The Land-Based Pollution of the Mediterranean Sea: Present State and Prospects

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Pressures on the Coast

The resident population of the Mediterranean coastal states has almost doubled in the last 40 years, reaching 450 million. It is expected to reach approximately 600 million by 2050 and possibly 700 million by the end of the 21st century. At present, one third of the Mediterranean population, around 145 million people, is concentrated on a narrow strip along the coast, and this number is expected to double by the year 2025.

The pressure exerted on the Mediterranean coast is dramatically amplified by the intensive seasonal increase in the population from tourism, which in some countries accounts for up to 90% of the total population. At least 50% of the tourists arriving in the Mediterranean are concentrated on the coast. The pressure is likely to increase in future, with an estimated doubling of tourism-related development in the Mediterranean, escalating from 140 million arrivals to a projected 350 million by 2025.

The dense human settlements established along the Mediterranean coast produce large amounts of municipal wastewater, which is discharged into the sea either untreated or after various degrees of treatment. In addition, during the peak summer season, sewage treatment plants are frequently unable to cope with the additional loads.

According to a survey of 19 Mediterranean countries by WHO/Europe (World Health Organisation Regional Office for Europe) as part of the MED POL Programme (the marine pollution assessment and control programme of the UNEP's Mediterranean Action Plan: www.medpol.unepmap.org), wastewater treatment plants serve around 68% of 489 coastal cities with more than 10,000 inhabitants and 74% of 104 coastal cities with more than 100,000 inhabitants (Charts 14 and 15).

Agriculture: The Largest Non-Point Contributor of Pollutants

Despite the many non-point sources of pollution carrying phosphorus, nitrogen, pesticides, metals, pathogens, salts and trace elements, agricultural practices have become the largest non-point contributors of pollutants to the Mediterranean.

The use of pesticides has greatly increased in the Mediterranean over the last twenty years, threatening the quality of ground and surface waters. Air transport contributes a considerable amount of pollutants to the marine environment, but agricultural run-off through rivers is the most important point-source contributor of pesticides to the Mediterranean.

By 2025 countries on the southern and eastern rims of the basin are expected to show a five-fold increase in their agro-food activities. These countries will therefore be the most vulnerable to increased pollution and environmental pressure from the development of the agro-food sector.

Industry in the Mediterranean Region

More than 200 petrochemical plants, energy installations and basic chemical plants are located along the Mediterranean coast and river catchment basins, including at least 40 major oil refineries, cement plants, steel mills, tanneries, food-processing plants, textile mills and pulp and paper mills. They are significant carriers of chemical pollutants discharged directly to the sea or through municipal sewerage

CHART 14 **Wastewater Treatment Plants (WWTPs) in Mediterranean Coastal Cities with Populations of between 10,000 and 100,000 Inhabitants**

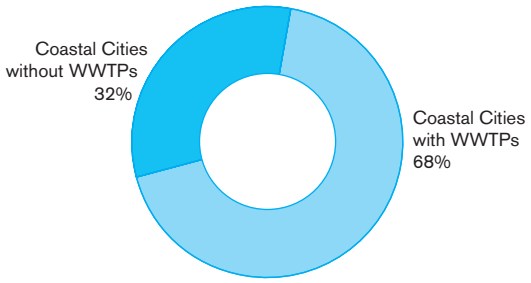
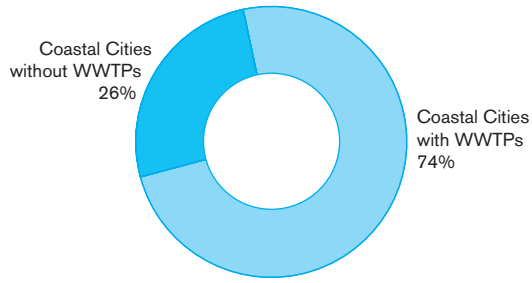


CHART 15 **Wastewater Treatment Plants in Mediterranean Coastal Cities with Populations of over 100,000 Inhabitants**



systems, outfalls, uncontrolled disposal sites and rivers.

Of the substances that are produced/released by industry, the most harmful to human health and the marine ecosystems are the Persistent, Bioaccumulative and Toxic (PBT) pollutants. These include heavy metals (mercury, cadmium and lead), some organometallic compounds and numerous organic compounds known as Persistent Organic Pollutants (POPs).

There is still a considerable gap in industrial development between the northern and the southern/eastern countries of the basin. A different picture is likely to emerge in the course of the 21st century as industrial production shifts south and eastward. These likely shifts in industrial production imply a potential increase in industry-related environmental pressures in the southern and eastern parts of the Mediterranean Basin.

The Response: A Common Strategy to Address Land-Based Pollution

As early as the 1970s, it became obvious to the Mediterranean countries that the origin of marine pollution was mainly to be found in land-based activities. As a result, the countries devoted particular attention to the preparation of an appropriate legal instrument to cover this aspect of marine pollution and, shortly after adopting the Mediterranean Action Plan (MAP, 1975) and the Convention for the Protection of the Mediterranean Sea against Pollution (Barcelona Convention, 1976), they adopted and signed the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources (LBS Protocol, 1980).

The LBS Protocol entered into force in June 1983, and an initial calendar of priority activities for its implementation, including marine pollution monitoring and a large training programme, was set by the countries through the MED POL Programme.

The 1992 Earth Summit in Rio signalled a change in the pace of events that eventually consolidated the shift in the direction of the MED POL Programme towards prevention and control of pollution from land-based activities and promoting the inclusion of environmental concerns in environmental policies in the Mediterranean. The Barcelona Convention was then revised in 1995 to give legal status to the commitments made at Rio.

In 1996, the Contracting Parties to the Barcelona Convention signed a revision of the LBS Protocol. Substances that are "toxic, persistent and liable to bioaccumulate" (PBTs) were placed first on the list of priority substances to be phased out.

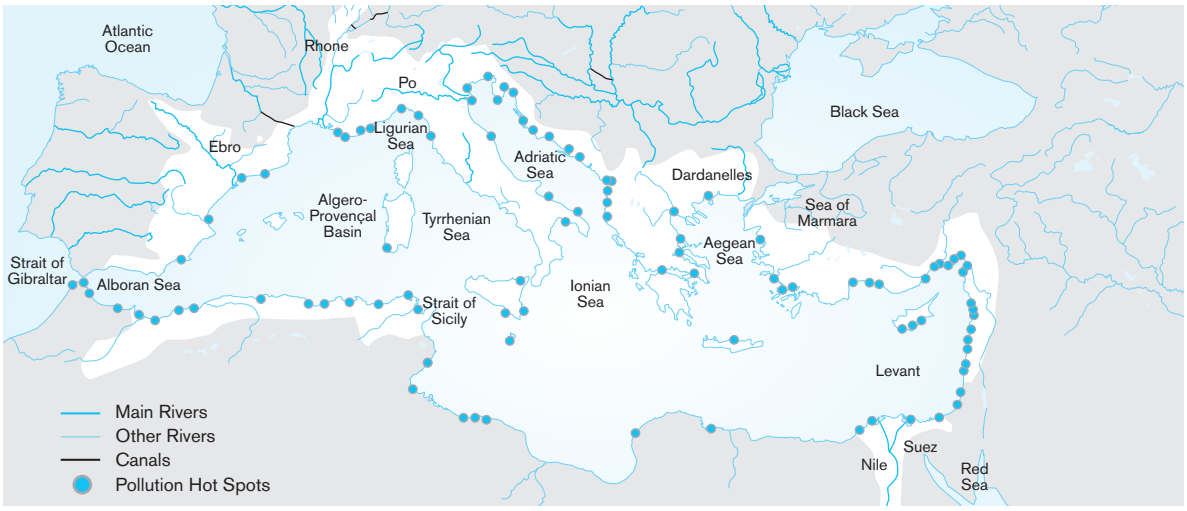
The amended Protocol covers not only the Mediterranean Sea itself, but also the entire watershed area within the territories of the riparian states draining into it, the waters on the landward side of territorial boundaries, and communicating brackish waters**,** marshes, coastal lagoons and groundwater.

In 2008, after many years of difficult negotiations, the amendments to the LBS Protocol entered into force. The Protocol is a milestone in the history of the Mediterranean Action Plan, as it establishes a clearly targeted legal framework for the progressive elimination of land-based pollution.

The Strategic Action Programme (SAP)

One of the major breakthroughs in the Mediterranean countries' efforts to combat land-based pollution, prompted by the signature of the revised LBS Protocol, was the formulation and adoption by the Contracting Parties of a Strategic Action Programme (SAP) to Address Pollution from Land-Based Activi-

MAP 1 **Distribution of the Identified Mediterranean Pollution Hot Spots**



Source: UNEP/MEDU.

ties. The SAP is an action-oriented MED POL initiative identifying priority target categories of activities and substances to be eliminated or controlled by the Mediterranean countries through a timetabled schedule for the implementation of specific control measures and interventions. The SAP, adopted by the Contracting Parties in 1997, is the basis for the implementation of the LBS Protocol by Mediterranean countries over the next 25 years.

The key land-based activities addressed in the SAP are linked to the urban environment (especially municipal wastewater and urban solid waste) and to industrial activities, targeting POPs in particular.

Also addressed are the release of nutrients into the marine environment, the storage, transportation and disposal of radioactive and hazardous wastes, and activities that contribute to the destruction of the coastline and coastal habitats.

The adoption of the SAP and the initiation of activities for its implementation even before the entry into force of the amended LBS Protocol indicate the determination of the countries to take concrete action to combat land-based pollution and contribute to maintaining and restoring marine biodiversity, safeguarding human health and promoting the sustainable use of marine living resources.

Shortly after its adoption, the SAP was recognised by the Council of the Global Environment Facility (GEF) as an important programme dealing directly with some of the major concerns relating to international waters. As a result of this recognition, the GEF Council approved a three-year Mediterranean Project, to start in January 2001, entailing a contribution of $6 million to carry out a number of important groundwork activities from the Strategic Action Programme that were essential to its long-term success.

One of the main outputs of the SAP was the formulation and adoption of National Action Plans (NAPs) specifically designed by each of the Contracting Parties to tackle land-based pollution in keeping with all the targets and activities identified in the SAP. The basis for initiating the pollution reduction process required by the SAP and indicated in the NAPs was the identification and formal recognition by the countries of the major marine pollution hot spots where action had to be focussed. The pollution hot spots were identified after the preparation of detailed national diagnostic analyses, where each country reviewed and highlighted its main marine and coastal issues and environmental priorities (Map 1).

The Need for Economic and Financial Instruments for a Sustainable Implementation of the SAP

When the costs of the SAP remedial actions were considered (in 1997 the cost of the implementation of the priority actions alone was estimated at about $10 billion), it became evident that the success of the SAP and the actual implementation by the countries of the pollution reduction interventions listed in the NAPs would largely depend on the identification of long-term sustainable financing mechanisms. As a result, since the adoption of the SAP, one of the major goals of the Barcelona Convention Secretariat and the MED POL Programme has been to assist countries

develop administrative, legal and fiscal mechanisms to sustainably finance it and to implement these mechanisms by adapting them to each country's national requirements. This has involved setting priorities for financing and mobilising the financial community and international donors. The results have been very encouraging to date. In addition to the GEF Project mentioned earlier, which identified and successfully tested a number of economic instruments in several countries, negotiations with the international financial community and international donors have so far greatly contributed to the launch of the actual pollution reduction process in the region. The GEF, together with a large number of international partners, such as the World Bank, has recently launched a large initiative (the Strategic Partnership) coordinated by MAP that has managed to mobilise around $100 million, again aiming at the implementation of the NAPs through capacity building, grants and investment loans. In addition, the EU's recent initiative, Horizon 2020, aimed at eliminating pollution of the Mediterranean by the year 2020, has based its action programme on the assessment made by the MED POL Programme of the pollution priorities and pollution hot spots and, with the participation of the European Investment Bank (EIB), has created an associated programme of concrete financial support for the implementation of the regional pollution reduction process.

The Pollution Reduction Process: Prospects

The SAP is an ambitious undertaking, spanning a lengthy period of 25 years and addressed to countries with different degrees of socio-economic development and technical, scientific and administrative competencies, as well as different cultural values and environmental priorities. When elaborating the SAP operational details, the Secretariat and the Mediterranean experts were faced with a real challenge in finding the appropriate strategy to translate the binding regional commitment to reduce polluting releases into a package of realistic actions for the Mediterranean countries.

It is in fact worth stressing that the SAP is being implemented in a region where about 70% of the countries belong to the developing world, with heterogeneous environmental policies and priority systems that consider economic development to be the number one priority to improve quality of life.

In view of the above, a new approach was proposed by MED POL and negotiated with the countries for the implementation of the pollution reduction process and, in particular, for the timely implementation by the countries of the measures and interventions targeted in the NAPs. In preparing the new approach, the main question was: should the Mediterranean countries adopt a "flat-rate" or "differentiated" approach as the basis for the implementation of the SAP and compliance with their commitments and targets?

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At first glance, the concept of "differentiation," based on countries' volumes of releases, volumes of reduction and reduction costs, would seem to be preferable. It would make it possible to partially take into consideration the situation of every Mediterranean country and its relative share in the degradation of the marine environment.

However, as a result of a complex calculation of the different differentiation criteria based on releases/inhabitant, GDP/inhabitant and releases/GDP, it was concluded that this approach cannot be adopted in the actual Mediterranean context, mostly because it is not fully quantifiable and is untraceable at both the national and regional levels.

The "flat-rate" approach consists of adopting the same rate of reduction of releases and the same timeframe indicated under the SAP provisions for all Mediterranean countries. This approach, which has been the basis of MAP and MED POL since their inception, was no longer considered adequate in view of trends in the Mediterranean and almost all regional seas towards the application of an ecosystem approach that highlights the different conditions (environmental, political, socio-economic, geomorphologic, etc.) prevailing in the different subregions, which indeed require differentiated pollution reduction measures.

As a result of the above, negotiations with countries finally led to the adoption of a differentiated approach,

limited however to the target deadline set for implementing the measures. Such decision will be subject to further analysis and possible revision once the ecosystem approach has been fully applied in the region.

After more than thirty years of efforts, the prospect of seeing the pollution of the Mediterranean substantially reduced in the next ten years is becoming a reality

Recently, such an approach was successfully tested in the framework of the negotiation and adoption of the first legally binding regional plans and programmes deriving from the provisions of the LBS Protocol. Three regional plans covering municipal BOD5,[1] DDT and a number of POPs were prepared applying the differentiation approach to the deadlines attached to the pollution reduction measures that countries had agreed to take. In practical terms, each country has to formally inform the Secretariat of the date, within a set time framework, by which it will take the adopted measures. Countries must moreover fully justify any delays. It is a politically acceptable approach that combines the principle of shared responsibility with prevailing socio-economic conditions, a fair approach that somehow guarantees the full implementation of the measures by all Parties.

After more than thirty years of efforts, the prospect of seeing the pollution of the Mediterranean substantially reduced in the next ten years is becoming a reality. The Barcelona Convention, with its Mediterranean Action Plan and its pollution control programme – the MED POL Programme – are finally breaking through years of technical gaps and political resistance in the region and gaining the international support needed in a region where about half the countries are still developing. Furthermore, the extensive capacity-building work carried out has finally ensured the existence of an adequate operational basis in all riparian countries capable of implementing the agreed pollution reduction measures. Finally, the objective of concretely reducing Mediterranean pollution by the year 2025 can now be reached.

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For more information on the MED POL Programme, see: www.medpol.unepmap.org.

[1] Biochemical Oxygen Demand, or BOD5, is a measure of the quantity of oxygen consumed by micro-organisms during the decomposition of organic matter over an elapsed period of 5 days.