2nd ENI SEIS II South Support Mechanism Regional Workshop on Indicators

Athens (Greece), 17-18 April 2018

Report of the Meeting

European Environment Agency

This project is funded by the European Union

Table of contents

Report of the meeting

Introduction

1. The 2nd ENI SEIS South Support Mechanism Regional Meeting on Indicators was held on 17-18 April 2018 in Athens, Greece, at the Royal Olympic Hotel. The Meeting was organized by UN Environment/Mediterranean Action Plan (MAP) Plan Bleu and the Mediterranean Pollution Assessment and Control Programme (MED POL), in collaboration with the European Environment Agency (EEA).

2. The regional meeting discussed the current progress on H2020 indicator development and related assessment on wastewater, industrial emissions and solid waste including marine litter. The meeting also reviewed the proposed indicators' methodological specifications and reporting processes, including regional infrastructures, and agreed on a set of recommendations. The final list of H2020 indicators and their specifications were reviewed and agreed accordingly.

Participation

3. The meeting was attended by representatives from the following countries: Albania, Algeria, Bosnia & Herzegovina, Croatia, Cyprus, Egypt, Greece, Israel, Italy, Jordan, Libya, Malta, Montenegro, Morocco, Palestine, Slovenia, Tunisia and Turkey.

4. The following specialized agencies, intergovernmental organizations, and European Union funded Projects and Programmes were represented: the Centre for Environment and Development for the Arab Region and Europe (CEDARE), the European Environment Agency (EEA), the Horizon 2020 and Sustainable Water Integrated Management (SWIM) Projects.

5. The UN Environment/MAP Secretariat was represented by the Coordinating Unit, Mediterranean Pollution Assessment and Control Programme (MED POL), Plan Bleu Regional Activity Centre, and Regional Activity Centre for Information and Communication (INFO/RAC).

6. The full list of participants is attached as Annex I to the present report.

Opening of the meeting

7. Mr Gaetano Leone, UN Environment/MAP Coordinator, opened the meeting and welcomed the participants. He stressed the importance of the long-standing cooperation between the European Environment Agency (EEA) and UN Environment/MAP. He also highlighted the relevant main achievements of UN Environment/MAP in the past biennium and underlined the progress made in the framework of ENI SEIS II Project. He concluded his remarks by wishing the participants a successful meeting, and reiterating the importance of timely finalization and agreement on the proposed H2020 indicators and related factsheets.

8. Mrs Cecile Roddier-Quefelec, representative of the EEA, in her opening remarks, referred to the collaboration between the two organisations for the implementation of shared environmental information system principles in the region. She underlined the history of good cooperation between EEA and UN Environment/MAP and the joint work laying ahead to implement ENI SEIS II South Project. She also pointed out the current efforts made to refine the Horizon 2020 indicators.

9. The meeting elected Mr. Emad Nassif Armanious Mahrous, representative of Egypt, to chair the plenary session. Following the Chair's invitation, all participants made a short presentation of themselves and their work.

10. The Chair, supported by Mr. Jean-Pierre Giraud, representative of UN Environment/MAP-Plan Bleu/Regional Activity Centre, introduced the agenda and modalities of the meeting, briefly describing the purpose of the proposed break-out sessions.

11. The proposed Provisional Agenda was adopted without any modifications, as presented in Annex II to the present report.

Session 1: Refinement of H2020 Initiative review mechanism

12. Mrs Tatjana Hema, Deputy Coordinator of UN Environment/MAP presented the progress on relevant indicator-based assessment processes envisaged under UN Environment/MAP Programme of Work 2018-2019. In this respect, she highlighted the main assessment process and products, such as Quality Status Report, NAP mid-term evaluation, Integrated Monitoring and Assessment Programme, State of Environment and Development Report and their linkages with the ENI SEIS II South Project. She also presented the objective and prospects of each assessment processes with their expected outcomes and the way forward to ensure their effective delivery within the current biennium.

13. The representative of EEA presented an overview of the environmental assessment processes delivered by the Agency in the past years, highlighting the continuous efforts made to improve and adapt the analytical framework and build-up coherent knowledge base. She described the content, modalities and main elements of the European State and Outlook Report (SOER 2020), highlighting the timeline and complementarities with the regional assessment work, in particular for the next State of Environment and Development (SoED) and Horizon 2020. She also stressed out the importance of the information chain and capacity to make use of all relevant data and information sources (including earth observation, expert knowledge, and stories) which would give comprehensive additional information for indicator-based assessments.

14. The representative of UN Environment/MAP -Plan Bleu presented a mapping of existing Mediterranean indicators vis a vis the Sustainable Development Goals (SDG) and Mediterranean Strategy for Sustainable Development (MSSD), H2020 Initiative, NAPs, SCP Action Plan and IMAP implementation. He presented briefly the key characteristics of each indicator and their geographical coverage area referring to the above-mentioned processes.

15. Mrs Celine Ndong and Mr. Alessandro Lotti, representatives of UN Environment/MAP-INFO/RAC and Mr. Michael Assouline representative of EEA presented the development of the Regional Information System. They provided information on data collection, in particular for the databases of MED POL, as well as on data management processes focusing on data acquisition, processing and dissemination, as main pillars of the Regional Information System. They explained the functionalities of the different modules that constitute the Regional Information System and underlined the critical importance of data dictionaries to be developed in order to elaborate XML files which are indispensable elements of the data acquisition and the quality assurance processes.

16. Mr Marco Montuori, consultant of UN Environment/MAP -MED POL, introduced the Guide on National Baseline Budget Information System, as a tool developed by INFO/RAC and MED POL for the submission of data of the countries on pollution loads to NBB/PRTR MED POL Info System. He introduced in detail how reports are created and submitted and how the quality assurance of the data is executed in the NBB/PRTR MED POL Information System.

17. Mr Dimitris Tsotsos, consultant of UN Environment/MAP-MED POL introduced the Pollutant Release and Transfer Register (PRTR) Implementing Guide, aiming at guiding national authorities to implement Pollutant Release and Transfer Register tools at national level. He explained the importance of PRTR process for recording and reporting pollutant releases to the environment. The meeting was also informed of the intention to prepare a regulatory act template for PRTR implementation with the provision for the facility operators to report pollution releases to marine environment to national authorities.

18. Following the presentations, participants raised a number of questions on the need to ensure convergence and alignment of the definition of proposed indicators among various relevant processes to avoid confusion and reduce burden on data reporting. The meeting embarked on discussions about the linkages between the different reporting obligations and related national legislations that require to be carefully examined to maximize synergies. Responding to the concerns raised by the meeting, Mrs. Hema underlined that the work on the H2020 indicators would support reporting across the board addressing relevant SDGs, NAP implementation, IMAP and other reporting obligations. The meeting also recognized the importance of ensuring national coordination between the work of SEIS/H2020 and relevant processes which would facilitate the work of all countries. The meeting discussed and addressed the ways on which data for the H2020 indicators may be reported. It was highlighted that most of the H2020 indicators are based on existing data flows and countries were invited to use for this purpose already established infrastructures.

Session 2. Review of H2020 indicators

19. The meeting was broken down into 3 working groups on the Horizon 2020 issues, namely water, industrial emissions and waste, to review and agree on the proposed indicator specifications, with a particular focus on uncertainties, quality assurance-related issues, data availability and the way forward to close the gaps aiming .at initiating quality assured data flows generation.

20. The sub-group on water reviewed the proposed 7 indicators and their links with other global and regional processes. The main outcomes from the consultations with ENI South countries (which took place between January and March 2018) were presented and discussed in particular regarding data availability and the main limitations on implementing and populating the water indicators, some of which were specifically addressed during the discussions.

21. Experts from Jordan and Palestine brought in their experiences and presented key challenges of implementation of Indicators 3.1 and 3.2 at national level. It was brought to the attention of the meeting that there may be some discrepancies between data provided by countries and data made available in global databases. Therefore, it was deemed necessary to validate data by countries for the assessment. The sub-group proposed to follow the definitions and methodological specifications of IMAP relevant factsheets for the Indicator 5.

22. The methodologies for Indicators 4.1, 4.2 and 4.3 were discussed in detail and some adjustments were made based on discussions and agreements made by the sub-group. The sub-group discussed one of the key issues related to computing of indicators at the catchment/hydrological basin in the coastal areas. During the discussion, participants recognized these linkages and were generally in favor of considering data aggregation at this geographical level. However, given some of the existing limitations, it was agreed to adopt a three-steps approach: development of aggregation of data at the hydrological basin would be pursued; in case data was not available, the coastal areas/main coastal cities should be considered; data at the national level was to be the minimum requirement, or when the entire territory is covered by the hydrological basin. A few illustrations of possible approaches to compute indicators at the hydrological basin level were presented but it was recognized that this topic may require some additional support and capacity building.

23. The sub-group on waste reviewed in detail the proposed indicators. The sub-group made a number of points regarding the “hardware” indicators respectively: (i) need for clear definitions of municipal waste and waste treatment; (ii)100 km buffer zone regarding geographical coverage with the required adjustments to be implemented by national authorities; (iii) need to include river basins as marine litter catchment areas. For this specific point, the agreement was to be consistent with the relevant outcome decided in the water sub-group; (iv) in spite of significant difficulties to quantify the work of the informal recyclers, it was agreed to consider this aspect and some success stories to highlight their contributions. The sub-group decided to collect data only from dumpsites and sanitary landfills for waste disposal, which would therefore make it easier to complete the requested data sets.

24. The sub-group welcomed the proposed “software” indicators as response indicators and made suggestions to refine and make them more representative of the shift to circular economy and sustainable consumption and production (SCP).

25. The sub-group on industrial emissions proposed some modifications. The group embarked on discussions on available resources and means by which countries can report regularly on the proposed indicators. This was followed by an in-depth discussion on the difficulties and challenges faced by various countries to collect and report data. The sub-group especially underlined the need for developing emission factors and completing legislation for data reporting at national level.

26. A summary of all the lists of indicators, agreed in the subgroups were presented and agreed in plenary, including the relevant factsheets which are presented in Annex III, appendix 2 to this report.

Session 3. Toward 2019 H2020 assessment

27. The representative of EEA introduced the main elements of the 2nd Joint EEA/UN Environment MAP Report on Progress of H2020 Initiative for consideration by the meeting. She presented the outcomes of the joint meeting of EEA and UN Environment/MAP on regional assessments which was held in Copenhagen on 26-28 of February 2018 and corresponding initial outline proposal for the report, ensuring complementarity and convergence with the UN Environment MAP/Plan Bleu State of the Environment and Development. She also clarified the key steps, timing and scope of the expected inputs and contribution from partner countries.

Session 4. Next steps

28. Each sub-group reported to the plenary the outcomes of their discussions regarding indicator factsheets. The meeting agreed on the proposed indicators factsheets with modifications and discussed the outcomes of the breakout sessions. The plenary provided guidance on the way forward as presented in Annex III Appendix 2 to this report.

29. Mr Erol Cavus, representative of UN Environment/MAP- MED POL, informed the meeting of the upcoming next cycle of National Baseline Budget updates and the technical and financial support envisaged for the countries to populate the agreed related indicators.

30. After a questions/answers session on the next steps, the representative of UN Environment/MAP-Plan Bleu, thanked all the participants for their active contribution and closed the meeting.

Annex I
List of Participants

List of Participants

REPRESENTATIVES OF THE CONTRACTING PARTIES

ALBANIA	**Mrs Oriana HANXHARI** NFP Assistant Coordinator - General Director Office National Environmental Agency Str` Sami Frasheri` Building No.4 1001 Tirana ohanxhari@yahoo.com +355696803660
ALGERIA	**Mrs Sophia AZOUANI** Directrice technique - Réseau de surveillance Observatoire National de l'Environnement et de Développement Durable 11, rue Mohamed Tazairt – 16000 Alger sophia.azouani@onedd.org **Mr Djamel BELALIA** Chef de service base de données Agence Nationale des Déchets 34, Rue des Fusillés, Mohamed BelouizdadAlger belalia.djamel@and.dz +213 21 67 36 67 **Mr Sami BOUHOUCHE** Chef de station de surveillance skikda observatoire national de l'environnement et du développement durable 11 Mohamed tazairt beb el oued alger ss.skikda@onedd.org +213 77570701-17 **Mrs. Fatima RAHAL** Chargée des Programmes Statistiques Office National des Statistiques Avenue Belkacemi Mohamed-El Annasser -Alger16000 nassimarahal@yahoo.fr +213 21 77 78 44
BOSNIA & HERZEGOVINA	**Mrs Selma CENGIC** Executive Director -Hydro engineering department Hydro Engineering Institute Sarajevo Stjepana Tomica 1 – Box 405 – 71000 Sarajevo selma.cengic@heis.ba +38733207949
CROATIA	**Mr Neven BUJAS** Head of laboratory - sector of development Hrvatske vode Box 40 - 22000 Šibenik neven.bujas@voda.hr +38522460682
CYPRUS	**Mr Neoklis ANTONIOU** Environment Officer - Department of Environment Ministry of Agricultutr, Rural Development and Environment

	20-22 28th Oktovriou ave. – 2414 Nicosia nantoniou@environment.moa.gov.cy +35722408936
EGYPT	**Mr Ahmed AHMED HASSAN MOHAMMED IBRAHIM** Environmental Researcher Egyptian Environmental Affairs Agency (EEAA) 30 Misr Helwan El-Zyrae Road, Maadi , Cairo a.hassan.water@gmail.com +201153168067 **Mr Emad NASSIF ARMANIOUS MAHROUS** General Manager of Environment Statistics Department Central Agency for Public Mobilization and Statistics (CAPMAS) 3 Salah Salem St. Nasr, City CairoC 11765 emadn62@yahoo.com +2024032162 **Ms Doaa RASLAN** General manager of investment projects Waste management regulatory agency Ministry of environment 78 seket haded elsuez Kobri el koba cairo Doya911@hotmail.com +2025256452
GREECE	**Mr Iakovos GKANOULIS** Special Secretary - Special Secretariat for Water Ministry of Environment and Energy Amaliados 17 – 11523 Athens j.ganoulis@prv.ypeka.gr +302106475102 **Mr Georgios MELEKIS** Public Servant - Special Secretariat for Water Ministry of Environment and Energy Amaliados 17 – 11523 Athens gmelekis.egy@gmail.com + 302106475131 **Mr George THEOFILOPOULOS** Biologist - Special Secreteriat for Water Ministry of Environment and Energy Athens g.theofilopoulos@prv.ypeka.gr +302131515432
ISRAEL	**Mr Rani AMIR** Director, Marine and Coastal Division Ministry of Environmental Protection pal yam 2 – Haifa rani@sviva.gov.il +972-4-8633500

	Mrs Orna MATZNER Senior Manager (Science and Research) Ministry of Environmental Protection 5 Kanfei Nesharim St. P.O.B 34033 Jerusalem 95464 orna@sviva.gov.il +972-2-6495845 **Mr Moishe YANAI** Head of Agriculture, Environment and Energy Sector ICBS 66 Kanfey Nesharim – Jerusalem yanaim@cbs.gov.il +972-2-6592162
ITALY	**Mr Giordano GIORGI** Researcher - Marine Environment Monitoring and Assessment Unit Italian National Institute for Environmental Protection and Research Via Vitaliano Brancati, 48 – 00144 Roma giordano.giorgi@isprambiente.it +390650074640
JORDAN	**Mrs Sona ABUZAHRA** Head of Environment Statistics Division Department of Statistics Al-Jubeha/Yajooz street Amman 11181 suna@dos.gov.jo - sona1z@yahoo.co.uk +96265300700/510 **Mr Ali ALMASHNI** Head of Environmental Monitoring Section Ministry of Environment King Fisal Bin AbdelAziz Street/Em Uthena Amman 11941 mashniali73@gmail.com +96265560113 **Dr. Jihad ALSAWAIR** Head of Environmental Monitoring & Assessment Directorate Ministry of Environment King Faisal ibn Abdulaziz street/ Om Othaina Amman 11941 jihad.alsawair@gmail.com +96265560113
LIBYA	**Mr Ali ELKEKLI** Director of Technical Cooperation & Consultation Department Environment General Authority Ain Zara Tripoli arelkekli@gmail.com +00218913777246 **Ms. Samia GRIMIDA** Project Coordinators Environment General Authority Ain ZaraTripoli fitori@hotmail.com +218919774420

	Mr Mohamed MOHAMED SALEM HAMOUDA Technical Adviser Environment General Authority & The Libyan Academy Ganzor Tripoli mshamouda@yahoo.com +218214871590
MALTA	**Mr Luke TABONE** Assistant Environment Protection Officer - Biodiversity and Water Unit Environment and Resources Authority (ERA) Spencer Hill street - MRS1441 Marsa luke.tabone@era.org.mt +35679936323 **Mr Claudio TOSCANO** Environment Protection Officer Environmental Resources Authority, Malta claudio.a.toscano@era.org.mt +35622923576
MONTENEGRO	**Mrs Ivana BULATOVIC** Advisor in EPA Montenegro - Monitoring, analises and reporting Environmental Protection Agency IV Proleterske 19 – 81000 Podgorica ivana.bulatovic@epa.org.me +38220446514
MOROCCO	**Mr Jamal ABBOUD** Chef de la Division de la Prévention de la Pollution Observatoire National de l’Environnement et du Développement Durable Ministère Délégué chargé de l'Environnement jamalenv@gmail.com +212661790248 **Mr Abdeslam ABID** Chargé du Dossier MED POL/LNESP Secrétariat D'Etat Chargé du Développement Durable LNESP, Av Mohamed BenAbdelah Ragragui, Madint Al Irfan, Agdal Rabat ab.abdeslam@yahoo.fr +212537770118 **Mrs Saida BOUROUS** Chef de service Secrétariat d'Etat chargé du Développement Durable 9, avenue Al Araar, secteur 16, Hay Ryad, Rabat bourousaida1960@gmail.com +212 537717762
PALESTINE	**Mr Zahran KHALEEF** Director of Environmental statistics Palestinian Central Bureau of Statistics Tokyo Street Ramallah zahran@pcbs.gov.ps

	+97022982700 **Mr Khaled SALEM** Information systems Department Director Environment Quality Authority P.O.Box 3841 Al Bireh khaledsal@hotmail.com +97222403495 **Ms. Kahramana ZEID AL KELANI** Director of International Relations Environment Quality Authority Al-Bireh-Al Sharafa- P.O.Box 3841 Ramallah kah_kelani@yahoo.com +972599240215
SLOVENIA	**Mrs. Valentina TURK** Science councillor - Marine Biology Station Piran National Institute of Biology Fornace 41 – 6330 Piran Valentina.Turk@nib.si +38659232916
TUNISIA	**Mr Lassaad CHOUBA** Researcher Institut National des Sciences et Technologies de la Mer Salammbo (INSTM) 28 Rue 2 mars 1934 Salammbô Annexe la Goulette 2060 Tunis lchouba@yahoo.fr +21671735848 **Mr Badreddine LASMAR** Directeur Général Agence Nationale de Gestion des Déchets 116 Rue HIPPOCRATE - Cité Ibn SINA2066 Tunis lasmar2@gmail.com +21671847493 **Mr Jamil SAIDANI** Sous-directeur Agence Nationale de Protection de l'Environnement (ANPE) Centre urbain nord-15 rue 7051 cité essalem - 2080 Tunis jamilsaidani31@gmail.com +21671371731
TURKEY	**Mrs Asli TOPALAK** Expert Ministry of Environment and Urbanization Ankara sezerasl@yahoo.com +905332532792

REPRESENTATIVES OF UNITED NATIONS SPECIALIZED AGENCIES, OTHER INTERGOVERNMENTAL ORGANIZATIONS AND EU FUNDED PROJECTS AND PROGRAMMES

CENTRE FOR ENVIRONMENT AND DEVELOPMENT FOR THE ARAB REGIONAL AND EUROPE (CEDARE)	**Mr Ahmed ABDELREHIM** Regional Programme Manager - Department of Knowledge Management Programme (KMP) Centre for Environment and Development for the Arab Regional and Europe (CEDARE) 1057 Heliopolis Bahary – 11737 Cairo ahrehim@cedare.int +20224513924 **Mrs. Catherine GHALY** Senior Regional Programme Specialist - Knowledge Management Programme (KMP) Centre for Environment and Development for the Arab Region and Europe (CEDARE) 1057 Heliopolis Bahary – 11737 Cairo cghaly@cedare.int +2024513921
EUROPEAN ENVIRONMENTAL AGENCY (EEA)	**Mrs Cécile RODDIER-QUEFELEC** Project coordinator - ENI SEIS Support Mechanism South Partnership and Network, European neighbourhood policy activities – Mediterranean area cooperation European Environment Agency Kongens Nytorv 8 – 1050 Copenhagen cecile.roddier-quefelec@eea.europa.eu +4533435940 **Mrs Sabah NAIT** Senior expert, in charge of cooperation MENA region Environment Agency Austria spittelauer Lände 5 – 1090 Vienna sabah.nait@umweltbundesamt.at +431313043245
HORIZON 2020 / SUSTAINABLE WATER INTEGRATED MANAGEMENT (HORIZON 2020/SWIM)	**Ms. Anastasia RONIOTES** H2020 Expert SWIM-H2020 SM 12 Kyrristou Street – 10556 Athens info@mio-ecsde.org +302103247490

SECRETARIAT TO THE BARCELONA CONVENTION
AND COMPONENTS OF THE MEDITERRANEAN ACTION PLAN

UN ENVIRONMENT MAP	**Mr Gaetano LEONE** Coordinator gaetano.leone@un.org +30 210 7273101 **Mrs Tatiana HEMA** Deputy Coordinator ttTatjana.hHema@un.org +30 210 7273115 **Mr Erol CAVUS** Programme Officer Mediterranean Pollution Assessment and Control Programme (MED POL) erol.cavus@un.org +30 210 7273123 **Ms Gyorgyi GURBAN** Ecosystem Approach Project Manager gyorgyi.gurban@un.org +30 210 7273105 **Mr Christos IOAKEIMIDIS** Marine Litter Project Officer christos.ioakeimidis@un.org +30 210 7273126 **Mr Stavros ANTONIADIS** Policy and Project Expert stavros.antoniadis@un.org +302107173140
PLAN BLEU REGIONAL ACTIVITY CENTRE (BP/RAC)	**Mr Jean-Pierre GIRAUD** Deputy Secretary General Sophia Antipolis 06560 Valbonne jpgiraud@planbleu.org +33786380936
REGIONAL ACTIVITY CENTRE FOR INFORMATION AND COMMUNICATION (INFO/RAC)	**Mrs Céline NDONG** Communication, Education and Dissemination Officer (CE&D Officer) celine.ndong@info-rac.org +39.06.50.07.21.72 **Mr. Alessandro LOTTI** alessandro.lotti@isprambiente.it

Invited Experts

Mr Seifeddine JOMAA Scientist - Department of Aquatic Ecosystem Analysis and Management Helmholtz Centre for Environmental Research - UFZ Brueckstrasse 3a – 39114 Magdeburg seifeddine.jomaa@ufz.de +493918109135
Mr Mohamad KAYYAL SEIS Industrial Emissions Consultant Damascus mohamad.kayyal_extern@kfw.de +963944281802
Mr Antonios MAVROPOULOS, SEIS Waste Consultant Aktiou 3 - 10446 Athens antonis.mavropoulos@d-waste.com +302155302449
Mr Marco MONTUORI Researcher CNR Roma marco.montuori@gmail.com +390697843276
Mrs Joana VEIGA Advisor/Researcher DELTARES Den Haag joana.veiga@deltares.nl +31611092342

Annex II
Agenda

Agenda

In the framework of the monitoring of the Horizon 2020 initiative for a Cleaner Mediterranean, a review process based on different levels of aggregation and analysis of environmental information has been developed and used to produce the 1st H2020 Mediterranean report, issued in May 2014[1]. As part of the review process, a set of H2020 indicators[2] has been identified and developed.

The programme of work of the second phase of Horizon 2020 (2015-2020) reaffirmed the relevance of the three sectors approach (waste water, solid waste and industrial emissions), strengthened its pollution prevention dimension, and focused on emerging issues such as hazardous waste and marine litter. In line with the 2015-2020 H2020 programme of work, a second H2020 indicator-based assessment is planned for 2019.

In addition to the progress report of the H2020 initiative implementation, and the update of the indicators exercises and assessment reports in the Mediterranean region, this 2nd regional workshop will mainly address:

- The reporting process and infrastructure development including the meta-data catalogue;
- The indicators methodological aspects (factsheets);
- The data collection and data gaps in the countries;
- The major tracks for filling the data gaps in the countries (e.g. capacity building, best practices).

[1] https://www.eea.europa.eu/publications/horizon-2020-mediterranean-report
[2] http://eni-seis.eionet.europa.eu/south/areas-of-work/indicators-and-assessment

Time Table

Day 1: 17 April 2018		**Interventions**
08:45-09:15	Registration	
09:15-09:40	Welcoming remarks and tour de table	EEA, UN Environment/MAP, Plan Bleu
Session 1. Refinement of H2020 Initiative review mechanism		
09:40-10:10	Overview of recently prepared or planned Indicator-based assessment processes of relevance for the Joint EEA/MAP report on the progress of H2020 Initiative	UN Environment/MAP, EEA
10:10-10:45	Review and mapping of existing regional and national indicators of relevance for H2020 Initiative (NAP/IMAP, MSSD, SCP, SDGs, etc.)	UN Environment/MAP, Plan Bleu,
10:45-11:00	*Coffee break*	
11:00-12:00	Data requirements, infrastructure development including meta data catalogue and linkages with other relevant reporting processes	EEA, INFO/RAC
12:00-13:00	National Budget Baselines update and NBB/PRTR Info System development	INFO/RAC, UN Environment/MAP
13:00-14:30	*Lunch*	
Session 2. Review of H2020 indicators		
14:30-15:45	Break-out sessions: – Group 1: Waste including marine litter – Group 2: Wastewater – Group 3: Industrial emissions including hazardous waste <u>Each group will focus on</u>: – Indicators factsheets (definition, geographical aspects); – Linkages with MSSD, SCP, IMAP and SDG indicators; – Data collection and data gaps; – The major tracks for filling the data gaps (capacity building, best practices and lessons learned); – Data quality assurance.	Thematic experts, UN Environment/MAP, EEA
15:45-16:00	*Coffee break*	
16:00-17:30	Break-out sessions continued	Thematic experts, UN Environment/MAP, EEA
17:30	*End of Day 1*	

Day 2: 18 April 2018		**Interventions**
Session 2. Review of H2020 indicators (continued)		
09:00-10:30	Break-out sessions (continued) Key messages and findings	Thematic experts, UN Environment/MAP, EEA

10:30-10:45	*Coffee break*	
10:45-13:00	Plenary Session: Feedback from break-out groups, recap and follow up actions	Rapporteur of each group, Thematic experts
13:00-14:30	*Lunch break*	
Session 3. Toward 2019 H2020 assessment		
14:30-15:45	Content of Joint EEA/MAP report on the progress of H2020 Initiative and linkages with the other relevant assessment processes	EEA, UN Environment/MAP
15:45-16:00	*Coffee break*	
Session 4. Next steps		
16:00 – 17:00	– Next steps and way forward – Upcoming activities – Conclusions and closure of the meeting	EEA, UN Environment/MAP
17:00	*End of Day 2*	

Annex III
Next Steps and Factsheets

Appendix 1: Next Steps

Next steps

	Timing	Who	Support
Final adjustments to the Indicator factsheets specification	By end May 2018	Regional experts	
Organisation of the national network to support indicator production	Q2-Q3 2018	Countries - National Team	SSFA – National Assistance
ENI SEIS II South regional workshop on infrastructure and data management	Second week of July 2018, Italy (tbc)	SEIS Project team Countries	
Populate and assess H2020 indicators	Q2-Q3 2018	Countries – National network	SSFA Technical Assistance
Ensure access/delivery of corresponding data flow	Q2-Q4 2018	Countries – National network	SSFA Technical Assistance
H2020/NBB data call	September – December 2018	SEIS Project Team Countries – Data Reporters	SSFA Technical Assistance Webinars
Consultation on annotated outline	Q3 2018	Countries – National Team	Webinars, Workshops
Provision of national case studies / best practices examples	Q4 2018 – Q2 2019	Countries – National Team, National Network	SSFA Technical Assistance
Review of final draft/Synthesis report	Q3 2019	Countries – National Team	

Appendix 2: Indicator Factsheets

2.a Water Indicators Factsheets
2.b Industrial Emission Indicators Factsheets
2.c Waste Management Indicators Factsheets

List of H2020 Indicators:

Indicators	Sub-indicators
IND 3. Access to Sanitation	3.1 Share of total, urban and rural population with access to an improved sanitation system (ISS)
	3.2 Proportion of population using safely managed sanitation services (SMSS)
IND 4. Municipal Wastewater Management	4.1 Municipal wastewater collected and wastewater treated
	4.2 Direct use of treated municipal wastewater
	4.3 Release of nutrients from municipal wastewater
IND 5. Coastal and Marine Water Quality	5.1 Nutrient concentrations in transitional, coastal and marine waters
	5.2 Bathing water quality
IND 6.1. Release of nutrients from industrial sectors	6.1.1. Total BOD load discharged from industrial installations to the Mediterranean marine environment.
	6.1.2. Total Nitrogen load discharged from industrial installations to the Mediterranean marine environment
	6.1.3. Total Phosphorus load discharged from industrial installations to the Mediterranean marine environment.
IND 6.2. Release of toxic substances from industrial sectors	6.2.1. Total heavy metals load released from industrial installations to the Mediterranean marine environment.
	6.2.2. Furans and dioxins load released from industrial installations to the Mediterranean marine environment.
	6.2.3. Polycyclic aromatic hydrocarbons (PAH) load released from industrial installations to the Mediterranean marine environment.
	6.2.4. Volatile organic compounds (VOC) load released from industrial installations to the Mediterranean marine environment.
IND 6.3. Industrial hazardous waste disposed in environmentally sound manner	6.3.1. Total quantity of generated hazardous waste from industrial installations.
	6.3.2. Quantity of industrial hazardous waste disposed in environmentally sound manner relative to total quantity of generated hazardous waste from industrial installations.
IND 6.4. Compliance measures aiming at the reduction and/or elimination of pollutants generated by industrial sectors	6.4.1. Number of industrial installations reporting periodically loads of pollutants discharged to the marine and coastal environments relative to the total number of industrial installations.
	6.4.2. Number of environmental inspections carried out by enforcement authorities in which industrial installations were found to be in breach of laws and regulations relative to the total number of executed inspections.
	6.4.3. Number of eliminated hotspots identified in the updated NAPs relative to the 2001 and 2015 baselines
IND 1. Municipal Waste Generation	IND 1.A Municipal waste composition
	IND 1.B Plastic waste generation per capita

	IND 1.C % of population living in Coastal Areas
	IND 1.D % of Tourists in Coastal Areas
IND 2. “Hardware” of waste management	IND 2.A Waste Collection IND 2.A.1 Waste Collection Coverage IND 2.A.2 Waste Captured by the formal waste sector
	IND 2.B Environmental Control IND 2.B.1 % of waste that goes to dumpsites IND 2.B.2 Number of dumpsites in Coastal Areas IND 2.B.3 Waste going to dumpsites in Coastal Areas
	IND 2.C Resource Recovery IND 2.C.1 % of plastic waste generated that is recycled
IND 3. “Software” of waste management	3.A MARINE LITTER & WASTE MANAGEMENT FRAMEWORK IND 3.A.1 Is there a National Assessment for ML and its impacts? IND 3.A.2 Is there a National Plan or Strategy for ML? IND 3.A.3 Is there a National Plan or Strategy for Waste Management? IND 3.A.4 Is there a National Law on Waste? IND 3.A.5 Is there a national plan or target to close the dumpsites before 2030? IND 3.A.6 Is there a National Information system for waste management in place?
	3.B RESOURCE RECOVERY IND 3.B.1 Is there a National Plan or Strategy for Waste Prevention? IND 3.B.2 Are there mandatory targets for recycling - recovery of packaging waste? IND 3.B.3 Are there EPR or Deposit- Return schemes for packaging waste? IND 3.B.4 Are there national policies to eliminate or reduce single-use plastics? IND 3.B.5 Are there financial incentives for reuse – resource recovery activities?
	3.C SUSTAINABLE CONSUMPTION AND PRODUCTION IND 3.C.1 Are there Sustainable Consumption and Production plans or strategies? IND 3.C.2 Are there green procurement rules for the public sector in place? IND 3.C.3 Are there policies to support sustainable tourism? IND 3.C.4 Are there policies to support eco-labelling and eco-design?

2.a Water Indicators Factsheets

Indicator Fact Sheet

3. Access to Sanitation

Indicators:

3.1 Share of total, urban and rural population with access to an improved sanitation system (ISS)

3.2 Proportion of population using safely managed sanitation services (SMSS)

Indicator Specification

Version: 3.0
Date: 11.05.2018

Version	Date	Author	Status and description	Distribution
1.0	27.02.2018	EEA/ETC (Deltares)	Specification sheet updated from SEIS I IND 3 and new SGD Indicator 6.2.1 definition	SEIS Team
2.0	12.04.2018	EEA/ETC (Deltares)/UNEP-MAP	Includes comments from UNEP-MAP	ENI South Countries (Athens Workshop)
3.0	11.05.2018	EEA/ETC (Deltares)/UNEP-MAP	Includes adjustments following 2nd Indicators Workshop (Athens, April 2018) and the revision from UNEP/MAP	

Indicator Specification

H2020 Indicators	
Thematic area **WATER**	**Date:** 11.05.2018 **Author(s): EEA/ETC, UNEP-MAP**
Policy theme **3. Access to sanitation**	
Indicators: **3.1 Share of total, urban and rural population with access to an improved sanitation system (ISS)** **3.2 Proportion of population using safely managed sanitation services (SMSS)**	

Rationale
Why is access to sanitation important for the state of the Mediterranean Management of safe water sources and proper sanitation are crucial for sustainable development. Access to water and sanitation are considered core socio-economic and health indicators and key determinants of child survival, maternal, and children's health, family wellbeing, and economic productivity. Lack of sanitation poses health risks from contaminated drinking water to life-threatening forms of diarrhea to infants, particularly for poorer segments of the population who are most exposed to inadequate human waste disposal. Enhancing access to improved sanitation services remains politically challenging due to rural/urban inequalities and the emergence of "pockets" of urban poverty. The urban population is likely to increase by 50% by 2025 in the Southern and Eastern Mediterranean rims. Therefore ensuring access to sanitation services in unregulated peripheral quarters and in medium and small-sized towns is a major social challenge in these developing regions. Furthermore, climate change places the additional challenge to regions with already scarce water supplies, such as the Eastern Mediterranean and North African countries, to manage better their water recources and services. In the Mediterranean, access to sanitation and wastewater treatment is still lagging behind as compared to access to drinking water. There are still 17.6 million people in the Mediterranean region without sanitation. Nevertheless, the ENP South region is generally above world average regarding access to improved sanitation. Between 2003 and 2011, there has been an increase in the access to improved sanitation from 87.5% to 92% in the region (EEA, 2014). Although the Millenium Development Goal (MDG) of halving the proportion of the population without sustainable access to safe drinking water and basic sanitation by 2015 has been achieven, the disparities between rural and urban areas still remain significant and may reach as much as 30% in certain Southern Mediterranean countries.
Justification for indicator selection
3.1 Share of total, urban and rural population with access to an improved (ISS) sanitation system The Joint Monitoring Programme (JMP) for Water Supply and Sanitation of the United Nations Children's Fund and the World Health Organization (WHO) developed this indicator to help monitor progress towards one of the Millennium Development Goals. It corresponds to the MDG Indicator 7.9: *Proportion of population using an improved sanitation facility*, under Goal 7: Ensure environmental sustainability. Since this indicator was also adopted as one of the H2020 Water Indicator during ENI-SEIS Phase I, it is deemed important to maintain it for time-series continuity. Fuerthermore, this indicator has been referenced by several countries in their updated National Action Plans, where it relates to specific operational targets put forward by Mediterranean countries (e.g. *Provide XX% population with connection to sewage networks by [2019 to 2025]*) under IMAP's Ecological Objective 5, being one of the proposed common indicators for the Mediterranean Action Plan. Despite discrepancies in the national definitions of urban population and acceptable sanitation, this indicator is important to show the progress being made in the Mediterranean region according to the type of wastewater collection (individual or collective) and the treatment methods, thus linking directly to the other priority indicators e.g. on volume of wastewater collected and type of treatment.
3.2 Proportion of population using safely managed sanitation services (SMSS). This indicator is based on the new definition of the Sustainable Development Goal (SDG) Indicator 6.2.1: *Proportion of population using safely managed sanitation services (SMSS), including a hand-washing facility with water and soap.* It builds on the MDG indicator 7.9 (population using improved sanitation facility) and addresses public health beyond the household level, including containment and treatment of the faecal waste, which is not includuded in the MDG definition described in 3.1a. Safe management of faecal waste needs to be considered in addition to access to improved services, since release of faecal waste pose

a risk to public health. The WHO found that in moving to improved sanitation there was a 16% reduction in diarrhoea. However, depending on the type of water supply diarrhoeal disease can be reduced by 28-45% when household water is treated and safely stored.

References

- EEA, 2014. Horizon 2020 Mediterranean Report – Towards shared environmental information systems EEA-UNEP/MAP Joint Report. Luxembourg: Publications Office of the European Union.
- SDG, 2016. Goal 6 Ensure availability and sustainable management of water and sanitation for al. https://unstats.un.org/sdgs/files/metadata-compilation/Metadata-Goal-6.pdf
- Synopsis of updated NAPs: Hotspots, sensitive areas, targets, measures, indicators and investment portfolios, UNEP/MAP, 2016.
- UNEP/MAP-Plan Bleu, 2009. State of the Environment and Development in the Mediterranean, UNEP/MAP-Plan Bleu, Athens.
- United Nations, 2015. The Millennium Development Goals Report 2015. New York.
- UN Water, 2017. Integrated Monitoring Guide for Sustainable Development Goal 6 on Water and Sanitation Targets and global indicators.
- WHO, 2009. Vision 2030: The resilience of water supply and sanitation in the face of climate change. France.WHO, 2014. Preventing diarrhoea through better water, sanitation and hygiene. - Exposures and impacts in low- and middle-income countries
- WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation, 2017. Guidance note to facilitate country consultation on JMP estimates for drinking water, sanitation and hygiene
- WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation, 2017. Progress on Drinking Water, Sanitation and Hygiene - 2017 update and SDG baselines

---

Indicator definition

***3.1** Share of total, urban and rural population with access to an improved (ISS) sanitation system*

“Share of population with access to improved sanitation” refers to the percentage of the population with access to facilities which hygienically separate human excreta from human, animal and insect contact. This indicator represents the share of population (total, urban, rural) having access to improved sanitation systems installed in homes or in the immediate vicinity, for the evacuation of human faeces (e.g. public sanitation network, septic tank).

The definition of “improved sanitation system” provided by JMP for Water Supply and Sanitation by the WHO and UNICEF is: connection to a public sewer, connection to a septic system, pour-flush latrine, access to a pit latrine, ventilated improved pit latrine.

According to WHO and UNICEF, facilities such as sewers or septic tanks, pour-flush latrines and simple pit or ventilated improved pit latrines are assumed to be adequate, provided that they are not public. To be effective, facilities must be correctly constructed and properly maintained. Sanitation solutions that are considered as "non-improved" include public or shared latrine, open pit latrine, bucket latrines.

This indicator distinguishes between total, urban and rural population. As the characteristics of urban and rural areas vary from country to country, no single definition can be applied regionally. National definitions most often refer to the size of localities. Rural populations often represent the part of the population considered as non-urban. Some countries distinguish between communal and non-communal populations instead of urban and rural. In others, no distinction between urban and rural populations is made or may have an additional category comprising refugee populations. See more details under section “Uncertainties” below.

Units
Percentage of population (%).

Geographical scope
Mediterranean.

Indicator definition

***3.2** Proportion of population using safely managed sanitation services (SMSS).*

In the context of H2020 and ENP-SEIS II, the indicator’s component on hygiene (*“hand-washing facility with water and soap*”) will not be accounted.

JMP defines “safely managed sanitation services” as an improved sanitation facility

a) that is not shared with other households
b) and where excreta is safely disposed of in situ or treated off site,

‘Improved’ facility is defined the same as for MDG Indicator i.e. flush or pour flush toilets to sewer systems, septic tanks or pit latrines, ventilated improved pit latrines, pit latrines with a slab, and composting toilets.

“Safely disposed in situ”: when pit latrines and septic tanks are not emptied, the excreta may still remain isolated from human contact and can be considered safely managed.

In addition to “safely managed sanitation”, JMP defines other less developed sanitation types:
“Basic sanitation services” include improved sanitation facilities that are not shared with other households but do not meet the described criteria for treatment. If facilities are shared with other households, the service is classified as “limited sanitation services”.
“Unimproved sanitation services” include those such as pit latrines without a slab or platform, hanging latrines and bucket latrines. Finally, at the bottom of the ladder classification system is “open defecation”, which refers to human faeces disposed of in fields, forest, bushes, open bodies of water, beaches or other open spaces or disposed with solid waste.

Units
Percentage of population (%) with “safely managed”, “basic”, “limited”, “unimproved” or “open defecation” services.

Geographical scope
Mediterranean.

Policy context and targets
General context description In the Mediterranean area, this indicator is linked to the Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-based Sources and Activities (LBS Protocol) and the Mediterranean Strategy for Sustainable Development (2016-2025) (MSSD). The Horizon 2020 Initiative, which aims to reduce the pollution of the Mediterranean Sea by 2020, recognizes the discharged of inadequately treated wastewater as one of the three priority areas causing major pollution in the Mediterranean Sea. The MSSD objectives are closely linked to the SDGs. Population access to adequate sanitation and appropriate urban wastewater treatment directly relate to the MSSD Objective 2: *Promoting resource management, food production and food security through sustainable forms of rural development*; and Objective 3: *Planning and managing sustainable Mediterranean cities.*
Targets Relevant targets in global initiatives: - The MDG target was: *By 2015, halve the number of inhabitants without access to sanitation*. - The SDG Target 6.2 associated to Indicators 3.1b is: *By 2030, to achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.* Relevant regional targets: - MSSD target for wastewater treated by country is 90% by 2025. - SAP-MED: by the year 2005, to dispose sewage from cities and urban agglomerations exceeding 100.000 inhabitants and areas of concern in conformity with the provisions of the LBS Protocol; by the year 2025, to dispose all municipal wastewater (sewage) in conformity with the provisions of the LBS Protocol. Targets in the updated NAPs (ENI-South): - Algeria, Egypt and Lebanon have defined common operational targets linked to % of population with connection to sewage networks by [2019 to 2025].   **Related policy documents** • UN, 2012. Millennium Development Goals Report 2012. • UN Water, 2017. Integrated Monitoring Guide for Sustainable Development Goal 6 on Water and Sanitation. Targets and Global Indicators. • UNEP/MAP, 2016. Mediterranean Strategy for Sustainable Development 2016-2025. Valbonne. • UNEP/MAP, 1999. Strategic Action Programme to Address Pollution from Land-based Activities. • UNEP/MAP, 2016. Synopsis of updated NAPs: Hotspots, sensitive areas, targets, measures, indicators and investment portfolios. • UNEP/MAP, 2012. Existing targets and EQO regarding pollution in the framework of UNEP/MAP MEDPOL Programme.

Methodology

3.1 Share of total, urban and rural population with access to an improved (ISS) sanitation system

Methodology for indicator calculation

The indicator is computed as follows:

(A / P) x 100

A: Population having access to improved sanitation installations

P: Total population

The indicator is calculated for urban, rural and total (urban + rural) populations. The ratio is expressed as percentage.

The datasets below are required for the calculation of the indicator.

Geographical coverage

National-level

- Total population
- Urban population
- Rural population
- Total population having access to improved sanitation installations
- Urban population having access to improved sanitation installations
- Rural population having access to improved sanitation installations

Coastal hydrological basin level

- Total population
- Urban population
- Rural population

Generally, data is available at the country level. However, by knowing the total, urban and rural population in the hydrological basins/catchment area, access to improved sanitation systems can be scaled to the catchment area that discharge in the Mediterranean.

Data sources

National sources

Since the late 1990s, data have routinely been collected at (sub)national levels using censuses and surveys by national governments, often with support from international development agencies.

Two data sources are common:

a) administrative or infrastructure data that report on new and existing facilities, e.g. holding companies as data owners/data producers;

b) data from household surveys including Multiple Indicator Cluster Surveys (MICS), Demographic and Health Surveys, and Living Standards Measurements Study (LSMS) surveys, and censuses, such as Census of Civil Building and Agriculture (CCBA). The latter are generally carried out by the Department of Statistics. Rural and urban population statistics are usually also obtained from population censuses.

International sources

Data on the % of the population using each system type are available in the MDG database per country.

Geographical units
This indicator is calculated at two geographical levels:
- Country level, including subdivision in urban and rural;
- Catchment/ hydrological basin at the coastal area or, if data not available, major coastal cities, in order to quantify the extent of land-based pressures that could potentially have a downstream effect on the state/impact of the sea.

Temporal units
Annual

Temporal coverage
2003-2016

Methodology for gap filling
Data gaps could be filled by combining data from different sources, such as surveys and censuses and by considering international sources, such as the MDG database. Note, however, that integrating data collected through different sources and methodologies can lead to discrepancies and inconsistencies (see Methodology Uncentainties below).

Methodological references

- MED POL, 2015
- United Nations Development Group, 2003. Handbook for Indicators for Monitoring the Millennium Development Goals.
- Plan Blue, 2006. Methodological sheets of the 34 priority indicators for the “Mediterranean Strategy for Sustainable development” - Follow up.
- MDG database
- http://mdgs.un.org/unsd/mdg/Default.aspx

Methodology

3.2 Proportion of population using safely managed sanitation services (SMSS).

Methodology for indicator calculation

This indicator is calculated for each classification of the indicator, ranging from *safely managed services* to *no service*.

A number of variables are required to calculate this indicator:

- P: total population
- TBP: total number of people with access to a basic sanitation system (improved facilities) which include:
  - Total number of people with access piped sewers
  - Total number of people with access septic tanks
  - Total number of people with access other improved onsite facilities
- SMS: total number people with access to of safely managed systems which include:
  - Total number of people with access to piped sewers that are contained + transported & delivered to treatment plants + treated at treatment plants
  - Total number of people with access to septic tanks that are contained + emptied for transport + transported & delivered to treatment plants + treated at treatment plants
  - Total number of people with access to other improved onsite facilities that are contained + emptied for transport + transported & delivered to treatment plants + treated at treatment plants. Or safely disposed insitu.
- SHP: total number of people with improved facilities shared with other households
- UNP: total number of people with access to unimproved facilities which do not separate excreta from human contact.
- ODP: total number of people with open defecation.
- NBP: total number of people with non-basic sanitation

The different classifications are then calculated as follows:

Safely managed services
SMS/P * 100

Basic services
(TBP-SMS)/P * 100

Limited service
SHP/P * 100

Unimproved
UNP/P * 100

No service
ODP/P * 100

Geographical coverage

The calculations above can be done for total population (P) of total national, rural and urban areas. In addition they can be performed on the total population (P) for the catchment/hydrological basin that discharge in the Mediterranean and/or coastal cities.

Data sources

National delivery through household surveys, institutional/utility records, licensed emptying service providers.

Data on the % of the population using each system type are available in the SDG database per country.

Geographical units

This indicator is calculated at two geographical levels:

- Country level, including total population and sub-division in urban and rural population;

- Catchment/ hydrological basin at the coastal area or, if data not available, major coastal cities, in order to quantify the extent of land-based pressures that could potentially have a downstream effect on the state/impact of the sea.

Temporal units
Annual

Temporal coverage
2003-2016

Methodology for gap filling
The SDG database contains estimates for this indicator on country level. Note, however, that integrating data collected through different sources and methodologies can lead to discrepancies and inconsistencies (see Methodology Uncentainties below).

Methodological references

- UN-Water Integrated Monitoring Initiative for SDG 6, 2017. Integrated Monitoring Guide for Sustainable Development Goal 6 on Water and Sanitation Targets and global indicatorsUN-Water, 2016. Step-by-step monitoring methodology for indicator 6.2.1. - draft. GEMI – Integrated Monitoring of Water and Sanitation Related SDG Targets
- SDG database

Uncertainties
Methodology uncertainty • Definition of "improved sanitation system". In the description of this indicator, reference is made to the definition of "improved sanitation system" provided by WHO and UNICEF (see section on "Indicator Definition" above). However, various types of facilities are available in the different countries which may not always be in line with the standard definition. For this reason, it is recommended to document in detail the types of facilities that are represented by the (sub) national data. • Improved sanitation systems shared with other households When an improved sanitation system is shared with other households the sanitation service is classified as limited service. When a household has additional (lower) qualified sanitation practices (e.g. open defacation) for example when the facilities cannot always be shared, the share of the population might fall under multiple categories. Rules for counting household according to either their higher or lower qualified practices need to be equal for all nationalities when monitoring. • Population statistics (urban, rural, refugees) Population statistics are a source of uncertainty due to the following reasons: a) the distinction between urban and rural population is not amenable to a single definition applicable to all countries, b) some countries consider refugees a separate population group (e.g. Palestine) and c) other countries do not make a distinction between rural and urban at all (e.g. Lebanon and Israel). For this reason, it is recommended to document in detail the (sub) national definitions of population upon delivery of data to be used in calculating the indicator. • Conversion from household to population data According to the definition of these indicators, reference is made to the share of *population*. However, in some countries this indicator is available in terms of share of *households*. In this case, it is required to convert the number of households to population so as to be coherent with the definition given above. It is recommended to describe in detail the steps and assumptions taken to apply this conversion. • Combination of different data sources and methodologies Two main data sources are common: administrative records and household surveys. Rural and urban population statistics come directly from population censuses. The combination of different methodologies may result in discrepancies between different data sets. For this reason, it is necessary to document the method of data collection upon delivery of data.
Data sets uncertainty • Although the datasets required to compute this indicator consist of population data (see section on "Methodology"), in the first reporting exercise countries delivered directly % data. The reason is that due to the uncertainties in population statistics (see section on "Methodology Uncertainty"), the calculation of % based on the population datasets leads to erroneous trends. • Data are not routinely collected by "the sector" but by others outside the sector as part of more general surveys. This increases the risks of inconsistencies. • The timing of collection and analysis of household survey data is irregular, with long intervals between surveys giving rise to data gaps. • When data are from administrative sources, they generally refer to existing sanitation facilities, regardless to whether they are used or not. Evidence suggests that data from surveys are more reliable than administrative records and provide information on facilities actually in use by the population. • Other sources of data sets uncertainty may result in countries with more than one producer of national data, possibly. For instance, in some countries, data is produced by the Ministry of Water as well as the Statistical department using different methodologies. Coordination between the different entities responsible for the production and compilation of data is

needed.

- Access to safely managed sanitation services includes extensive information on the containment, transport and treatment of the wastewater. Data collection and estimations are in part based on household surveys. It is not likely that all households are aware of the method of containment, transport and treatment of their wastewater. Thus this would require the datasets (surveys, monitoring, estimation) to be combined, potentially leading to errors and discrepancies between countries.
- There may be some degree of uncertainty associated to the estimation of and assumptions made regarding: sealed septic tanks which may not be properly separated from land and water resources; septic tanks that are actually not emptied regularly; percentage of water that is not transported to the WWTPs.

Rationale uncertainty

- While access is the most reasonable indicator for assessing sanitation facilities, it still involves severe methodological and practical problems as described above. Other uncertainties related to the indicator rationale may include:
    - Facility quality is not systematically addressed in surveys and censuses. In practice, it is often hard to ascertain during a survey or a census which type of sanitation solution is considered improved or not.
    - The fact that facilities are available does not mean that they are used.
    - Although it is insightful to assess the entire chain of services and type of containment used by different population, a detailed mapping of the full range of sanitation services could prove to be challenging.

Water Indicators Fact Sheet

4. Municipal Wastewater Management

Indicators:

4.1 Municipal wastewater collected and wastewater treated

4.2 Direct use of treated municipal wastewater

4.3 Release of nutrients from municipal wastewater

Indicator Specification

Version: 3.0
Date: 14.05.2018

Version History

Version	Date	Author	Status and description	Distribution
1.0	24.02.2018	EEA/ETC (Deltares), UNEP-MAP (M. Kayyal)	Specification sheet updated from SEIS I Ind 4 and included new indicators 4.2 and 4.3, which includes methodology proposed by M. Kayyal	SEIS Team
2.0	12.04.2018	EEA/ETC (Deltares), UNEP-MAP	Includes comments from UNEP-MAP	ENI South Countries (Athens Workshop)
3.0	14.05.2018	EEA/ETC (Deltares, Petra Ronen), UNEP-MAP	Includes adjustments following 2nd Indicators Workshop (Athens) and revision of UNEP/MAP	

Indicator Specification

H2020 Indicators	
Thematic area **WATER**	**Date** 14.05.2018 **Author (s) EEA/ETC, UNEP/MAP**
Policy theme **4. Municipal Wastewater Management**	
Indicators: **4.1 Municipal wastewater collected and wastewater treated** **4.2 Direct use of treated municipal wastewater** **4.3 Release of nutrients from municipal wastewater** **Additional information:** Type of Treatment Total annual design capacity of functional WWTPs Number of functional MWWTPs	

Rationale

Why is appropriate wastewater management crucial for the Mediterranean?

Wastewater generated from coastal cities is one of the major pollution problems and is therefore recognized as one of the Horizon 2020 Initiative priority areas. The discharge of untreated wastewater directly in freshwater, coastal and marine environments causes enormous health concern. It also represents a significant pressure on aquatic ecosystems as wastewater carries high loads of nutrients (nitrogen and phosphorus), contaminants (e.g. heavy metals, PAHs, halogenated compounds) and pathogenic microorganisms (including coliforms, faecal streptococcus, salmonella etc).

The polluting effect of wastewater discharge is variable and largely dependent on the initial composition, quantity, level of treatment of the collected wastewater, composition of the effluent and the capacity of the receiving water bodies. The initial composition of wastewater depends on factors connected to the standard of living, weather conditions, water supply systems, water quantities available and composition of industrial wastes. In coastal communities, seasonal variations may be affected by tourism.

Appropriate collection and treatment of urban wastewater not only prevents human health issues and pollution of aquatic environments but has also a large potential and benefits in the overall management of water resources. In a context of climate change and increased pressure on water availability, treated wastewater is an asset, as it helps to close the gap between supply and increasing demand, and is one of the most sustainable alternatives to cope with water scarcity.

This cluster of indicators assesses the complete cycle of wastewater management, in particular when combined with Indicator 3 (“access to sanitation”) and Indicator 5 (“coastal and marine water quality”). It can help monitor the potential level of pollution from urban point sources entering the aquatic environment and pinpoint those areas where intervention may be most needed. Furthermore, these indicators capture also the potential and significance of reuse of treated wastewater and the progress towards a more sustainable and integrated water resource management.

Justification for indicator selection

4.1 Municipal wastewater collected and wastewater treated

The rate of wastewater collected and treated by public sanitation is very variable among Mediterranean countries, ranging from 7% to 90%. Many countries, particularly in the South, still discharge a significant portion of the collected wastewater into internal waterways or into the sea without prior treatment. A considerable part of the Mediterranean coastal cities in ENP-South countries are not served by wastewater treatment facilities, although reported data is inconsistent and limited. As the issue became higher on political agendas, large investments have been made in recent years in the region to improve the situation and therefore it becomes crucial to assess the effectiveness of such measures through appropriate data collection and management.

This indicator provides information on the collection and treatment level of wastewater in the region and can be considered as a “response” indicator. It helps identifying communities where wastewater treatment action is required, while helping to assess where progress has been made.

Indicator 4.1 was adopted as one of the H2020 Water Indicators during ENPI-SEIS Phase I and is closely linked to the MSSD Indicator 2.5. Furthermore, this indicator has been referenced by several countries in their updated National Action Plans, where it relates to specific operational targets put forward by Mediterranean countries under IMAP’s Ecological Objective 5 (see more in Targets section below), being one of the proposed common indicators for the Mediterranean Action Plan.

4.2 Direct use of treated municipal wastewater

Wastewater use is a widespread practice in the Mediterranean, mainly for agricultural and landscape irrigation, and groundwater recharge. The management, standards and enforcement of wastewater use, however, vary greatly across countries and in many cases raw or insufficiently treated wastewater is used, with serious health hazards and environmental risks. Water reuse is generally limited when compared with the total water use but it is expected to increase significantly, due to water scarcity and increasing water demands (e.g. tourism) but also cost-effectiveness of water reclamation and gradually more demanding quality standards for wastewater discharges.

For treated municipal wastewater to be reused and to prevent health risks potentially associated with wastewater, quality standards for safe reuse need to be defined and met.

This indicator is relevant from a socio-economic viewpoint related to efficient use of water resources and the use of non-conventional sources of water, as well as an environmental perspective linked to water quality. It can therefore be considered as a “response” indicator.
4.3 Release of nutrients from municipal wastewater Municipal wastewater can be an important source of input of nutrients and organic substances into aquatic bodies, directly impacting water quality. High nutrient loads entering the Mediterranean can lead to eutrophication events in an otherwise oligotrophic sea. The impact of eutrophication is detrimental to the environment from both from an ecological as well as a socio-economic perspective, considering its impact on marine biological resources and the risk of harmful algae blooms on public health. This indicator is a “pressure” indicator, providing insight into the quality of discharged municipal effluents and the degree to which nutrients from treated municipal wastewater may contribute to the increased concentration of nutrients in certain areas of the Mediterranean Sea. The indicator complements IMAP indicator 13 (on eutrophication) and is in line with the requirements of the Regional Plan on the reduction of BOD_5 from urban agglomerations [1]. It also provides data and information regarding the operational target identified by the Mediterranean countries with regards to reduction of BOD discharges to the Mediterranean Sea.
References • Decision IG 21/10 of COP 19 of the Barcelona Convention on IMAP • EEA, 2014. Horizon 2020 Mediterranean Report – Towards shared environmental information systems EEA-UNEP/MAP Joint Report. Luxembourg: Publications Office of the European Union. • Loutfy, N.M., 2010. Reuse of Wastewater in Mediterranean Region, Egyptian Experience. In: Barceló D., Petrovic M. (eds) Waste Water Treatment and Reuse in the Mediterranean Region. The Handbook of Environmental Chemistry, vol 14. Springer, Berlin, Heidelberg. • UNEP/MAP, 2005. Guidelines for Municipal Water Reuse in the Mediterranean Region. • UNEP/MAP-Plan Bleu, 2009. State of the Environment and Development in the Mediterranean, UNEP/MAP-Plan Bleu, Athens. • UNEP/MAP, 2017. Mediterranean Quality Status Report. Tirana, Albania. • European Commission, 2016. Glossary of terms related to Urban Waste Water - Environment - European Commission. http://ec.europa.eu/environment/water/water-urbanwaste/info/glossary_en.htm • European Commission, 2007. Terms and Definitions of the Urban Waste Water Treatment Directive 91/271/EEC. • European Commission, 2016. EU-level instruments on water reuse Final report to support the Commission’s Impact Assessment • EU, 2016. Guidelines on Integrating Water Reuse into Water Planning and Management in the context of the WFD.

1 The Directive 91/271/EEC concerning urban waste water treatment defines an agglomeration as “an area where the population and/or economic activities are sufficiently concentrated for urban waste water to be collected and conducted to an urban waste water treatment plant or to a final discharge point”

Indicator definition
***4.1**Municipal wastewater collected and wastewater treated*

This indicator measures:

- Volume of municipal wastewater collected by public sewage networks and from storage tanks
- Volume of wastewater treated in wastewater treatment plants

Municipal wastewater is defined as domestic wastewater or the mixture of domestic wastewater with industrial wastewater and/or run-off rain water. Storage tanks and other types of contained systems can be considered as hermetic, do not have an overflow and the waste water is regularly collected and transported to a treatment plant. Wastewater treatment is defined as the process of removing contaminants from wastewater according to the established national standards on effluent quality, to allow for its discharge to the environment without adverse impact on public health and the ecosystem.

Additional information that supplements this Indicator

- Percentage of the treated wastewater according to the type of treatment (primary, secondary, tertiary)
- Total annual design capacity of functional facilities
- Total number of functional municipal wastewater treatment facilities

Treatment can comprise a wide range of processes including simple screening, sedimentation, biological-chemical processes, or appropriately designed marine discharge. Here reference is made to types of wastewater treatments defined according to the Mediterranean Regional Plan on BOD and the European Urban Wastewater Treatment Directive:
Primary treatment: physical and/or chemical process involving settlement of suspended solids, or other processes in which the BOD_5 of the incoming waste water is reduced by at least 20% before discharge and the total suspended solids of the incoming waste water are reduced by at least 50%;
Secondary (biological) treatment: uses biological process to decompose most of the organic matter, resulting in the reduction of 70-90% of BOD_5. and remove about 20 - 30 % of the nutrients. Primary treatment alone does not remove ammonium, whereas the removal rate of ammonium by secondary (biological) treatment is around 75 %.
Tertiary (advanced or more stringent) treatment: further removes nutrients (nitrogen and/or phosphorus) and/or any other pollutant affecting the quality or a specific use of water: microbiological pollution, colour, etc.

Units

- Volume of municipal wastewater collected in **million m^3 per year**
- Volume of municipal wastewater treated in wastewater plants in **million m^3 per year**

Additional information

- % wastewater treated by primary treatment
- % wastewater treated by secondary treatment
- % wastewater treated by tertiary treatment
- Total annual design capacity of functional facilities (10^9 m3/year or PE, if volume not available)
- Total number of functional municipal wastewater treatment facilities

Geographical scope
Mediterranean.

Indicator definition
4.2 *Direct use of municipal wastewater*
This indicator encompasses the use of water which is generated from municipal wastewater or any other urban marginal water and treated to a standard that is appropriate for its intended use. "Direct use" refers to the introduction of treated wastewater via pipelines and other necessary infrastructure directly from a water treatment plant to a distribution system. An example would be the distribution of treated wastewater to be used directly in agricultural irrigation. This excludes reuse of treated wastewater which is placed into a water body source such as a lake, river, or aquifer and then some of it retrieved for later use. Treated wastewater stored in artificial water reclamation reservoirs prior to its use should be included in the indicator. This indicator thus measures the volume of direct treated wastewater intended for reuse, with no or little prior dilution with freshwater during most of the year. The applications of direct treated wastewater require quality standards and include: - Irrigation water (agriculture, landscape, sport and recreation). - Water for manufacturing and construction industry (cooling and process water). - Dual water supply systems for urban non-potable use (toilet flushing and garden use). - Firefighting, street washing, dust suppression and snowmaking. - Water for restoration and recreation of existing or creating new aquatic ecosystems. - Recreational water bodies (including land redevelopment1). - Aquifer recharge through injection wells for saline intrusion control. - Fish ponds. **Units** Million m^3 per year **Geographical scope** Mediterranean.
Indicator definition
4.3 *Release of nutrients from municipal wastewater*
This indicator is defined as the nutrients and organic matter loads from urban centres discharged to the Mediterranean per year, specified for biological oxygen demand (BOD), total phosphorus (TP), and total nitrogen (TN). Municipal wastewater originating from urban agglomerations $\geq$ 2000 p.e. situated in coastal hydrological basin and those agglomerations with direct access to the Mediterranean is to be considered in the indicator Thus the indicator estimates: • The total BOD load from urban wastewater discharged in the Mediterranean per year • The Total Phosphorus load from urban wastewater discharged in the Mediterranean per year • The Total Nitrogen load from urban wastewater discharged in the Mediterranean per year **Biochemical Oxygen Demand (BOD)**: indicates the oxygen needed by aerobic microorganisms to breakdown the organic components present in a sample of wastewater. This sub-indicator therefore reflects the load of organic matter in wastewater effluents discharged into the Mediterranean Sea. **Total Nitrogen (TN)**: This indicator comprises the ions nitrate, nitrite and ammonium in the dissolved phase (DIN) and the organic forms of nitrogen (mostly proteins and other N-containing substances) existing in biota and other particulate materials and in dissolved organic matter. **Total Phosphorus (TP):** This indicator comprises the dissolved ion phosphate and the organic forms

of phosphorus existing in biota and other particulate materials (POP) and in dissolved organic matter (DOP).

Units
Tonnes of BOD/N/P per year.

Geographical scope
Mediterranean.

Policy context and targets

General context description

The safe treatment of wastewater to protect public health, improve and/or (re-)use limited resources and limit pollution is recognized as a priority by many different policy initiatives in the region.
In the Northern Mediterranean, the European Directive (91/271/EEC) concerning urban wastewater treatment (which prescribes as a minimum requirement the secondary treatment for urban areas (agglomerations) of size > 10,000 p.e.[2] discharging into coastal waters and for agglomerations of size ≥ 2000 p.e. discharging into freshwater and estuaries), has contributed to the significant increase of the population connected to wastewater treatment plants over the past two decades.

Contracting parties to the Barcelona Convention adopted the Genoa Declaration in 1985, which included, as one of the priorities, the establishment of sewage treatment plants in all cities around the Mediterranean Sea with more than 100,000 inhabitants, appropriate outfalls and treatment plants for all cities with more than 10,000 inhabitants. This target was further reinforced in the framework of the Strategic Action Programme to combat pollution from land based sources in the Mediterranean (SAP-MED) adopted in 1997, where countries also committed to reduce 50% the nutrient inputs from industrial sources to the Mediterranean sea area by 2010 as well as reduce nutrient inputs from diffuse sources (agriculture and aquaculture) into areas they are likely to cause pollution.

In 2009, the Regional Plan on BOD emissions from municipal wastewater treatment facilities was adopted. This includes legally binding measures, programmes and timeframes based on Article 15 of the LBS Protocol. Countries should ensure that wastewater originating from all agglomerations of more than 2000 inhabitants are collected and treated before discharging them into environment.
In 2012, the Contracting Parties to the Barcelona Convention adopted Decision IG. 20/4 of the 17th Conference of the Parties on the ecosystem approach. Eleven ecological objectives were approved including EO5 on eutrophication. The Ecosystem Approach is the guiding principle to MAP Programme of Work and all policy implementation and development undertaken under the auspices of UNEP/MAP Barcelona Convention, with the ultimate objective of achieving the Good Environmental Status (GES) of the Mediterranean Sea and Coast. Following up on the latter, Decision IG. 21/3 on the ecosystems approach adopted definitions of Good Environmental Status (GES). The Decision provides details of the operational objectives, indicators, GES and proposed targets.

Specifically, on wastewater reuse, the Sustainable Development Goal on Water (SDG 6) mentions the use of non-conventional sources of water to increase substantially water-use efficiency by 2030. In Europe, water reuse is a top priority area in the Strategic Implementation Plan of the European Innovation Partnership on Water, and maximisation of water reuse is a specific objective in the Communication "Blueprint to safeguard Europe's water resources", the water milestone of EU’s 2020 Strategy. It is expected that in 2018, the European Commission will propose legislation on minimum requirements for water reuse in irrigation and aquifer recharge.

Targets

Several targets that have been put forward in global and regional initiatives regarding urban wastewater management, reduction of pollution from wastewater and increase wastewater use.

SAP MED and Regional Plan Targets

By 2015 or 2019: National BOD_5 Emission Limit Values (ELVs) for urban wastewater after treatment in the:

a) LBS Protocol Area less than 50 mg/l, assuming a performance of reduction of the influent load of 70-90 % (secondary treatment).
b) LBS Protocol Area – marine outfalls (ref. Art. 7 LBS Protocol) less than 200 mg/l, assuming a performance of reduction of the influent load of 20 % (primary treatment).

2 The Directive 91/271/EEC defines one population equivalent (p.e.) as the organic biodegradable load having a five-day biochemical oxygen demand (BOD5) of 60 g of oxygen per day”

ELVs refer to mean maximum allowable pollutant concentration to be finally discharged to the receiving water environment. These ELVs should only be adopted considering local conditions and provided that total loads do not affect the receiving marine environment.

Other regional targets regarding nutrients in the framework of SAP-MED are laid on the Decision IG.20/8.2: “Regional Plan on the reduction of BOD_5 in the food sector”; and Decision IG. 21/3 on the ecosystems approach, which includes also targets on eutrophication for achieving GES.

By 2025: Disposal in in conformity with the LBS Protocol for all cities and agglomerations > 2,000 inhabitants.

NAP targets
National targets may also exist in some countries, for example in their National Action Plans (NAPs). Mediterranean countries presented similar national targets in the framework of SAP-MED and the regional plans. These targets do not include specific percentages yet but common operational targets in the NAPs related to nutrients are:

- *Provide XX% population with the connection to sewage networks by [2019 to 2025]* – (mentioned in the NAPs of 5 countries);
- *Provide XX% of agglomerations with more than 2000 inhabitants with appropriate wastewater collection and treatment by [2019 to 2025]* –(mentioned in the NAPs of 8 countries);
- *Reduce by XX% BOD_5 discharged to water bodies by [2019 to 2025]* – (mentioned in the NAPs of 7 countries);
- *Reduce by XX% nutrient input from agricultural activities discharged to water bodies by [2019 to 2020]* – (mentioned in the NAPs of 4 countries).

MSSD target
The Mediterranean Strategy for Sustainable Development 2016-2025 sets the target for the percentage of treated wastewater at 90% per country by 2025.

- This target is specifically linked to indicator 4.1

Related policy documents

- UNEP/MAP (2012). Existing targets and EQO regarding pollution in the framework of UNEP/MAP MEDPOL programme UNEP(DEPI)/MED WG.372/Inf.3
- http://www.themedpartnership.org/med/pfpublish/p/doc/ef0de1181e589046cafa4cedac9ddf23
- COP16 Report (2009). Regional Plan on the reduction of BOD5 from urban waste water in the framework of the implementation of Article 15 of the LBS Protocol.
- UNEP/MAP (2005). Mediterranean Strategy for Sustainable Development. Athens, MAP.
- Implementation of Council Directive 91/271/EEC of 21 May 1991 concerning urban wastewater treatment, as amended by Commission Directive 98/15/EC of 27 February 1998 (COM(2004) 248 final)
- Agenda 21. Chapter 18: Protection of the Quality and Supply of Freshwater Resources: Application of Integrated Approaches to the Development, Management, and Use of Water Resources.
- UNEP/MAP, 2016. Mediterranean Strategy for Sustainable Development 2016-2025. Valbonne. Plan Bleu, Regional Activity Centre.
- UNEP/MAP, 2016. Synopsis of updated NAPS: hotspots, sensitive areas, targets, measures and indicators. Marseille, France.
- WHO, 2016. Annex 3: Wastewater Safely Treated.

http://www.who.int/water_sanitation_health/monitoring/coverage/explanatory-note-sdg-6-3-1-wastewater-treatment.pdf?ua=1

Methodology

4.1Municipal wastewater collected and wastewater treated

Methodology for indicator calculation

This indicator gives the volume of municipal wastewater collected by public sewage networks and storage tanks; and the volume of municipal wastewater treated by the wastewater treatment plants (in Million m3 per year).

The volume of wastewater treated is the proportion of collected water that is returned to the environment according to national criteria and standards to ensure minimal impact on the aquatic environment.

This indicator also includes additional information on the type of treatment (primary, secondary, tertiary).

The following datasets are required for the calculation of the indicator. This information is required both at the country level and at the coastal hydrological basin level (see Geographical Units below).

- Volume of municipal wastewater collected
- Volume of municipal wastewater treated
- Volume of municipal wastewater subject to primary treatment
- Volume of municipal wastewater subject to secondary treatment
- Volume of municipal wastewater subject to tertiary treatment

In case wastewater collected and treated is available only in BOD5 population equivalent, volume population equivalent 1 p.e. = 200 l should be used for conversion.

Most of data on water are available at the administrative unit level, generally for communes. If data are available for all communes in a given country, these can be aggregated (i.e. summed) to estimate the indicator at the country level.

For the computation of the indicator at the level of hydrological basin (catchment) of the coastal area, the following methodological approaches are proposed. Data for those communes that fall within the hydrological basin (catchment) of coastal areas have to be aggregated. The difficulty arises when a commune is partly inside and partly outside the limit of the hydrological basin. In this case several methods can be applied.

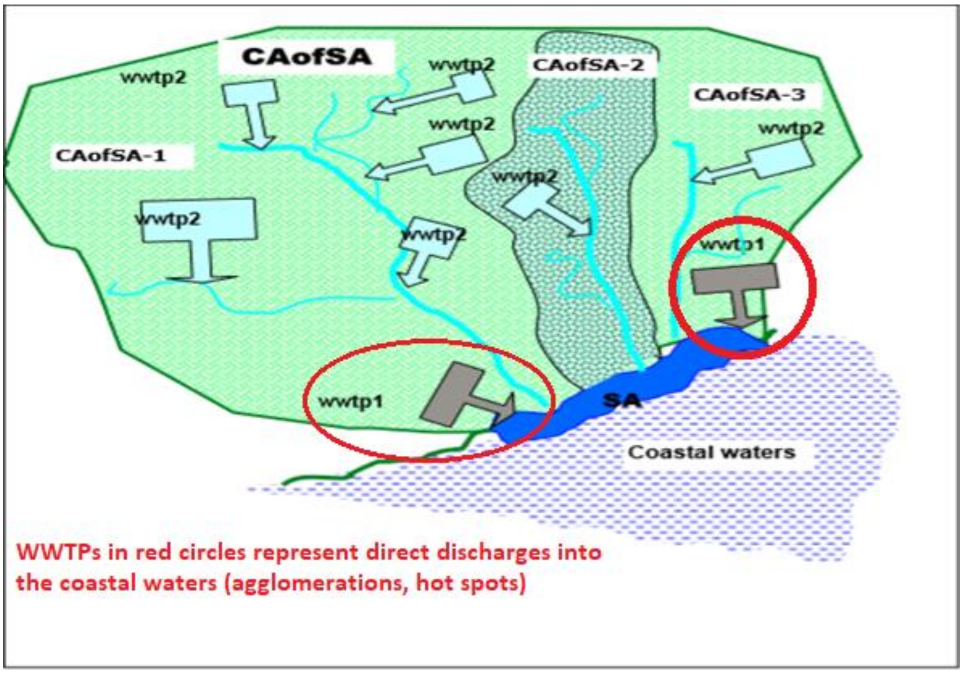

Figure 1: Schema of delineated hydrological catchments of coastal areas

Method	Example	Comments
1. Using the location of the centre of the commune	If the centre of the commune is inside the hydrological basin, then 100 % of the waste water is considered. If it is outside, 0% of the waste water is considered	Easy but very rough
2. Using the share of the area of the commune within the coastal hydrological basin limit	If, for example, 30 % of the area of the commune falls within the hydrological basin, then 30% of the volume of waste water is considered	Need to compute the area using GIS
3. Using the share of the population living within the limit	If, for example, 70 % of the population of the commune is living in the hydrological basin, then 70% of the volume of waste water is considered	The spatial distribution of the population in the commune must be available and analysed
4.Using GIS layer of disaggregated data on individual wastewater treatment plants and collecting systems	Geo-analysis using overlay and intersect with the GIS layer of delineated hydrological basin (catchment) of coastal area	Most precise calculation. The approach for calculating the indicator at the level of hydrological basin (catchment) of coastal areas depends primarily on the availability of GIS layer of basin delineation. In case the layer is not available, a temporary approach is recommended (see Methodology for gap filling)

Data sources
National sources:

At the national level, data are available from national water authorities and water supply utilities. At the commune-level (see Methodology for indicator calculation above) data may be obtained from:

- meter readings from water authorities;
- data on the capacity of the serviced area;
- performance of wastewater treatment facilities;
- information from wastewater laboratories;
- number of house connections to the sewerage system.

Other data may be available from water authorities, water service companies, municipal authorities, field project evaluation reports and GIS databases.

International sources:

UNEP/MAP MEDPOL and FAO Aquastat information system.

Geographical units

This indicator is calculated at two geographical levels:
- National level
- Hydrological basin (catchment) of coastal areas. In case it is not possible to provide data at this level, then data should be provided for the main coastal cities or the coastal area.

Temporal units
Annual

Temporal coverage
2003-2016

Methodology for gap filling
Data gaps are filled by supplementing national data with international sources, such as UNEP/MAP MEDPOL and FAO Aquastat data. Note, however, that combining data collected through different sources and methodologies can lead to discrepancies and inconsistencies. Other data gaps may include missing data at the commune-level. One way of gap filling could include estimations based on communes with comparable size, population, level service etc. for which data is available for a given period. An approach to calculation of indicators at the level of hydrological basin (catchment) of coastal areas depends primarily on the availability of GIS layer of basin delineation. In case the layer is not available, a temporary approach (until the delineation is completed) is recommended, consisting in collecting and aggregating data from the coastal areas/main coastal cities, possibly following the coastal units as defined by the Mediterranean ICZM protocol Art 3/b).
Methodological references • Agenda 21. Chapter 18: Protection of the Quality and Supply of Freshwater Resources: Application of Integrated Approaches to the Development, Management, and Use of Water Resources. • http://www.un.org/esa/sustdev/natlinfo/indicators/indisd/english/chapt18e.htm • EEA CSI 024 (Urban waste water treatment) Indicator factsheet • http://www.eea.europa.eu/data-and-maps/indicators/urban-waste-water-treatment/ • Methodological sheets of the 34 priority indicators for the “Mediterranean Strategy for Sustainable development” Follow up. Plan Bleu, 2006. • UNEP/ROWA, Regional Workshop on Priority Environmental Indicators 13 – 15 October 2003 • WHO, 2000. Environmental health indicators: Development of a methodology for the WHO European region

Methodology
4.2 Direct use of treated municipal wastewater
Methodology for indicator calculation This indicator gives the measure (in volume, Million m^3 per year) of treated municipal wastewater (primary, secondary, tertiary effluents) intended to be reused, i.e. with no or little prior dilution with freshwater during most of the year. The volume of direct reuse of wastewater (measured at the outlet of WWTP) can be divided into different categories of use, such as: - Irrigation water (agriculture, landscape, sport and recreation). - Water for manufacturing and construction industry (cooling and process water). - Dual water supply systems for urban non-potable use (toilet flushing and garden use). - Firefighting, street washing, dust suppression and snowmaking. - Water for restoration and recreation of existing or creating new aquatic ecosystems. - Recreational water bodies (including land redevelopment1). - Aquifer recharge through injection wells for saline intrusion control. - Fish ponds. Each specific application may require a certain level of treatment, according to national and/or regional standards. **Data sources** At the national level, data may be available from national water authorities and water supply utilities. From International sources, some data exist at the FAO Aquastat information system: http://www.fao.org/nr/water/aquastat/wastewater/index.stm **Geographical units** National **Temporal units** Annual **Temporal coverage** 2003-2016
Methodology for gap filling The FAO Aquastat database contains data on the direct use of treated municipal wastewater. However the data is not consistent and not available for all countries.
Methodological references • Mediterranean EUWI Wastewater Reuse Working Group, 2007. Joint Mediterranean EUWI/WFD process - Mediterranean Wastewater Reuse Report. • UNEP/MAP, 2005. Guidelines for municipal water reuse in the Mediterranean region. Athens, Greece.

Methodology
4.3 Release of nutrients from municipal wastewater

Methodology for indicator calculation (including description of data used)

The proposed sub-indicators are:

- Generated urban wastewater (in population equivalent) in the hydrological basins (catchments) of coastal areas and in the coastal agglomerations directly discharging into the coastal areas
- Total volume of urban wastewater discharged (Million m^3 per year) by WWTPs in the hydrological basin (catchment) of coastal area and directly in the coastal areas
- Total BOD load from urban wastewater discharged in the Mediterranean/year
- Total Nitrogen load from urban wastewater discharged in the Mediterranean/year
- Total Phosphorus load from urban wastewater discharged in the Mediterranean/year

1. Obtain figures on population numbers living in the agglomerations of size ≥2000 inhabitants i) located within the hydrological basins of coastal areas (P1) and ii) discharging (treated /or untreated) wastewater directly into the Mediterranean (P2) Determine the urban wastewater generated in the coastal hydrological basin and in the costal agglomerations in P.E.

2. Obtain data for the total treated and discharged volume of urban wastewater from existing Municipal WWTPs in the hydrological basin (catchments) of coastal areas and in the costal agglomerations

3. Obtain data on shares of treated wastewater (in P.E.) in the hydrological basin (catchments) of coastal areas and in the costal agglomerations, receiving :
   a. Primary treatment (20-30 % BOD, 15% N_{tot}, 10% P_{tot} reduction)
   b. Secondary treatment (85% BOD, 35% N_{tot}, 20% P_{tot} reduction)
   c. Tertiary treatment (99% BOD, 70% N_{tot}, 80% P_{tot} reduction)

4. Consider the following information to determine the figures in the next steps:

Person Load

BOD, g/person.d	15-80
COD, g/person.d	25-200
Nitrogen, g/person.d	2-15
Phosphorus, g/person.d	1-3
Wastewater, m³/person.d	0.005-0.4

Person Equivalent (PE)

- 1 PE = 60 g BOD/d
- 1 PE = 200 l /d

Please note that regional plan for BOD calls for 60 g BOD load for each person per day.

5. Based on the treated wastewater in PE in the hydrological basin (catchments) of coastal areas and in the costal agglomeration, calculate:
   a. BOD, TN, and TP loads discharged after tertiary treatment
   b. BOD, TN, and TP loads discharged after secondary treatment
   c. BOD, TN, and TP loads discharged after primary treatment

6. Calculate BOD, TN, and TP loads for wastewater discharged without treatment in the hydrological basin (catchments) of coastal areas and in the costal agglomeration.

7. Add up the total discharged loads from all treated and untreated wastewater originating in agglomerations (of size ≥2000 p.e.) located in the hydrological basin of coastal areas and those directly discharging into the Mediterranean, in order to calculate:
8. Total BOD load from urban wastewater discharged in the Mediterranean/year
9. Total Nitrogen load from urban wastewater discharged in the Mediterranean/year
10. Total phosphorus load from urban wastewater discharged in the Mediterranean/year

If available, the data on discharged loads (BOD_5, TN, TP) for individual WWTPs should be used to calculate the total discharged loads and supplemented by the measured or estimated loads discharged from collecting systems without treatment.

In case real measurements for COD of raw municipal wastewater exist, these data can possibly be converted into BOD_5. Conversion factors can range between 0.4 and 0.8, depending, among others factors, on the contribution of industrial wastewater. National typical values of correlation between COD and BOD should be investigated and if not available, the average factor of 0.47 could be used: $BOD_5 = 0.47*COD$.

Data sources
Treated wastewater:
At the national level, data are available from national water authorities and water supply utilities (see also Data Sources of Ind. 4.1).

Geographical units
Hydrological basin of coastal areas (including agglomerations discharging directly into Mediterranean).

Temporal units
Annual

Temporal coverage
2003-2016

Methodology for gap filling
Data for Indicator 4.1 can be used if calculated for the hydrological basin of coastal areas.
In case of lack of data for all agglomerations ≥ 2000 p.e. located in the hydrological catchment of the coastal area a phased approach can be applied for Indicator 4.3 based on data on the various hotspots and sensitive areas in the particular catchment combined with the data from agglomeration with direct discharge into the Mediterranean.

Methodological references

- Kayyal, M., 2018. Methodology for computing nutrients from urban sources. Personal reference.

Uncertainties
4.1 *Municipal wastewater collected and wastewater treated*
Methodology uncertainty • The definition of primary, secondary and tertiary treatment depends on the set national standards on effluent quality. For a coherent regional assessment, these national standards should also be reported, if available. • Data based on WWTP nominal capacities may in reality be much higher than the actual/real capacities. In this case, it should be clearly indicated that the data does not reflect “real” measurements but is rather an estimation based on nominal capacities. • Data based on inflowing wastewater volume to WWTPs: In the case of malfunctioning and overflowing WWTPs, wastewater may go through the WWTPs without proper treatment. For this reason, information on effluent quality should also be considered. • Double counting of municipal wastewater generated and treated should be avoided in cases where a mix of domestic and industrial wastewater is first treated at industrial WWTP and then the effluent undergoes treatment at municipal WWTP. The approach to calculation of indicator 4.1 and 4.3 for municipal wastewater with a significant share of industrial wastewater and a pre-treatment at industrial WWTP should consider the specific WWTPs flow schema and where possible use measured flow and data on the concentration of nutrients rather than estimates based on population equivalents.
Data sets uncertainty • Composition of municipal wastewater. There are many types of wastewater collection systems, such as separated collection systems, in which rainwater and wastewater are collected in separate conducts versus combined collection systems, which collect rainwater and wastewater in one conduct. Municipal wastewater may contain a mixture of domestic, commercial, industrial wastewater. For this reason, it is recommended to document in detail the composition of municipal wastewater that is considered by (sub) national data.
Rationale uncertainty • This indicator provides information on the level of wastewater treatment but does not address the appropriate level of treatment required to safeguard specific ecosystems. It is therefore important to provide information on effluent quality and established standards on effluent composition aimed at protecting the receiving ecosystems.

***4.2** Direct use of treated municipal wastewater*
Rationale, Methodology and data sets uncertainties • Quality standards for different countries and the different uses may not specified. • There may be not a clear distinction between wastewater reused from municipal sources and other sources of wastewater. • Depending on the data source, there may be inconsistencies between the reported wastewater treated that is provided and the reported volume that is in fact used.
***4.3** Release of nutrients from municipal wastewater*
Methodology uncertainty • The indicator is partially based on estimations instead of real measurements (see more under data sets uncertainty). • Other sources rather than domestic households are not considered in the estimation of wastewater (based on population size). For example, seasonal tourism can have a large impact in terms of generation of urban wastewater.
Data sets uncertainty • Throughout the year there may be a large variability in terms of wastewater generated (e.g. seasonality of tourism), which may not be captured in the data. • The estimation of urban wastewater generated is based on population size, whereas other sources of wastewater (e.g. rainwater, non-households/domestic facilities) could contribute considerably to the total nutrient load as well. While this is not captured in this sub-indicator it may be contemplated in the data associated to the wastewater treated. The estimation of urban wastewater generated and the loads of nutrients from untreated wastewater discharged can be therefore underestimated, while the proportion of wastewater treated be overestimated. • The data on PE discharged from WWTPs can correspond to the capacity/design of WWTPs rather data on treated discharges.
Rationale uncertainty • This indicator intends to assess the contribution of urban agglomerations and households to the input of key nutrients in wastewater into aquatic bodies and ultimately the marine environment. It focuses on point-sources only and does not consider agglomerations smaller than 2000 inhabitants. Furthermore, the estimation nature of some of the sub-indicators may result in underestimation of wastewater generated in relation to the wastewater treated.

Water Indicators Fact Sheet

5. Coastal and Marine Water Quality

Indicators:

5.1 Nutrient concentrations in transitional, coastal and marine waters

5.2 Bathing water quality

Indicator Specification

Version: 3.0
Date: 11.05.2018

Version History

Version	Date	Author	Status and description	Distribution
1.0	13.02.2017	MED POL Deltares	Specification sheet updated from SEIS I Ind 5 and to include new indicator 5.2. Both 5.1 and 5.2 in line with IMAP's Fact Sheets	SEIS Team
2.0	12.04.2018	MED POL, EEA/ETC (Deltares), UNEP-MAP	Includes comments from UNEP-MAP	ENI South Countries (Athens Workshop)
3.0	11.05.2018	MED POL, EEA/ETC (Deltares), UNEP-MAP	Adjustment after revision of UNEP/MAP ("Policy Questions" removed)	

Indicator Specification

H2020 Indicators	
Thematic area **WATER**	**Date** 11.05.2018 **Author (s): MED POL, EEA/ETC**
Policy theme **5. Coastal and Marine Water Quality**	
Indicators: **5.1 Nutrient concentrations in transitional, coastal and marine waters** **5.2 Bathing water quality** The specification for Indicator 5.1 is based on the specification sheet from ENPI-SEIS I (MED POL, 2015) and both Indicators 5.1 and 5.2 are in line with IMAP's fact sheets for Common Indicators 13 and 21, respectively.	

Rationale
Why is coastal and marine water quality important in the Mediterranean? Water quality in transitional and coastal regions can be adversely affected by anthropogenic activities, such as the discharge of urban and industrial untreated sewage, agricultural and animal waste runnoff, atmospheric deposition of airborne emissions from shipping and combustion processes. These activities can lead to elevated nutrient concentrations and euthrophication phenomena, which can have negative impacts such as potentially harmful algal blooms and oxygen depletion, affecting benthic communities and fish. Furthermore, contamination with untreated wastewater will degrade the quality of bathing water and pose health risks due to increased pathogens concentrations. Water quality is thus not only important from an environemntal perspective but also from a socio-economic one, considering that coastal tourism is a key economic activity in the Mediterranean region. Indicators 5.1 and 5.2 capture these two aspects of water quality.
Justification for indicator selection
5.1 Nutrient concentrations in transitional, coastal and marine waters The Mediterranean Sea is one of the most oligotrophic (poor in nutrients) oceanic systems. However, some coastal hotspots receive excessive loads of nutrients from sewage effluents, river fluxes, aquaculture farms, fertilizers, and industrial facilities, resulting into intense eutrophic phenomena with adverse effects for the marine ecosystem and humans. Because nutrient enrichment is the first factor promoting eutrophication, eutrophic areas in the Mediterranean are mostly limited to coastal areas, enclosed bays, river estuaries, coastal lagoons or embayments with restricted water exchange with the open sea. Eutrophication can cause a chain of undesirable effects, including changes in species composition and functioning, reduced water transparency due to an increase in suspended algae, oxygen depletion and noxious odour due to the decay of organic material. Prevention of human-induced eutrophication and its adverse effects, is one of the ecological objectives (EO) of the Ecossystem Approach being implemented by the Barcelona Convention. The concentration of key nutrients in the water column is one of the Common Indicators from the Integrated Monitoring and Assessment Programme (IMAP), linked to EO5 on Eutrophication. Different parameters have been identified as providing most information relative to eutrophication e.g. chlorophyll, dissolved oxygen, inorganic nutrients, organic matter, water transparency. The concentration of key nutrients in the water column, in particular where in situ monitoring is advised (see IMAP, 2016), is a «state» indicator and can relate more directly to land-based sources, with link to H2020 indicators on wastewater management and nutrients release from industrial sectors («pressure» indicators).

The results of the assessment by UNEP/MAP on key nutrients in the water column in the Mediterranean indicate that the picture in the Mediterranean is rather limited due to data availability and quality but confirm the validity of this indicator in assessing eutrophication.

5.2 Bathing water quality

Tourism is an important component of socio-economic development in the Meditteranean region. The Mediterranean beaches are known for their attractiveness and are popular tourist destinations. Discharge of untreated or partially treated wastewater in the coastal and marine environment can lead to feacal contamination, microbiological pollution and potential pathogens in the environment, posing a public health risk in bathing water sites. Despite the overal improvement of sewerage systems in the Mediterranean region, in particular in the Northern part, bathing water degradation is still a problem in many areas. Thus it remains crucial to monitor the state of the Mediterranean water quality in view of implementing and monitor the necessary measures and inform the public and visitors on the safety of coastal bathing sites.

The Barcelona Convention has adopeted ecological objectives for *contaminants not to cause significant impact on coastal and marine ecosystems and human health.* Indicator 5.2 corresponds to IMAP’s Common Indicator 21: *Percentage of intestinal enterococci concentration measurements within established standards,* used to assess water quality in coastal bathing water sites.

Enterococci sp. has been demonstrated to be an appropriate indicator for faecal bacteria in brackish and marine waters and is known to be a good indicator for human pathogens in wastewater discharges.

References

- Arhonditsis, G., Tsirtsis, G., Angelidis, M. O. and Karydis, M., 2000. Quantification of the effects of nonpoint nutrient sources to coastal marine eutrophication: applications to a semi-enclosed gulf in the Mediterranean Sea, Ecological Modelling, Volume 129, Issues 2-3, Pages 209-227.
- EEA, 2017. European bathing water quality in 2016. EEA Report, No 5/2017
- Kamizoulis, G., and Saliba, L., 2003. Development of coastal recreational water quality standards in the Mediterranean. Environment International. 30, pp 841-854.
- Karydis, M. and Kitsiou, D., 2011. Eutrophication and Environmental Policy in the Mediterranan Sea: a review
- Kocak, M. et al, 2010. Long-term atmospheric nutrient inputs to the Eastern Mediterranean: sources, solubility and comparison with riverine inputs
- MAP, 2001. Atmospheric transport and deposition of pollutants into the Mditerranean Sea, MAP Technical Report Series, No 133, Athens.
- MED POL, 2015. Indicator Fact Sheet 5. Nutrient concentrations in transitional, coastal and marine waters of the Mediterranean Sea.
- UNEP/MAP, 2016. Integrated Monitoring and Assessment Programme (IMAP) of the Mediterranean Sea and Coast and Related Assessment Criteria.
- UNEP/MAP, 2017. IMAP Common Indicator Guidance Fact Sheets (Pollution and Marine Litter).
- UNEP/MAP, 2017. Mediterranean Quality Status Report

Indicator definition
***5.1** Nutrient concentrations in transitional, coastal and marine waters*

Main indicators definition: Total Nitrogen and Total Phosphorus

The indicators refer to the levels and trends in total nitrogen and total phosphorus concentration in the transitional, coastal and marine waters of the Mediterranean Sea.

Total nitrogen (TN) is not a chemical entity but the methodological addition of the nitrogen equivalent of a number of nitrogen-containing substances. Total nitrogen comprises the ions nitrate, nitrite and ammonium in the dissolved phase (DIN) and the organic forms of nitrogen (mostly proteins and other N-containing substances) existing in biota and other particulate materials (PON) and in dissolved organic matter (DON).

Total phosphorus (TP) comprises the dissolved ion phosphate and the organic forms of phosphorus existing in biota and other particulate materials (POP) and in dissolved organic matter (DOP).

Sub-indicators: **NO3, NO2, NH4, o-PO4**
These sub indicators refer to the levels and trends in: nitrate, nitrite, ammonia and ortho-phosphate concentration in transitional, coastal and marine waters of the Mediterranean Sea.

NO3 : Nitrate is a chemical entity naturally existing in the environment. Nitrate is the most stable form of nitrogen in oxidized marine environments. Elemental nitrogen (gas), present in the atmosphere and dissolved in the seawater, may be converted to one of other forms by micro-organisms in the nitrogen-fixation process. The reverse is also true, nitrate and other forms of nitrogen may be converted into elemental nitrogen through de-nitrification.

NO2: Nitrite is a chemical entity naturally existing in the environment contributing, as a source of Nitrogen, to the maintenance of the ecosystem. Although free nitrite is toxic to all kinds of higher organisms, marine plants can take it up and some micro-organisms can transform it onto nitrate, ammonium or even nitrogen gas. Nitrite will, eventually, contribute to the production of particulate organic matter (POM) and/or dissolved organic matter (DOM).

NH4 : Ammonium is a chemical entity naturally existing in the environment contributing, as a source of Nitrogen, to the maintenance of the ecosystem. Ammonium is excreted by many organisms, particularly those constituting the zooplankton, and marine plants can take it up even more readily than nitrate or nitrite. Some micro -organisms can transform it onto nitrite, nitrate or even nitrogen gas. Ammonium will, eventually, contribute to the production of particulate organic matter (POM) and/or dissolved organic matter (DOM).

o-PO4: Orthophosphate is a chemical entity naturally existing in the environment and is of great importance for the maintenance of the ecosystem since it is required by marine plants and other microorganisms for the production of particulate organic matter (POM) and, eventually, dissolved organic matter (DOM).

Units
Concentrations in micromol per liter (µmol/L)

Geographical scope
Mediterranean.

Indicator definition
***5.2** Bathing water quality*

Main indicators definition: Percentage of intestinal enterococci concentration measurements in bathing water sites within established standards

The indicator refers to a microbiological parameter of water quality in terms of standards and criteria adopted in the Mediterranean (Decision IG.20/9) and which are also in line with the EU New bathing Water Directive (2006/7/EC). It is based on the concentration of intestinal enterococci, a faecal indicator that includes all the species from the *Enterococcus* genus. Environmental Enterococci species can often be grouped, since they fulfill the following criteria: growth between 10-45 °C, resistance to 60 °C for 30 minutres, growth at pH 9.6 and 6.5 % NaCl, and the ability to reduce 0.1% methylene blue.

Quality standards were set based on Intestinal enterococci concentration (cfu/100mL), with limit values per water quality status: Excellent quality (<100), Good quality, (101-200), Sufficient quality (185) and Poor quality/Immediate action (>185).

Units

cfu/100 mL (based on Intestinal enterococci)
Quality standards: Excellent quality, Good quality, Sufficient quality, Pool quality/Immediate action

Geographical scope

Coastal bathing sites of the Mediterranean.

Policy context and targets
General context description One of the Barcelona Convention's main objectives is to assess and control marine pollution and eutrophication in the Mediterranean. Both the Convention and the H2020 Initiative, recognise contamination from land-based sources, including urban wastewater, as a major source of pollution in the Mediterranean Sea. The Mediterranean Action Plan and the Barcelona Convention's Protocols, together with the European Union Directives on water quality and coastal management, provide a solid policy background to assess and tackle eutrophication problems and bathing water quality degradation in the Mediterranean region. In 2016, the Integrated Monitoring and Assessment Programme and related Assessment Criteria (IMAP) was adopted. IMAP provides guidelines for Mediterranean Contracting Parties to apply the Ecosystem Approach to the management of human activities that affect the region.
5.1 Nutrient concentrations in transitional, coastal and marine waters The issue of a consistent monitoring strategy and assessment of eutrophication was first raised at the UNEP/MAP MED POL National Coordinators Meeting in 2001 (Venice, Italy) which recommended to the Secretariat to elaborate a draft programme for monitoring of eutrophication in the Mediterranean coastal waters (UNEP/MAP MED POL, 2003). In spite of a series of assessments reviewing the concept and state of eutrophication, there are important gaps in the capacity to assess the intensity of this phenomenon. Efforts have been devoted to define the concepts to assess the intensity and to extend experience beyond the initial sites in the Adriatic Sea, admittedly, the most eutrophic area in the entire Mediterranean Sea. In the context of the Mediterranean Sea, the Integrated Monitoring and Assessment Programme (UNEP/MAP, 2016) and the European Marine Strategy Framework Directive (2000/56/EC) are the two main policy tools for the eutrophication phenomenon. **Targets** The most pertinent regional and national targets with regard to concentrations of nutrients in water arises from the implementation of UNEP/MAP's Ecosystem Approach (EcAp) and IMAP, done in synergy with EU Marine Strategy Directive (MSFD). The EO5 is "human-induced eutrophication is prevented, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algal blooms and oxygen deficiency in bottom waters." In this framework, a few targets associated to EO5 have been proposed: 1. Reference nutrients concentrations according to the local hydrological, chemical and morphological characteristics of the un-impacted marine region. 2. Decreasing trend of nutrients concentrations in water column of human impacted areas, statistically defined. 3. Reduction of BOD emissions from land based sources. 4. Reduction of nutrients emissions from land based sources Decision IG. 21/3 of the Barcelona Convention Contractibg Parties on the ecosystems approach includes also targets on eutrophication for achieving GES. In relation to IMAP's Indicator, for each considered marine spatial scale (region, sub-region, local water mass, etc.) the nutrient levels should be compared based on base reference levels and trends monitoring until commonly agreed thresholds have been scientifically assessed and agreed upon in the Mediterranean Sea. **Related policy documents**

- UNEP/MAP, 1997. SAP MED, 1997
- UNEP/MAP, 2016. Decision IG.22/7 - Integrated Monitoring and Assessment Programme (IMAP) of the Mediterranean Sea and Coast and Related Assessment Criteria.
- UNEP/MAP, 2009. Decision IG.19/7. Regional Plan on the reduction of BOD5 from urban waste water in the framework of the implementation of Article 15 of the LBS Protocol.
- EU, 2000. Water Framework Directive (WFD) 2000/60/EC: Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.
- EU, 2008. Marine Strategy Framework Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy.
- Karydis M, Kitsiou D. (2012) Eutrophication and environmental policy in the Mediterranean Sea: A review. Environ Monit Assess. 184(8): 4931-84.

5.2 Bathing water quality.

In 1985, the Contracting Parties of the Barcelona Convention adopted ad interim common Quality criteria and standards for coastal and recreational waters in 1985, in anticipation of further evidence.
In 2003, the WHO developed the “Guidelines for Safe Recreational Water Environments”, which resulted in the EU linking their new proposal to the WHO guidelines.
The Mediterranean Standards and Criteria for bathing waters were proposed in 2007, based on the WHO guidelines for “Safe Recreational Water Environments” and the EC Directive for “Bathing Waters”. The proposal was made in an effort to provide updated criteria and standards that can be used in the Mediterranean countries and to harmonize their legislation in order to provide homogenous data. These guidelines were coupled with instructions to prepare water quality profiles in 2009. All Mediterranean countries were assisted by WHO/MED POL to perform pilot studies on the preparation of bathing water quality profiles, which were presented in Athens in 2010. In 2012, the revised criteria and standards were agreed at the 17th meething of the Contracting parties to the Barcelona Convention (Decision IG.20/9 Criteria and Standards for bathing waters quality in the framework of the implementation of Article 7 of the LBS Protocol). The revised criteria and standards require monitoring, assessment and classification of bathing water quality status that is referred to as “excellent”, “good”, “sufficient” and “poor quality”, with each qualification linked to clear numerical quality standards of bacteriological quality.

The EU Directive on the quality of bathing waters (76/160/EEC) is one of the oldest environmental laws in the EU, adopted in 1976. A new EC Directive was adopted by the EU, in 2006.

Targets

The main objective is to reduce gastroenteritis and other waterborne health risks and to provide better and earlier information of bathing water quality to the citizens. Though no specific targets for reduction have been set regionally, under the MAP Barcelona Convention. The initial GES proposed target is an *Increasing trend in the measurements within established standards (levels of intestinal enterococci comply with established national or international standards, such as EU 2006/7 Directive).*

Related policy documents

- UNEP/MAP, 2012. Decision IG.20/9 - Criteria and Standards for bathing waters quality in the framework of the implementation of Article 7 of the LBS Protocol.
- UNEP/MAP, 2013. Decision IG.21/3 - Ecosystems Approach including adopting definitions of Good Environmental Status (GES) and Targets.
- UNEP/MAP, 2016. Decision IG.22/7 - Integrated Monitoring and Assessment Programme

(IMAP) of the Mediterranean Sea and Coast and Related Assessment Criteria.

-

- EEA, 2017. European bathing water quality in 2017. 1977-8449, report no 5.
- EU, 2006. Directive 2006/7/EC of the European Parliament and of the Council - concerning the management of bathing water quality and repealing Directive 76/160/EEC.
- EU, 1975. Council – Council Directive of 8 December 1975 – concerning the quality of bathing water (76/160/EEC).
- WHO, 2003. Guidelines for safe recreational water environments. Volume 1: Coastal and Fresh Water. Geneva, Switzerland.

Methodology

5.1 Nutrient concentrations in transitional, coastal and marine waters

Methodology for indicator calculation (including description of data used)

For all indicators: Spectrophotometry (manually or automated methods and instrumentation).

Main Indicators

Total nitrogen (TN) concentration

The test for determination of total nitrogen in seawater (and fresh water as well) consists in the digestion of the unfiltered sample followed by Kjeldahl (ammonia, organic and reduced N) and, after oxidation, by the standard photometric technique used for analysis of nitrate. Alternatively, filtering through glass fiber filters allows the concentration of Particulate Nitrogen which will be submitted to digestion, while the filtrate would be oxidised and submitted to the nitrate analysis. The sensitivity of these techniques is high. However, except in hotspots, concentrations in surface waters may be near detection level.

Other nitrogen ions and fractions may be analyzed, depending on whether the aliquot of water has been previously filtered and/or digested: a) *organic Nitrogen (DON);* b) *Total Dissolved Nitrogen (DN);* c) *Particulate Organic Nitrogen (PON)*. From an environmental point of view, the state in which the nutrient is present in the effluent is quite irrelevant, since the transit from one form to another is readily carried out by one or other kind of the omnipresent micro-organisms.

Total phosphorus (TP) concentration

The test for determination of total phosphorus in seawater (and fresh water as well) consists in the oxidation to phosphate, which is then determined by standard photometric technique.

From a purely technical point of view, it should be stressed that all analytical procedures and techniques should be subject to inter-calibration and quality control protocols.

Sub-indicators

Nitrate (NO3) concentration

The test for determination of nitrate in seawater (and fresh water as well) consists of a standard photometric technique based on the reduction of nitrate to nitrite with copperised cadmium and then formation of a dye with sulphanilamide and nafthyl-ethylene-diamine. The second step also reacts with nitrite. Usually, nitrite is determined separately by the same technique without the reducing step although, often, the parameter Nitrate includes Nitrite as well. The sensitivity of this technique is very high. However, except in hotspots, concentrations in surface waters may be near detection level.

Nitrite (NO2) concentration

The test for determination of nitrite in seawater (and fresh water as well) consists in a standard photometric technique based on the formation of a dye with sulphanilamide and nafthyl-ethylene-diamine. If the procedure starts with the reduction of nitrate, both ions are quantified together. The precision of this technique is very high; however, concentrations in deeper waters may be near detection level.

Ammonium (NH4) concentration

The test for determination of ammonium in seawater (and fresh water as well) consists of a standard photometric technique based on the formation of an indophenol dye. The sensitivity of this technique is relatively high; however, concentrations in open sea waters may be near detection level. The technique is subject to laboratory contamination if proper working conditions are not kept.

Orthophosphate (o-PO4) concentration

The test for determination of orthophosphate in seawater (and fresh water as well) consists in a standard specific photometric technique based on the reduction of molybdate to molybdenum blue. The sensitivity of this technique is very high. However, except in hotspots, concentrations in surface waters may be near detection level.

Geographical coverage
Mediterranean transitional, coastal and relevant marine waters.
The geographic scale of monitoring depends on several factors (e.g. hydrological conditions, input from rivers) and the purpose of monitoring (e.g. monitoring of “hotpsots”, assessment of “Good Environmental Status”, etc – See IMAP Common Indicators Guidance Fact sheets).

Transitional waters: Transitional waters are those waters between the land and the sea and include fjords, estuaries, lagoons, deltas and rias. They often encompass river mouths and so show the transition from freshwater to marine conditions. Depending on the tidal influence from coastal waters, but also on the freshwater influence from upstream, transitional waters are often characterised by frequently changing salinity.

Coastal waters: The part of the ocean adjacent to the coast of a state that is considered to be part of the territory of that state and subject to its sovereignty (see http://www.wiser.eu/background/coastal-waters/)

Marine Waters: The part of the ocean that extends further to the coastal waters to the open seas.

Data sources
Data are generated from the national monitoring programme of the countries in transitional, coastal and marine waters.
In Europe: EEA Waterbase - Transitional, coastal and marine waters
In the Mediterranean: MED POL/WHO

Temporal units
At the Mediterranean Sea latitudes, in general terms, the pre-summer and Winter primary production bloom intensity peaks of natural eutrophication will define the strategy for the sampling frequency, altough year round measurements of nutrients may be more appropriate. The optimum frequency (seasonal 2 to 4 times per year or monthly 12 times per year) for the monitoring of nutrients at the selected stations should be choseen taking into account the necessity of both to control the deviations of the known natural cycles of eutrophication in coastal areas and the control of (decreasing) trends monitoring impacted areas, therefore, from low frequency (mínimum)to high frequency measurements.
Therefore, either for impacted or non-impacted coastal waters the optimal frequency per year and sampling locations needs to be selected at a local scales, whilst for open waters the sampling frequency to be determined on a sub-regional level following a risk based approach.

Temporal coverage
2003-2016
For some areas, data series exist since 1998.

Methodology for gap filling
National Laboratories should be encouraged to provide the data for the years that are not available in MEDPOL data base because they were not complying with the agreed reporting format and quality assurance programme.

Methodological references

- MED POL, 2014
- UNEP/MAP, 2017. IMAP Common Indicator Guidance Fact Sheets (Pollution and Marine Litter).

Methodology

5.2 Bathing water quality

Methodology for indicator calculation
The following methodology is in line with the IMAP’s Common Indicators Guidance Fact-sheets.

ISO 7899-2 (based on membrane filtration technique or any other approved technique) has been proposed by Directive 2006/7/EC with the specification below.

Based upon percentile evaluation of the log_{10} normal probability density function of microbiological data acquired from the particular bathing water, the percentile value is derived as follows:

1) Take the log10 value of all bacterial enumerations in the data sequence to be evaluated. (If a zero value is obtained, take the log10 value of the minimum detection limit of the analytical method used instead)
2) Calculate the arithmetic mean of the log10 values (μ).
3) Calculate the standard deviation of the log10 values (σ).

Quality standards and limit values per water quality status (Decision IG.20/9):

Category	A	B	C	D
Limit values	**<100***	**101-200***	**185****	**>185**(1)**
Water Quality	**Excellent**	**Good**	**Sufficient**	**Poor/Immediate Action**

(*)The upper 95-percentile point of the data probability density function is derived from the following equation: upper 95-percentile = antilog (μ + 1,65 σ).

(**)The upper 90-percentile point of the data probability density function is derived from the following equation: upper 90-percentile = antilog (μ + 1,282 σ).

(1) For single sample appropriate action is recommended to be carried out once the count for IE exceeds 500 cfu/100 mL

Minimum sampling frequency: at least one per month and not less than four in a bathing period

including an initial one prior to the start of the bathing period. For classification purposes at least 12 sample results are needed spread over 3-4 bathing seasons.

Data sources
For EU countries: Directorate-General for Environment (DG ENV) , European Environment

Agency (EEA).

Geographical scope
In order to comply with the stated Common Indicator within IMAP the geographic reporting scales (nested approach) should be taken into account. However, the balance between data, location and spatial resolution should be carefully considered for coherence in areas (1) and (2), as this Common

Indicator is largely (if not entirely) evaluated in coastal waters (3):

(1) Whole region (i.e. Mediterranean Sea);

(2) Mediterranean sub-regions, as presented in the Initial Assessment of the Mediterranean Sea, UNEP(DEPI)/MED IG.20/Inf.8;

(3) Coastal waters and other marine waters;

(4) Subdivisions of coastal waters provided by Contracting Parties

Temporal units
Seasonal (bathing water season, usually May-September).

Temporal coverage
IMAP referes to the Annex IV of the EU Directive 2006/7/EC for the temporal scope guidance:

1. One sample is to be taken shortly before the start of each bathing season. Taking account of this extra sample and subject to point 2 (below), no fewer than four samples are to be taken and analysed per bathing season.
2. However, only three samples need be taken and analysed per bathing season in the case of a bathing water that either:

(a) has a bathing season not exceeding eight weeks; or

(b) is situated in a region subject to special geographical constraints.

3. Sampling dates are to be distributed throughout the bathing season, with the interval between sampling dates never exceeding one month.
4. In the event of short-term pollution, one additional sample is to be taken to confirm that the incident has ended. This sample is not to be part of the set of bathing water quality data. If necessary to replace a disregarded sample, an additional sample is to be taken seven days after the end of the short-term pollution.

Methodology for gap filling
No gaps are filled.

Methodological references

- UNEP/MED, 2012. Decision IG.20/9 - Criteria and Standards for bathing waters quality in the framework of the implementation of Article 7 of the LBS Protocol.
- UNEP/MAP, 2017. IMAP Common Indicator Guidance Fact Sheets (Pollution and Marine Litter).
- WHO, 2000. Monitoring Bathing Waters - A Practical Guide to the Design and Implementation of Assessments and Monitoring Programmes.

Uncertainties
***5.1** Nutrient concentrations in transitional, coastal and marine waters*
Methodology uncertainty A number of scientific studies, in the Eastern Mediterranean clearly show that atmospheric deposition (wet and dry) plays an important role in the open sea and possibly in the coastal area as well.
Data sets uncertainty According to UNEP/MAP MEDPOL existing monitoring programme is targeting hotspot locations including sources and therefore data points are not evenly distributed along the Mediterranean coastline. This may result in geographical gaps in the available information.
Rationale uncertainty Due to variations in fresh water discharges and the hydrological variability of the coastal zone and internal nutrient cycling processes, trend and nutrient concentrations as such cannot be directly related to policy measures taken.
***5.2** Bathing water quality*
Methodology uncertainty ISO 7899-2 describes the isolation of intestinal enterococci (*Enterococcus faecalis*, *E. faecium*, *E. durans* and *E. hirae*). In addition, other *Enterococcus* species and some species of the genus *Streptococcus* (namely *S. bovis* and *S. equinus*) may occasionally be detected. These *Streptococcus* species do not survive long in water and are probably not enumerated quantitatively. For purposes of water examination, enterococci sp. can be regarded as indicators of faecal pollution, despite it should be mentioned that some enterococci found in water can occasionally also originate from other habitats.
Data sets uncertainty Different time-series may not be consistent in terms of geographic coverage, as different countries started monitoring bathig water sites in different years. There may be also a large variability in terms of the number and type of bathing sites designated.
Rationale uncertainty Human enteric viruses are the most likely pathogens responsible for waterborne diseases from recreational water use but detection methods are complex and costly for routine monitoring. Given that this indicator only consideres intestinal enterococci, compliance with high standards does not necessarily guarantee that there is no risk to human health.

2.b Industrial Emission Indicators Factsheets

Industrial Emissions Indicator IND 6.1: Release of nutrients from industrial sectors

Sub-indicators

6.1.1) Total BOD load discharged from industrial installations to the Mediterranean marine environment.

6.1.2) Total Nitrogen load discharged from industrial installations to the Mediterranean marine environment.

6.1.3) Total Phosphorus load discharged from industrial installations to the Mediterranean marine environment.

Rationale

Justification for indicator selection

This indicator represents the emissions from industrial sources from individual facilities within the Mediterranean coastal zone with regard to nutrients. It is a pressure indicator.

This indicator is referenced by a number of pollution reduction programmes and environmental initiatives including H2020 and NAPs. The indicator complements IMAP indicator 13 (eutrophication) and is in line with the requirements of the Regional plan on the reduction of BOD5 in the food sector. It also provides data and information regarding the operational target identified by the Mediterranean countries with regards to reduction of BOD discharges to the Mediterranean Sea.

The main reason for selection of nutrients is due to their effects on the marine environment. This is manifested by enhanced productivity, which can result in changes in species diversity, excessive algal growth, dissolved oxygen reductions and associated fish kills, and increased prevalence or frequency of toxic and other species algal blooms. This process is linked to the "eutrophication" phenomena, which is caused by an augmentation of nutrient inputs to coastal and marine areas as a consequence of human activities. Marine eutrophication is mainly an inshore problem that affects lagoons, harbors, estuaries and coastal areas adjacent to river mouths of highly populated river basins and/or which receive sewage from coastal cities.

Indicator definition

Nutrients

Nutrients consist of various anthropogenic sources including municipal sewage, industrial wastewater and agriculture. Of concern is biodegradable organic matter (BOD) of industrial wastewater effluents discharged from the food and other industrial sectors; Total Nitrogen (TN); and Total Phosphorus (TP) from agricultural effluents collected by the hydrologic network in the coastal zone of the Mediterranean Sea.

(1) **Biological Oxygen Demand** (**BOD**) is the amount of dissolved oxygen needed (i.e. demanded) by aerobic biological organisms to break down organic material present in a given water sample at certain temperature over a specific time period. This indicator presents information on the BOD estimate of industrial wastewater effluents discharged from food sector industries listed in Appendix I of Decision IG.20/8.2 and other industries within the hydrological basin discharging directly or indirectly into the Mediterranean Sea.

(2) **Total Nitrogen (TN):** This indicator comprises the ions nitrate, nitrite and ammonium in

the dissolved phase (DIN) and the organic forms of nitrogen (mostly proteins and other N-containing substances) existing in biota and other particulate materials and in dissolved organic matter.

(3) **Total Phosphorus (TP):** This indicator comprises the dissolved ion phosphate and the organic forms of phosphorus existing in biota and other particulate materials (POP) and in dissolved organic matter (DOP).

Industrial installations

Industrial installations are facilities intended for use in the manufacture or processing of products involving systematic labor or habitual employment. It consists of a fixed or semi-fixed location of a complete system or a self-contained unit, with its accompanying assemblies, accessories and parts. The principal contributors to nutrients discharges from industrial installations are food industries and food processing including olive oil production, vegetable oil processing, sugar beet processing, canned fruits and vegetables, fish processing, livestock production, wine and spirits, beer production and soft drinks. Other industries contributing to discharge of nutrients include pulp and paper industries, textile dyeing, leather processing, fertilizers and inorganic chemicals, and petroleum refineries.

Units

Nutrient pollution load indicator may be reported to population-equivalent and measured as BOD or TN or TP load discharged from industrial installations in metric tons per year.

Policy context and targets

Policy context description

In November 1995, the Global Program of Action for the Protection of the Marine Environment from Land-Based Activities was adopted. It is designed to be a source of practical guidance to States in taking actions within their respective policies, priorities and resources. In 2012, the Manila Declaration on Furthering the Implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities was adopted. It contains 16 provisions centering on programs to be undertaken for the period 2012-2016 on GPA’s priority areas such as marine litter, wastewater, pollution from fertilizer and biodiversity loss. The Declaration also calls on member-countries to engage and step up their efforts to develop strategies and policies on the sustainable use of “nutrients” so as to improve nutrient use efficiency and to mitigate negative environmental impacts.

In 1975, 16 Mediterranean countries and the European Community adopted the Mediterranean Action Plan (MAP); the first-ever Regional Seas Programme under UNEP's umbrella. In 1995, the Action Plan for the Protection of the Marine Environment and the Sustainable Development of the Coastal Areas of the Mediterranean (MAP Phase II) was adopted by the Contracting Parties to replace the Mediterranean Action Plan of 1975. The Barcelona Convention has given rise to seven Protocols addressing specific aspects of Mediterranean environmental conservation. The Protocol on Land-Based Sources (the LBS Protocol) was adopted on 17 May 1980. The Protocol entered into force on 17 June 1983. The original Protocol was modified by amendments adopted on 7 March 1996 by the Conference of Plenipotentiaries on the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources (UNEP(OCA)/MED IG. 7/4). The amended Protocol, recorded as “Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities”, entered into force on 18 May 2006.

In 1999, the parties to the Barcelona Convention adopted a Strategic Action Programme to Address Pollution from Land-Based Activities (SAP-MED). SAP-MED identified categories of pollutants and activities to be eliminated or controlled by the Mediterranean countries by 2025. In this context, countries prepared inventories of all pollution sources on their coasts in the framework of the National Baseline Budget of emissions and releases (NBBs), as well as National Action Plans (NAPs) describing the policies and investments that each country intends to undertake to reduce pollution from identified “pollution hotspots.” SAP-MED includes special provisions on nutrients and suspended solids.

Ten Regional Plans in the framework of Article 15 of the LBS Protocol were adopted. These plans specify and strengthen the SAP-MED with regards to industrial pollution sector (POPs, heavy metals and food industry), urban development (BOD5 from WWTP and marine litter), as well as enhance monitoring and reporting requirements. Of particular interest is the Regional Plan on the reduction of BOD in the food sector [Decision IG.20/8.2].

In 2012, the Contracting Parties to the Barcelona Convention adopted Decision IG. 20/4 of the 17th Conference of the Parties on the ecosystem approach. Eleven (11) ecological objectives were approved including EO5 on eutrophication. The Ecosystem Approach is the guiding principle to MAP Programme of Work and all policy implementation and development undertaken under the auspices of UNEP/MAP Barcelona Convention, with the ultimate objective of achieving the Good Environmental Status (GES) of the Mediterranean Sea and Coast. Following up on the latter, Decision IG. 21/3 on the ecosystems approach adopted definitions of Good Environmental Status (GES). The Decision provides details of the operational objectives, indicators, GES and proposed targets.

Mainstreaming EcAp into the work of UNEP/MAP Barcelona Convention and achieving the GES of the Mediterranean Sea and Coast through the EcAp process have been supported by several European Union funded projects including EcAp-MED I (2012-2015) and EcAp-MED II (2015-2018) projects.

The Euro-Mediterranean Environment Ministers at their meeting in Cairo in 2006 invited "the European Commission to coordinate the partnership of the Horizon 2020 initiative through the establishment of an efficient institutional steering mechanism with key representatives from the Euro-Mediterranean governments and other partners to provide overall guidance, review, monitoring and effectively coordinate with other related initiatives." As of 2008, this initiative is one of the main pillars of the UfM. Based on the Mid-term review of the Horizon 2020 initiative, the Union of the Mediterranean (UfM) Environment Ministers at their meeting in Athens in May 2014 called for modifications to the structure of the Initiative. Specifically, the final declaration of the UfM Ministerial meeting undertook to address outstanding data needs by applying the principles of Shared Environment Information Systems (SEIS) in line with the commitments under the Barcelona Convention and the NAPs, also contributing to its regional integrated monitoring programme. On this basis, the 2nd phase of this initiative aims to expand the existing H2020 priorities with regards to water, solid waste and industrial emissions to the Mediterranean Sea.

Targets

SAP-MED proposes the year 2025 as a target date for disposal of all wastewater from industrial installations which are sources of BOD, nutrients and suspended solids. The Regional Plan on the reduction of BOD5 in the food sector states that Industrial Food Plants shall implement by 2014 the stipulated emission limit values, taking into account their national circumstances the respective capacity to implement the required measures. Mediterranean countries presented in their NAPs national targets for reduction of BOD in conformity with the provision of SAP-MED and the legally binding requirements of the regional plans. Decision IG. 21/3 on the ecosystems approach includes also targets on eutrophication for achieving GES.

The Euro-Mediterranean Ministers adopted the Athens Declaration in May 2014 in which it was pledged to implement instruments, programmes, action plans and guidelines adopted at Barcelona Convention CoP19 to prevent pollution from maritime transport, marine exploration and land-based activities, as crucial means for the achievement of the objectives of the Barcelona Convention and targets set in its Protocols.

Methodology

Methodology for indicator calculation

Two common methodologies are presented for calculating this indicator:

1. Emission factors method: An emission factor is a representative value that attempts to relate the quantity of a pollutant released to the marine environment with an activity associated with the release of that pollutant. These factors are usually expressed as the weight of pollutant divided by a unit weight, volume, distance, or duration of the activity emitting the pollutant. In most cases, such factors are simply averages of all available data of acceptable quality, and are generally assumed to be representative of long-term averages for all facilities in the source category (i.e., a population average).

   The US EPA[3] defines the general equation for emissions estimation:

   $$E = A \times EF \times (1 - ER/100)$$

   where:

   E = emission
   A = activity rate
   EF = emission factor
   ER = overall emission reduction efficiency (%)

   The emission factors technique can be used to obtain data that complement those reported in the NBB or PRTR systems. As these systems are based on information of releases of a specific list of pollutants to water, air and land, some pollutants included in these lists may not be routinely analyzed in the effluents and emissions, and therefore no extensive data sets may be available. To bypass the lack of such analytical data, the pollutants releases can be estimated by using the Emission Factors (EF) technique.

   Required data for estimating pollution loads from industrial installations are:
   - Relevant industrial sectors per administrative region.
   - Relevant industrial processes generating pollutant of interest.
   - Unit production quantity.
   - Emission factor for relevant pollutant for each industrial sector.

2. Field measurements should be undertaken when datasets needed for calculating the indicator are lacking. Field measurements should be performed by trained personnel who possess the knowledge about the specific aspects pertinent to the industry in question. They should be properly equipped with regards to sampling and testing equipment and protective clothing. Field measurements are executed according to standard protocols and working instructions. This involves desk study whereby relevant information on the specific industrial installation(s) is collected and spots to be checked are mapped. In the field, it is critical to verify that production lines are working, and to locate emission points and corresponding effluent flow rates from each point. Samples may be obtained if the inspector deems it necessary for counter-checking of the self-monitoring results (i.e. field measurements). Objective evidence of state of pollution at the effluents' points should be acquired such as photographs and oral/written statements, reports of previous test analysis, etc. Standard methods for laboratory determination of nutrients concentrations are as follows:

   - Determination of BOD: The most common method recognized for the measurement of BOD is the dilution method. It is the standard method recognized by U.S. EPA NS labeled Method 5210B in the Standard Methods for the Examination of Water and Wastewater for determination of BOD5.
   - Determination of Total Nitrogen: The test for determination of total nitrogen in seawater (and fresh water as well) consists in the digestion of the unfiltered sample followed by Kjeldahl (ammonium) or, after oxidation, by the standard photometric technique used for analysis of nitrate.
   - Determination of Total Phosphorus: The test for determination of total phosphorus in seawater (and fresh water as well) consists in the oxidation to phosphate, which is then determined by standard photometric technique.

[3] https://www.epa.gov/air-emissions-factors-and-quantification/basic-information-air-emissions-factors-and-quantification

Required data to calculate pollution load from effluent points of the industrial facility are:

- Effluent flow rate from the emission point, and duration of flow.
- Concentration of pollutant from the emission point.

Description of required data

- Relevant industrial sectors per administrative region.
- List of industrial facilities for a particular sector in an administrative region.
- Estimated or calculated pollution loads for the relevant pollutant for each industrial facility.

Geographical coverage

Administrative regions of the whole Mediterranean sea watershed as defined in section 3.1 of the "Updated guidelines to assess national budget of pollutants (NBB)" [UNEP(DEPI)/MED WG. 404/4].

Temporal coverage

Three data series for the years 2003, 2008 and 2015 are available. However, not all Mediterranean countries have reported in all three time periods.

Basis for aggregation

Due to the very complex nature of this indicator, the only possible aggregation is per substance (measured in the same phase) at the national level or at the coastal hydrological basin. This entails the presentation of nutrients in three sub-indicators for BOD, phosphorus and nitrogen.

Trend analysis

Can be performed based on the three data series in 2003, 2008 and 2015 for a limited number of substances and only in some countries.

Methodology for gap filling

Two methodologies are presented for the indicator on release of nutrients from industrial sectors. In principle, the two methods constitute two alternatives for estimates of releases. However, in case of lack of actual data on the industrial processes generating the pollutants of interest and their unit production quantities for use in the emission factor method, required data may be obtained from records maintained by relevant governmental authorities that issued the permit for the industrial facility in question.

Data specifications

Data sets availability

Key source of data needed for estimating pollution loads for this indicator can be found in the NBB or PRTR registers. Alternatively:

- Data on types of liquid effluents generated from industrial facilities may be found in records of industrial permitting authorities for each administrative region.
- Concentrations of pollutants in liquid effluents may be available in national/ regional inspection registers of pollutants discharged by industrial facilities, if such registers are institutionalized.
- Data on industrial sectors operating in a particular administrative region are available from records of industrial permitting authorities for each administrative region.

References for data collection

- 'Updated guidelines to assess national budget of pollutants (NBB)', UNEP(DEPI)/MED WG.404/4, Barcelona, 18-19 December 2014.
- 'National Baseline Budget for 2008', UNEP-MAP, Athens 22 August 2008.
- 'Web based NBB reporting system specification requirements', UNEP(DEC)/MED WG.393/3, 4 March 2014.
- UNEP/MAP, 2014a. Introduction to pollutant release and transfer register (PRTR) and guidelines for reporting (UNEP(DEPI)/MED WG.399/3).
- UNEP/MAP, 2014b. Industrial emission factors. Updated version 2012. (UNEP(DEPI)/MED WG.393/Inf.5).
- 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. European Union, 2006.
- 'International Standard Industrial Classification of all Economic Activities (ISIC), Rev4', Department of Economic and Social Affairs, Statistics Division, United Nations, New York, 2008.

Uncertainties

Methodological uncertainties

Methodological uncertainties depend on whether the emission factor or field measurement method is used. With reference to:

- The emission factor method, uncertainty is related to whether the characteristics of the industrial process for which the emission factor was developed are similar to those of the industrial process in question. Typically, emission factors are derived for specific industrial processes using certain manufacturing technology operating in a specific environment. In case the technology is different, then the level of pollutants it emits will vary, and the emission factor is no longer representative of the process in question.
- The field measurement method, uncertainty is related to the accuracy of measurements of concentration in industrial effluents, and to proper estimates of flow rates which can be averaged over the daily or monthly production of the industrial unit. These two factors affect the calculation of the pollution load for the industrial facility. Another source of uncertainty is related to the number of emission points and ability to estimate actual pollution load.

Industrial Emissions Indicator IND 6.2: Release of toxic substances from industrial sectors

Sub-indicators

6.2.1) Total heavy metals load released from industrial installations to the Mediterranean marine environment.
6.2.2) Furans and dioxins load released from industrial installations to the Mediterranean marine environment.
6.2.3) Polycyclic aromatic hydrocarbons (PAH) load released from industrial installations to the Mediterranean marine environment.
6.2.4) Volatile organic compounds (VOC) load released from industrial installations to the Mediterranean marine environment.

Rationale

Justification for indicator selection

This indicator represents the emissions from industrial sources originating from individual facilities within the Mediterranean coastal zone with regard to toxic substances, and hydrocarbons. It is a pressure indicator.

This indicator is referenced by a number of pollution reduction programmes and environmental initiatives including Regional Seas, MED POL, H2020, NAPs and SDG. SDG indicators are regarded as the main drivers for updating the scope of the industrial emissions indicators. They are a measure of the strength of economic activities which represent at the same time the drivers of pollution generation and environmental pressures on the marine and coastal ecosystems. As these economic activities contribute to the wealth of the Mediterranean countries and to the social well-being of its people, this indicator should lead to an effective monitoring process capturing the principle of sustainable development, while promoting at the same time the creation of functional synergies among all stakeholders. Pollutants addressed by this indicator are based on SAP-MED categories and substances included in Annex I.C of the LBS Protocol, which are compiled in the NBB and PRTR registers. Furthermore, the indicator is in line with the requirements of the Regional plans on the reduction, elimination and phasing out of POPs and mercury. It provides data and information regarding the operational target identified by the Mediterranean countries with regards to reduction of discharges of hazardous substances from industrial plants or their safe disposal.

The main reason for selection of toxic substances is due to the fact that industrial development in the Mediterranean countries varies greatly from one country to another. From the thirty sectors of activity primarily considered in the Annex I of the LBS Protocol, twenty-one are industrial. Furthermore, most countries in the region have an important public industrial sector which is composed of large industries including energy production; oil refineries; petrochemicals; basic iron and steel metallurgy; basic aluminum metallurgy; fertilizer production; paper and paper pulp; and cement production. These industries are major contributors for toxic substances and hydrocarbons which are generated in large quantities causing damage to human health, ecosystems, habitats and biodiversity. On the international level, priority has been given to toxic, persistent and bioaccumulable pollutants for their effects on human health, biodiversity and the preservation of ecosystems and long-term and long-distance effects. Successive releases of these chemicals over time will result in the continued accumulation and ubiquitous presence of POPs in the global environment. Their high persistence poses a risk of causing adverse effects to the environment and human health.

Regarding hydrocarbons, this includes various groups such as halogenated hydrocarbons, polycyclic aromatic hydrocarbons (PAH) and volatile organic compounds (VOC). All of these substances were reported by most of the Mediterranean countries in NBB inventories carried out in 2003 and 2008.

Halogenated hydrocarbons include polychlorinated dibenzo-dioxins (PCDDs) and polychlorinated dibenzo-furans (PCDFs). These substances are amongst the most toxic and persistent substances reaching the marine and coastal environment through point and diffuse sources. Polycyclic aromatic hydrocarbons (PAHs) are ubiquitous environmental pollutants generated primarily during the incomplete combustion of organic materials (e.g. coal, oil, petrol, and wood). Many PAHs have toxic, mutagenic and/or carcinogenic properties. PAHs are highly lipid soluble and thus readily absorbed from the gastrointestinal tract of mammals. Volatile Organic Compounds (VOC) are organic compounds having initial boiling points less than or equal to 250 °C and can do damage to visual or audible senses. VOCs are numerous, varied, and ubiquitous. They include both human-made and naturally occurring chemical compounds. Some VOCs are dangerous to human health or cause harm to the environment. Harmful VOCs are typically not acutely toxic, but instead have compounding long-term health effects.

Indicator definition

Toxic substances

1. **Heavy metals**: This indicator presents information on heavy metal annual emissions reported from point sources in the Mediterranean Sea area (land based sources/coastal zone discharged to air or water). Six heavy metals have been identified in SAP-MED. These include:
    i. Mercury. The most important industrial sources of mercury are combustion of coal in power plants; chlor-alkali production; manufacture and disposal of batteries; waste incineration and roasting and smelting in non-ferrous metal smelters.
    ii. Cadmium. The most important industrial sources of cadmium are zinc and lead metal processing; electroplating; the production of cadmium compounds; pigment production; the manufacture and disposal of batteries; the production of stabilizers for plastics and phosphate fertilizers.
    iii. Lead. The most important industrial sources of lead are lead metallurgy; the manufacture and disposal of batteries; additives for petrol; enamels and ceramic glazes and glass manufacture.
    iv. Zinc is a commonly occurring trace-metal and is essential to living organisms for enzymatic functions. High levels of zinc are found in coastal areas and biota. Dispersion and diffusion can rapidly remove zinc.
    v. Copper: The most important industrial sources of copper are metallurgy, covering of metallic surfaces; electric cables and pesticides.
    vi. Chromium: The most important industrial sources of chrome are: chrome metallurgy; covering of metals; tanneries; textile and wool dyeing; corrosion inhibitors in closed cycle cooling systems.
2. **Halogenated hydrocarbons.** This indicator presents information on dioxins and furans. These substances can be found as contaminants in some products and can be produced in combustion processes. The most important anthropogenic sources of dioxins and furans are combustion installations such as incinerators of wastes, combustion of residual sludge, fossil power plants, manufacture and use of certain pesticides, paper pulp bleaching, metallurgy of metals, and recovery of metals (mainly copper wire and electric motors and copper and aluminum turnings). Halogenated hydrocarbons include Polychlorinated dibenzo-dioxins (PCDD) and Polychlorinated dibenzo-furans (PCDF).
3. **Polycyclic aromatic hydrocarbons (PAH).** This indicator presents information on the PAH group. PAHs contain hundreds of substances occurring naturally in oil in ppm levels. PAHs are formed from the incomplete combustion of organic matter and this process is the main source of PAHs in air. Major anthropogenic sources of PAHs include residential heating, coal gasification and liquefying plants, carbon black, coal-tar pitch and asphalt production, coke and aluminum production, catalytic cracking towers and related activities in petroleum refineries as well as and motor vehicle exhaust.

4. **Volatile Organic Compounds (VOC)**. This indicator presents information on VOC emissions reported from point sources (land based sources/ coastal zone). VOCs are organic compounds that easily become vapor or gas. VOCs are emitted from a variety of sources including motor vehicles, chemical manufacturing facilities, refineries, factories, etc.

Industrial installations

Industrial installations are facilities intended for use in the manufacture or processing of products involving systematic labor or habitual employment. It consists of a fixed or semi-fixed location of a complete system or a self-contained unit, with its accompanying assemblies, accessories and parts.

Units

Toxic substances indicators may be reported in kilograms per year for emissions of contaminants consisting of total heavy metals, PAH and VOC, and in grams per year for furans and dioxins.

Policy context and targets

Policy context description

In 1975, 16 Mediterranean countries and the European Community adopted the Mediterranean Action Plan (MAP); the first-ever Regional Seas Programme under UNEP's umbrella. In 1995, the Action Plan for the Protection of the Marine Environment and the Sustainable Development of the Coastal Areas of the Mediterranean (MAP Phase II) was adopted by the Contracting Parties to replace the Mediterranean Action Plan of 1975. The Barcelona Convention has given rise to seven Protocols addressing specific aspects of Mediterranean environmental conservation. The Protocol on Land-Based Sources (the LBS Protocol) was adopted on 17 May 1980. The Protocol entered into force on 17 June 1983. The original Protocol was modified by amendments adopted on 7 March 1996 by the Conference of Plenipotentiaries on the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources (UNEP(OCA)/MED IG.7/4). The amended Protocol, recorded as “Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities”, entered into force on 18 May 2006.

In 1999, the parties to the Barcelona Convention adopted a Strategic Action Programme to Address Pollution from Land-Based Activities (SAP-MED). SAP-MED identified categories of pollutants and activities to be eliminated or controlled by the Mediterranean countries by 2025. In this context, countries prepared inventories of all pollution sources on their coasts in the framework of the National Baseline Budget of emissions and releases (NBBs), as well as National Action Plans (NAPs) describing the policies and investments that each country intends to undertake to reduce pollution from identified “pollution hotspots.” SAP-MED includes special provisions on toxic substances including heavy metals and hydrocarbons.

Ten (10) Regional Plans in the framework of Article 15 of the LBS Protocol were adopted. These plans present an important added value as they further specify and strengthen the SAP-MED with regards to the industrial pollution sector, including POPs and heavy metals, as well as enhance monitoring and reporting requirements.

In 2012, the Contracting Parties to the Barcelona Convention adopted Decision IG. 20/4 of the 17th Conference of the Parties on the ecosystem approach. Eleven (11) ecological objectives were approved including EO9 on contaminants. The Ecosystem Approach is the guiding principle to MAP Programme of Work and all policy implementation and development undertaken under the auspices of UNEP/MAP Barcelona Convention, with the ultimate objective of achieving the Good Environmental Status (GES) of the Mediterranean Sea and Coast. Following up on the latter, Decision IG. 21/3 on the ecosystems approach adopted definitions of Good Environmental Status (GES). The Decision provides details of the operational objectives, indicators, and GES targets. Mainstreaming EcAp into the work of UNEP/MAP Barcelona Convention and achieving the GES of the Mediterranean Sea and Coast through the EcAp process have been supported by several European Union funded projects including EcAp-MED I (2012-2015) and EcAp-MED II (2015-

2018) projects.

The Euro-Mediterranean Environment Ministers at their meeting in Cairo in 2006 invited "the European Commission to coordinate the partnership of the Horizon 2020 initiative through the establishment of an efficient institutional steering mechanism with key representatives from the Euro-Mediterranean governments and other partners to provide overall guidance, review, monitoring and effectively coordinate with other related initiatives." As of 2008, this initiative is one of the main pillars of the UfM. Based on the Mid-term review of the Horizon 2020 initiative, the Union of the Mediterranean (UfM) Environment Ministers at their meeting in Athens in May 2014 called for modifications to the structure of the Initiative. Specifically, the final declaration of the UfM Ministerial meeting undertook to address outstanding data needs by applying the principles of Shared Environment Information Systems (SEIS) in line with the commitments under the Barcelona Convention and the NAPs, also contributing to its regional integrated monitoring programme. On this basis, the 2nd phase of this initiative aims to expand the existing H2020 priorities with regards to water, solid waste and industrial emissions, including hazardous waste to the Mediterranean Sea.

Finally, it is noted that toxic substances are addressed in the Water Framework Directive (2000/60/EU), the Dangerous Substances Directive (76/464/EEC); Directive (2008/105/EC) on environmental quality standards in the field of water policy, etc. Halogenated hydrocarbons are also on the EU's list of priority substances [2455/2001/EC (EU, 2001a)].

Targets

SAP-MED proposes the year 2025 as a target date for phasing out to the fullest possible extent discharges, emissions and losses of mercury, cadmium and lead, and inputs of PAHs. SAP-MED also proposes reduction of inputs of dioxins and furans by 2010, and elimination of discharges of zinc, copper and chrome to the fullest possible extent. The Regional Plan on the reduction of inputs of Mercury (Decision IG. 20/8) stipulates that the Parties shall adopt by 2019 National ELVs for Mercury emissions from other than Chlor Alkali industry. The Parties shall ensure also that the releases of mercury from the activity of Chlor alkali plants shall cease by 2020 at the latest. Decision IG. 21/3 on the ecosystems approach includes targets on contaminants for achieving GES.

The Euro-Mediterranean Ministers adopted the Athens Declaration in May 2014 in which they pledged to implement instruments, programmes, action plans and guidelines adopted at Barcelona Convention CoP19 to prevent pollution from maritime transport, marine exploration and land-based activities, as crucial means for the achievement of the objectives of the Barcelona Convention and targets set in its Protocols.

Methodology

Methodology for indicator calculation

The two common methodologies for calculating this indicator are (1) the emission factors (EF) technique and (2) field measurements:

1. Emission factors: An emission factor is a representative value that attempts to relate the quantity of a pollutant released either by direct aqueous discharges or indirectly by air emissions to the marine environment with an activity associated with the release of that pollutant. These factors are usually expressed as the weight of pollutant divided by a unit weight, volume, distance, or duration of the activity emitting the pollutant. In most cases, such factors are simply averages of all available data of acceptable quality, and are generally assumed to be representative of long-term averages for all facilities in the source category (i.e. a population average). The US EPA[4] defines the general equation for emissions estimation:

$$E = A \times EF \times (1-ER/100)$$

[4] https://www.epa.gov/air-emissions-factors-and-quantification/basic-information-air-emissions-factors-and-quantification

where:

E = emission
A = activity rate
EF = emission factor
ER =overall emission reduction efficiency (%)

The emission factors technique can be used to obtain data that complement those reported in the NBB or PRTR systems. As these systems are based on information of releases of a specific list of pollutants to water, air and land, some pollutants included in these lists may not be routinely analyzed in the effluents and emissions, and therefore no extensive data sets may be available. To bypass the lack of such analytical data, the pollutants releases can be estimated by using the Emission Factors (EF) technique.

Required data for estimating pollution loads from industrial installations are:

- Relevant industrial sectors per administrative region.
- Relevant industrial processes generating contaminant of interest.
- Unit production quantity.
- Emission factors for relevant contaminant for each industrial sector.

2. Field measurements should be undertaken when datasets needed for calculating the indicator are lacking. Field measurements should be performed by trained personnel who possess the knowledge about the specific aspects pertinent to the industry in question. They should be properly equipped with regards to sampling and testing equipment and protective clothing. Field measurements are executed according to standard protocols and working instructions. This involves desk study whereby relevant information on the specific industrial installation(s) is collected and spots to be checked are mapped. In the field, it is critical to verify that production lines are working, and to locate emission points and corresponding effluent flow rates from each point. Samples may be obtained if the inspector deems it necessary for counter-checking of the self-monitoring results (i.e. field measurements). Objective evidence of state of pollution at the effluents' points should be acquired such as photographs and oral/written statements, reports of previous test analysis, etc.

   Required data to calculate pollution load from effluent points of the industrial facility are:

   - Effluent flow rate from the emission point, and duration of flow.
   - Concentration of contaminant from the emission point.

Description of required data

- Relevant industrial sectors per administrative region.
- List of industrial facilities for a particular sector in an administrative region.
- Estimated or calculated pollution loads for the relevant contaminant for each industrial facility.

Geographical coverage

Administrative regions of the whole Mediterranean sea watershed as defined in section 3.1 of the "Updated guidelines to assess national budget of pollutants (NBB)" [UNEP(DEPI)/MED WG. 404/4].

Temporal coverage

Three data series for the years 2003, 2008 and 2015 are available. However, not all Mediterranean countries have reported in all three time periods.

Basis for aggregation

Due to the very complex nature of this indicator, the only possible aggregation is per substance (measured in the same phase) at the national level or at the coastal hydrological basin. Hence*:*

- Heavy metal indicators can be aggregated and reported as a single sub-indicator.
- Halogenated hydrocarbons indicators (PCDD and PCDF) can be aggregated and reported as a single sub-indicator.
- Polycyclic aromatic hydrocarbons (PAH) are reported as a single sub-indicator.

- Volatile organic compounds indicators (VOC) are reported as a single sub-indicator.

Trend analysis

Can be performed based on the three data series in 2003, 2008 and 2015 for a limited number of substances and only in some countries.

Methodology for gap filling

Two methodologies are presented for the indicator on release of toxic substances from industrial sectors. In principle, the two methods constitute two alternatives for estimates of releases. However, in case of lack of data on the industrial processes of interest and their unit production quantities for use in the emission factor method, required data may be obtained from records maintained by relevant governmental authorities that issued the permit for the industrial facility in question.

Data specifications

Data sets availability

Key source of data needed for estimating pollution loads for this indicator can be found in the NBB or PRTR registers. Alternatively:

- Data on types of aqueous discharges and air emissions from industrial facilities may be found in records of industrial permitting authorities for each administrative region.
- Concentrations of contaminants in aqueous discharges and air emissions may be available in national/ regional inspection registers of pollutants discharged by industrial facilities, if such registers are institutionalized.
- Data on industrial sectors operating in a particular administrative region may be found in records of industrial permitting authorities for each administrative region.

References for data collection

- 'Updated guidelines to assess national budget of pollutants (NBB)', UNEP(DEPI)/MED WG.404/4, Barcelona, 18-19 December 2014.
- 'National Baseline Budget for 2008', UNEP-MAP, Athens 22 August 2008.
- 'Web based NBB reporting system specification requirements', UNEP(DEC)/MED WG.393/3, 4 March 2014.
- UNEP/MAP, 2014a. Introduction to pollutant release and transfer register (PRTR) and guidelines for reporting (UNEP(DEPI)/MED WG.399/3).
- UNEP/MAP, 2014b. Industrial emission factors. Updated version 2012. UNEP(DEPI)/MED WG.393/Inf.5.
- 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. European Union, 2006.
- 'International Standard Industrial Classification of all Economic Activities (ISIC), Rev4', Department of Economic and Social Affairs, Statistics Division, United Nations, New York, 2008.

Uncertainties

Methodological uncertainties

Methodological uncertainties depend on whether the emission factor technique or the field measurement method is used.

- With regards to the emission factor method, uncertainty is related to whether the characteristics of the industrial process for which the emission factor was developed are similar to those of the industrial process. Typically, emission factors are derived for specific industrial processes using a manufacturing technology operating in a specific environment. In case the technology is different, or the raw material varies, then the level of contaminants it emits will vary, and the emission factor is no longer representative of the process.

- For the field measurement method, uncertainty is related to the accuracy of measurements of concentration levels in industrial effluents, and to proper estimates of flow rates which can be averaged over the daily or monthly production of the industrial unit. These two factors affect the calculation of the pollution load for the industrial facility. Another source of uncertainty is related to addressing all emission points in a facility and estimating its actual pollution load.

Industrial Emissions Indicator IND 6.3:
Industrial hazardous waste disposed in environmentally sound manner

Sub-indicators

6.3.1) Total quantity of generated hazardous waste from industrial installations.

6.3.2) Quantity of industrial hazardous waste disposed in environmentally sound manner relative to total quantity of generated hazardous waste from industrial installations.

Rationale

Justification for indicator selection

This indicator reflects the provisions of the Strategic Action Programme (SAP-MED) and the legally binding requirements in relevant regional plans which call for proper handling, storage and sound disposal of hazardous industrial waste. It also addresses the legal obligations of the Basel and Stockholm Conventions with regards to reduction of transboundary movement of hazardous waste and chemicals; the minimization and prevention of hazardous waste generation; and the availability of disposal facilities for the environmentally sound management of stock piles of chemicals and hazardous waste. This indicator provides a measure of the commitments of the Mediterranean Countries to meet the obligations and deadlines set in the legally binding decisions regarding hazardous waste management as reflected in their operational targets and investment measures defined in their NAPs in terms of construction, expansion and upgrading of their industrial hazardous waste disposal facilities.

A close examination of pollution reduction programmes and environmental initiatives related to pollution reduction and control in the Mediterranean Sea reveals that this indicator is referenced by the IMAP, NAPs, MSSD and SDG. In that respect, it is noted that SDG indicators are regarded as the main drivers for updating the scope of the industrial emissions indicators. They are a measure of the strength of economic activities which represent at the same time the drivers of pollution generation and environmental pressures on the marine and coastal ecosystems. As these economic activities contribute to the wealth of the Mediterranean countries and to the social well-being of its people, this indicator should lead to an effective monitoring process capturing the principle of sustainable development, while promoting at the same time the creation of functional synergies among all stakeholders.

Indicator definition

This indicator addresses the stockpiling and disposal of hazardous waste in sound environmental manner. Below are definitions of key terms of this indicator:

(1) **Hazardous waste** consists of the categories featuring on the list included in Decisions IG. 19/8 and IG. 20/8.3, Annex I of the Hazardous Waste Protocol, and in Annex I of the Basel Convention.

(2) **Disposal of waste** means operations which do not lead to the possibility of resource recovery, recycling, reclamation, direct re-use or alternative uses of hazardous waste as defined in Annex IV(A) of the Basel Convention.

(3) **Environmentally sound manner** means taking all practical steps to ensure that wastes are collected, transported, and disposed of (including after-care of disposal sites) in a manner which will protect human health and the environment against the adverse effects which may result from such wastes [UNEP(DEPI)/MED IG. 20/8 and Basel Convention (Article 2:8)]. For POPs, this means disposed of in such a way that the persistent organic pollutant content is destroyed or irreversibly transformed so that they do not exhibit the characteristics of persistent organic pollutants, or otherwise disposed of in an environmentally sound manner when destruction or irreversible transformation does not represent the environmentally preferable option, or the persistent organic pollutant content is low, taking into account international rules, standards, and guidelines and relevant global and regional regimes governing the management of hazardous waste and the Basel Convention.

(4) Industrial installations are facilities intended for use in the manufacture or processing of products involving systematic labor or habitual employment. It consists of a fixed or semi-fixed location of a complete system or a self-contained unit, with its accompanying assemblies, accessories and parts.

Units

- The total quantity of generated industrial hazardous waste from industrial installations is reported in metric tons per year.
- The quantity of industrial hazardous waste disposed in environmentally sound manner relative to total quantity of generated industrial hazardous waste is reported in percent.

Policy context and targets

Policy context description

In 1999, the parties to the Barcelona Convention adopted the Strategic Action Programme to Address Pollution from Land-Based Activities (SAP-MED). It foresees the implementation of national and regional actions for pollution reduction and for phasing out of toxic chemicals, environmental sound collection and disposal of hazardous waste.

In 2009 and 2012, the Contracting parties adopted several legally binding decisions and plans targeting specific industrial pollutants including persistent organic pollutants (POPs). The decisions include a number of legal requirements entailing reduction and elimination of releases, isolation and containment of wastes, and safe handling, collection, transport, storage and disposal of hazardous waste. The legally binding measures are:

- Regional Plan on the elimination of Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Mirex and Toxaphene in the framework of implementation of Article 15 of the LBS Protocol (2009).
- Regional Plan on the elimination of Alpha hexachlorocyclohexane; Beta exachlorocyclohexane; Hexabromobiphenyl; Chlordecone; Pentachlorobenzene; Tetrabromodiphenyl ether and Pentabromodiphenyl ether; Hexabromodiphenyl ether and Heptabromodiphenyl ether; Lindane; Endosulfan, Perfluorooctane sulfonic acid, its salts and perfluorooactane sulfonyl fluoride, in the framework of the implementation of Article 15 of the LBS Protocol (2012).

The measures included in the regional plans are fully in line with the requirements of the Stockholm Convention. The prescribed chemicals to be eliminated according to these plans are included in Annex A of the Stockholm Convention. The Hazardous Wastes to be addressed by this indicator are listed in Annex I of the Hazardous Waste Protocol under the Barcelona Convention. These chemicals are also included in Annex I of the Basel Convention.

Most Mediterranean Countries have ratified the Basel and Stockholm Conventions which link the issue of national data on waste generation to the control of transboundary movement of wastes. National data on waste generation provides a basis for decision-makers to prioritize issues concerning waste management. Moreover, the waste minimization and reduction and/or elimination of the generation and the amount of wastes subject to the transboundary movement could be dealt more efficiently. The Basel convention also addresses the availability of disposal facilities for generated hazardous waste by seeking specific data on the annual amount of waste that the facility is designed to treat, and remaining capacity of landfills for disposal of generated hazardous waste.

The European Union Directive 75/442/EEC on wastes and Directive 91/689/EEC on hazardous waste regulate pollution reduction and elimination by the EU Member states.

Targets

SAP-MED proposes the year 2025 as a target date to dispose all hazardous wastes in a safe and environmentally sound manner and in conformity with the provisions of the LBS Protocol and other international agreed provisions. The Regional Plan on the elimination of Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Mirex and Toxaphene stipulates that each Party shall implement the measures to eliminate the chemical wastes and stock piles by 31 December 2012 at the latest. The Regional Plan on the elimination of Alpha hexachlorocyclohexane; Beta exachlorocyclohexane; Hexabromobiphenyl; Chlordecone; Pentachlorobenzene; Tetrabromodiphenyl ether and Pentabromodiphenyl ether; Hexabromodiphenyl ether and Heptabromodiphenyl ether; Lindane; Endosulfan, Perfluorooctane sulfonic acid, its salts and perfluorooactane sulfonyl fluoride states that each Party shall implement the measures to eliminate the chemical waste and stock piles by 2013 at the latest.

Methodology

Methodology for indicator calculation

The proposed methodology for calculating the total quantity of generated industrial hazardous waste is based on the summation of amounts of generated hazardous waste from individual industrial installations in metric tons per year.

The disposed quantity of hazardous industrial waste in environmentally sound manner is computed in metric tons per year based on the following equation:

$$D = Q + I - E - S$$

where:

- D = disposed quantity of industrial hazardous waste in environmentally sound manner.
- Q = total generated quantity of industrial hazardous waste.
- I = imported quantity of hazardous waste for environmentally sound disposal.
- E = exported quantity of hazardous waste for environmentally sound disposal.
- S = stockpiled quantity of hazardous stored on site under controlled or uncontrolled conditions in metric tons per year.

Geographical coverage

Administrative regions of the whole Mediterranean sea watershed as defined in section 3.1 of the “Updated guidelines to assess national budget of pollutants (NBB)” [UNEP(DEPI)/MED WG. 404/4].

Basis for aggregation

Due to the common characteristics of the hazardous industrial chemicals, all hazardous waste and chemicals included in the relevant regional decisions can be aggregated for the purpose of determining each of the two sub-indicators.

Temporal coverage

Contracting parties report to Barcelona Convention Reporting System (BCRS) for Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal (HW Protocol). Datasets are available for 2008-2009; 2010-2011; 2012-2013 and 2014-2015. Counteracting Parties reports to Stockholm Convention Secretariat and the periodicity of the national reporting is every four years in accordance with a format as established by the COP at its first meeting (decision SC-1/22).

Trend analysis

Can be performed once sufficient data are collected by all countries, but not earlier that 2020.

Methodology for gap filling

Data required for determining the sub-indicators can be obtained from national inventories on disposal of hazardous waste. In that respect, it should be noted that required data for the sub-indicators are partly covered with those required for reporting on the Basel and Stockholm Conventions. In case such data are lacking, a survey of land-based industrial sources generating hazardous waste should be undertaken, and waste registers maintained by the individual industrial facilities should be referred to for the purpose of determining the total amounts of wastes disposed or stockpiled.

Data specifications

Data sets availability

Key source of data needed for estimating amounts of waste for the sub-indicators may be found in national inventories for management of hazardous waste complied by environmental authorities in compliance with the obligations of the Basel and Stockholm conventions. Data sets are available for 1st reporting cycle (31 December 2006); 2nd reporting cycle (31 October 2010); 3rd reporting cycle (31 August 2014); 4th reporting cycle (still ongoing till 31 August 2018).[5]

Uncertainties

Methodological uncertainties

Methodological uncertainties may be attributed to several aspects including:

- Reluctance of industries to report actual amounts of generated hazardous waste.
- Reluctance of industries to release accurate information on stockpiles of chemicals and wastes maintained on- or off-site.
- Lack of regular updating of data in national inventories.
- Presence of illegal disposal facilities (i.e. operating without permits) which are used for disposal of hazardous waste.

[5] http://chm.pops.int/Countries/Reporting/NationalReports/tabid/3668/Default.aspx

Industrial Emissions Indicator IND 6.4:

Compliance measures aiming at the reduction and/or elimination of pollutants generated by industrial sectors

Sub-indicators
6.4.1) Number of industrial installations reporting periodically loads of pollutants discharged to the marine and coastal environments relative to the total number of industrial installations. 6.4.2) Number of environmental inspections carried out by enforcement authorities in which industrial installations were found to be in breach of laws and regulations relative to the total number of executed inspections. 6.4.3) Number of eliminated hotspots identified in the updated NAPs relative to the 2001 and 2015 baselines.

Rationale
<u>Justification for indicator selection</u> This indicator reflects the compliance measures that are called for in the Strategic Action Programme (SAP-MED) and stipulated for in the legally binding measures and regional plans in the framework of the implementation of Article 15 of the LBS Protocol of the Barcelona Convention. A close examination of pollution reduction programmes and environmental initiatives related to pollution reduction and control in the Mediterranean Sea reveals that this indicator is referenced in the Countries' updated NAPs. It is in line with the compliance requirements of the Regional plans on the reduction of BOD, elimination and phasing out of POPs and mercury. This indicator also suggests whether the Country in question possesses the institutional structures necessary to enforce its adopted legal requirements. It reflects presence of trained and competent personnel in its institutions to carry out inspections; apply sanctions and enforce decisions.

Indicator definition
(1) Industrial installations are facilities intended for use in the manufacture or processing of products involving systematic labor or habitual employment. It consists of a fixed or semi-fixed location of a complete system or a self-contained unit, with its accompanying assemblies, accessories and parts. **(2) Environmental inspection** refers to a proactive (planned and routine) process that involves collecting information to make an assessment of a duty holder's current level of compliance, by comparing their activities to the legal requirements and benchmark standards relevant to the activities in question.[6] **(3) Hotspots** are defined as:[7] a) **Point sources** on the coast of the Mediterranean Sea which potentially affect human health, ecosystems, biodiversity, sustainability or economy in a significant manner. They are the main points where high levels of pollution loads originating from domestic or industrial sources are being discharged; b) **Coastal areas** where the coastal marine environment is subject to pollution from one or more point or diffused sources on the coast of the Mediterranean which potentially affect human health in a significant manner, ecosystems, biodiversity, sustainability or economy.

[6] Minimum criteria for REACH and CLP Inspections. Forum for Exchange of information on Enforcement, ECHA, March 2011.
[7] Updated criteria and methodology to assess hotspots and sensitive areas in the Mediterranean. UNEP(DEPI)/MED WG.404/7, December 2014.

Units

The unit for each of the three sub-indicators is a percentage value reported nationally in percent per year.

Policy context and targets

Policy context description

In 1999, the parties to the Barcelona Convention adopted the Strategic Action Programme to Address Pollution from Land-Based Activities (SAP-MED). In order to ensures compliance with the conditions laid down in authorizations and regulations, SAP-MED calls on responsible Authorities to establish systems of monitoring and inspection.

In 2009 and 2012, the Contracting parties to the Barcelona Convention adopted a number of legally binding measures and plans targeting specific industrial pollutants including persistent organic pollutants (POPs), mercury, and BOD from the food sector. The decisions call on Parties to ensure that their competent authorities or appropriate bodies monitor releases of pollutants and contaminants into water, air and soil to verify compliance with the requirements stipulated in these decisions.

The 18th meeting of the Contracting parties to the Barcelona Convention (COP 18), held in Istanbul, Turkey in December 2013, requested the Contracting parties to update the National Action Plans adopted between 2003 to 2005 in the framework of Article 5 of the LBS Protocol of the Barcelona Convention. With the view to support countries in following a harmonized methodology to update the NAPs, the Secretariat developed NAP update Guidelines which were reviewed and endorsed in the meeting of the MEDPOL Focal Points held on 26 to 28 March 2014 (Athens, Greece). The Secretariat was asked to particularly continue work for finalization of the technical annexes of NAP update Guidelines including one annex on updated criteria on hotspots and sensitive areas assessment with the aim to address additional developments and updated legal and technical standards to meet ECAP GES targets and the legally binding commitments under the Regional Plans (Article 15 of the LBS Protocol). The meeting of MED POL Focal Points held on 18 and 19 December 2014 in Barcelona reviewed and endorsed the updated criteria.

Targets

Several regional targets with regard to this indicator are defined in the framework of SAP-MED 1997 and Regional Plans, 2009 and 2012 to be achieved by 2025. The agreed targets may be also reviewed in the framework of UNEP/MAP Ecosystem approach roadmap implementation in synergy with EU Waste Framework Directive. H2020 is also providing for de-pollution of the Mediterranean by 2020.

Methodology

Methodology for indicator calculation

The proposed methodology for calculating this indicator is dependent on the collected data required for computing each of the three sub-indicators:

1. *Number of reporting industrial installations:*

   Required data include:

   - Number of records of industries providing data on discharges and emissions released by their industrial processes.
   - Total number of industrial installations required to provide data on discharges and emissions released by their industrial processes.

Records of discharges and emissions are typically maintained by environmental agencies or authorities. Information on industrial installations required to provide information discharges and emissions are typically found in their environmental permit.

Sub-indicator is computed by calculating percentage number of reporting industrial installations to the total number required to report on their discharges and emissions in percent per year.

2. *Number of environmental inspections carried out by enforcement authorities:*

   Required data include:
   - Number of records of environmental inspections carried out by enforcement authorities in which industrial installations were found to be in breach of laws and regulations.
   - Total number of executed inspections carried out by enforcement authorities.

   Records of environmental inspections including outcomes of these inspections are typically maintained by environmental enforcement authorities.

   Sub-indicator is computed by calculating percentage number of inspections in which industrial installations were found to be in breach of laws and regulations to the total number of carried out inspections in percent per year.

3. *Number of eliminated hotspots:*

   Required data include:
   - Number of eliminated hotspots to date
   - Number of hotspots as reported in the updated NAPs of 2015.
   - Number of hotspots as reported in 2001.

   Records on the status of hotspots are typically maintained by environmental agencies or authorities. Baseline number of hotspots of 2001 and 2015 are found in UNEP/MAP database, countries reports on hotspots, and updated NAPs of 2015.

   Sub-indicator is computed by calculating percentage number of eliminated hotspots to the total number of hotspots in 2001 and in 2015 in percent per year.

Geographical coverage

Administrative regions of the whole Mediterranean sea watershed as defined in section 3.1 of the “Updated guidelines to assess national budget of pollutants (NBB)” [UNEP(DEPI)/MED WG. 404/4].

Temporal coverage

Contracting parties report to Barcelona Convention Reporting System (BCRS) for LBS Protocol for inspections under enforcement. The reports are not submitted regularly, but in theory Contracting Parties report to the BCRS on compliance measures (e.g. number of inspections, fines, breaching against legal requirements, etc.).

Basis for aggregation

Aggregation of sub-indicators is not possible. Each sub-indicator is calculated separately.

Trend analysis

This is performed based upon collection of sufficient data required for each sub-indicator; but not earlier that 2020.

Methodology for gap filling

1. *Number of reporting industrial installations:*

   Required data can be obtained from records of environmental agencies and authorities. In case such data are missing or incomplete, information may be found in BCRS data base. Alternatively, data may be published in national and international environmental reports.

2. *Number of environmental inspections carried out by enforcement authorities:*

   Required data can be obtained from records of environmental agencies and authorities. In case such data are missing or incomplete, information may be found in BCRS data base.

Alternatively, data may be published in national and international environmental reports.

3. *Number of eliminated hotspots:*
   Required data can be obtained from records of environmental agencies and authorities. In case such data are missing or incomplete, information may be found in UNEP/MAP database, countries reports on hotspots, and updated NAPs of 2015.

Data specifications

Data sets availability

1. *Number of reporting industrial installations:*
   Data sets provided by Contracting parties in the framework of the Barcelona Convention Reporting System (BCRS) for LBS Protocol for inspections under enforcement are available for 2008-2009; 2010-2011; 2012-2013 and 2014-2015.
2. *Number of environmental inspections carried out by enforcement authorities:*
   Data sets provided by Contracting parties in the framework of the Barcelona Convention Reporting System (BCRS) for LBS Protocol for inspections under enforcement are available for 2008-2009; 2010-2011; 2012-2013 and 2014-2015.
3. *Number of eliminated hotspots:*
   Data sets provided in UNEP/MAP database; countries reports on hotspots and updated NAPs of 2015.

Uncertainties

Methodological uncertainties

Methodological uncertainties may be attributed to several aspects dependent on each sub-indicator:

1. *Number of reporting industrial installations:*
   Inability to account for all reported discharges and emissions released by industrial installations.
2. *Number of environmental inspections carried out by enforcement authorities:*
   Lack of accurate record of number of environmental inspections carried out by environmental enforcement authorities.
3. *Number of eliminated hotspots:*
   Inability to account for new hotspots that develop after 2015.

Waste Management Indicators Factsheets

INDICATOR FACT – SHEET

1. Municipal Waste Generation

Sub-indicators

IND 1.A Municipal waste composition

IND 1.B Plastic waste generation per capita

IND 1.C % of population living in Coastal Areas

IND 1.D % of Tourists in Coastal Areas

DRAFT Indicator Specification

Version: 2.0
Date: 30.05.2018

Indicator Specification

H2020 Indicators	
Thematic area WASTE	**Date** **Author (s)**
Policy theme **Marine Litter and waste management interfaces**	
Indicators 1. Municipal Waste Generation **Sub-indicators** *1.A Municipal waste composition* *1.B Plastic waste generation per capita* *1.C % of population living in Coastal Areas* *1.D % of Tourists in Coastal Areas* **Additional information** (if applicable) The specification has been modified, comparing to the 2015 versions, trying to reflect the Marine Litter drivers (plastic waste generated, touristic activities) and to focus on the Costal Areas	
Rationale	
Despite the progress made, waste management is still a major concern for the Mediterranean countries. In the Mediterannean North, in general terms, countries have sufficient waste management and recycling infrastructure, almost complete collection coverage and long-established formal recycling activities. However, even in these countries, there are still active dumpsites, especially in some of the small and touristic islands, while the high touristic pressures push the exisitng infrastructure out of its limits, especially during the high season. The plastic waste generated during the high toursitic seasons can hardly be captured by the existing recycling and waste management systems, while on some cases, scale economies, geographical particularities, and serious logistic problems prohibit the development of substantial recycling activities. In the rest of the countries (North Africa, Middle East, Turkey) while there are substantial on-going efforts to implement waste management systems, uncontrolled dumpsites and poor sanitary landfills are still a major disposal practice, recycling efforts are mainly stimulated by the informal sector and waste treatment infrastructure is still at its very beginning. In many cases, the biggest problems appear in the most touristic areas that lack waste management infrastructure, resulting in serious waste leakages towards the Mediterranean Sea, dumpsites on the sea-shore, rivers full of plastics, serious risks for the water quality, and increased Marine Litter Quantities. In addition, there are still cases where less than 100% of the waste generated is collected, due to the lack of collection capacity in the most remote and rural areas. The combination of high touristic pressures (Mediterranean Sea is the most atractive touristic destination of the world), population growth especially in the South – Easter Mediterranean countries, highly urbanised coastal areas, and important refugee streams, creates a very dynamic and difficult landscape for waste management and poses serious governance challenges for the authorities involved.	
Justification for indicator selection	
This indicator and its sub-indicators are describing the pressure and the drivers for ML. The indicator was already in use in H2020, as well as in several other relevant documents. More specifically, the waste quantity on a national level is somehow representative of the pressure on a national level. However, the total waste generated on a national level is just a slight (and sometimes minor) indication of what is happening with ML because as it was explained i.ML origins mainly from coastal and river catchment areas, so the geography determines the relevance of the national figures to ML and ii. the most important component of ML is plastic	

waste, thus the percentage (%) of plastics in waste is also very important. In addition, as touristic activities are also a driver for ML, it is important to highlight their relevance. So, the initial indicator was enriched with three new sub-indicators to reflect better the pressure and the drivers for ML. The use of the composition in five fractions is based on the Wasteaware Indicators as developed by UNEP and ISWA in the Global Waste Management Outlook. The selected indicators are the following.

1. Waste Generation

This indicator shows the overall pressure from the waste generated on a national level. For benchmarking purposes, it is better to express it with the national average waste generation per capita (kg/y).

1.A Waste Composition

This indicator shows the different streams of the waste generated and it helps to identify the recovery and recycling potential. In addition, it shows the importance of plastics in the waste stream, the dominant material in ML.

1.B Plastic waste generation per capita

This indicator shows how much plastic waste is generated per capita annually. The more the plastic waste per capita the more the leakages of plastics to ML. The indicator is a measure of the potential contribution of the waste stream to ML.

1.C % of Population living in Coastal Areas

This indicator shows how the % of the total population that lives in coastal areas. This indicator can be used as a proxy for the waste quantities that are more possible to leak ML in case a detailed waste distribution is not available. It also shows the population that will be more vulnerable to the economic and environmental impacts of ML.

1.D % of Tourists in Coastal Areas

Tourism, recreational activities and maritime transport are major marine litter drivers. This indicator shows the additional pressure to ML from touristic activities. As tourism is an important driver to ML, this indicator also demonstrates the relevance of this driver in comparison with others.

An increased no. of tourist overnight stays means production of more waste, increased emissions of climate gases and other air pollutants as well as an increased consumption of certain natural resources (e.g. drinking water) etc. This means an increased pressure on the physical environment.

REFERENCES

- Cécile Roddier-Quefelec, Review of H2020 indicators - Group Work, 1st ENI SEIS II South Support Mechanism Regional workshop on indicators 17-18 May 2017, Copenhagen, Denmark
- Ellen McArthur Foundation, 2016, The New Plastics Economy
- Horizon 2020 Mediterranean report, EEA Technical report No 6/2014
- ISWA Task Force on Marine Litter Report, *Prevent Marine Plastic Litter Now*, September 2017
- JRC, 2016, Identifying Sources of marine Litter
- MED-Zero Plastic action plan- Targeting the ML of the tourism industry in the Mediterranean Sea, January 2016
- Plan-Blue, 2014, Economic and social analysis of the uses of the coastal and marine waters in the Mediterranean, characterization and impacts of Fisheries, Aquaculture, Tourism and recreational activities, Maritime transport and Offshore extraction of oil and gas sectors. Technical Report, Valbonne
- Stavros Antoniadis, Indicator processes at UN Environment/MAP Core NAP follow-up indicators, 1st ENI SEIS II South Support Mechanism Regional workshop on indicators 17-18 May 2017, Copenhagen, Denmark
- Summary Report V.3, 13/06/20171st ENI SEIS II South Support Mechanism Regional workshop on indicators 17-18 May 2017, Copenhagen, Denmark
- The Next Wave – Investment Strategies for plastic free seas, Ocean Conservancy 2017
- UNEP – ISWA, Global Waste Management Outlook, 2015, ISBN: 978-92-807-3479-9
- UNEP/MAP, 2012, State of the Mediterranean Marine and Coastal Environment - Barcelona Convention, Athens

Indicator definition

IND 1: Total municipal solid waste (MSW) generation on a specific geographical level

IND1 is calculated by aggregating the waste generated in a geographic region. Usually, the quantities are reported on a municipality or regional level based on:

- Assessments from the waste collection system
- Records from the local waste treatment and disposal facilities
- Assessments based on the population using proper waste generation rates

Definitions required

The definition of MSW used in this document is the one from the UN-Habitat[8]: 'wastes generated by households, and wastes of a similar nature generated by commercial and industrial premises, by institutions such as schools, hospitals, care homes and prisons, and from public spaces such as streets, markets, slaughter houses, public toilets, bus stops, parks, and gardens' It is important that you annotate your figures with the local/national definition(s) of MSW and provide the definition of MSW used – such definitions do vary a lot between countries, and understanding such differences is vital to ensure that the indicator sets are comparable.

Temporal Unit

Annualy

Units

Tons per year (on the geogrpahical scale defined)

Kg/cap/year (on the geogrpahical scale defined)

IND 1.A Waste Composition

Summary composition of MSW as generated.

Data points used for 5 key fractions – all as % wt. of total MSW generated as follows.

Definitions required

[1] Organic fraction % w/w	The 'organic' fraction is defined primarily as kitchen and food waste from households and restaurants; market wastes; green, garden or yard waste, including wood from pruning trees in public parks and/or along roads; and similar. It excludes paper, cardboard, textiles, leather, and wood from packaging or furniture. Please note whether some organic waste is likely to have been reported as part of another fraction – e.g. if MSW is routinely mixed with sand or soil during collection (so that the 'fine fraction' is likely to include a portion of the organics), and/or if the 'other' fraction is high.
[2] Plastic fraction %	The plastic fraction includes mostly packaging wastes, such as PET,PVC, polypropylene, high and low density polyethylene (HDPE/LDPE) and polystyrene.
[3] Paper fraction %	The paper fraction includes cardboard, but excludes laminated materials such as drink cartons.
[4] Metal fraction %	The metal fraction includes ferrous (iron and steel) and non-ferrous (e.g. aluminium, copper, lead, zinc, tin) metals and alloys.
[5] Rest %	[5] = 100% - [4] - [3] - [2] - [1]

Temporal Unit

Annualy

Units

w/w % on wet basis

[8] http://www.waste.nl/sites/waste.nl/files/product/files/swm_in_world_cities_2010.pdf. (page 6).

IND 1.B: Plastic waste generation per capita
IND1.B is calculated in two ways.

A. If the waste quantities (W in tons), the composition (P the w/w% of plastics) and the population (N) are known and calculated, then:
Plastic Waste / Capita = 1000 * (W x P) / N (in kg/year)

B. If the waste has been calculated using special waste generation rates per capita (SR in kg/year) and the composition is known (P the w/w% of plastics), then:
Plastic Waste / Capita = SR x P (in kg/year)

Definitions required

The plastic waste fraction includes mostly packaging wastes, such as PET,PVC, polypropylene, high and low density polyethylene (HDPE/LDPE) and polystyrene.

Temporal Unit
Annualy

Units
Kg/cap/year (on the geogrpahical scale defined)

IND 1.C: % of population living in Coastal Areas / Total Population

This calculation of this indicator is based on the definition of the coastal areas. Population in coastal areas, according the recent UN work on SDGs, is the population living within 100 km of the coastline[9]. As general guidance, any informal or unofficial settlements should be included in the estimate used.

As an example of the importance of this indicator, the Mediterranean region's population is concentrated near the coasts. More than a third live in coastal administrative entities totalling less than 12 % of the surface area of the Mediterranean countries. The population of the coastal regions grew from 95 million in 1979 to 143 million in 2000. It could reach 174 million by 2025. The concentration of population in coastal zones is heaviest in the western Mediterranean, the western shore of the Adriatic Sea, the eastern shore of the Aegean-Levantine region, and the Nile Delta[10].

Definitions required
Population in coastal areas, according the recent UN work on SDGs, is the population living within 100 km of the coastline. Using a GIS, the percentage of the population in the coastal zone can be calculated easily.

Temporal Unit
Annualy

Units
% of population living in Coastal Areas (population in Coastals Areas /Total Population)

[9] http://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets/oceans_seas_coasts/pop_coastal_areas.pdf
[10] **See *Population density and urban centres in the Mediterranean basin* at http://www.grida.no/resources/5900**

IND 1.D: % of Tourists in Coastal Areas / Population in Coastal Areas

This calculation of this indicator is based on two parameters. The first is the population P in Coastal Areas (as discussed before). The second one is the number of tourists – visitors overnight stays (S) in various types of accommodation. The equivalent of a single resident is also used (see definitions below). An assumption is made that the tourists and the residents have the same consumption and production patterns and the same contribution to ML. Although this is not accurate, as tourists tend to produce more waste than permanent residents, we will follow this assumption for simplification purposes.

Definitions required

Tourists and visitors are defined according the UN World Tourism Organization[11]

"Tourism comprises the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited."

Equivalent of a single permanent resident: The residential population has been thought to stay the whole year within the area, 365 days (the number of days taken for holiday by the residential population assumes covers up the seasonal population who is not included in the overnight stays statistics). Thus, the equivalent of one permanent resident is equal with 365 overnight stays[12].

Temporal Unit
Annualy

Units

% of Tourists in Coastal Areas (Tourists on Coastals Areas / Population in Coastal Areas)

[11] See UN, Department of Economic and Social Affairs Statistics Division International Recommendations for Tourism Statistics 2008, https://unstats.un.org/unsd/publication/Seriesm/SeriesM_83rev1e.pdf#page=21

[12] EU, EUROSTAT, Methodological work of measuring the sustainable development of tourism, Part 2: Manual of sustainable development indicators of tourism, 2006 http://ec.europa.eu/eurostat/documents/3888793/5834249/KS-DE-06-002-EN.PDF/178f8c9a-4a03-409c-b020-70ff7ef6803a

Policy Context and Targets

Marine litter (ML) is a challenge of global scale and implications. It is necessary to develop a more integrated perspective regarding ML. ML is not simply related to SWM and recycling, it is a result of a systemic failure, with the following four key-parameters:

(I) The continuous growth in use of thousands of different forms of plastics.

(II) Poor or absent solid waste management services and infrastructure, and insufficient monitoring & law enforcement (mainly in the Med North).

(III) Problematic - vulnerable markets for secondary plastics.

(IV) Lack of a systemic and in-depth understanding of:

- The technical challenges and the restrictions of material properties and the flows of plastics.
- The effects of social consumption patterns and littering behaviours on solid waste generation.
- The impacts of unplanned tourist developments and of the fishing industry.

The plastic production & consumption, the lack of waste & recycling infrastructure and enforcement, (especially in coastal areas), the problematic markets for secondary materials and the touristic activities can be considered as Drivers of ML generation.

An important step forward towards dealing with the marine litter problem was adoption of Decision IG.20/10 at the 17th Meeting of the Contracting Parties of the Barcelona Convention (Paris, February 2012) entitled "Adoption of the Strategic Framework for Marine Litter management". This Strategic Framework analyses the problem and is proposing quite a number of activities that would help in approaching in a systematic way the problem of marine litter. COP 17 also adopted the ecological objective on marine litter in the framework of the ecosystem approach. Decision IG.20/10 mandated the Secretariat to prepare the Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the LBS Protocol.

Another very important step was the Regional Plan on ML in the Mediterranean. The Plan came into force on 8 July 2014 for all parties to the Land Based Sources (LBS) Protocol and it:

- provides Mediterranean countries with a framework to elaborate national policies and action plans to address impacts of marine litter
- creates momentum for addressing litter-related marine and coastal pollution in an integrated manner

Regarding waste management, the plan was aiming mainly to waste prevention, using the following goals:

1. Solid waste management - reduction at source, waste hierarchy (**2025**)

• Reducing/ reusing/ recycling measures for plastic packaging waste (**2019**)

• Explore and implement to the extent possible the following (**2017**):

- Extended Producer Responsibility
- Sustainable Procurement Policies
- Voluntary agreements and fiscal and economic instruments to reduce plastic bags consumption
- Deposits, Return and Restoration System (for beverage containers and expandable polystyrene boxes in the fishing sector)
- Cooperate with industry to establish procedures and manufacturing methodologies to reduce micro-plastic

4. Close the existing illegal dump sites on land (2020)

5. Combat dumping including littering on the beach, illegal sewage disposal in the sea, the coastal zone and rivers

The Horizon 2020 Initiative, which aims to reduce the pollution of the Mediterranean Sea by 2020, recognizes the importance of waste as one of the three priority areas causing major pollution in the Mediterranean Sea. The UN Global Programme of Action for the Protection of the Marine Environment against Land-Based Activities and the Convention for the Protection of the Mediterranean Sea against Pollution have also identified waste management as a priority intervention.

In all the relevant efforts and plans, the major objective is to reduce plastic waste by shifting to circular economy, enabling re-design of materials and products, advancing reuse and recycling practices. The policies (and the proposed indicators in this document) are directly related with the SDGs as follows:

GOALS	TARGET	INDICATORS
Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable	11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste	% of urban solid waste regularly collected and with adequate final discharge with regards to the total waste generated by the

	management.	city
Goal 12: Ensure sustainable consumption and production patterns	12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.	Treatment of waste, generation of hazardous waste, hazardous waste management, by type of treatment
	12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	National recycling rate, tons of material recycled
Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development	14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	Index of coastal eutrophication and floating plastic debris density

The UN has established the Global Partnership on Marine Litter, with the following Goals. Goal A: Reduced levels and impacts of land-based litter and solid waste introduced into the aquatic environment. Goal B: Reduced levels and impact of sea-based sources of marine debris including solid waste, lost cargo, ALDFG, and abandoned vessels introduced into the aquatic environment. Goal C: Reduced levels and impacts of (accumulated) marine debris on shorelines, aquatic habitats, and biodiversity. It is anticipated that different stakeholders will form sub-groups to focus on specific issues, e.g. cross-cutting issues.

The shift to Circular Economy is necessary for the substantial reduction and prevention of ML. The G20 have advocated for a global roadmap for action to address the life cycle of plastics and effectively valorize plastics in the economy whilst mitigating their environmental impacts. This roadmap includes:

1. Upstream measures
2. Consumption based measures
3. Worldwide engagement in awareness of impacts and the need for social change.
4. Measures to enhance and advance waste management - the required measures involve (indicatively):

- Separate waste collection: Emphasis should be placed on moving away from landfill and energy recovery towards re-use and recycling. Separate municipal waste collection is a key element within this infrastructure, to make recycling a convenient option for citizens to deal with their waste plastics. Re- use opportunities in the plastic packaging sector, ranging from reusable B2B crates to refillable bottles for beverages and cleaning products.
- Waste management infrastructure and services: Direct investment in waste infrastructure is needed in all countries to increase the rate of recovery and reduce the leakage of plastics. Although landfilling should be the least-preferred option, investment in sanitary landfills is still desirable in countries where informal and unprotected landfills are a major source of plastic pollution.
- Export of plastic waste: In general, plastic waste should not be exported for disposal or treatment in locations with significantly lower treatment standards than the country of origin. Countries which export waste for recycling should have responsibility to assess and take into account the impacts of that trade. An estimated 15 million tonnes of plastic is traded per year as waste destined for recycling.
- Infrastructure for maritime and fisheries marine litter: Whilst terrestrial sources are the most important, an estimated 0.5 to 5.9 million tonnes of plastics enters the oceans from sea-based sources every year. Appropriate waste infrastructure at ports can reduce this flow of waste.
- Deposit refunds and extended producer responsibility (EPR): Producers should be made responsible for their products after the point of sale. Deposit refund and EPR instruments, which support the uptake, quality and economics of recycling, thus reducing marine littering, should be implemented. EPR schemes also encourage producers to design their products to be suitable for take-back and recycling.
- Clean-up and collection: Given the size of the oceans and the scale of the marine litter problem, clean- up activities are costly, largely ineffective and create an unhelpful illusion that upstream measures are not necessary. Whilst upstream measures should be preferred, clean-up may be a suitable last resort for addressing marine litter in limited zones such as urban areas, tourist beaches and ports where the litter causes severe social and economic damage.

Related policy documents

- Decision IG.20/10 at the 17th Meeting of the Contracting Parties of the Barcelona Convention (Paris, February 2012) entitled “Adoption of the Strategic Framework for Marine Litter management”.
- EU Marine Strategy Framework Directive (MSFD), 2008/56/EC
- A European Strategy for Plastics in a Circular Economy, COM (28) 2018, 16-1-2018
- EU, DG for Internal Policies, EU Action to Combat Marine Litter, IP/A/ENVI/2017-02, May 2017
- G20 Insights, T20 Task Force Circular Economy: Circular economy measures to keep plastics and their value in the economy, avoid waste and reduce marine litter, 2017
- United Nations Environment Assembly of the United Nations Environment Programme, Resolution on Marine Litter and Microplastics, UNEP/EA.3/L.20, Third Session, 4-6 December 2017
- UNEP, Regional Plan for the Marine Litter Management in the Mediterranean, UNEP (DEPI)/MED WG. 379/5, 2013
- UN Global Programme of Action for the Protection of the Marine Environment against Land-Based Activities

Methodology

IND 1: Total municipal solid waste (MSW) generation (W)

Calculations

IND1 is calculated by aggregating the waste generated in a geographic region. Usually, the quantities are reported on a municipality or regional level based on:

- Assessments from the waste collection system
- Records from the local waste treatment and disposal facilities
- Assessments based on the population using proper waste generation rates

Geographical coverage

This indicator is calculated on a country level.

Temporal Coverage

It will be very useful if 10-15 years' time series can be provided

Data collection & availability

Collect data from different sources, compare and contrast recent available data and estimates; and provide justification of the estimate used. When official data is scarce, please obtain the best estimate by extrapolating data from interviews with as many solid waste management stakeholders as possible and, when applicable, observing waste trucks during their rounds.

Problems and gaps

It is important to notice that in the developing world the waste generated is usually more than the waste collected (due to both lack of regular collection services and collection by the informal sector) and the waste collected is more than the waste disposed of in controlled facilities (due to the existence of dumpsites). The usual mistake that should be avoided is to report the waste collected by municipalities as waste generated and ignore uncollected waste and the informal recyclers collection systems.

Methodological uncertainties

A major uncertainty comes from the different definitions used in different countries and areas. There must be a common definition or when different definition are in use, there must be a careful screening before any comparison or aggregation should be made.

Some useful questions that should be put before the final outcomes. What is the source of the available estimates? How and when were the estimates made; how reliable are they; is the waste weighed? If measurement is made at the point of disposal, how is this extrapolated back to the quantity generated? Is allowance made for seasonal variations? If time series data are available for different years, please check for their consistency. If there is no directly measured data available, and an estimate has had to be made from published estimates of waste per capita (perhaps at the national level), then information should be check and justified.

One of the easy ways to cross-check the reliability of your data sets is to compare the national or regional average waste generation per capita (in kg/year or kg/day) with the waste generation per capita from similar countries. The word "similar" means to look for countries or regions with similar GDP/cap, similar poverty and urbanization rates. Tools like the Waste Atlas (www.atlas.d-waste.com) and reports like the Global Waste Management Outlook can be very helpful on that.

IND 1.A: Waste Composition

Calculations

The average national composition in the relevant fractions is calculated by aggregating the different compositions in municipalities or regions or waste management authorities. The aggregation should be weighted with the waste generation of each area. As an example, the national average % w/w of plastic waste to MSW in a country with 3 regions (with W1, W2, W3 waste quantities) and three different % w/w of plastic fraction (P1, P2, P3) the national average is calculated as below:

$\% \text{ w/w } P_{national} = [(W1 \times P1) + (W2 \times P2) + (W3 \times P3)] / (W1 + W2 + W3)$

Geographical coverage

This indicator is calculated on a country level.

Temporal Coverage

It will be very useful if 10-15 years' time series can be provided, with the changes of the composition for each material.

Data collection & availability

It is important to examine the full sets of whatever data are available on MSW composition as generated, with accompanying details. The best method is to run waste characterization campaigns that will provide results based on measurements. There are many ways to organize a waste characterization campaign, UNEP's document[13] "DEVELOPING INTEGRATED SOLID WASTE MANAGEMENT PLAN - TRAINING MANUAL" provides very practical ways to organize and aggregate the results on a national level. In case there are no proper data sets, then using benchmarking indicators and tools related to GDP/cap and consumption, it is possible to simulate the national waste composition, of course with more uncertainties.

Problems and gaps

The most important issue when measurements are available is to identify where the measurements took place in a waste bin or in a treatment – disposal facility. In the first case, the waste composition is more representative in terms of the materials and their potential for recovery. In the second case, as waste has been mixed and maybe compacted in the collection vehicles, some materials have been mixed with the organic fraction (especially papers and small plastics). Do data reflect waste composition 'as generated' (prior to any recycling), or 'as collected, treated or disposed'? If at the disposal site, is correction made for materials removed earlier for recycling?

A very common problem is that measurements are made in disposal sites, thus the waste composition is already changed due to formal and informal recycling practices.

In many countries, there are specific guidelines for the implementation of waste characterization campaigns to ensure that the results are uniform.

Methodological uncertainties

Usually, there are several data sets available regarding the waste composition. Those data sets should be carefully reviewed and their details should be assessed too. Some crucial questions are:

When were the measurements made?

How regularly is composition measured?

Are seasonal variations taken into account? How reliable is the data?

If time series data are available, they must be checked for their consistency. One of the easy ways to cross-check the reliability of your data sets is to compare the national or regional average waste generation per capita (in kg/year or kg/day) with the waste generation per capita from similar countries. The word "similar" means to look for countries or regions with similar GDP/cap, similar poverty and urbanization rates. Tools like the Waste Atlas (www.atlas.d-waste.com) and reports like the Global Waste Management Outlook can be very helpful on that.

Another crucial point that needs to be checked regards the types of waste streams that are involved in the waste composition measurements and the potential inconsistent typologies and categories.

[13] UNEP DEVELOPING INTEGRATED SOLID WASTE MANAGEMENT PLAN - TRAINING MANUAL, VOL. 1 Waste Quantification and Characterization with Projections for the future
https://wedocs.unep.org/bitstream/handle/20.500.11822/7502/ISWMPlan_Vol1.pdf?sequence=3&isAllowed=y

IND 1.B: Plastic waste generation per capita

Calculations

This indicator is calculated with two ways.

A. If the waste quantities (W in tons), the composition (P the w/w% of plastics) and the population (N) are known and calculated, then:

Plastic Waste / Capita = 1000 * (W x P) / N (in kg/year)

B. If the waste has been calculated using special waste generation rates per capita (SR in kg/year) and the composition is known (P the w/w% of plastics), then:

Plastic Waste / Capita = SR x P (in kg/year)

Geographical coverage

This indicator is calculated on a country level.

Temporal Coverage

It will be very useful if 10-15 years' time series can be provided, with the changes of the composition for each material.

Data collection & availability

The data required is the waste quantities, the composition and the population. A crucial issue concerns the estimation population, especially in areas with refugees and touristic activities. In several cases, instead of the permanent population which is usually known, the equivalent population[14] is calculated, in a similar way with the waste-water treatment facilities. In other cases, the total waste generated is just divided with the permanent population, so the actual waste generation per capita includes also the contribution of tourists and refugees. In any case, the seasonal variations should be considered.

Problems and gaps

The problems and gaps are related with the problems and gaps in calculating the waste quantities and composition.

Methodological uncertainties

As this indicator is calculated using the waste quantities, the composition and the population, all the uncertainties in waste quantities, composition and population are involved in this calculation.

One of the easy ways to cross-check the reliability of your data sets is to compare the national or regional average plastic waste generation per capita (in kg/year or kg/day) with the plastic waste generation per capita from similar countries. The word "similar" means to look for countries or regions with similar GDP/cap, similar poverty and urbanization rates. Tools like the Waste Atlas (www.atlas.d-waste.com) and reports like the Global Waste Management Outlook can be very helpful on that.

[14] Oscar Saladie, Determinants of waste generation per capita in Catalonia (North-eastern Spain): the role of seasonal population, *European Journal of Sustainable Development* (2016), **5**, 3, 489-504

IND 1.C: % of Population living in Coastals Areas / Total Population

Calculations

This calculation of this indicator is based on the definition of the coastal areas. Population in coastal areas, according the recent UN work on SDGs, is the population living within 100 km of the coastline[15].

A GIS system is required. Using a GIS, the percentage of the population in the coastal zone can be calculated easily. If a country's census administrative units line up with the coastal zone, the population from these units can be summed to estimate the population of the zone. It is far more likely, however, that the geographic administrative units will not match the area of the coastal zone exactly. In these cases, creating a gridded surface of population can provide an estimate of the population in the zone. The vector layer of administrative units with associated population can be converted into a raster layer made up of grid cells of an assigned size (e.g., 30 arc-seconds which equates to an approximately 1 km grid at the equator). The population of an administrative unit is distributed evenly among the grid cells within that unit. On the edges, where a grid cell is split by two or more units, a proportional allocation method can be used to assign population to the grid cell based on the area of each unit that falls within the cell.

Geographical coverage

100 km buffer zone from the coastline.

Alternatively: catchment/ hydrological basin at the coastal area or, if data not available, major coastal cities, in order to quantify the extent of land-based pressures that could potentially have a downstream effect on the state/impact of the sea.

Temporal Coverage

The changes in coastal population is enough to be monitored on a 3-5 years basis

Data collection & availability

The crucial issue is how to calculate the 100 kilometre coastal buffer of the land area. For that purpose, the data must be projected into an equidistant map projection appropriate for the country. The two pieces of spatial data needed to measure this indicator are gridded population and a coastal zone delineation (or mask). Countries may have the most detailed and accurate population and coastal zone data available for their own country. Where these data are not available, or where data incompatibilities make integration difficult, there are freely-available global datasets that can be used. For example, the Socioeconomic Data and Applications Center (SEDAC) of the Center for International Earth Science Information Network at Columbia University (CIESIN) has developed a digital database of global population distribution in 1990, 1995, and 2000. Known as Gridded Population of the World v.3 (GPW), this data set is available at a 2.5 arc-minute grid (equivalent to 21 km2 at the equator), and its coastline closely matches the widely available coastline from the Digital Chart of the World (DCW). The Global Rural-Urban Mapping Project (GRUMP) is a related product that delineates urban areas using a variety of information sources (night-time lights, Digital Chart of the World, tactical pilotage charts, and classified satellite data), reallocating the population distribution of GPW to reflect higher densities in urban areas.

Problems and gaps

This indicator can be used as a proxy of the drivers and pressures to ML and coastal ecosystems, but it does not directly quantify the pressures. Quantification of pressures requires knowledge of the total population in details, not just percentages, and is further enhanced by information on environmentally significant human activities (e.g., industry, tourism, agriculture).

Methodological uncertainties

The coastal zone can be defined in different ways depending on the focus of interest and the availability of data. Typically, a combination of distance-to-coast and elevation data is used. The Millennium Ecosystem Assessment used 100 kilometres from the coast as the distance threshold and 50 meters as the elevation threshold, choosing whichever was closer to the sea. Other works use 10 meters elevation contiguous with the coast and no distance threshold; in most places this delineated an area closer than 100km from the sea, though in some areas it extended farther. In general distance- based measures are best suited for indicators used to denote coastal pressures, while elevation-based measures are best suited for indicators used to denote hazard vulnerability.

[15] http://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets/oceans_seas_coasts/pop_coastal_areas.pdf

IND 1.D: % of Tourists in Coastal Areas / Population in Coastal Areas

Calculations

This calculation of this indicator is based on the following parameters a. the population P in Coastal Areas b. the number of tourists – visitors overnight stays (S) in various types of accommodation, c. the equivalent of one permanent resident which is equal with 365 overnight stays.
The indicator is calculated as below:
% of Tourists / Population = (S/365)/P

Geographical coverage

100 km buffer zone from the coastline.
Alternatively: catchment/ hydrological basin at the coastal area or, if data not available, major coastal cities, in order to quantify the extent of land-based pressures that could potentially have a downstream effect on the state/impact of the sea.

Temporal Coverage

The changes in this ratio is enough to be monitored on a 3-5 years basis

Data collection & availability

The data regarding the permanent population is supposed to be known. The data regarding the overnight stays and the arrivals are supposed to be available from the Tourism Satellite Accounts (TSA) as described in details by the UNWTO[16]. In any case, as described below, what is required is a good proxy of the relevant data and not an exact estimation. Unless a TSA has been established, it is unlikely that any one statistical source would be able to provide all the information needed for this calculations. In particular, international and domestic travel data sets are almost always distinct and do not emanate from the same statistical sources. This has two important implications for the building of the data for this section. First, it is most likely that the data will have to be compiled from multiple sources. Second, and, more importantly, the definitions employed for the data elements will almost certainly be different and great care will be needed to establish comparability.
In case the required data is not available, some rough calculations can be done using the number of beds available in touristic enterprises and an average stay based on surveys.
Useful resources for statistics on tourism are available at the UNWTO E-Library[17], as well as in the World Bank database[18].

Problems and gaps

In general terms, in case there are substantial touristic activities in an area, suitable statistics are developed if not by the state entities by commercial chambers, associations of touristic enterprises etc. So, in such cases the statistic authorities must find the proper source to "pump" the relevant data. In cases where Tourism Satellite Account are in places, alternative statistics by non-state entities can be used to reduce the uncertainties and cross-check the outputs.

Methodological uncertainties

The main problem is that several countries might not have reliable Tourism Satellite Accounts, thus their availability is a key-issue. The European Edition of Data from the Tourism Satellite Accounts[19] and the global edition *TSA Data Around the World*[20] can provide useful insights and some ideas on how to set up a Tourism Satellite Account.

[16] WTO, UNWTO General Guidelines for Developing the Tourism Satellite Account (TSA) – Measuring Tourism Supply Chain, 2000 https://www.e-unwto.org/doi/pdf/10.18111/9789284403837
[17] https://www.e-unwto.org
[18] https://data.worldbank.org/indicator/ST.INT.ARVL
[19] EUROSTAT, Tourism Satellite Accounts in Europe, 2016 http://ec.europa.eu/eurostat/documents/7870049/7880233/KS-FT-17-002-EN-N.pdf/1070ebdc-b9e1-4a93-abb8-cecd83d40f68
[20] WTO, TSA data around the world, 2010 http://statistics.unwto.org/sites/all/files/pdf/tsa_data.pdf

Waste Management Indicators Factsheets

INDICATOR FACT – SHEET

2. “Hardware” of waste management

Sub-indicators

IND 2.A Waste Collection

IND 2.A.1 Waste Collection Coverage

IND 2.A.2 Waste Captured by the formal waste sector

IND 2.B Environmental Control

IND 2.B.1 % of waste that goes to dumpsites

IND 2.B.2 Number of dumpsites in Coastal Areas

IND 2.B.3 Waste going to dumpsites in Coastal Areas

IND 2.C Resource Recovery

IND 2.C.1 % of plastic waste generated that is recycled

DRAFT Indicator Specification

Version: 1.0
Date: 30.05.2018

Indicator Specification

<table>
<tr><td colspan="2">H2020 Indicators</td></tr>
<tr><td>Thematic area
WASTE</td><td>Date
Author (s)</td></tr>
<tr><td colspan="2">Policy theme
Marine Litter and waste management interfaces</td></tr>
<tr><td colspan="2">Indicator
2. “Hardware” of waste management
Sub-indicators
IND 2.A Waste Collection
IND 2.A.1 Waste Collection Coverage
IND 2.A.2 Waste Captured by the formal waste sector
IND 2.B Environmental Control
IND 2.B.1 % of waste that goes to dumpsites
IND 2.B.2 Number of dumpsites in Coastal Areas
IND 2.B.3 Waste going to dumpsites in Coastal Areas
IND 2.C Resource Recovery
IND 2.C.1 % of plastic waste generated that is recycled

Additional information
(if applicable)
The specification has been modified, comparing to the 2015 versions. This indicator substitutes the previous Indicator 2 “Collected and treated municipla waste”. The reasons are explained at the rationale.</td></tr>
</table>

Rationale

Performance indicators provide a good basis for assessing the existing situation, carrying out a comparison and tracking changes or progress made over time. For indicators to be useful as a tool for decision makers and politicians, they need to simplify the potential mass of data by being selective, by focusing on the important elements rather than trying to cover all aspects. By doing so, the information the indicators present will be relatively easy to use and understand.

Unfortunately, compiling high quality data on waste and waste treatment has long been a challenge. The available estimates are diverse, not verified or reliable, and often rather outdated. Thus, transforming waste data into reliable waste statistics has proven difficult. Definitely, this situation reflects to Marine Litter Statistics too, in one or another way. Some of the major areas of concern are:

- Lack of standard definitions and classifications
- Absence of measurement and of standard methodologies for measurement
- Lack of standard reporting systems

Interest in performance indicators for solid waste management is long-standing. Researchers have examined the bias issues in the then-standard set of three benchmark indicators: waste generated per capita; proportion of waste being managed by different methods; and proportion of households with a regular collection service. They found that although solid waste planning is a multi-disciplinary field requiring information about the physical, environmental, social, and economic implications of a system, the environmental indicators in use for solid waste do not adequately inform decision-makers about these attributes. Therefore, in many cases the indicators do not facilitate a holistic approach to environmental planning and policymaking.

A notable recent attempt to develop benchmark indicators and apply them to the comparison of cities both North and South was the report prepared for UN-Habitat on the state of solid waste management in the World's cities. The evolution of this tool is described in the recent UNEP – ISWA Global Waste Management Outlook and the set of Wasteaware Indicators.

According this tool, experience suggests that, for a system to be sustainable in the long term, consideration needs to be given to:

- All the physical elements (infrastructure) of the system.
- All the stakeholders (actors) involved.
- All the strategic aspects, including the political, health, institutional, social, economic, financial, environmental and technical facets.

The concept of Integrated Sustainable Waste Management (ISWM) which explicitly brings together all three dimensions, is gradually becoming the norm in discussion of solid waste management in developing countries. In this systematic description we can refer to the "software" and the "hardware" of waste management. The "software" refers to all the governance aspects (financial sustainability, social inclusion, institutional development). The "hardware" refers to all the relevant infrastructure (collection, recycling, treatment and disposal).

Justification for indicator selection

The "Hardware" of waste management comprises the three primary physical components (elements), each linked to one of the key drivers that are described.

Waste collection: driven primarily by public health (Indicator 2A)

Safe management of human excreta (sanitation) and removal, treatment, and management of solid waste are two of the most vital urban environmental services. While other essential utilities and infrastructure like energy, transport and housing often get more attention (and much more budget); failing to manage the 'back end' of the materials cycle has direct impacts on health, length of life, and the human and natural environment. Uncollected solid waste clogs drains and causes flooding and subsequent spread of water-borne diseases.

Cities spend a substantial proportion of their available recurrent budget on solid waste management, perhaps as much as 20-50% for some smaller cities. Yet UN-HABITAT data shows waste collection rates for cities in low- and middle-income countries generally in the range of 10-90%, which means that large portions of the population receive no services at all, and much waste ends up in the environment. The data also show that rates of diarrhoea and acute respiratory infections are significantly higher for children living in households where solid waste is dumped, or burned, in the yard, compared to households in the same cities, which receive a regular waste collection service.

Waste treatment and disposal: driven primarily by environmental protection (Indicator 2B)

Until the environmental movement emerged in the 1960s, most unwanted materials were discharged to land, as open dumping, to air, as burning or evaporation of volatile compounds, or to water by discharging solids and liquids to surface or groundwater or the ocean. There was little regard for the effects on drinking water resources and health of those living nearby, because disposal was based on the idea that wastes decomposed and returned to the environment without harming it.

Over the last 30-40 years, environmental control over has seen development of a series of steps, first phasing out uncontrolled disposal, then introducing, and gradually increasing, environmental standards, for example on water pollution and methane emissions from sanitary landfills and air pollution from incinerators. Many cities in low- and middle-income countries are still working on phasing out open dumps and establishing controlled disposal. This is a first step towards good waste management, and is designed to pave the way for a sanitary landfill, seen to be an essential part of any waste management system.

The 3Rs – reduce, reuse, recycle: driven by the resource value of the waste (IND 2.C)

Many developing and transitional country cities still have active informal sector recycling, reuse, and repair systems, which often achieve recycling rates comparable to those in the West, at no cost to the formal waste management sector. Not only does the informal recycling sector provide livelihoods to huge numbers of the urban poor, but they also save the city 15-20% of its waste management budget, by reducing the amount of wastes that would otherwise have to be collected and disposed of by the City.

During the past 10-20 years, high-income countries have been rediscovering the value of recycling as an integral part of their waste (and resource, management systems, and have invested heavily in both physical infrastructure and communication strategies to increase recycling rates. Major priorities to improve environmental performance and conserve resources work to shift the focus of waste management. e goal of safe disposal shifts to an emphasis on valorisation, and commercialisation, of three sets of materials:

- Products which can be re-used, repaired, refurbished, or re-manufactured to have longer useful lives;
- Recyclable materials which can be extracted, recovered, and returned to industrial value chains, where they strengthen local, regional, and global production; and
- Bio-solids consisting of plant and animal wastes from kitchen, garden, and agricultural production, together with safely managed and treated human excreta, which are sources of key nutrients for the agricultural value chain, and have a major role to play in food security and sustainable development.

REFERENCES

- ENPI-SEIS 30/04/2014 How existing municipal solid waste data in ENPI East countries can be used for the development of waste indicators,
- FRENCH MINISTRY OF THE ENVIRONMENT, ENERGY AND MARINE AFFAIRS, May 2017, 10 Key Indicators for Monitoring Circular Economy
- UNEP and CSIRO (2011). *Resource Efficiency: Economics and Outlook for Asia and the Pacific* http://apps.unep.org/publications/pmtdocuments//pdf/Resource_Ef ciency_EOAP_web.pdf
- UNEP and CSIRO (2013). *Recent Trends in Material Flows and Resource Productivity in Asia and the Pacific* http://www.unep.org/pdf/RecentTrendsAP(FinalFeb2013).pdf
- UNEP – ISWA, Global Waste Management Outlook, 2015, ISBN: 978-92-807-3479-9
- UN HABITAT, Solid Waste Management in the World’s Cities, 2009
- Wasteaware’ benchmark indicators for integrated sustainable waste management in cities, Waste Management, Volume 35, January 2015, Pages 329-342

Indicator definition

IND 2.A: Waste Collection

IND 2.A.1: Waste Collection Coverage (Wcc)

This indicator provides the % of the population of the country that is covered by a regular collection service organised either by public authorities or private companies. It is a measure of the public health protection (due to regular removal of waste) and the quality of municipal governance. The indicator includes both formal municipal and informal sector services.

Wcc (%) = Ps / P

Where:

Ps = population of the country that is covered by a regular collection service organised either by public authorities or private companies

P = total population of the country

Definitions required

A ‘collection service’ may be ‘door to door’ or by deposit into a community container. ‘Collection’ includes collection for recycling as well as for treatment and disposal (so includes e.g. collection of recyclables by itinerant waste buyers). ‘Reliable’ means regular - frequency will depend on local conditions and on any pre-separation of the waste. For example, both mixed waste and organic waste are often collected daily in tropical climates for public health reasons, and generally at least weekly; source- separated dry recyclables may be collected less frequently.

Formal Waste Sector: Solid waste system, solid waste authorities, government, materials recovery facility; Solid waste management activities planned, sponsored, financed, carried out or, regulated and/or recognised by the formal local authorities or their agents, usually through contracts, licenses or concessions.

Informal Waste Sector: Waste pickers, scavengers, junkshops; Individuals or enterprises who are involved in waste activities but are not sponsored, financed, recognised or allowed by the formal solid waste authorities, or who operate in violation of or in competition with formal authorities

Temporal Unit

Annualy

Units

% on total population of the country

IND 2.A: Waste Collection

IND 2.A.2: Waste captured by the system (Ws)

This indicator provides the % of the percentage of waste generated that is actually handled completely by the formal waste management and recycling system, thus the waste that is not lost through illegal burning, burying or dumping in unofficial areas.

Waste captured by the system represents all the waste materials shown on a Materials Flow Diagram that are delivered to an official treatment/disposal facility or to a recycling factory (MRF). This includes street sweepings, wastes collected, and waste materials collected for and delivered to recycling. Accordingly, once again it is mentioned that waste capture does not include collected waste materials that are then dumped at an illegal ('wild') dumpsite location.

Although the positive role of the informal recyclers is recognized, there is a huge lack of relevant reliable data, so their contribution can't be measured at this stage.

$$Ws\ (\%) = Wf/W$$

Where:
Wf = Waste captured by the formal waste sector
W = Total Waste Generated

Definitions required

Formal Waste Sector: Solid waste system, solid waste authorities, government, materials recovery facility; Solid waste management activities planned, sponsored, financed, carried out or, regulated and/or recognised by the formal local authorities or their agents, usually through contracts, licenses or concessions.

MRF (Material Recover Facility: Materials recovery facility, IPC, IPF, intermediate processing centre/facility, recycling processing centre; An industrial facility of moderate scale that is designed for post-collection sorting, processing, and packing of recyclable and compostable materials. It is usually of moderate technical complexity with a combination of automated and hand-sorting. e inputs are usually commingled or mixed recyclables and not mixed waste. The outputs are industrial grade materials, usually crushed or baled and separated by type, colour, etc.

Treatment: Decontamination, processing, incineration, anaerobic digestion, biogas production, pyrolysis, composting; Labour based or mechanical methods to reduce the risk of exposure or reduce the impacts to the environment of toxic or hazardous materials associated with the waste stream and in some cases, can concurrently capture and increase the economic value of specific waste stream components value added
Disposal-legal: Disposal of waste at a site designated by the municipal authorities

Temporal Unit
Annualy

Units
w/w % on total waste generated

IND 2.B: Environmental Control - % of controlled treatment and disposal (We)
This indicator provides the % of controlled treatment and safe disposal practices, the percentage of the total municipal solid waste destined for treatment or disposal in either a state- of-the-art, engineered facility or a ‘controlled’ treatment or disposal site. Thus, the indicator is a measure of the environmental control or protection achieved by the formal system. Waste being accepted at a facility ‘counts’ towards this quantitative indicator if the facility has reached at least an intermediate level of control. By definition, the calculation does not include informal recycling facilities, illegal disposal and dumpsites.

The numerator is similar to IND 2.A.2. The denominator is (Total Waste generated – Waste recycled and reused).

We % = Wf / (W – Wr)

Where:

Wf = Waste captured by the formal waste sector
W = Total waste generated

Wr = Recycled and reused waste

<u>Definitions required</u>

Formal Waste Sector: Formal Waste Sector: Solid waste system, solid waste authorities, government, materials recovery facility; Solid waste management activities planned, sponsored, financed, carried out or, regulated and/or recognised by the formal local authorities or their agents, usually through contracts, licenses or concessions.

Informal Waste Sector: Waste pickers, scavengers, junkshops; Individuals or enterprises who are involved in waste activities but are not sponsored, financed, recognised or allowed by the formal solid waste authorities, or who operate in violation of or in competition with formal authorities

Dumpsite: Dump, open dump, uncontrolled waste disposal site; A designated or undesignated site where any kinds of wastes are deposited on land, or burned, or buried, without supervision ad without precautions regarding human health or environment

Disposal-illegal: Dumping, wild dumping, littering; Disposal of waste at a site different from one officially designated by the municipal authorities, especially where it is specifically prohibited. May also refer to disposal at the wrong time or in the wrong quantities, even if all other aspects are correct

<u>Temporal Unit</u>
Annualy

<u>Units</u>
w/w % in (Total Waste generated – Waste recycled and reused).

IND 2.B.1: % of waste that goes to uncontrolled dumpsites **(Wd)**
This indicator provides the % of the waste that goes to the dumpsites, thus it is a measure of the pressure for leakages related to ML and water pollution. In addition, it shows the maturity of the national waste management system. The calculation formula is the following:

$$\% \, Wd = Wu / (Wg – Wr)$$

Where:

Wu = Waste delivered to dumpsites

W = Total waste generated

Wr = Recycled and reused waste

In practice, the indicator can be calculated as follows:

$$\% \, Wd = 100\% - IND\ 2.B$$

Definitions required
Dumpsite: Dump, open dump, uncontrolled waste disposal site; A designated or undesignated site where any kinds of wastes are deposited on land, or burned, or buried, without supervision ad without precautions regarding human health or environment

Disposal-illegal: Dumping, wild dumping, littering; Disposal of waste at a site different from one officially designated by the municipal authorities, especially where it is specifically prohibited. May also refer to disposal at the wrong time or in the wrong quantities, even if all other aspects are correct

Temporal Unit
Annualy

Units
w/w %

IND 2.B.2: Number of Dumpsites in Coastal Areas **(NdC)**
This indicator provides the dispersion of potential leakages & pollution including marine litter sources in the Coastal Area, thus it is a direct measure of the pressure and the drivers for ML and water pollution. In addition, it shows the maturity of the waste management system in the Coastal Areas. The target of the regional plan was to eliminate dumpsites by 2020.

<u>Definitions required</u>
Dumpsite: Dump, open dump, uncontrolled waste disposal site; A designated or undesignated site where any kinds of wastes are deposited on land, or burned, or buried, without supervision ad without precautions regarding human health or environment

Disposal-illegal: Dumping, wild dumping, littering; Disposal of waste at a site different from one officially designated by the municipal authorities, especially where it is specifically prohibited. May also refer to disposal at the wrong time or in the wrong quantities, even if all other aspects are correct

Coastal Areas: Areas within 100 km buffer zone of the coastline.

<u>Temporal Unit</u>
Annualy

<u>Units</u>
Number of dumpsites in the Coastal Area

IND 2.B.3: Waste going to dumpsites in the Coastal Areas (WdC)

This indicator provides how much waste goes to dumpsites located in Coastal Areas. The spatial distribution of dumpsites provides a very good picture for the paths that the pollution including marine litter and combined quantity of waste dumped and it gives a clear picture of the waste disposed through dumpsites in the coastal area.

All the following indicators are calculated on the level of the Coastal Areas.

$$\% \; Wd = Wu / (Wg - Wr)$$

Where:

Wu = Waste delivered to dumpsites

W = Total waste generated

Wr = Recycled and reused waste

Definitions required

Dumpsite: Dump, open dump, uncontrolled waste disposal site; A designated or undesignated site where any kinds of wastes are deposited on land, or burned, or buried, without supervision ad without precautions regarding human health or environment

Disposal-illegal: Dumping, wild dumping, littering; Disposal of waste at a site different from one officially designated by the municipal authorities, especially where it is specifically prohibited. May also refer to disposal at the wrong time or in the wrong quantities, even if all other aspects are correct

Coastal Areas: Areas within 100 km buffer zone of the coastline.

Temporal Unit

Annualy

Units

w/w %

IND 2.C: Resource Recovery (RR)

The indicator shows the percentage of total municipal solid waste generated that is recycled. It includes both materials recycling and organics valorisation / recycling (composting, animal feed, anaerobic digestion).

RR (%) = Wr / W

Where:
W = Total waste generated

Wr = Recycled and reused waste

<u>Definitions required</u>

Recycling: the term represents a collection of public and private, formal and informal activities that result in diverting materials from disposal and recovering them in order to return them to productive use'. The recycling rate should include the contribution from the 'informal' recycling sector as well as formal recycling as part of the solid waste management system. Recycling is higher up the waste hierarchy, so energy recovery from e.g. thermal treatment is not considered here.

Formal Waste Sector: Formal Waste Sector: Solid waste system, solid waste authorities, government, materials recovery facility; Solid waste management activities planned, sponsored, financed, carried out or, regulated and/or recognised by the formal local authorities or their agents, usually through contracts, licenses or concessions.

Informal Waste Sector: Waste pickers, scavengers, junkshops; Individuals or enterprises who are involved in waste activities but are not sponsored, financed, recognised or allowed by the formal solid waste authorities, or who operate in violation of or in competition with formal authorities

<u>Temporal Unit</u>
Annualy

<u>Units</u>
w/w %

IND 2.C.1: % of plastic waste generated that is recycled (RRpl)

The indicator shows the percentage of total plastic municipal solid waste generated that is recycled. It includes materials recycling only.

RRpl = Pr / Pw

Where:
Pr = plastic that is recycled or reused
Pw = Plastic waste generated

Pw can be calculated by multiplying the % of plastics in waste composition with the total waste generated.

Definitions required

Plastics: The plastic fraction includes mostly packaging wastes, such as PET, PVC, polypropylene, high and low density polyethylene (HDPE/LDPE) and polystyrene.

Temporal Unit
Annualy

Units
w/w %

Policy Context and Targets

Marine litter (ML) is a challenge of global scale and implications. It is necessary to develop a more integrated perspective regarding ML. ML is not simply related to SWM and recycling, it is a result of a systemic failure, with the following four key-parameters:

(I) The continuous growth in use of thousands of different forms of plastics.

(II) Poor or absent solid waste management services and infrastructure, and insufficient monitoring & law enforcement (mainly in the Med North).

(III) Problematic - vulnerable markets for secondary plastics.

(IV) Lack of a systemic and in-depth understanding of:

- The technical challenges and the restrictions of material properties and the flows of plastics.
- The effects of social consumption patterns and littering behaviours on solid waste generation.
- The impacts of unplanned tourist developments and of the fishing industry.

The plastic production & consumption, the lack of waste & recycling infrastructure and enforcement, (especially in coastal areas), the problematic markets for secondary materials and the touristic activities can be considered as Drivers of ML generation.

An important step forward towards dealing with the marine litter problem was adoption of Decision IG.20/10 at the 17th Meeting of the Contracting Parties of the Barcelona Convention (Paris, February 2012) entitled "Adoption of the Strategic Framework for Marine Litter management". This Strategic Framework analyses the problem and is proposing quite a number of activities that would help in approaching in a systematic way the problem of marine litter. COP 17 also adopted the ecological objective on marine litter in the framework of the ecosystem approach. Decision IG.20/10 mandated the Secretariat to prepare the Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the LBS Protocol.

Another very important step was the Regional Plan on ML in the Mediterranean. The Plan came into force on 8 July 2014 for all parties to the Land Based Sources (LBS) Protocol and it:

- provides Mediterranean countries with a framework to elaborate national policies and action plans to address impacts of marine litter
- creates momentum for addressing litter-related marine and coastal pollution in an integrated manner

Regarding waste management, the plan was aiming mainly to waste prevention, using the following goals:

1. Solid waste management - reduction at source, waste hierarchy (**2025**)

- Reducing/ reusing/ recycling measures for plastic packaging waste (**2019**)
- Explore and implement to the extent possible the following (**2017**):
  - Extended Producer Responsibility
  - Sustainable Procurement Policies
  - Voluntary agreements and fiscal and economic instruments to reduce plastic bags consumption
  - Deposits, Return and Restoration System (for beverage containers and expandable polystyrene boxes in the fishing sector)
  - Cooperate with industry to establish procedures and manufacturing methodologies to reduce micro-plastic

4. Close the existing illegal dump sites on land (2020)

5. Combat dumping including littering on the beach, illegal sewage disposal in the sea, the coastal zone and rivers

The Horizon 2020 Initiative, which aims to reduce the pollution of the Mediterranean Sea by 2020, recognizes the importance of waste as one of the three priority areas causing major pollution in the Mediterranean Sea. The UN Global Programme of Action for the Protection of the Marine Environment against Land-Based Activities and the Convention for the Protection of the Mediterranean Sea against Pollution have also identified waste management as a priority intervention.

In all the relevant efforts and plans, the major objective is to reduce plastic waste by shifting to circular economy, enabling re-design of materials and products, advancing reuse and recycling practices. The policies (and the proposed indicators in this document) are directly related with the SDGs as follows:

GOALS	TARGET	INDICATORS
Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable	11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.	% of urban solid waste regularly collected and with adequate final discharge with regards to the total waste generated by the city
Goal 12: Ensure sustainable consumption and production patterns	12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.	Treatment of waste, generation of hazardous waste, hazardous waste management, by type of treatment
	12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	National recycling rate, tons of material recycled
Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development	14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	Index of coastal eutrophication and floating plastic debris density

The UN has established the Global Partnership on Marine Litter, with the following Goals. Goal A: Reduced levels and impacts of land-based litter and solid waste introduced into the aquatic environment. Goal B: Reduced levels and impact of sea-based sources of marine debris including solid waste, lost cargo, ALDFG, and abandoned vessels introduced into the aquatic environment. Goal C: Reduced levels and impacts of (accumulated) marine debris on shorelines, aquatic habitats, and biodiversity. It is anticipated that different stakeholders will form sub-groups to focus on specific issues, e.g. cross-cutting issues.

The shift to Circular Economy is necessary for the substantial reduction and prevention of ML. The G20 have advocated for a global roadmap for action to address the life cycle of plastics and effectively valorize plastics in the economy whilst mitigating their environmental impacts. This roadmap includes:

1. Upstream measures

2. Consumption based measures

3. Worldwide engagement in awareness of impacts and the need for social change.

4. Measures to enhance and advance waste management - the required measures involve (indicatively):

- Separate waste collection: Emphasis should be placed on moving away from landfill and energy recovery towards re-use and recycling. Separate municipal waste collection is a key element within this infrastructure, to make recycling a convenient option for citizens to deal with their waste plastics. Re- use opportunities in the plastic packaging sector, ranging from reusable B2B crates to refillable bottles for beverages and cleaning products.

- Waste management infrastructure and services: Direct investment in waste infrastructure is needed in all countries to increase the rate of recovery and reduce the leakage of plastics. Although landfilling should be the least-preferred option, investment in sanitary landfills is still desirable in countries where informal and unprotected landfills are a major source of plastic pollution.
- Export of plastic waste: In general, plastic waste should not be exported for disposal or treatment in locations with significantly lower treatment standards than the country of origin. Countries which export waste for recycling should have responsibility to assess and take into account the impacts of that trade. An estimated 15 million tonnes of plastic is traded per year as waste destined for recycling.
- Infrastructure for maritime and fisheries marine litter: Whilst terrestrial sources are the most important, an estimated 0.5 to 5.9 million tonnes of plastics enters the oceans from sea-based sources every year. Appropriate waste infrastructure at ports can reduce this flow of waste.
- Deposit refunds and extended producer responsibility (EPR): Producers should be made responsible for their products after the point of sale. Deposit refund and EPR instruments, which support the uptake, quality and economics of recycling, thus reducing marine littering, should be implemented. EPR schemes also encourage producers to design their products to be suitable for take-back and recycling.
- Clean-up and collection: Given the size of the oceans and the scale of the marine litter problem, clean- up activities are costly, largely ineffective and create an unhelpful illusion that upstream measures are not necessary. Whilst upstream measures should be preferred, clean-up may be a suitable last resort for addressing marine litter in limited zones such as urban areas, tourist beaches and ports where the litter causes severe social and economic damage.

Related policy documents

- Decision IG.20/10 at the 17th Meeting of the Contracting Parties of the Barcelona Convention (Paris, February 2012) entitled “Adoption of the Strategic Framework for Marine Litter management”.
- EU Marine Strategy Framework Directive (MSFD), 2008/56/EC
- A European Strategy for Plastics in a Circular Economy, COM (28) 2018, 16-1-2018
- EU, DG for Internal Policies, EU Action to Combat Marine Litter, IP/A/ENVI/2017-02, May 2017
- G20 Insights, T20 Task Force Circular Economy: Circular economy measures to keep plastics and their value in the economy, avoid waste and reduce marine litter, 2017
- United Nations Environment Assembly of the United Nations Environment Programme, Resolution on Marine Litter and Microplastics, UNEP/EA.3/L.20, Third Session, 4-6 December 2017
- UNEP, Regional Plan for the Marine Litter Management in the Mediterranean, UNEP (DEPI)/MED WG. 379/5, 2013
- UN Global Programme of Action for the Protection of the Marine Environment against Land-Based Activities

Methodology

IND 2.A: Waste Collection

IND 2.A.1: Waste Collection Coverage

<u>Calculations</u>

Wcc (%) = Ps / P

Where:

Ps = population of the country that is covered by a regular collection service organised either by public authorities or private companies

P = total population of the country

The national figures should be aggregated by the regional or municipal figures – obviously, the final figures should be weighed.

<u>Geographical coverage</u>
This indicator is calculated on a country level, including the total population.

<u>Temporal Coverage</u>

It will be very useful if 10-15 years' time series can be provided

<u>Data collection & availability</u>

In general terms, data about population is usually available by state statistic authorities. However, it is not always sure that the data regarding the waste collection coverage is organized and collected on a national level. In some cases, this is done by ad-hoc committees under the ministries of Environment or the one that deals with municipalities.

<u>Problems and gaps</u>

The major problem is that in many countries the collection coverage is not measured and aggregated on a national level, and sometimes not even on a regional level. Another important problem is that the activities and the involvement of the informal sector is sometimes ignored or underestimated, although in several cities and countries informal recyclers manage up to 8-10% of the waste generated.

<u>Methodological Uncertainties</u>

Unless there is a proper national reporting system that works, it will be very difficult to assess the national collection coverage. In addition, even when such systems are in place they usually refer to the waste collection done by the municipalities or the accredited companies and they do not include the collection by informal recyclers. The quantification of the informal recyclers contribution is one of the most difficult aspects, by definition, but it is not impossible to have at least an assessment of it, as it will be explained later.

IND 2.A: Waste Collection

IND 2.A.2: Waste captured by the system

Calculations

Ws (%) = Wf/W

Where:
Wf = Waste captured by the formal waste sector
W = Total Waste Generated

Geographical coverage
This indicator is calculated on a country level.

Temporal Coverage
It will be very useful if 10-15 years' time series can be provided.

Data collection & availability
In general terms, the crucial issue is to collect and find access to the data collected at the facilities. Even if these data sets are not available in a ministry or in the statistic authorities, the waste management authorities can retrieve them and then, the national authorities have to aggregate them.

Problems and gaps
If the data from facilities is retrieved, then before the aggregation it is required to manage the data and provide it in a uniform way. Usual problems that emerge are the different units used (in some cases there are landfills measuring the number of vehicles instead of the tons of waste), not comparable time-series due to the different time of operations or other problems, inconsistent data sets involving different service areas monthly or even daily etc. Another important problem is that in several cases facilities do not distinguish in their records different waste streams, so there is a risk to aggregate non-municipal waste in the national figures.

Methodological Uncertainties
The major uncertainty regards the availability of the data on a national level. If there is not a proper reporting system in place, then the indicator can be only roughly assessed by the capacities of the official facilities.

IND 2.B: Environmental Control - % of controlled treatment and disposal

Calculations
We % = Wf / (W – Wr)

Where:

Wf = Waste captured by the formal waste sector
W = Total waste generated

Wr = Recycled and reused waste

Geographical coverage
This indicator is calculated on a country level.

Temporal Coverage
It will be very useful if 10-15 years' time series can be provided.

Data collection & availability
The data required can be assessed using the records of the relevant facilities. Those facilities almost always have weighbridges and measure the input waste, so their records can be used to estimate the numerator. In general terms, the crucial issue is to collect and find access to the data collected at the facilities. Even if these data sets are not available in a ministry or in the statistic authorities, the waste management authorities can retrieve them and then, the national authorities must aggregate them.

Problems and gaps
If the data from facilities is retrieved, then before the aggregation it is required to manage the data and provide it in a uniform way. Usual problems that emerge are the different units used (in some cases there are landfills measuring the number of vehicles instead of the tons of waste), not comparable time-series due to the different time of operations or other problems, inconsistent data sets involving different service areas monthly or even daily etc. Another very important problem is that in several cases facilities do not distinguish in their records different waste streams, so there is a risk to aggregate non-municipal waste in the national figures.

Methodological Uncertainties
The main problem again lies around landfills and when they are considered safe and protect public health and environment. The Landfill Working Group of the International Solid Waste Association[21] has developed a concrete evaluation system to hep decision-makers on distinguishing between safe and controlled Vs uncontrolled disposal.

[21] ISWA International Guidelines for Landfill Evaluation, 2011, available at http://www.iswa.org/media/publications/knowledge-base/

IND 2.B.1: % of waste that goes to dumpsites

Calculations

$$\% Wd = Wu / (Wg – Wr)$$

Where:

Wu = Waste delivered to dumpsites

W = Total waste generated

Wr = Recycled and reused waste

% Waste that goes to dumpsites = 100% - IND 2.B

Geographical coverage

This indicator is calculated on a country level.

Temporal Coverage

It will be very useful if 10-15 years' time series can be provided.

Data collection & availability

The data required can be assessed using the records of the relevant facilities. Those facilities almost always have weighbridges and measure the input waste, so their records can be used to estimate the numerator. In general terms, the crucial issue is to collect and find access to the data collected at the facilities. Even if these data sets are not available in a ministry or in the statistic authorities, the waste management authorities can retrieve them and then, the national authorities must aggregate them.

Problems and gaps

If the data from facilities is retrieved, then before the aggregation it is required to manage the data and provide it in a uniform way. Usual problems that emerge are the different units used (in some cases there are landfills measuring the number of vehicles instead of the tons of waste), not comparable time-series due to the different time of operations or other problems, inconsistent data sets involving different service areas monthly or even daily etc. Another very important problem is that in several cases facilities do not distinguish in their records different waste streams, so there is a risk to aggregate non-municipal waste in the national figures.

Methodological Uncertainties

The main problem again lies around landfills and when they are considered safe and protect public health and environment. The Landfill Working Group of the International Solid Waste Association[22] has developed a concrete evaluation system to hep decision-makers on distinguishing between safe and controlled Vs uncontrolled disposal.

[22] ISWA International Guidelines for Landfill Evaluation, 2011, available at http://www.iswa.org/media/publications/knowledge-base/

IND 2.B.2: Number of dumpsites in Coastal Areas

Calculations
If the Coastal Area has been defined as it has been presented in the discussion for IND1.C, then the indicator can be calculated only by counting the number of dumpsites in the Coastal Area.

Geographical coverage
100 km buffer zone from the coastline.
Alternatively: catchment/ hydrological basin at the coastal area or, if data not available, major coastal cities, in order to quantify the extent of land-based pressures that could potentially have a downstream effect on the state/impact of the sea.

Temporal Coverage
It will be very useful if 10-15 years' time series can be provided.

Data collection & availability
The crucial issue is how to calculate the 100 kilometre coastal buffer of the land area. For that purpose, the data must be projected into an equidistant map projection appropriate for the country. The two pieces of spatial data needed to measure this indicator are gridded population and a coastal zone delineation (or mask). Some countries have already made a national inventory of their dumpsites so using a GIS system it will not be that difficult to calculate the indicator.

Problems and gaps
The issues here are mostly related with the issues about the registration of dumpsites and the relevant data information available as well as with the clear definition of the coastal areas.

Methodological Uncertainties
The coastal zone can be defined in different ways depending on the focus of interest and the availability of data. Typically, a combination of distance-to-coast and elevation data is used. The Millennium Ecosystem Assessment used 100 kilometres from the coast as the distance threshold and 50 meters as the elevation threshold, choosing whichever was closer to the sea. Other works use 10 meters elevation contiguous with the coast and no distance threshold; in most places this delineated an area closer than 100km from the sea, though in some areas it extended farther. In general distance- based measures are best suited for indicators used to denote coastal pressures, while elevation-based measures are best suited for indicators used to denote hazard vulnerability.

In some cases, there are no records about the dumpsites, so the relevant data can be retrieved from rough assessments or national - regional inventories.

IND 2.B.3: Waste going to dumpsites in the Coastal Areas

Calculations

All the following indicators are calculated on the level of the Coastal Areas.

$$\% \, Wd = Wu / (Wg – Wr)$$

Where:

Wu = Waste delivered to dumpsites

W = Total waste generated

Wr = Recycled and reused waste

Geographical coverage

100 km buffer zone from the coastline.

Alternatively: catchment/ hydrological basin at the coastal area or, if data not available, major coastal cities, in order to quantify the extent of land-based pressures that could potentially have a downstream effect on the state/impact of the sea.

Temporal Coverage

It will be very useful if 10-15 years' time series can be provided.

Data collection & availability

The crucial issue is how to calculate the 100 kilometre coastal buffer of the land area. For that purpose, the data must be projected into an equidistant map projection appropriate for the country. The two pieces of spatial data needed to measure this indicator are gridded population and a coastal zone delineation (or mask). Some countries have already made a national inventory of their dumpsites so using a GIS system it will not be that difficult to calculate the indicator.

Problems and gaps

The issues here are mostly related with the issues about the registration of dumpsites and the relevant data information available as well as with the clear definition of the coastal areas.

Methodological Uncertainties

The coastal zone can be defined in different ways depending on the focus of interest and the availability of data. Typically, a combination of distance-to-coast and elevation data is used. The Millennium Ecosystem Assessment used 100 kilometres from the coast as the distance threshold and 50 meters as the elevation threshold, choosing whichever was closer to the sea. Other works use 10 meters elevation contiguous with the coast and no distance threshold; in most places this delineated an area closer than 100km from the sea, though in some areas it extended farther. In general distance- based measures are best suited for indicators used to denote coastal pressures, while elevation-based measures are best suited for indicators used to denote hazard vulnerability.

In some cases, there are no records about the dumpsites, so the relevant data can be retrieved from rough assessments or national - regional inventories.

IND 2.C: Resource Recovery

Calculations

RR (%) = Wr / W

Where:
W = Total waste generated

Wr = Recycled and reused waste

Geographical coverage

This indicator is calculated on a country level.

Temporal Coverage

It will be very useful if 10-15 years' time series can be provided.

Data collection & availability

For this calculation, since IND1 has been already calculated, it is necessary to recover data from both the formal and the informal sector. The recyclables from the formal sector are always registered and usually there are invoices or other receipts for their quantities. However, the difficulty lies in quantifying the contribution of the informal recyclers. Unless there is a detailed study about them, we propose an empirical assessment as follows. The informal recyclers, finally, sell their recyclables to the same supply chains that deal with the recyclables from the formal sector. So, a survey and research for the quantities that those companies manage can provide the contribution of the informal sector. Most of those companies are willing to share information about the recyclables they buy from the informal sector and provide an order of magnitude for the contribution of the informal sector.

Problems and gaps

In several countries, the recycling markets are not well structured and the relevant data is not systematically aggregated and reported on a national level. If the data from facilities is retrieved, then before the aggregation it is required to manage the data and provide it in a uniform way. Other problems are the relevant mentioned in IND 2.B.

Uncertainties

The problem lies in the assessment of the contribution of the informal sector, since in many cases informal recyclers do not use the official facilities and they deliver their recyclables directly to companies dealing with recyclables. The quantification of the informal recyclers contribution is one of the most difficult aspects, by definition, but it is not impossible to have at least an assessment of it.

IND 2.C.1: % of plastic waste generated that is recycled

Calculations

$$RRpl = Pr / Pw$$

Where:
Pr = plastic that is recycled or reused
Pw = Plastic waste generated

Pw can be calculated by multiplying the % of plastics in waste composition with the total waste generated.

Geographical coverage
This indicator is calculated on a country level.

Temporal Coverage
It will be very useful if 10-15 years' time series can be provided.

Data collection & availability
For this calculation, since IND1 has been already calculated, it is necessary to recover data from both the formal and the informal sector. The recyclables from the formal sector are always registered and usually there are invoices or other receipts for their quantities. However, the difficulty lies in quantifying the contribution of the informal recyclers. Unless there is a detailed study about them, we propose an empirical assessment as follows. The informal recyclers, finally, sell their recyclables to the same supply chains that deal with the recyclables from the formal sector. So, a survey and research for the quantities that those companies manage can provide the contribution of the informal sector. Most of those companies are willing to share information about the recyclables they buy from the informal sector and provide an order of magnitude for the contribution of the informal sector.

Since plastic producers are usually aware of the recycling market, they can be helpful for a quick survey if the relevant data is not available.

Problems and gaps
In several countries, the recycling markets are not well structured and the relevant data is not systematically aggregated and reported on a national level. If the data from facilities is retrieved, then before the aggregation it is required to manage the data and provide it in a uniform way. Other problems are the relevant mentioned in IND 2.B.

Uncertainties
The problem lies in the assessment of the contribution of the informal sector, since in many cases informal recyclers do not use the official facilities and they deliver their recyclables directly to companies dealing with recyclables. The quantification of the informal recyclers contribution is one of the most difficult aspects, by definition, but it is not impossible to have at least an assessment of it.

Waste Management Indicators Factsheets

INDICATOR FACT – SHEET

3. "Software" of waste management

Sub-indicators

MARINE LITTER & WASTE MANAGEMENT FRAMEWORK
IND 3.A.1 Is there a National Assessment for ML and its impacts?
IND 3.A.2 Is there a National Plan or Strategy for ML?
IND 3.A.3 Is there a National Plan or Strategy for Waste Management?
IND 3.A.4 Is there a National Law on Waste?
IND 3.A.5 Is there a national plan or target to close the dumpsites before 2030?
IND 3.A.6 Is there a National Information system for waste management in place?
RESOURCE RECOVERY
IND 3.B.1 Is there a National Plan or Strategy for Waste Prevention?
IND 3.B.2 Are there mandatory targets for recycling - recovery of packaging waste?
IND 3.B.3 Are there EPR or Deposit- Return schemes for packaging waste?
IND 3.B.4 Are there national policies to eliminate or reduce single-use plastics?
IND 3.B.5 Are there financial incentives for reuse – resource recovery activities?

SUSTAINABLE CONSUMPTION AND PRODUCTION

IND 3.C.1 Are there Sustainable Consumption and Production plans or strategies?
IND 3.C.2 Are there green procurement rules for the public sector in place?
IND 3.C.3 Are there policies to support sustainable tourism?
IND 3.C.4 Are there policies to support eco-labelling and eco-design?

DRAFT Indicator Specification
Version: 1.0
Date: 30.04.2018

Indicator Specification

<table>
<tr><td colspan="2">H2020 Indicators</td></tr>
<tr><td>Thematic area
WASTE</td><td>Date
Author (s)</td></tr>
<tr><td colspan="2">Policy theme
Marine Litter and waste management interfaces</td></tr>
<tr><td colspan="2">Indicator
3. “Software” of waste management
Sub-indicators
<u>3.A MARINE LITTER & WASTE MANAGEMENT FRAMEWORK</u>
IND 3.A.1 Is there a National Assessment for ML and its impacts?
IND 3.A.2 Is there a National Plan or Strategy for ML?
IND 3.A.3 Is there a National Plan or Strategy for Waste Management?
IND 3.A.4 Is there a National Law on Waste?
IND 3.A.5 Is there a national plan or target to close the dumpsites before 2030?
IND 3.A.6 Is there a National Information system for waste management in place?
<u>3.B RESOURCE RECOVERY</u>
IND 3.B.1 Is there a National Plan or Strategy for Waste Prevention?
IND 3.B.2 Are there mandatory targets for recycling - recovery of packaging waste?
IND 3.B.3 Are there EPR or Deposit- Return schemes for packaging waste?
IND 3.B.4 Are there national policies to eliminate or reduce single-use plastics?
IND 3.B.5 Are there financial incentives for reuse – resource recovery activities?
<u>3.C SUSTAINABLE CONSUMPTION AND PRODUCTION</u>
IND 3.C.1 Are there Sustainable Consumption and Production plans or strategies?
IND 3.C.2 Are there green procurement rules for the public sector in place?
IND 3.C.3 Are there policies to support sustainable tourism?
IND 3.C.4 Are there policies to support eco-labelling and eco-design?

Additional information
(if applicable)
The specification aims to measure the policy responses on a national level by answering “yes” or “no” to specific questions. Overall, it reflects the “software’ of waste management and the readiness of countries to deal with ML.</td></tr>
</table>

Rationale

Performance indicators provide a good basis for assessing the existing situation, carrying out a comparison and tracking changes or progress made over time. For indicators to be useful as a tool for decision makers and politicians, they need to simplify the potential mass of data by being selective, by focusing on the important elements rather than trying to cover all aspects. By doing so, the information the indicators present will be relatively easy to use and understand.

Unfortunately, compiling high quality data on waste and waste treatment has long been a challenge. The available estimates are diverse, not verified or reliable, and often rather outdated. Thus, transforming waste data into reliable waste statistics has proven difficult. Definitely, this situation reflects to Marine Litter Statistics too, in one or another way. Some of the major areas of concern are:

- Lack of standard definitions and classifications
- Absence of measurement and of standard methodologies for measurement
- Lack of standard reporting systems

Interest in performance indicators for solid waste management is long-standing. Researchers have examined the bias issues in the then-standard set of three benchmark indicators: waste generated per capita; proportion of waste being managed by different methods; and proportion of households with a regular collection service. They found that although solid waste planning is a multi-disciplinary field requiring information about the physical, environmental, social, and economic implications of a system, the environmental indicators in use for solid waste do not adequately inform decision-makers about these attributes. Therefore, in many cases the indicators do not facilitate a holistic approach to environmental planning and policymaking.

A notable recent attempt to develop benchmark indicators and apply them to the comparison of cities both North and South was the report prepared for UN-Habitat on the state of solid waste management in the World's cities. The evolution of this tool is described in the recent UNEP – ISWA Global Waste Management Outlook and the set of Wasteaware Indicators.

According this tool, experience suggests that, for a system to be sustainable in the long term, consideration needs to be given to:

- All the physical elements (infrastructure) of the system.
- All the stakeholders (actors) involved.
- All the strategic aspects, including the political, health, institutional, social, economic, financial, environmental and technical facets.

The concept of Integrated Sustainable Waste Management (ISWM) which explicitly brings together all three dimensions, is gradually becoming the norm in discussion of solid waste management in developing countries. In this systematic description we can refer to the "software" and the "hardware" of waste management. The "software" refers to all the governance aspects (financial sustainability, social inclusion, institutional development). The "hardware" refers to all the relevant infrastructure (collection, recycling, treatment and disposal).

Justification for indicator selection
The indicator was constructed in a way to be relatively easily assessed and at the same time to include all the major aspects that are related with ML. More specifically, the indicator has three components. Each component has certain questions that are answered either by yes or no. The first component deals with the marine litter and the waste management framework. Here, the aim is to identify a. if the countries understand ML as a priority that requires specific planning on a national level, and b. how mature and cohesive is the national waste management framework. The second component deals with the resource recovery framework. The questions here aim to identify if the national framework in place supports waste prevention, resource recovery, and recycling, especially in plastics. The third component deals with the Sustainable Consumption and Production policies. It aims to see the policy advances and the practices that are promoted mainly by the public sector REFERENCES • Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan {SEC (2008) 2110} {SEC (2008) 2111 • OECD, Extended Producer Responsibility: A Guidance Manual for Governments, 2001 • SWITCHMED, Regional Action Plan on Sustainable Consumption and Production in the Mediterranean, 2017 • UNEP, Sustainable Consumption and Production Global edition. A Handbook for Policymakers, 2015 • UNEP – ISWA, Global Waste Management Outlook, 2015, ISBN: 978-92-807-3479-9 • UN HABITAT, Solid Waste Management in the World's Cities, 2009 • Wasteaware' benchmark indicators for integrated sustainable waste management in cities, Waste Management, Volume 35, January 2015, Pages 329-342

Indicator definition
3.A MARINE LITTER & WASTE MANAGEMENT FRAMEWORK IND 3.A.1 Is there a National Assessment for ML and its impacts? IND 3.A.2 Is there a National Plan or Strategy for ML? IND 3.A.3 Is there a National Plan or Strategy for Waste Management? IND 3.A.4 Is there a National Law on Waste? IND 3.A.5 Is there a specific plan or a specific target to close the dumpsites before 2030? IND 3.A.6 Is there a National Information System for waste management in place? All the questions are answered by yes or no. Definitions required IND 3.A.1 – IND 3.A.2: the answer “yes” is given either if the relevant documents are officially approved or if they are under elaboration and they are going to be completed before the end of 2019. IND 3.A.3 – IND 3.A.4: the answer “yes” is given only if the relevant documents are officially approved. IND 3.A.5: the answer “yes” is given only if there is such a specific target in the National Plan or Strategy or if there is a specific plan for the closure of dumpsites. IND 3.A.6: the answer “yes” is given only if there is an existing, operational National Information System for waste management or if waste management consists a sub-system of a broader Environmental Information System. Temporal Unit Biannualy Units Each “yes” counts 6.66%

3.B RESOURCE RECOVERY

IND 3.B.1 Is there a National Plan or Strategy for Waste Prevention?
IND 3.B.2 Are there mandatory targets for recycling - recovery of packaging waste?
IND 3.B.3 Are there EPR or Deposit- Return schemes for packaging waste?
IND 3.B.4 Are there national policies to eliminate or reduce single-use plastics?
IND 3.B.5 Are there financial incentives for reuse – resource recovery activities?

Definitions required

IND 3.B.1: The answer "yes" is given only if there is a particular national plan or strategy for waste prevention that has been approved officially or if this is under elaboration and it is going to be completed before the end of 2019.

IND 3.B.2: The answer "yes" is given only if there specific quantified targets for recycling – recovery of packaging waste in the National Plan or Strategy or in a National Law or Regulation.

IND 3.B.3: The answer "yes" is given only if a national Extended Producer Responsibility (EPR) Scheme for packaging waste is in place or if there is a national Deposit-Return Scheme in place.

IND 3.B.4: The answer "yes" is given only if there are approved national policies or legislation – regulations for the reduction of single use plastics or any specific part of them (bags, straws, plastic cups etc.)

IND 3.B.5: The answer "yes" is given only if a. there are specific measures like VAT exemption or reduction or other types of financial support of the recycling-recovery activities b. there are financial measures to reduce landfilling like landfill or incineration taxes.

Recycling: it is defined as in IND 2.C

EPR Scheme: Extended Producer Responsibility (EPR) is a policy approach under which producers are given a significant responsibility – financial and/or physical – for the treatment or disposal of post-consumer products. Assigning such responsibility could in principle provide incentives to prevent wastes at the source, promote product design for the environment and support the achievement of public recycling and materials management goals.

Deposit- Return Scheme: Deposit-return schemes involve consumers paying a small extra fee every time they buy a particular type of product. They get the money back when they bring the empty packaging to a collection point. Similar systems for glass bottles have been in place for decades.

Temporal Unit
Biannualy

Units
Each "yes" counts 6.66%

3.C SUSTAINABLE CONSUMPTION AND PRODUCTION

IND 3.C.1 Are there national Sustainable Consumption and Production (SCP) plans or strategies?
IND 3.C.2 Are there national Green or Sustainable Procurement Rules for the public sector in place?
IND 3.C.3 Are there national policies to support Sustainable Tourism?
IND 3.C.4 Are there national policies to support Eco-labelling?

Definitions required
IND 3.C.1: The answer "yes" is given only if there is a particular national plan or strategy for SCP that has been approved officially or if this is under elaboration and it is going to be completed before the end of 2019.

IND 3.C.2: The answer "yes" is given only if there are official national – govermental guidelines for green or sustainable public procurement
IND 3.C.3: The answer "yes" is given only if there is a national plan or strategy that has been approved officially or if this is under elaboration and it is going to be completed before the end of 2019.

IND 3.C.4: The answer "yes" is given only if there is a national plan or strategy that has been approved officially or if this is under elaboration and it is going to be completed before the end of 2019.

Sustainable Consumption and Production (SCP)[23]: As defined by the Oslo Symposium in 1994, sustainable consumption and production (SCP) is about "the use of services and related products, which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of further generations". Following UN and UNEP's suggestions many countries have developed national SCP plans.
Green Public Procurement (GPP)[24]: This means that public authorities seek to purchase goods, services and works with a reduced environmental impact throughout their life-cycle compared to goods, services and works with the same primary function which would otherwise be procured.

Sustainable Public Procurement (SPP)[25]: This is a process by which public authorities seek to achieve the appropriate balance between the three pillars of sustainable development - economic, social and environmental - when procuring goods, services or works at all stages of the project.

Sustainable Tourism[26]: it is defined by paragraph 130 of The Future We Want as a significant contributor "to the three dimensions of sustainable development" thanks to its close linkages to other sectors and its ability to create decent jobs and generate trade opportunities. Therefore, Member States recognize "the need to support sustainable tourism activities and relevant capacity-building that promote environmental awareness, conserve and protect the environment, respect wildlife, flora, biodiversity, ecosystems and cultural diversity, and improve the welfare and livelihoods of local communities".
Eco-label[27]: "Ecolabelling" is a voluntary method of environmental performance certification and labelling that is practised around the world. An ecolabel identifies products or services proven environmentally preferable overall, within a specific product or service category. There are different classifications and certification systems of labels.

Temporal Unit
Biannualy

Units
Each "yes" counts 6.66%

[23] https://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=1951&menu=35
[24] http://ec.europa.eu/environment/gpp/versus_en.htm
[25] https://www.unenvironment.org/regions/asia-and-pacific/regional-initiatives/supporting-resource-efficiency/asia-pacific-roadmap-2
[26] https://sustainabledevelopment.un.org/topics/sustainabletourism
[27] https://globalecolabelling.net/what-is-eco-labelling/

Policy Context and Targets

Marine litter (ML) is a challenge of planetary scale and implications. It is necessary to develop a more integrated perspective regarding ML. ML is not simply related to SWM and recycling, it is a result of a systemic failure, with the following four key-parameters:

(I) The continuous growth in use of thousands of different forms of plastics.

(II) Poor or absent solid waste management services and infrastructure (mainly in the Med South), and insufficient monitoring & law enforcement (mainly in the Med North).

(III) Problematic - vulnerable markets for secondary plastics.

(IV) Lack of a systemic and in-depth understanding of:

- The technical challenges and the restrictions of material properties and the flows of plastics.
- The effects of social consumption patterns and littering behaviours on solid waste generation.
- The impacts of unplanned tourist developments and of the fishing industry.

The plastic production & consumption, the lack of waste & recycling infrastructure and enforcement, (especially in coastal areas), the problematic markets for secondary materials and the touristic activities should be considered as Drivers of ML.

The Horizon 2020 Initiative, which aims to reduce the pollution of the Mediterranean Sea by 2020, recognizes the importance of waste as one of the three priority areas causing major pollution in the Mediterranean Sea. The UN Global Programme of Action for the Protection of the Marine Environment against Land-Based Activities and the Convention for the Protection of the Mediterranean Sea against Pollution have also identified waste management as a priority intervention.

The major target is to reduce plastic waste by shifting to circular economy, enabling re-design of materials and products, advancing reuse and recycling practices. The proposed indicators are directly related with the SDGs as follows:

GOALS	TARGET	INDICATORS
Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable	11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.	% of urban solid waste regularly collected and with adequate final discharge with regards to the total waste generated by the city
Goal 12: Ensure sustainable consumption and production patterns	12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.	Treatment of waste, generation of hazardous waste, hazardous waste management, by type of treatment
	12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	National recycling rate, tons of material recycled
Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development	14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	Index of coastal eutrophication and floating plastic debris density

The UN has established the Global Partnership on Marine Litter, with the following Goals. Goal A: Reduced levels and impacts of land-based litter and solid waste introduced into the aquatic environment. Goal B: Reduced levels and impact of sea-based sources of marine debris including solid waste, lost cargo, ALDFG, and abandoned vessels introduced into the aquatic environment. Goal C: Reduced levels and impacts of (accumulated) marine debris on shorelines, aquatic habitats, and biodiversity. It is anticipated that different stakeholders will form sub-groups to focus on specific issues, e.g. cross-cutting issues.

The shift to Circular Economy is necessary for the substantial reduction and prevention of ML. The G20 have advocated for a global roadmap for action to address the life cycle of plastics and effectively valorize plastics in the economy whilst mitigating their environmental impacts. This roadmap includes:
1. Upstream measures
2. Consumption based measures
3. Worldwide engagement in awareness of impacts and the need for social change.
4. Measures to enhance and advance waste management - the required measures involve (indicatively):

- Separate waste collection: Emphasis should be placed on moving away from landfill and energy recovery towards re-use and recycling. Separate municipal waste collection is a key element within this infrastructure, to make recycling a convenient option for citizens to deal with their waste plastics. Re- use opportunities in the plastic packaging sector, ranging from reusable B2B crates to refillable bottles for beverages and cleaning products.
- Waste management infrastructure and services: Direct investment in waste infrastructure is needed in all countries to increase the rate of recovery and reduce the leakage of plastics. Although landfilling should be the least-preferred option, investment in sanitary landfills is still desirable in countries where informal and unprotected landfills are a major source of plastic pollution.
- Export of plastic waste: In general, plastic waste should not be exported for disposal or treatment in locations with significantly lower treatment standards than the country of origin. Countries which export waste for recycling should have responsibility to assess and take into account the impacts of that trade. An estimated 15 million tonnes of plastic is traded per year as waste destined for recycling.
- Infrastructure for maritime and fisheries marine litter: Whilst terrestrial sources are the most important, an estimated 0.5 to 5.9 million tonnes of plastics enters the oceans from sea-based sources every year. Appropriate waste infrastructure at ports can reduce this flow of waste.
- Deposit refunds and extended producer responsibility (EPR): Producers should be made responsible for their products after the point of sale. Deposit refund and EPR instruments, which support the uptake, quality and economics of recycling, thus reducing marine littering, should be implemented. EPR schemes also encourage producers to design their products to be suitable for take-back and recycling.
- Clean-up and collection: Given the size of the oceans and the scale of the marine litter problem, clean- up activities are costly, largely ineffective and create an unhelpful illusion that upstream measures are not necessary. Whilst upstream measures should be preferred, clean-up may be a suitable last resort for addressing marine litter in limited zones such as urban areas, tourist beaches and ports where the litter causes severe social and economic damage.

Related policy documents

- United Nations Environment Assembly of the United Nations Environment Programme, Resolution on Marine Litter and Microplastics, UNEP/EA.3/L.20, Third Session, 4-6 December 2017
- EU Marine Strategy Framework Directive (MSFD), 2008/56/EC
- A European Strategy for Plastics in a Circular Economy, COM (28) 2018, 16-1-2018
- EU, DG for Internal Policies, EU Action to Combat Marine Litter, IP/A/ENVI/2017-02, May 2017
- G20 Insights, T20 Task Force Circular Economy: Circular economy measures to keep plastics and their value in the economy, avoid waste and reduce marine litter, 2017
- UN Global Programme of Action for the Protection of the Marine Environment against Land-Based Activities

Methodology

The following remarks apply to all the questions

Calculations

Each "yes" counts for counts 6.66%. The ranking of each country is calculated multiplying the number of "yes" by 6.66%. If a country has positive answers to all the questions it will be ranked with 100%, which means that the country's software reposnds in an integrated and complete way the ML challenge.

Geographical coverage

The answers consider the national level only, as the aim is to measure the policy response of the countries. If there are local initiatives they should be mentioned in the assessments, but they will not be part of the ranking process.

Temporal Coverage

It will be very useful if the indicator could be calculated for the last 5 years.

Data collection & availability

In general terms, the data required is easy to be found and the official approvals are easily accessed by the involved authorities.

Problems and gaps

There is a problem regarding the elaboration of on-going plans – in some of the questions the on-going efforts are ranked with "yes" if there is a deadline to be completed before 2019. There is a need to discuss more about it. In some cases, maybe there will be laws and not national plans, or pieces of regulation that cover the requested questions.

Uncertainties

The major uncertainty lies in the common understanding of the relevant terms as well as in identifying how they have been (and if) incorporated in the national policy-making and legislation frameworks.