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2025 United Nations Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development
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Ocean Action Panels

ADVANCE UNEDITED

Ocean Action Panel 4: Preventing and significantly reducing marine pollution of all kinds, in particular from land-based activities

Concept paper prepared by the Secretariat

Summary

The present concept paper was prepared pursuant to paragraph 24 of General Assembly resolution 78/128, in which the General Assembly requested the Secretary-General of the 2025 United Nations Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development to prepare concept papers on each of the themes of the Ocean Action Panels, taking into account the relevant ocean-related processes of the General Assembly and other possible contributions. The present paper relates to Ocean Action Panel 4, entitled "Preventing and significantly reducing marine pollution of all kinds, in particular from land-based activities". In the paper, the status, trends, challenges and opportunities for the achievement of relevant targets of Sustainable Development Goal 14 are set out, under the overarching theme of the Conference: "Accelerating action and mobilizing all actors to conserve and sustainably use the ocean".

I. Introduction

1. Marine pollution remains one of the greatest threats to ocean health, biodiversity, and livelihoods of coastal communities worldwide. The global ocean economy, worth $3 to $6 trillion, and employing over 150 million people[1] is increasingly threatened by pollution from land and sea.

2. Land-based pollutants, including from domestic and industrial wastewater, manufacturing discharges, chemicals and pharmaceutical compounds, macro and microplastics, and nutrients are transported via water from source to sea. Sea-based pollution from sources such as shipping, fisheries and aquaculture, sand and mineral extraction, tourism and other ocean industry activities also contribute to the challenge. In addition, noise, light and sediment pollution pose serious risks to marine species and ecosystems.

3. This paper builds presents the status, trends, challenges and opportunities for the achievement of relevant targets of Sustainable Development Goal 14. It explores the current state of land and sea-based pollution, identifies emerging challenges, and highlights scalable, action-oriented solutions.

4. There have been a number of significant ocean-related multilateral developments since UNOC-2, including the World Trade Organization agreement on fisheries subsidies (2022), the adoption of the Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Agreement), Convention on Biological Diversity Kunming-Montreal Global Biodiversity Framework (KM-GBF), and the adoption of the Global Chemicals Framework. Other significant developments include the launch of the Intergovernmental Negotiating Committee (INC) to develop an international legally binding instrument on plastic pollution, including in the marine environment, the launch of an ad-hoc open-ended working group to establish a science-policy panel (SPP) to contribute further to the sound management of chemicals and waste and to prevent pollution, and the ongoing work of the International Seabed Authority on regulations with respect to activities in the Area. Further, the sixth session of the UN Environment Assembly adopted resolutions on oceans (6/15), water (6/13) and sound management of chemicals and waste (6/9). *Looking ahead in 2025 and beyond,* the INC is anticipated to conclude its work at a resumed session (INC-5.2), the ad-hoc open-ended working group on the SPP is also foreseen to finalize its work at its resumed session (OEWG3.2), and the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships will enter into force on 26 June 2025.

[1] UNCTAD, 2023, Trade and Environment Review 2023 – Building a sustainable and resilient ocean economy beyond 2030. Geneva, United Nations

5. The lessons learned, best practices and solutions to prevent and address marine pollution which can be shared are numerous, including from the implementation of the legally binding treaties under IMO, such as MARPOL, London Convention and Protocol, as well as the 50 years of work of the Regional Seas Conventions and Action Plans and 30 years of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA).

6. When convening in Nice for the third UN Ocean Conference (UNOC-3) in June, we will be half-way through the UN Decade of Ocean Science for Sustainable Development[2] and the UN Decade on Ecosystem Restoration,[3] with 5 years remaining to progress on SDGs and key targets in the KMGBF and the Paris Agreement.

7. UNOC-3 provides an opportunity to accelerate global efforts to conserve and sustainably use the ocean and its resources, including those related to preventing and significantly reducing marine pollution of all kinds. To achieve this, the world must transition from commitments to escalated and accelerated action, weaving together diverse data, knowledge and governance systems as well as connecting actors and lessons learned.

II. Status and trends

8. The world is now two-thirds of the way to the deadline of achieving the UN Sustainable Development Goals (SDGs), the blueprint for a more resilient and prosperous world and the roadmap out of current global crises. With just five years to go, current progress falls short of what is required. The SDGs Report 2024[4] warns that only 17% of the SDG targets are currently on track for achievement, with nearly half showing minimal or moderate progress, and over one-third stalled or regressing. **Target 14.1** of the SDGs calls for the prevention and significant reduction of marine pollution of all kinds by 2025, in particular from land-based activities, including marine debris and nutrient pollution. This involves addressing sources such as improper wastewater disposal and waste management, agricultural runoff, and industrial discharges. Progress towards achieving Target 14.1 of the SDGs has been marginal, and despite global efforts to prevent and reduce marine pollution, significant acceleration is needed. The report also showed that progress has been limited, and substantial acceleration is needed on SDG **Target 6.3** to "by 2030, improve water quality by reducing pollution". The water continuum moves pollutants from freshwater to ocean, which highlights the relevance of adopting a source-to-sea approach on the prevention and reduction of marine pollution.

9. The global ocean economy doubled from $1.3 trillion in 1995 to $2.6 trillion in 2020 in gross value-added, growing at an average of approximately 2.9% per annum. Despite

[2] https://oceandecade.org/

[3] https://www.decadeonrestoration.org/

[4] UN DESA. 2024. The Sustainable Development Goals Report 2024. New York, UN DESA. https://doi.org/10.18356/9789213589755

positive economic impacts, this growth can have negative consequences on the environment including increased marine pollution, carbon emissions, and other pressures, all of which will prevent the ocean economy from expanding as it has for the last 25 years[5]. For example, cumulative impacts of pollution, along with overfishing and unsustainable management of stocks could lead to the continued decline of global fishery resources.

10. Human-induced eutrophication, caused by the release of excess nutrients into the ocean due to urban, industrial and agricultural effluents and run-off, can lead to harmful algal blooms, dead zones and loss of biodiversity in aquatic ecosystems. This issue continues to escalate, requiring better assessment of the drivers of eutrophication to inform reduction strategies and policies.[6] Globally, nitrogen use is extremely inefficient, with over 80% of anthropogenic reactive nitrogen lost to the environment, equating to around 200 million tons[7] of reactive nitrogen lost annually. Similarly, approximately 80%[8] of mined phosphorus used in agriculture is either stored, wasted, or lost throughout the food chain. The global cost of phosphorus pollution is staggering, estimated at $265 billion[9] per year.

11. The growing intensity of industrialization, and urbanization in coastal areas, especially in developing economies, has led to a surge in untreated wastewater and industrial discharges into rivers, coasts, and marine ecosystems. These discharges can carry heavy metals, toxins, microplastics, nutrients, and persistent pollutants that can cause long-term damage to biodiversity, ecosystem services, and human health. Global commitments such as SDG Target 6.3 and international initiatives like the Global Wastewater Initiative[10] (GWWI), emphasize the importance of addressing wastewater reuse as a dual solution to pollution and water scarcity. Similarly, the revised European Union Urban Wastewater Treatment Directive incorporates microplastics and emerging pollutants, serving as a benchmark for global wastewater management. Despite these advancements, many States struggle to enforce regulations, provide technical support, finance wastewater treatment, recover valuable resources from wastewater (such as energy, nutrients, and clean water) or implement effective industrial practices. By 2030, the health and livelihoods of 4.8 billion people could be at risk if water quality monitoring is not improved. In 2023, over 2 million water quality measurements were used to report on SDG indicator 6.3.2, but the countries that represent the lowest-income half of the world contributed less than 3 percent of this total[11]. Regional

[5] OECD, 2025, The Ocean Economy to 2050, OECD Publishing, forthcoming, (Formenti and Pacini, 2024; UNCTAD, forthcoming 2025; 2024, 2023)

[6] https://doi.org/10.25607/4wbg-d349

[7] http://nora.nerc.ac.uk/id/eprint/500700/

[8] Cordell, D., J.O. Drangert, and S. White. 2009. The story of phosphorus: Global food security and food for thought. Glob. Environ. Chang. 19(2): 292–305. doi: 10.1016/j.gloenvcha.2008.10.009.

[9] Beusen, A.H.W., A.F. Bouwman, L.P.H. Van Beek, J.M. Mogollón, and J.J. Middelburg. 2016. Global riverine N and P transport to ocean increased during the 20th century despite increased retention along the aquatic continuum. Biogeosciences 13(8): 2441–2451. doi: 10.5194/ bg-13-2441-2016.

[10] https://www.unep.org/topics/ocean-seas-and-coasts/ecosystem-degradation-pollution/wastewater/global-wastewater

[11] https://www.unwater.org/sites/default/files/2024-08/SDG6_Indicator_Report_632_Progress-on-Ambient-Water-Quality_2024_EN_0.pdf

Pollution Protocols, Strategies and Action Plans developed within the framework of the Regional Seas Programme facilitate coordinated regional action to address challenges of wastewater management.

12. Plastic pollution remains particularly alarming, as it constitutes at least 85% of total marine waste,[12] with approximately 11 million metric tons entering oceans annually - a figure projected to triple by 2040 if no action is taken. Plastic pollution continues to have extensive and detrimental impacts on marine ecosystems, wildlife, human health, and economies with impacts that are beyond the safe operating space for humanity.[13] More than 4,000 animal species are thought to be adversely affected[14], with interactions including ingestion, entanglement, and habitat disruption.

12. In 2022, 62 million tons of global electronic waste (e-waste) was generated, reached up from 53.6 million tons in 2019. Of this, 22.3% was documented as properly collected and recycled, an improvement from the 17.4% reported in 2019. However, the growth in e-waste generation is outpacing recycling efforts by nearly a factor of five. Improper disposal can negatively impact ocean health due to the release of hazardous substances, including microplastics.

13. Successful waste management will also entail the establishment of adequate reception facilities for ship-generated wastes in ports, as mandated under MARPOL Annex V, as well as global implementation of the regulatory framework established under the 1972 London Convention and the 1996 London Protocol on the prevention of marine pollution from dumping of waste and other matter at sea.

14. In the context of the Paris Agreement, Nationally Determined Contributions (NDCs) are central to global climate action, outlining each country's commitments to reduce greenhouse gas emissions and adapt to climate change impacts. While NDCs primarily focus on climate mitigation and adaptation, there is a growing recognition of the role that wastewater management plays in these efforts. Improved wastewater treatment can reduce methane and nitrous oxide emissions, which are potent greenhouse gases, and enhance water quality, benefiting both climate and marine ecosystems. Estimations from the Intergovernmental Panel on Climate Change (IPCC) suggest that wastewater generates similar amounts of GHGs as the aviation industry (approximately 2% of the total GHG emissions).[15] However, recent research has suggested that this figure could be underestimated, and that wastewater could account for approximately 5% of GHGs.[16] Furthermore, wastewater contains five times more energy (such as biogas, heat and electricity) than is required to treat it.[17] If full utilization of energy from wastewater

[12] UNEP. 2021. From Pollution to Solution: A global assessment of marine litter and plastic pollution
[13] https://doi.org/10.1021/acs.est.1c04158
[14] UN Third World Ocean Assessment (WOA III) – draft accessed 26.01.2025
[15] IPCC (2022). Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Report of IPCC. doi: 10.1017/9781009157926.004
[16] Mojtaba M. et al (2023) Net-zero carbon condition in wastewater treatment plants: A systematic review of mitigation strategies and challenges, Renewable and Sustainable Energy Reviews. https://doi.org/10.1016/j.rser.2023.113638.
[17] Xiaodi H. et al (2019). Energy recovery from wastewater: Heat over organics, Water Research, Volume 161.

was harnessed globally, more than half a billion people could be provided with power.[18] The nutrients in wastewater globally are enough to provide around 12% of global fertilizer demand[19], which has a potential value of around $30 to $40 million. Nutrient recovery has the potential to decrease the 5% of global GHG emission contribution from fertilizer production and use[20], along with a reduction of biodiversity loss and improvement of fertilizer access to low-income areas.

15. Several emerging aspects of marine pollution need more attention. Underwater noise from shipping, oil exploration and military activities disrupt marine life, and marine mammals in particular. A growing number of synthetic chemicals (e.g. personal care products, pharmaceuticals, industrial chemicals such as per- and polyfluoroalkyl substances (PFAS) are entering marine ecosystems in increasing quantities with potentially harmful effects on marine ecosystems and human health. Antimicrobial resistance (AMR) threatens marine biodiversity by disrupting ecosystems, endangering aquatic species, and weakening disease management in marine life, ultimately reducing the health and resilience of ocean habitats. Knowledge gaps regarding these chemicals of emerging concern are vast, and the effects of their interactions with marine ecosystems are complex. Some pollutants cause chronic toxicity and endocrine disruption in aquatic wildlife. Others, when exposures are high enough, can cause acute impacts, including mortality.[21]

16. **The United Nations Decade of Ocean Science for Sustainable Development 2021–2030** stresses the need to understand and map land and sea-based sources of pollutants and contaminants and their potential impacts on human health and ocean ecosystems, to develop solutions in order to remove or mitigate such impacts. Its Vision 2030 Challenges set ambitious, interconnected goals representing the most immediate needs for ocean knowledge. In 2024 a White Paper on Challenge 1 to "Understand and beat marine pollution" outlined 'a set of strategic ambitions to address critical gaps in science, knowledge and solutions needed to achieve a clean ocean.'[22] By 2030, the success of this challenge is expected to be demonstrated by the generation of scientifically sound data enabling a holistic understanding of the extent and impact of pollution across the land-ocean continuum.[23]

17. **The Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects ("the Regular Process")** is an intergovernmental process that aims to regularly review the environmental, economic and social aspects of the state of the ocean to contribute to enhancing the

https://doi.org/10.1016/j.watres.2019.05.106.

[18] https://doi.org/10.59117/20.500.11822/43142

[19] Manzoor, Q. et al. (2020). Global and regional potential of wastewater as a water, nutrient and energy source. Nat Resour Forum. 2020; 44: 40–51. https://doi.org/10.1111/1477-8947.12187

[20] Gao, Y., Cabrera Serrenho, A. Greenhouse gas emissions from nitrogen fertilizers could be reduced by up to one-fifth of current levels by 2050 with combined interventions. Nat Food 4, 170–178 (2023). https://doi.org/10.1038/s43016-023-00698-w

[21] Tian, Z. et al (2020) A ubiquitous tire rubber–derived chemical induces acute mortality in coho salmon https://www.science.org/doi/10.1126/science.abd6951

[22] UNESCO-IOC (2024). Ambition, Action, Impact: The Ocean Decade Pathway to 2030. Consolidated Outcomes of the Vision 2030 Process. UNESCO, Paris. (The Ocean Decade Series, 50)

[23] Hatje, V., Rayfuse, R., et al. 2024. Ocean Decade Vision 2030 White Papers – Challenge 1: Understand and Beat Marine Pollution. Paris, UNESCO-IOC. (The Ocean Decade Series, 51.1). https://doi.org/10.25607/6m86-s908

scientific basis for ocean-related policymaking. The Regular Process is currently working towards the publication of the Third World Ocean Assessment (WOA III), which will comprise an updated and comprehensive overview of the state of the ocean, covering all environmental, social and economic aspects, including, *inter alia,* marine pollution, eutrophication, and contaminants. Preliminary findings of WOA III will be presented at the 2025 UN Ocean Conference.

Recent developments in multilateral agreements and governance frameworks

18. **The BBNJ Agreement:** the Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction ("BBNJ Agreement"), was adopted on 19 June 2023. It applies to areas beyond national jurisdiction, which includes the high seas and the international seabed area (the "Area"). Like other maritime zones, areas beyond national jurisdiction are affected by anthropogenic pressures including pollution. The BBNJ Agreement recognizes the need to address, in a coherent and cooperative manner, biological diversity loss and degradation of ecosystems of the ocean, due to pollution, including plastic pollution, among other factors. It incorporates a number of general principles and approaches that are directly relevant to marine pollution, and addresses several issues that are relevant in this regard. Future area-based management tools, including marine protected areas, may, in geographically defined areas beyond national jurisdiction, restrict activities that commonly lead to sea-based pollution such as shipping or fishing. Such tools may also contribute to improving the health of ecosystems and thus enhance resilience to pollution. In addition, emergency measures may provide a tool for States to address acute pollution events which have caused, or are likely to cause, serious or irreversible harm to marine biological diversity of areas beyond national jurisdiction. The provisions on environmental impact assessments aim to prevent, mitigate and manage the impacts, including cumulative impacts, of planned activities on the marine environment. Moreover, through its provisions on capacity-building and the transfer of marine technology, the BBNJ Agreement is expected to lead to increased access to the latest scientific expertise and marine technology which can assist States in preventing, reducing and controlling marine pollution more effectively.

19. **INC on Plastic Pollution negotiations**: Following the historic resolution adopted during the resumed fifth session of the UN Environment Assembly (UNEA-5.2) in March 2022, the INC convened five sessions between November 2022 and December 2024, that focused on developing an international legally binding instrument on plastic pollution, including in the marine environment, based on a comprehensive approach that addresses the full life cycle of plastic, including its production, design, consumption and disposal, and taking into account, among other things, the principles of the Rio Declaration on Environment and Development, as well as national circumstances and capabilities. The INC will continue its work in 2025, aiming to conclude negotiations at a resumed fifth session (INC-5.2). The final agreement is anticipated to set a framework for international cooperation and action.

20. **Ad-hoc open-ended working group to establish a science-policy panel (SPP) to contribute further to the sound management of chemicals and waste and to prevent pollution** : At UNEA5.2, resolution 5/8 decided that a science-policy panel should be established to contribute further to the sound management of chemicals and waste and prevent pollution and that an ad hoc open-ended working group (OEWG) would prepare proposals for the establishment of such science-policy panel. This OEWG convened three sessions between October 2022 and June 2024, that focussed on developing foundational documents for this panel. SPP OEWG 3.2 will resume its work in Uruguay

back-to-back with the Intergovernmental Meeting to consider the establishment of a science-policy panel from 14 to 20 June 2025.

21. **Kunming-Montreal Global Biodiversity Framework (KMGBF)**: Adopted on 19 December 2022, the KM-GBF calls for a reduction of pollution risks and the negative impact of pollution from all sources by 2030, to levels that are not harmful to biodiversity and ecosystem functions and services, considering cumulative effects (target 7). Target 18 aims to identify by 2025, and eliminate, phase out, or reform incentives, including subsidies, that are harmful to biodiversity, reducing them by at least $500 billion per year by 2030 and to scale up positive incentives for the conservation and sustainable use of biodiversity. The KM-GBF aligns with global efforts to mitigate marine pollution, such as the reduction of single-use and short-lived plastics and the promotion of circular economy practices to reduce waste generation. Additionally, it encourages restoration and protection of ecosystems that are particularly vulnerable to pollution, such as coral reefs and mangroves, and which play critical roles in marine biodiversity and the health of the ocean.

22. **The United Nations Convention on the Law of the Sea** (**UNCLOS**) sets out the legal framework within which all activities in the oceans and seas must be carried out. Pursuant to Part XII of UNCLOS, States have a general obligation to protect and preserve the marine environment. Specifically relating to pollution, States are required to take necessary measures to prevent, reduce and control pollution of the marine environment and take all necessary measures to ensure that activities under their jurisdiction or control are so conducted as not to cause damage by pollution to other States and their environment. This is inclusive of all sources of pollutants, including, *inter alia,* land, sea, and atmospheric-based pollution. Notably, 2024 marked the 30th anniversary of the entry into force of UNCLOS. In 2024, the International Tribunal for the Law of the Sea delivered its Advisory Opinion on the ***Request submitted to the Tribunal by the Commission of Small Island States on Climate Change and International Law***, where the Tribunal unanimously determined that anthropogenic emissions of GHG constitute pollution of the marine environment, and are therefore applicable to the aforementioned obligations set out under UNCLOS.

23. **UN Fish Stocks Agreement (UNFSA)**: In June 2023, the resumed Review Conference on the UNFSA recommended that States and regional economic integration organizations recognize the links between abandoned, lost or otherwise discarded fishing gear, including ghost fishing, and broader marine pollution challenges, particularly marine debris, including plastics and microplastics. The Conference also recommended enhancing efforts to prevent and mitigate the impacts of all kinds of abandoned, lost or otherwise discarded fishing gear.[24]

24. **UNGA processes:** The General Assembly continued to consider the protection and preservation of the marine environment, including issues of marine pollution, through its annual resolutions on oceans and the law of the sea (see A/RES/79/144) and sustainable fisheries (see A/RES/79/145).

25. Adopted in September 2023, the United Nations Environment Programme's (UNEP) **Global Framework on Chemicals** presents a plan to help support States and stakeholders address the full lifecycle of chemicals. Through its strategic objectives and associated targets, the Global Framework on Chemicals aims to promote multi-sectoral

[24] See report of the resumed Review Conference on the UNFSA, A/CONF.210/2023/6, Annex, A./9

and multi-stakeholder engagement and initiatives to enhance the safe and sustainable management of chemicals and waste. Whilst it is non-binding, it takes due account of other relevant chemical and waste instruments, agreements, and sectors, including health and labour, and possesses the flexibility to take new instruments, agreements and activities into account.

26. **Regional Seas Programme:** Regional Seas Conventions and Action Plans covering over 183 countries facilitate the implementation of region-specific activities, bringing together stakeholders including Governments, scientific communities, civil societies, Indigenous Peoples, local communities and the youth to "address the accelerating degradation of the world's oceans and coastal areas through a "shared seas" approach". Development of regional pollution reduction strategies and plans and assessments reports on pollution enables more targeted and harmonized regional, national and local responses.

III. Challenges and opportunities

27. The UNOC-2[25] concept note highlights the varying nature of the impacts from pollution on ecosystems and human well-being, and underscores that pollution remains a major obstacle to achieving the SDGs, with Governments and local authorities struggling to address the issue effectively and in an integrated manner.

Main challenges

28. The challenges identified in 2022 remain today, including the need to strengthen and reinforce the effective implementation of regulatory frameworks, which necessitate improved collaborative efforts and cooperation across all levels of governance. The global nature of marine pollution requires collaborative international efforts. Achieving consensus among States and stakeholders with different priorities, barriers and capacities presents a significant challenge.

29. The transboundary effects of marine pollution make this a truly global challenge that requires coordination across and beyond maritime zones. The lack of coordination, both among authorities (environmental and other that may have roles to play in the implementation of policies/regulations to address marine pollution) at the national level, but also between countries, remains a challenge in many regions, both with respect to land-based and sea-based sources of pollution.

30. Despite a number of new and ongoing initiatives (see table 1), several of which have been endorsed as programmes under the UN Decade of Ocean Science for Sustainable Development, the limited availability of the required relevant knowledge, data, technical and human capacity, as well as insufficient funding, remain substantial barriers to address the challenges effectively (see OAP 2).

31. Despite positive progress, achieving a transformation at the scale and pace needed faces several hurdles. These include fragmentation of solutions, lack of political attention and prioritization, and insufficient investments.

[25] http://sdgs.un.org/sites/default/files/2022-05/ID_1_Addressing_marine_pollution.pdf?_gl=1*5ru37k*_ga*MTI4ODg2MDE0MC4xNzM3NTQ4MTI0*_ga_TK9BQL5X7Z*MTczODY3MjA2OS4xLjEuMTczODY3MjExNS4wLjAuMA..

32. The limited availability of data and lack of harmonization among stakeholders are also factors that hamper actions. In some key sectors, engaging the private sector remains a challenge, while in others, it plays a leading and impactful role.

33. Global instruments and multilateral environmental agreements provide governance frameworks for targeted and harmonized actions to effectively address many types of pollution, with several developments since UNOC-2. However, for these to have the intended impact, they need to not only be agreed and ratified but also implemented effectively and in a timely manner. Furthermore, tracking progress of efforts to address pollution remains a challenge.

34. One of the main challenges identified in reducing marine pollution (including plastic pollution) is the lack of appropriate waste management systems that can prevent leakages to the aquatic environments.

35. Furthermore, the negative consequences of poor water management, including the lack of a source-to-sea perspective, are significant not only for sea-based activities such as fisheries, aquaculture and coastal tourism, but also for land-based activities such as agriculture and manufacturing. Transboundary river systems remain pollution hotspots, exacerbating marine degradation downstream. This not only causes environmental damage but also exacerbates economic and social inequalities.

36. Despite international commitments to address these issues, several of which have concluded in the period since UNOC-2, several challenges persist. These include gaps in technical capacity for industrial compliance, inadequate infrastructure for waste and wastewater management (including treatment and recovery of resources), and insufficient financing for operations, maintenance, or to scale up solutions. Industries, particularly small and medium enterprises (SMEs), often lack incentives and resources to adopt cleaner production technologies or circular economy practices.
Many countries have implemented stricter regulations relating to single-use plastic products, plastic use and waste management, as well as initiatives to improve wastewater treatment and reduce agricultural runoff to tackle nutrient pollution. However, challenges remain, including the high, increasing volume of e.g. plastic waste, insufficient infrastructure in some regions, and the need for stronger enhancement and enforcement of existing regulations towards waste reduction, reuse, and recycling. There are also large data gaps on pollution which if addressed, would help to track progress and further direct efforts.

Emerging opportunities

36. Since UNOC-2, waste and wastewater challenges have intensified due to increasing pollution, and gaps in implementing international legal frameworks at national, regional, and global levels, such as the Regional Seas' protocols on the protection of marine ecosystems from land-based pollution. Many countries struggle with enforcing wastewater regulations, aligning national policies with global commitments, and mobilizing resources for sustainable wastewater management.

37. The Global Framework on Chemicals introduces the possibility to establish Implementation Programmes to provide coherence between existing activities, identify gaps and amplify and accelerate action required for transformational change.

38. The momentum created by the UNEA resolution 5/14 (2022) establishing an INC to develop an international legally binding instrument on plastic pollution, including in the marine environment, appears to have increased funding being allocated to address plastic pollution, but this is not the case for other pollutants and the funding is not evenly distributed across the lifecycle of the pollutants. There are opportunities for more efficient coordination amongst donors.

39. **Science-Policy Panel (SPP):** The new science-policy panel can help to translate scientific findings into policy action and is expected to work strategically with the recently adopted Global Chemicals Framework and numerous Multilateral Environmental Agreements. Negotiators are fine-tuning the details of this new science-policy panel. Once operational, it will complete a trifecta of similar global science-policy bodies (IPCC and IPBES) designed to counter the triple planetary crisis of climate change, nature and biodiversity loss, and pollution and waste.

40. There are also emerging opportunities that may offer scalable solutions to the challenges in addressing marine pollution. Circular resource efficiency approaches, as outlined in the next section, provide actionable pathways for cities, industries and agriculture to optimize resource use, reduce waste, and minimize emissions. Nature-based solutions, such as replantation of mangroves, constructed wetlands, and bio-filtration systems can be essential for restoring marine ecosystems and strengthening biodiversity while also building resilience to climate change. Such solutions may also be more cost-effective.

41. Financial institutions have been increasing their role in addressing pollution challenges by mobilizing capital and addressing environmental risks in their operations, and adopting innovative financing mechanisms, such as blue bonds, blended finance, and results-based funding, to support sustainable infrastructure solutions and pollution prevention measures. Additionally, financial institutions can further incentivize compliance with regional and international commitments by integrating environmental, social, and governance criteria into lending and investment decisions.

42. There is an increasing inclusion of Nature-based Solutions (NbS) in updated Nationally Determined Contributions (NDCs) under the Paris Agreement, particularly concerning coastal and marine ecosystems. As of September 2023, 97 out of 148 countries have incorporated coastal and marine NbS into their NDCs[26], reflecting a growing commitment to leveraging natural systems for climate mitigation and adaptation. These solutions often encompass sustainable wastewater management practices that protect and restore marine environments. However, the countries which contribute to 85% of global GHG emissions did not include wastewater management as part of their mitigation measures within their NDCs. This reveals a significant opportunity to capitalize within climate mitigation NDCs on the potential for reducing GHG emissions that wastewater management offers.

43. Community driven actions and the empowerment of local communities also present potential opportunities, including through community education, as well as participation in international negotiations to inform governance and regulatory actions[27]. Increasing public awareness and involving local communities at local, regional and international levels provide an opportunity

[26] Lecerf, M., Herr D., Elverum, C., Delrieu, E. and Picourt, L. (2023). Coastal and marine ecosystems as Nature-based Solutions in new or updated Nationally Determined Contributions, Ocean & Climate Platform, Conservation International, IUCN, Rare, The Nature Conservancy, Wetlands International and WWF

[27] See report "Global online stakeholder consultation: Inputs to Ocean Action Panel's Concept Papers".

to strengthen actions aimed at tackling pollution going forward, and to address some of the aforementioned challenges. Further strengthening of international partnerships can also provide an opportunity to tackle transboundary pollution and safeguard shared marine resources.

44. The private sector holds further potential for driving solutions. Public-private partnerships (PPPs) can accelerate innovation, mobilize financing, and facilitate the adoption of technologies that reduce pollution at its source. Without the active engagement and collaboration of the private sector, the development and implementation of effective and feasible solutions may prove challenging, as the private sector may act as both the engine to create solutions but also as a catalyst for industry and consumers' behavioral change. These can be supported by trade-related opportunities that embrace the circular economy, such as through business models centered on alternative production solutions. Governments can act as facilitators of positive transition and by promoting international cooperation[28].

45. As efforts intensify to prevent and reduce pollution of all kinds, there is an opportunity to move towards more circular economy approaches that prioritize prevention and promote circular goods and services through coherent and effective trade policies. This includes efforts to identify barriers and opportunities for environmentally sustainable and effective non-polluting substitutes and alternatives, in particular based on traditional knowledge of Indigenous Peoples and local communities, locally adapted and conducive to sustainable development. Conducive trade policies, such as favorable tariff regimes and non-tariff measures, are also crucial for the diffusion of low-carbon technologies and renewable energy sources[29]. These technologies may not be available locally, especially in developing countries, but are necessary to decarbonize highly polluting ocean industries such as maritime transport.

46. The BBNJ Agreement may provide a valuable opportunity to further strengthen efforts to address marine pollution in areas beyond national jurisdiction, with potential positive effects for other maritime zones as well. The BBNJ Agreement aims to enhance cross-sectoral cooperation with likely beneficial effects on addressing marine pollution. Building on UNCLOS, Parties to the Agreement are to cooperate for the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, including through cooperation with and among relevant legal instruments and frameworks and relevant global, regional, subregional and sectoral bodies. The Conference of the Parties established under the Agreement is required to promote cooperation and coordination with and among such relevant instruments, frameworks and bodies, including by developing appropriate processes for such cooperation.

Noise pollution, including from offshore wind development, can have negative impacts on marine wildlife species. However, these impacts can be significantly reduced through good planning and other measures. In this regard, the Convention on Migratory Species (CMS) and others have produced guidance. Moreover, the CMS Energy Task Force identified reconciling renewable energy developments with the conservation of migratory species as one of its priorities. In addition, in 2023, the International Maritime Organization (IMO) issued revised guidelines for the reduction of underwater noise from commercial shipping to address adverse

[28] As an example, the World Trade Organization (WTO) Dialogue on Plastic Pollution (DPP) Ministerial Statement (WT/MIN(24)/14), calls for concrete, pragmatic and effective outcomes by 2026, including, inter alia, opportunities to align/harmonize restrictions on single-use plastics; identify gaps in international standards applicable to environmentally sustainable and effective non-plastic substitutes and alternatives; facilitate access to technologies and services required for environmentally sustainable waste management; improve transparency of trade flows of plastics associated with international trade and embedded in traded goods; and better match existing trade-related needs and available assistance to address plastic pollution.

[29] ITC, 2024; UNCTAD and UNESCAP, 2023

impacts on marine life [30], and in 2024, IMO approved an action plan for the reduction of underwater noise from commercial shipping[31].

47. Several other overarching themes and processes are also relevant to the discussion. The "Leave No One Behind" principle, enshrined in the 2030 Agenda, requires that the UN prioritizes equity and inclusivity in its work, and distinguishes inequalities across countries—such as differences in economic development and climate vulnerability—and those within countries, which are now predominant.[32] The 2022 UN General Assembly resolution on the human right to a safe and healthy environment[33] and the Pact for the Future in 2024[34], have reiterated this principle. In addition, the fourth International Conference on Small Island Developing States, held from 24 to 30 May 2024, agreed on the Antigua and Barbuda Agenda for SIDS (ABAS): a Renewed Declaration for Resilient Prosperity[35].

IV. Action oriented pragmatic solutions

48. Building on the identified challenges and opportunities, this section highlights pragmatic and scalable solutions to prevent and significantly reduce marine pollution of all kinds. By aligning technical innovation, financing mechanisms and governance frameworks, these solutions demonstrate how governments and stakeholders, including the private sector, can work together to prevent and reduce marine pollution of all kinds, in particular from land-based sources. It is worthwhile noting that there is an opportunity to further collect, generate and share additional examples of solutions which can be replicated and scaled. Some broader areas are mentioned below, as well as illustrative examples in the table.

Digital transformation to reduce land-based pollution

49. In February 2024, UNEP unveiled the Wastewater Solution Space prototype — a practical, AI-powered digital tool designed to drive scalable solutions in wastewater management. This user-driven platform will provide both specialized and non-specialized users with rapid access to actionable wastewater management solutions, financing models, and implementation strategies tailored to diverse contexts. UNEP is currently developing a tool called “Minimal Viable Product”, which, once operationalized, will promote impactful wastewater solutions worldwide. The Digital Platform of the Global Partnership on Plastic Pollution and Marine Litter is the global hub for crowd-sourced resources and data on plastic pollution, and is an exemplar of digital transformation and user-centric access to digital solutions. UNEP will continue to expand and strengthen functionalities of the Digital Platform to drive collaborative change, including a new Solutions Hub, and to further improve accessibility to solutions that cater to women, youth, and disadvantaged groups, for a just transition.

Industrial transformation through resource efficiency

50. Industries can be enabled to reduce wastewater discharges, conserve resources, and improve environmental performance. For example, TEST-Niger reduced industrial pollution by 36% and

[30] IMO (2023). “Revised Guidelines for the reduction of underwater radiated noise from shipping to address adverse impacts on marine life”, MEPC.1/Circ.906.
[31] IMO (2024), “Action plan for the reduction of underwater noise from commercial shipping”, MEPC 82/17, annex 8.
[32] United Nations (2023). Our Common Agenda: Policy Brief 1: To Think and Act for Future Generations. United Nations.
[33] A/RES/76/300
[34] A/RES/79/1
[35] A/CONF.223/2024/4

catalyzed $4.2 million in private investments. The UK FCDO-UNCTAD Sustainable Manufacturing and Environmental Pollution (SMEP) programme[36] is funding 23 projects in sub-Saharan Africa and South Asia, deploying £24.6 million to integrate circular economy solutions into manufacturing systems and identify and incubate solutions that address the environmental and health impacts of manufacturing. Solutions include enhancement of wastewater treatment from textiles and tanneries sectors, development of biodegradable alternatives to conventional fishing gear to minimize ghost fishing, and advancement of novel fibers that are sourced from agriculture waste, indirectly reducing polyester demand, which is a major source of marine microplastics.

Circular solutions for plastic pollution

51. UNIDO's SwitchMed program and the GEF Integrated Program on Plastics demonstrate how industries can adopt circular economy models to valorize plastic waste streams, reduce single-use plastics, and strengthen recycling infrastructure. UNEP is co-leading with WWF the implementation of the GEF-funded 'Circular Solutions to Plastic Pollution'[37] Integrated Program, designed to transition countries toward a circular plastics economy, particularly in the food and beverage sector. This USD 96 million program will be delivered through 15 national child projects and one global child project (Global Platform) in cooperation with UNDP, UNIDO and the respective national environmental agencies.

52. UK-FCDO-UNCTAD's SMEP Programme also responds to the circularity challenge by trialing how industries can shift from linear waste systems to resource efficient, closed loop models. As an example, SMEP supports improvement of how recycling processes work, through e.g., recovering and treating wastewater from plastic washing lines at Mr. Green, a plastics recycler in Kenya. Another initiative under the SMEP umbrella, the FlipFlopi project, combines plastic waste upcycling with safeguarding of heritage knowledge to transform plastic waste into boats and furniture in the Lamu archipelago, including Lamu Town, a UNESCO World Heritage site in Kenya.

Nature-based Solutions

53. Nature-based solutions, such as constructed wetlands and natural vegetation buffers, can enhance industrial wastewater treatment systems by providing cost-effective, scalable approaches to reduce residual pollutants while restoring ecosystems and improving water quality. To support the use of nature-based solutions to prevent and reduce pollution, UNEP, in collaboration with the International Organization for Migration (IIOM), established a demonstration treatment wetland system in Iraq as a replicable, cost-effective and low maintenance solution to sustain natural wetlands and support agricultural livelihoods, in addition to mitigating serious water scarcity and reduce pollution. Protecting the Iraqi marshes is key to preserving biodiversity, agriculture, livestock, fishing and human health.

Financing innovation for pollution reduction

54. Innovative financing mechanisms, including blended finance, public-private partnerships, and green bonds mobilize resources for industrial upgrades, circular economy systems, and wastewater infrastructure.

Data-driven monitoring/progress

55. Digital technologies, such as remote sensing and real-time water quality sensors, improve transparency, accountability, and data-driven decision-making for pollution control and management.

[36] https://smepprogramme.org/project/freshppact-impact-hub/
[37] https://www.thegef.org/projects-operations/projects/11181

Table 1: Pollution prevention and management initiatives

Initiative	Partners	Description
OceanLitter Programme	IMO and FAO	GloLitter Partnerships, RegLitter[38] and PROSEAS[39] - prevention and reduction of sea-based marine plastic litter (SBMPL) supporting 30 countries. Supports member states to tackle marine plastic litter issues on national and regional levels both from shipping and fisheries sectors through technical assistance to develop and implement national and regional action plans on marine plastic litter, legal, policy and institutional reform, regional partnerships between the countries, trainings, as well as pilot projects. Specific program activities empower women to participate in finding solutions to marine plastic litter and showcase their success.
Voluntary Code of Conduct on the Sustainable Use and Management of Plastics in Agriculture (VCoC)	FAO	Aims to provide a policy framework in support of the sustainable use of plastics in agriculture and their alternatives, by assisting policy makers in creating and strengthening policies and strategies, and by providing the other stakeholders along the agri-food value chain recommendations and best practices. The Code is in development phase and update on the status is provided in COAG/2024/8[40].
GloNoise Partnership	IMO, GEF and UNDP	Aims to reduce underwater radiated noise (URN) from shipping by facilitating capacity building in 6 countries to support national monitoring programs for defining baselines, stakeholder engagement, and integration of URN management into marine policies.
NUclear TEChnology for Controlling Plastic Pollution (NUTEC Plastics) including NUTEC Global Marine Monitoring Network	The International Atomic Energy Agency (IAEA)	Focuses on research, development, capacity building, and the implementation of nuclear techniques to tackle plastic upcycling and marine plastics monitoring. Upcycling aspects are addressed by reducing plastic waste volumes through the use of radiation technologies to improve plastic recycling methods and to develop bio-based alternatives to single use petroleum-based plastics. Marine plastics aspects are addressed by raising the capacity of laboratories worldwide for tracking marine

[38] https://glolitter.imo.org/
[39] https://www.thegef.org/projects-operations/projects/11166
[40]

		microplastics by providing sampling and analytical equipment along with tailored capacity building and harmonized methods. As of 2024, 104 laboratories from 100 countries are participating in a global NUTEC network for microplastics monitoring in the marine environment and 39 countries are developing recycling technology under the Initiative
Radioactive effluents into the marine environment.	IAEA	Provides guidance based on its Safety Standard for regulating the release of radioactiv effluents into the marine environment. Thi guidance supports environmental monitorin and surveillance of nuclear facilities, as well a the assessment of radiological impacts on bot the public and marine flora and fauna. Th IAEA Marine Radioactivity Information Syster (MARIS) is a global data repository fo measurements of radioactivity in seawate biota, sediment and suspended matter.
Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP)	FAO, IMO, IAEA, IOC-UNESCO, ISA, UNDP, UNEP, UNIDO, UN DOALOS, WMO	GESAMP is a group of independent scientific experts that provides advice to the UN system on scientific aspects of marine environmental protection, and mechanism for cooperation, and to avoid duplication of efforts. Examples of recent efforts to address current issues of relevance are: Working Group 40 on Plastics and Micro-plastics in the Ocean (co-sponsored by IOC UNESCO and UNEP), Working Group 43 on sea-based sources of marine litter (co-sponsored by FAO, IMO and UNEP) as well as Working Group 45 on climate change and greenhouse gas (GHG) related impacts on contaminants in the ocean co-sponsored by IAEA, UNEP, IOC-UNESCO, WMO and IMO.
UNIDO's Resource Efficient and Cleaner Production (RECP) and TEST methodologies	UNIDO	Industrial transformation through Resource Efficiency - enable industries to reduce wastewater discharges, conserve resources, and improve environmental performance.
The Global Programme of Action for the Protection of the Marine	UNEP, IMO, FAO, GESAMP, WHO, IAEA, AFDB, UNDP, UNEP-DHI, UN-HABITAT,	UNEP provides secretariat services to three global multi-stakeholder partnerships aimed at reducing pollution from source to sea: The Global Partnership on Plastic Pollution and Marine Litter (GPML), the Global

Environment from Land-Based Activities (GPA)[41] 3 Partnerships	IOC-UNESCO, ADB,UKCEH, NYU, UAIg, CIWF, Yara, IFA, RIHN, UAF, Ragnsells, and many other governments and actors.	Partnership on Nutrients Management (GPNM) [42], and the Global Wastewater Initiative (GWWI) [43]. They convene over 1,000 member organizations including governments, civil society, academia, and the private sector, facilitate cooperation, and enhance the harmonization of scientific, technical and technological knowledge through their working groups, communities of practice and capacity building initiatives at national, regional and global levels. The GPML Digital Platform which integrates data and connects stakeholders to guide action on plastic pollution and marine litter, could be replicated for other pollutants.
World Trade Organization (WTO) Dialogue on Plastic Pollution and Environmentally Sustainable Plastics Trade (DPP)[44]	WTO, supported by 50+ stakeholders, including UNCTAD, UNEP, FAO, ISO, WHO, civil society, academia and private sector	DPP 82 co-sponsors – representing around 90% of global trade in plastics – are working towards "concrete, pragmatic and effective" outcomes by 2026 called for by the DPP Ministerial Statement (WT/MIN(24)/14) [45]. These include, inter alia, opportunities to align/harmonize restrictions on single-use plastics; identify gaps in international standards applicable to environmentally sustainable and effective non-plastic substitutes and alternatives; facilitate access to technologies and services required for environmentally sustainable waste management; improve transparency of trade flows of plastics associated with international trade and embedded in traded goods; and better match existing trade-related needs and available assistance to address plastic pollution.
Sustainable Manufacturing and Environmental Pollution (SMEP) Programme	UNCTAD UK-FCDO SouthSouthNorth, Pegasys	The programme addresses the environmental and health impacts of the manufacturing sector in sub-Saharan Africa and South Asia, and some of the most pressing challenges associated with plastic pollution. FCDO has committed £24.6 million to deliver research and related interventions to meet programme objectives. The SMEP programme was

[41] https://www.unep.org/topics/ocean-seas-and-coasts/ecosystem-degradation-pollution/global-programme-action-gpa
[42] https://www.unep.org/explore-topics/oceans-seas/global-partnership-nutrient-management
[43] https://www.unep.org/resources/report/global-wastewater-initiative-gwi-response
[44] https://www.wto.org/english/tratop_e/ppesp_e/ppesp_e.htm
[45] chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/WT/MIN24/14.pdf&Open=True

		commissioned in mid-2019 and will run until October 2026. It funds projects addressing direct and indirect areas leading to oceans pollution, such as developing biodegradable fishing gear, developing natural fibres from agriwaste, and supporting water treatment projects that avoid marine eutrophication.
UNCTAD Ocean Economy and Fisheries Programme	UNCTAD	The UNCTAD Ocean Economy Programme helps countries integrate sustainability into trade and policy frameworks, ensuring that ocean-based industries contribute to economic growth without exacerbating marine pollution. It promotes trade policies that enable circular economy models, encouraging sustainable production and waste reduction in ocean-linked sectors. With its collaboration with SMEP it supports implementation of pollution control measures, through UNCTAD's mandate on marine pollution, strengthening the policy and economic foundations needed to reduce marine pollution at scale. The UN Ocean Forum, held biennially with UNCTAD partners, builds consensus and generates policy recommendations on trade-related aspects of SDG 14, supporting the United Nations Ocean Conference outcomes.
UNCTAD Plastics and Non-Plastic substitutes database	UNCTAD Statistics and UNCTAD Ocean and SMEP Programmes	UNCTAD hosts databases on trade in plastics [46] and trade in non-plastic substitutes [47], providing a data tool to track commercial trends in the global materials system. The tool enables tracking of trade in novel non-plastic substitutes, such as the growing role of seaweed for non-food applications.
Regional Seas Programme	Regional Seas Conventions and Actions Plans including Regional Activity Centres, Regional Nodes and Partners	The Regional Seas Conventions and Action Plans continue to work through Land Based Sources, Oil Spills, Dumping and other agreements and Protocols to respond to current and emerging pollution priorities. Regional Strategies and Action Plans and Regional Assessment Reports support harmonized action on pollution.

[46] https://unctadstat.unctad.org/datacentre/
[47] https://unctad.org/news/new-data-tracks-global-trade-non-plastic-substitutes

V. Conclusions and recommendations

56. Preventing and significantly reducing marine pollution of all kinds, in particular from land-based activities, requires an integrated approach that combines resource efficiency, circular and nature-based solutions, infrastructure investments, innovative financing, and robust governance. The existing framework of regulations and global standards set through various sectoral bodies and international conventions, has developed over decades and has been strengthened over the past few years to address the urgency reflected in the 2030 Agenda and the SDGs, including through the adoption of the BBNJ Agreement, which adds to the existing global and regional ocean governance framework. Targeted support must be leveraged to build the capacity to ratify and implement the provisions of relevant governance frameworks.

57. For many kinds of marine pollution, reductions at the source are the most effective actions. Engagement of all stakeholders, including the private sector, in marine pollution prevention and reduction is essential at all levels, to drive change in product design and value chain management, and to support investment in circular solutions. Given that pollution is generated from different sectors, varies among different geographies and has cross-sectoral and transboundary impacts, intersectoral coordination and source to sea approaches are needed to effectively address marine pollution. This needs to be supported by targeted public education and awareness programmes that also consider behavioral change.

58. To accelerate progress on marine pollution towards agreed goals and targets, particularly SDG Target 14.1, governments, development partners, financial institutions, the private sector and other relevant stakeholders should prioritize:

- Scaling resource efficiency and cleaner production in cities, industrial sectors and food systems, including agriculture, horticulture and aquaculture.
- Enhancing human, technical and institutional capacity at all levels (from local to global) to empower actions on the shared vision of reducing marine pollution of all kinds.
- Scaling up investments in nature-based and innovative solutions as sustainable alternatives for all relevant sources of pollution, including conventional wastewater treatment.
- Promoting effective and coherent governance and legislation to create an enabling political and regulatory environment at global, regional, national and local levels, including strengthening governance and regional cooperation to effectively implement and enforce obligations.
- Filling knowledge gaps and leveraging robust data management practices, big data and AI analytics and digital decision support tools in open-access platforms to improve transparency, accountability, learning and data-driven/evidence-based decision-making.
- Strengthening global to local action by implementing a source to sea approach to address pollution.
- Avoiding siloed approaches to prevent and reduce marine pollution, such as interventions with a single thematic focus in isolation.
- Assessing impacts of pollution, such as chronic and acute effects on human health, marine species and ecosystems, including cumulative impacts, and their integration in conservation plans, as well as identifying high-risk areas where marine pollution and migratory marine species or vulnerable ecosystems significantly intersect.
- Aligning international commitments with actionable, scalable pathways and solutions.

- Enhancing the development of regional pollution reduction strategies and action plans, including through the development or updating of legally binding regional pollution related protocols and agreements through Regional Seas Programmes.

VI. Guiding questions

1. What national or regional initiatives have been developed or implemented in the last 2 years aiming to reduce marine pollution, and how could these serve as a model for other countries/regions to accelerate actions towards the achievement of SDG Target 14.1?

2. Regarding the role of the private sector, how can respective relevant industry sectors scale up resource-efficient and cleaner production practices to reduce marine pollution, including through wastewater treatment and emission reduction?

3. How can public-private partnerships accelerate investments in pollution reduction technologies, and how can we ensure their long-term sustainability and scalability?

4. How can nature-based solutions contribute to the mitigation of marine pollution, and what role can governments, the private sector and civil society play in their implementation?

5. What capacity-building measures are needed to support adoption of technology that can contribute to the mitigation of marine pollution? How can partnerships and innovative finance mechanisms be leveraged to support and strengthen capacity-building?

6. How can governments enhance governance and enforcement of domestic laws to effectively reduce marine pollution from land-based sources?

7. How can the role of international legal instruments be enhanced to strengthen their role in prevention and reduction of marine pollution? What further contribution can they make in coordinating efforts to tackle marine biodiversity loss and pollution, as well as addressing transboundary issues in major river systems, to ensure effective source-to-sea policies?

8. What role can existing platforms, such as the Global Programme of Action and the Regional Seas Conventions and Action Plans play in addressing marine biodiversity and pollution challenges?

9. How can data-driven tools support monitoring and accountability, and how can such tools play a role in pollution management?

10. How can the promotion of synergies across MEAs and other existing institutional regulatory frameworks and bodies move from a conceptual approach to an implementable approach that is operationalized on the ground, supporting national and regional-level implementation?