston was recovered immediately (three months). From the point of view of the environment, it was possible to prevent the production of 20 tons annually of organic waste at the source.

## 6. THE INDUSTRY AND SUSTAINABLE DEVELOPMENT WORKING GROUP

The Mediterranean Commission on Sustainable Development (MCSD) approved the creation of the "Industry and Sustainable Development" working group at the plenary meeting held in Palma de Mallorca (Spain) on 6-8 May 1997, in order to prepare proposals and recommendations that make it possible to progress towards

The meeting of experts organised by CP/RAC and held in Barcelona in June 2001 proposed several approaches in order to advance towards sustainable development of industry in the Mediterranean region.

implementation of the principles of sustainability in industry, processes, products and services.

Algeria and Italy were designated leaders of the working group and the other members were ASCAME<sup>8</sup>, CEFIC<sup>9</sup>, the European Commission, EOAEN<sup>10</sup>, Israel,

MEDCOAST<sup>11</sup>, RME<sup>12</sup>, Spain, Tunisia, Turkey and the WWF<sup>13</sup>. The Cleaner Production Regional Activity Centre (CP/RAC) together with the MED POL programme were named technical support units.

After two seminars, held in Trieste and Massa Carrara<sup>14</sup>, in the plenary meeting of MCSD held in Tunis from 14 to 17 November 2000, Spain offered to organise through CP/RAC a Regional Workshop to discuss the approaches to recommend to MCSD.

From 27 to 29 June 2001, a group of more than 60 specialists met in Barcelona. The group was formed by representatives of the Contracting Parties and institutions that are part of MCSD, members of the working group and observers, with debate based on a background paper prepared by CP/RAC.

These proposals for action are multi-disciplinary and are the basis for support for mechanisms, tools and institutions that promote cleaner production in industry in the region, introduction of standards of sustainability in businesses, promotion of the transfer of knowledge and strengthening of the mechanisms for control and monitoring, stressing the criteria that mark the road to follow towards sustainability.

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<sup>8</sup> Association of Mediterranean Chambers of Commerce.

<sup>9</sup> European Chemical Industry Council.

<sup>10</sup> Chamber group for the development of Greek islands.

<sup>11</sup> Mediterranean Coastal Environment.

<sup>12</sup> Mediterranean Water Network.

<sup>13</sup> World Wild Fund for Nature.

<sup>14</sup> Organised respectively by the International Centre for Science and High Technology of the United Nations Industrial Development Organisation (ICS/UNIDO) and the Government of Italy.

■ An Israeli company producing organic nitrate products generated large amounts of polluted wastewater with sulphuric acid, nitric acid and isomer residues, which required a large investment for treatment by an external firm.

The company changed the processing conditions in the precipitation stage of the product and added a short washing stage to recover acids, thus reducing the concentration of pollutants in the wastewater and making possible recovery of the product.

Through this approach, the firm succeeded in reducing the generation of hazardous waste from 1,010 tons/year to 10 tons/year, reduced from 150 to 60 tons/year the consumption of products neutralisers applied to the wastewater and succeeded in recovering a good part of the product, totalling savings of euro 202,000 per year and amortising the investment in seven months.

■ One of the main environmental aspects to take into account in the industrial processes in the textile sector is the large amount of water that is used. In Turkey, this factor was in addition to the scarcity of water in the area where the factory was located.

The environmental study carried out by the company analysed water consumption and identified opportunities for improvement. A key factor for the company, at the time of putting into practice these opportunities, was its low capacity for investment.

After studying the feasibility of the technical, environmental and economic aspects, the firm decided to reduce the ratio of solution in the dyeing process from 1:7 to 1:4, to reuse wastewater for pre-washing of filters and to optimise the process of regeneration of resins that controlled water hardness. Once it was determined that if regeneration were carried out in 43 minutes instead of the usual 62 minutes, not only succeeded in reducing the time necessary to carry out the operation, increasing productivity but also achieving considerable savings in the use of water for regeneration.

The firm did not have to make any investment so the benefit was immediate, and, furthermore, it achieved an annual savings of euro 2,000.

## 7. THE ROAD TOWARDS SUSTAINABILITY

The VII meeting of the Contracting Parties held in Monaco adopted a series of recommendations to stimulate sustainable development in the industrial sectors in the region. The recommendations adopted lay out four approaches directed to the Contracting Parties and a fifth approval of monitoring of the process especially directed to the MAP secretariat.

### **1. Strengthening the use of mechanisms, tools and stakeholders**

One of the main objectives is to increase and strengthen the institutions and organisations that work in the Mediterranean in order to promote sustainable development of industry, produce synergies, improve efficiency, avoid duplication of effort and promote coordinated work (recommendations 1.1 and 1.2).

### **2. Introduction of standards of sustainability in businesses**

The integration of the concept of cleaner production and sustainable development in business practices, the introduction of cleaner production principles in training and education and implementation of environmental standards for products, processes and services are the best guarantees for the future.

Protection and preservation of the environment should be included in all phases of any industrial activity:

from planning and operations to eventual cessation of activities. For this, an environmental management plan should be drafted before undertaking any activity, the application of environmental management tools and implementation of efficient inspection systems.

Likewise, control measures must be established to ensure the environmental quality of the site after decommission of any industrial activity.

In order to convince successfully industry to adopt and apply commitments to environmental protection, it is necessary to introduce consultation and consensus building mechanisms as well as incentive and dissuasive economic instruments.

At the same time, subsidies for the use of natural resources should be gradually reduced, environmental costs introduced in prices of goods and services, and the “polluter pays” principle applied (recommendations 2.1, 2.2, 2.3, 2.4, 2.5, 2.6 and 2.7).

### **3. Promotion of the transfer of knowledge**

Technical training, instruments for facilitating the transfer of technology, the exchange of information and the development of training mechanisms for experts, administration, small and medium enterprises, etc., as well as the exchange of knowledge and experiences are also conditions required to advance towards more sustainable development (recommendations 3.1 and 3.2).



#### **4. Mechanisms for control and monitoring**

The creation of mechanisms, for control and monitoring of industrial sustainability should be promoted using internationally accepted indicators to ensure that no dysfunctions in projects linked to development are produced that can affect sustainability in the region and the countries, sectors and businesses (recommendations 4.1, 4.2 and 4.3).

#### **5. Follow up**

The MAP Secretariat, in cooperation with other national, regional and international institutions, will promote implementation of these proposals for action integrating them into the activities of MCSD and into the MAP objectives and programmes (recommendations 5.1 and 5.2).



**Mediterranean Commission on Sustainable  
Development (MCSD)**

**Recommendations and proposals for action on  
INDUSTRY AND SUSTAINABLE  
DEVELOPMENT**

**Proposed by the MCSD and as adopted by the  
Contracting Parties  
(Monaco 14-17 November 2001)**

Considering the terms of reference as set for it by the Mediterranean Commission on Sustainable Development (MCSD) meeting held in Tunis in November 2000.

Having convened in Barcelona (Spain) from 27 to 29 June 2001 under the auspices of the United Nations Environment Programme Mediterranean Action Plan, and with the support of the Regional Activity Centre for Cleaner Production (RAC/CP) and MED POL.

Considering the background paper entitled "Status and trends of industry and sustainable development in the Mediterranean Region" and the various regional and national case studies presented at the Regional Workshop held in Barcelona.

Considering the ensuing discussions, the views and recommendations put forward by the various members of the Working Group.

Considering the main actors, legal frameworks, tools and instruments that may play a part in the integration of industry and environment so as to reach ecologically sustainable industrial development (ESID).

Considering the Contracting Parties' international

commitments, particularly the Barcelona Convention and its Protocols.

Considering that the pressure from industrial activities, particularly around pollution hotspots and sensitive zones, calls for an integrated approach so as to reduce the adverse impacts arising from pollution.

Considering the need to give due consideration to climate change, biodiversity and transboundary issues.

Considering the need to assist enterprises, particularly Small and Medium Enterprises, and Small and Medium Industries (SMEs/SMIs), to comply with their legal obligations, and to adopt the concept of sustainable development by developing and mobilising the means and the appropriate instruments, and by fostering a participatory approach, such as voluntary agreements.

Considering the precautionary and polluter pays principles as a means for reducing industrial pollution.

Aware of the lacunae that exist in initiatives currently undertaken to reduce industrial pollution.

Aware that the Strategic Action Programme (SAP) is a vital instrument for implementing the Protocol to combat pollution from land-based sources and activities, particularly industrial pollution, and that its application contributes to improving the quality of the marine environment and the environmental performance of enterprises and their competitiveness, and desiring to meet fully the SAP objectives and targets.

Desiring to integrate the concept of sustainable development into the industrial development process.

Desiring to anticipate foreseeable impacts on the en-

vironment arising from the evolution of socio-economic development of the Mediterranean basin region, particularly the establishment of the Euro-Mediterranean Free Trade Zone.

Desiring to promote the transparency of any monitoring and evaluation processes applied towards reaching ecologically sustainable industrial development (ESID).

Desiring to strengthen the competitiveness of the industrial pollution prevention and control sector in the Mediterranean countries.

In order to promote the integration of industry and the environment so as to reach ecologically sustainable industrial development (ESID), notably through cleaner production, at regional, national and local levels, and by particularly targeting SMEs/SMIs.

Hereunder submits a proposed set of actions and recommendations in contribution to the preparation of the Mediterranean Strategy for Sustainable Development.

## RECOMMENDATIONS AND PROPOSALS FOR ACTION

### **1. Reinforcement of the Use of Existing Mechanisms, Tools and Stakeholders**

#### *A. Addressed to the Contracting Parties*

1.1 To strengthen and make coordinated use of relevant existing international, regional and national resources, such as cleaner production (CP) centres, UNIDO, research and development institutions, industry and professional associations;

To promote and support the establishment of such resource centres and other relevant sources of expertise at national and local levels, where needed.

#### *B. Addressed to the Secretariat*

1.2 To identify interested parties and make them aware of the implications of on sustainable development for production, distribution and consumption of industrial products and to facilitate cooperation among these stakeholders, namely:

- government ministries (ministries of the environment, industry, planning, economic affairs, commerce, tourism, transport, agriculture, health, etc.);
- financial institutions;
- industries, chambers of commerce and industrial associations;
- regional and international institutions, such as European Union, League of the Arab States, Mediterranean Action Plan, United Nations Environmental Programme, United Nations Industrial Development Organisation,

- World Business Council for Sustainable Development;
- local authorities;
  - non-governmental organizations;
  - university institutions and training and research institutions.

## **2. Introduction of Sustainable Standards within Companies**

### *A. Addressed to the Contracting Parties*

2.1 To promote consensus building through consultation mechanisms at the national and local levels for integration of industry and sustainable development, notably through sound environmental management and cleaner production practices;

To provide an appropriate framework for the promotion of successful voluntary agreements and autocontrol in industries for the periodic monitoring of their performance and compliance.

2.2 To establish incentives aimed at encouraging existing industries to adapt to current environmental requirements;

To require environmental management plans for any proposed industrial activity prior to their start-up and to provide assistance for the preparation and implementation of environmental management plans, when needed, notably in relation with the future Euro-Mediterranean Free Trade Zone;

To promote the establishment of environment friendly activity zones avoiding concentration in coastal areas which could suffer from the impact of various activities linked to the Euro-mediterranean Free Trade Zone.

To set specific after-care obligations, especially relating to the decommissioning of industrial establishments, including site remediation, as a pre-condition for the granting of an industrial operating permit;

To set up effective inspection systems that ensure that industrial establishments comply with permit conditions.

2.3 To promote an integrated approach to sustainable development through the use of existing and new environment management tools, such as:

- strategic impact and environmental impact assessments;
  - environmental management systems (ISO 14000, EMAS, etc.);
  - integrated pollution prevention and control, integrated product policy and life-cycle analysis;
  - waste-reduction audits, good housekeeping methods, the simple material balance approach and sector-specific cleaner production opportunity assessment checklists.
- To apply environmental criteria and standards, taking into account the specific conditions of each country:
- to marketed products, including imported products;
  - to market-liberalisation processes;
  - in codes of practice relating to national and foreign investment;
  - in public procurement procedures.

2.4 To internalise environmental externalities (hidden or implicit environmental costs) and apply the "polluter pays" principle;

To reduce progressively the subsidization of production inputs, especially subsidized water and energy costs so as to better reflect the environmental costs of production.

2.5 To use appropriate economic and financial instruments as tools to ease the introduction of sustainability into the general management of enterprises.

2.6 To integrate principles of cleaner production and sustainable development into processes, products and services;

To integrate principles of cleaner production and sustainable development into all aspects of training and education.

*B. Addressed to the Secretariat*

2.7 To prepare and disseminate through regional and national institutions the tools, experiences, lessons learned and methodologies that would facilitate consensus-building and consultation mechanisms.

### **3. Promotion of the Transfer of Knowledge**

*A. Addressed to the Contracting Parties*

3.1 To promote the transfer of environmentally sound technologies and their adaptation to national and local conditions, notably through partnerships and twinning;

To promote the dissemination of information about all relevant technological know-how, practices, diagnostic tools, guides, demonstration projects, etc;

To exchange information, particularly at the regional level, through networking and other electronic means, including the interconnection of existing networks and the creation of a common Web site that would specifically target SMEs, SMIs and handcraft activities.

3.2 To create mechanisms (through training, twinning, technical information, business incubators, public participation, etc.) to enhance capacity-building:

- for the training of experts;

- for the technical divisions of public administrations, including inspection institutions;

- for SMEs and SMIs;

- for vulnerable areas and islands.

### **4. Control and Follow-up Mechanisms**

*A. Addressed to the Contracting Parties*

4.1 To establish, implement and improve monitoring and evaluation systems that are consistent with generally accepted systems, namely:

- at the company level: performance indicators to monitor continuous improvement;

- at the sectoral and national levels: benchmarking mechanisms, including indicators and sectoral reports.

*B. Addressed to the Secretariat*

4.2 To promote and follow implementation of monitoring and evaluation systems that are consistent with generally accepted systems, such as:

- sustainable industry indicators that complement those already adopted in the region;

- a regional review of progress in the integration of industry and sustainable development.

4.3 To promote the monitoring and follow-up of sustainability-related projects by entities that are independent of the financing and executing agencies of those projects.

### **5. Follow-up**

*A. Addressed to the Secretariat*

5.1 To require the MAP Secretariat in cooperation with relevant national, regional and international institutions:

- to facilitate the follow up of the implementation of these proposals for action;
- to integrate the recommendations of the working group into the targets and timetable of MAP programmes and tools, such as the Strategic Action Plan (SAP) and Global Environment Fund (GEF) activities, as well as those of CP/RAC;
- to facilitate the integration of industrial environmental criteria into the activities of the MCSD, in particular the free trade and environment issue;

5.2 To present to the eighth meeting of MCSD specific guidelines for implementation of the recommendations that includes deadlines, actors involved, financial, technical and human requirements, expected outputs and indicators.

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