



# Strategic Action Programme to Address Pollution from Land Based Activities (SAP-MED) and related National Action Plans (NAP)

Implementation Status 2000–2015



Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem

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For bibliographic purposes this volume may be cited as: Strategic Action Programme to Address Pollution from Land Based Activities in the Mediterranean region (SAP-MED) and National Action Plans' (NAP) implementation 2000 – 2015, UNEP/MAP, Athens, 2015.

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Strategic Action Programme to address Pollution from Land-Based Activities (Sap-MED) and related National Action Plans (NAP) Implementation Status 2000-2015

ISBN No: 978-92-807-3572-7

## **ACKNOWLEDGEMENTS**

This publication was prepared by the UNEP/MAP-Programme for the Assessment and Control of Marine Pollution in the Mediterranean (MED POL) through the MedPartnership Project co-funded by GEF and the Mediterranean Trust Fund of the UNEP/MAP Barcelona Convention. The chief editors were Tatjana Hema (UNEP/MAP-MED POL), Hoda El Turk (UNEP/MAP) and Virginie Hart (UNEP/MAP-MED POL). The main contributors were Mohamad Kayyal, Susanna Casanova, MED POL consultants and Tatjana Hema, MED POL Programme Officer.

The United Nations Environment Programme/Mediterranean Action Plan (UNEP/MAP) acknowledges the comments received on this evaluation report from the MED POL Focal Points. These have been included in the final version as appropriate. UNEP/MAP wishes to thank all other contributors who were involved in the finalization of the SAP-MED and NAPs implementation evaluation.

The MedPartnership: The Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem (MedPartnership) is a collective effort of leading organizations (regional, international, nongovernmental, etc.) and countries sharing the Mediterranean Sea towards the protection of the marine and coastal environment of the Mediterranean. The MedPartnership is being led by the United Nations Environment Programme (UNEP) Mediterranean Action Plan (MAP) and the World Bank and is financially supported by the Global Environment Facility (GEF), and other donors, including the European Union (EU) and all participating countries





# Introduction

The Strategic Action Plan (SAP-MED) is a long-term policy framework to combat pollution from land-based sources in the Mediterranean. SAP-MED was adopted by the Contracting Parties in their 10<sup>th</sup> Contracting parties meeting in Tunis, 1997 with the view to facilitate the implementation of the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources (LBS Protocol) of UNEP/ MAP-Barcelona Convention. The SAP-MED was formulated under the leadership of the Contracting Parties to the Barcelona Convention with the financial support of the Global Environment Facility (GEF.) It was preceded by an in depth transboundary diagnostic analysis which led to the identification of priority issues, measures and setting of short, midterm and long term marine and coastal pollution reduction targets.

## SAP-MED consists of the following components:

- Regional outputs covering the elaboration of programmes of measures, sets of priority technical guidelines, development of tools supporting monitoring, enforcement, reporting and public participation as well as supporting countries to enhance their implementation on the ground at national and local levels. These regional outputs should be delivered by the Secretariat (MED POL Programme) in the framework UNEP/MAP Programme of Work under the guidance of MED POL Focal Points of the Contracting Parties to the Barcelona Convention.
- 33 regional pollution reduction targets addressing a considerable number of substances including toxic, persistent and liable to bioaccumulate, heavy metals, organohalogens, radioactive substances, nutrients, suspended solids

and hazardous wastes, as well as sectors in accordance with the LBS Protocol, including urban environment (municipal sewage, solid waste and air pollution), industrial development, physical alterations and destruction of habitats.

- Requirements to develop National Action Plans in accordance with Article 5 of the LBS Protocol with the view to breakdown SAP-MED requirements into national and local actions and to identify priority policy, legal, institutional and pollution reduction measures, including investment needs for meeting the agreed SAP-MED targets.
- Requirements to report on SAP-MED and NAP implementation on a periodical basis (every five years) and in accordance with Article 13 of the LBS Protocol on NAP implementation effectiveness (every two years).

An operational framework for the implementation of the SAP-MED was agreed in 2000 including the establishment of necessary governance set ups at regional and national levels. The Contracting Parties to the Barcelona Convention elaborated their National Action Plans (NAP) in 2004-2005. The NAPs specify key interventions of a policy and regulatory nature, as well as concrete investments in the field of pollution reduction; timetable for their implementation and associated costs. The measures provided for in the NAPs were envisaged to be accomplished by 2010 and 2015. Some of the NAPs also included measures that generally took into account pollution reduction/ abatement investments needs for the period beyond 2015.

The SAP-MED was complemented by other important UNEP/MAP policy and legal developments, as well as relevant international commitments for integrating the ecosystem approach and related Good Environmental Status (GES) targets as well as the legally binding measures and obligations taken by the Contracting Parties through 10

Regional Plans adopted in 2009, 2012 and 2013.

This evaluation was mandated by COP17, Paris, France, 2012 and prepared in the framework of the UNEP/MAP-MED POL Programme under the Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem Project (MedPartnership). The MedPartnership is a collective effort of leading organizations (regional, international, nongovernmental, etc.) and countries sharing the Mediterranean Sea towards the protection of the marine and coastal environment of the Mediterranean. The MedPartnership is led by the United Nations Environment Programme (UNEP) Mediterranean Action Plan (MAP) and the World Bank and is financially supported by the Global Environment Facility (GEF) and other donors including the European Union (EU) and all participating countries.

The methodology followed for conducting the evaluation of SAP-MED/NAP implementation consisted of:

- Analysis of the status of implementation SAP-MED regional outputs.
- Desk review of the legal framework, national strategies and plans and all the available information and data on the state of the environment of each Contracting Party with the view to assess the extent to which the Parties support NAP implementation, existing gaps and the way forward.
- Analysis of reported and published data by the Contracting Parties on releases of pollutants into the marine environment (mainly NBB and PRTR) in order to track trends.

Key messages are presented in each section of the Evaluation Report including an overarching chapter addressing the main findings and also the way forward.



RACSPA, Gérard Pergent

## Regional Outputs of SAP-MED implementation

The implementation of the Regional component of the SAP-MED led to the elaboration and formulation of a large scope of policy, guidelines and other tools supporting the Contracting Parties in enhancing their efforts to implement the Barcelona Convention and its pollution related Protocols with a particular focus on urban environment, industrial development, physical alterations and destruction of habitats.

Table 1 provides an overview of SAP-MED regional deliverables regarding legally binding measures; regional policies; criteria and standards; quality objectives; technical guidelines; marine pollution monitoring and assessment activities; capacity building and public participation.

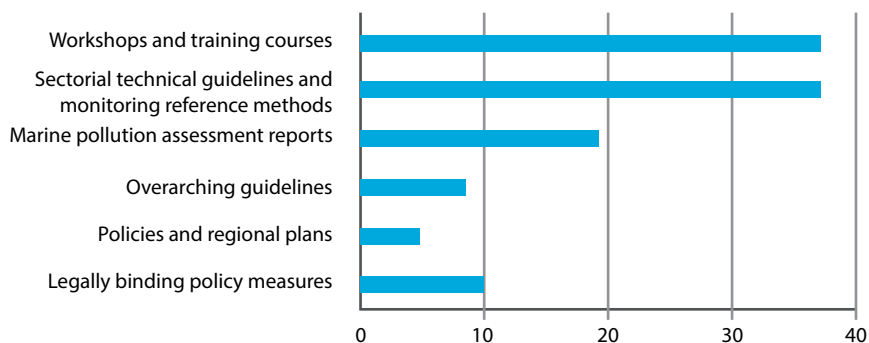
**Table 1.** Overview of SAP-MED regional deliverables

Sector	Urban Environment	Industrial Development	Physical Alterations and Destruction of Habitats
Deliverables			
10 Legally binding measures and timetables	<ul style="list-style-type: none"> <li>- Two Regional Plans for reduction of BOD5 from urban wastewater and from food sector.</li> <li>- Regional Plan on Marine Litter Management in the Mediterranean</li> </ul>	<ul style="list-style-type: none"> <li>- Five Regional Plans for elimination of POPs.</li> <li>- Regional plan for reduction of inputs of Mercury.</li> <li>- Regional plan for phasing out of DDT</li> </ul>	
5 Regional policies addressing sectors/ pollutants	<ul style="list-style-type: none"> <li>- Plan on reduction of input of BOD by 50% by 2010 from industrial sources for the Mediterranean region</li> <li>- Strategic framework on marine litter management</li> </ul>	<ul style="list-style-type: none"> <li>- Plan for the reduction by 20% by 2010 of the generation of hazardous wastes from industrial installations for the Mediterranean region</li> <li>- Plan for the management of hazardous waste, including inventory of hazardous waste in the Mediterranean region</li> <li>- Plan for the management PCBs waste and nine pesticides for the Mediterranean Region</li> </ul>	
Criteria and Standards as per Article 7 of the LBS Protocol and Environmental Quality Objectives	<ul style="list-style-type: none"> <li>- Criteria and Standards for bathing waters quality</li> </ul>	<ul style="list-style-type: none"> <li>- Emission limit values for point source discharges (e.g. BOD, PAH, heavy metals, organometallic and organohalogen compounds)</li> </ul>	<ul style="list-style-type: none"> <li>- Decision on the Ecosystems Approach including Adoption of definitions of GES and Targets for Ecological Objectives on Pollution and Marine Litter</li> </ul>



Overarching guidelines (8)	<ul style="list-style-type: none"> <li>- NAP Guidelines (2)</li> <li>- Guidance on cost-effectiveness and cost-benefit analysis (1)</li> <li>- Approaches to estimating the costs for the Regional Plans/ legally binding measures adopted by the Contracting Parties (1)</li> <li>- NBB Guidelines (2)</li> <li>- Common hotspot and sensitive areas assessment criteria (2)</li> </ul>		
Sectorial technical Guidelines and Monitoring Reference Methods (35)	<ul style="list-style-type: none"> <li>- Guidelines for sewage and solid waste collection, treatment and disposal including:  6 guidelines municipal wastewater 2 guideline in marine litter management</li> </ul>	<ul style="list-style-type: none"> <li>- 12 guidelines for industrial wastewater, application of BAT and BEP for management of pollutants such as BOD, PCB, hazardous wastes, organometallic and organohalogen compounds and key industrial sectors</li> </ul>	<ul style="list-style-type: none"> <li>- Good agricultural practices</li> <li>- Guidance on preservation of habitats</li> <li>- Guidelines on desalination</li> </ul>
	<ul style="list-style-type: none"> <li>- 2 guidelines in monitoring and inspection</li> <li>- 10 updated Reference methods on contaminant monitoring</li> </ul>		
Marine pollution monitoring	<ul style="list-style-type: none"> <li>- Coordination of national monitoring of contaminants at Mediterranean hot spots and coastal waters consisting of <b>state monitoring, trend monitoring, and compliance monitoring of</b></li> <li>- contaminants monitoring</li> <li>- biological effects monitoring</li> <li>- eutrophication monitoring</li> </ul>		
Marine pollution assessment Reports (19)	<ul style="list-style-type: none"> <li>- 14 thematic assessments of the state of the marine and coastal pollution and marine litter (2005, 2009, 2010, 2011, 2012, 2013, 2014, 2015) including status of WWTP in the Mediterranean</li> <li>- TDA; a regionally-prepared transboundary diagnostic analysis (2005)</li> <li>- 4 sub-regional reports on assessment of marine and coastal pollution (2011)</li> <li>- Periodical assessment of national marine pollution data deriving from monitoring programmes</li> <li>- List of common DPSIR indicators on marine pollution</li> </ul>		
Marine pollution reporting by the Contracting Parties	<ul style="list-style-type: none"> <li>- Yearly reporting of national pollution monitoring data</li> <li>- Biannual reporting of national loads for categories of pollutants</li> <li>- Every 5 year reporting of national loads of pollutants (NBB)</li> <li>- Establishment of PRTR by a number of Mediterranean countries</li> </ul>		
Capacity building activities (over 35)	<ul style="list-style-type: none"> <li>- Over 35 activities organized in the period from 1998 to 2015.</li> <li>- Topics addressed pollution monitoring and inspection, wastewater treatment, water reclamation and reuse, inspection for bathing waters quality, in addition to inter-calibration exercises, ESM of key industrial sectors, etc.</li> <li>- Water demand management, sludge treatment and disposal, and sustainable development of coastal areas.</li> <li>- Training for laboratory technicians in cooperation with the IAEA for testing levels of priority pollutants in the marine environment.</li> <li>- Capacity building to assist public agencies in their task for identification and prioritization of hot spots based on a specific ranking system.</li> </ul>		
Public participation	<ul style="list-style-type: none"> <li>- Strong Public Participation component in the MedPartnership project</li> <li>- Several UNEP/MAP-MED POL pollution assessment and reduction activities implemented with the active collaboration of NGOs/MAP Partners</li> <li>- Promoting public access to information by issuing the MED Waves publication</li> </ul>		

A quantitative illustration of the scope and breadth of deliverables under the Regional component of SAP-MED is shown in Figure 1.



**Figure 1.** Scope and breadth of outputs delivered under the Regional component in the framework of SAP-MED

On the sectoral level, the number of deliverables accomplished under the Regional component for each of the municipal wastewater, industrial development, protection of habitat and in the inspection and monitoring field, is illustrated in Figure 2. As can be seen, 24 training courses and workshops have been conducted in the municipal wastewater sector, while 30 scientific publications, 7 legally binding measures and 8 technical guidelines have been produced in the industrial development sector. The list of legally binding measures adopted under the Regional component in the framework of SAP-MED is provided in Table 2.

1. Regulation (EC) No 166/2006, OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC.
2. Hoornweg, Daniel; Bhada-Tata, Perinaz. 2012. *What a waste: a global review of solid waste management*. Urban development series; knowledge papers no. 15. Washington, DC: World Bank.
3. <http://documents.worldbank.org/curated/en/2012/03/16537275/waste-global-review-solid-waste-management>
4. <http://epp.eurostat.ec.europa.eu/portal/page/portal/environment/data/database>
5. EEA-UNEP/MAP joint report, 2014; Horizon 2020 Mediterranean report toward shared environmental information systems.
6. The Regional Solid Waste Exchange of Information and Expertise network in Mashreq and Maghreb countries.
7. Hoornweg, Daniel; Bhada-Tata, Perinaz. 2012. *What a waste: a global review of solid waste management*. Urban development series; knowledge papers no. 15. Washington, DC: World Bank. <http://documents.worldbank.org/curated/en/2012/03/16537275/waste-global-review-solid-waste-management>
8. Note that rates for Egypt and Morocco are mean values
9. Note that rates for Monaco and Syria have been adjusted to 100 percent.

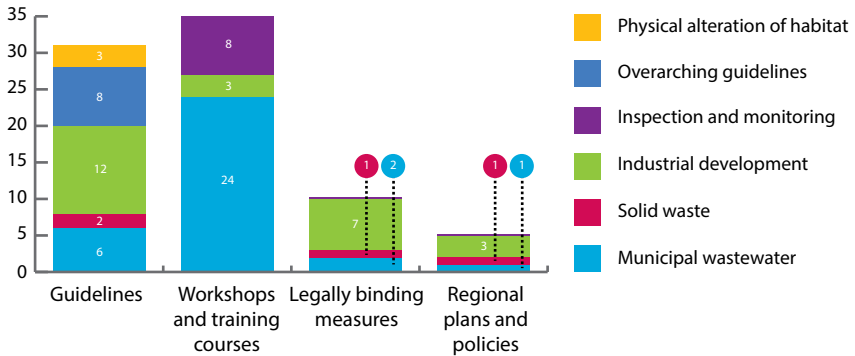
**Table 2.** Legally binding measures and criteria adopted by COP16, COP18 and COP19 of the Contracting Parties to the Barcelona Convention

Regarding thematic assessments, these address pressures and drivers from different sectors affecting marine and coastal pollution in the Mediterranean. They may be categorized based on their themes falling under the three pollution-related ecological objectives EO5 (eutrophication); EO9 (contaminants); and EO10 (marine litter), all of which contribute to the achievement of ecosystem approach-based Good Environmental Status (GES) in the framework of the LBS Protocol and the Regional Plans. The 19 assessments can be sub-divided into the following groups:

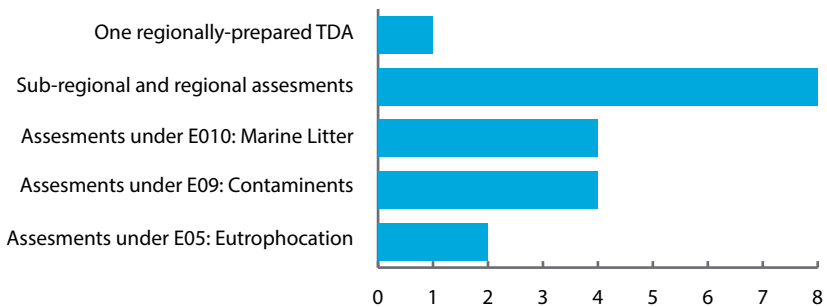
- Two assessment reports under EO5 (2005 and 2014);

- Four assessment reports under EO9 (2011, 2013, 2014, 2015);
- Four assessment reports under EO10 (2010, 2013, 2015);
- Eight sub-regional and regional assessment reports addressing all aspects including state of WWTP in the Mediterranean (2009, 2011, 2012); and
- One regionally-prepared TDA-transboundary diagnostic analysis (2005)

Figure 3 illustrates graphically the distribution of these assessments amongst the aforementioned groups.



**Figure 2.** Deliverables of regional outputs per sector in the framework of SAP-MED (excluding assessments – see Figure 3 below)



**Figure 3.** Assessments reports categorized by subject under each of the three ecological objectives

# Regional Synopsis of NAP Implementation 2005-2015

The NAPs were prepared by all Mediterranean countries during the period 2004-2005 with the aim of developing and implementing concrete pollution reduction measures that address priority sectors and substances included in Annex 1 of the LBS Protocol and SAP-MED. The NAPs consider environmental and socio-economic issues, policy and legislative frameworks, and management, institutional and technical infrastructure available in the country. They also incorporate mechanisms for information exchange, technology transfer and promotion of cleaner technology, public participation and sustainable financing. A close examination of the scope of measures included in the individual NAPs shows that over 90 percent do indeed address all SAP priority substances regarding the sectors of “urban environment” and “industrial development”. However, on the implementation side, and specifically regarding:

1. Ability of national environmental laws and legislation to legally support pollution reduction resulting from SAP priority substances;
2. Presence of policy frameworks that promote pollution reduction and prevention in line with the measures of the NAPs; and
3. Existence of institutional structures capable of supporting monitoring activities, inspection, permitting and enforcement; promoting public participation and ensuring access to information.

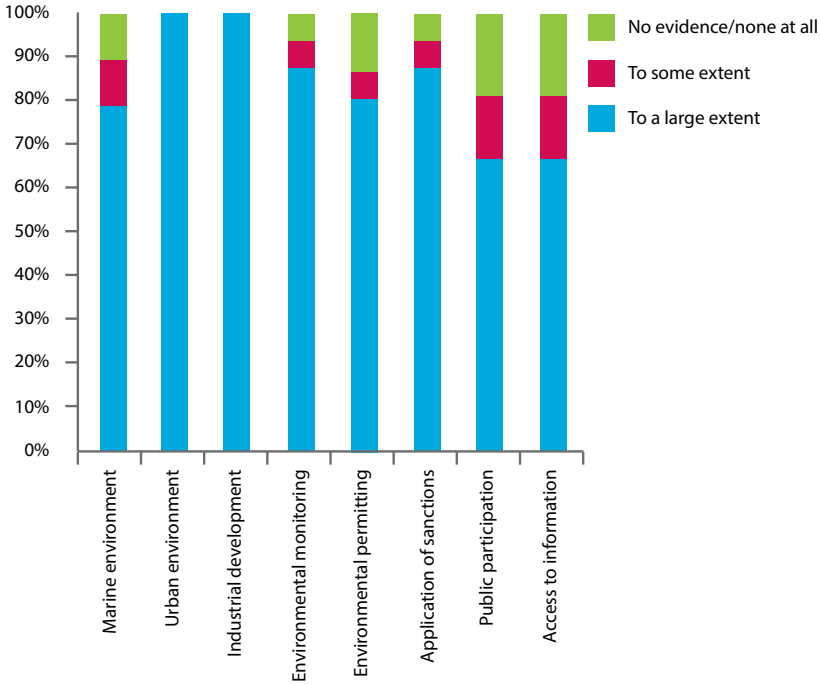
The following findings, categorized according to each evaluation criteria, are reached:<sup>1</sup>

- Regarding environmental laws and legislation, and as illustrated in Figure 4, between 80 percent and 100 percent of countries have introduced to a large extent national laws that specifically address protection of the marine environment, urban environment industrial development environmental monitoring and permitting and application of sanctions.
- With reference to policy frameworks, and as can be seen from Figure 5, approximately 80 to 90 percent of countries have introduced policies that led to a large extent to protection of the marine environment, integrated coastal zone management, protection of the urban environment and control of industrial pollution.
- With regards to the establishment of supporting institutional structures, as can be illustrated from Figure 6, between 60 to 75 percent of countries have in place the appropriate structures to support monitoring, permitting and inspection activities, in addition to the necessary institutional framework for application of sanctions.

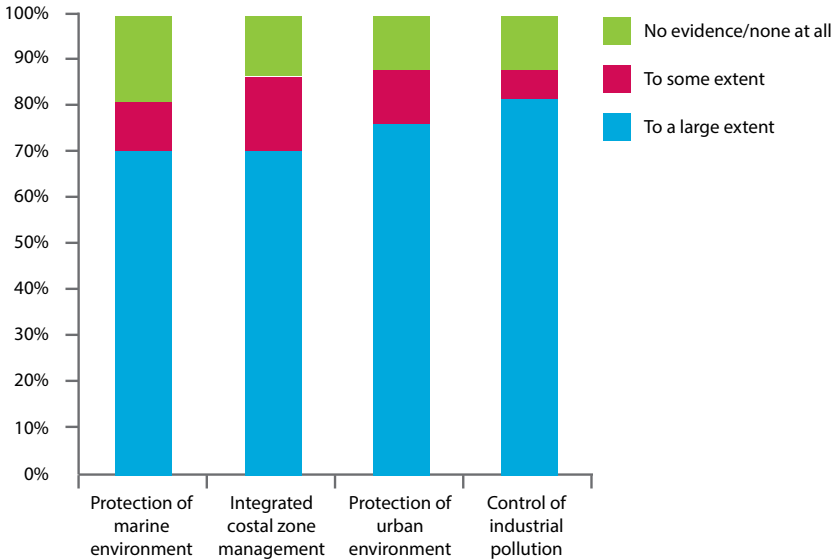
## Main findings and key messages

- Over 80 percent of national laws and policy frameworks of the Mediterranean Countries support NAP implementation. More than 50 percent of these laws provide for integrated monitoring programmes of marine and coastal environment, or incorporate in their policies the main principles of the ecosystem approach.

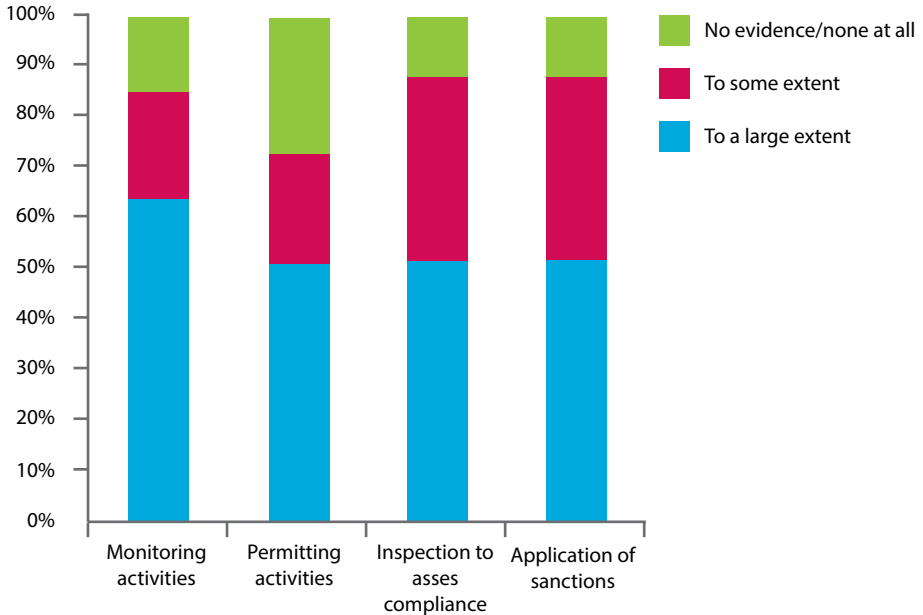
1. Meeting NAP requirements to a large extent whereby the Countries fulfill completely all requirements needed to support NAP implementation;  
- Meeting NAP requirements to some extent whereby the Countries do not address all aspects required for supporting NAP implementation;  
- None at all whereby the Countries do not address any aspect required for supporting NAP implementation; and  
- No evidence is available whereby no decision could be made as reliable information could not be obtained from available sources.



**Figure 4.** Countries with environmental laws and legislation to legally support pollution reduction resulting from SAP-MED priority substances



**Figure 5.** Countries with policy frameworks that promote pollution reduction and prevention in line with the measures of the NAPs



**Figure 6.** Countries with appropriate institutional structures capable of supporting monitoring activities, inspection, permitting and enforcement

- Over 85 percent of national laws and legislation support monitoring, permitting, inspection and application of sanctions; however, supporting institutional structures for enforcement of permitting and compliance are only found in 57 to 71 percent of the Countries. This is manifested in:
  - Lack of systematic implementation of monitoring activities;
  - Inability to enforce permitting requirements; and
  - Lack of transparent reporting measures taken and access by the general public.
- Environmental inspection processes should be strengthened. Compliance with permitting requirements should be assessed and requirements enforced.
- Capacity building programmes to enhance the efficiency of environmental inspections and enforcement should be implemented.
- Threats from land-based sources as well as from other sources should be monitored in a regular and systematic manner. The interaction among and cumulative impacts of the various threats should be recognized.
- Legislation related to compliance and enforcement focuses on traditional pollution command and control tools and is relatively weak on using economic instruments for pollution reduction and prevention. Therefore, the latter should be further promoted as an efficient complimentary tool to ensure pollution reduction.

- Only two thirds of the Countries promote in their national policies public participation in decision-making processes and protect public's right to access to environmental data and information. Further efforts should be made in this respect.
- There is a need to make an in depth assessment of existing policy and regulatory frameworks to assess the gaps and the needs for taking into considerations the obligations and measures provided for in the 10 LBS Regional Plans with the view to achieve the ecosystem based GES targets with regards to pollution and marine litter.
- NAP implementation was not monitored by the countries in a systematic manner; therefore, a proper monitoring plan should be introduced as early as possible through a common set of indicators.

## Regional analysis of pollutants' loads and releases to the Mediterranean

SAP-MED addresses a number of priority categories of substances and sectors in accordance with LBS Protocol of the Barcelona Convention covering both urban environment and industrial development as illustrated in Table 3.

The adoption of 10 Regional Plans in the framework of Article 15 of the LBS Protocol presented an important added value to SAP-MED as they further specified and strengthened the SAP-MED with regards to industrial pollution sector (Persistent Organic Pollutants [POPs], heavy metals and food industry), urban development (BOD<sub>5</sub> from urban wastewater and marine litter), as well as enhanced the SAP-MED monitoring and reporting requirements for these specific pollutants.

**Table 3.** SAP-MED Priority Substances

Sector	Category	Substances
Urban environment	Municipal wastewater Municipal solid waste Air pollutants	
Industrial develop- ment	Toxic, Persistent and Liable to Bioaccumulate (TPB)	Aldrine, DDT, Dieldrine, Endrine, Chlordane, Heptachlor, Mirex, Toxaphene, Hexachlorobenzene, Polychlorinated biphenyls (PCB), Polychlorinated dibenzo-p-dioxins/furans (PCDD/PCDF), Polycyclic Aromatic Hydrocarbons (PAH), Mercury, Cadmium, Lead, Organometallic compounds
	Other heavy metals	Zinc, Copper, Chrome
	Organohalogen compounds	Chlorinated solvents, Chlorinated paraffins, Chlorobenzenes, Polychlorinated naphtalenes (PCNs), Polybrominated diphenyl ethers (PBDE) and Polybrominated biphenyls (PBB), Chlorophenols, Lindane, Chlorophenoxy acids
	Radioactive substances	-
	Nutrients and suspended solids	BOD <sub>5</sub> , Nutrients (Nitrogen, Phosphorous), Suspended Solids (SS)
	Hazardous wastes	Obsolete chemicals, Used lubricating oils, Batteries

A reporting system was also established to track pollution reduction progress/trends and hotspot elimination, referred to as National Baseline Budget system (NBB). Efforts were made to introduce Pollutant Release and Transfer Register (PRTR) as a tool supporting effectively the NBB reporting and building capacities of a number of the Contracting Parties.

For the purpose of this evaluation, data acquired from the pollutant loads releases into the marine environment (NBB) 2003, 2008, 2013 and the latest E-PRTR were analyzed and assessed.

## Constraints and limitations of data analysis

It has to be noted that national data on (NBB) presented inconsistencies between reporting years, and with other reporting systems (PRTR) in those countries where different reporting systems were in use. Therefore, the variations within the scope of the reporting, different methods of calculation and lack of data validation hindered to some extent the identification of reliable trends, and thus the extraction of solid conclusions and recommendations.

**Geographical scope of NBB:** Countries used different criteria to delimitate the geographic scope to build-up the industrial inventory to be included in the NBB. Some countries considered the overall Mediterranean hydrological basin, while others preferred to work on the Mediterranean coastal administrative regions level.

**Register:** Register detail (emission value per pollutant, nature (air/water) and installation/site) was submitted in NBB 2003 and 2008; however, NBB 2013 provided aggregated data only. E-PRTR specifies register detail as well.

**Emission value:** Emissions values into air/water for all pollutants were reported in kg/year except for PCDD/PCDF, which was mostly reported in mg/year.

**Direct versus indirect emissions:** Different criteria were used to report water discharges. Some countries (e.g. E-PRTR reporting countries) differentiated between direct (after treatment, to rivers and coastal waters) and indirect (before treatment, to sewage systems) emissions, and in these cases direct discharges were only selected for the NBB database.

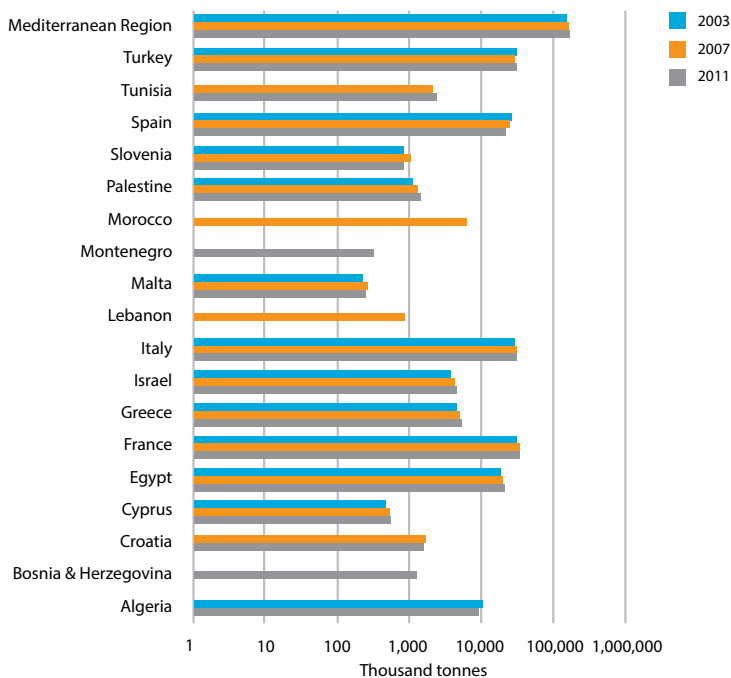
**Method of calculation:** Some countries used emission factors and activity data to estimate atmospheric and water releases, while others combined estimated with monitored data.

**Pollutants:** The number of reported pollutants notably increased in 2008 and 2013. For this reason, trends on specific pollutants are subject to previous reporting data.

**Sectors:** NBB sectors/subsectors differ from E-PRTR list of activities. To enhance comparability, NBB sectors were converted and aggregated into the 9 main activities set by Annex I of the E-PRTR Regulation<sup>2</sup>. As E-PRTR does not fully cover the scope of the NBB, NBB sectors not covered by E-PRTR, e.g. transport, tourism or agriculture, were included in the "Other activities" category.

<sup>2</sup> Regulation (EC) No 166/2006, OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC.





**Figure 7.** MSW generation in Mediterranean countries

Source: Eurostat and SEIS report (Algeria and Tunisia in 2011), UNSD (Algeria in 2003) and Medstat compendium 2006 (Egypt in 2000, Lebanon in 2007, Morocco in 2000 and Tunisia in 2004)

The analysis covers the two main SAP-MED sectors, namely urban environment and industrial development.

## 4.1 Urban environment

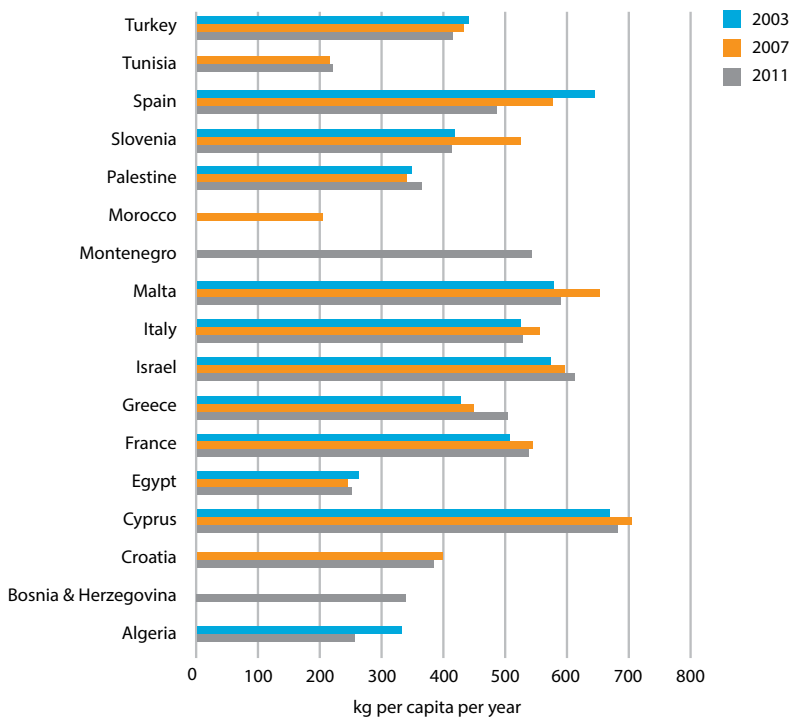
SAP-MED foresees for urban solid waste management the reduction at source, separate collection, recycling, composting and environmentally sound disposal by 2025. The Regional plan on Marine litter Management (2013) boosts the application of the waste hierarchy as a priority order in waste prevention and management legislation and policy, i.e.: prevention, preparing for re-use, recycling, other recovery, e.g. energy recovery and

environmentally sound disposal.

Most data on solid waste management have been extracted from World Bank reports<sup>3</sup> (17 Mediterranean countries available), Eurostat reports<sup>4</sup> (10 Mediterranean countries), the SEIS report<sup>5</sup>, SWEEP-NET reports<sup>6</sup> (5 countries available) and Report for RECO BALTIC 21 TECH.

With regard to Municipal Solid Waste (MSW) generation, Figure 7 shows generation of MSW for 2003, 2007 and 2011 for the Mediterranean region and per country, while Figure 8 shows the generation of MSW per capita for 2003, 2007 and 2011 per country.

3. Hoorweg, Daniel; Bhada-Tata, Perinaz. 2012. What a waste: a global review of solid waste management. Urban development series; knowledge papers no. 15. Washington, DC: World Bank. <http://documents.worldbank.org/curated/en/2012/03/16537275/waste-global-review-solid-waste-management>  
 4. <http://epp.eurostat.ec.europa.eu/portal/page/portal/environment/data/database>  
 5. EEA-UNEP/MAP joint report, 2014; Horizon 2020 Mediterranean report toward shared environmental information systems.  
 6. The Regional Solid Waste Exchange of Information and Expertise network in Mashreq and Maghreb countries.



**Figure 8. MSW generation per capita per year in Mediterranean countries**

Source: Eurostat and SEIS report (Algeria and Tunisia in 2011), UNSD (Algeria in 2003) and Medstat compendium 2006 (Egypt in 2000, Lebanon in 2007, Morocco in 2000 and Tunisia in 2004)

Source: Eurostat and SEIS report (Algeria and Tunisia in 2011), UNSD (Algeria in 2003) and Medstat compendium 2006 (Egypt in 2000, Lebanon in 2007, Morocco in 2000 and Tunisia in 2004)

The Municipal Solid Waste (MSW) collection rate and the disposal methods (in percent) in Mediterranean countries are presented in Figure 9 and Figure 10 (based on World Bank, 2012.<sup>7</sup>)

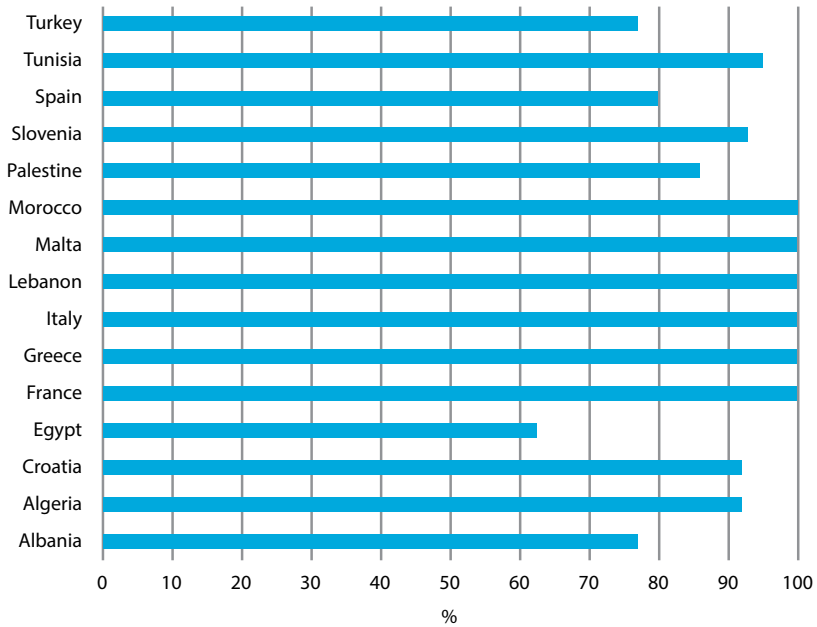
### Main findings and key messages

- An overall reduction trend on MSW generation was identified in the Mediterranean region for the period 2003-2011; however, this regional trend needs

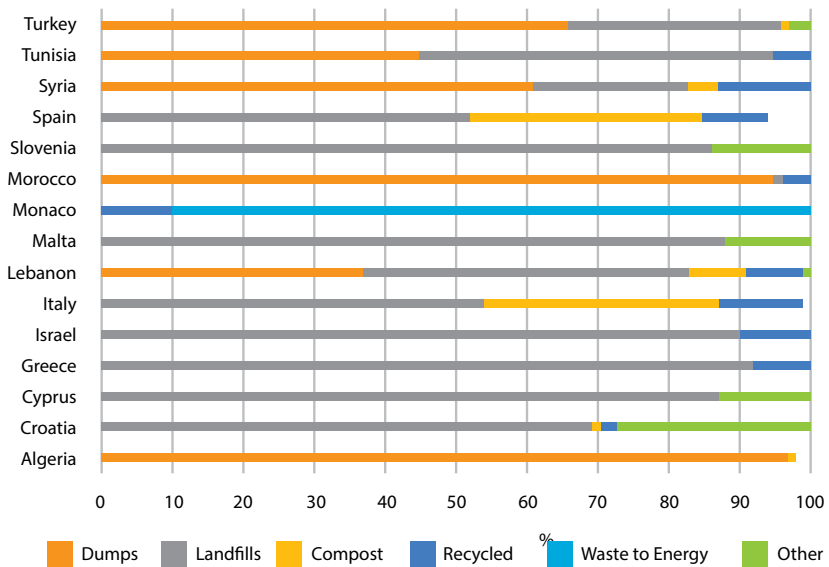
to be further confirmed with data missing from some countries for certain years.

- As for MSW generation per capita per year, the highest rates in the region are close to 600 kg/capita/year. The lowest rates are between 200-300 kg/capita/year.
- Most EU countries show collection rates near 100 percent, while for other Mediterranean countries, collection rates vary between 40 to 85 percent.
- Open-air dumping is a common disposal method in several Mediterranean countries.

7. Hoornweg, Daniel; Bhada-Tata, Perinaz. 2012. What a waste: a global review of solid waste management. Urban development series; knowledge papers no. 15. Washington, DC: World Bank. <http://documents.worldbank.org/curated/en/2012/03/16537275/waste-global-review-solid-waste-management>



**Figure 9.** MSW collection rates in Mediterranean countries (Source: World Bank, 2012)<sup>8</sup>



**Figure 10.** MSW disposal methods in Mediterranean countries (Source: World Bank, 2012)<sup>9</sup>

8. Note that rates for Egypt and Morocco are mean values

9. Note that rates for Monaco and Syria have been adjusted to 100 percent.

- Recycling and composting are not common in most Mediterranean countries.

## 4.2 Industrial development

### 4.2.1 Releases of pollutants into the marine environment (NBB)

National Baseline Budget (NBB) is the reporting tool established to detect any possible reduction trend in the direct and indirect releases of pollutants into the marine environment which could result from the implementation of priority actions as described in the NAPs/SAP-MED targets. NBB compiles national pollutant discharges to air and water for a large number of pollutants with a five-year periodicity.

As part of this evaluation, a comprehensive data analysis regarding 2003, 2008 and 2013 data was undertaken. Due to the reduced number of NBB 2013 country reports (only available for Egypt, Israel, Lebanon, Montenegro and Turkey); E-PRTR 2013 was also considered for the EU Mediterranean countries (Cyprus, France, Italy, Greece, Malta, Slovenia and Spain) to better describe the regional scenario. In this context, conclusions are drawn with caution, especially those related with the number of registers, as NBB 2013 reports do not include submitted register details. Main results and information gaps are provided below.

**Countries:** In 2003, all 22 countries reported data to the NBB, while in 2008 data were not available for two countries (Greece and Albania). Only five countries submitted NBB 2013. To complement the analysis for 2013, E-PRTR from EU Members (seven countries) were also considered.

**Registers:** In 2003, a total of 7,554 registers were submitted while in 2008, the number of registers increased to 12,595. Regarding NBB 2013, the number of registers, which went up to 7,144, was calculated based on E-PRTR 2013 only as no register detail was submitted by NBB 2013 reporting. The number of registers by country is shown in Figure 11.

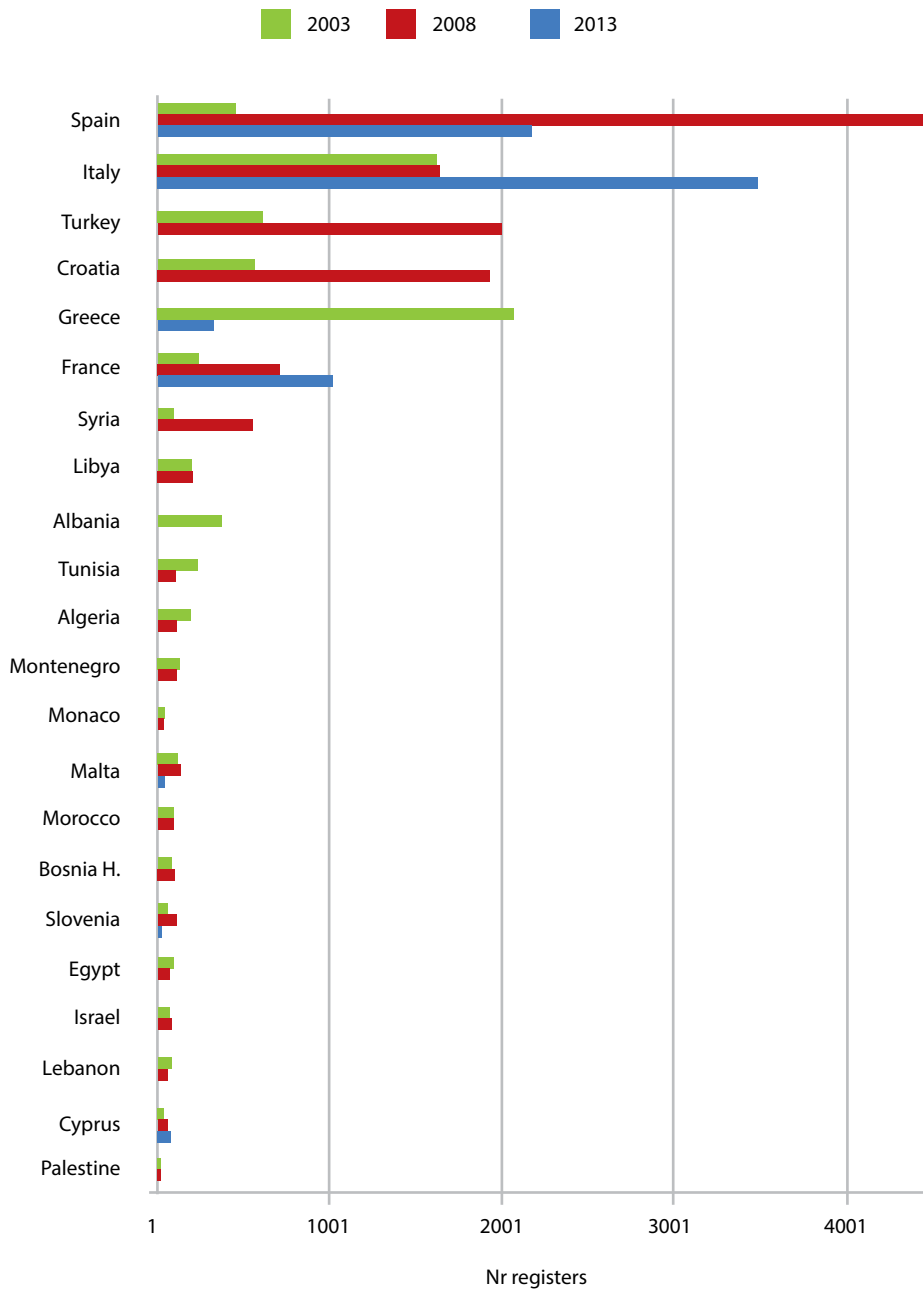
**Nature of emissions:** The number of air emission registers was 14 percent higher than the number of liquid discharge registers in 2003. On the contrary, in 2008, registers on water discharges were 8 percent higher than air registers. In 2013, air emission registers were 62 percent higher than liquid discharges (based on E-PRTR data only). Three countries did not report atmospheric emissions in 2003, one country in 2008 and three countries in 2013. The number of registers by nature is shown in Figure 12.



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**Pollutants:** Approximately 75 different substances were included in the 2003 dataset, while in 2008, a total 103 pollutants were reported, including 70 of the substances reported in 2003. In 2013, 92 different pollutants were reported by either NBB or E-PRTR. Table 4 provides the number of different sectors and pollutants reported by each country in 2003, 2008 and 2013.

As for the highest reported pollutants in the registers, BOD<sub>5</sub> was the pollutant mostly reported in both NBB 2003 and 2008



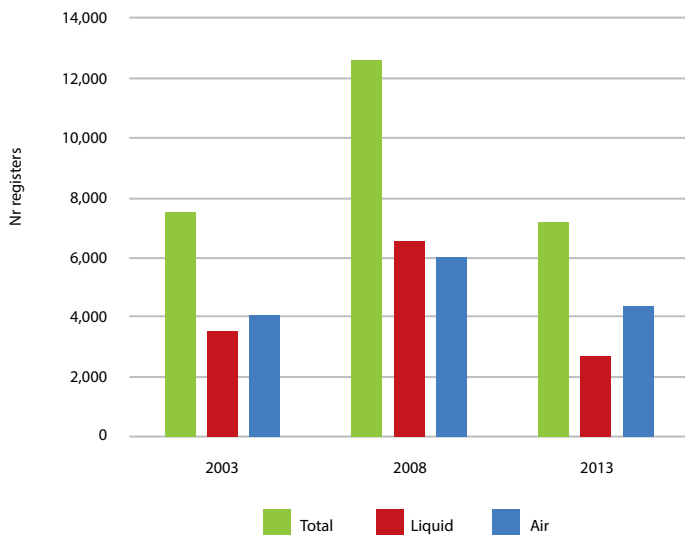
**Figure 11.** Number of registers per country (NBB 2003, 2008 and E-PRTR 2013)

(9 and 11 percent, respectively), followed by Nitrogen Oxides (NOx/NO2) and Non-methane organic compounds (NMVOC) in 2003, and Total Suspended Solids (TSS) and Nitrogen Oxides (NOx/NO2) in 2008.

and 11 percent, respectively, of the total number of registers). Chemical industry, waste and wastewater and energy are the most reported sectors in 2008 (18 percent, 13 percent and 11 percent, respectively).

Waste and wastewater, intensive livestock and aquaculture and energy are the most reported sectors in 2013 (24 percent, 21 percent and 13 percent, respectively).

Regarding trends, intensive livestock and aquaculture, and waste and wastewater management present a significant increase from 2003 to 2013, while chemical industry and production of metals show a noticeable decline, particularly from 2008 to 2013.

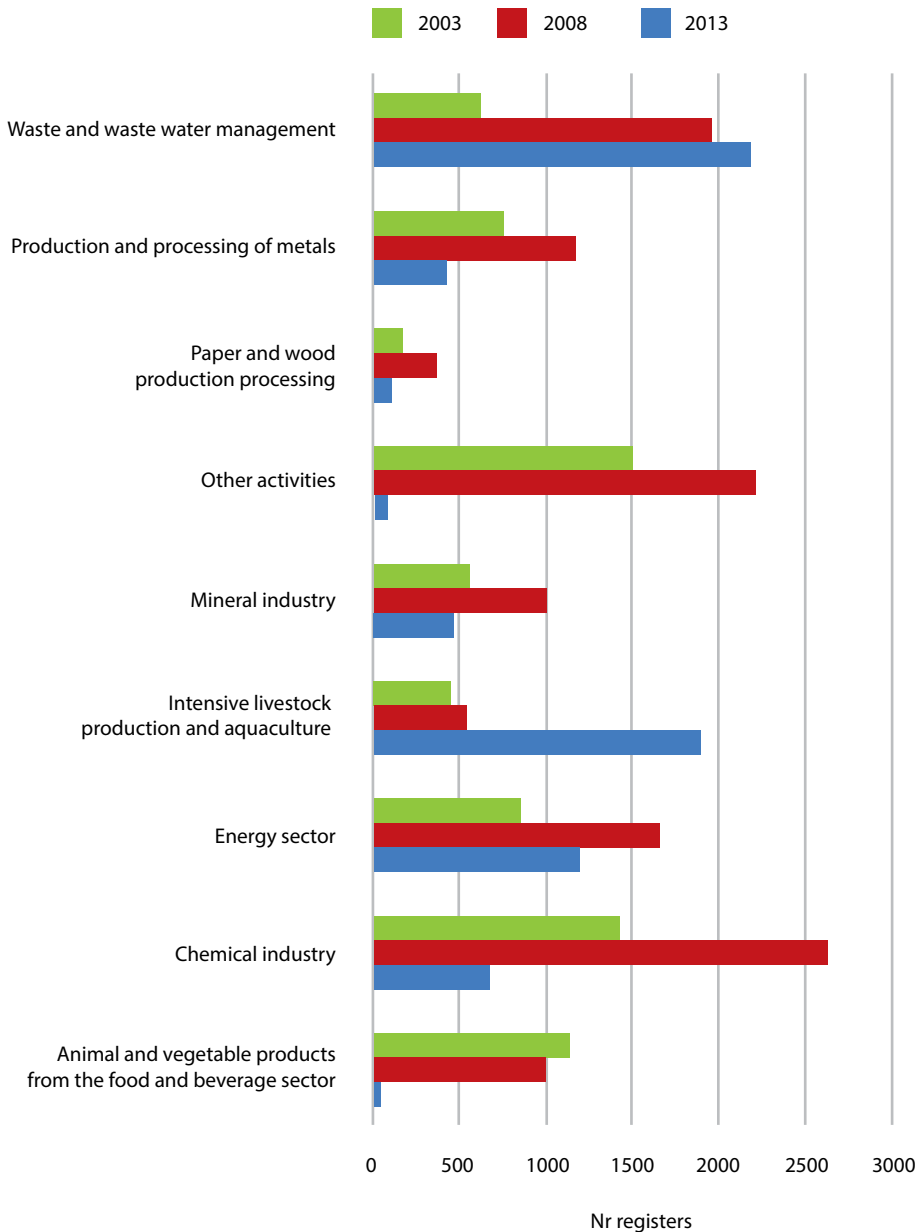


**Figure 12.** Number of registers per nature (NBB 2003, 2008 and E-PRTR 2013)

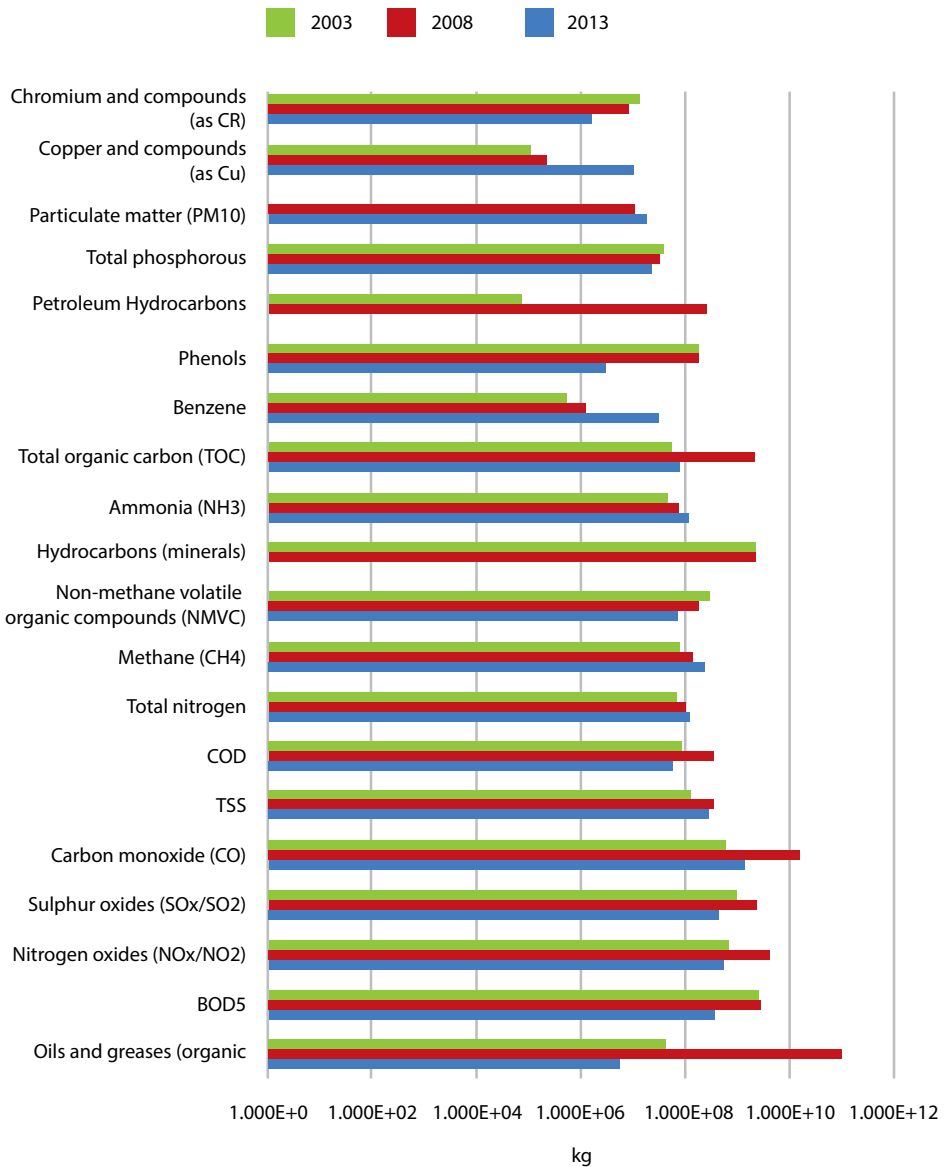
Regarding 2013, and due to the lack of register details in NBB 2013, only E-PRTR data from EU Mediterranean countries were considered. Ammonia was the pollutant mostly reported (27 percent of all registers), followed by Nitrogen Oxides (NOx/NO2) and Zinc and compounds (7 and 5 percent, respectively). It has to be noted the BOD<sub>5</sub> is not reported under the E-PRTR.

**Sectors and subsectors:** Figure 13 shows the number of registers per sector reported by NBB 2003, NBB 2008 and E-PRTR 2013. Sector categories are based on the list of activities in Annex I of E-PRTR Regulation. Chemical industry, food and beverage and energy are the most reported sectors in 2003 (19 percent, 15 percent





**Figure 13.** Number of registers per sector (NBB, 2003, NBB 2008 and E-PRTR 2013)  
*(Based on the list of activities in Annex I of E-PRTR Regulation).*



**Figure 14.** Top pollutants by emission values (NBB 2003, 2008, 2013 and E-PRTR, 2013)<sup>10</sup>.

<sup>10</sup>. NBB 2013 for Egypt, Lebanon, Israel, Montenegro and Turkey. E-PRTR 2013 for Cyprus, France, Italy, Greece, Malta, Slovenia and Spain.



**Table 4.** Number of different sectors and pollutants reported by each country in 2003 and 2008.

Country	2003		2008		2013	
	nSectors	nPollutants	nSectors	nPollutants	nSectors	nPollutants
Albania	14	18	-	-	-	-
Algeria	13	30	15	20	-	-
Bosnia H.	8	23	6	18	-	-
Croatia	18	35	16	34	-	-
Cyprus	11	21	7	27	5	16
Egypt	10	30	10	29	7	16
France	14	17	21	54	9	72
Greece	21	24	-	-	8	44
Israel	7	35	8	27	8	64
Italy	20	48	13	47	9	79
Lebanon	14	38	14	17	16	28
Libya	8	27	7	27	-	-
Malta	6	25	6	25	4	20
Monaco	7	24	7	23	-	-
Montenegro	7	24	6	28	7	25
Morocco	9	7	9	5	-	-
Palestine	1	10	1	10	-	-
Slovenia	11	20	12	18	3	10
Spain	0	31	22	80	9	67
Syria	14	27	14	26	-	-
Tunisia	10	29	9	16	-	-
Turkey	19	31	20	25	12	31

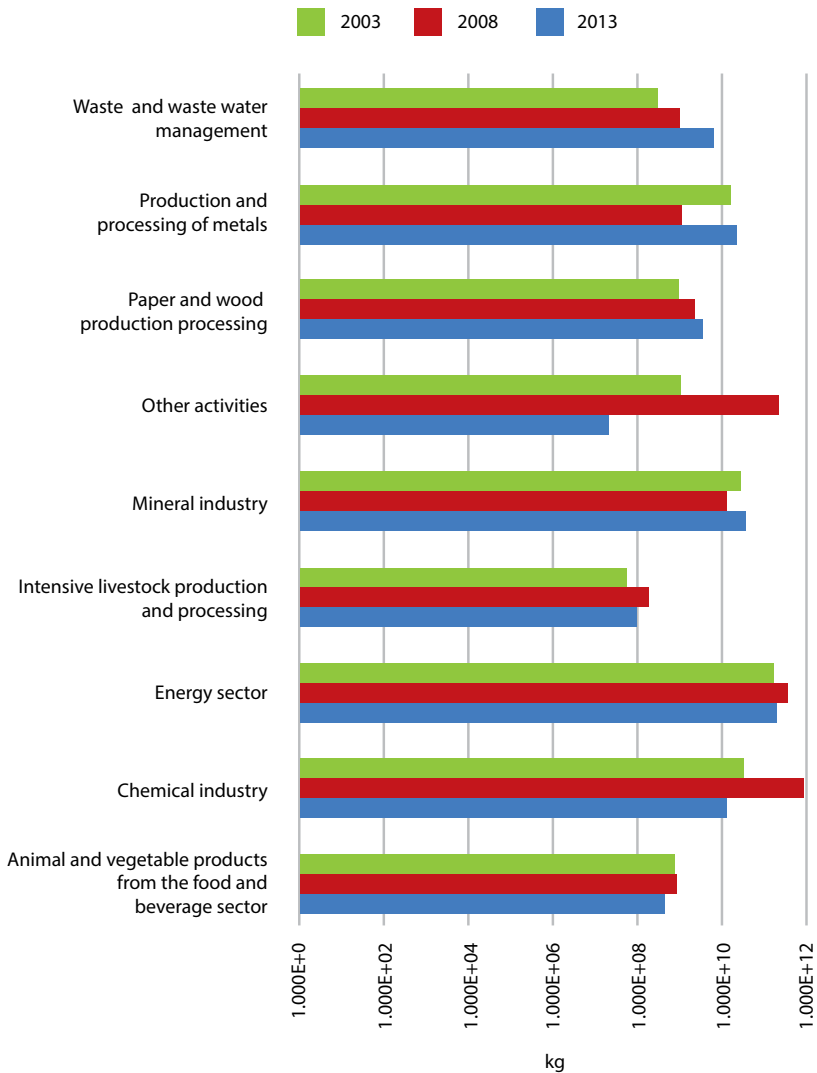
## 4.2.2 Emission trends

Figure 14 shows the pollutants with major emission values reported by NBB 2003, NBB 2008 and E-PRTR 2013 in the Mediterranean region. Pollutants most emitted/ discharged in 2003 are hydrocarbons (minerals), BOD<sub>5</sub> and sulphur oxides (SOx/SO<sub>2</sub>). In 2008, pollutants most emitted/ discharged are oils and greases (organic), carbon monoxide (CO) and nitrogen oxides (NOx/NO<sub>2</sub>). In 2013, atmospheric pollutants such as Nitrous Oxide (N<sub>2</sub>O), Carbon Monoxide (CO), Nitrogen Oxides (NOx/NO<sub>2</sub>) and Sulphur Oxides (SOx),

and BOD<sub>5</sub> are the most emitted pollutants in the region.

Regarding trends, copper (Cu), benzene, ammonia (NH<sub>3</sub>), PM<sub>10</sub>, methane (CH<sub>4</sub>) and Total Nitrogen show increasing trends from 2003 to 2013, while chromium (Cr), Total Phosphorous, Phenols and NMVOC show decreasing trends for the same period.

Concerning atmospheric emissions, Figure 15 shows the total air emission values per sector reported by NBB 2003, NBB 2008 and E-PRTR 2013 in the Mediterranean region. The sectors reporting major atmospheric emissions in



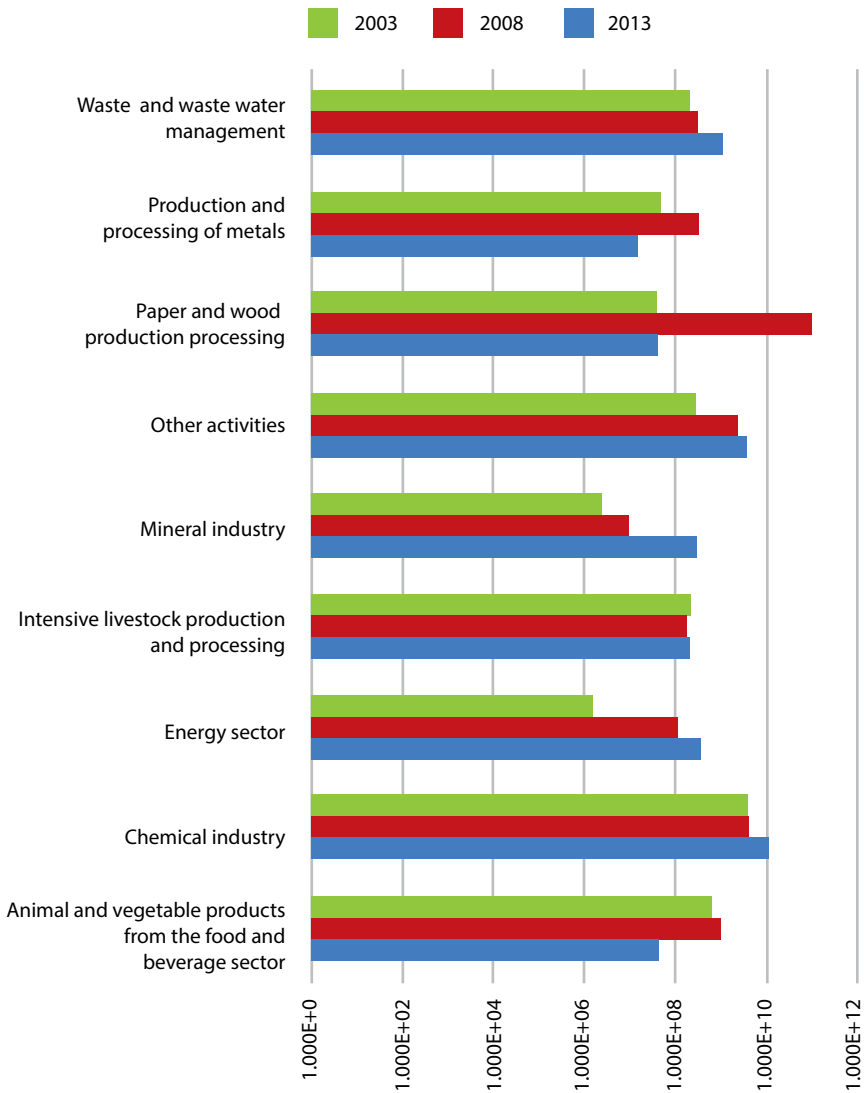
**Figure 15.** Total emission values to air per sector (NBB, 2003, 2008 and 2013 and E-PRTR 2013)<sup>11</sup>

2003 are the energy sector, chemical industry and mineral industry with a 66 percent, 14 percent and 12 percent, respectively. Main sectors emitting atmospheric pollutants in 2008 are chemical industry and energy sector (59 and 25 percent, respectively). Sectors with major atmospheric emissions in 2013 are the energy sector (71 percent of total

air emissions) and the mineral industry (13 percent).

Regarding trends, waste and wastewater management, and paper and wood processing industries show general increasing trends from 2003 to 2013, while some particular decreasing trends are

11. NBB 2013 for Egypt, Lebanon, Israel, Montenegro and Turkey. E-PRTR 2013 for Cyprus, France, Italy, Greece, Malta, Slovenia and Spain.



**Figure 16.** Total aqueous effluent values per sector (NBB 2003, 2008 and 2013 and E-PRTR 2013)<sup>12</sup>

12. NBB 2013 for Egypt, Lebanon, Israel, Montenegro and Turkey. E-PRTR 2013 for Cyprus, France, Italy, Greece, Malta, Slovenia and Spain.

observed for chemical industry, energy sector, intensive livestock and food and beverage sector from 2008 to 2013.

Figure 16 shows the total water effluent values per sector reported by NBB 2003, NBB 2008 and E-PRTR 2013 in the Mediterranean region. The sectors reporting major effluent values in 2003 are the chemical industry (74 percent) and food and beverage (11 percent). In 2008, main sectors discharging pollutants to water are paper and wood processing and chemical industry (92 and 4 percent, respectively). In 2013, chemical industry and other activities (66 and 22 percent, respectively) are the sectors reporting major liquid emissions.

Regarding trends, waste and wastewater management, mineral industry, energy sector and chemical industry show general increasing trends from 2003 to 2013, while production of metals, paper and wood processing and food and beverage sector present particular decreasing trends from 2008 to 2013.



and scope; direct/indirect emissions; and method of calculation and data validation are issues that require further analysis.

5. In terms of pollution reduction, and in spite of data gaps, it is obvious that pressures from land-based sources remain high; therefore, trend monitoring of releases and pressures is crucial to define the most effective measures.

### Main findings and key messages

1. Pollution-related reporting capabilities of the Contracting Parties have improved and significant progress has been made. For the 2013 reporting cycle, further efforts are needed; particularly from those countries which have not submitted NBB 2013 yet.
2. Harmonization of NBB scope and methodology among all countries remains a priority.
3. Gaps need to be addressed with regards to E-PRTR, and synergies with NBB should be enhanced.
4. Geographical scope; sector categories

6. The process for updating NAPs should offer the opportunity to improve the reporting system at national and regional levels, including on-line reporting based on SEIS principles.

### Analysis of target achievement 2010-2025

SAP-MED sets specific pollution reduction targets for 33 different substances emitted from land based sources to be achieved by 2010 and 2025. In this regard, Table 5 shows the level of achievement, based on NBB 2003, 2008 and NBB, E-PRTR 2013 data, of such SAP-MED targets for the whole Mediterranean region.

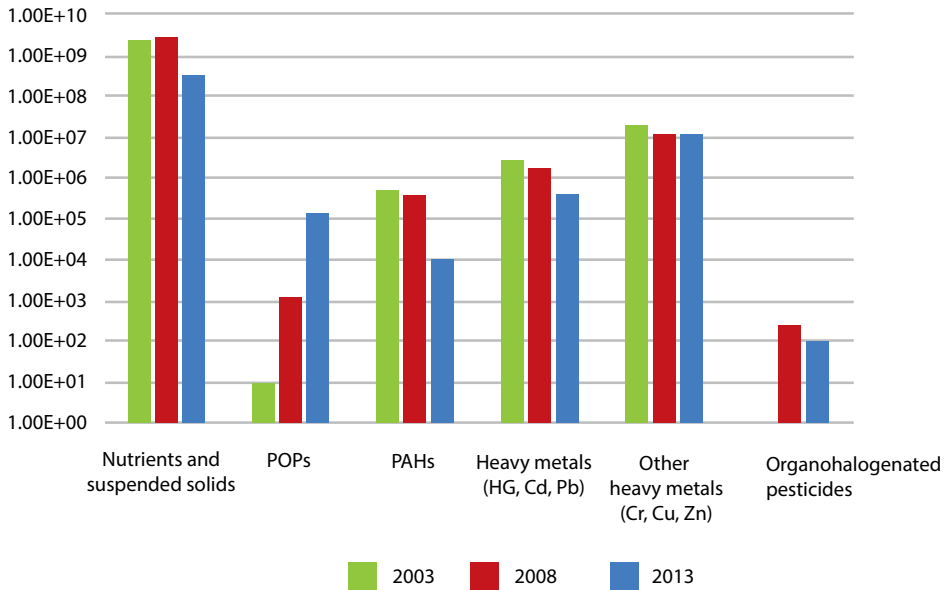
**Table 5.** Level of achievement of SAP-MED targets based on 2003, 2008 and 2013 NBB data and E-PRTR 2013 data.

SAP-MED Category	Substance	SAP-MED target	Emission value (kg/year)			Trend 2013 vs 2003 <sup>13</sup>
			2003	2008	2013 <sup>14</sup>	
Nutrients and suspended solids	BOD5	Reduce 50% inputs of BOD by 2010	●	●	●	
POPs	Aldrin	Phase out inputs of 9 pesticides and PCBs and reduce to the fullest possible extent hexachloro benzene, dioxins and furans by 2010	-	133.1	127.1	-5% <sup>15</sup>
	Dieldrin		-	69.59	124.23	79% <sup>15</sup>
	Endrin		-	0.06	37.97	●
	Heptachlor		-	0.07	92.00	●
	Hexachloro-benzene		0.36	29.57	25.17	>100% <sup>15</sup>
	PCB/PCT		5.2	14.93	7,289.15	>100% <sup>15</sup>
	PCDD/PCDF		5.18	1,037.62	147,195.57	>100%
PAHs	PAH	Phase out to the fullest possible extent inputs of PAHs by 2010	512,331	421,053	12,434	-98%
Heavy metals (Hg, Cd, Pb) and organometallic compounds	Mercury	Phase out to the fullest possible extent discharges and emissions and losses of heavy metals by 2025	1,029,131	612,618	58,671	-94%
	Cadmium		21,057	11,347	38,506	83%
	Lead		1,760,068	1,245,723	342,117	-81%
Other heavy metals	Zinc	Reduce discharges, emissions and losses of zinc, copper and chrome by 2010	7,753,795	3,110,815	851,796	-89%
	Copper		107,641	226,923	10,520,102	>100%
	Chrome		●	8,516,046	1,602,495	-88%
Organohalogenated pesticides	Lindane	Reduce discharges, emissions and losses into the Mediterranean Sea by 2010	0.03	267.71	105.90	>100%

13. Current status (in %) has been calculated following the formula: (kg substance reported 2013–kg substance reported 2003)/kg substance reported 2003. Numbers in red mean a net increase from 2003 to 2008 while numbers in green mean a net reduction from 2003 to 2008.

14. 2013 values include NBB 2013 for Egypt, Lebanon, Israel, Montenegro and Turkey. E-PRTR 2013 for Cyprus, France, Italy, Greece, Malta, Slovenia and Spain

15. Current status calculated following: (kg substance reported 2013–kg substance reported 2008)/kg substance reported 2008.



**Figure 17.** Trends of SAP-MED reduction targets per category of pollutants at regional level 2010-2025.

### Main findings and key messages

Assuming that NBB 2003; the first reporting cycle, had important gaps, reporting scope has generally increased in number of registers, pollutants, sectors/ activities in 2008 and 2013 due also to E-PRTR of the EU countries contribution. Although 2013 data are still incomplete, the reported releases of some pollutants, in particular POPs, show that data were probably under-reported in the previous reporting cycles, and that pressures are still high at present. Success stories with BOD<sub>5</sub>, some heavy metals and PAH seems to be reflected in regional decreasing trends; however, a complete analysis for 2013 is required to confirm regional trends.

Key messages arising from the pollutants' trend analyses are as follows:

Based on available data, BOD<sub>5</sub>, PAH, Mercury, Lead, Zinc and Chrome showed a

significant reduction of discharges into the Mediterranean Sea. However, this trend must be considered carefully as 10 countries have not submitted either NBB or PRTR 2013 yet.

Loads of PCB/PCT, Hexachlorobenzene, Lindane, PCDD/PCDDF Cadmium and Copper show increasing trends (unless the loads of pollutants reported in 2003 and 2008 were incomplete and had serious gaps).

Other target substances (e.g. some POPs) were assessed based on 2013 versus 2008 data, or were not considered due to the lack of NBB data. It should be noted however that some increases have been observed, although most of them should be banned (e.g. dieldrin, endrin or heptachlor). The reason might be a more comprehensive reporting scope, particularly from E-PRTR.

Trends of SAP-MED reduction targets per category of pollutants at regional level from

2010 to 2025 are shown in Figure 17.

## Key messages and way forward

### Overarching key messages

The regional synopsis of NAPs implementation in spite of existing gaps, shows that:

- Over 80 percent of the national policy and legal frameworks for marine and coastal pollution assessment and control are in place in most Mediterranean countries.
- Over 85 percent of national laws and legislation support monitoring, permitting, inspection and application of sanctions.
- There is a marked improvement in pollution-related reporting capabilities of the Contracting Parties as evident from the significant progress made from 2003 to 2013.

### Nevertheless, it is found that:

- More than 40 percent of legislation do not address integrated monitoring programmes of marine and coastal environment, nor do they incorporate in their policies the main principles of the ecosystem approach.
- NAP implementation was not monitored by the countries in a systematic manner.
- Supporting institutional structures for enforcement of permitting and compliance are lacking in about one third of the Countries. This is manifested in lack of systematic implementation of monitoring activities; inability to enforce permitting requirements; and lack of transparent reporting measures taken and access by the general public.

- Only two thirds of the Countries promote in their national policies public participation in decision-making processes, and protect public's right to access to environmental data and information.

The regional analysis of pollutants loads discharged to the Mediterranean indicates decreasing trends for a number of pollutants in particular for heavy metals and PAH. However, it shows that pollution pressures over the marine and coastal environments are still high, and require a more effective implementation of existing and additional measures.



### Way forward

#### **Implementation and enforcement**

1. As current legislation related to compliance and enforcement focuses on traditional pollution command and control tools, Countries should further promote economic instruments for pollution reduction and prevention as an efficient complementary tool to ensure pollution reduction.

## ***Institutional set-up***

- 2.** Environmental inspection processes should be strengthened. Compliance to permitting requirements should be assessed and requirements enforced. Capacity building programmes to enhance the efficiency of environmental inspections and enforcement should be implemented.
- 3.** Threats from land-based sources, as well as from other sources, should be monitored in a regular and systematic manner. The interaction amongst, and cumulative impacts of, the various threats should be recognized and assessed.
- 4.** Further efforts should be exercised to promote public participation in decision-making processes in national policies, and to protect public's right to access to environmental data and information.

## ***Programmes of Measures***

- 5.** There is a need to make an in depth assessment of existing policy and regulatory frameworks to assess gaps and identify needs for taking into consideration the obligations and measures provided in the 10 LBS Regional Plans with the view to achieve the ecosystem-based GES targets with regards to pollution and marine litter.

## ***Pollution Trends, Marine Pollution Monitoring and Reporting***

- 6.** In view of pollutants' loads and inventories discharged to the Mediterranean Sea, and in spite of data gaps, it is obvious that pressures from land-based sources remain high.
- 7.** Waste and wastewater management, energy sector, chemical, mineral industry and production of metals seem to be key sectors to focus attention on, with

the view to enhance their environmental performance, and prevent and reduce pollutant loads.

- 8.** There is a need to strengthen monitoring processes in a systematic manner by introducing adequate monitoring plans as early as possible through a common set of indicators. This is important in order to assess effectiveness of measures contained in the updated NAPs. The updated NAPs should offer an opportunity to achieve this objective including on-line reporting based on SEIS principles. The focus should be on trend monitoring of releases and pressures as a principal tool for defining the most effective measures.
- 9.** Pollution-related reporting capabilities require further improvement. Further efforts are needed to ensure regular reporting and quality assured data. Harmonization of NBB scope and methodology among all countries remains a priority. Gaps need to be addressed with regards to E-PRTR. Synergies and harmonization of E-PRTR and NBB reports should be enhanced.

The updated NAPs (2015-2025) should consider three major innovations as a vehicle for achieving the above:

- a)** *Development of programmes of measures aiming at pollution prevention and control to ensure compliance with the legally binding commitments under the Regional Plans adopted in the framework of Article 15 of the LBS Protocol, and achieving the relevant ecosystem approach GES targets and the remaining SAP-MED targets;*
- b)** *Identification of a set of indicators to regularly assess implementation of the updated NAP Programmes of Measures and their effectiveness on achieving GES targets; and*



*c) Application, to the extent possible, of cost benefit and or effectiveness analysis tools in identifying the most relevant programmes of measures to achieve Good Environmental Status with the view to enhance their financial sustainability and effectiveness.*

## Acronyms and Abbreviations

BOD5	Biochemical Oxygen Demand
COP16	16th Meeting of the Contracting Parties to the Barcelona Convention
COP17	17th Meeting of the Contracting Parties to the Barcelona Convention
DDT	Dichlorodiphenyltrichloroethane
DPSIR	Driving forces Pressure, State, Impact, Response
EC	European Commission
EO	Ecological Objective
ESM	Environmental Sound Management (eNeN)
EU	European Union
GEF	Global Environment Facility
GES	Good Environmental Status
IAEA	The International Atomic Energy Agency
LBS Protocol	Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources
MedPartnership	The Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem
MED POL	UNEP/MAP Programme for the Assessment and Control of Marine Pollution in the Mediterranean
MSSD	Mediterranean Strategy for Sustainable Development
NAP	National Action Plan under the LBS Protocol
NBB	National Baseline Budget
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated biphenyl
PCDD	Polychlorinated dibenzo-p-dioxins
PCDF	Polychlorinated dibenzo-p-furans
POP	Persistent organic pollutant
PRTR	Pollutant Release and Transfer Register
SAP-MED	Strategic Action Programme of regional and national activities to address land-based pollution
TDA	Transboundary Diagnostic Analysis
UNEP/MAP	United Nations Environment Programme/Mediterranean Action Plan
UNEP	United Nations Environment Programme
WWTP	Waste Water Treatment Plant



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