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First Meeting of the Working Group of Experts on Upgrading the Regional Plan on Municipal Wastewater Treatment and developing a new Regional Plan on Sewage Sludge Management

Videoconference, 9-10 December 2020

Report of the Meeting

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UNEP/MAP
Athens, 2021

Table of Contents

	Pages
Report of the Meeting	1 - 5
Annex I: List of Participants	
Annex II: Agenda of the Meeting	
Annex III: Conclusions and Recommendations	
Appendix 1 Regional Plan for Urban Wastewater Treatment	
Appendix 2 Regional Plan for Sewage Sludge Management	

Introduction

1. In accordance with the United Nations Environment Programme/Mediterranean Action Plan (UNEP/MAP), Programme of Work 202-2021 adopted by the 21st Ordinary Meeting of the Contracting Parties to the Barcelona Convention and its Protocols (Napoli, Italy, 2-5 December 2019), the Secretariat organized the First Meeting of the Working Group of Experts on Upgrading the Regional Plan on Urban Wastewater Treatment and developing a new Regional Plan on Sewage Sludge Management was held by videoconference. The meeting was organized by UNEP/MAP Secretariat (MED POL Programme).

2. The objective of the Meeting was to discuss the draft upgraded Regional Plan on Urban Wastewater Treatment and the new Regional Plan on Sewage Sludge Management with the aim to reaching consensus on the proposed measures which have been prepared by MED POL in collaboration with MAP components, as appropriate, taking fully into consideration the Main Elements of the Six Regional Plans to Reduce/Prevent Marine Pollution from Land-Based Sources included in Decision IG.24/10 (COP 21).

Participation

3. The meeting was attended by representatives from the following Contracting Parties: Bosnia and Herzegovina, Croatia, Cyprus, Egypt, European Union, France, Greece, Israel, Italy, Lebanon, Malta, Morocco, Montenegro, Slovenia, Spain, Tunisia and Turkey. The United Nations Environment Programme (UNEP), including the Mediterranean Action Plan/ Barcelona Convention Secretariat (UNEP/MAP) were also represented, along with the following Mediterranean Action Plan Components: the Mediterranean Pollution Assessment and Control Programme (MED POL) and the Regional Activity Centre for Sustainable Consumption and Production (SCP/RAC).

4. The following United Nations bodies, specialized agencies, convention secretariats and intergovernmental organizations were represented: The United Nations Industrial Development Organization (UNIDO), the International Maritime Organization (IMO), UNEP Cartagena Convention Secretariat & Caribbean Environment Programme (UNEP/CEP), the United Nations Economic and Social Commission for Western Asia (UN ESCWA), the Food and Agriculture Organization of the United Nations (FAO), the United Nations Environment Programme in Nairobi (UNEP), as well as the European Environment Agency (EEA).

6. The following non-governmental organizations and other institutions were represented: The Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO-ECSDE).

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

Agenda item 1: Opening of the Meeting

8. The Meeting was opened at 10:00 AM (EEST) on 9 December 2020 by the Coordinator of the United Nations Environment Programme/ Mediterranean Action Plan - Barcelona Convention Secretariat, Mr. Gaetano Leone. Mr. Leone provided an overview of existing regional plans adopted in previous COP meetings between 2009 and 2013. He presented COP-20 and COP 21 Decisions which mandated the Secretariat to develop the main elements of six new/updated Pollution Reduction Regional Plans and to subsequently update/develop these Plans. He explained the purpose for these new regional plans including promoting National and Regional priorities, advocating a new approach to build the Regional Plans' measures around sectors rather than individual pollutants, creating coherent approach to regional implementation of legally binding measures, mirroring global work and developments on pollution including on plastics and microplastics, contributing to the ongoing process for updating the LBS Protocol, and incorporating cross-cutting actions across the pollution dimension, including actions on climate change, and economic instruments/ cost benefit approaches.

Agenda item 2: Adoption of the Provisional Agenda and Organization of Work

a) Rules of Procedure for the Meeting

10. The Rules of Procedure for Meetings and Conferences of the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and its Protocols was applied mutatis mutandis to the present Meeting (UNEP/IG.43/6, Annex XI).

b) Election of Officers

11. Subject to Rule 20 of the rules of procedure mentioned at para. 2(a) for meetings and conferences of the Contracting Parties, the Meeting elected one (1) President, three (3) Vice Presidents and one (1) Rapporteur from among the participants, as follows:

Chair: Mrs. Lala Khadija Ghedda, Morocco
Vice-Chair: Mr. Francesco Mundo, Italy
Vice-Chair: Ms. Annabelle Haber, Malta
Vice-Chair: Mr. Najib Abi Chedid, Lebanon
Rapporteur: Ms. Ana Sudar, Bosnia & Herzegovina.

c) Adoption of the Provisional Agenda

12. Subject to Rule 14 of the Rules of Procedure mentioned at para. 2(a), the proposed agenda appearing in document UNEP/MED WG.484/1 and annotated in the UNEP/MED WG.484/2 document was reviewed and accepted, as proposed by the Chair. The Annotated Agenda was adopted by the Meeting as appended to the present document.

d) Organization of Work

13. The discussions were proposed to be held in three plenary sessions from 10:00 to 12:00; 13:00 to 15:00 and 15:30-17:30 during the two-day Meeting.

14. Simultaneous interpretation in English and French will be available for the three sessions. All documentation will be in English and French. Participants are encouraged to download the documentation on their computers in advance of the session. The meeting will be recorded for future reference.

15. The Meeting addressed all Agenda items during the two-day meeting. The Meeting closed on 10 December 2020 after adopting its Conclusions and Recommendations appended to this present document.

Agenda item 3: Review of draft Regional Plan on Urban Wastewater Treatment

16. Under this agenda item, Mohamad Kayyal, MED POL Programme Officer, UNEP/MAP Barcelona Convention Secretariat, presented document UNEP/MED WG.484/3 on the Regional Plan for Urban Wastewater Treatment including adopted guiding principles; outline/ structure; proposed measures; significance of upgraded aspects of the existing Regional Plan for Reduction of BOD5; timetable for implementation and reporting; as well as the status of the preparation of the annexes of the Regional Plan.

17. With regard to the Definitions of Terms (Article I), proposals were made to introduce the definition of the term “Chemical Oxygen Demand (COD),” and to amend the definition of the term “Industrial Wastewater” so run-off rainwater is excluded. Discussion is pending on the term “tertiary treatment” to be coordinated and agreed with the same term included in the Regional Plan for Sewage Sludge Management prior to the 2nd Working Group Meeting.

18. One of the representatives of the Working Group raised the issue of “Preservation of Rights” under Article III of the Regional Plan. In response, Ms. Tatjana Hema, the Deputy Coordinator, UNEP/MAP Barcelona Convention Secretariat explained that this is a standard provision used in the current Regional Plans, and almost in all MAP legal instruments including the Convention itself. She added that this article creates the conditions to keep unchanged national or other standards and measures in force which are stricter than the provisions of the referred legal instruments.

19. With regard to the Measures for Collection and Treatment of Urban Wastewater (Article V), a number of comments were made to address the article on setting quality standards aiming at meeting emission limit values for discharge of treated effluents from WWTPs. In principle, there were no objections on the text of this Article pending review and final agreement on contents of Annexes I.A, I.B and I.C of this Regional Plan. Proposals were made to amend the article related to the level of treatment (secondary and tertiary) for agglomerations attributed to various population sizes. It was also pointed out that promoting nature-based solutions will be undertaken to the extent possible, and that segregation of sewage and storm water systems will be undertaken if technically and economically feasible.

20. Following questions and concerns raised by the floor on the proposed timetables for implementation of some measures, the Deputy Coordinator recommended that these proposals are not discussed at this meeting; rather, they should be left in square brackets for the second meeting of the Working Group, and even for the consideration of the Meeting of the MED POL Focal Points, because the issue of implementation timetable is not only technical in nature, but also requires other important considerations on the national level, including aspects of socioeconomic nature. Having said so, the Deputy Coordinator encouraged members of the Working Group to express their concerns from a technical point of view for the suggested timetable. Further to receiving their inputs, the Secretariat will undertake a “consistency check” to ensure that deadlines for various measures do correlate with each other.

21. With regard to the Measures on Reuse and Reclamation of Wastewater (Article V), proposals were made for promoting reuse of treated wastewater. Although there was agreement in principle with the proposed content, the final word would be pending review and final revision on contents of the Appendix I.B.¹

22. With regard to the Measures on Industrial Wastewater Discharge (Article V), agreement was expressed with the articles setting emission limit values for industrial facilities discharging into collection systems and the environment pending review and final agreement on deadlines.

23. With regard to the measure under Article VI on Technical Assistance, Transfer of Technology and Capacity Building, a suggestion was made to make reference to “circular economy” when introducing subjects for exchanging and sharing best practices, particularly in relation to “sustainable consumption and production.”

24. Following the clarifications by the Secretariat regarding the status of the preparation of the Annexes, more time was requested by the participants for further review at the national level. Meanwhile, the Deputy Coordinator suggested that members of the Working Group may share their comments in writing with the Secretariat for consideration and preparation of their revised versions, as appropriate, for the 2nd Working Group Meeting planned to be held in May 2021.

25. The conclusions and recommendations under this agenda item are presented in Annex III of this report.

¹ Slovenia provided feedback on some aspects included in Appendix I.B related to ELVs for bacteria *Escherichia coli*, fecal coliforms and intestinal viruses noting that further discussions are necessary.

Agenda item 4: Review of draft Regional Plan on Sewage Sludge Management

26. Under this agenda item, the Secretariat presented document UNEP/MED WG.484/4 on the Regional Plan for Sewage Sludge Management including adopted guiding principles; outline/structure; proposed measures; timetable for implementation and reporting; as well as the status of the preparation of the annexes of the Regional Plan.

27. With regard to the Definitions of Terms (Article I), requests were made to continue discussion on the introduced terms in the draft Regional Plan during online consultations prior to the convening of the 2nd Working Group Meeting, with a particular focus on the term “Tertiary Treatment” to be coordinated and agreed with the same term included in the Regional Plan for Urban Wastewater Management.

28. With regard to the Scope and Objective of the Regional Plan (Article II), reference was made to using the term “beneficial substances” in lieu of “valuable substances” while focusing on exploitation of energy potential of sewage sludge.

29. With regard to the Guiding Principles of the Regional Plan (Article IV), requests were made to remove all references relating effective treatment to quality of sludge; toxic risks of heavy metals; and the power supply potential of sewage sludge. Requests were made to introduce principles related to sewage sludge use in other applications, as well as alternative energy source.

30. With regard to the Measures for Treatment of Sewage Sludge (Article V), proposals were made to rephrase the article relating treatment processes to quality of biosolids. Requests were also made for substituting the term “reuse” with the term “use” of sewage sludge; and for removing reference to the tabulated limit values for concentrations of heavy metals in industrial effluents discharging into collection systems in order to avoid duplication with the same limit values included in the Regional Plan for Urban Wastewater Treatment. Proposals were also made to make reference that disposal of sewage sludge in coastal areas is prohibited. Finally, several participants raised their concern regarding the proposed deadlines for implementation of the proposed measures. Proposed deadlines remain for the time being in square brackets, pending the need for further consultations on the national level.

31. With regard to the Measures on Sewage Sludge Use and Recovery (Article V), requests were made about the need to add reference in the related article to not only energy but also nutrient recovery.

32. With regard to the Measures for Reducing Impacts of Climate Change (Article V), requests were made about BAT and BEP whereby the aim should be to reduce energy costs and increase water savings during treatment of sewage sludge. Proposals were also made for explicitly referring to the use of biosolids for soil amendment with regard to improvement of infiltration of both rainwater and irrigation water.

33. Several participants raised concerns regarding the proposed deadlines for implementation of the proposed measures in line with previous concerns raised for the deadlines stipulated in the Regional Plan for Urban Wastewater Treatment. The Secretariat confirmed that the proposed deadlines remain for the time being in square brackets, pending further consultations and feedback on the national level.

34. With regard to the measure under Article VI on Technical Assistance, Transfer of Technology and Capacity Building, a suggestion was made to make reference to “circular economy” when introducing subjects for exchanging and sharing best practices, particularly in relation to “sustainable consumption and production.”

35. Following the clarifications by the Secretariat regarding the status of the Annexes under development, the members of the Working group highlighted the need for circulating the completed draft annexes for their review with the aim of sharing feedback and comments in writing prior to convening the 2nd Working Group Meeting planned to be held in May 2021.

36. The conclusions and recommendations under this agenda item are presented in Annex III of this report.

Agenda item 5: Any Other Business

37. The European Union made two presentations highlighting EU work on issues related to the Regional Plans on Wastewater Treatment and Sewage Sludge Management, and their related legislation.

38. The Secretariat explained that it is undertaking a study to enable the Parties to assess the costs of implementation of the main regional and national measures proposed and associated socioeconomic benefits. The Secretariat informed members of the Working Group that they will be approached for specific data and information pertaining to this task with the aim of presenting the findings of this assessment during the 2nd Working Group Meeting.

Agenda item 6: Conclusions and Recommendations

39. The Meeting participants reviewed, amended and adopted the draft conclusions and recommendations resulting from the Meeting discussions with the Rapporteur and appended to this Meeting Report.

Agenda item 7: Closure of the Meeting

40. The Chair closed the Meeting at 17:30 on Thursday 10 December 2020.

Annex I
List of Participants

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Annex II
Agenda of the Meeting

Agenda of the Meeting

- Agenda item 1:** Opening of the Meeting
- Agenda item 2:** Adoption of the Provisional Agenda and Organization of Work
- Agenda item 3:** Review of draft Regional Plan on Municipal Wastewater Treatment
- Agenda item 4:** Review of draft Regional Plan on Sewage Sludge Management
- Agenda item 5:** Any other Business
- Agenda item 6:** Conclusions and Recommendations
- Agenda item 7:** Closure of the Meeting

Annex III
Conclusions and Recommendations

Conclusions and Recommendations

On 9 and 10 December 2020, the First Meeting of the Working Group of Experts on Upgrading the Regional Plan on Urban Wastewater Treatment and developing a new Regional Plan on Sewage Sludge Management was held by videoconference. The meeting was organized by UNEP/MAP Secretariat (MED POL Programme).

Further to its deliberations, the following conclusions were reached by the Meeting:

1. The Meeting reviewed and approved the draft Regional Plan on Urban Wastewater Treatment revised and contained in Annex I. The Meeting concurred with the proposed articles and related measures, while incorporating a number of technical modifications and amendments.
2. The meeting agreed to provide written inputs preferably before the end of the meeting on the content of the proposed appendices and continue on-line consultations after the meeting.

(APPENDIX I.A: Minimum quality requirements for discharge of effluents from urban wastewater treatment plants to the environment; APPENDIX I.B: Minimum quality standard classes for reuse of treated wastewater for agriculture irrigation or aquifer recharge; APPENDIX I.C: Quality requirements for discharge of industrial wastewater into collecting systems and urban wastewater treatment plants; APPENDIX II: Recommended nature-based solutions for small agglomerations; APPENDIX III: Industrial sectors for which emission limit values must be set prior to discharge into collection systems and urban WWTPs; APPENDIX IV: Recommended BAT and BEP for pollution prevention, reduction and control in urban wastewater treatment plants; APPENDIX V.A: Monitoring control procedures for discharges from urban wastewater treatment plants; APPENDIX V.B: Monitoring programmes of treated wastewater further to water class for reuse in agriculture or aquifer recharge; APPENDIX V.C: Monitoring program of discharged industrial effluents to collecting systems).

3. The Meeting reviewed and approved the draft Regional Plan on Sewage Sludge Management (UNEP/MED WG.484/4). The Meeting concurred with the proposed articles and related measures, while incorporating a number of technical modifications and amendments. The updated version of the working document UNEP/MED WG.484/4 encompassing proposed changes in “track change mode” is included in the Annex II to this report.
4. The Meeting requested the Secretariat to continue online coordination between members of the working group with the aim to reaching consensus on the following issues prior to the Second Meeting of the Working Group in May 2021:
 - a) Proposed deadlines for implementation of measures included in square brackets in the Regional Plan;
 - b) Scope and contents of the Appendices at the drafting stage (APPENDIX I: Selected treatment methods of sewage sludge; APPENDIX II: Assessment of presence of microplastics, pharmaceuticals and personal care products in sewage sludge and methods for reduction at the source; APPENDIX III: Technical guidelines for treated sewage sludge (biosolids) use in agriculture and land reclamation; APPENDIX IV: Technical guidelines for sewage sludge use in waste to energy plants (sewage sludge incineration); APPENDIX V: Guidelines for routine monitoring of treated sewage sludge (biosolids));

- c) Review of completed annexes; and
- d) Technical details of the subject matter addressed in the Regional Plan including tabulated Emission Limit Values and related technical data and information.

Annex III
Appendix 1
Regional Plan for Urban Wastewater Treatment

Regional Plan for Urban Wastewater Treatment

ARTICLE I Definition of Terms

For the purpose of this Regional Plan for Urban Wastewater Treatment; hereinafter referred to as the "Regional Plan":

- a) "Agglomeration" means an area where the population and/or economic activities are sufficiently concentrated for urban wastewater to be collected and conducted to an urban wastewater treatment plant or to a final discharge point;
- b) "Appropriate treatment" means treatment of urban wastewater by any process and/or disposal system which after discharge allows the receiving waters to meet the relevant quality objectives;
- c) "Aquifer" is an underground rock formation or sedimentary deposit porous enough to hold water that can be used to supply wells;
- d) "Aquifer recharge" is the process of water infiltration by rainfall or other surface water into the ground. Groundwater recharge or deep percolation is a hydrologic process, whereby water moves downward from surface water to groundwater;
- e) "Best Available Techniques (BAT)" means the latest stage of development (state of the art) of processes of facilities, or of methods of operation which indicate the practical suitability of a particular measure for limiting discharges, emissions and waste as stipulated in LBS Protocol Annex IV;
- f) "Best Environmental Practice (BEP)" means the application of the most appropriate combination of environmental control measures and strategies as stipulated in LBS Protocol Annex IV;
- g) "Biochemical Oxygen Demand (BOD5)" Amount of oxygen needed for the biochemical oxidation of the organic matter to carbon dioxide in 5 days;
- h) "COD" Chemical Oxygen Demand is defined as the amount of oxygen equivalents consumed in the chemical oxidation of organic matter by strong oxidant;
- i) "Collecting system" means a system of conduits which collects and conducts urban wastewater;
- j) "Contaminants of Emerging Concern (CEC)" include several types of chemicals: persistent organic pollutants (POPs), pharmaceuticals and personal care products (PPCPs), including a wide suite of human prescribed drugs, veterinary medicines such as antimicrobials, antibiotics, anti-fungal, growth promoters and hormones; endocrine-disrupting chemicals (EDCs); including synthetic estrogens and androgens, nanomaterials such as carbon nanotubes or nano-scale particulate titanium dioxide, of which little is known about either their environmental fate or effects;
- k) "Domestic wastewater" means wastewater from residential settlements and services which originates predominantly from the human metabolism and from household activities;
- l) "Emission Limit Values (ELVs)" means the maximum allowable concentration measured as a "composite" sample, of a pollutant in an effluent discharged to the environment;
- m) "Industrial wastewater" means any wastewater which is discharged from premises used for carrying on any trade or industry, other than domestic wastewater and run-off rainwater ;
- n) "Land-Based Sources Protocol (LBS) "refers to the amended version of 1996 of the LBS Protocol;

- o) "Managed aquifer recharge (MAR)" is defined as the intentional recharge of water to aquifers for subsequent recovery or environmental benefit;
- p) "One (1) population equivalent (p.e.)" means the organic biodegradable load having a five-day biochemical oxygen demand (BOD5) of 60 grams of oxygen per day. For the purpose of this regional plan, the load expressed in p.e. shall be calculated on the basis of the maximum average weekly load entering the treatment plant during the year, excluding unusual situations such as those due to heavy rain;
- q) "Primary treatment" means treatment of urban wastewater by a physical and/or chemical process involving settlement of suspended solids, or other processes in which the BOD5 of the incoming wastewater is reduced by at least 20 percent before discharge and the total suspended solids of the incoming wastewater are reduced by at least 50 percent;
- r) "Reclaimed water" urban wastewater that has been treated to meet specific water quality criteria with the intent of being used for a range of beneficial purposes. Synonymous with recycled or reused water;
- s) "Secondary treatment" means treatment of urban wastewater by a process generally involving biological treatment with a secondary settlement or other process so that the treatment results in a minimum reduction of the initial load of 70 to 90 percent of BOD5;
- t) "Secretariat" means the body referred to in Article 17 of the Barcelona Convention, as amended in 1995;
- u) ["Tertiary treatment" means treatment of urban wastewater by process generally involving of physical, chemical, biological and other procedures so that the treatment results in reduction of nutrient salts by 80 percent and the initial load of more than 90 percent of BOD5];
- v) "Urban wastewater" means wastewater of the mixture of domestic wastewater with industrial wastewater and/or run-off rainwater (91/271/EEC);
- w) "WEFE" means Water – Energy – Food – Ecosystem Nexus;
- x) "Wastewater Treatment Plant (WWTP)" means systems used to treat urban wastewater using physical, chemical and/or biological techniques.

ARTICLE II

Scope and Objective

1. The area to which the Regional Plan applies is the area defined in accordance with Article 3 of the LBS Protocol, consisting of the Mediterranean Sea Area as defined in Article 1 of the Convention; the hydrologic basin of the Mediterranean Sea Area; waters on the landward side of the baselines from which the breadth of the territorial sea is measured and extending, in the case of watercourses, up to the freshwater limit; brackish waters, coastal salt waters including marshes and coastal lagoons; and ground waters communicating with the Mediterranean Sea.
2. The Regional Plan shall apply to the collection, treatment, reuse and discharge of urban wastewaters and the pre-treatment and discharge of industrial wastewater from certain industrial sectors.
3. The objective of the Regional Plan on Urban Wastewater Treatment is to protect the coastal and marine environment and human health from the adverse effects of the above mentioned wastewater direct and or indirect discharges, in particular regarding adverse effects on the oxygen content of the coastal and marine environment and eutrophication phenomena as well as promote resource water and energy efficiency.

ARTICLE III

Preservation of Rights

4. The provisions of this Regional Plan shall be without prejudice to stricter provisions respecting the management of urban wastewater treatment plants contained in other existing or future national, regional or international instruments or programs.

ARTICLE IV

Guiding Principles

5. The Regional Plan measures are formulated to ensure the application of the following principles:
 - i. Effective reuse and reclamation of treated wastewater is promoted as a means for water resource conservation and efficiency to effectively address regional water scarcity;
 - ii. Wastewater collection and treatment systems incorporate aspects related to climate change impacts in the design and operation phases, including extreme hydrological patterns and their impact on influent wastewater flow;
 - iii. Wastewater treatment processes promote energy efficiency and water savings, and integrate renewable energy alternatives to the extent possible in accordance with BAT and BEP;
 - iv. Industrial wastewater entering collection systems and WWTPs are subject to pre-treatment in order to (a) protect the collection systems and the treatment plant; (b) ensure that the operation of the WWTP and the treatment of the sludge are not impeded; and (c) ensure that discharge effluents do not adversely affect the Mediterranean marine environment, particularly for priority substances, contaminants of emerging concern which are harmful to the receiving waters and cannot be treated in urban WWTPs;
 - v. WEFE nexus is incorporated into the design phase of WWTPs with the aim to promote energy efficiency, reuse of treated wastewater in agriculture, and recharge of groundwater aquifers with treated wastewater;
 - vi. Selection of treatment technologies takes into consideration investment and operational costs of the treatment technology and the ability to pay by beneficiaries in order to ensure sustainable and reliable quality-treated wastewater.

ARTICLE V

Measures

I. Collection and treatment of urban wastewater

6. The Parties shall ensure that all agglomerations are provided with collecting systems for urban wastewater as follows:
 - i. **[at the latest by 2025]**² for those with a population equivalent (p.e.) of more than 15,000, and
 - ii. **[at the latest by 2035]**³ for those with a population equivalent (p.e.) between 2000 and 15,000.

² EU Urban Wastewater Treatment Directive by 1998

³ EU Urban Wastewater Treatment Directive by 2005

7. The Parties shall set quality standards with the aim of meeting emission limit values for discharge of treated effluents from WWTPs upon implementation of necessary measures. The following minimum quality requirements included in Appendix I shall be set [**at the latest by 2023**]:⁴
 - i. Minimum quality requirements for discharge of effluents from urban wastewater treatment plants to the environment (Appendix I.A).
 - ii. Minimum quality standard classes for reuse of treated wastewater for agriculture irrigation or aquifer recharge (Appendix I.B).
 - iii. The quality requirements for discharge of industrial wastewater into collecting systems and urban wastewater treatment plants (Appendix I.C).

The Parties approve as appropriate stricter quality standards than those provided in Appendix I.C taking into account the characteristics of receiving/recipient environment.
8. The Parties shall ensure that prior to its discharge, treated wastewater from urban WWTPs meets the following minimum performance reduction targets [**by 2035 at the latest**]:
 - i. All discharges from agglomerations attributed to a population size of more than 15,000 p.e. are subject to tertiary treatment.
 - ii. All discharges from agglomerations attributed to a population size between 2,000 and 15,000 p.e. are subject to secondary treatment.
9. The Parties shall promote to the extent possible nature-based solutions for small agglomerations of less than 2000 p.e. with a focus on constructed wetlands where applicable, based on the elements as provided for in Appendix II.
10. The Parties shall ensure that urban wastewater treatment plants, built to comply with the requirements of Articles 7 and 8, are designed, constructed, operated and maintained to ensure sufficient performance under normal local climatic conditions.
11. The Parties shall ensure that WWTPs are designed to account for:
 - i. Seasonal variations of loads including from touristic activities;
 - ii. Volume and characteristics of the local municipal wastewater; and
 - iii. Limitation of pollution of receiving water (taking into consideration, inter alia, Contaminants of Emerging Concern).
12. The Parties shall implement measures for:
 - i. Segregating collection systems for storm water and municipal wastewater, if technically and economically feasible;
 - ii. Preventing or if not possible minimizing sewage and WWTP overflow due to rainwater penetration and flooding;
 - iii. Addressing impacts of points of discharge of treated wastewater so as to minimize effects on receiving waters;
 - iv. Adopting tools for conservation of surface water runoff in built environment;
 - v. Reducing pollutant loads and litter in storm water runoff from municipal and industrial sources.⁵

II. Reuse and reclamation of wastewater

⁴ There is agreement with this article 7 pending review and final agreement on contents of the annexes (I.A, I.B, I.C)

⁵ Contracting Parties agreed that storm water management will be addressed in a separate Regional Plan

13. The Parties shall promote the reuse of treated wastewater. To this aim, the Parties shall implement water reuse systems that may include the following:
- i. Treatment technologies and additional treatments needed to ensure that reclaimed water meets the minimum quality standards classes for water reuse as provided for in Appendix I.B;
 - ii. Storage and distribution systems of treated effluents;
 - iii. Reuse for agriculture;
 - iv. Recharge methods in case of managed aquifer recharge.

III. Industrial wastewater discharge

14. **[By 2023 at the latest,]**⁶ the Parties shall ensure that the competent authority or appropriate body sets emission limit values appropriate to the nature of industry discharging industrial effluents to collection systems connected to urban WWTPs, as provided for in Appendix III.
15. **[By 2035 at the latest,]**⁷ the Parties shall ensure that industrial wastewater discharged into collecting systems and urban WWTPs shall meet emission limit values set in Appendix I.C.
16. **[By 2035 at the latest,]**⁸ the Parties shall ensure that industrial wastewater discharged to the environment shall meet emission limit values achieved through implementation of pretreatment according to BAT and BEP with respect to conditions specified in prior regulations and/or specific authorization by the competent authority or appropriate body.⁹

IV. Monitoring

17. The Parties shall take measures to ensure monitoring of:
- i. Discharges from urban wastewater treatment plants to verify compliance with the requirements in accordance with the monitoring control procedures laid down in Appendix V.A.
 - ii. Receiving waters subject to discharges from urban wastewater treatment plants.
 - iii. Quality of reclaimed wastewater discharged from treatment plants for beneficial use in line with the main elements of monitoring programmes provided for in Appendix V.B
 - iv. Discharged industrial effluents to collection systems including substances harmful to receiving waters, sewerage networks and urban wastewater treatment plants in accordance with the appropriate monitoring programmes set forth in Appendix V.C.

ARTICLE VI

Technical Assistance, Transfer of Technology and Capacity Building

18. For the purpose of facilitating the effective implementation of the measures and monitoring obligations under Article V of this Regional Plan, the Parties are urged to consider the techniques provided for in Appendix IV of this Plan and to exchange and share best practices directly or with the support of the Secretariat including BAT, BEP, sustainable consumption and production,

⁶ EU Urban Wastewater Treatment Directive by 1993

⁷ Consistency check will be undertaken by the Secretariat to ensure that both deadlines in Para 15 and Para 7.iii are consistent and correlate with each other.

⁸ EU Urban Wastewater Treatment Directive by 2000

⁹ Israel proposes to move the deadline of paragraphs 15 and 16 from 2035 back to 2025

circular economy, resource efficiency, WEFE Nexus in the design, construction, operation and maintenance of the urban wastewater treatment plants.

ARTICLE VII
Timetable for Implementation

19. The Parties shall implement the measures included in this Regional Plan in line with recommendations of Appendices I to V, as per the timelines associated with these measures.

ARTICLE VIII
Reporting

20. The Parties shall report on implementation of measures stipulated in this Regional Plan in line with the reporting requirement and timelines provided in Article 26 of the Convention and Article 13, paragraph 2(d) of the LBS Protocol.

ARTICLE IX
Entry into Force

21. The present Regional Plan shall enter into force and become binding on the 180th day following the day of notification by the Secretariat in accordance with Article 15, paragraphs 3 and 4, of the LBS Protocol.

[APPENDIX I.A**Minimum quality requirements for discharge of effluents from urban wastewater treatment plants to the environment**

The Countries shall define quality standards to meet emission limit values for discharge of treated effluents from urban WWTPs to the environment.

Table 1: Emission limit values for discharge of effluent to the environment are the following:

Element	Unit	Limit values	Reference ¹⁰
Total phosphorus	%	Minimum percentage of reduction of overall load entering WWTP is at least 75%	Directive 91/271/EEC concerning urban waste-water treatment
Total nitrogen	%		
Arsenic (As)	mg/L	0.05-0.01 0.5	IED Directive Public Health Regulations, Israel
Cadmium (Cd)	mg/L	0.025	Public Health Regulations, Israel
Chlorine residual	mg/L	0.1	Public Health Regulations, Israel
Chromium (Cr)	mg/L	0.25	Public Health Regulations, Israel
COD	mg/L	100	Waste Water Ordinance
Copper (Cu)	mg/L	0.1	Public Health Regulations, Israel
Cyanide	mg/L	0.01	Public Health Regulations, Israel Waste Water Ordinance
Lead (Pb)	mg/L	0.04	Public Health Regulations, Israel
Mercury (Hg)	mg/L	0.0025	Public Health Regulations, Israel
Mineral Oil	mg/L	1.5	Public Health Regulations, Israel
Nickel	mg/L	0.25	Public Health Regulations, Israel
pH	pH units	7-8.5	
Phenol	mg/L	0.025 0.15	Public Health Regulations, Israel Waste Water Ordinance
Total Nitrogen	mg/L	40 15	Waste Water Ordinance Public Health Regulations, Israel
Total phosphorous	mg/L	2	Waste Water Ordinance Public Health Regulations, Israel
Total Suspended Solids (TSS)	mg/L	15 30	Public Health Regulations, Israel Waste Water Ordinance
Zinc	mg/L	1	Public Health Regulations, Israel
Total Hydrocarbons	g/L	2 – 10	Waste Water Ordinance

The “Quality Requirements” for the discharge of effluents from urban wastewater treatment plants to the environment shall address the following:

- Determination of the reduction target for Contaminants of Emerging Concern (CEC); performance of inventory, identification of the causes of pollution, and treatment at source in the most economically and environmentally effective manner.
- Setting thresholds for toxicity of effluent streams discharged to the environment to prevent toxicity to aquatic organisms
- Determination of the minimum percentage of biodegradability of the effluent streams (at least 80%) to achieve minimum accumulation in the ecosystem and losses of habitats and biodiversity; and

¹⁰ Reference column of all tables in this annex will be removed from the final text. They are only provided to provide information on the source of values proposed in these tables

- Identification of potential microplastic sources and adoption of related policy and methodology further to state of the art on related research on this topic.

APPENDIX I.B

Minimum quality standard classes for reuse of treated wastewater for agriculture irrigation or aquifer recharge

a. Classes definitions for reclaimed water for reuse in agriculture irrigation¹¹

Class A – **All food crops**, including crops eaten raw when reclaimed water comes into direct contact with edible parts of the crop, and irrigation of root crops.

Class B - Processed food crops: crops which are intended for human consumption not to be eaten raw but after a treatment process and **Non-food crops**: crops which are not intended for human consumption.

Table 2: Reclaimed water quality criteria for agricultural irrigation according to class definition¹²

Parameter	Limit values for reclaimed water quality class for effluent reuse in agricultural irrigation *	
	Class A	Class B
BOD5	≤10 mg/L	25 mg/L or reduction of the influent load of 70% to 90%.
COD	100 mg/L	125 mg/L
E. Coli	≤10 cfu/100 ml	≤100 cfu/100 ml
Fecal Coli	≤10 cfu/100ml or below detection limit	≤100 cfu/100ml
Intestinal nematodes (helminth eggs)	≤1 egg/l	≤1 egg/l
Legionella spp.	≤1,000 cfu/l	≤1,000 cfu/l
Total Suspended Solids (TSS)	≤10 mg/L	35 mg/L or reduction of influent load of 90%.
Turbidity	≤5 NTU	None

* The provisions presented should only be adopted taking into account local conditions, and provided that total loads do not affect the receiving environment

Table 3: Reclaimed water quality criteria for agricultural irrigation

Element	Reclaimed water quality - Limit values [mg/l]	Reference ¹³
Total Nitrogen	25	Public Health Regulations, Israel
Total phosphorous	5	Waste Water Ordinance

¹¹ Minimum quality requirements for water reuse in agricultural irrigation and aquifer recharge https://publications.jrc.ec.europa.eu/repository/bitstream/JRC109291/jrc109291_online_08022018.pdf

¹² Source of information:

1. Council Directive 91/271/eec of 21 may 1991 concerning urban waste-water treatment
2. REGULATION (EU) 2020/741 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 May 2020 on minimum requirements for water reuse
3. Minimum quality requirements for water reuse in agricultural irrigation and aquifer recharge, 2017.

With one exception :COD - [Italian regulations DM 185/2003](#).

¹³ Reference column will be removed further to approval of values in this table

Element	Reclaimed water quality - Limit values [mg/l]	Reference ¹³
Sodium - Na	150	Waste Water Ordinance
Chlorides - Cl	250	IED Directive
Boron - B	0.5	Spanish regulations for water reuse
Heavy Metals		
Cadmium - Cd	0.01	Minimum quality requirements for water reuse in agricultural irrigation and aquifer recharge
Chromium - Cr	0.1	IED Directive
Copper - Cu	0.2	Spanish regulations for water reuse
Mercury - Hg	0.002	Public Health Regulations, Israel
Nickel - Ni	0.2	Italian regulations DM 185/2003
Lead - Pb	0.1	Public Health Regulations, Israel
Zinc - Zn	0.5	Public Health Regulations, Israel
pH	6.5-8.5	

Table 4: Reclaimed water quality criteria for *additional Heavy Metals content*

Element	Reclaimed water quality - Limit values [mg/l]	Reference ¹⁴
Aluminium - Al	5 1	Public Health Regulations, Israel & Italian regulations DM 185/2003
Arsenic - As	0.1	Spanish regulations for water reuse & Public Health Regulations, Israel
Beryllium - Be	0.1	Spanish regulations for water reuse & Italian regulations DM 185/2003 & Public Health Regulations, Israel
Cobalt - Co	0.05	Spanish regulations for water reuse & Italian regulations DM 185/2003 & Public Health Regulations, Israel
Iron - Fe	2	Italian regulations DM 185/2003 & Public Health Regulations, Israel
Lithium - Li	2.5	Public Health Regulations, Israel
Manganese - Mn	0.2	Spanish regulations for water reuse & Italian regulations DM 185/2003 & Public Health Regulations, Israel
Molibdenum - Mo	0.01	Spanish regulations for water reuse & Public Health Regulations, Israel
Selenium - Se	0.02	Spanish regulations for water reuse & Public Health Regulations, Israel
Vanadium - V	0.1	Spanish regulations for water reuse & Italian regulations DM 185/2003 & Public Health Regulations, Israel

¹⁴ Reference column will be removed further to approval of values in this table

Table 5: Class of reclaimed water, associated agricultural use and irrigation method considered

Crop	Reclaimed water quality class	Irrigation method
All food crops including root crops consumed raw	Class A	All irrigation methods allowed
Processed food crops	Class B	Drip irrigation only
Non-food crops including crops to feed milk/meat producing animals	Class A	All irrigation methods allowed
	Class B	Drip irrigation only
Industrial, energy and seed crops	Class B	All irrigation methods are allowed

b. Recommends minimum requirements of reclaimed water for aquifer recharge

Managed aquifer recharge (MAR) is defined as the intentional recharge of water to aquifers for subsequent recovery or environmental benefit. The purposes for undertaking managed aquifer recharge are as follows:

- Establish saltwater intrusion barriers in coastal aquifers.
- Provide storage for the recharged water for subsequent retrieval and reuse.
- Maintain groundwater dependent terrestrial and aquatic ecosystems.
- Dilute saline or polluted aquifers.
- Control or prevent ground subsidence.

Recharge methods:¹⁵

1. **Surface spreading** – a method of recharge whereby the water moves from the land surface to the aquifer by infiltration and percolation through the vadose zone. When used as a recharge method, adverse effects to the soil and related dependent ecosystems should be avoided.
2. **Direct injection** – a method of directly pumping/ injecting water into the groundwater zone. Direct discharges of pollutants into groundwater is not allowed.

Health and environmental risk assessment:

Health and environmental risk assessment is needed to define minimum quality requirements. The assessment will address appropriate health protection; provision of public confidence in reuse practices; avoiding adverse effects on groundwater, soils and related dependent ecosystems. The overall levels of health protection should be comparable for different water-related exposures (i.e. drinking water, and reclaimed water for irrigation of food crops).

¹⁵ https://publications.jrc.ec.europa.eu/repository/bitstream/JRC109291/jrc109291_online_08022018.pdf

APPENDIX I.C

**Quality requirements for discharge of industrial wastewater into collecting systems
and urban wastewater treatment plants**

Industrial wastewater¹⁶ entering collection systems and urban WWTPs shall be subject to pre-treatment as required in order to:

- Protect the health of staff working in collecting systems and treatment plants.
- Ensure that collecting systems, WWTP and associated equipment are not damaged.
- Ensure that the operation of the WWTP and the treatment of sludge are not impeded.
- Ensure that discharges from the treatment plants do not adversely affect the environment or prevent receiving water from complying with other regulatory requirements.
- Ensure that sludge can be disposed of safely in an environmentally acceptable manner.

Table 6: Quality requirements for industrial wastewater at the point of discharge to the collection system and urban WWTPs

No.	Industrial Activity	Contaminants for monitoring
1	Wastewater containing mineral oil*	pH, TSS, VSS, Mineral Oil, Total Oil & Grease, Heavy Metals, Total Hydrocarbons, Polyphenols, Phenols
2	Domestic and communal wastewater (function halls, restaurants, shopping malls, Hotels etc.);	BOD, COD, pH, TSS, Total Oil & Grease, Cl, Na, Boron, Detergents***
3	Food Sector - Animal and vegetable products**	COD, pH, TSS, Total Oil & Grease, Heavy Metals, Cl, Na, Total N, Total P, Polyphenols, Phenols
4	Food Sector - Meat industry & Fish processing	BOD, COD, pH, TSS, Total Oil & Grease, Cl, Na, Total N, Total P, Polyphenols, Phenols
5	Textile sector - manufacturing and finishing	BOD, COD, pH, VSS, TSS, Cl, DOX, Heavy Metals, Toxicity to fish eggs (Tegg), Total Hydrocarbons, Detergents***
6	Metals production and processing	COD, pH, VSS, TSS, Mineral Oil, Heavy Metals, Cl, DOX, Cyanides, Total Hydrocarbons, Volatile halogenated hydrocarbons, Toxicity to fish eggs (Tegg)
7	Laundry Facilities	COD, pH, VSS, TSS, Cl, Na, Boron, Total Hydrocarbons, Detergents***
8	Gas stations	COD, pH, Mineral Oil, BTEX, MTBE
9	Agriculture: chicken farms, pig farms, fish farms, etc.	COD, pH, TSS, Cl, Na, Total N, Total N, Boron
10	Leather production, fur processing, leather fibreboard manufacturing	COD, VSS, TSS, Heavy Metals, Volatile halogenated hydrocarbons, Polyphenols, Phenols, Toxicity to fish eggs (Tegg)
11	Waste and wastewater management	BOD, COD, pH, VSS, TSS, Mineral Oil, Total oil & Grease, Heavy Metals, Total N, Total P, Cl, BOD, Total Hydrocarbons, Toxicity to fish eggs (Tegg)
12	Production of printing blocks, publications and graphic-arts products	pH, VSS, TSS, Heavy Metals, Cl, Toxicity to fish eggs (Tegg)

¹⁶ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31991L0271&from=EN>

No.	Industrial Activity	Contaminants for monitoring
13	Chemical industry: chemicals, pharmaceuticals, fertilizers, pesticides, detergents, solvents, petrochemicals, Cosmetic, plastic etc.	BOD, COD, pH, VSS, TSS, Mineral Oil, Heavy Metals, Cl, DOX, Total N, Total P, Benzene, Phenols, Volatile halogenated hydrocarbons, Boron, Toxicity to fish eggs (Tegg)
14	Hospitals	BOD, COD, pH, VSS, TSS, Heavy Metals, Cl, Detergent***

* Wastewater containing mineral oil - facilities in which wastewater containing mineral oil is produced regularly in degreasing, cleaning, maintenance, repair and recycling disassembly of vehicles and vehicle parts.

** Food Sector - Animal and vegetable products - Milk processing, Production of fruit and vegetable products, Production of soft drinks and bottling of drinks etc.

*** Detergents - Surfactants in detergents shall be considered as biodegradable if the level of biodegradability (mineralisation) measured is at least 60% within twenty-eight days.¹⁷

Additional requirements:

- Determine reduction targets for industries using the following substances or their compounds: Hexachlorocyclohexane, DDT, Dicofol, Pentachlorophenol, endosulphane, aldrin, dieldrin, endrin, isodrin, Tetrachloromethane, Hexachlorobenzene, Hexachlorobutadiene, Trichloromethane, Trichloroethane, Tetrachloroethylene, 1,2 dichloroethane, Trichlorobenzene
- Set requirements and reduction targets for industries in which the plants or operating units use Contaminants of Emerging Concern (CEC);
- Set thresholds for toxicity of effluent streams discharging to collection system and urban WWTPs;
- Determine minimum percentage of biodegradability of the effluent streams (at least 80%);
- Identify potential sources of microplastics; monitor the contents of the microplastic in the effluent streams; and adopt appropriate reduction targets.

Table 7: Emission limit values (ELV) for industries to discharge their effluents to collection systems and urban WWTPs

Element	Unit	Limit values for effluent discharge to collection systems	Reference ¹⁸
Aluminium - Al	mg/L	25	Discharge of Industrial Sewage into the Sewage System, Israel
BOD5	mg/L	COD concentration not to exceed four times BOD concentration	Discharge of Industrial Sewage into the Sewage System, Israel
Fluoride – F	mg/L	6	Discharge of Industrial Sewage into the Sewage System, Israel
Sodium - Na	mg/L	230	Discharge of Industrial Sewage into the Sewage System, Israel
Phenols	mg/L	3	Discharge of Industrial Sewage into the Sewage System, Israel
Total O&G	mg/L	250	Discharge of Industrial Sewage into the Sewage System, Israel
Arsenic - As	mg/L	0.1	Wastewater Ordinance
Benzene	mg/L	0.05	Wastewater Ordinance
Beryllium - Be	mg/L	0.5	Discharge of Industrial Sewage into the Sewage System, Israel
Cadmium - Cd	mg/L	0.1	Wastewater Ordinance

¹⁷ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32004R0648&from=EN>

¹⁸ Reference column will be removed further to approval of values in this table

Element	Unit	Limit values for effluent discharge to collection systems	Reference ¹⁸
			& Discharge of Industrial Sewage into the Sewage System, Israel
Chloride - Cl	mg/L	430	Discharge of Industrial Sewage into the Sewage System, Israel
Chlorine	mg/L	0.5	Wastewater Ordinance & Discharge of Industrial Sewage into the Sewage System, Israel
Chromium - Cr	mg/L	0.5	Wastewater Ordinance & Discharge of Industrial Sewage into the Sewage System, Israel
Cobalt - Co	mg/L	1	Wastewater Ordinance & Discharge of Industrial Sewage into the Sewage System, Israel
COD	mg/L	2000	Discharge of Industrial Sewage into the Sewage System, Israel
Copper - Cu	mg/L	0.5 1	Wastewater Ordinance & Discharge of Industrial Sewage into the Sewage System, Israel
Cyanide	mg/L	0.2 0.5	Wastewater Ordinance & Discharge of Industrial Sewage into the Sewage System, Israel
AOX	mg/L	1	Wastewater Ordinance & Discharge of Industrial Sewage into the Sewage System, Israel
Lead - Pb	mg/L	0.5	Wastewater Ordinance & Discharge of Industrial Sewage into the Sewage System, Israel
Lithium - Li	mg/L	0.3	Wastewater Ordinance & Discharge of Industrial Sewage into the Sewage System, Israel
Manganese - Mn	mg/L	1	Discharge of Industrial Sewage into the Sewage System, Israel
Mercury - Hg	mg/L	0.05	Wastewater Ordinance & Discharge of Industrial Sewage into the Sewage System, Israel
Mineral Oil	mg/L	20	Discharge of Industrial Sewage into the Sewage System, Israel
Molybdenum - Mo	mg/L	0.15	Discharge of Industrial Sewage into the Sewage System, Israel
Nickel - Ni	mg/L	0.5	Wastewater Ordinance & Discharge of Industrial Sewage into the Sewage System, Israel
Total phosphorous - (TP)	mg/L	30	Discharge of Industrial Sewage into the Sewage System, Israel
pH	units	6.0-10.0	
Polyphenols	mg/L	100	Discharge of Industrial Sewage into the Sewage System, Israel
Selenium - Se	mg/L	0.05	Discharge of Industrial Sewage into the Sewage System, Israel
Total Dissolved Solids (TDS)	mg/L	3,500	Discharge of Industrial Sewage into the Sewage System, Israel

Element	Unit	Limit values for effluent discharge to collection systems	Reference ¹⁸
Temp - C°	°	40° Celsius	
Tin - Sn	mg/L	2	Wastewater Ordinance & Discharge of Industrial Sewage into the Sewage System, Israel
Total Nitrogen - (TN)*	mg/L	15-30	IED Directive & Directive 91/271/EEC concerning urban waste-water treatment
Total Hydrocarbons	mg/L	20	Wastewater Ordinance
Toxicity to fish eggs (Tegg)		2	Wastewater Ordinance
Total Suspended Solids (TSS)	mg/L	1000	Discharge of Industrial Sewage into the Sewage System, Israel
Vanadium - V	mg/L	0.5	Discharge of Industrial Sewage into the Sewage System, Israel
Volatile halogenated hydrocarbons (VHHC)	mg/L	0.1**	Wastewater Ordinance
Zinc - Zn	mg/L	3	Discharge of Industrial Sewage into the Sewage System, Israel

* Total nitrogen as the sum of ammonia nitrogen, nitrite nitrogen and nitrate nitrogen

** Volatile halogenated hydrocarbons - sum of trichloroethene, tetrachloroethene, 1,1,1-trichloroethane, dichloromethane - calculated as chlorine

APPENDIX II

Recommended nature-based solutions for small agglomerations

Proposed outline

- Nature-based solutions (NBS)
 - o Definition and goals
- Review of available technologies:
 - o NBS technologies used to treat municipal wastewater (infiltration basin, constructed wetland, rain garden, etc.)
 - o Wastewater characteristics suitable for each type of technology (quantity and quality),
 - o Local environmental conditions fit for each technology (climate, precipitation patterns, etc.)
 - o Summary
 - Advantages and disadvantages of reviewed technologies.

APPENDIX III
**Industrial sectors for which emission limit values must be set prior to discharge
 into collection systems and urban WWTPs**

Table 8: List of industrial sectors requiring prior regulations and/or specific authorization

Industrial Sector	
Food Sector	Milk-processing; Manufacture of fruit and vegetable products; Manufacture and bottling of soft drinks; Potato-processing; Meat industry; Breweries; Production of alcohol and alcoholic beverages; Manufacture of animal feed from plant products, Manufacture of gelatin and of glue from hides, skin and bones; Malt-houses; Fish-processing industry
Textile sector	Textile manufacturing and finishing; dry cleaning
Metals production and processing	Metal production, finishing and processing
Agriculture	Chicken farms, pig farms, fish farms, etc.
Leather production, fur processing, leather fibreboard manufacturing	Processing of animal slaughter by-products and residue from leather manufacturing into leather glue, bone glue, gelatine or naturin (sausage casing)
Waste and wastewater management	Waste and wastewater management and Storage of waste above ground
Production of printing blocks, publications and graphic-arts products	Photographic processes; Production of printing blocks; publications and graphic-arts products
Chemical Sector	Chemicals, Pharmaceuticals, fertilizers, Pesticides, Detergents, Solvents, Petrochemicals, Cosmetic, Plastic etc.

APPENDIX IV
**Recommended BAT and BEP for pollution prevention, reduction and control
in urban wastewater treatment plants**

Proposed outline

- This Appendix will address the definition of criteria for application of BAT and BEP in WWTPs addressing the following points:
 - o An overview of best available wastewater treatment technologies (BAT) and best available environmental practices (BEP) for use of wastewater which are most appropriate in the context of the Mediterranean region
 - o Energy performance
 - o Water performance
 - o Wastewater treatment efficiencies.
 - o Preference for use of alternative and renewable energy

APPENDIX V.A
**Monitoring control procedures for discharges from
urban wastewater treatment plants**

Proposed outline

- Frequency of monitoring
- Methods of sampling
- Standard analytical methods
- Uniform and computed data collection
- Data analysis by the regulator and periodic inspection methods

APPENDIX V.B
**Monitoring programmes of treated wastewater further to water class
for reuse in agriculture or aquifer recharge**

Proposed outline

- Frequency of monitoring
- Methods of sampling
- Standard analytical methods
- Uniform and computed data collection
- Data analysis by the regulator and periodic inspection methods

APPENDIX V.C

Monitoring program of discharged industrial effluents to collecting systems

This Appendix will address monitoring of industrial effluents discharged to the collection system and urban WWTPs which are proposed to be undertaken in accordance with the recommended frequency specified below depending on the type of industrial sector.

Table 9: Recommended sampling frequency per year for industrial wastewater at the point of discharge to the collection systems and urban WWTP

No.	Industrial Activity	Sampling frequency per year
1	Wastewater containing mineral oil	4
2	Domestic and communal wastewater (function halls, restaurants, shopping malls, hotels etc.)	4
3	Food Sector - Animal and vegetable products	4
4	Food Sector - Meat industry & Fish processing	4
5	Textile sector - manufacturing and finishing	4
6	Metals production and processing	6
7	Laundry Facilities	4
8	Gas stations	4
9	Agriculture: chicken farms, pig farms, fish farms, etc.	4
10	Leather production, fur processing, leather fibreboard manufacturing	4
11	Waste and wastewater management	Waste – 4 Hazardous waste - 6
12	Production of printing blocks, publications and graphic-arts products	4
13	Chemical industry including chemicals, pharmaceuticals, fertilizers, pesticides, detergents, solvents, petrochemicals, Cosmetic, plastic etc.	Water consumption: - less than 5,000 m ² /year -6 - higher than 5,000 m ² /year - 12
14	Hospitals	4

This Appendix will also provide guidance related to:

- Frequency of monitoring
- Methods of sampling
- Standard analytical methods
- Uniform and computed data collection
- Data analysis by the regulator and periodic inspection methods]¹⁹

¹⁹ The corresponding open bracket is at the beginning of the annexes section on page 7

Annex III
Appendix 2
Regional Plan for Sewage Sludge Management

Regional Plan for Sewage Sludge Management

ARTICLE I Definition of Terms

[For the purpose of this Regional Plan for the Sewage Sludge Management; hereinafter referred to as the “Regional Plan”:

- (a) “Anaerobic digestion” is the biological conversion of organic matter to biogas and residual solids at temperatures between 20°C and about 40°C, typically 37°C with a mean residence time of 15 to 30 days (Mesophilic) or that takes place between 49°C and 57°C (thermophilic) (ISO 16968);²⁰
- (b) "Best Available Techniques (BAT)" means the latest stage of development (state of the art) of processes of facilities, or of methods of operation which indicate the practical suitability of a particular measure for limiting discharges, emissions and waste as stipulated in Land-Based Source (LBS) Protocol, Annex IV;
- (c) "Best Environmental Practice (BEP)" means the application of the most appropriate combination of environmental control measures and strategies as stipulated in LBS Protocol Annex IV;
- (d) “Biosolids” are organic-based materials from industrial or municipal wastewater sludge and their derived products, in the form of solids, semi–solids, semi–liquids (pasty), and liquids which have been treated to meet specific standards, guidelines or requirements including the reduction of pathogens, vector attraction and contaminant criteria (ISO 19698);
- (e) “Class ‘A’ biosolids” is the material that has met the Class A pathogen reduction requirements or equivalent treatment by a process to further reduce pathogens to: 1,000 MPN/g DM fecal coliforms, 3 MPN/4g DM Salmonella, 1 PFU/4g DM enterovirus and 1 viable/4g helminth ova. Processes for reducing pathogens include composting, heat drying, heat treatment, thermophilic aerobic digestion, beta or gamma ray irradiation and pasteurization;²¹
- (f) “Class ‘B’ biosolids’ is the material that has met the Class B pathogen reduction requirements or equivalent treatment by a process to significantly reduce pathogens to less than 2,000,000 MPN/g DM fecal coliforms. Processes include aerobic digestion, composting, anaerobic digestion, lime stabilization and air drying;
- (g) "Collecting system" means a system of conduits which collects and conducts urban wastewater;
- (h) “Composting” is the natural aerobic biological process, carried out under controlled conditions, which converts organic material into a stable humus-like product (ISO 16968);
- (i) “Domestic wastewater” also called sanitary wastewater is wastewater discharged from residences and from commercial, institutional, and similar facilities;²²

²⁰ ISO 16968.2020. Sludge recovery, recycling, treatment and disposal. Beneficial use of biosolids-land application.

²¹ EPA. 2003. Environmental Regulations and Technology. Control of Pathogens and Vector Attraction in Sewage Sludge (including domestic sewage). Under 40 CFR Part 503. EPA/625/R-92/013.

²² Tchobanoglous, G.1991.Wastewater Engineering: treatment, disposal and reuse. Metcalf & Eddy, Inc. 3rd ed./ revised by G. Tchobanoglous and F. Barton.

- (j) "Industrial wastewater" is wastewater discharge resulting from any industrial or commercial activity (ISO20670);²³
- (k) "Land-Based Sources Protocol (LBS) " refers to the amended version of 1996 of the LBS Protocol;
- (l) "Primary sludge" is sludge from primary settling tanks, typically grayish and slimy in nature, and, in most of the cases, has an extremely offensive odor. Primary sludge can be readily digested under suitable conditions of operation;³
- (m) "Primary treatment" is the physical operation including screening and sedimentation used to remove the floating and settleable solids found in wastewater;³
- (n) "Secondary sludge (activated sludge)" is the sludge particles produced in raw or settled wastewater by the growth of organisms in aeration tanks in the presence of dissolved oxygen. The term activated comes from the fact that the particles are teeming with bacteria, fungi, and protozoa. Activated sludge is different from primary sludge in that the sludge particles contain many living organisms which can feed on the incoming wastewater;²⁴
- (o) "Secondary treatment" involves biological and chemical processes used to remove most of the organic matter;³
- (p) "Secretariat" means the body referred to in article 17 of the Barcelona Convention, as amended in 1995;²⁵
- (q) "Sludge incineration (waste to energy)" is a two-step process involving drying and combustion after a preceding dewatering process, such as filters, drying beds, or centrifuges (European Environmental Agency);²⁶
- (r) "Tertiary treatment" consists of the additional combinations used to remove other constituents, such as nitrogen and phosphorus that are not reduced significantly by secondary treatment;³
- (s) "Urban wastewater" means wastewater of the mixture of domestic wastewater with industrial wastewater and/or run-off rainwater (91/271/EEC);²⁷
- (t) "Wastewater Treatment Plant (WWTP)" is the facility designed to treat wastewater by a combination of physical, chemical and biological processes, for the purpose of reducing organic and inorganic contaminants in wastewater. There are different levels of wastewater treatment, according to the desired quality of treated wastewater and the level of contamination (ISO 20670).^{5]}

ARTICLE II

Scope and Objective

1. The area to which the Regional Plan applies is the area defined in accordance with Article 3 of the LBS Protocol, consisting of the Mediterranean Sea Area as defined in Article 1 of the Convention; the hydrologic basin of the Mediterranean Sea Area; waters on the landward side of the baselines from which the breadth of the territorial sea is measured and extending, in the case

²³ ISO20670.2020. Water reuse – Vocabulary

²⁴ American Water Works Association (AWWA). Common terms in wastewater treatment.

²⁵ Decision IG.20/8.2. "Regional Plan on the reduction of BOD5 in the food sector in the framework of the implementation of Article 15 of the LBS Protocol".

²⁶ European Environmental Agency. GEMET - Environmental thesaurus.

http://www.eionet.europa.eu/gemet/aliss_scripts/concept/7738

²⁷ Council Directive 91/271/EEC of 21 May 1991 concerning urban wastewater treatment

of watercourses, up to the freshwater limit; brackish waters, coastal salt waters including marshes and coastal lagoons; and ground waters communicating with the Mediterranean Sea.

2. The Regional Plan shall apply to the treatment, disposal and use of sewage sludge from Urban Wastewater Treatment Plants.
3. The objective of the Regional Plan is to ensure effective reuse of beneficial substances and exploitation of energy potential of sewage sludge, while preventing harmful effects on human health and the environment.

ARTICLE III

Preservation of Rights

4. The provisions of this Regional Plan shall be without prejudice to stricter provisions respecting the management of sewage sludge from urban wastewater treatment plants contained in other existing or future national, regional or international instruments or programs.

ARTICLE IV

Guiding Principles

5. The Regional Plan measures are formulated to ensure the application of the following principles:
 - i. Sewage sludge is treated prior to any use and/or disposal;
 - ii. Management alternatives are prioritized for beneficial use of sewage sludge in agricultural land applications in order to minimize landfilling and adverse environmental effects;
 - iii. Since sewage sludge can have valuable agronomic properties reducing dependence on fertilizers, its application is encouraged in agriculture subject to appropriate treatment and quality standards
 - iv. Sewage sludge can be used in other applications such as forests, mine reclamation sites, and other disturbed lands, parks, and golf courses;
 - v. Use of sewage sludge does not impair the quality of the soil and of agricultural products;
 - vi. Use of sewage sludge in agriculture is regulated in such a way as to prevent harmful effects on soil, water bodies, vegetation, animals and humans;
 - vii. Sewage sludge may be used as an alternative fuel; energy production; and for incineration and co-incineration and other proven applications.

ARTICLE V

Measures

I. Treatment of sewage sludge

6. The Parties shall ensure that all necessary treatment processes are carried out in the wastewater treatment plant and outside the plant, in order to obtain biosolids of quality suitable for the specific use in:
 - i. Agricultural land application as a fertilizer or for land reclamation; and
 - ii. Energy recovery (i.e. incineration).

Treatment processes for sewage sludge stabilization, incineration, drying, thickening, phosphorus removal and storage are provided for in Appendix I.

7. The Parties shall apply appropriate treatment steps to limit pathogen contents in biosolids. The Parties shall further set classes for sludge with limit values for pathogen contents to ensure that use of sludge would not affect human health and the environment. The following limit values in Table 1 for pathogen contents and biosolids classes shall be met [**at the latest by 2023**]. More stringent provisions may be set by the Parties.

[Table 1: Limit values for pathogen content for biosolids classes ²⁸				
Class	Faecal Coliforms	Salmonella sp.	Enterovirus	Helminths ova
Class A	< 1000 MPN/g DM	< 3 MPN/4 g DM	1 PFU ²⁹ /4 g DM	1 viable/4 g DM
Class B	< 2,000,000 MPN/g DM ³⁰]			

8. The Parties shall apply appropriate treatment steps to limit concentrations of heavy metals in biosolids destined for agricultural applications. The following limit values for heavy metals set in Tables 2, 3 and 4 shall be met [**at the latest by 2023**]. More stringent provisions may be applied by the Parties.

[Table 2: Limit values for concentration of heavy metals in biosolids (mg.kg ⁻¹ DS) ³¹							
Soil pH	Cadmium	Chromium ³²	Copper	Mercury	Nickel	Lead	Zinc
pH < 7	20	1000	1000	16	300	750	2500
pH > 7	40	1500	1750	25	400	1200	4000]

[Table 3: Limit values for concentrations of heavy metals in soil to which biosolids is applied biosolids (mg.kg ⁻¹ DS) ³³							
Soil pH	Cadmium	Chromium ³⁴	Copper	Mercury	Nickel	Lead	Zinc
pH < 7	1	100	50	1	30	50	150
pH > 7	3	150	140	1.5	75	300	450]

²⁸ United States Environmental Protection Agency. 1994. A Plain English Guide to the EPA Part 503. Biosolids Rule. Office of Wastewater Management. EPA/832/R-93/003.

²⁹ PFU: Plaques Forming Unit

³⁰ The geometric mean of seven samples

³¹ Council Directive 86/278/EEC of 12 June 1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture. Available from: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31986L0278>

³² Spain. Real Decreto 1310/1990.

³³ Council Directive 86/278/EEC of 12 June 1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture. Available from: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31986L0278>

³⁴ Spain. Real Decreto 1310/1990

[Table 4: Limit values for amounts of heavy metals which may be added annually to agricultural land, based on a 10-year average biosolids (mg.kg ⁻¹ DS) ^{35, 36}						
Cadmium	Chromium	Copper	Mercury	Nickel	Lead	Zinc
0.30	6	9	0.10	3	15	30]

9. The Parties shall set maximum limit values for heavy metals in industrial wastewater effluents discharging to collecting systems and urban wastewater treatment plants in accordance with the Regional Plan for Urban Wastewater Treatment.
10. The Parties shall apply appropriate treatment steps to reduce quantities of microplastics, pharmaceuticals and personal care products (PPCP) discharged in the raw wastewater. Methods for assessment and reduction of microplastics in urban wastewater are presented in Appendix II.
11. In the event that quality limits set in Tables 1 to 4 cannot be met, the Parties shall apply alternative means to agricultural use including incineration and regulated landfilling ensuring that in both cases, there is no negative impact on the environment, particularly for water sources [**and that disposal of sewage sludge in coastal areas is prohibited**].
12. The parties shall apply appropriate treatment processes to reduce volatile organic compounds and diminish possible odor emissions in the different stages of sludge treatment, transport and application in agriculture and other suitable uses.

II. Sewage sludge use and energy/nutrient recovery

13. Depending on the class of the treated sewage sludge, the Parties shall develop the required infrastructure for use of treated sludge for agricultural land application and/or for energy/nutrient recovery [**at the latest by 2035**]. Appendix III provides guidance for treated sewage sludge (biosolids) use in agriculture and land reclamation. Appendix IV provides guidance for sewage sludge use in waste to energy plants (sewage sludge incineration).

III. Considerations for reducing impacts of climate change

14. The Parties shall reduce energy costs and increase water savings during treatment by using BAT and applying BEP including the use of alternative and renewable energy sources based on advanced technologies such as anaerobic digestion, pyrolysis/gasification, mass burning and other technologies.
15. The Parties shall implement technologies targeting energy efficient treatment of sludge such as pretreatment of sludge, solar drying, bio-drying, composting, etc.
16. The Parties shall promote implementation of adaptation measures for climate change protection including:
 - i. Taking advantage of the biosolids as an important source of nutrients and organic matter;

³⁵ Council Directive 86/278/EEC of 12 June 1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture. Available from: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31986L0278>

³⁶ Israeli Water Regulations (Use and Disposal of Sludge)-2004

- ii. Using biosolids as soil amendment³⁷ to combat desertification; improve infiltration of water (precipitation or irrigation water); ensure better drainage in high rainfall areas; and decrease surface water run-off;
- iii. Increasing on-site carbon sequestration potential.

IV. Monitoring

17. The Parties shall take measures to ensure monitoring of quality of sewage sludge in (i) the treatment plant and (ii) after treatment with the aim of determining sludge class for use in agriculture or for incineration, and accordingly, to select the appropriate monitoring programme as provided for in Appendix V.

ARTICLE VI

Technical Assistance, Transfer of Technology and Capacity Building

18. For the purpose of facilitating the effective implementation of the measures and monitoring obligations under Article V of this Regional Plan, the Parties are urged to consider the techniques provided for in this Plan and to exchange and share best practices directly or with the support of the Secretariat including BAT, BEP, sustainable consumption and production, circular economy, resource efficiency, WEFE Nexus in the design, construction, operation and maintenance of the urban wastewater treatment plants.

ARTICLE VII

Timetable for Implementation

19. The Parties shall implement the measures included in this Regional Plan in line with recommendations of Appendices I to V, as per the timelines associated with these measures.

ARTICLE VIII

Reporting

20. The Parties shall report on implementation of measures stipulated in this Regional Plan in line with the reporting requirement and timelines provided in Article 26 of the Convention and Article 13, paragraph 2(d) of the LBS Protocol.

ARTICLE IX

Entry into Force

21. The present Regional Plan shall enter into force and become binding on the 180th day following the day of notification by the Secretariat in accordance with Article 15, paragraphs 3 and 4, of the LBS Protocol.

³⁷ Soil amendment is a substance added to soil to improve its pH or physical properties, for example, lime, gypsum, organic matter. Sludge contribute organic matter to the soil. Alkaline-treated sludge can contribute to improve pH in low pH soils.

**[OUTLINE OF APPENDIX I
Selected treatment methods of sewage sludge**

- Sludge stabilization
 - Anaerobic digestion
 - Aerobic digestion
 - Alkaline treatment
 - Composting
- Sludge incineration
- Sludge drying
 - Direct dryers
 - Indirect dryers
 - Solar drying
- Solid thickening and dewatering systems
 - Solid thickening
 - Solids dewatering
- Methods of phosphorus recovery from sludge
- Conditions for the temporary/permanent storage for biosolids

OUTLINE OF APPENDIX II

Assessment of presence of microplastics, pharmaceuticals and personal care products in sewage sludge and methods for reduction at the source

- a) Pharmaceuticals and Personal Care Products (PPCP)
- b) Microplastics

OUTLINE OF APPENDIX III

**Technical guidelines for treated sewage sludge (biosolids) use
in agriculture and land reclamation**

- a) Determination of biosolids application rate according to the heavy metals content
- b) Determination of biosolids application rate according to the nitrogen content
- c) Determination of biosolids application rate according to the phosphorus content
- d) Annual application rate according to the most limiting rate (N, P, heavy metals)
- e) Crop fertilization management taking into account the nutrient content of treated wastewater and biosolids
- f) Soil monitoring [including sampling and testing]
- g) Application techniques
- h) Setbacks (buffer zones)
- i) Restricted activities and withholding periods in relation to biosolids quality
- j) Environmental and water sources protection

OUTLINE OF APPENDIX IV

Technical guidelines for sewage sludge use in waste to energy plants (sewage sludge incineration)

- a) Thermal sewage sludge treatment
- b) Sewage sludge mono-incineration
 - o Firing systems
- c) Emissions from sewage sludge incineration plants
- d) Other processes
 - o The SynGas process
 - o Developments of alternative sewage sludge treatment processes
- e) Co-incineration of sewage sludge
- f) Co-incineration in coal-fired power plants
- g) Co-incineration in waste incineration plants
- h) Co-incineration in cement works
- i) Advantages and disadvantages of sewage sludge co-incineration

OUTLINE OF APPENDIX V

Guidelines for routine monitoring of treated sewage sludge (biosolids)

- a) Frequency of monitoring
- b) Methods of sampling
 - o Biosolids sampling
 - o Soil sampling
- c) Parameters to be tested and Standard analytical methods
- d) Data collection, record keeping and reporting
- e) Data analysis by the regulator and periodic inspection methods]