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on marine litter and microplastics
Fourth meeting**

Online, 9–13 November 2020

Item 4 (d) of the provisional agenda*

**Analysis of the effectiveness of existing
and potential response options and activities
(res. 4/6 subparagraph 7(d))**

**Analysis of the effectiveness of existing and potential response options
and activities on marine litter and microplastics at all levels to
determine the contribution in solving the global problem**

Note by the Secretariat

1. The ad hoc open-ended expert group (AHEG) was established through United Nations Environment Assembly (UNEA) resolution 3/7 paragraph 10. Its mandate was extended through resolution 4/6 paragraph 7, which also requested the group to, among other things, through subparagraph 7(d):

“Analyse the effectiveness of existing and potential response options and activities on marine litter and microplastics at all levels to determine the contribution in solving the global problem.”

2. As requested by the expert group of the Secretariat during the third ad hoc open-ended meeting on marine litter and microplastics, the analysis builds on the stock-taking exercise mandated under resolution 4/6 subparagraph 7(a) and described in UNEP/AHEG/4/2. Additionally, comments provided during the third meeting of the expert group and intersessionally by Member States, the Scientific Advisory Committee, and major groups and stakeholders have informed the revised methodology; the existing body of work on effectiveness analysis methodologies has been considered; and three pilot studies that apply the updated methodology have been taken into consideration.
3. This document aims to provide more information on the analysis of effectiveness of potential response options outlined in operative paragraph 7(d) of the UNEP/EA.4/Res.6, and complements working document UNEP/AHEG/4/4 on the same subject.

* UNEP/AHEG/4/1.

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1. Introduction

4. This document responds to United Nations Environment Assembly (UNEA) resolutions 3/7 and 4/6 and the outcome document of AHEG-3, in which the importance of achieving the global goal of long-term elimination of discharge of litter and microplastics to the oceans was agreed. Analysis is provided on the effectiveness of response options to determine their contribution in solving the global problem. Due to the complexity of this and the large number of variables, further attention could be given to options for strengthening implementation of these response options.

5. This report has been prepared taking into account the feedback received from consultations prior to the fourth meeting of the ad hoc open-ended expert group on marine litter and microplastics (AHEG-4) to ensure that it adequately responds to the request set out in subparagraph 7(d). The report elaborates on the study outlined in UNEP/AHEG/4/4.

6. The discharge of plastic waste into the environment presents a risk to the oceans in the form of marine plastic litter and microplastics. Preventive and mitigative actions have been put in place at the international, regional, national and subnational levels to prevent such discharge into the environment and to mitigate the impacts thereof once discharged. An analysis of the effectiveness of existing and potential response options must identify and consider the barriers which undermine the goal of long-term elimination of discharge into the ocean, whereas discussion of the enabling conditions could assist in enhancing the effectiveness of response options.

2. Submissions on methodological approaches

7. In accordance with the guidance to the Secretariat on preparations for AHEG-4, the Scientific Advisory Committee convened by the Executive Director of UNEP to guide and provide input to the preparation of an assessment on sources, pathways and hazards of litter including plastic litter and microplastics pollution was invited to provide advice on methodological approaches to analyse the effectiveness of existing and potential response options. Member States and major groups and stakeholders were subsequently invited to submit further suggestions for improving the methodology. Submissions were uploaded to the UNEP papersmart portal or emailed directly to the Secretariat.

8. The proposed revised methodology was presented to Member States and major groups and stakeholders during an online webinar on 17 February 2020. Comments were noted during the webinar and the methodology was revised. A second webinar was held in May 2020, with presentations on the revised methodology and response option archetypes to be included in the study, followed by an introduction to the three pilot studies. The pilot studies were subsequently presented to Member States and major groups and stakeholders during an interactive technical briefing on 12 August 2020. All comments received throughout the intersessional period have been taken into account, which has further refined the methodology as well as the structure of this study.

3. Method

9. The revised methodology builds on submissions from Member States, the Scientific Advisory Committee, and major groups and stakeholders with regard to the methodology and the pilot studies. Previous work conducted under UNEA and the AHEG meetings have served as additional references, including the discussion papers on barriers (UNEP/AHEG/2018/1/2), national, regional and international response options (UNEP/AHEG/2018/1/3), environmental, social and economic costs and benefits (UNEP/AHEG/2018/1/4), and the feasibility and effectiveness of different response options (UNEP/AHEG/2018/1/5), the consolidated background paper of the discussion papers (UNEP/AHEG/2018/2/2) as well as the report submitted in delivery of UNEA resolution (Res.) 2/11, *Combating marine plastic litter and microplastics: an assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches* (UNEP/AHEG/2018/1/INF/3).

10. Activities relevant to the different response options submitted to the stock-taking survey, undertaken in delivery of UNEA Res. 4/6 para. 7(a), have been included as supporting examples. Submissions in response to UNEA resolution 3/7 paragraph 10(d) have informed the selection of response options.

11. Ten response option archetypes emerged from this work:

(a) Existing response options

- i. Regional marine litter action plans (UNEA Res. 1/6, UNEA Res. 2/11, UNEA Res. 3/7, UNEA Res. 4/6, UNEA Res. 4/9);
- ii. National marine litter action plans (UNEA Res. 1/6, UNEA Res. 2/11, UNEA Res. 3/7);

- iii. National solid waste management strategies (UNEA Res. 1/6, UNEA Res. 3/7, UNEA Res. 4/6, UNEA Res. 4/9; UNEP/AHEG/2018/2/2 Consolidated Background Paper of the Discussion Papers presented at the Ad hoc open-ended expert group on marine litter and microplastics First meeting, Nairobi, 29–31 May 2018, Annex 1);
 - iv. National regulatory measures (UNEA Res. 2/11, UNEA Res. 4/9, UNEP/AHEG/2018/1/2; UNEP/AHEG/2018/2/2 Consolidated Background Paper of the Discussion Papers presented at the Ad hoc open-ended expert group on marine litter and microplastics First meeting, Nairobi, 29–31 May 2018, Annex 1);
 - v. Market-based instruments (UNEA Res. 2/11, UNEA Res. 3/7, UNEA Res. 4/9, UNEP/AHEG/2018/1/2, UNEP/AHEG/2018/1/3; UNEP/AHEG/2018/2/2 Consolidated Background Paper of the Discussion Papers presented at the Ad hoc open-ended expert group on marine litter and microplastics First meeting, Nairobi, 29–31 May 2018, Annex 1).
- (b) Potential response options
- i. Strengthening the international framework (UNEP/AHEG/2018/1/2, UNEP/AHEG/2018/1/3; UNEP/AHEG/2018/2/2 Consolidated Background Paper of the Discussion Papers presented at the Ad hoc open-ended expert group on marine litter and microplastics First meeting, Nairobi, 29–31 May 2018, Annex 1);
 - ii. Strengthening regional frameworks (UNEA Res. 4/6, UNEP/AHEG/2018/1/2, UNEP/AHEG/2018/1/3; UNEP/AHEG/2018/2/2 Consolidated Background Paper of the Discussion Papers presented at the Ad hoc open-ended expert group on marine litter and microplastics First meeting, Nairobi, 29–31 May 2018, Annex 1);
 - iii. Global design standards (UNEA Res. 2/11, UNEA Res. 4/9, UNEP/AHEG/2018/1/2, UNEP/AHEG/2018/1/3; UNEP/AHEG/2018/2/2 Consolidated Background Paper of the Discussion Papers presented at the Ad hoc open-ended expert group on marine litter and microplastics First meeting, Nairobi, 29–31 May 2018, Annex 1);
 - iv. A new international framework (UNEP/AHEG/2018/1/2, UNEP/AHEG/2018/1/3, UNEP/AHEG/2018/2/2 Consolidated Background Paper of the Discussion Papers presented at the Ad hoc open-ended expert group on marine litter and microplastics First meeting, Nairobi, 29–31 May 2018, Annex 1);
 - v. National microplastics strategies (UNEA Res. 1/6, UNEA Res. 2/11, UNEA Res. 3/7, UNEA Res. 4/6)

12. Lack of funds has repeatedly been identified as a barrier to effective implementation of national waste management strategies,¹ demonstrating the need to strengthen funding globally. Response options for regulatory measures and market-based instruments have been combined with solid waste management to provide an integrated and holistic approach to waste management supported by sustainable domestic sources of finance.

13. A three-phased approach has been used for all response option archetypes. An **analysis of measures to address the life cycle** is first conducted, followed by an **analysis of indicators**. These analyses inform a **final discussion on effectiveness**.

14. The **analysis of measures to address the life cycle** incorporates the International Electrotechnical Commission (IEC) and International Organization for Standardization (ISO) 31010 Bowtie analysis methodology to identify the source of risks (drivers), pressures, control measures, and any barriers affecting the success of those controls within the response option archetype.² Thus the drivers, pressures, state, impact and responses (DPSIR) framework is also incorporated, which could help describe cause-effect relationships across different sectors.³ Response options are reviewed for actions that target each life cycle phase and suggestions provided for strengthening the life cycle phase of the response option. This first phase of the analysis informs the final discussion on effectiveness of the response option.

15. The **analysis of indicators** uses the indicators suggested in submissions by Member States, the Scientific Advisory Group, and major groups and stakeholders. Indicators are grouped into input, process and performance indicators, and provide an overview of the existing instruments relevant to the response option. Input indicators are descriptive of the response option, process indicators provide enabling factors, and performance indicators highlight outputs and outcomes already achieved and related to the response option. Indicators are given a rating of high, medium or low, or a yes/no rating based on their inclusion in the instruments relevant to the response option.

¹ Honolulu Strategy, 2011. *The Honolulu Strategy, A Global Framework for Prevention and Management of Marine Debris* <<http://www.unep.org/gpa/documents/publications/honolulustrategy.pdf>>.

² See Astles, K.L., Cormier, R., 2018. *Implementing Sustainably Managed Fisheries Using Ecological Risk Assessment and Bowtie Analysis*. 10. <https://doi.org/10.3390/su10103659>; Cormier, R., Elliot, M., Kannen, A., 2018. *IEC/ISO Bowtie analysis of marine legislation: A case study of the Marine Strategy Framework Directive*. ICES Cooperative Research Report No. 342, 56. <https://doi.org/10.17895/ices.pub.4504>

³ See UNEP, 2017b. *Strengthening the Science-Policy Interface: A gap analysis*. https://wedocs.unep.org/bitstream/handle/20.500.11822/22261/Gap_Analysis_2017.pdf?sequence=1&isAllowed=y.

16. The **final discussion on effectiveness** provides a qualitative analysis of the effectiveness of response options, including key barriers and enabling conditions. The following provides the factors discussed and how they are rated.

- i. Maturity
 - (a) High = Well established over many years in many Member States.
 - (b) Medium = Well established over a few years in only a few Member States.
 - (c) Low = Not well established yet in many Member States, but recent examples exist.
- ii. Feasibility
 - (a) High = Feasibility has been demonstrated.
 - (b) Medium = Feasibility has been demonstrated, but requires additional factors to be in place.
 - (c) Low = Feasibility has not yet been demonstrated. It has potential, but requires additional factors to be in place.
- iii. Time frame for planning and implementation
 - (a) Short = 0-2 years.
 - (b) Medium = 2-5 years.
 - (c) Long = 5+ years.
- iv. Impact
 - (a) High = addresses most pressures and barriers, could scale well.
 - (b) Medium = addresses some pressures and barriers, could possibly scale well.
 - (c) Low = a small number of pressures and barriers are addressed, may be challenging to scale.
- v. Overall comments
 - (a) Includes conditions that increase or reduce the effectiveness of the response option.

17. A final section provides a tabular overview of the contribution of the response options to solving the global problem.

4. Findings

4.1. STRENGTHENING THE EXISTING INTERNATIONAL FRAMEWORK

18. Strengthening the existing international framework is a **potential** response option that aims to close gaps in addressing the life cycle of marine litter and microplastics and to harmonize national action in this regard. The objectives are to prevent pollution, protect biodiversity and species and to manage chemicals and waste.⁴ Instruments are mostly binding, with some voluntary instruments relevant at the international level, covering all **geographic ranges**. All life cycle phases could benefit from strengthened measures, and all **environmental zones** could be better protected by these measures. **Actions** are predominantly cover prevention, monitoring & evaluation, with some mitigative activities. The **scale** rating for this potential response option is high because it is adopted at the international level, although its success will be determined by how effectively such measures are adopted in relevant international instruments.

4.1.1. Analysis of measures to address the life cycle

Upstream activities

19. The pressure influencing the first driver of the **source materials phase of the life cycle** is unsustainable development. It could be addressed by integrating the Sustainable Development Goals (SDGs) to guide the development of measures to combat marine litter and microplastics. The SDG approach may be limited by lack of understanding of the links between such measures and opportunities to achieve other SDGs in addition to SDG 14 (Life Below Water). This barrier could be overcome by expanding the mandate of an existing international body⁵ to build linkages across existing instruments⁶ and coordinate activities across the life cycle to drive action towards relevant SDGs, particularly SDG12 (Sustainable Consumption and Production), thereby harmonizing national and regional action towards sustainable materials management (SMM).⁷ National activities towards all SDGs will require coordination across multiple government authorities, necessitating a single national body to be established to drive the relevance of marine litter and microplastics to each SDG.

⁴ UNEP, 2017a. *Combating marine plastic litter and microplastics: An assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches*. https://papersmart.unon.org/resolution/uploads/unep_aheg_2018_inf3_full_assessment_en

⁵ EIA submission for response options

⁶ Switzerland, Malaysia, Singapore, EU submissions for response options

⁷ The Organisation for Economic Co-operation and Development (OECD) defines SMM as “a policy approach that aims to address the social, environmental and economic considerations throughout the life-cycle of a product or material, thereby improving resource security and competitiveness through better resource productivity.” For OECD work in this field, go to <https://www.oecd.org/env/waste/smm.htm>.

20. The pressure influencing the second driver of the **product manufacture phase of the life cycle** is lack of global regulatory measures and guidance on production methods. To address this barrier, global design standards could be developed⁸ to reduce marine pollution from land-based sources, giving effect to Article 207(4) of the UN Law of the Sea Convention (UNCLOS) that requests states to endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment from land-based sources. A scoping study on best practices for the design and recycling of fishing gear has been conducted, which could form a basis for addressing production methods contributing to sea-based sources. Global product standards could incorporate and expand on restrictions on the use of persistent organic pollutants (POPs) under the Stockholm Convention to better manage all plastics additives (e.g. through the Strategic Approach to International Chemicals Management (SAICM)), as well as support the development of upstream measures to minimize the generation of hazardous wastes and other wastes at source as per Article 4.2(a) of the Basel Convention. The effectiveness of preventive control may be limited by slow adoption of these standards in national policies, laws and regulations to stimulate eco-design by industries operating within Member State jurisdictions. Capacity-building could assist with the development of national legal and policy frameworks in this regard, including through developing a standardized set of definitions.⁹ A multi-stakeholder platform¹⁰ and technical workshops could strengthen the science-policy interface. Pilot projects could promote context-appropriate transfer of technology. Research on design options to prevent abandoned, lost and otherwise discarded fishing gear (ALDFG) and microplastics in the fishing and aquaculture industries could also be prioritized. Adoption of the voluntary IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units (CTU Code)¹¹ could be promoted to prevent cargo loss during shipping.

21. The pressure influencing the third driver, the **use phase of the life cycle**, is lack of global measures with regard to sustainable consumption patterns¹² that specifically target reductions of marine litter and microplastic. This could be addressed through the adoption of binding and/or voluntary measures that target sustainable consumption within high-impact industries such as tourism, shipping, agriculture and fisheries. The effect of preventive control could be reduced by lack of participation. That barrier could be overcome through developing sectoral guidelines to promote reuse, repair, and a reduction in the generation of wastes. For example, an interactive workshop titled “Leveraging sustainable procurement practices to transform tourism value chains” has led to 16 case studies being documented on transforming the tourism value chains to low carbon and resource efficient models.¹³

22. Adoption of Food and Agriculture Organization of the UN (FAO) guidelines,¹⁴ such as those for the marking of fishing gear, could be promoted for inclusion within national fishing licensing schemes and the number of regional fisheries bodies that include binding measures to prevent ALDFG and ghost fishing could be increased.¹⁵

Summary of upstream activities

23. The upstream pressures, controls, and barriers for a strengthened international framework are summarized in Table 1, providing insight into enabling conditions for this response option.

Table 1: Summary of upstream and midstream activities for a strengthened international framework

	Source Materials	Product Manufacture	Use
Pressures	<ul style="list-style-type: none"> • Unsustainable development 	<ul style="list-style-type: none"> • Lack of global regulatory measures, guidance 	<ul style="list-style-type: none"> • Lack of global sustainable consumption measures
Prevention Controls	<ul style="list-style-type: none"> • Integration of SDGs 	<ul style="list-style-type: none"> • Global design standards 	<ul style="list-style-type: none"> • Binding/voluntary measures for sustainable consumption in specific sectors
Barriers	<ul style="list-style-type: none"> • Recognition of links to other SDGs 	<ul style="list-style-type: none"> • Poor/slow adoption in national policies and legislation 	<ul style="list-style-type: none"> • Lack of Member State participation
Barrier Controls	<ul style="list-style-type: none"> • Expand mandate of existing international body to build linkages 	<ul style="list-style-type: none"> • Capacity building 	<ul style="list-style-type: none"> • Develop sectoral guidelines

⁸ EIA, 2020. Convention on Plastic Pollution Toward a new global agreement to address plastic pollution.

⁹ The Group of Chief Scientific Advisors (EU) has provided a scientific opinion recommending to “Initiate the development of consensual international definitions and standards for the measurement and monitoring of microplastic pollution and its impact on ecosystems and human health enabling: i) a globally-coherent picture of the nature and threats of microplastic pollution and, ii) clear, unambiguous technical prescriptions and criteria for regulatory measures, when these are needed development of International scientific standards and methodologies.” EU, 2019. Environmental and Health Risks of Microplastic Pollution. Group of Chief Scientific Advisors Scientific Opinion 6/2019.

¹⁰ Japan submission for response options

¹¹ International Maritime Organization (IMO)/International Labour Organization (ILO)/United Nations Economic Commission for Europe (UN ECE) (2014). *IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units (CTU Code). 2014 Edition.* <https://www.unece.org/trans/wp24/guidelinespackingctus/intro.html>.

¹² See UNEP, 2012. The Global Outlook on SCP Policies. Taking action together.

¹³ <https://www.oneplanetnetwork.org/leveraging-procurement-tourism>

¹⁴ UNEA Res. 2/11, para. 14

¹⁵ Gilman, E., 2015. *Status of international monitoring and management of abandoned, lost and discarded fishing gear and ghost fishing.* Marine Policy 60, 225-239. <http://dx.doi.org/10.1016/j.marpol.2015.06.016>

	<ul style="list-style-type: none"> • Establish national coordinating body 	<ul style="list-style-type: none"> • Multi-stakeholder platform to strengthen science-policy interface 	
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Downstream activities

24. The pressure influencing the fourth driver, the **end-of-life phase of the life cycle**, is unsustainable waste management. This could be addressed by strengthening compliance with the Basel Convention in line with its definition of environmentally sustainable waste management in Article 2(8)¹⁶ and of the principle of proximity in Article 4.2(b), and in compliance with the Stockholm Convention to ensure products containing substances regulated by the Convention are “not permitted to be subjected to disposal operations that may lead to recovery, recycling, reclamation, direct reuse or alternative uses of persistent organic pollutants” (Article 6.1.d(iii)). This restriction could be expanded to recycling processes for all plastics to prevent reintroduction of chemicals of concern.¹⁷ Lack of infrastructure, which contributes to international trade in waste, undermines the ability to achieve these goals. This barrier could be overcome by providing capacity-building and sharing of best practices through a multi-stakeholder platform towards creating a policy environment that incentivizes private investment.¹⁸ That includes developing market-based instruments to incentivize return schemes (including for fishing gear) and enacting laws that consider illegal traffic in hazardous or other wastes to be criminal activities (Basel Convention, Article 4.3) and that ensure transparency of trade in plastic waste, as set out in the 2019 Plastic Waste Amendments to the Basel Convention. As a result of these amendments, a review is being undertaken to determine if any additional hazardous constituents or characteristics in relation to plastic waste should be added to Annex I or III of the Basel Convention.¹⁹ Regional support could be provided through the network of 14 Regional and Coordinating Centres for Capacity Building and Technology Transfer (BCRCs) established under the Basel Convention,²⁰ which also provides for a technical assistance plan for countries in need of assistance,²¹ including strengthening enforcement. The Plastic Waste Partnership was also established in 2019, which aims to “mobilise business, government, academic and civil society resources, interests and expertise to improve and promote the environmentally sound management (ESM) of plastic waste at the global, regional and national levels and to prevent and minimize its generation.”²²

25. Post-discharge **mitigative activities** could include providing capacity-building and assistance to identify hotspots, particularly where sensitive ecosystems are impacted, and sustainable removal of marine litter from these areas. For example, field testing is underway in five countries in Asia and East Africa for the UNEP/IUCN Hotspot Methodology.²³ Technology transfer for capture devices, including for wastewater treatment, could be achieved through pilot projects and assistance to existing facilities with upgrades.

26. **Monitoring and evaluation** of the global status of marine litter and progress in reducing its discharge into the ocean is not currently an objective of any international instrument. The Honolulu Strategy suggests approaches, but no measurable targets or timelines are provided. This strategy could be revised to include agreed indicators of success and to identify institutions that are appropriate to conduct monitoring. For example, impacts on biodiversity could be monitored under the Convention on Biological Diversity (CBD). Monitoring of cargo losses from shipping could be strengthened to complement the International Maritime Organization (IMO) Action Plan to address marine plastic litter from ships. The number of regional fisheries bodies that have adopted binding measures for the reporting and monitoring of losses or sightings of ALDFG could be expanded. Reporting of losses and sightings could also be included in national fishing licensing schemes.²⁴ Global standards for national monitoring and reporting on production, consumption, use, final treatment and trade of products could be developed²⁵ to allow aggregation at the international level to measure progress on targets using indicators to be agreed. Some work on losses to the environment from across the value chain have been modelled for macro- and microplastics²⁶. Further work, incorporating various models and approaches could be undertaken to move towards baselines against which global progress could be measured.

¹⁶ Basel Convention, Article 2(8): “‘Environmentally sound management of hazardous wastes or other wastes’ means taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes.” *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal*. <https://www.basel.int/Portals/4/Basel%20Convention/docs/text/BaselConventionText-e.pdf>.

¹⁷ ENEC, 2019. Motivations for and Barriers to Ecodesign in Industry.

¹⁸ See Pew Trusts, 2020. Breaking the Plastic Wave. A comprehensive assessment of pathways towards stopping ocean plastic pollution.

¹⁹ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)).

²⁰ <http://www.basel.int/Partners/RegionalCentres/Overview/tabid/2334/Default.aspx>

²¹ Decision BC-14/18. See <http://www.basel.int/Implementation/Plasticwaste/Technicalassistance/tabid/8340/Default.aspx>

²² <http://www.basel.int/Implementation/Plasticwastes/PlasticWastePartnership/tabid/8096/Default.aspx>

²³ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)).

²⁴ UNEA Res. 2/11, para 14 ; Gilman, E., Chopin, F., Suuronen, P., Kuemlangan, B., 2016. *Abandoned, lost or otherwise discarded gillnets and trammel nets*. FAO Fisheries & Aquaculture Technical Paper, i-79. <http://www.fao.org/3/a-i5051e.pdf>

²⁵ Switzerland, Philippines, Africa Group submission for response options

²⁶ UNEP, 2018a. Mapping of global plastics value chain and plastics losses to the environment.

Summary of downstream activities

27. The downstream pressures, controls, and barriers for a strengthened international framework are summarized in Table 2, providing insight into enabling conditions for this response option.

Table 2: Summary of downstream activities for a strengthened international framework

	End-of-life	Mitigative Controls	Monitoring & Evaluation
Pressures	<ul style="list-style-type: none"> Unustainable waste management 	<ul style="list-style-type: none"> Lack of information and capacity for monitoring 	<ul style="list-style-type: none"> Global tracking of marine litter not the focus of any international instrument
Prevention Controls	<ul style="list-style-type: none"> Environmentally sound waste management as per Basel Convention 	<ul style="list-style-type: none"> Capacity-building to identify hotspots 	<ul style="list-style-type: none"> Strengthen monitoring under CBD, IMO, FAO, Basel Convention, SAICM, GPA
Barriers	<ul style="list-style-type: none"> Lack of infrastructure 	<ul style="list-style-type: none"> Lack of infrastructure to prevent discharge 	<ul style="list-style-type: none"> Tracking across multiple instruments
Barrier Controls	<ul style="list-style-type: none"> Capacity building Sharing of best practices 	<ul style="list-style-type: none"> Technology transfer for capture devices, wastewater treatment 	<ul style="list-style-type: none"> Streamline reporting requirements

4.1.2. Analysis of indicators

Input

28. The response option of strengthening the existing international framework has a **global scope**. This response option emerged after the Stockholm Conference in the 1970s. Subsequent adoptions and revisions of international conventions regulate a variety of relevant topics, including transboundary movements of hazardous wastes and other wastes, persistent organic pollutants (POPs) and dumping of wastes at sea. According to the UNEP/AHEG/2018/1/INF/3 report, there are eight relevant international legally binding instruments relevant to the prevention of marine litter and microplastics.²⁷ Voluntary instruments have also been adopted in the fisheries sector. The **maturity** of this response option is therefore high. International conventions that form the existing international framework have a fairly high level of ratification by Member States, including over 180 Member States to the Stockholm Convention and the Basel Convention, and 168 Member Parties to UNCLOS. The **scale** rating of the existing international framework is therefore high.

Process indicators

29. An overall **management target** specific to marine litter and microplastics has not been set by binding instruments at the international level. States are obligate to “prevent, reduce and control pollution of the marine environment from any source.”²⁸ However, no binding quantitative values have been provided to give effect to this duty. In lieu of a binding target, UNEA Resolution 3/7 has set a global management target of long-term elimination of discharge of litter and microplastics to the oceans and of avoiding detriment to marine ecosystems and the human activities dependent on them from marine litter and microplastics. Giving effect to this are the targets of reduced amount and impact of marine litter from land- and sea-based sources, or from marine litter accumulated on shorelines in benthic habitats and in pelagic waters.²⁹

30. International instruments include **operational targets** for specific instructions of reaching the management target of preventing, reducing and controlling pollution of the marine environment from any source. However, these are not quantitative, except where prohibitions can be regarded as a zero target, and do not address all life cycle phases in adequate detail. The release of toxic, harmful or noxious substances from land-based sources, or from/through the atmosphere or by dumping, must be minimized. Pollution must be minimized to the fullest extent possible from vessels, installations and devices operating in the marine environment.³⁰ The generation of hazardous wastes and other wastes must be minimised at source.³¹ The production, use, import and export of regulated chemicals must be prohibited, while others listed must be restricted.³² Contracting parties agreed to individually and collectively promote the effective control of all sources of pollution of the marine environment and take all practicable steps to prevent the pollution of the sea by the dumping of waste and other matter, to prevent harm to living resources and marine life.³³ States are

²⁷ This report includes the Paris Agreement in the analysis in recognition of requests by Member States and major groups and stakeholders to consider impacts on climate change.

²⁸ UNCLOS, 1982. *United Nations Convention on the Law of the Sea* <http://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf>., Article 194

²⁹ Honolulu Strategy

³⁰ UNCLOS, Article 194.3

³¹ Basel Convention, Article 4.2(a)

³² Stockholm Convention, Article 3.2

³³ *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*, 1046UNTC 138 (entered into force 30 August 1975) (*London Convention*) Article 1.

required to minimise pollution, waste, discards, catch by lost or abandoned gear, catch of non-target species and protect biodiversity in the marine environment.³⁴ Consideration should be given to new technologies to minimise accidental loss and facilitate location and recovery of abandoned, lost or otherwise discarded fishing gear (ALDFG) in order to improve product desing. Participation in pellet control programmes could be expanded and encouraged.³⁵

31. Taking into account the lack of capacity and funding for the management of marine litter in developing countries,³⁶ **local capacity building and development** has therefore been emphasised in the existing international framework. Member States could take action to build capacity to monitor and enforce compliance with national and local legislation and permit conditions regarding litter, dumping, solid waste management, stormwater, and surface runoff, as well as MARPOL Annex V requirements.³⁷ It is emphasised that effective coordination among civil society, government, and the private sector would improve the response to and rate of removal of marine debris.³⁸

32. At the international level, Member States have decided on **financial** arrangements of voluntary or binding natures, especially on securing funding for developing States' implementation, through capacity-building, technology transfer and research. Each Party State is to provide financial support and incentives for national activities that are intended to achieve the goal of the existing convention within its capacities, while developed Party States shall provide financial assistance for developing states and economies in transition for agreed full incremental costs of fulfilling their obligations.³⁹ Country parties should continue to mobilize finance from a wide variety of sources, instruments and channels, assisting developing countries with their needs.⁴⁰

33. **Monitoring** is an important element in the existing international framework. Monitoring supports a responsive international framework and facilitates adaptation to emerging issues. At the international level, States have agreed to develop monitoring methods and mechanisms for effective implementation at the regional and national level. The risks or effects of pollution are to be monitored for the purposes of evaluation and analysis.⁴¹ Member Parties agreed to cooperate in monitoring the effects of the management of hazardous wastes on human health and the environment.⁴² Monitoring implementation and compliance is undertaken by the Committee for Administering the Mechanism for Promoting Implementation and Compliance with the Basel Convention.⁴³

34. Within the existing international framework, progress **reports** are requested from States on a regular basis. Contents of State reports include measures taken in compliance with the instrument, the effectiveness of these measures and the difficulties experienced in implementation.⁴⁴ Parties must also provide reports to the Secretariat to assist with the monitoring of hazardous wastes and other wastes.⁴⁵ There are no international obligations to report specifically on the environmental status of marine litter and microplastics, or on relevant production, consumption, trade and end-of-life treatment processes beyond current reporting requirements under the Basel Convention and the Stockholm Convention.

35. Within the existing international framework, **evaluation and review** are commonly required. For the review of implementation, the Conference of the Parties shall review the implementation of the instrument and establish the form of reports to be submitted by Member Parties. The Conference of the Parties shall also review scientific, technical and technological provided on biodiversity provided by the subsidiary body.⁴⁶ The Conference of the Parties shall also assess the collective progress towards achieving the purpose of the instrument. With the global stocktake, the Conference of the Parties shall inform Member Parties to update and enhance their actions and provide relevant support.⁴⁷ Every five years, national strategies and their effectiveness in reducing or eliminating releases from unintentional production of POPs is required.⁴⁸

36. Under the existing international framework, **domestic stakeholders** are included, and the principle of public participation is promoted. Parties shall consult their national stakeholders, including women's groups and groups

³⁴ *The United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks*, UN Doc A/CONF.164/37 ('UNFSA')

³⁵ Honolulu Strategy, Strategy B1, Goal A

³⁶ Philippines, Afrcan Group submission for response options ; UNEP/AHEG/2018/1/2 ; UNEP/AHEG/2018/1/4

³⁷ Honolulu Strategy, Strategy A6, B6

³⁸ Honolulu Strategy, 2011. *The Honolulu Strategy, A Global Framework for Prevention and Management of Marine Debris* <<http://www.unep.org/gpa/documents/publications/honolulustrategy.pdf>>. Strategy C3.

³⁹ Stockholm Convention, Article 13.

⁴⁰ Paris Agreement, Article 9(4).

⁴¹ UNCLOS, Article 204

⁴² Basel Convention, Article 10.

⁴³ The Committee is a subsidiary body of the Conference of the Parties to the Basel Convention that was established in 2002 under Article 15, paragraph 5(e) of the Convention

⁴⁴ Stockholm Convention, Article 15. Convention on Biological Diversity, opened for signature 5 June 1992, 1760 UNTS 79 (entered into force 29 December 1993) ('CBD') Article 26.

⁴⁵ Basel Convention, Article 16(g)

⁴⁶ CBD, Article 23.

⁴⁷ Paris Agreement, Article 14.

⁴⁸ Stockholm Convention, Article 5(a.v)

involved in the health of children, in order to facilitate the development, implementation and updating of their implementation plans for management of POPs.⁴⁹ Outreach and education of the negative impacts from marine debris are highly recommended to States.⁵⁰

37. The existing cooperation on **international capacity building** emphasises the assistance to developing countries, specifically on aspects including technical assistance, technology transfer, training and scientific research, as well as the allocation of funds for the prevention of marine pollution.⁵¹ Member States recognised the importance of support for and international cooperation on adaptation efforts, as well as the importance of considering the needs of developing countries, especially those that are particularly vulnerable to the adverse effects of climate change.⁵² Member Parties shall fully consider the specific needs and special situation of least developed countries and small island developing states in their actions with regard to technical assistance.⁵³ To promote the use of best management practice (BMP) and best available technology (BAT), States shall cooperate in promoting research, development and exchange of information on best technologies for containment, recovery, recycling or destruction of controlled substances or reducing their emissions.⁵⁴ Useful measures could include: Improvements in waste management with the aim of the cessation of open and other uncontrolled burning of wastes, including the burning of landfill sites. When considering proposals to construct new waste disposal facilities, consideration should be given to alternatives such as activities to minimize the generation of municipal and medical waste, including resource recovery, reuse, recycling, waste separation and promoting products that generate less waste. Under this approach, public health concerns should be carefully considered. Regional and subregional centres are promoted for capacity-building and transfer of technology to assist developing country Parties and Parties with economies in transition.⁵⁵

38. **Co-benefits** including environmental, social and economic are taken into consideration in the existing international framework. It emphasises the negative impacts on public health and cultural values from marine pollution.⁵⁶ Marine litter also poses negative impacts on the social and aesthetic values generated by biodiversity.⁵⁷ Social, technological and economic aspects are to be taken into account when ensuring the generation of hazardous wastes and other wastes are reduced to a minimum.⁵⁸ Annex F of the Stockholm Convention contains detailed information on socio-economic considerations for possible control measures regarding chemicals under consideration for inclusion in the Convention, including for alternatives.

Performance indicators

39. Assessing the **performance** of a strengthened international framework within the role of harmonization could include the tools developed to assist with development and implementation of measures to better address the life cycle. Guidance on the reporting required by countries is also needed to enable aggregation of national reports at the regional and international levels.

Summary of indicators

40. The assessment of instruments and measures relevant to a strengthened international framework are summarized in Table 3, providing insight into the input, process and performance of this response option.

Table 3: Summary of indicators for a strengthened international framework

Indicator Type	Indicator	Description	Evaluation
INPUT	Scope	International, regional or national	International
	Maturity	Operational years - high, medium, low	High
	Scale	Level of adoption	High
PROCESS	Governance	Management targets	High – no targets specific to marine litter beyond UNEA Resolution 3/7.
		Operational targets	Medium – Some goals are included in existing MEAs that could be applied to some life cycle phases.

⁴⁹ Stockholm Convention, Article 7(2)

⁵⁰ Honolulu Strategy, Strategy B1.

⁵¹ UNCLOS, Article 202, 203

⁵² Paris Agreement, Article 7.

⁵³ Stockholm Convention, Article 12.

⁵⁴ Stockholm Convention, Part V

⁵⁵ Stockholm Convention, Article 12(4)

⁵⁶ Honolulu Strategy.

⁵⁷ CBD, Preamble.

⁵⁸ Basel Convention, Article 4(2)

	Management	Local capacity building Ongoing funding secured	Yes – not well represented Yes – varied funding sources, including different stakeholders and innovative funding mechanisms
		Monitoring in place	Yes – monitoring within the mandate of existing MEAs. Upstream monitoring of production and consumption is limited to POPs. No indicators developed for marine litter or microplastics.
		Reporting in place	Yes – required under existing MEAs. Life cycle measures for marine litter and microplastics not specifically included beyond the Basel Convention.
		Review process defined	Yes – includes implementation and difficulties experienced, with some review of national action plans every five years.
	Co-operation	Domestic stakeholder inclusion International capacity building	Yes – strong for POPs Yes – strong support for developing countries and some for economies in transition.
	Co-benefits recognised	Environmental Social Economic	Yes – strong focus on environmental health Yes – strong focus on human health. Yes – limited compared to environmental and human health
PERFORMANCE	Outputs	Guidelines, sharing of best practices	Yes – platforms established for exchange of best practices and stakeholder engagement; subsidiary bodies and regional centres established.
	Outcomes		Yes – Guidelines to support national implementation.

4.1.3. Discussion on effectiveness

41. The above analysis of measures to address the life cycle, together with the analysis of indicators, inform the following assessment of the effectiveness of strengthening the existing international framework to contribute to the global goal of eliminating the discharge of marine litter and microplastics to the ocean, as per UNEA resolution 3/7 paragraph 1.

Maturity

42. **High.** This response option emerged following the UN Conference on the Human Environment in 1972. Subsequent adoptions and revisions of international conventions regulate a variety of relevant topics, including transboundary movements of hazardous wastes, POPs, and dumping at sea. According to UNEP/AHEG/2018/1/INF/3, there are eight relevant legally binding international instruments. In addition, voluntary instruments have been adopted in sectors including fisheries.

Feasibility

43. **Medium.** Feasibility could be demonstrated through eight international conventions and a number of voluntary instruments that are widely recognized by Member States. The United Nations Convention on the Law of the Sea (UNCLOS) sets out general obligations with regard to protection and preservation of the marine environment. Pollution from sea-based sources is addressed in the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex V; the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter and its Protocol (the London Convention and the London Protocol); the UN Fish Stock Agreement; and the FAO Code of Conduct for Responsible Fisheries. Strengthening mostly applies to land-based sources of marine litter and microplastics. At a minimum, the Stockholm Convention and the Basel Convention would require strengthening through measures specific to marine litter and microplastics. Negotiations may take a number of years. Addressing the full life cycle, including additives, across all phases may be challenging. Monitoring and reporting progress that is specific to marine litter and microplastics may be challenging to coordinate and to aggregate across multiple instruments.⁵⁹

⁵⁹ UNEP, 2017a. *Combating marine plastic litter and microplastics: An assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches*. https://papersmart.unon.org/resolution/uploads/unep_aheg_2018_inf3_full_assessment_en

Time frame

44. **Long.** International instruments that tackle marine pollution, directly or indirectly, have been adopted for long-term enforcement (five or more years). Amendments, implementing agreements and reviews are adopted or conducted to take into account new developments and mandates.

Impact

45. **High.** Strengthening existing international frameworks is an effective response option to prevent and reduce marine litter at the international level. It has a global impact in that it overcomes a number of pressures and barriers. These international instruments have not specifically or adequately included microplastic pollution in their mandates, nor have they employed a full life cycle perspective for marine pollution. They could be supplemented with relevant reviews, amendments, implementing agreements or voluntary instruments.

Overall comments

46. The existing international framework focuses on pollution, wastes and the protection of natural resources, with regulations on preventing pollution from land- and sea-based sources. To be effective, Member States could expand mandates to include microplastic pollution, enhance compliance through establishing an international platform and encourage upstream preventive measures. This includes development of global design standards to improve the environmental performance of products, discussed in section 5.2 as a separate response option.

47. The effectiveness of the existing international framework is currently constrained by a lack of enforcement mechanisms, national bodies dedicated to the issue, funding limitations and poor technologies in Member States. Strengthening the existing international framework might not necessarily address these barriers.

4.2. DEVELOPING GLOBAL DESIGN STANDARDS

48. The development of global design standards to improve products' environmental performance is another potential response option intended to harmonize national action to drive global markets.⁶⁰ These standards would be designed to take effect at the international level in a voluntary framework, providing a **scale** rating of medium to high, but their effectiveness would be determined by the ways in which they were adopted at the national level in both voluntary and mandatory measures. The primary objective is to reduce leakage of products and materials into all environmental compartments, focusing on preventive activities that target all life cycle phases and protect all **environmental zones**.

4.2.1. Analysis of measures to address the life cycle

Upstream activities

49. The pressure influencing the first driver, the **source materials phase of the life cycle**, is unsustainable development. Strengthened corporate environmental responsibility could reduce the impact of material extraction and the production of feedstocks (e.g. pellets). Plastic is not historically the primary product of the oil and natural gas extractive industries, which affects motivation to make significant changes to processes.⁶¹ Environmental performance rating schemes could drive changes in processes that reduce the impacts of material extraction, including contributions to climate change,⁶² inefficient use of resources, and generation of hazardous wastes and other hazardous by-products.⁶³ Schemes that provide a rating system for processes' environmental performance are in place. One example, Operation Clean Sweep (OCS), is an international programme designed to minimize the discharge of plastic pellets, flakes and powders from both production and transport processes.⁶⁴ OCS was made compulsory for all PlasticsEurope members from January 2020.⁶⁵

⁶⁰ AHEG-1, Co-Chairs Summary, Annex I, para 6

⁶¹ <https://www.eia.gov/tools/faqs/faq.php?id=34&t=6>; <https://theconversation.com/fossil-fuel-industry-sees-the-future-in-hard-to-recycle-plastic-123631>

⁶² CIEL, 2019. Plastic & Climate: The Hidden Costs of a Plastic Planet. ; EIA, 2020. Convention on Plastic Pollution Toward a new global agreement to address plastic pollution.

⁶³ Togo Welfare submission for response options

⁶⁴ <https://www.opcleansweep.org/>

⁶⁵ PlasticsEurope, 2019. Operation Clean Sweep® Port of Antwerp Activity Report 2019.

50. The pressure influencing the second driver, the **product manufacture phase of the life cycle**, is lack of due diligence by manufacturers.⁶⁶ A product rating and labelling system that evaluates the inclusion of design criteria⁶⁷ could promote innovation in design for the environment.⁶⁸ Such a rating system could include criteria such as use of non-hazardous recycled content, limited production of hazardous and other wastes, reduced amounts of packaging, design for remanufacture⁶⁹ and use of remanufacturing systems (combining reused, repaired and new components).⁷⁰ The effectiveness of a rating system as a preventive control could be reduced by lack of standards to guide design;⁷¹ uncertainty about environmental benefits versus possible loss of functionality; poor market demand for products that meet particular standards;⁷² limited availability of high-quality secondary materials;⁷³ slow uptake by industry; and lack of national product standards that integrate global design standards (environmental and other) into legislation.⁷⁴ Examples include a number of design and eco-labelling standards adopted in the EU.⁷⁵ In addition, eco-design indicators are poorly represented in government research and development programmes.⁷⁶ These barriers could be overcome by establishing a technical advisory body⁷⁷ to develop definitions and appropriate design standards, to disseminate these standards to industry⁷⁸ including how to implement them,⁷⁹ and to estimate the environmental, economic and social benefits of different design options. Market demand could be increased by mandating the inclusion of non-hazardous recycled and recyclable content,⁸⁰ supported by awareness-raising campaigns to create a competitive advantage⁸¹ for manufacturers that meet standards (market signals).⁸² Quality standards for sorted plastic waste could improve the quality of secondary materials. Promoting measurable and time-bound commitments by industry could improve the uptake of design standards for safe remanufacturing. Fiscal and economic incentives could encourage design for remanufacturing and the adoption of remanufacturing processes. International capacity-building could assist Member States to develop such domestic regulatory and market-based instruments. It could also support the inclusion of eco-design indicators in research and development (R&D) programmes.⁸³

51. The pressure influencing the third driver, the **use phase of the life cycle**, is the high rate of product disposal and microplastic releases. A product rating and labelling system⁸⁴ that evaluates the inclusion of design for material durability, reuse, repair,⁸⁵ reduced product redundancy (longevity) and avoidance of microplastic emissions⁸⁶ could stimulate the design of products with a longer disposal time frame.⁸⁷ The effectiveness of such preventive control could be reduced by lack of standards to guide design, poor understanding of systems (e.g. regulatory and policy frameworks, infrastructure) to support reuse and repair schemes, slow uptake by manufacturers and retailers, low consumer participation in repair or return for reuse schemes, and conflict between product functionality and the environmental outcomes of design for reduced abrasion.⁸⁸ These barriers could be overcome by establishing a technical advisory body⁸⁹

⁶⁶ UNEP, 2017a. *Combating marine plastic litter and microplastics: An assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches*. https://papersmart.unon.org/resolution/uploads/unep_aheg_2018_inf3_full_assessment_en; Dauvergne, P., 2018. *Why is the global governance of plastic failing the oceans?* Glob. Environ. Change-Human Policy Dimens. 51, 22-31. 10.1016/j.gloenvcha.2018.05.002 ; Philippines, Africa Group submissions for response options.

⁶⁷ Philippines, EU, Japan, Switzerland, Norway submissions for response options; ENEC, 2019. *Motivations for and Barriers to Ecodesign in Industry*. ; UNEP/AHEG/2018/1/2, para. 23

⁶⁸ UNEA Res. 4/9, para. 4; EIA, 2020. *Convention on Plastic Pollution Toward a new global agreement to address plastic pollution*. ; UNEP, 2020b. *National Guidance for Plastic Pollution Hotspotting and Shaping Action*. Introduction report, United Nations Environment Programme. Nairobi, Kenya.

⁶⁹ Rossi, M., Germani, M., Zamagni, A., 2016. *Review of ecodesign methods and tools. Barriers and strategies for an effective implementation in industrial companies*. J. Clean Prod. 129, 361-373. <https://doi.org/10.1016/j.jclepro.2016.04.051>

⁷⁰ ECOS, 2019. *For Better Not Worse: Applying Ecodesign Principles to Plastics in the Circular Economy*

⁷¹ EIA, 2020. *Convention on Plastic Pollution Toward a new global agreement to address plastic pollution*. ; UNEP/AHEG/2018/1/2, para. 8, para. 13 (table), para. 16, para. 23

⁷² Norway, Switzerland submission for response options

⁷³ ECOS, 2019. *For Better Not Worse: Applying Ecodesign Principles to Plastics in the Circular Economy*

⁷⁴ Rossi, M., Germani, M., Zamagni, A., 2016. *Review of ecodesign methods and tools. Barriers and strategies for an effective implementation in industrial companies*. J. Clean Prod. 129, 361-373. <https://doi.org/10.1016/j.jclepro.2016.04.051>

⁷⁵ See Annex B, ECOS, 2019. *For Better Not Worse: Applying Ecodesign Principles to Plastics in the Circular Economy*

⁷⁶ ENEC, 2019. *Motivations for and Barriers to Ecodesign in Industry*.

⁷⁷ CIEL submission for response options

⁷⁸ ENEC, 2019. *Motivations for and Barriers to Ecodesign in Industry*.

⁷⁹ Rossi, M., Germani, M., Zamagni, A., 2016. *Review of ecodesign methods and tools. Barriers and strategies for an effective implementation in industrial companies*. J. Clean Prod. 129, 361-373. <https://doi.org/10.1016/j.jclepro.2016.04.051>

⁸⁰ ECOS, 2019. *For Better Not Worse: Applying Ecodesign Principles to Plastics in the Circular Economy*

⁸¹ Rossi, M., Germani, M., Zamagni, A., 2016. *Review of ecodesign methods and tools. Barriers and strategies for an effective implementation in industrial companies*. J. Clean Prod. 129, 361-373. <https://doi.org/10.1016/j.jclepro.2016.04.051>

⁸² ENEC, 2019. *Motivations for and Barriers to Ecodesign in Industry*.

⁸³ ENEC, 2019. *Motivations for and Barriers to Ecodesign in Industry*.

⁸⁴ OECD, 2016b. *Policy Guidance on Resource Efficiency*. OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264257344-en>

⁸⁵ UNEP, 2020b. *National Guidance for Plastic Pollution Hotspotting and Shaping Action*. Introduction report, United Nations Environment Programme. Nairobi, Kenya.

⁸⁶ Philippines, Africa Group submissions for response options; ECOS, 2019. *For Better Not Worse: Applying Ecodesign Principles to Plastics in the Circular Economy*

⁸⁷ Rossi, M., Germani, M., Zamagni, A., 2016. *Review of ecodesign methods and tools. Barriers and strategies for an effective implementation in industrial companies*. J. Clean Prod. 129, 361-373. <https://doi.org/10.1016/j.jclepro.2016.04.051>

⁸⁸ ENEC, 2019. *Motivations for and Barriers to Ecodesign in Industry*.

⁸⁹ CIEL submission for response options

to develop appropriate definitions and design standards⁹⁰ and to estimate the environmental benefits of various design options. Technology transfer, capacity-building and multi-stakeholder platforms⁹¹ with experts could provide knowledge on provision of supporting infrastructure and on policy environments that stimulate industry uptake of reuse and return schemes, coupled with awareness-raising to encourage consumer participation. Industry uptake of design standards for durability, reuse, repair, reduced redundancy, and avoidance of emissions of microplastics could be improved by encouraging measurable and time-bound commitments. A technical advisory body⁹² could assist with design options to reduce abrasion of materials. Rate-of-abrasion labelling could improve use of materials to minimize microplastic emissions.⁹³

Summary of upstream activities

52. The upstream pressures, controls, and barriers are global design standards are summarized in Table 4, providing insight into enabling conditions for this response option.

Table 4: Summary of upstream and midstream activities for global design standards

	Source Materials	Product Manufacture	Use
Pressures	<ul style="list-style-type: none"> Unsustainable development 	<ul style="list-style-type: none"> Lack of due diligence 	<ul style="list-style-type: none"> High rate of disposal and leakage
Prevention Controls	<ul style="list-style-type: none"> Strengthen corporate environmental responsibility 	<ul style="list-style-type: none"> Product rating and labelling system 	<ul style="list-style-type: none"> Product rating and labelling (durability, reuse, repair, longevity, abrasion)
Barriers	<ul style="list-style-type: none"> Lack of motivation 	<ul style="list-style-type: none"> Lack of standards to guide design Uncertainty of outcomes Lack of end-markets Slow uptake by industry Limited high-quality secondary materials 	<ul style="list-style-type: none"> Lack of national standards for durability, reuse, repair, longevity, abrasion Lack of supporting systems Slow industry uptake Low consumer participation Product performance reduction
Barrier Controls	<ul style="list-style-type: none"> Environmental performance rating schemes 	<ul style="list-style-type: none"> Technical advisory body (definitions, design standards, estimate outcomes) Mandatory inclusion of recycled, recyclable content Promote industry commitment and competition Capacity-building for national policies to incentivise eco-design Eco-design indicators in R&D programmes 	<ul style="list-style-type: none"> Technical advisory body (definitions, design standards, estimate outcomes, abrasion) Capacity-building Technology transfer Multi-stakeholder platform Promote industry action and reporting through e.g. commitments Rate-of-abrasion labelling

Downstream activities

53. The pressure influencing the fourth driver, the **end-of-life phase of the life cycle**, is the abundance of products that are difficult to recycle, often leading to a low collection rate.⁹⁴ A product rating and labelling system that evaluates the inclusion of design for recyclability criteria could increase the share of products on the market that are easy and economically feasible to recycle.⁹⁵ The effectiveness of such preventive control could be reduced by lack of standards to guide design, lack of suitable end-of-life infrastructure, limited end-markets for secondary materials, lack of national product standards to integrate global design standards (environmental or other) into legislation, and poor representation of eco-design indicators in government research and development programmes.⁹⁶ Regulators may also lack expertise in addressing eco-design and be inflexible or slow to change.⁹⁷ These barriers could be overcome by establishing a technical advisory body⁹⁸ to research and develop appropriate design standards for recyclability and to estimate the environmental, economic and social benefits of various design options. Market demand for secondary materials could be increased by mandating the inclusion of non-hazardous recycled and recyclable content. Promoting measurable and

⁹⁰ EIA, 2020. Convention on Plastic Pollution Toward a new global agreement to address plastic pollution.

⁹¹ Japan submission for response options

⁹² CIEL submission for response options

⁹³ Eunomia, 2018. Investigating options for reducing releases in the aquatic environment of microplastics emitted by (but not intentionally added in) products.

⁹⁴ UNEP, 2020b. National Guidance for Plastic Pollution Hotspotting and Shaping Action. Introduction report, United Nations Environment Programme. Nairobi, Kenya.

⁹⁵ AHEG-1, Co-Chairs Summary, Annex I, para 8; UNEP/AHEG/2018/1/3; OECD, 2018c. Improving Plastics Management: Trends, policy responses, and the role of international co-operation and trade. OECD Environment Policy Paper No. 12.

⁹⁶ ENEC, 2019. Motivations for and Barriers to Ecodesign in Industry.

⁹⁷ Ibid.

⁹⁸ CIEL submission for response options

time-bound commitments by industry could improve the uptake of design standards. Technology transfer, capacity-building, and exchange platforms with experts could provide knowledge on the provision of supporting infrastructure and policy environments that stimulate industry innovation in materials and investment in infrastructure.⁹⁹ Eco-design indicators could also be promoted for inclusion in research and development (R&D) programmes.¹⁰⁰

54. Post-discharge **mitigative activities** could focus on design options to reduce the environmental and social impacts of marine litter and microplastics. For example, a scoping study by the OSPAR Commission,¹⁰¹ one of the Regional Seas, examines the feasibility of design options for fishing gear to improve recyclability and management at end of life and reduce the environmental impact of abandoned, lost or otherwise discarded gear, also promoted in the Honolulu Strategy.¹⁰²

55. **Monitoring and evaluation** activities lack information about, and methods of tracing, the uptake and impact of design changes. No global targets in this regard have been set using indicators to report against.¹⁰³ Developing definitions of terms such as “recyclable” could assist in refining indicators and targets. Mechanisms are needed to track industry commitment and transition to the manufacture of products that meet environmental standards.¹⁰⁴

Summary of downstream activities

56. The downstream pressures, controls, and barriers are global design standards are summarized in Table 5, providing insight into enabling conditions for this response option.

Table 5: Summary of downstream activities for global design standards

	End-of-life	Mitigative Controls	Monitoring & Evaluation
Pressures	<ul style="list-style-type: none"> Abundance of difficult-to-recycle products 	<ul style="list-style-type: none"> Poor understanding of behavioural drivers, environmental and social impacts 	<ul style="list-style-type: none"> Lack of information
Prevention Controls	<ul style="list-style-type: none"> Product rating and labelling (design for recyclability) 	<ul style="list-style-type: none"> Research design options to reduce impact and facilitate end-of-life management 	<ul style="list-style-type: none"> Improve traceability on uptake and impact of design change
Barriers	<ul style="list-style-type: none"> Lack of national standards to guide design Lack of infrastructure Limited end-markets Limited eco-design indicators in R&D programmes 	<ul style="list-style-type: none"> Lack of incentive by manufacturers and consumers 	<ul style="list-style-type: none"> No methods developed
Barrier Controls	<ul style="list-style-type: none"> Technical advisory body (definitions, recyclability design standards, estimate outcomes) Mandatory inclusion of recycled, recyclable content Promote industry commitments Capacity-building Technology transfer Multi-stakeholder platform Eco-design indicators in R&D programmes 	<ul style="list-style-type: none"> Research incentives to encourage eco-design and consumer participation 	<ul style="list-style-type: none"> Develop definitions Set global targets and indicators to track eco-design

4.2.2. Analysis of indicators

⁹⁹ Vietnam submission on response options

¹⁰⁰ ENEC, 2019. Motivations for and Barriers to Ecodesign in Industry.

¹⁰¹ OSPAR Commission (2020). OSPAR Scoping Study on Best Practices for the Design and Recycling of Fishing Gear as a Means to Reduce Quantities of Fishing Gear Found as Marine Litter in the North-East Atlantic. <https://www.ospar.org/documents?v=42718>.

¹⁰² Honolulu Strategy, Strategy B4

¹⁰³ Philippines, Africa Group, Switzerland submissions for response options

¹⁰⁴ ECOS, 2019. For Better Not Worse: Applying Ecodesign Principles to Plastics in the Circular Economy ; Rossi, M., Germani, M., Zamagni, A., 2016. *Review of eco-design methods and tools. Barriers and strategies for an effective implementation in industrial companies*. J. Clean Prod. 129, 361-373. <https://doi.org/10.1016/j.jclepro.2016.04.051>

Input

57. The response option of developing global design standards for product environmental performance has a **global scope**. Because such standards are not well-developed at the international level and outcomes of industry commitments not yet proven, the **maturity** is low. Adoption of global standards within national regulatory and policy frameworks is limited, providing a **scale** rating of small.

Process indicators

58. Overall **management targets** for the development of global design standards could aim for an overall reduction in waste generated and reductions in contributions to climate change. **Operational targets** could be developed for the percentage of products meeting eco-labelling certification standards within particular product categories or material types. Thus, the overall reduction in products with low recycling value are reduced.¹⁰⁵ Certification could include quality of materials and/or performance outcomes. Examples could include targets for packaging (e.g. beverage), secondary packaging, textiles, automotive tyres, PVC, HDPE, PVC, etc. Targets for the inclusion of recycled content, recyclable content, reusability and repairability may be appropriate to some categories. Some industry examples exist in this regard.

59. **Local capacity building** in the form of technical guidance on the integration of such standards and reporting requirements, particularly for small and medium enterprises,¹⁰⁶ could also be needed and may be provided through regional support centres. Services for pre- and post-collection separation may require guidance on the identification of materials to improve collection and uptake in secondary markets.

60. Ongoing **funding** for eco-innovation and integration of global design standards could be improved through the inclusion of performance indicators in national R&D programs.¹⁰⁷ Standards of a more detailed nature may require regular assessment of applicability, which may be funded by governments and industry.

61. Harmonized **monitoring** methods would need to be developed, particularly for the assessment of recycled content. Mass balance accounting has been suggested,¹⁰⁸ with a study requested on mass balance methodologies to certify circular polymers.¹⁰⁹ Repair and reuse facilities will need to be tracked, as well as volume and types of materials being incinerated and landfilled. Such methods could work towards information that allows for monitoring of products on the global market that do not meet eco-labelling certification, and more accurate calculations of leakage into the environment and therefore discharge into the oceans. A global mapping and assessment of standards, labels and claims on plastic packaging has been conducted which could provide a basis for ongoing monitoring in this regard.¹¹⁰ Monitoring methods should be taken into account when developing design standards.

62. **Reporting** is important to track progress against relevant SDGs, including SDG1 (No Poverty), and allow for synergies under applicable MEAs. Reporting standards should provide for a global ‘state of industry’ assessment, highlighting progress and gaps in the integration of global design standards, challenges in implementation by governments and industry, and international capacity-building and technology transfer.

63. **Review** of progress towards the global management and operational targets would require indicators to be agreed. In addition, review of detailed standards may require revision to ensure applicability to industry innovation and emerging research.

64. **Domestic stakeholder inclusion** requires consultation with all sectors across the value chain to ensure the design of effective product environmental performance criteria. The Forest Stewardship Council (FSC) integrates the international generic indicators to address certain principles of the International Labour Organization (ILO) convention, including two indicators for the engagement of affected stakeholders.¹¹¹ These or similar indicators could be developed, particularly for recycling facilities where secondary materials are manufactured, including from legacy plastics.

65. **International capacity building** could be provided to Member States where assistance is required in the development of national regulatory and policy frameworks that integrate the global design standards and incentivise adoption by those industries that place products on their market from international and domestic sources (defined as ‘producers’ in examples of current national EPR legislation). This could be accomplished in through guidelines, multi-stakeholder platforms and workshops.

66. **Co-benefits** could be defined and targeted for environmental, social and economic outcomes. Environmental outcomes could include reduced landfill usage, reduced contributions to climate change and various resource efficiency

¹⁰⁵ UNEP, 2020b. National Guidance for Plastic Pollution Hotspotting and Shaping Action. Introduction report, United Nations Environment Programme. Nairobi, Kenya. ; UNEP, 2019a. Addressing marine plastics: A systemic approach. Recommendations for action.

¹⁰⁶ Rossi, M., Germani, M., Zamagni, A., 2016. *Review of ecodesign methods and tools. Barriers and strategies for an effective implementation in industrial companies*. J. Clean Prod. 129, 361-373. <https://doi.org/10.1016/j.jclepro.2016.04.051>

¹⁰⁷ ENEC, 2019. Motivations for and Barriers to Ecodesign in Industry.

¹⁰⁸ ACC, 2020. Principles for Eliminating Plastic Waste through a Circular Economy.

¹⁰⁹ United States of America, Save Our Seas 2.0 Act, Section 134. Available at: <https://www.congress.gov/bill/116th-congress/senate-bill/1982/text#toc-HF84FB2F1007041869B93AB2261F0524B>

¹¹⁰ UNEP, 2020a. Can I Recycle This? A Global Mapping and Assessment of Standards, Labels and Claims on Plastic Packaging.

¹¹¹ <https://fsc.org/en/newsfeed/new-international-generic-indicators-igis-are-effective-immediately>

benefits. Social outcomes could include reduced risk to human health, improvements to natural environment, financial value added to a larger number of waste products to improve livelihoods of informal collection and recycling services,¹¹² improved livelihoods, and intergenerational justice from a reduction in use of non-renewable resource. Economic outcomes include increased economic feasibility of recycling, industry savings from improved resource efficiency, and reduced costs of solid waste management to local governments and taxpayers.

Performance indicators

67. **Outputs** of global design standards as a response option could include the development of definitions, design standards (environmental performance criteria) for target product categories and materials, indicators and methods for monitoring progress towards operational and management targets. **Outcomes** could include the integration of global design standards in national standards, legislation and policy; adoption of environmental performance criteria by industry within design; improved quality and secure end-markets for secondary materials; a measured reduction in products placed on the global market that do not meet eco-labelling certifications; and improvement to livelihoods.

Summary of indicators

68. The assessment of instruments and measures relevant to developing global standards are summarized in Table 6, providing insight into the input, process and performance of this response option.

Table 6: Summary of indicators for global design standards

Indicator Type	Indicator	Description	Evaluation
INPUT	Scope	International, regional or national	International
	Maturity	Operational years - high, medium, low	Low
	Scale	Level of adoption	Medium to high
PROCESS	Governance	Management targets	Low – no examples of global targets for waste reduction through design.
		Operational targets	Low – Some industry commitments exist, particularly for packaging.
	Management	Local capacity building	Yes – the need for training of local industries (design and reporting) and informal sectors for identification and separation standards is recognised and some examples of implementation exist.
		Ongoing funding secured	Yes – funding for innovation through inclusion of indicators in R&D programmes. Funding required for ongoing assessment of effectiveness of global design standards.
		Monitoring in place	Yes – rates for recycled content, repair and reuse, incineration, landfill, products not meeting eco-labelling certification.
		Reporting in place	Yes – track progress against relevant SDGs, including SDG1. Allow for global ‘state of industry’ assessment.
	Co-operation	Review process defined	Yes – Indicators developed for tracking against global management and operational targets. Regular review process for design standards.
		Domestic stakeholder inclusion	Yes – ILO indicators for the engagement of affected stakeholders could be considered.
	Co-benefits recognised	International capacity building	Yes - development of national regulatory and policy frameworks through guidelines, multi-stakeholder platforms and workshops.
		Environmental	Yes - reduced landfill usage, reduced contributions to climate change and various resource efficiency outcomes.
	Social	Yes – reduced risk to human health, improved livelihoods, and intergenerational justice.	

¹¹² UNEP, 2019a. Addressing marine plastics: A systemic approach. Recommendations for action.

		Economic	Yes – increased economic feasibility of recycling, industry savings from improved resource efficiency, and reduced costs of solid waste management to local governments and taxpayers.
PERFOR- MANCE	Outputs		Yes – development of definitions, design standards, indicators and monitoring methods. Guidelines for governments and industry.
	Outcomes		Yes – Development of national design standards, legislation and policy; adoption of design standards by industry; improved quality and secure end-markets; reduction in products that do not meet eco-labelling certifications; improvement to livelihoods.

4.2.3. Discussion on effectiveness

69. The above analysis of measures to address the life cycle, together with the analysis of indicators, inform the following assessment of the effectiveness of global design standards in contributing to the global goal of elimination of discharge of marine litter and microplastics to the ocean.

Maturity

70. **Low.** This response option is not well established.

Feasibility

71. **Medium.** Feasibility has not been demonstrated. Global design standards have good potential. Some level of confidence is provided by building on existing efforts to develop performance standards for plastics, including standards developed in fora addressing other environmental issues.

Time frame

72. **Medium to long.** Global design standards based on high-level performance criteria could be developed in the medium term of two to five years. More detailed or challenging design standards may need a **longer** time frame of five or more years.

Impact

73. **High.** Well-constructed global design standards could address most of the pressures and barriers identified across all phases of the life cycle and operate at **global scale**.

Overall comments

74. To be effective, this response option needs strong technical support and engagement with multiple actors across the life cycle, including social aspects of waste management.

75. The effectiveness is greatly enhanced by strong governmental support to establish an enabling political and economic environment that incentivises investment in material innovation and infrastructure.

76. The effectiveness could be limited by slow integration of global design standards in national standards and legislation, inclusion of eco-design principles in government R&D programmes.

4.3. A NEW INTERNATIONAL FRAMEWORK

77. There is no international instrument to harmonise and guide national activities towards a global target of zero discharge of litter and microplastics to the oceans.¹¹³ Developing a new international framework would therefore represent a **potential** response option to the global issue that aims to harmonize action to prevent the generation of litter and microplastics at the global level across all life cycle phases, and adopting a multi-layered governance approach.¹¹⁴ All **environmental zones** are targeted for protection. Wide participation by Member States could be assumed, providing a **scale** rating of high. A new international framework could harmonise action at the national level, facilitated through regional institutions, and targeting the long-term elimination of discharge of marine litter and microplastics to the

¹¹³ The Honolulu Strategy provides a broad set of goals and strategies to guide national effort but does not suggest institutional and operational mechanisms to achieve these. The Strategy forms a strong basis for a new international framework.

¹¹⁴ See UNEP/AHEG/2018/1/3; Response option submissions from EU, Switzerland, EIA.

oceans. This may be a voluntary framework, binding, or a combination thereof. Actions include those of a preventive and mitigative nature, including monitoring & evaluation. The **geographic range** is all terrestrial and maritime zones.

4.3.1. Analysis of measures to address the life cycle

Upstream activities

78. The pressure influencing the first driver, the **source materials phase of the life cycle**, is unsustainable development practices. UNEA, in 2017, encouraged all Member States to "develop and implement action plans for preventing marine litter and the discharge of microplastics; encouraging resource efficiency, and increasing collection and recycling rates of plastic waste and re-design and re-use of products and materials; and avoiding the unnecessary use of plastic and plastic containing chemicals of particular concern where appropriate."¹¹⁵ The development and implementation of National Marine Litter Action Plans (NAP-MaLis)¹¹⁶ provides the opportunity to address these practices in the context of marine litter and microplastics,¹¹⁷ including by targeting resource efficiency.¹¹⁸ Barriers to successful implementation of NAP-MaLis include lack of capacity and funding in some Member States,¹¹⁹ a weak science-policy interface,¹²⁰ and lack of global information and targets¹²¹ for source materials. Capacity-building could be achieved by developing guidelines to assist Member States in the design and implementation of NAP-MaLis.¹²² It could be supported through workshops hosted by regional knowledge hubs,¹²³ including regional coordinating units and regional activity centres.¹²⁴ International funding¹²⁵ could assist with the process of developing NAP-MaLis, as for other Multilateral Environmental Agreements (MEAs). Science-based approaches could be enhanced by establishing an intergovernmental science-policy platform,¹²⁶ which could strengthen confidence in the outcomes of policy interventions, including environmental and social outcomes.¹²⁷ Improved baseline information is required, particularly within some regions, to better understand global trends and the development of global indicators for source materials.

79. The pressure influencing the second driver, the **product manufacture phase of the life cycle**, is poor due diligence by industry.¹²⁸ Adoption of the principle of design for sustainability could reduce the amount of waste generated¹²⁹ during the use of products and at the end-of-life phase, as well as minimizing harm from additives of concern. Barriers to achieving sustainable design of products are lack of capacity for the development of standards, legislation and regulations to implement upstream interventions;¹³⁰ a weak science-policy interface with regard to alternate materials and design standards;¹³¹ and lack of information and global targets for product manufacture.¹³² These barriers could be addressed by enhancing capacity and developing/sharing best practices.¹³³ The science-policy interface could be strengthened through a scientific advisory body to, for example, prioritize the type of research required and define product performance features to guide the development of product standards,¹³⁴ as well research and innovation by the private sector.¹³⁵ Such scientific advisory body could also develop standard definitions, targets and indicators for reporting,¹³⁶ together with methods for improving the traceability of materials and additives used and traded.¹³⁷ Global targets¹³⁸ could be adopted voluntarily by industry or made mandatory, where appropriate.¹³⁹

¹¹⁵ UNEP/UNEA/3/7 (para 4c)

¹¹⁶ ASEAN+3 Marine Plastics Debris Cooperative Action Initiative, available at: <https://www.mofa.go.jp/files/000419527.pdf>; Vietnam submission on response options

¹¹⁷ UNEA Res. 3/7, para. 4(d), UNEA Res. 4/9 para. 1

¹¹⁸ UNEA Res. 1/6, para. 16, Philippines, African Group submission for response options ; G20 Implementation Framework for Actions on Marine Plastic Litter

¹¹⁹ Philippines, African Group submission for response options ; UNEP/AHEG/2018/1/2 ; UNEP/AHEG/2018/1/4

¹²⁰ UNEA Res. 4/6

¹²¹ Philippines, Africa Group submissions for response options

¹²² UNEP, 2019b. Guidelines for the Development of Action Plans on Marine Litter.

¹²³ ASEAN+3 Marine Plastics Debris Cooperative Action Initiative, available at: <https://www.mofa.go.jp/files/000419527.pdf>

¹²⁴ UNEA Res. 3/7, para. 5

¹²⁵ UNEP/AHEG/2018/1/3, Togo Welfare, Malaysia submissions for response options

¹²⁶ ASEAN, 2019. ASEAN Framework of Action on Marine Debris.

¹²⁷ Togo Welfare submission on response options

¹²⁸ UNEP, 2017a. *Combating marine plastic litter and microplastics: An assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches*. https://papersmart.unon.org/resolution/uploads/unep_aheg_2018_inf3_full_assessment_en; <https://www.unenvironment.org/news-and-stories/story/engaging-industry-tackle-marine-litter>

¹²⁹ OECD, 2018c. Improving Plastics Management: Trends, policy responses, and the role of international co-operation and trade. OECD Environment Policy Paper No. 12.

¹³⁰ Vietnam, Japan submissions on response options

¹³¹ Switzerland submission on response options

¹³² Philippines, Africa Group submissions for response options

¹³³ Malaysia, EIA submissions for response options

¹³⁴ Switzerland, Vietnam submissions for response options

¹³⁵ Malaysia submission on response options

¹³⁶ Switzerland, Philippines, Africa Group submission for response options

¹³⁷ CIEL submission on response options

¹³⁸ Philippines, Africa Group submissions for response options

¹³⁹ Vietnam submission on response options

80. The pressure influencing the third driver, the **use phase of the life cycle**, is slow market reform.¹⁴⁰ The types of products placed on the market and consumer decisions could be influenced by labelling and certification schemes¹⁴¹ reflecting the content of products and their human health and environmental risks, among others. Barriers to successful implementation include lack of resources for the development and administration of certification schemes,¹⁴² lack of global information on consumption patterns, and lack of global targets against which to track progress. An advisory body made up of industry actors and stakeholders across the life cycle could define performance criteria and standards to meet certification requirements, building on existing efforts and standards in place,¹⁴³ and develop methods and indicators to track global consumption patterns.

Summary of upstream activities

81. The upstream pressures, controls, and barriers for a new international framework are summarized in Table 7, providing insight into enabling conditions for this response option.

Table 7: Summary of upstream and midstream activities for a potential new international framework

	Source Materials	Product Manufacture	Use
Pressures	<ul style="list-style-type: none"> • Unsustainable development 	<ul style="list-style-type: none"> • Poor industry due diligence 	<ul style="list-style-type: none"> • Slow market reform
Prevention Controls	<ul style="list-style-type: none"> • National Marine Litter Action Plans (NAP-MaLis) 	<ul style="list-style-type: none"> • Design for sustainability 	<ul style="list-style-type: none"> • Labelling and certification schemes
Barriers	<ul style="list-style-type: none"> • Lack of capacity and funding • Weak science-policy interface (economic, social outcomes) • Lack of global information and targets 	<ul style="list-style-type: none"> • Lack of capacity for development of policy frameworks • Weak science-policy interface (alternatives, design standards) • Lack of information and global targets 	<ul style="list-style-type: none"> • Lack of resources • Lack of global information and targets
Barrier Controls	<ul style="list-style-type: none"> • NAP-MaLi guidelines • Regional workshops • International funding for development of NAP-MaLis • Intergovernmental science-policy platform • Collect baseline information 	<ul style="list-style-type: none"> • Develop/share best practices • Scientific advisory body (standards, definitions, targets, indicators) • Improve traceability of materials and additives 	<ul style="list-style-type: none"> • Multi-stakeholder advisory body to develop standards for certification schemes • Develop methods and indicators for global tracking

Downstream activities

82. The pressure influencing the fourth driver, the **end-of-life phase of the life cycle**, is poor governance of waste. Environmentally sound management¹⁴⁴ of waste requires the development of integrated and holistic waste management practices that complement approaches promoted under the Basel Convention. A lack of knowledge on policy interventions that incentivize private sector investment in sound waste management¹⁴⁵ (thereby supporting domestic financing of these services) could be addressed by engaging actors across the value chain in a multi-stakeholder platform, enhancing understanding of socio-economic context,¹⁴⁶ in particular the informal sector, and facilitating technology transfer.¹⁴⁷ A scientific advisory body could also develop methods to close information gaps at the global level, as well as develop global targets and indicators for tracking progress towards environmentally sound waste management.

83. Once plastic litter and microplastics have discharged into the environment, a new international framework could assist in harmonizing **monitoring and evaluation** activities and methods to facilitate the aggregation of national results at regional and national levels. *Guidelines for the Monitoring and Assessment of Plastic Litter in the Ocean* were published in 2019 by the Joint Group of Experts on the Scientific Aspects of Marine Environmental Pollution

¹⁴⁰ OECD, 2018c. Improving Plastics Management: Trends, policy responses, and the role of international co-operation and trade. OECD Environment Policy Paper No. 12.; OECD, 2019b. Policy Approaches to Incentivise Sustainable Plastic Design, OECD Environment Working Papers No. 149.

¹⁴¹ Eunomia, 2016. Study to support the development of measures to combat a range of marine litter sources. Report for European Commission DG Environment.; EIA, 2020. Convention on Plastic Pollution Toward a new global agreement to address plastic pollution.

¹⁴² OECD, 2016a. *Extended Producer Responsibility: Updated Guidance for Efficient Waste Management*. OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264256385-en>

¹⁴³ For example, the Ellen MacArthur Foundation's New Plastics Economy, <https://www.ellenmacarthurfoundation.org/our-work/activities/new-plastics-economy>; Singapore, EU submission for response options

¹⁴⁴ ASEAN+3 Marine Plastics Debris Cooperative Action Initiative, available at: <https://www.mofa.go.jp/files/000419527.pdf>; EU, Switzerland, Japan submissions for response options; G20 Implementation Framework for Actions on Marine Plastic Litter.

¹⁴⁵ Vietnam submission on response options

¹⁴⁶ Togo Welfare submission on response options

¹⁴⁷ Philippines, Africa Group, Vietnam submissions on response options

(GESAMP).¹⁴⁸ These guidelines could be expanded to include monitoring methodologies for all environmental compartments (e.g. air, land, soils, freshwater systems). GESAMP is currently assessing existing risk assessment methodologies for estimating the impact of marine litter and microplastics in order to focus research and target measures.¹⁴⁹

84. Standards for reporting at the national, regional and international level¹⁵⁰ could facilitate the assessment of trends and progress towards global targets, informing regular reviews of the effectiveness of implementation measures.

Summary of downstream activities

85. The downstream pressures, controls, and barriers for a new international framework are summarized in Table 8, providing insight into enabling conditions for this response option.

Table 8: Summary of downstream activities for a potential new international framework

	End-of-life	Monitoring & Evaluation
Pressures	<ul style="list-style-type: none"> • Poor waste governance 	<ul style="list-style-type: none"> • Lack of harmonised data
Prevention Controls	<ul style="list-style-type: none"> • Environmentally sound waste management 	<ul style="list-style-type: none"> • Guidelines to harmonise methodologies • Reporting standards
Barriers	<ul style="list-style-type: none"> • Lack of knowledge on policy interventions for private sector engagement • Lack of global information and targets 	<ul style="list-style-type: none"> • Lack of capacity on methodologies • Lack of evaluation of progress
Barrier Controls	<ul style="list-style-type: none"> • Multi-stakeholder platform. • Strengthen socio-economic understanding. • Scientific advisory body to develop methods for global tracking 	<ul style="list-style-type: none"> • Workshops, training the trainer • Set review process for evaluation of effectiveness

4.3.2. Analysis of indicators

Input indicators

86. As suggested by its name, the new international framework for marine litter and microplastics has a **global scope**. As the new international framework is still at a proposal phase, this maturity of it is **low**, allowing for some guidance on experiences under other relevant MEAs. Elements of a new framework have been in place for a number of years, such as environmentally sound waste management as per the Basel Convention. Wide participation by Member States could be assumed, providing a **scale** rating of high.

Process indicators

87. A potential new international framework could adopt the management target set by UNEA resolution 3/7 paragraph 1. This was reiterated in UNEA resolution 4/6, setting a global target of long-term elimination of discharge of litter and microplastics to the oceans and of avoiding detriment to marine ecosystems and the human activities dependent on them from marine litter and microplastics. In line with SDGs beyond SDG 14, the management targets for this international framework could also aim to combat issues of human health resulting from marine litter and microplastics. Examples of management targets from complementary international instruments include ‘[s]tates have the obligation to protect and preserve the marine environment’,¹⁵¹ and State Parties are ‘[d]etermined to protect human health and the environment from the harmful impacts of persistent organic pollutants.

88. Setting out instructive **operational targets** is key to evaluating the contribution to the overall goal of prevention and reduction of litter and microplastics in the oceans. A potential new international framework could set operational targets that are measurable and timebound, addressing the full life cycle of upstream, midstream and downstream activities, with a focus on prevention. Examples of operational targets from related international instruments are provided as a basis for the design of a new international framework. As per the Stockholm Convention, States could be requested to prohibit and/or take the legal and administrative measures necessary to eliminate their production and use, import and export of the persistent organic pollutants listed in relevant annexes, so as to reduce or eliminate releases from intentional production and use.¹⁵² States are obliged to ensure that hazardous wastes or other wastes are managed

¹⁴⁸ GESAMP (2019). Guidelines on the monitoring and assessment of plastic litter and microplastics in the ocean (Kershaw P.J., Turra A. and Galgani F. editors), (IMO/FAO/UNESCO-IOC/UNIDO/WMO/IAEA/UN/UNEP/UNDP/ISA Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection)

¹⁴⁹ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)).

¹⁵⁰ Switzerland, Philippines, Africa Group submission for response options

¹⁵¹ *United Nations Convention on the Law of the Sea*, opened for signature 10 December 1982, 1833 UNTS 3 (entered into force 16 November 1994) (‘*UNCLOS*’); *Stockholm Convention on Persistent Organic Pollutant*, opened for signature 22 May 2001, 2256 UNTS 119 (entered into force 17 May 2004) (‘*Stockholm Convention*’).

¹⁵² *Stockholm Convention*, Article 3.

in a manner which will protect human health and the environment against the adverse effects which may result from such wastes.¹⁵³ The Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol) places limitations and prohibitions on the use of listed substances by industry, including the trade thereof. Further operational targets could include the global rate of collection, reuse, repair and recycling; global rates for various final disposal options; reduction in consumption of unnecessary and avoidable products; and percentage of new products meeting agreed environmental design criteria,

89. Lack of capacity and funding to effectively manage marine litter is a common problem for developing countries. **Local capacity building and development** is therefore an essential element to ensure effective implementation of the international framework. At the international level, this could focus on building capacity for Member States to enforce, to monitor and to collaborate on marine litter issues. It also guides capacity building at regional and national levels as part of marine litter action plans. In many international instruments, States are recommended to provide training of scientific and technical personnel and facilitate the participation of developing countries in relevant international programmes.¹⁵⁴ States are also suggested to conduct training in safe and efficient location and removal methods, as well as improving co-management of marine litter removal to increase the effectiveness thereof. Development and promotion of effective reporting systems and coordinated rapid response mechanisms would increase the efficiency of locating marine litter.¹⁵⁵

90. Within the new international framework, Member States could collaborate on appropriate financial arrangements of a voluntary nature, including the establishment of **funding** mechanisms, particularly to assist developing States in implementation, for the purposes of capacity building, technology transfer and enhancing knowledge-building and scientific research. Multiple-source funding approaches, mechanism and arrangements could be made accordingly. In the complementary international instruments, Parties are required to, within their capabilities, promote financial support and incentives in respect of the national activities to achieve relevant objectives.¹⁵⁶ To support developing States, funding mechanisms could provide direct enhancement of implementation capacities, or include technical and financial assistance.¹⁵⁷ States are encouraged to leverage human and financial resources through cooperation mechanisms to reduce the amount and impact of accumulated marine litter.¹⁵⁸

91. **Monitoring** supports a responsive international framework that could adapt to the changing conditions of actors and stakeholders across the entire product value chain. In the potential international framework for marine litter, monitoring could take place at different levels, including production, consumption, trade, final treatment, contribution to climate change,¹⁵⁹ as well as effects on livelihoods. At the international level, cooperation on standardising monitoring methods is emphasised. At the regional level, regional data collection and sharing is essential as it could assist regional States by providing scientific information and statistics related to marine litter. At the national and local level, monitoring is closely linked with the enforcement of legislation and regulations. For transboundary pollution, Member States could cooperate in monitoring the effects of the management of hazardous wastes on human health and the environment.¹⁶⁰ Member States, within their capabilities, could encourage and undertake appropriate monitoring pertaining to all additives and associated chemicals, including their sources, presence and their impacts.¹⁶¹

92. Progress **reports** regarding implementation situations and future action could be submitted by Member States on a regular basis. States could report on measures taken to combat marine litter and microplastics and their effectiveness and difficulties in meeting the international objectives.¹⁶² A potential new international framework could provide minimum reporting requirements to harmonize content and allow for comparability and tracking against global indicators. A **review** process could be defined to assess progress against global goals and effectiveness of measures in place, particularly for emerging issues.

93. At the international level, **domestic stakeholder participation** and public participation could be promoted as a principle. An international coordination center could be established, or an existing body strengthened to facilitate activities between regional nodes, national focal points and local nodes. For awareness raising, States could promote public awareness of the environmental effects of the emissions of controlled substances and other substances that deplete the ozone layer.¹⁶³ To raise awareness for fishers, States could promote responsible fisheries through education and

¹⁵³ *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal*, opened for signature 22 March 1989, (entered into force 5 May 1992) in accordance with article 25 (1) ('*Basel Convention*')

¹⁵⁴ *Montreal Guidelines for the Protection of the Marine Environment against Pollution from Land-based Sources*, Decision 13/18/II of the Governing Council of UNEP of 24 May 1985.

¹⁵⁵ NOAA, U.a., *The Honolulu Strategy A global framework for prevention and management of marine debris*.

¹⁵⁶ *Stockholm Convention*, Article 13.

¹⁵⁷ FAO, 1995. *FAO Code of Conduct for Responsible Fisheries*, Rome.

¹⁵⁸ UNEP and NOAA, 'The Honolulu Strategy A global framework for prevention and management of marine debris' (2011).

¹⁵⁹ CIEL, 2019. *Plastic & Climate: The Hidden Costs of a Plastic Planet*.

¹⁶⁰ *Basel Convention*, Article 10.

¹⁶¹ *Stockholm Convention*, Article 11.

¹⁶² *Stockholm Convention*, Article 11; *Paris Agreement* opened for signature 12 December 2015, (entered into force 4 November 2016) Article 13; *Convention on Biological Diversity*, opened for signature 5 June 1992, 1760 UNTS 79 (entered into force 29 December 1993) ('*CBD*') Article 26.

¹⁶³ *Montreal Protocol on Substances that Deplete the Ozone Layer*, opened for signature 16 September 1987, 1522 UNTS 3 (entered into force 1 January 1989, in accordance with article 16(1)).

training.¹⁶⁴ States could conduct education and outreach to enhance understanding of marine debris impacts, prevention and management from land- and sea-based sources.¹⁶⁵

94. Cooperation on **international capacity building** emphasises the assistance to developing countries, specifically on aspects including technical assistance, technology transfer, training and scientific research. States have established a global climate change adaptation goal of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change.¹⁶⁶ Member States have recognised the significance of timely and appropriate technical assistance in response to requests from developing States, and capable States are to provide technical assistance for capacity-building relating to the implementation of such international instruments.¹⁶⁷

95. For **co-benefits**, as combating marine litter is the aim of this international framework, environmental benefits would be the most relevant positive outcomes of its implementation. As a complex cultural and multi-sectoral problem, marine litter could lead to significant ecological, economic, and social costs around the globe. Plastic and other solid waste directly and negatively impact coastal and marine species and their habitats, economic health, human health and safety, as well as social values.¹⁶⁸ By addressing the full life cycle and progressing towards a circular economy, threats posed to public health, as well as aesthetic and cultural values could be gradually prevented and reduced. For instance, biological diversity has intrinsic social, economic, scientific, educational, cultural, recreational and aesthetic values.¹⁶⁹ In addition, knowledge of marine litter and its negative impacts on different sectors of society could be disseminated and better understood.¹⁷⁰

96. By recognising direct relationships between marine litter, environment, human health, economic development, social wellbeing and food security, the international framework for marine litter could encourage closer collaboration between the public and private sectors, develop sustainable businesses by promoting product sustainability, stimulate the market for sustainable products, and create recruitment opportunities in the green industry. A better environment provides more opportunities for directly related industries including fisheries, aquaculture and tourism. Gender equality and social justice for women, migrants and underdeveloped communities who are exposed to high risk of harm and exploitation from marine litter could be advanced.¹⁷¹ By increasing access to finance and facilitating private sector engagement, investment, trade and sustainable markets could be promoted in industries and activities that further marine litter management and prevention.¹⁷² States could be encouraged to promote the socio-economic benefits of establishing policies to prevent marine litter and develop potential policy measures in this regard.¹⁷³ To engage the private sector, Member States could encourage collaboration between national authorities and businesses to promote product sustainability. Private sector investment in redesigning products, packaging and materials, as well as engaging value chain stakeholders to increase waste recovery and recycling rates could also be recommended.¹⁷⁴

Performance indicators

97. Assessing the **performance** of a potential new international framework within the role of harmonization could include the tools developed to assist with national implementation, particularly in the development of NAP-MaLis. Guidance on the reporting required by countries is also needed to enable aggregation of national reports at the regional and international levels. Examples of guidance on the development of NAP-MaLis: Guidelines for the Development of Action Plans on Marine Litter¹⁷⁵; Honolulu Strategy. A Global Framework for Prevention and Management of Marine Debris¹⁷⁶; Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change.¹⁷⁷ The Convention on Biological Diversity (CBD) includes National Biodiversity Strategies and Action Plans (NBSAP) Capacity Building Modules and a second series of capacity building modules on National Biodiversity

¹⁶⁴ FAO, 'FAO Code of Conduct for Responsible Fisheries' (1995), para 6.16.

¹⁶⁵ UNEP and NOAA, 'The Honolulu Strategy A global framework for prevention and management of marine debris' (2011).

¹⁶⁶ Paris Agreement, Article 7.

¹⁶⁷ Stockholm Convention, Article 12.

¹⁶⁸ UNEP and NOAA, 'The Honolulu Strategy A global framework for prevention and management of marine debris' (2011).

¹⁶⁹ CBD, Preamble.

¹⁷⁰ Togo Welfare submission on response options

¹⁷¹ Togo Welfare submission on response options

¹⁷² APEC, APEC Roadmap on Marine Debris

¹⁷³ G20 Germany 2017, 'G20 Action Plan on Marine Litter' (2017).

¹⁷⁴ ASEAN, *ASEAN Framework of Action on Marine Debris* <<https://environment.asean.org/wp-content/uploads/2019/06/ASEAN-Framework-of-Action-on-Marine-Debris-FINAL.pdf>>.

¹⁷⁵ UNEP, 2019b. Guidelines for the Development of Action Plans on Marine Litter.

¹⁷⁶ Honolulu Strategy, 2011. *The Honolulu Strategy, A Global Framework for Prevention and Management of Marine Debris* <<http://www.unep.org/gpa/documents/publications/honolulustrategy.pdf>>.

¹⁷⁷ UNEP, 2016. *Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change*. United Nations Environment Programme, Nairobi. <http://www.unep.org/about/sgb/Portals/50153/UNEA/Marine%20Plastic%20Debris%20and%20Microplastic%20Technical%20Report%20Advance%20Copy.pdf>

Strategies and Action Plans has been developed, aimed at National Focal Points of the convention.¹⁷⁸ A number of capacity building workshops have been held on the design and implementation of NBSAPs.¹⁷⁹

Summary of indicators

98. The assessment of instruments and measures relevant to a new international framework are summarized in Table 9, providing insight into the input, process and performance of this response option.

Table 9: Summary of indicators for a potential new international framework

Indicator Type	Indicator	Description	Evaluation
INPUT	Scope	International, regional or national	International
	Maturity	Operational years - high, medium, low	Low – this is a potential response option and is not well-established. Existing MEAs provide some references and elements of the international framework have been in operation under existing MEAs for a number of years.
	Scale	Level of adoption	High – wide participation is assumed
PROCESS	Governance	Management targets	High – a global target has been agreed within UNEA resolution 3/6.
		Operational targets	Low – Targets are required across the life cycle, and global indicators developed against which to track progress. It may take some years to develop targets for life cycle phases. The required baseline information may also take many years to gather.
	Management	Local capacity building	Yes – development and training in reduction, removal and reporting of marine litter. Regional centres to assist countries with implementation. Guidelines and train the trainer workshops.
		Ongoing funding secured	Yes – a financial mechanism could assist developing countries with implementation, including through capacity building, technology transfer, enhancing knowledge-building and scientific research. Varied funding sources, including donor countries.
		Monitoring in place	Yes – takes place across the entire product value chain, including production, consumption, trade, final treatment, contribution to climate change, and effects on livelihoods. Guidelines developed for monitoring of all environmental compartments. Global tracking and traceability of production, consumption, end-of-life treatment, including trade of waste.
Reporting in place	Reporting in place	Yes – minimum reporting requirements to harmonize content and allow for comparability and tracking against global indicators. Reporting across global life cycle, including trade, and state of environment.	
	Review process defined	Yes – biannual, to assess progress against global goals and effectiveness of measures in place, particularly for emerging issues. Global indicators agreed for key life cycle activities and determining state of environment.	
Co-operation	Domestic stakeholder inclusion	Yes – international coordination centre to facilitate activities between regional nodes, national focal points and local nodes. Guidelines for engagement with actors across life cycle, specific sectors & stakeholders.	

¹⁷⁸ <https://www.cbd.int/nbsap/training/>

¹⁷⁹ <https://www.cbd.int/nbsap/workshops/>

		International capacity building	Yes – assistance to developing countries, including technical assistance, technology transfer, training and scientific research. Assistance in developing & implementing national marine litter action plans, inventories & monitoring programmes.
	Co-benefits recognised	Environmental Social Economic	Yes – including climate change Yes – Currently limited. Improving public health (including (mosquito-borne diseases), advancing gender equality and social justice. Livelihood improvements for informal sector. Yes – currently limited. Creation of jobs, economic benefits for local fishery and tourism communities. Could improve economic feasibility of recycling.
PERFORMANCE	Outputs	Guidelines, platforms for sharing	Yes – platforms exist for exchange of best practices and stakeholder engagement; subsidiary bodies established. Guidelines for the development of national marine litter action plans.
	Outcomes		Yes – Number of national marine litter action plans adopted.

4.3.3. Discussion on effectiveness

99. The above analysis of measures to address the life cycle, together with the analysis of indicators, inform the following assessment of the effectiveness of a new international framework in contributing to the global goal of elimination of discharge of marine litter and microplastics to the ocean.

Maturity

100. **Low.** This response option is not well established.

Feasibility

101. **Medium.** Feasibility has not been demonstrated. The international framework has potential, and some level of confidence is provided by building on existing efforts under various fora, measures and activities adopted under various MEAs, and activities in a small number of Member States that have already adopted NAP-MaLis for marine litter and microplastics. Feasibility also depends on the voluntary or binding nature of the framework. A binding framework is likely to be more complex, particularly where industry measures are mandatory. While a global management target has been set in UNEA resolution 3/7, operational targets across the life cycle could be more challenging and require information that may take years to collect.

Time frame

102. **Medium to long.** A voluntary framework could be developed in the medium term (two to five years). A binding framework might require a **long time frame** (five years or more).

Impact

103. **High.** A well-designed international framework could address most pressures and barriers identified across all phases of the life cycle and operate at the **global scale**.

Overall comments

104. To be effective, this response option would require a global approach to capacity building and funding requirements, particularly for the collection of information, and the development of NAPs and relevant national regulatory responses.

105. The effectiveness in upstream prevention is greatly enhanced by the development of global standards for the design of sustainable products that reduce waste generation and facilitate reuse and end-markets for recycled content.

106. The engagement of multiple actors across the life cycle is crucial to designing appropriate and effective global design standards, global targets and indicators. A number of relevant activities are underway in various industry, intergovernmental and other fora that could be built on.

107. The effectiveness could be limited by the lack of information across all actors in the value chain and all life cycle phases. Challenges in developing methods for traceability to inform indicators could delay the design of measures

and the assessment of effectiveness thereof. Significant investment is needed to close the global gap of 2 billion people not having access to waste collection services, requiring rapid development of legal and policy environments that stimulate private sector investment.

4.4. STRENGTHENING THE EXISTING REGIONAL FRAMEWORK

108. Strengthening the existing regional framework is a **potential** response option that aims to close life cycle gaps in regional legally binding instruments to manage pollution of the marine environment. Voluntary instruments in the form of marine litter action plans are discussed in Section 5.5. **Actions** include those of a preventive and mitigative nature, including monitoring & evaluation. The **geographic range** is predominantly the coastal zone and maritime areas within national jurisdiction, with urban areas targeted for waste management. **Environmental zones** targeted for protection are marine areas and freshwater environments that lead to the oceans. In particular, upstream measures are needed that address the full life cycle and target protection of all environmental zones. Once all regions have adopted strengthened and harmonized protocols to control land-based sources of pollution, together with regional protocols to prohibit dumping, the **scale** rating could be assessed as high.

4.4.1. Analysis of measures to address the life cycle

Upstream activities

109. The pressure influencing the **source materials phase of the life cycle** is limited application of sustainable materials management (SMM)¹⁸⁰ within the existing regional framework. This could be addressed by implementing best environmental practices (BEPs), as promoted by many instruments, including to meet environmental quality standards.¹⁸¹ However, poor application of the most appropriate combinations of environmental measures and strategies could limit the effectiveness of such an approach.¹⁸² This barrier could be overcome by providing technical guidance on specific aspects of BEPs, such as use of best available technologies (BATs) for clean technologies,¹⁸³ thereby improving resource efficiency, and enhancing social¹⁸⁴ and economic outcomes. Examples include the HELCOM Stakeholder Conference on Marine Litter held in 2016, and the Regional 3R Forum in Asia and the Pacific¹⁸⁵

110. The pressure influencing the **product manufacture phase of the life cycle** is lack of regulatory measures and guidance on production methods, including product design, additives of concern and discharge of pellets. This could be addressed by developing regional codes of good environmental practice that cover all aspects of a product's life cycle, supported by certification schemes.¹⁸⁶ The effectiveness of codes of practice, including pellet emission best practices, could be restrained by limited capacities in Member States.¹⁸⁷ This barrier could be overcome through regional cooperation on innovation and development, including regional pilot programmes and demonstration sites, demonstration projects, regional multi-stakeholder platforms¹⁸⁸ for the exchange of technology and best practices, and the development of regional model policy.¹⁸⁹

111. The pressure influencing the **use phase of the life cycle** is lack of measures to encourage behavioural change by industry and consumers. To address this, the existing regional framework could target sectors¹⁹⁰ relevant to the region (e.g. tourism, agriculture, fisheries) as well as consumers. For example, to reduce abandoned, lost and otherwise discarded fishing gear (ALDFG), regional fisheries bodies with the mandate to establish binding measures could

¹⁸⁰ G20 Implementation Framework for Actions on Marine Plastic Litter

¹⁸¹ Tehran Convention, 2003. *Framework Convention for the Protection of the Marine Environment of the Caspian Sea* <http://www.tehranconvention.org/IMG/pdf/Tehran_Convention_text_final_pdf.pdf>. ; Helsinki Convention, 1992. *Convention on the Protection of the Marine Environment of the Baltic Sea Area* <http://www.helcom.fi/Documents/About%20us/Convention%20and%20commitments/Helsinki%20Convention/1992_Convention_1108.pdf>. ; LBS/A Protocol for the Mediterranean, 1980. *Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities, as amended 7 March 1996* <http://wedocs.unep.org/bitstream/handle/20.500.11822/7096/Consolidated_LBS96_ENG.pdf?sequence=5&isAllowed=y>. ; LBS/A Protocol for the Black Sea, 2009. *Protocol on the Protection of the Marine Environment of the Black Sea From Land Based Sources and Activities* <http://www.blacksea-commission.org/_convention-protocols.asp>. ; UNEP/AHEG/2018/1/2, para. 18 (table)

¹⁸² UNEP/AHEG/2018/1/2, para. 18 (table)

¹⁸³ OECD, 2018a. Best Available Techniques (BAT) for Preventing and Controlling Industrial Pollution, Activity 2: Approaches to establishing BAT around the World, Environment Directorate, OECD.

¹⁸⁴ Togo Welfare submission on response options

¹⁸⁵ <https://www.env.go.jp/recycle/3r/en/index.html>

¹⁸⁶ EIA, 2020. Convention on Plastic Pollution Toward a new global agreement to address plastic pollution.

¹⁸⁷ Switzerland, EIA submission for response options

¹⁸⁸ ASEAN+3 Marine Plastics Debris Cooperative Action Initiative, available at: <https://www.mofa.go.jp/files/000419527.pdf>

¹⁸⁹ See for example guidelines developed for the Pacific region: SPREP, 2018b. Regulating Plastics in Pacific Island Countries. A guide for policymakers and legislative drafters.

¹⁹⁰ UNEP/AHEG/2018/1/3, para. 10

strengthen management measures for prevention and remediation,¹⁹¹ thus giving greater effect to the FAO Code of Conduct for Responsible Fisheries.¹⁹² The effectiveness of stakeholder participation in preventive activities may be limited by poor awareness of the issues as well as lack of availability of alternative systems, products or materials. These barriers could be overcome by the promotion of reuse and repair systems involving manufacturers and retailers,¹⁹³ exchanges of best practices on the use of market-based instruments to drive behavioural change,¹⁹⁴ the development of regional eco-labelling schemes to guide purchasing behaviour, and the development of guidelines and model policy to facilitate national activities. Supporting activities include regionally sensitive awareness-raising campaigns, for example, efforts underway by the African Council of Religious Leaders-Religions for Peace (ACRL-RfP) and the UNEP – project “Transforming Tourism Value Chains” targeting the tourism sector in the Latin America-Caribbean region, Mauritius and the Philippines.¹⁹⁵ Another example is the measures to reduce leakage from the tourism, fisheries and waste management sectors targeted in the IUCN project “Effective, Quantifiable Solutions To Address Plastic Leakage From Small Island Developing States.”

Summary of upstream activities

112. The upstream pressures, controls, and barriers for a strengthened regional framework are summarized in Table 10, providing insight into enabling conditions for this response option.

Table 10: Summary of upstream and midstream activities for a strengthened regional framework

	Source Materials	Product Manufacture	Use
Pressures	<ul style="list-style-type: none"> Limited application of sustainable materials management 	<ul style="list-style-type: none"> Lack of regulatory measures and guidance on production methods 	<ul style="list-style-type: none"> Lack of measures to encourage behavioural change by industry and consumers
Prevention Controls	<ul style="list-style-type: none"> Promote best environmental practices (BEPs) 	<ul style="list-style-type: none"> Regional codes of good environmental practice Certification schemes 	<ul style="list-style-type: none"> Stakeholder participation
Barriers	<ul style="list-style-type: none"> Poor application of BEP, BAT 	<ul style="list-style-type: none"> Limited capacity of Member States 	<ul style="list-style-type: none"> Poor awareness of the issues Lack of availability of alternative systems, products or materials
Barrier Controls	<ul style="list-style-type: none"> Technical guidance on specific aspects of BEPs 	<ul style="list-style-type: none"> Regional multi-stakeholder platforms 	<ul style="list-style-type: none"> Promotion of reuse and repair systems

Downstream activities

113. The pressure influencing the **end-of-life phase of the life cycle** is lack of measures targeting sustainable waste management. To address this, the existing regional framework could be strengthened to promote increased collection and recycling rates, as well as best practices for final treatment including compliance with the Stockholm Convention with regard to recycling and reuse of POPs (see section 5.1). Measures to strengthen compliance with the London Protocol and MARPOL Annex V, as well as the Basel Convention, could also be promoted (see section 5.1). The effectiveness of strengthened measures may be reduced by lack of capacity, funding, infrastructure and technology, as well as lack of legislation, in Member States. These barriers could be overcome by elaborating on the duty currently established to consider best available techniques and best environmental practice specific to environmentally sustainable waste management; developing guidelines for waste minimization in target sectors; providing guidelines and technical workshops to improve government and industry knowledge on Design for Recycling (DfR); assessing the feasibility of regional waste processing hubs;¹⁹⁶ enhancing ongoing efforts to develop regional strategies for port reception facilities; increasing the adoption of regional dumping protocols; developing pilot projects to identify and demonstrate context-appropriate technology; and developing model legislation,¹⁹⁷ including with regard to market-based instruments to assist with domestic financing of solid waste management and the return of fishing gear.

114. Post-discharge **mitigative activities** are poorly reflected in regional frameworks outside marine litter action plans. Regional instruments could strengthen the obligation to restore the marine environment, including through coastal zone clean-ups and removal of litter from the marine environment. Existing regional frameworks have a facilitative

¹⁹¹ Gilman, E., 2015. *Status of international monitoring and management of abandoned, lost and discarded fishing gear and ghost fishing*. Marine Policy 60, 225-239. <http://dx.doi.org/10.1016/j.marpol.2015.06.016>; Iran submission for response options

¹⁹² UNEP/AHEG/2018/1/3, para. 49

¹⁹³ UNEP/MAP, 2013. *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol (Decision IG.21/7)* <<http://www.unepmap.org/index.php?module=content2&catid=001011006>>.

¹⁹⁴ UNEA Res. 4/9 para. 7

¹⁹⁵ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a))

¹⁹⁶ Pacific Region Infrastructure Facility (PRIF), 2018. *Pacific Region: Solid Waste Management and Recycling. Pacific Country Profiles*. <https://www.theprif.org/documents/regional/urban-development-waste-management/pacific-region-solid-waste-management-and>

¹⁹⁷ Examples of existing legislation can be found at <https://nicholasinstitute.duke.edu/plastics-policy-inventory>

role. They promote technical assistance and use of best available techniques and best environmental practices. These frameworks could therefore promote activities including the use of capture technologies such as those for wastewater treatment plants, rivers and stormwater outlets¹⁹⁸ and sustainable removal of litter through research, workshops and guidelines. Further responses for regional marine litter action plans, which could be a delivery mechanism for technical assistance, are outlined in section 5.5.

115. **Monitoring and evaluation** activities are mandated by articles in regional legally binding instruments, including an obligation to report and review the effectiveness of action plans, programmes and measures implemented to prevent pollution of the marine environment from land-based sources. Few timelines are provided. Thus, there is a mandate to develop regional monitoring programmes, which some regions have already initiated under regional marine litter action plans. Minimum global standards for monitoring have been developed.¹⁹⁹ Monitoring programmes could support the strengthening of the regional framework by informing the development of quantitative and operational reduction targets at the regional level in order to facilitate adoption of targets at the national level. There are examples of indicators for marine litter and biota²⁰⁰ and others are planned.²⁰¹ These indicators could be expanded to allow progress monitoring across all phases of the life cycle. Measures for ALDFG monitoring also needs to be strengthened within the protocols of regional fisheries bodies²⁰² in order to allow targets to be set in the future. Monitoring, development of indicators and reporting within the scope of relevant instruments could help track progress at the global level, including for production, consumption, trade and the state of the environment.

Summary of downstream activities

116. The downstream pressures, controls, and barriers for a strengthened regional framework are summarized in Table 11, providing insight into enabling conditions for this response option.

Table 11: Summary of downstream activities for a strengthened regional framework

	End-of-life	Mitigative Controls	Monitoring & Evaluation
Pressures	<ul style="list-style-type: none"> Lack of measures targeting sustainable waste management 	<ul style="list-style-type: none"> Mitigation poorly reflected within instruments 	<ul style="list-style-type: none"> Challenges in reporting and reviewing effectiveness of regional instruments
Prevention Controls	<ul style="list-style-type: none"> Promote increased collection and recycling rates Promote best practices for final treatment 	<ul style="list-style-type: none"> Strengthen the obligation to restore the marine environment 	<ul style="list-style-type: none"> Include reporting elements specific to marine litter and microplastics
Barriers	<ul style="list-style-type: none"> Lack of capacity Lack of funding Lack of infrastructure and technology Lack of supporting legislation 	<ul style="list-style-type: none"> Lack of technical know-how. 	<ul style="list-style-type: none"> Limited development of indicators
Barrier Controls	<ul style="list-style-type: none"> Strengthen adoption of best available techniques and best environmental practice Guidelines for waste minimization in target sectors Guidelines and technical workshops on Design for Recycling (DfR) Assess feasibility of regional waste processing hubs Regional strategies for port reception facilities Increase adoption of regional dumping protocols Pilot projects for context-appropriate technology Develop model legislation 	<ul style="list-style-type: none"> Promote technical assistance for use of best available techniques and best environmental practices Research Workshops Guidelines 	<ul style="list-style-type: none"> Develop regional monitoring programs Expand indicators to cover full life cycle Strengthen measures for ALDFG monitoring

4.4.2. Analysis of indicators

117. The existing regional framework has a regional scope. This response option was initiated in the 1970s with the first regional convention on marine environmental protection, the Convention on the Protection of the Mediterranean

¹⁹⁸ UNEP/AHEG/2018/1/3, para. 38

¹⁹⁹ GESAMP, 2019. Guidelines for the Monitoring and Assessment of Plastic Litter in the Ocean.

²⁰⁰ <https://www.ospar.org/work-areas/eiha/marine-litter/assessment-of-marine-litter>

²⁰¹ <https://helcom.fi/action-areas/monitoring-and-assessment/monitoring-manual/litter/>

²⁰² Gilman, E., 2015. *Status of international monitoring and management of abandoned, lost and discarded fishing gear and ghost fishing*. Marine Policy 60, 225-239. <http://dx.doi.org/10.1016/j.marpol.2015.06.016> ; Iran submission for response options; UNEA Res. 3/7 para. 4(f)

against Pollution.²⁰³ The subsequent adoption of conventions and protocols, as well as reviews and revisions, has taken place in several regions. The **maturity** of the concept is therefore high, having been in place for over four decades, making them a well-established instrument with many examples of implementation across regions. Out of 18 Regional Seas Programmes, 14 regional conventions are in place for the protection of the marine environment (UNEP/AHEG/2018/1/INF/3), of which 13 are in force, and nine protocols for land-based sources of marine pollution, of which five are in force.²⁰⁴ Twelve regional marine litter action plans have been adopted, four are under development or review and one is legally binding. In the fishery sector, regional fishery bodies across the globe have adopted binding measures and data collection protocols on monitoring and controlling ALDFG and ghost fishing. The targets of these binding instruments include banning large-scale driftnets, the introduction of biodegradable materials and the management of demersal longline gear.²⁰⁵ The **scale** of these action plans is therefore high, covering the majority of regions.

Process indicators

118. Most of the overarching **management targets** provided in the existing regional framework include qualitative values. For instance, coastal States have agreed to take all appropriate measures to prevent, abate, combat and to the fullest possible extent eliminate pollution to the regional sea and to protect and enhance the marine environment to contribute to its sustainable development.²⁰⁶ Member Parties shall endeavour to ensure sound environmental management and development of natural resources, using the best practicable means in accordance with States' capabilities. They shall also endeavour to harmonise regional policies.²⁰⁷

119. Some of the **operational targets** of the existing regional framework have been specified in convention and protocol texts. Member Parties agree to take all measures to prevent, abate and combat pollution from discharges from ships, land-based sources and pollution caused by dumping from ships and aircraft.²⁰⁸ In addition, protocols to prevent pollution from land-based sources establish a list of land-based sources and activities and their associated contaminants of greatest concern to the marine environment. The process for developing regional standards and practices for the prevention, reduction, and control of the sources and activities are also outlined.²⁰⁹

120. **Local capacity building and development** have been included in the existing regional framework. Member Parties must cooperate in the provision of technical and other assistance to prevent marine pollution, with consideration of the special needs of developing countries.²¹⁰ The Asia-Pacific Economic Cooperation (APEC) Oceans and Fisheries Working Group hosted a capacity building training programme for its member economies to raise awareness of the environmental damage and impact caused by marine debris, and to strengthen government officials' capacity to enhance marine debris management and act in accordance with international standards by effective management of marine debris.²¹¹

121. The existing regional framework generally regulates the obligation to adopt **financial** rules and make a decision on financial participation.²¹² Some regions have established a trust **fund** specifically for marine environmental protection, including proposals for a trust fund for marine protected areas.²¹³

122. Under the existing regional framework, Member States have regulated the duty to **monitor** compliance and enforcement of instruments. To prevent and eliminate pollution from land-based sources, Contracting Parties shall provide for a system of regular monitoring and inspection to assess compliance with authorisations and regulations of releases into water or air.²¹⁴ Relevant national authorities shall arrange to monitor the various impacts of wastewater

²⁰³ *Convention for the Protection of the Mediterranean Sea against Pollution*, 1102 UNTS 27 (entered into force 12 February 1978) ('*Barcelona Convention*').

²⁰⁴ UNEP/AHEG/2018/1/INF/3, Combating Marine Plastic Litter and Microplastics: An Assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches – Summary for Policy Makers.

²⁰⁵ Eric Gilman, 'Status of international monitoring and management of abandoned, lost and discarded fishing gear and ghost fishing' (2015) 60 *Marine Policy* 229.

²⁰⁶ *Convention for the Protection of the Mediterranean Sea against Pollution*, 1102 UNTS 27 (entered into force 12 February 1978) ('*Barcelona Convention*').

²⁰⁷ *Convention for the Protection of the Natural Resources and Environment of the South Pacific Region* (1986, '*Noumea Convention*').

²⁰⁸ *Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft*, 1102 UNTS 92 (entered into force 12 February 1978) ('*Mediterranean Dumping Protocol*').

²⁰⁹ The Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol) to the Cartagena Convention, see <http://cep.unep.org/cartagena-convention/lbs-protocol/protocol-concerning-pollution-from-land-based-sources-and-activities>

²¹⁰ *Mediterranean Dumping Protocol*, Art. 11.

²¹¹ *Capacity Building for Marine Debris Prevention and Management in the APEC Region Workshop Report*, Yeosu, Korea, 12-18 June 2017, APEC Oceans and Fisheries Working Group.

²¹² *Barcelona Convention*, Art. 12; *Convention on the Protection of the Marine Environment of the Baltic Sea Area*, 13 ILM 546 (entered into force 3 May 1980) ('*Helsinki Convention*') Art. 22.

²¹³ See <https://www.unenvironment.org/unepmap/who-we-are/mediterranean-trust-fund> and https://planbleu.org/sites/default/files/upload/files/Objective1_MPATrustFund_FINAL.PDF.

²¹⁴ Annex I to the *Convention for the protection of the marine environment of the North-East Atlantic*, 2354 UNTS 67 (entered into force 25 March 1998) ('*OSPAR Convention*') Art. 1.

discharges and emissions into the atmosphere.²¹⁵ Detailed requirements of the assessment of the quality of the regional marine environment have been developed.²¹⁶

123. Under the existing regional framework, **reporting** is included as an obligation of the Contracting Parties to regional marine environmental protection conventions and protocols. The Contracting Parties shall report on the legal and administrative measures taken for the implementation of relevant instruments and the effectiveness of such reported measures.²¹⁷ **Evaluation and review** are closely connected with the reporting process, as reports submitted by States are to be reviewed by the meetings of the Contracting Parties.²¹⁸ The regional marine environment commission is also obliged to review the contents of the instruments and to recommend amendments for the Contracting Parties.²¹⁹

124. For **domestic stakeholder participation**, regional conventions and protocols incorporate articles regarding public information and participation. The Contracting Parties shall give the public appropriate access to information on the environmental state and activities and measures that affect or are likely to affect the environmental state.²²⁰ The United Nations Economic Commission for Europe (UNECE) concluded the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention)²²¹ in 1998 to ensure public participation and the access to environmental justice. Aarhus Convention regulates collection, dissemination and access to environmental information.²²²

125. The existing regional framework proactively promotes **international capacity building**. Regional conventions and protocols incorporate articles regarding international cooperation on capacity building. The Contracting Parties cooperate to provide technical assistance in fields relating to marine pollution, with priority given to the special needs of regional developing countries.²²³ OSPAR has collaborated with other regional seas, including with coastal States to the Convention for Cooperation in the Protection, Management and Development of the Marine and Coastal Environment of the Atlantic Coast of the West, Central and Southern Africa Region (Abidjan Convention). The two regions work together on the implementation of the ecosystem-based approach, awareness-raising and the management of offshore oil and gas activities.²²⁴

126. For **co-benefits**, the existing regional framework has recognised the importance of the marine environment and the fauna and flora that the environment supports.²²⁵ It further recognises the economic, social, health and cultural value of the regional marine environment.²²⁶ As offshore oil and gas activities are an important industry for coastal States to the OSPAR Convention, OSPAR put forward the Offshore Oil and Gas Industry Strategy to enhance the management of pollution from oil and gas industry and safeguard human health and conserve marine ecosystems.²²⁷ Helsinki Commission (HELCOM) has conducted economic and social analyses to examine the economic impact of human-induced activities in marine and coastal areas, as well as anthropogenic impacts on the marine environment.²²⁸

Performance indicators

127. To include marine litter in existing sustainable forums including sustainable consumption and production (SCP) could be an **outcome** performance of strengthening the existing regional framework as a response option. To achieve the aim of ‘minimi[s]ing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product’ and not jeopardising the needs of future generations, under UNEP, regional initiatives including SwitchMed, SWITCH-Asia and SWITCH Africa Green have supported social and eco innovations to enhance the sustainability of consumption and production patterns.²²⁹ Opportunities could exist for strengthened collaboration with these regional innovation forums or other relevant platforms to consider aspects related to the plastic value chain, with with special focus on eco production designs and green consumption behaviours. Social justice sector could also be included and strengthened under the existing regional framework to achieve environmental justice on communities affected by marine litter and microplastics pollution.

²¹⁵ Annex III to the Helsinki Convention, Regulation 3(4).

²¹⁶ Annex IV to the OSPAR Convention: On the Assessment of the Quality of the Marine Environment.

²¹⁷ Barcelona Convention, Art. 26; OSPAR Convention, Art. 22 and Helsinki Convention, Art. 16.

²¹⁸ Barcelona Convention, Art. 18 ;

²¹⁹ Helsinki Convention, Art. 20.

²²⁰ Barcelona Convention, Art. 15; Helsinki Convention, Art. 17.

²²¹ Aarhus Convention, 1998. *UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters* <<https://www.unece.org/env/pp/treatytext.html>>.

²²² Aarhus Convention, Arts 4-5.

²²³ Barcelona Convention, Art. 13.

²²⁴ See <https://www.ospar.org/about/international-cooperation/abidjan-convention>. Also see OSPAR’s cooperation with the Caribbean Region, <https://www.unenvironment.org/cep/ospar-commission-and-cartagena-convention>.

²²⁵ OSPAR Convention, Preamble.

²²⁶ Barcelona Convention, Preamble.

²²⁷ See <https://qsr2010.ospar.org/en/ch07.html>

²²⁸ HELCOM, 2018a. Economic and Social Analyses in the Baltic Sea region-HELCOM Thematic assessment 2011-2016.

²²⁹ See <https://www.unenvironment.org/explore-topics/resource-efficiency/what-we-do/sustainable-consumption-and-production-policies#:~:text=Sustainable%20consumption%20and%20production%20refers,the%20service%20or%20product%20so> and <http://www.cprac.org/en/what-we-do/sustainable-consumption-and-production>.

128. The **outcomes** of strengthening the existing regional framework could be assessed by binding and voluntary instruments adopted on relevant topics, as well as the waste reduction. For social equity, with the improvement in environmental justice in South African communities through capacity-building programs, a nationwide 30-35 per cent reduction in waste was witnessed.²³⁰ For fishery sector, among 19 representative global and regional intergovernmental bodies and agreements with the competence to establish conservation and management measures for marine capture fisheries, four of them have convention texts with an explicit mandate to monitor and/ control ALDFG and ghost fishing. Ten of them have required logbook and/or observer data collection protocols for reporting abandonment, loss and discarding of fishing gear.²³¹ With OSPAR's scoping study on best practices for the design and recycling of fishing gear, a high recycling rate is expected.²³² With its long tradition of legislation on waste, the European Union (EU) has conducted a review of its waste legislation and proposed to include the leading waste-management targets and strengthen waste prevention provisions. As outlined in the G20 report, the EU has adopted laws on how waste should be treated, and legislation on specific products or waste streams. Among these documents, an EU Directive on the reduction of the impact of certain plastic products on the environment was adopted in 2019. This Directive regulates plastic products including fishing gear containing plastics.²³³ Additionally, the EU Port Reception Facilities Directive regulates discharges from ship-generated waste, including the discharges from fishing vessels.²³⁴

Summary of indicators

129. The assessment of instruments and measures relevant to a strengthened regional framework are summarized in Table 12, providing insight into the input, process and performance of this response option.

Table 12: Summary of indicators for a strengthened regional framework

Indicator Type	Indicator	Description	Evaluation
INPUT	Scope	International, regional or national	Regional
	Maturity	Operational years - high, medium, low	High – many instruments have been in place for a number of decades
	Scale	Level of adoption	High – various instruments exist covering most regions that provide a mandate covering elements of marine conservation
PROCESS	Governance	Management targets	Medium – high-level qualitative targets for protecting regional marine environment exist that could apply to marine litter and microplastics Medium – some qualitative targets exist for specific sources of pollution that could apply, but quantitative targets and indicators would be needed specific to marine litter and microplastics.
		Operational targets	
	Management	Local capacity building	Yes – mainly focused at government authorities
		Ongoing funding secured	Yes – regional marine environment trust fund; marine protected area trust fund
	Monitoring in place	Yes – monitoring of compliance; the assessment of the quality of the regional marine environment	
	Reporting in place	Yes – reports of measures taken and effectiveness of those measures	

²³⁰ <https://www.unenvironment.org/news-and-stories/story/marine-litter-and-environmental-justice>

²³¹ Eric Gilman, 'Status of international monitoring and management of abandoned, lost and discarded fishing gear and ghost fishing' (2015) 60 Marine Policy 232.

²³² OSPAR Commission, 'OSPAR scoping study on best practices for the design and recycling of fishing gear as a means to reduce quantities of fishing gear found as marine litter in the North-East Atlantic' (2020).

²³³ Ministry of the Environment, Japan, 'G20 Report on Actions against Marine Plastic Litter First Information Sharing based on the G20 Implementation Framework' (2019). Also see <https://eur-lex.europa.eu/eli/dir/2019/904/oj>

²³⁴ Ministry of the Environment, Japan, 'G20 Report on Actions against Marine Plastic Litter First Information Sharing based on the G20 Implementation Framework' (2019). Also see <https://eur-lex.europa.eu/eli/dir/2019/904/oj>

		Review process defined	Yes – review the implementation status; possible amendments based on reviews.
	Co-operation	Domestic stakeholder inclusion	Yes – procedures for the collection and dissemination of public information
		International capacity building	Yes – interregional cooperation; special needs of developing countries
	Co-benefits recognised	Environmental	Yes – mostly focused on marine and coastal zones
		Social	Yes – limited and general, focusing on services provided by the marine environment
		Economic	Yes – limited and general, focusing on services provided by the marine environment
PERFORMANCE	Outputs		Sustainable consumption and production, including eco innovations
	Outcomes	<i>[List types, e.g. guidelines, workshops]</i>	Waste reduction, adoption of binding instruments regarding fishing gears

4.4.3. Discussion on effectiveness

130. The above analysis of measures to address the life cycle, together with the analysis of indicators, inform the following assessment of the effectiveness of regional marine litter action plans in contributing to the global goal of elimination of discharge of marine litter and microplastics to the ocean.

Maturity

131. **High.** This response option was initiated in the 1970s with the first regional convention on marine environmental protection, the Barcelona Convention on the Protection of the Mediterranean against Pollution. It was adopted in 1976 and entered into force in 1978. The subsequent adoption of conventions and protocols, as well as reviews and revisions, has taken place in several regions. Out of 18 Regional Seas Programmes, currently 14 regional conventions are in place for the protection of the marine environment (UNEP/AHEG/2018/1/INF/3), of which 13 are in force, and nine protocols for land-based sources of marine pollution, of which five are in force. Twelve regional marine litter action plans have been adopted, four are under development and one is binding (see Section 5.5).

Feasibility

132. **High.** Feasibility has been strongly demonstrated, as there are 14 regional conventions for the protection of the marine environment. Member States who are Parties to these conventions have adopted specific protocols on topical issues including dumping and pollution from land-based sources. In regional agreements adopted under the Regional Seas, there are articles addressing pollution from dumping, ships and land-based sources. The need for scientific and technological cooperation between Contracting Parties is also recognised. Regional Activity Centres (RACs) and Regional Activity Networks (RANs) have been established under regional conventions for better implementation of agreements and protocols and coordination among Member States. Five regional nodes of the GPML have also been established to assist with, for example, implementation of regional marine litter action plans. The number of nodes could be expanded and their role at the regional level strengthened to assist with the development of NAP-MaLis.²³⁵ Some regions have established supplementary trusts for the protection of the marine environment in order to secure funding. Other sustainable funding and self-sufficient financial sources are also being explored.

Time frame

133. **Long.** Regional legally binding instruments whose purpose is to protect the marine environment have been adopted for long-term enforcement, i.e. over five or more years. Amending and reviewing these legally binding instruments takes several years. Other regional instruments, including RAP-MaLis (see section 5.5 below), provide specific timelines for different activities and projects.

Impact

134. **High.** Strengthening existing regional frameworks is an effective response option for regulating and guiding action at the regional level. Overarching agreements and protocols with specific targets could make it obligatory to address pressures and barriers identified in some life cycles. Most regional frameworks have not adopted a full life cycle perspective. To have a greater impact, this approach could be supplemented by strengthened regional marine litter action plans.

²³⁵ UNEA Res. 3/7, para. 5

Overall comments

135. Nine out of eighteen regional conventions developed for the protection of the marine environment under the UNEP Regional Seas Programmes have adopted protocols specific to pollution from land-based sources and activities (UNEP/AHEG/2018/1/INF/3). To strengthen the existing regional framework, all regions could adopt protocols for land-based sources of marine pollution, incorporating measures specific to the life cycle of marine litter and microplastics.

136. Existing regional framework outputs are dominant in the post-discharge stage, with articles obligating monitoring. General measures for the prevention of pollution from land- and sea-based sources apply to the end-of-life phase. To strengthen existing regional framework to be effective across all life cycle phases, Member States could expand mandates and enhance enforcement with specific instruments (binding or voluntary) that include upstream preventive measures and active industry participation, particularly for the phases of product manufacture and use. In future reviews and revisions, additional upstream preventive measures could be negotiated and included, based on best environmental practices, most appropriate technologies and techniques. To achieve this, access to scientific knowledge, research and development capacity and transfer of technology are to be taken into consideration.

137. The effectiveness of existing regional frameworks could be constrained by limited funding at the regional level, as well as limited participation and capacities of stakeholders and enforcement authorities and lack of technologies and facilities at the national level. Therefore, funding that supports capacity building activities, cooperative projects and the general operation could be encouraged.

138. To be effective, local capacity-building that ensures implementation and enforcement could be delivered in forms of workshops, seminars and site visits. Capacity-building activities could be strengthened in areas including market-based instruments, sustainable waste management and private-public partnership for reducing waste generation and increasing recycling. Monitoring indicators and standards could be discussed and adopted by the region, to ensure a better quality of data collection and analysis. The life cycle phases of source materials, product manufacture and use could be strengthened.

4.5. REGIONAL MARINE LITTER ACTION PLANS

139. Regional marine litter action plans (RAP-MaLis) are an **existing response option** that aims to facilitate action at the national level to prevent (or reduce to the minimum) pollution by marine litter. They target coastal and marine **environmental zones**, with some freshwater zones. Impacts on habitats, species and ecosystem services, as well as on human health and safety, are also targeted for reduction to a minimum. The **scale** rating for adoption is high. Nearly all the 18 Regional Seas Programmes have adopted regional marine litter action plans (RAP-MaLis) or are in the process of developing such action plans. Several additional marine litter action plans have also been adopted under other intergovernmental economic fora, such as the G7, G20, APEC and ASEAN. The instruments are generally voluntary, with some operating within binding framework. **Actions** include those of a preventive and mitigative nature, including monitoring & evaluation. The **geographic range** is predominantly the coastal zone and maritime areas within national jurisdiction, with urban areas targeted for waste management.

4.5.1. Analysis of measures to address the life cycle

Upstream activities

140. It is recognised that policies for improving resource efficiency could contribute in combatting marine litter.²³⁶ The pressure influencing the **source materials phase of the life cycle** is poor resource efficiency.²³⁷ RAP-MaLis target this problem by promoting the 3R hierarchy of reduce, reuse, recycle.²³⁸ Reduction at source, particularly through urban solid waste management, could be assisted by applying the waste hierarchy.²³⁹ Controls that improve resource efficiency of plastics could reduce the use of renewable resources (e.g. water) and non-renewable resources (e.g. oil, natural gas). In addition, the release of greenhouse gases could be reduced.²⁴⁰ The USAID Clean Cities, Blue Ocean (CCBO)

²³⁶ OECD, 2019a. Improving Resource Efficiency to Combat Marine Plastic Litter. Issue Brief. Prepared by the OECD as input for the 2019 G20 Ministerial Meeting on Energy Transitions and Global Environment for Sustainable Growth.

²³⁷ As promoted in the G20 Implementation Framework for Actions on Marine Plastic Litter; UNEA Res. 3/7, UNEA Res. 1/6, para. 16

²³⁸ NOWPAP, 2008. *Regional Action Plan on Marine Litter (RAP MALLI)*. http://dinrac.nowpap.org:8080/documents/NOWPAP_RAPMALLI.pdf; SPREP, 2018a. Pacific Regional Action Plan. Marine Litter 2018-2025, Apia, Samoa. ASEAN Framework of Action on Marine Debris; UNEA Res. 4/6

²³⁹ UNEP/MAP, 2013. *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol (Decision IG.21/7)* <<http://www.unepmap.org/index.php?module=content2&catid=001011006>>.

²⁴⁰ OECD, 2019a. Improving Resource Efficiency to Combat Marine Plastic Litter. Issue Brief. Prepared by the OECD as input for the 2019 G20 Ministerial Meeting on Energy Transitions and Global Environment for Sustainable Growth.

initiative aims to build capacity and commitment for the 3Rs and improved solid waste management, working in partnership with the private sector at all levels.²⁴¹

141. Adoption of measures to achieve these goals may be delayed or weakened due to uncertainty about the effectiveness of interventions,²⁴² as well as industry lobbying.²⁴³ Effective implementation could require coordination across multiple government agencies. RAP-MaLis have addressed these barriers by promoting the establishment of a policy making mechanism with a supporting national coordinating body, or strengthening a relevant agency should one exist, for such purposes.²⁴⁴ Guidelines could facilitate national action, e.g. the UNEP Guidelines for the Development of Action Plans on Marine Litter,²⁴⁵ and the Regional Plan on Marine Litter Management in the Mediterranean Article 7 - Integration of marine litter measures into the LBS National Action Plans (LBS NAPs).²⁴⁶ Platforms for sharing of best practices, including the SIDS Action Platform, the GPML, and projects such as one titled Marine Litter Reduction in the Caribbean, A Collaborative Effort Between the Bahamas, Belize, Jamaica, Grenada, and St. Vincent and the Grenadines,²⁴⁷ may also facilitate capacity building and national action. The development of model legislation is suggested to assist countries in assessing the relevance and adoption within their national context.²⁴⁸ Some have developed such model legislation.²⁴⁹ Research topics for consideration at the regional level have also been suggested, including partner institutions to conduct such research.²⁵⁰

142. The pressure influencing the **product manufacture phase of the life cycle** is poor industry practices.²⁵¹ Market-based instruments are commonly promoted in RAP-MaLis, requiring producers, manufacturers, brand owners and first importers to be responsible for the entire life cycle of their products. The effect of the instruments could be reduced by low collection rates.²⁵² Attaining higher collection and recycling rates is often directly related to the design of plastics and products that contain plastics.²⁵³ RAP-MaLis promote activities that encourage the recyclability of plastic products, such as reducing the use of additives,²⁵⁴ and the design of products is targeted to improve reuse, recycling and materials reduction.²⁵⁵ Product design modifications have also been suggested to substitute expanded polystyrene and extruded polystyrene in articles and to minimise EPS consumption.²⁵⁶ Design changes could be incentivised through the promotion of the extended producer responsibility (EPR) principle, which is common across regional action plans, including for the design of fishing gear to promote its return to land for recycling.²⁵⁷ EPR and other economic instruments could not only drive design for reuse, repair and recyclability, but also stimulate end markets for recycled materials. RAP-MaLis have identified research topics relevant to this area, conducted scoping studies and published background documents (see output indicators below). A list of principles to improve the different phases of the design process in terms of reduction/prevention of marine litter generation resulting from the HELCOM-INTERREG Workshop on Marine Litter and Ecodesign held on 15 June 2018 in Berlin (Germany) has been drafted.²⁵⁸ However, outputs that address this life cycle phase are generally low apart from efforts to strengthen policies to prevent pellet loss.²⁵⁹ Plastic producers and converters, in particular for polystyrene products, have been highlighted for promotion of

²⁴¹ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)).

²⁴² Dauvergne, P., 2018. *Why is the global governance of plastic failing the oceans?* Glob. Environ. Change-Human Policy Dimens. 51, 22-31. 10.1016/j.gloenvcha.2018.05.002

²⁴³ <https://www.ciel.org/news/plastics-industry-knew/>; <https://www.npr.org/2020/03/31/822597631/plastic-wars-three-takeaways-from-the-fight-over-the-future-of-plastics>

²⁴⁴ COBSEA, 2019. COBSEA Regional Action Plan on Marine Litter 2019, Secretariat of the Coordinating Body on the Seas of East Asia (COBSEA) and United Nations Environment Programme, Bangkok.

²⁴⁵ UNEP, 2019b. Guidelines for the Development of Action Plans on Marine Litter.

²⁴⁶ UNEP/MAP, 2013. *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol (Decision IG.21/7)* <<http://www.unepmap.org/index.php?module=content2&catid=001011006>>.

²⁴⁷ UNEP-CAR/RCU, 2014. *Regional Action Plan on Marine Litter Management (RAPMaLI) for the Wider Caribbean Region 2014 (CEP Technical Report: 72)*. United Nations Environment Programme Caribbean/ Regional Coordinating Unit (UNEP-CAR/RCU). http://www.cep.unep.org/cep-documents/rapmali_web.pdf

²⁴⁸ SPREP, 2018a. Pacific Regional Action Plan. Marine Litter 2018-2025, Apia, Samoa.

²⁴⁹ SPREP, 2018b. Regulating Plastics in Pacific Island Countries. A guide for policymakers and legislative drafters.

²⁵⁰ UNEP/MAP, 2013. *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol (Decision IG.21/7)* <<http://www.unepmap.org/index.php?module=content2&catid=001011006>>.

²⁵¹ UNEP, 2017a. *Combating marine plastic litter and microplastics: An assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches*. https://papersmart.unon.org/resolution/uploads/unep_aheg_2018_inf3_full_assessment_en; EIA submission for response options; Philippines submission for response options.

²⁵² UNEA Res. 3/7, para. 4(c)

²⁵³ OECD, 2019a. Improving Resource Efficiency to Combat Marine Plastic Litter. Issue Brief. Prepared by the OECD as input for the 2019 G20 Ministerial Meeting on Energy Transitions and Global Environment for Sustainable Growth.

²⁵⁴ OSPAR, 2014. *Regional Action Plan for Prevention and Management of Marine Litter in the North-East Atlantic (2014-2021)*.

<https://www.ospar.org/documents?v=34422>

²⁵⁵ ASEAN, 2019. ASEAN Framework of Action on Marine Debris, HELCOM, 2015. *Regional Action Plan for Marine Litter in the Baltic Sea*. <http://helcom.fi/Lists/Publications/Regional%20Action%20Plan%20for%20Marine%20Litter.pdf>

²⁵⁶ Lassen, C., Warming, M., Kjølholt, J., Jakobsen, L.G., Vrubliauskiene, N., Novichkov, B., A/S, C., 2019. Survey of Polystyrene Foam (EPS and XPS) in the Baltic Sea

²⁵⁷ OSPAR, 2020. OSPAR scoping study on best practices for the design and recycling of fishing gear as a means to reduce quantities of fishing gear found as marine litter in the North-East Atlantic.

²⁵⁸ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a))

²⁵⁹ OSPAR, 2014. *Regional Action Plan for Prevention and Management of Marine Litter in the North-East Atlantic (2014-2021)*.

<https://www.ospar.org/documents?v=34422>

compliance with Operation Clean Sweep. Requirements regarding pellets and dust emission could also be made a component of environmental permits for producers and converters.²⁶⁰ In lieu of national policies, NGOs are actively promoting industry engagement in Operation Clean Sweep.²⁶¹

143. The pressure influencing the **use phase of the life cycle** consists of poor practices by both industry and consumers.²⁶² A number of industries have been recognised in RAP-MaLis as major contributors to marine litter and microplastics. Poor application of best environmental practices could lead to leakage from fishing vessel operations, shipping operations, cruise ships and beachside tourist enterprises, amongst others.²⁶³ To address this, RAP-MaLis promote design of products that will enable reuse and repair²⁶⁴ and promote awareness-raising to encourage consumers to reduce their consumption of avoidable products, such as Beat the Microbead.²⁶⁵

144. The effectiveness of these approaches may be undermined by low industry engagement, with few examples of systems for reuse and repair; lack of consumer awareness; and lack of alternative products that are less harmful. Eco-labelling of plastic products to indicate their environmental impact are encouraged,²⁶⁶ as well as voluntary agreements with retailers for reusable container systems are being promoted,²⁶⁷ along with fiscal and economic instruments to reduce consumption of plastic bags, microbeads and single-use plastics.²⁶⁸ Expandable polystyrene boxes in the fishing sector and beverage packaging have been highlighted for deposit, return and restoration systems.²⁶⁹ The Adopt-a-Beach and Fishing-for-Litter programs are examples of creating awareness through action, while cooperation with high-profile events, such as Greening the Pacific Games, aims to engage the corporate sector. Some scoping studies have been conducted to understand consumer behaviour contributions to waste generation and provide guidance for policymakers, but outputs to address this life cycle phase are generally low

Summary of upstream activities

145. The upstream pressures, controls, and barriers for regional marine litter action plans are summarized in Table 13, providing insight into enabling conditions for this response option.

Table 13: Summary of upstream and midstream activities for regional marine litter action plans

	Source Materials	Product Manufacture	Use
Pressures	<ul style="list-style-type: none"> Poor resource efficiency 	<ul style="list-style-type: none"> Poor industry practices 	<ul style="list-style-type: none"> Poor practices by industry and consumers
Prevention Controls	<ul style="list-style-type: none"> 3R waste hierarchy 	<ul style="list-style-type: none"> Market-based instruments 	<ul style="list-style-type: none"> Promote design to enable reuse and repair Awareness-raising of alternatives
Barriers	<ul style="list-style-type: none"> Uncertainty of effectiveness of interventions and industry lobbying Coordination across multiple government agencies 	<ul style="list-style-type: none"> Low collection rates 	<ul style="list-style-type: none"> Low industry engagement Low consumer engagement
Barrier Controls	<ul style="list-style-type: none"> Guidelines could facilitate national action Platforms for sharing of best practices Develop model legislation National coordinating body 	<ul style="list-style-type: none"> Promote design to drive design for reuse, repair, recycling, including reducing problematic additives 	<ul style="list-style-type: none"> Eco-labelling to indicate environmental impact Voluntary agreements with retailers for return, reuse schemes Awareness through action (Adopt-a-Beach, Fishing-for-Litter)

Downstream activities

²⁶⁰ HELCOM, WS RAP ML 4-2019, document 3-1

²⁶¹ <https://www.tangaroablue.org/pelletalertproject/zero-pellet-loss-through-operation-clean-sweep/>

²⁶² UNEA Res. 3/7, para 6.

²⁶³ SPREP, 2018a. Pacific Regional Action Plan. Marine Litter 2018-2025, Apia, Samoa.

²⁶⁴ ASEAN, 2019. ASEAN Framework of Action on Marine Debris.

²⁶⁵ <https://www.beatthemicrobead.org/>

²⁶⁶ UNEP, 2018c. Western Indian Ocean Regional Action Plan on Marine Litter, UN Environment/Nairobi Convention, Nairobi.

²⁶⁷ UNEP/MAP, 2013. *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol (Decision IG.21/7)* <<http://www.unepmap.org/index.php?module=content2&catid=001011006>>.

²⁶⁸ Ibid.

²⁶⁹ Ibid.

146. The pressure influencing the **end-of-life phase of the life cycle** is weak governance by authorities, limiting confidence in investments in collection and sorting infrastructure and other waste management processes.²⁷⁰ It is recognised that investment in collection and sorting infrastructure could be stimulated by stronger policy frameworks at the national level.²⁷¹ Marine litter management should be an integral part of solid waste management and other relevant strategies to ensure environmentally sound management of human activities and rational use of resources.²⁷² RAP-MaLis promote environmentally sound waste management, including addressing illegal dumping and illegal disposal in coastal zones and rivers,²⁷³ and strengthening enforcement measures to combat illegal dumping and illegal solid waste or sewage disposal in the coastal zone and rivers, in accordance with national legislation.²⁷⁴ Consumer practices could undermine efforts towards environmentally sound waste management, such as at-source sorting and participation in drop-off/return programmes.²⁷⁵ To facilitate national action in this regard, manufacturers may apply a deposit to distributors to encourage the return of products for recycling.²⁷⁶ Deposit-return schemes encourage separation by consumers and have been adopted for PET and glass bottles and aluminium cans.²⁷⁷ The design of these schemes could vary with regard to the deposit paid by consumers, the fund these fees contribute to, the level of technology used and awareness-raising to stimulate participation.²⁷⁸ Deposit schemes are also implemented at different points in the value chain. Research on best practices for the return of fishing gear²⁷⁹ and prevention of marine litter from the fishing industry have been published and research to obtain better understanding of upstream waste flows.²⁸⁰ Sectoral guidelines have been developed on marine litter management, including for commercial shipping and passenger ships.²⁸¹

147. Post-discharge **mitigative activities** are dominated by research to address knowledge gaps on the sources and pathways of marine litter and microplastics, particularly through sewage and wastewater treatment plants. Understanding the sources and pathways is key to developing effective controls. In support of this, RAP-MaLis have suggested research to identify and evaluate accumulation areas and sources of litter, including maritime transport, industrial, agricultural and urban activities, fishing activities, rivers and diffuse inputs, as well as the development of GIS and mapping systems to locate these and common methodologies for evaluating the costs of removal and disposal.²⁸² Riverine and sewage inputs are also important pathways requiring further research.²⁸³ Surveys could assist in establishing and updating baseline data and identifying hotspots (in collaboration with stakeholders)²⁸⁴ to assist in the development of methodologies and assessment criteria,²⁸⁵ including removal and in particular for specially protected areas or where protected species are impacted.²⁸⁶ Tools such as circulation models could assist in the mapping process.²⁸⁷ Projects are in place for the removal of microplastics before reaching the ocean, for example the FanPLESStic-sea project initiated by HELCOM.²⁸⁸

148. RAP-MaLis have been successful in promoting regular national marine litter clean-up campaigns and supporting the International Coastal Cleanup Campaign. In addition, the sustainable practices of the Adopt-a-Beach and Fishing-for-Litter programmes²⁸⁹ are promoted in consultation with the competent international and regional organizations and

²⁷⁰ Vietnam submission on response options

²⁷¹ OECD, 2019a. Improving Resource Efficiency to Combat Marine Plastic Litter. Issue Brief. Prepared by the OECD as input for the 2019 G20 Ministerial Meeting on Energy Transitions and Global Environment for Sustainable Growth.

²⁷² UNEP, 2018c. Western Indian Ocean Regional Action Plan on Marine Litter, UN Environment/Nairobi Convention, Nairobi.

²⁷³ UNEP-CAR/RCU, 2014. *Regional Action Plan on Marine Litter Management (RAPMaLI) for the Wider Caribbean Region 2014 (CEP Technical Report: 72)*. United Nations Environment Programme Caribbean/ Regional Coordinating Unit (UNEP-CAR/RCU). http://www.cep.unep.org/cep-documents/rapmali_web.pdf

²⁷⁴ COBSEA, 2019. COBSEA Regional Action Plan on Marine Litter 2019, Secretariat of the Coordinating Body on the Seas of East Asia (COBSEA) and United Nations Environment Programme, Bangkok.

²⁷⁵ OECD, 2018b. *Improving Markets for Recycled Plastics: Trends, Prospects and Policy Responses*. <http://dx.doi.org/10.1787/9789264301016-en>; Oosterhuis, F., Papyrakis, E., Boteler, B., 2014. *Economic instruments and marine litter control*. *Ocean & Coastal Management* 102, 47-54. <https://doi.org/10.1016/j.ocecoaman.2014.08.005>

²⁷⁶ OECD, 2016a. *Extended Producer Responsibility: Updated Guidance for Efficient Waste Management*. OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264256385-en>

²⁷⁷ Ocean Conservancy, 2019. *Plastics Policy Playbook. Strategies for a Plastic-Free Ocean*.

²⁷⁸ OECD, 2018c. *Improving Plastics Management: Trends, policy responses, and the role of international co-operation and trade*. OECD Environment Policy Paper No. 12.

²⁷⁹ OSPAR, 2020. OSPAR scoping study on best practices for the design and recycling of fishing gear as a means to reduce quantities of fishing gear found as marine litter in the North-East Atlantic.

²⁸⁰ OSPAR, 2019b. Scoping study to identify key waste items from the fishing industry and aquaculture.

²⁸¹ See NOWPAP, <http://cearac.nowpap.org/activities/marine-litter/>

²⁸² UNEP/MAP, 2013. *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol (Decision IG.21/7)* <<http://www.unepmap.org/index.php?module=content2&catid=001011006>>.

²⁸³ HELCOM, 2019c. HELCOM RAP ML, RL8 Assess the importance of the contribution of upstream waste flows to the marine environment and, if needed, identify suitable actions (3-9).

²⁸⁴ UNEP/MAP, 2013. *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol (Decision IG.21/7)* <<http://www.unepmap.org/index.php?module=content2&catid=001011006>>.

²⁸⁵ UNEP, 2018c. Western Indian Ocean Regional Action Plan on Marine Litter, UN Environment/Nairobi Convention, Nairobi.

²⁸⁶ UNEP/MAP, 2013. *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol (Decision IG.21/7)* <<http://www.unepmap.org/index.php?module=content2&catid=001011006>>.

²⁸⁷ <https://ec.europa.eu/jrc/en/science-update/new-modelling-tool-identify-distribution-and-accumulation-floating-marine-litter>

²⁸⁸ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)): HELCOM - Baltic Marine Environment Protection Commission; FanPLESStic project – Initiatives to remove microplastics before they enter the sea.

²⁸⁹ See also DEFISHGEAR

in partnership with fishers. Adequate collection, sorting, recycling and/or environmentally sound disposal of the litter should also be ensured.²⁹⁰ Sharing of best practices for monitoring and removal is strong.²⁹¹

149. **Monitoring and evaluation** activities are a dominant feature of RAP-MaLis due to the lack of harmonised data across Member States. Many RAP-MaLis promote the development of national monitoring programmes on marine litter based on methodologies that are harmonised at the regional level,²⁹² including mapping of hotspots, and supported by regional guidelines.²⁹³ The methods suggested in the recently published Guidelines for the Monitoring and Assessment of Plastic Litter and Microplastics in the Ocean²⁹⁴ may also be incorporated.²⁹⁵ Workshops, including GPML “training of trainers,”²⁹⁶ are widely used to build capacity across regions and at the national level. The establishment of an Expert Group on Regional Marine Litter Monitoring Programme is also promoted in RAP-MaLis. These groups could assist in the preparation of the Regional Marine Litter Monitoring Programme, the design National Monitoring Programme on Marine Litter and the establishment of the Regional Data Bank on Marine Litter.²⁹⁷

Summary of downstream activities

150. The downstream pressures, controls, and barriers for regional marine litter action plans are summarized in Table 14, providing insight into enabling conditions for this response option.

Table 14: Summary of downstream activities for regional marine litter action plans

	End-of-life	Mitigative Controls	Monitoring & Evaluation
Pressures	<ul style="list-style-type: none"> Weak national governance 	<ul style="list-style-type: none"> Lack of understanding of sources and pathways 	<ul style="list-style-type: none"> Lack of harmonised data
Mitigative Controls	<ul style="list-style-type: none"> Integrated solid waste management strategies 	<ul style="list-style-type: none"> Research Removal activities with data collection 	<ul style="list-style-type: none"> Guidelines to harmonise methodologies
Barriers	<ul style="list-style-type: none"> Consumer participation (sorting, deposit schemes, etc) Sectoral engagement 	<ul style="list-style-type: none"> Lack of participation 	<ul style="list-style-type: none"> Lack of capacity on methodologies
Barrier Controls	<ul style="list-style-type: none"> Awareness raising Sectoral guidelines 	<ul style="list-style-type: none"> Adopt-a-Beach, Fishing-for-Litter Sharing of best practices 	<ul style="list-style-type: none"> Workshops, training the trainer

4.5.2. Analysis of indicators

Input indicators

151. The **scope** of this response option is regional, often defined within legal instruments, with a high level of maturity. RAP-MaLis were initiated under the UNEP Regional Seas Programme, with the first action plans being adopted in 2007/8. Since then, additional regions have adopted action plans specific to marine litter and others have revised their action plans. The **maturity** of the concept is therefore high, having been in place for over a decade, making them a well-established instrument with many examples of implementation across countries. As the adoption of regional marine litter action plans has grown, only one region remains under the Regional Seas Programme with no marine litter action plan or plans underway to develop one. In addition, action plans have been adopted under a number of regional economic fora, providing further international coverage. The **scale** rating of these action plans is therefore **high**, covering 146 coastal States. Greater engagement of land-locked States could be promoted.

Process indicators

152. The overarching **management targets** agreed in RAP-MaLis include quantitative and qualitative values. For instance, coastal States have agreed to substantially reduce marine litter to levels where properties and quantities do not cause harm to the marine environment by 2020.²⁹⁸ States have aimed at a significant quantitative reduction of marine

²⁹⁰ UNEP/MAP, 2013. *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol (Decision IG.21/7)* <<http://www.unepmap.org/index.php?module=content2&catid=001011006>>.

²⁹¹ See for example, <https://www.unenvironment.org/cep/news/video/regional-seas-conventions-collaborate-implement-sdg-14-across-atlantic>

²⁹² See example of HELCOM Monitoring sub-programme on beach litter <https://portal.helcom.fi/meetings/HOD%2056-2019-597/MeetingDocuments/3-14%20Draft%20HELCOM%20monitoring%20sub-programme%20on%20beach%20litter.pdf>

²⁹³ UNEP/MAP, 2013. *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol (Decision IG.21/7)* <<http://www.unepmap.org/index.php?module=content2&catid=001011006>>.

²⁹⁴ GESAMP, 2019. Guidelines for the Monitoring and Assessment of Plastic Litter in the Ocean.

²⁹⁵ COBSEA, 2019. COBSEA Regional Action Plan on Marine Litter 2019, Secretariat of the Coordinating Body on the Seas of East Asia (COBSEA) and United Nations Environment Programme, Bangkok.

²⁹⁶ <https://www.gpmarinelitter.org/what-we-do/training>; <https://www.gpmarinelitter.org/events/workshop/second-training-trainers-monitoring-and-assessment-marine-plastic-litter-and?doctypeid=24>

²⁹⁷ UNEP/MAP, 2013. *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol (Decision IG.21/7)* <<http://www.unepmap.org/index.php?module=content2&catid=001011006>>.

²⁹⁸ Commission, O., Regional Action Plan for Prevention and Management of Marine Litter in the North-East Atlantic.

litter by 2025 compared to 2015.²⁹⁹ Some States have concluded quantitative targets such as to reduce marine litter by 20% within a timeline of 2024.³⁰⁰ The **operational targets** of the regional marine litter action plans are not always explicitly listed as a target, but reflected in many of the activities agreed at the regional and national levels. Examples of these activities include legal and policy measures, market-based instruments (MBIs), reduction of microplastic pollution and sea-based pollution.³⁰¹ For example:

- Starting at a regional baseline **waste-recycling rate** of 14% in 2014, increase the rate to 60% by 2020 and 70% by 2025;
- Increase the number of national or state **container deposit programmes** from 4 (2014) to 7 (by 2020) and 10 (by 2025).
- Increase the number of national or state **user-pay systems for waste collection** from 9 (2014) to 14 (by 2020) and 21 (by 2025).
- Starting at a baseline rate for **waste collection coverage rate of population** of 88% (urban) and 35% (nationally), achieve a 100% (urban) and 40% (nationally) rate by 2020 and finally reaching 60% nationally by 2025.
- Reduce the number of temporary, unregulated and open dumpsites from over 250 in 2014 to 237 (by 2020), dropping to 225 by 2025.

153. Targets, such as the adoption of national regulatory and market-based instruments, may require longer timeframes to implement than those provided in RAP-MaLis.

154. **Local capacity building and development** could be provided by the Secretariat of the RAP-MaLi or be a part of national implementation plans. Regional working groups are to be established by Secretariat of the RAP-MaLi to coordinate stakeholder participation and advise on appropriate action.³⁰² The Secretariat of the RAP-MaLi may be requested within RAP-MaLis to provide and organise capacity building in the form of technical assistance on the prevention and reduction of marine litter from land-based and sea-based sources to staff from national and municipal governments, port authorities and the shipping industry. Regional workshops and training courses are suggested as methods to achieve this.³⁰³

155. **Sources of funding** are identified, and some are suggested. Timetables with associated costs of implementation have been outlined with sources of funding identified. This varies from the Secretariat of the RAP-MaLi to external funding sources, such as international investment programs and donor countries.³⁰⁴ Countries are also encouraged to collaborate with government agencies and departments and develop partnerships in order to secure funding.³⁰⁵

156. **Monitoring** is a strong feature of the RAP-MaLis. A regional Data Bank on Marine Litter is planned to support and coordinate data collection and exchange, and regular assessment of the marine litter status.³⁰⁶ Expert Groups on Regional Marine Litter Monitoring Programme are suggested and organised.³⁰⁷ To facilitate the development of National Marine Litter Monitoring Programme, the Secretariat of RAP-MaLi is requested to prepare the Guidelines for the preparation of the National Marine Litter Monitoring Programme. Under provided guidelines, the amount of beach litter, for instance, is recorded according to the types listed.³⁰⁸ To prepare for better monitoring practices, the standardisation of methodologies for studying and reporting on marine litter and microplastics, updating baseline data and the identification of hotspots of land-based and sea-based sources of marine litter and microplastics are conducted.³⁰⁹

157. A primary role of RAP-MaLis is the evaluation and **reporting** of regional activities that contribute to the achievement of the overall objectives of facilitation. Regional reporting could therefore include aggregated national reports on the activities undertaken at the national level and the results achieved, as well as activities undertaken at the regional level by the regional body. Regional reports could also track progress to the Sustainable Development Goal

²⁹⁹ HELCOM, Regional Action Plan for Marine Litter in the Baltic Sea.

³⁰⁰ *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol*,

³⁰¹ To establish a policy-making mechanism and supporting agency is pointed out in COBSEA, COBSEA Regional Action Plan on Marine Litter 2019. Exchange of best practices aiming at zero pellet loss along the whole plastics manufacturing chain is promoted from production to transport sectors is introduced in PlasticEurope, Operation Clean Sweep® (OCS) manual. Information of the clean-ups of the floating litter (the 'Fish-for-Litter' for instance) and the seabed from marine litter caught incidentally and/or generated by fishing vessels including derelict fishing gears is available at <https://fishingforlitter.org/>.

³⁰² Environment, U., Western Indian Ocean Regional Action Plan on Marine Litter.

³⁰³ COBSEA, 'COBSEA Regional Action Plan on Marine Litter 2019' (2019).

³⁰⁴ See for example, SPREP, 2018a. Pacific Regional Action Plan. Marine Litter 2018-2025, Apia, Samoa.

https://www.regjeringen.no/en/dokumenter/marine_litter/id2642037/; <https://www.sprep.org/news/pacific-ocean-litter-project-polp-to-strengthen-pacific-action-against-plastic-pollution>

³⁰⁵ *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol*, UNEP(DEPI)/MED IG.21/9 Annex II; SPREP, 'Pacific Regional Action Plan. Marine Litter 2018-2025' (2018).

³⁰⁶ *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol*,

³⁰⁷ Secretariat of COBSEA and UNEP, 'COBSEA Regional Action Plan on Marine Litter 2019' (2019).

³⁰⁸ Commission, O., Guideline for Monitoring Marine Litter on the Beaches in the OSPAR Maritime Area.

³⁰⁹ HELCOM, 'Regional Action Plan for Marine Litter in the Baltic Sea' (2015); UN Environment, 'Western Indian Ocean Regional Action Plan on Marine Litter' (2018).

(SDG) target 14.1 and other relevant SDGs, based on National Marine Litter and Microplastic Monitoring Programmes.³¹⁰ Where standard methodologies for studying and reporting on marine litter and microplastics have been developed, including the sources, types and impacts, these should be tested and validated for applicability.³¹¹

158. The frequency of **evaluation and review** of RAP-MaLis could be specifically scheduled or the review period may depend on the respective implementation period of the RAP. The evaluation and subsequent revision of RAP-MaLis are to be based on monitoring outcomes, and measured against key performance indicators for implementation activities.³¹² For example, HELCOM is currently in the process of conducting an analysis of sufficiency of measures on marine litter in the update of the HELCOM Baltic Sea Action Plan.³¹³ Visions for updated RAP-MaLis after evaluation and review include reducing waste from specific sources, including cruise ships and tourism and enhancement of infrastructure to catch the marine litter.³¹⁴

159. For **domestic stakeholder** participation, the principle of public participation and stakeholder involvement have been included as overarching principles for the implementation of RAP-MaLis.³¹⁵ Stakeholders, including regional, national and local authorities, industries such as the maritime and tourism sector, fisheries, aquaculture, as well as civil society are involved in the cooperation on combating marine litter.³¹⁶ In regard to prevention measures that involve domestic stakeholders, manufacturing procedures and methods with plastic industry for the minimisation of decomposition characteristics of plastic and reduction of microplastic have been established.³¹⁷ Programmes and initiatives for the removal and sound disposal of land- and sea-based marine litter could be developed and implemented together with relevant stakeholders. Specifically for consumption and production phases, to achieve a sustainable target, a multi-stakeholder whole lifecycle approach could prevent and reduce leakage at source.³¹⁸ For training across sectors and among different stakeholder groups, regional education and training have been conducted to enhance understanding of marine litter generation pathways, impacts and possible prevention action, to facilitate the application of technical sectoral guidelines.³¹⁹

160. **International capacity building** could be conducted with competent international and regional organisations, as well as relevant scientific institutions researching on marine litter.³²⁰ For example, a Regional Cooperation Platform on Marine Litter has been established and initiatives on coordinating, consulting, exchange of good practices are put forward.³²¹ In association with monitoring programmes on microplastics, regional training on the development and implementation of harmonising National Marine Litter and Microplastic Monitoring Programmes as well as relevant data management and reporting is to be conducted.³²² Institutional cooperation with relevant international and regional entities to the implementation of RAP-MaLis is proposed.³²³ International and collaboration on research on the sources and fate of plastics and the impact on human and marine health and corresponding responses, as well as sharing of scientific knowledge are proposed.³²⁴ In practice, national and regional training for waste management, including the ‘training of trainers’ model has been incorporated and conducted.³²⁵

161. For **co-benefits**, RAP-MaLis have included assessments of socio-economic impacts in marine sectors resulting from degradation of marine and coastal habitats and ecosystems, including assessments of the impact on human health from marine litter, based on commonly agreed methods, national monitoring and surveys.³²⁶ Combating marine litter could be closely linked to socio-economic benefits. For example, the Fishing-for-Litter project could reduce the time

³¹⁰ COBSEA, ‘COBSEA Regional Action Plan on Marine Litter 2019’ (2019).

³¹¹ UN Environment, ‘Western Indian Ocean Regional Action Plan on Marine Litter’ (2018).

³¹² OSPAR Commission, ‘Guideline for Monitoring Marine Litter on the Beaches in the OSPAR Maritime Area’ (2010); SPREP, ‘Pacific Regional Action Plan. Marine Litter 2018-2025’ (2018).

³¹³ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a))

³¹⁴ OSPAR Commission, ‘Guideline for Monitoring Marine Litter on the Beaches in the OSPAR Maritime Area’ (2010); SPREP, ‘Pacific Regional Action Plan. Marine Litter 2018-2025’ (2018).

³¹⁵ COBSEA, ‘COBSEA Regional Action Plan on Marine Litter 2019’ (2019); *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol*, UNEP(DEPI)/MED IG.21/9 Annex II.

³¹⁶ *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol*,

³¹⁷ *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol*, UNEP(DEPI)/MED IG.21/9 Annex II.

³¹⁸ COBSEA, ‘COBSEA Regional Action Plan on Marine Litter 2019’ (2019).

³¹⁹ COBSEA, ‘COBSEA Regional Action Plan on Marine Litter 2019’ (2019).

³²⁰ *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol*,

³²¹ *Discussion paper on national, regional and international response options, including actions and innovative approaches, and voluntary and legally binding governance strategies and approaches*, UNEP/AHEG/2018/1/3, (8 May 2018); SPREP, ‘Pacific Regional Action Plan. Marine Litter 2018-2025’ (2018); OSPAR Commission, ‘Guideline for Monitoring Marine Litter on the Beaches in the OSPAR Maritime Area’ (2010); HELCOM, ‘Regional Action Plan for Marine Litter in the Baltic Sea’ (2015); UN Environment, ‘Western Indian Ocean Regional Action Plan on Marine Litter’ (2018).

³²² COBSEA, ‘COBSEA Regional Action Plan on Marine Litter 2019’ (2019).

³²³ COBSEA, ‘COBSEA Regional Action Plan on Marine Litter 2019’ (2019).

³²⁴ 2017, G.G., G20 Action Plan on Marine Litter, Canada, G.o., Ocean Plastic Charter.

³²⁵ See for example, <https://www.unenvironment.org/cobsea/news/story/east-asian-seas-countries-welcome-harmonization-marine-litter-monitoring-efforts>; <https://www.gpmarinelitter.org/what-we-do/training>; <https://www.gpmarinelitter.org/events/workshop/second-training-trainers-monitoring-and-assessment-marine-plastic-litter-and?doctypeid=24>.

³²⁶ COBSEA, ‘COBSEA Regional Action Plan on Marine Litter 2019’ (2019); *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol*, UNEP(DEPI)/MED IG.21/9 Annex II.

fishers spend untangling nets, and gain support from stakeholders including port authorities and the fishing industry. In terms of social aspects, fishers' action could raise awareness among the fishing industry and the general public, as well as leading to changes in practices and culture in the fishing sector.³²⁷ However, greater recognition could be given to a wider range of co-benefits that could be achieved through RAP-MaLis, including environmental, economic, public health, aesthetic and cultural benefits. Marine pollution could cause a broad spectrum of economic impacts that reduce the economic benefits derived from marine and coastal activities.³²⁸ Existing economic fora aspire to increase financial and facilitative support for the private sector to promote investment, trade and boost relevant industries.³²⁹ They also recommend to include social-economic benefits in preventing marine litter into establishing policies.³³⁰ At the same time, the engagement of value chain stakeholders is recommended to develop enabling environment for increased waste recovery and recycling rates.

Performance indicators

162. Assessing the **performance** of RAP-MaLis within the role of facilitation could include the tools developed to assist with national implementation. Guidance on the reporting required by countries is also needed to enable aggregation of national reports at the regional level. This could, for example, include:

- Policy and legal instruments, including a national action plan, to prevent and reduce the generation of marine litter and microplastics
- Institutional arrangements in this regard
- Assessment of the effectiveness of the implementation of the measures
- Difficulties in the implementation of measures encountered.³³¹

163. An example of outcomes reported for the above regional outputs could be found in the Pacific region where Eight Pacific island countries have banned single-use plastics (plastic shopping bags, straws, cutlery and polystyrene), and seven have announced their intention to do so.³³²

Examples of outputs and outcomes for RAP-MaLis include:

- Cooperation
 - Establishment of regional nodes under the Global Partnership on Marine Litter (GPML) in the Mediterranean, Northwest Pacific, Pacific, South Asia and the Wider Caribbean.³³³ These platforms bring together multiple stakeholders, including government, industry, civil society, academia and other intergovernmental fora.
 - OSPAR Riverine litter as source of marine litter – work session and cooperation between EIHA and HASEC INPUT (OSPAR Commission, EIHA 18/06/16), supported by a workshop on Riverine Litter.³³⁴
 - Collaboration between OSPAR Commission and Cartagena Convention to harmonize marine litter monitoring for plastic free oceans³³⁵
 - OSPAR Workshop on projects related to riverine inputs (micro- and macroplastics)³³⁶
- Guidelines and best practices
 - NOWPAP - Sectoral Guidelines for the Marine Litter Management: Commercial Shipping (2010)
 - NOWPAP - Sectoral Guidelines for Marine Litter Management: Passenger Ships (2010)
 - NOWPAP - Regional Report on Measures and Best Practices for Prevention of Marine Litter Input from Land-Based Sources in the NOWPAP Region
 - UNEP Guidelines for the Development of Action Plans on Marine Litter.³³⁷
 - SPREP, Regulating Plastics in Pacific Island Countries. A guide for policymakers and legislative drafters.³³⁸
 - OSPAR Best practice examples of fishing gear return systems for repairs.³³⁹

³²⁷ See <https://fishingforlitter.org/>

³²⁸ Honolulu Strategy.

³²⁹ APEC, 'APEC Roadmap on Marine Debris' (2019).

³³⁰ G20 Germany 2017, 'G20 Action Plan on Marine Litter' (2017).

³³¹ UNEP/MAP, 2013. *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol (Decision IG.21/7)* <<http://www.unepmap.org/index.php?module=content2&catid=001011006>>.

³³² SPREP, 2019. Agenda Item 12.3.4: Implementation of the Pacific Marine Litter Action Plan. 29th SPREP MEETING 'A Resilient Blue Pacific.' Apia, Samoa 3-6 September 2019.

³³³ <https://www.gpmarinelitter.org/regional-nodes>

³³⁴ https://www.ospar.org/site/assets/files/41639/information_related_to_projects_workshop_riverine_litter-_paris-_4-5_of_june.pdf

³³⁵ <https://www.unenvironment.org/cep/editorial/collaboration-between-ospar-commission-and-cartagena-convention-harmonize-marine-litter>

³³⁶ https://www.ospar.org/site/assets/files/41639/information_related_to_projects_workshop_riverine_litter-_paris-_4-5_of_june.pdf

³³⁷ UNEP, 2019b. Guidelines for the Development of Action Plans on Marine Litter.

³³⁸ SPREP, 2018b. Regulating Plastics in Pacific Island Countries. A guide for policymakers and legislative drafters.

³³⁹ OSPAR, 2020. OSPAR scoping study on best practices for the design and recycling of fishing gear as a means to reduce quantities of fishing gear found as marine litter in the North-East Atlantic.

- Decision IG.22/10 - UNEP(DEPI)/MED IG.22/28 Implementing the Marine Litter Regional Plan in the Mediterranean (Fishing for Litter Guidelines, Assessment Report, Baselines Values, and Reduction Targets)
- OSPAR - Guideline for Monitoring Marine Litter on the Beaches in the OSPAR Maritime Area³⁴⁰
- OSPAR - CEMP Guidelines for monitoring marine litter washed ashore and/or deposited on coastlines (beach litter)³⁴¹
- OSPAR - CEMP Guidelines for Monitoring and Assessment of plastic particles in stomachs of fulmars in the North Sea area³⁴²
- OSPAR - CEMP Guidelines on Litter on the Seafloor³⁴³
- Regional Plan on Marine Litter Management in the Mediterranean and Related Best Practices Adopt-a-Beach (Main Elements)³⁴⁴
- HELCOM - Guidelines for monitoring beach litter.³⁴⁵
- HELCOM - Development of best practice on the disposal of old pleasure boats³⁴⁶
- HELCOM Recommendation 23/5 - Reduction of Discharges from Urban Areas by the Proper Management of Storm Water Systems.³⁴⁷
- HELCOM - The Baltic Sea Blueprint: A step-by-step roadmap on how to approach Derelict Fishing Gear.³⁴⁸
- HELCOM - Outcome of the regional questionnaire to compile information on national activities with regard to ALDFG.³⁴⁹
- Training of Trainers on Monitoring and Assessment of Marine Litter and Microplastics, based on Handbook of Survey Methodology Plastics Leakage. Plastics Leakage (developed for CSIRO Global Plastic Pollution Project)³⁵⁰
- Examples of inspirational projects and best practices to prevent litter entering the water systems. Section 4³⁵¹
- OSPAR online data portal (<http://www.ospar.org/data>)
- DeFishGear Project website³⁵²
- Monitoring and Assessment Guidelines for Marine Litter in Mediterranean MPAs³⁵³
- Reporting standards
 - Regional Plan on Marine Litter Management in the Mediterranean, Annex IV – Elements of National Biennial Reports, Report on the Implementation of the Measures.³⁵⁴
 - Annex IV - Elements for National Biennial Reports³⁵⁵ - planning and policy frameworks; national monitoring activities
 - MARLISCO best practices map, online at: <http://www.marlisco.eu/best-practices-map.en.html>.
- Research
 - OSPAR Inventory of knowledge and actions concerning riverine litter relevant for the OSPAR area.³⁵⁶
 - OSPAR Background document on pre-production Plastic Pellets.³⁵⁷
 - OSPAR Scoping study to identify key waste items from the fishing industry and aquaculture.³⁵⁸

³⁴⁰ OSPAR, 2010. Guideline for Monitoring Marine Litter on the Beaches in the OSPAR Maritime Area.

³⁴¹ <https://www.ospar.org/work-areas/cross-cutting-issues/cemp>

³⁴² <https://www.ospar.org/work-areas/cross-cutting-issues/cemp>

³⁴³ <https://www.ospar.org/work-areas/cross-cutting-issues/cemp>

³⁴⁴ UNEP/MED, 2018. Regional Plan on Marine Litter Management in the Mediterranean and Related Best Practices Adopt-a-Beach (Main Elements) (UNEP/MED WG.452/5).

³⁴⁵ HELCOM, 2019b. HELCOM Guidelines for monitoring beach litter.

³⁴⁶ HELCOM, *HELCOM RAP ML, RSI Development of best practice on the disposal of old pleasure boats*.

<https://portal.helcom.fi/meetings/PRESSURE%2010-2019-549/MeetingDocuments/3-6%20HELCOM%20RAP%20ML,%20RSI%20Development%20of%20best%20practice%20on%20the%20disposal%20of%20old%20pleasure%20boats.pdf>

³⁴⁷ See HELCOM, Outcome of WS RAP ML 4-2019.

³⁴⁸ HELCOM, 2019a. The Baltic Sea Blueprint: A step-by-step roadmap on how to approach Derelict Fishing Gear.

³⁴⁹ HELCOM, 2018b. Outcome of the regional questionnaire to compile information on national activities with regard to ALDFG (WS RAP ML 3-2018).

³⁵⁰ https://wedocs.unep.org/bitstream/handle/20.500.11822/30267/TOT_Manual_19.pdf

³⁵¹ OSPAR, 2016a. Inventory of knowledge and actions concerning riverine litter relevant for the OSPAR area.

³⁵² <http://www.defishgear.net/>

³⁵³ Galgani, F., Alan, D., Liubartseva, S., Gauci, A., Doronzo, B., Brandini, C., Gerigny, O., 2019. Monitoring and Assessment guidelines for Marine Litter in Mediterranean MPAs.

³⁵⁴ UNEP/MAP, 2013. *Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol (Decision IG.21/7)* <<http://www.unepmap.org/index.php?module=content2&catid=001011006>>.

³⁵⁵ Ibid.

³⁵⁶ OSPAR, 2016b. OSPAR RAP action 41. Inventory of knowledge and actions concerning riverine litter relevant for the OSPAR area.

³⁵⁷ OSPAR, 2018. OSPAR Background document on pre-production Plastic Pellets.

³⁵⁸ OSPAR, 2019b. Scoping study to identify key waste items from the fishing industry and aquaculture.

- Review of BAT and BEP in Urban Wastewater Treatment Systems focusing on the reductions and prevention of stormwater related litter, including micro-plastics, entering the Marine Environment.³⁵⁹
- OSPAR Survey of Polystyrene Foam (EPS and XPS) in the Baltic Sea³⁶⁰ – includes sources, transport through wastewater and stormwater discharge and river transport.
- Composition and Spatial Distribution of Litter on the Seafloor.³⁶¹
- Reports
 - State of the Baltic Sea – Second HELCOM holistic assessment 2011-2016.³⁶²
 - OSPAR 2017 intermediate assessment of Beach Litter - Abundance, Composition and Trends.³⁶³
 - Marine Litter Assessment in the Mediterranean.³⁶⁴

Summary of indicators

164. The assessment of instruments and measures relevant to regional marine litter action plans are summarized in Table 15, providing insight into the input, process and performance of this response option.

Table 15: Summary of indicators for regional marine litter action plans

Indicator Type	Indicator	Description	Evaluation
INPUT	Scope	International, regional or national	Regional
	Maturity	Operational years - high, medium, low	High - 2008-present, some revised, some under review
	Scale	Level of adoption	High - Nearly all regions covered and near-full adoption in each region. Greater engagement of land-locked States could be enhanced
PROCESS	Governance	Management targets	High – high-level targets for marine litter, some for microplastics.
		Operational targets	High – Many inferred. Recent RAP-MaLis provide detailed targets, but some may be difficult to achieve in timeframes provided and within the capacity of Member States.
	Management	Local capacity building	Yes - regional working groups, technical assistance, particularly for marine litter monitoring.
		Ongoing funding secured	Yes – varied funding sources, including different stakeholders and support for innovative funding mechanisms and EPR.
		Monitoring in place	Yes – “Training of Trainers” based on GESAMP guidelines. Some regions have developed indicators. Upstream monitoring for production and consumption is limited.
	Reporting in place	Yes – some detailed indicators are designed for measuring progress reporting for stakeholders. Could be expanded to include production, consumption and final treatment. ³⁶⁵	
	Review process defined	Yes – mostly biannual, some mid-term reporting where timeframe specified for action plans.	

³⁵⁹ OSPAR, 2019a. Review of BAT and BEP in Urban Wastewater Treatment Systems focusing on the reductions and prevention of stormwater related litter, including micro-plastics, entering the Marine Environment

³⁶⁰ Lassen, C., Warming, M., Kjølholt, J., Jakobsen, L.G., Vrubliauskiene, N., Novichkov, B., A/S, C., 2019. Survey of Polystyrene Foam (EPS and XPS) in the Baltic Sea

³⁶¹ <https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/pressures-human-activities/marine-litter/composition-and-spatial-distribution-litter-seafloor/>

³⁶² HELCOM, 2018c. State of the Baltic Sea – Second HELCOM holistic assessment 2011-2016. Baltic Sea Environment Proceedings 155.

³⁶³ <https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/pressures-human-activities/marine-litter/beach-litter/>. See also <https://oap.ospar.org/en/>

³⁶⁴ UNEP/MAP, 2015. *Marine Litter Assessment in the Mediterranean*. United Nations Environment Programme / Mediterranean Action Plan (UNEP/MAP).

³⁶⁵ Switzerland submission for response options

	Co-operation	Domestic stakeholder inclusion	Yes – a multi-stakeholder whole lifecycle approach including fisheries, tourism, aquaculture and civil society
		International capacity building	Yes - e.g. cooperation and collaboration through regional organisations (e.g. EU and ASEAN) and bilateral cooperation on trade, circular economy and data exchange.
	Co-benefits recognised	Environmental Social	Yes – priority for all RAP-MaLis. Yes – limited. Improving public health, advancing gender equality and social justice for women, migrants and poor communities who are at higher risk for harm and exploitation.
		Economic	Yes – limited. Creation of jobs, economic benefits for local fishery and tourism communities.
PERFORMANCE	Outputs		Yes – Guidelines, workshops and research/scoping studies.
	Outcomes		Yes – Removal activities, some update of legislations, limited state of marine litter reports.

4.5.3. Discussion on effectiveness

165. RAP-MaLis work between the international and national level as a facilitative role in preventing and reducing marine litter. As a response option to the global issues of marine litter and microplastics, and towards an objective of long-term elimination of discharge to the oceans, RAPs act as a robust tool for targeting all life cycle phases in a cooperative and facilitative manner. As discussed, and analysed above, with practices of adopting RAPs globally, a suite of tools has been provided and implemented, with the opportunity for further research and guidelines to be developed.

Maturity

166. **High.** This response option was initiated in 2007/2008, with subsequent reviews and revisions undertaken.

Feasibility

167. **High.** Feasibility has been strongly demonstrated.

168. Local capacity building and development under RAP-MaLis are planned and provided through various fora, including regional working groups and identifying and engaging stakeholders at different governmental levels, sectors and life phases. Training and technical assistance are provided to government officials at national and municipal levels, port authorities and shipping industry, as well as consumers and employees in related industries (tourism, for instance). Simultaneously, ongoing funding is specifically discussed and suggested, including external sources from international organisations and participating countries. MBIs have been included and promoted in the processes of implementing RAP-MaLis; instruments including EPR schemes, deposit-return schemes not only control marine pollution through financial incentives but also provide financial support for waste management and relevant research to some extent. Therefore, RAP-MaLis already have a funding structure in place; however, more sustainable funding and self-sufficient financial sources are expected. Specifically, private sector investment or public-private partnerships are needed.

169. In the future implementation, prevention, reduction and control measures for marine litter could be based on best environmental practices, most appropriate technologies and techniques. Among Member States, access to statistics and scientific knowledge, research capacity and transfer of marine technology are to be taken into consideration. Examples of these technologies include ‘waste to energy’ technologies, technological modifications of fishing nets to reduce loss, using drones for sensing and monitoring and the use of biodegradable materials.³⁶⁶

170. Additional upstream preventive measures could be promoted³⁶⁷ based on **best environmental practices** and most appropriate technologies and techniques. For this, access by Member States to scientific knowledge, research

³⁶⁶ UNEP, 2016. *Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change*. United Nations Environment Programme, Nairobi.

<http://www.unep.org/about/sgb/Portals/50153/UNEA/Marine%20Plastic%20Debris%20and%20Microplastic%20Technical%20Report%20Advanced%20Copy.pdf>; GESAMP, 2019. Guidelines for the Monitoring and Assessment of Plastic Litter in the Ocean.

³⁶⁷ UNEA Res. 3/7, para. 4(e)

capacity and technology transfer should be taken into consideration. Examples of relevant technologies include “waste to energy”, modification of fishing nets to reduce loss,³⁶⁸ use of drones for sensing and monitoring, and use of biodegradable materials.³⁶⁹

Time frame

171. **Long.** Many regional marine litter action plans have adopted a limited time frame, with specific timelines for different activities and projects. Other action plans have no specified end date.

172. For the RAP-MaLis, a variety of time frames are provided. Some have included Sustainable Development Goals (SDGs) as their goals and associated targets, which include long-term activities and projects that require ongoing operation and maintenance time for **2-5 years (medium)**.³⁷⁰ Specifically, for actions including improving port reception facilities to manage ship-generated waste and changing products to environmentally friendly products, as building facilities and changing production lines require time and investment, **2-5 years (medium)** have been allocated for this kind of proposed actions. As RAPs are acting as a facilitative role between the international and national level, the adoption of regional guidelines for combating marine litter, education and awareness-raising, including monitoring and best environmental practices, have been incorporated in RAPs and are allocated **2-5 years (medium)** for development and specification.

Impact

173. **High.** RAP-MaLis are an effective response option to facilitate national action. With some additional and shared outputs, they could encourage actions that address most of the pressures and barriers identified across all phases of the life cycle. While these action plans operate at the regional scale, coverage will be nearly global once all regions have adopted RAP-MaLis. However, engagement with non-coastal states could strengthen outcomes beyond the 146 coastal countries covered by RAP-MaLis.

174. In this response option, the primary **life cycle phase** addressed is end-of-life, as most RAP-MaLis have made efforts in waste management and clean-ups. If RAP-MaLis are further expanded to address source materials, product manufacture and use phases, including regional guidelines for a circular economy, EPR schemes with a focus on product design and facilitation for enhancing regional 6Rs,³⁷¹ upstream preventive measures could be achieved and pressure for the last life cycle phase could be eased. Combating sea-based sources of pollution, such as dumping at sea, lost fishing gears and abandoned vessels, are types of pollution being targeted in some regions and could be strengthened in others.

Overall comments

175. Regional marine litter action plan outputs are dominant in the post-discharge areas of monitoring and removal. To be effective across all life cycle phases, RAP-MaLis would require expanded mandates, particularly with regards opportunities to engage with industry in upstream preventive measures.

176. The effectiveness of RAP-MaLis could be constrained by limited funding at the regional level, as well as capacities of stakeholders and enforcement authorities and lack of technologies and facilities at the national level.

177. The focus of capacity-building activities has been on monitoring and removal activities, with some research activities undertaken to improve knowledge. Capacity-building activities could be strengthened in the area of policy and regulatory interventions, particularly for market-based instruments to incentivise design for sustainability, reduction in waste generation and increase support by the private sector for end-of-life treatment options. The life cycle phases of source materials, product manufacture and use could be strengthened.

178. In conclusion, RAP-MaLis make an important contribution to solving the global problem of marine litter and microplastics through the following activities:

- Research and development on regional topical issues related to marine litter, including microplastics.
- Adopting and promoting regional guidelines and best environmental practices of combating both land-and sea-based pollution.
- Adoption of regional model policy and legislation.
- The establishment and maintenance of a regional platform for knowledge sharing.

³⁶⁸ UNEA Res. 3/7 para. 4(f)

³⁶⁹ See UNEP (2016). *Marine Plastic Debris and Microplastics: Global Lessons and Research to Inspire Action and Guide Policy*. <http://doi.org/10.13140/RG.2.2.30493.51687>.

³⁷⁰ For instance, SDG 3 ‘Ensure healthy lives and promote well-being for all at all ages’; target 3.9: ‘By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination’.

SDG 9: ‘Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation’; target 9.4: ‘By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, all countries taking action in accordance with their respective capabilities’.

³⁷¹ SPREP, 2018a. Pacific Regional Action Plan. Marine Litter 2018-2025, Apia, Samoa.

- Capacity building programmes for monitoring and data collecting and reporting.

4.6. NATIONAL MARINE LITTER ACTION PLANS

179. A national marine litter action plan is an **existing** response option that aims to prevent and reduce to the minimum pollution of the marine environment by litter and microplastics from activities operating under national jurisdiction. The primary life cycle focus is the end-of-life phase, with some attention given to upstream measures, particularly through acknowledgement of the need to transition to a circular economy. **Actions** include prevention and mitigation, as well as monitoring and evaluation. National marine litter action plans (NAP-MaLis) mostly target freshwater and marine **environmental zones** for protection, operating in the **geographic zones** of the coastal zone, maritime areas within national jurisdiction, water catchments, freshwater rivers and lakes, urban environment and waste disposal sites. The **scale** rating is small due to limited adoption at the national level, but these plans could be operationalized more broadly as more Member States adopt them. NAP-MaLis are voluntary instruments.

4.6.1. Analysis of measures to address the life cycle

Upstream activities

180. The pressure influencing the **source materials phase of the life cycle** is the linear economy, with a number of action plans promoting a transition to a circular economy,³⁷² including the development of strategies to achieve this. The complexity of measures to be undertaken and the number of government authorities that need to be involved may limit the effectiveness of a circular economy approach. Legal barriers to achieving a circular economy have also been expressed by Member States, including: “the lack of definitions and the occurrence of gaps in legislation; unclear definitions of targets in legislation; the definition of hard numerical limits in regulations; lagging or incomplete implementation or enforcement of legislation; inconsistent national implementation of international legislation; legislations that conflict each other because they represent conflicting values, for example with hygiene rules versus food waste.”³⁷³ These barriers could be addressed by improving the level of knowledge on the social, economic and environmental³⁷⁴ impacts of marine litter and the benefits of measures to address them. A single national governmental body could be established to oversee management of marine litter prevention and mitigation across agencies and sectors,³⁷⁵ including in cases where waste management is decentralized and/or dominated by the informal sector. Including various agencies could attract funding and staff allocation from different government sources for the delivery of NAP-MaLis. Conducting comprehensive assessment of the legal framework, followed by a review of instruments, may be necessary in some Member States and assistance may be required by some in this regard.³⁷⁶

181. The pressure influencing the **product manufacture phase of the life cycle** is poor application of due diligence, including the polluter pays principle, in various sectors of industry.³⁷⁷ To improve the use of due diligence, development of national design standards³⁷⁸ could promote a reduction in the production of unnecessary, disposable and difficult to recycle materials,³⁷⁹ as well as increasing design for reuse, repair and remanufacture and the use of recycled materials.³⁸⁰

182. The effectiveness of national design standards may be limited by a lack of incentive for eco-design³⁸¹ that meets national standards.³⁸² This barrier could be addressed by setting national targets,³⁸³ strengthening end markets to ensure demand (e.g. through establishing sustainable public procurement policies),³⁸⁴ enhancing industry technical knowledge

³⁷² Ministry of Natural Resources and Environment, Vietnam, ‘National action plan for ocean plastic waste management by 2030’ (2020) ; Canadian Council of Ministers of the Environment, 2018. Strategy on Zero Plastic Waste; Ministry of Energy, Science, Technology, Environment & Climate Change (MESTECC), Malaysia. Malaysia’s Roadmap Towards Zero Single-Use Plastics 2018-2030; Ministry of Ocean and Fisheries of Korea (MOF) , 2018. 3rd National Marine Litter Management Plan (2019-2023); World Economic Forum, ‘Radically Reducing Plastic Pollution in Indonesia: A Multistakeholder Action Plan National Plastic Action Partnership’ (2020); Kenya Association of Manufacturers, ‘Kenya Plastic Action Plan’ (2019).

³⁷³ UNEP/AHEG/2018/1/2, para. 13

³⁷⁴ Togo Welfare submission on response options; Ministry of Natural Resources and Environment, Vietnam, ‘National action plan for ocean plastic waste management by 2030’ (2020).

³⁷⁵ UNEP/AHEG/2018/1/3, para. 10, para. 41

³⁷⁶ UNEP, 2019b. Guidelines for the Development of Action Plans on Marine Litter.

³⁷⁷ UNEP/AHEG/2018/1/2, para. 13 (table) Dauvergne, P., 2018. *Why is the global governance of plastic failing the oceans?* Glob. Environ. Change-Human Policy Dimens. 51, 22-31. 10.1016/j.gloenvcha.2018.05.002

³⁷⁸ UNEP/AHEG/2018/1/2, para. 16, para. 18 (table) ; Canadian Council of Ministers of the Environment, 2018. Strategy on Zero Plastic Waste. Result Area 2.

³⁷⁹ UNEA Res. 4/9, para. 4 ; UNEP/AHEG/2018/1/2, para. 15, para. 16

³⁸⁰ UNEP/AHEG/2018/1/2, para. 18 (table) ; Canadian Council of Ministers of the Environment, 2018. Strategy on Zero Plastic Waste. Result Area 4.

³⁸¹ UNEP/AHEG/2018/1/3, para. 41, para. 42

³⁸² Canadian Council of Ministers of the Environment, 2018. Canada-wide action plan on zero plastic waste. Phase 1. Priority Action 3.

³⁸³ UNEP, 2019a. Addressing marine plastics: A systemic approach. Recommendations for action.

³⁸⁴ UNEP/AHEG/2018/1/2, para. 13 (table)

on the use of recycled content,³⁸⁵ and developing market-based instruments that encourage or mandate use of design standards where appropriate.³⁸⁶

183. The pressure influencing the **use phase of the life cycle** is poor development of systems for reuse, repair and remanufacture. This could be addressed by developing market-based instruments to encourage development and use of these systems.³⁸⁷ Their slow uptake presents a barrier to the effectiveness of these instruments.³⁸⁸ It could be overcome by engaging with manufacturers and retailers to develop appropriate infrastructure³⁸⁹ and addressing cultural barriers to behavioural change,³⁹⁰ in particular promoting alternatives to single-use products and participation in reusable systems and eco-labelling schemes,³⁹¹ and making consumers aware of reuse and repair options.³⁹² Market-based instruments are further described in Section G.

Summary of upstream activities

184. The upstream pressures, controls, and barriers for national marine litter action plans are summarized in Table 16, providing insight into enabling conditions for this response option.

Table 16: Summary of upstream and midstream activities for national marine litter action plans

	Source Materials	Product Manufacture	Use
Pressures	<ul style="list-style-type: none"> Linear economy 	<ul style="list-style-type: none"> Poor industry due diligence 	<ul style="list-style-type: none"> Lack of systems for reuse, repair, remanufacture
Prevention Controls	<ul style="list-style-type: none"> Transition to a circular economy 	<ul style="list-style-type: none"> National design standards 	<ul style="list-style-type: none"> Market-based instruments to incentivise development and use of systems for reuse, repair, remanufacture
Barriers	<ul style="list-style-type: none"> Complexity Multiple government agency involvement needed Legal barriers 	<ul style="list-style-type: none"> Lack of incentive to integrate design standards 	<ul style="list-style-type: none"> Slow uptake by industry and consumers
Barrier Controls	<ul style="list-style-type: none"> Improved knowledge on environmental social, and economic outcomes Establish national coordinating government body Asses and review of legal framework 	<ul style="list-style-type: none"> National targets for design Strengthen end-markets 	<ul style="list-style-type: none"> Engage manufacturers, retailers Address cultural barriers Raise awareness of alternatives

Downstream activities

185. The pressure influencing the **end-of-life phase of the life cycle** is a lack of environmentally sustainable solid waste management. This could be addressed through improved stakeholder engagement across sectors and the life cycle.³⁹³ The effectiveness of stakeholder engagement is reduced where management strategies are poorly integrated.³⁹⁴ This barrier could be overcome by integration of the informal sector;³⁹⁵ integration of innovation in production with end-of-life systems and infrastructure (including waste streams for alternative materials);³⁹⁶ integration of measures to reduce contamination; and integration of areas poorly covered by waste services.³⁹⁷ Market-based instruments could play a role in incentivizing private sector investment, as shown in section 5.7, and in strengthening coordinated financing and incentives.³⁹⁸

186. Post-discharge **mitigative activities** focus on removal activities, particularly beach clean-ups. Greater attention could be given to capture technology, such as sewer grates and storm water capture booms,³⁹⁹ particularly to capturing

³⁸⁵ ENEC, 2019. Motivations for and Barriers to Ecodesign in Industry.

³⁸⁶ UNEA Res. 4/9 para. 7

³⁸⁷ UNEA Res. 4/9 para. 6

³⁸⁸ Dauvergne, P., 2018. *Why is the global governance of plastic failing the oceans?* Glob. Environ. Change-Human Policy Dimens. 51, 22-31. 10.1016/j.gloenvcha.2018.05.002

³⁸⁹ UNEP, 2019a. Addressing marine plastics: A systemic approach. Recommendations for action.

³⁹⁰ UNEP/AHEG/2018/1/2, para. 21 (table – Education / awareness)

³⁹¹ Canadian Council of Ministers of the Environment, 2018. Strategy on Zero Plastic Waste. Result Area 6.

³⁹² UNEP/AHEG/2018/1/2, para. 21 (table – Education / awareness)

³⁹³ UNEP, 2019a. Addressing marine plastics: A systemic approach. Recommendations for action.

³⁹⁴ Ocean Conservancy, 2015. *Stemming the Tide: Land-based strategies for a plastic-free ocean*, McKinsey Center for Business and Environment.

³⁹⁵ UNEP/AHEG/2018/1/2, para. 18

³⁹⁶ UNEP, 2019a. Addressing marine plastics: A systemic approach. Recommendations for action. ; UNEP/AHEG/2018/1/2 para. 18 (table)

³⁹⁷ UNEP/AHEG/2018/1/2, Section III D ; Ocean Conservancy, 2015. *Stemming the Tide: Land-based strategies for a plastic-free ocean*, McKinsey Center for Business and Environment.

³⁹⁸ UNEP, 2019a. Addressing marine plastics: A systemic approach. Recommendations for action.

³⁹⁹ Canadian Council of Ministers of the Environment, 2018. Canada-wide action plan on zero plastic waste. Phase 1. Result Area 9.

microplastics in sewage and wastewater treatment and sludge.⁴⁰⁰ The cost of installing and maintaining effective capture technology is a barrier in many countries. Financial assistance, including through capacity building for development of public-private partnerships for larger infrastructure,⁴⁰¹ and technology transfer could increase the implementation of these technologies, including through pilot programmes. Clean-up and litter capture devices provide an opportunity to gather data, including through citizen science programmes, such as OpenLitterMap.⁴⁰²

187. **Monitoring and evaluation** of the effectiveness of NAP-MaLis is made less effective by a lack of national targets for the reduction of marine litter against which progress could be reported. Developing national inventories⁴⁰³ in which to gather data on production, consumption, end-of-life treatment, and trade in materials and waste could assist in understanding baselines and developing targets.⁴⁰⁴ This is hampered by lack of data in most Member States. By designing national inventories, Member States could identify gaps in data on material flows and waste generation⁴⁰⁵ and identify areas for the development of methods to close such gaps across actors and life cycle phases, including through monitoring programmes. Measures to mitigate and clean up abandoned, lost or discarded fishing gear are also to be considered in NAP-MaLis.⁴⁰⁶

Summary of downstream activities

188. The downstream pressures, controls, and barriers for national marine litter action plans are summarized in Table 17, providing insight into enabling conditions for this response option.

Table 17: Summary of downstream activities for national marine litter action plans

	End-of-life	Mitigative Controls	Monitoring & Evaluation
Pressures	<ul style="list-style-type: none"> Lack of environmentally sustainable waste management 	<ul style="list-style-type: none"> Focus on beach clean-ups 	<ul style="list-style-type: none"> Lack of national targets
Prevention Controls	<ul style="list-style-type: none"> Improve stakeholder engagement across life cycle 	<ul style="list-style-type: none"> Expand use of capture technologies 	<ul style="list-style-type: none"> National inventories
Barriers	<ul style="list-style-type: none"> Poorly integrated waste management 	<ul style="list-style-type: none"> Cost of installation and maintenance 	<ul style="list-style-type: none"> Lack of data
Barrier Controls	<ul style="list-style-type: none"> Integration of the informal sector Reduce contamination Increase coverage of waste management services Coordinated and integrated finance 	<ul style="list-style-type: none"> Technology transfer Capacity building for development of public-private partnerships Include in monitoring programmes 	<ul style="list-style-type: none"> National inventories National monitoring programmes

4.6.2. Analysis of indicators

Input

189. The adoption of NAP-MaLis has been welcomed by some States as a response to the escalating issue of marine litter. NAP-MaLis have national and subnational **scope**, often defined within legal instruments. NAP-MaLis have been adopted or reviewed since around 2009,⁴⁰⁷ and countries that have adopted NAP-MaLis include both developed and developing countries. The **maturity** of the concept is therefore medium, having been updated and implemented in a variety of States in different stages of economic development. As major participants of international trade and contributors to economic growth, G20 countries are proactive in adopting national action plans, but less so for national marine litter action plans, especially in developing States. The **scale** rating of these national action plans is therefore low.

Process indicators

190. Overarching **management target** for a reduction in marine litter are not commonly listed in NAP-MaLis, including clear timelines for achieving these targets. Some set broad goals to eliminate plastic litter from land-based and ocean-based sources, while Indonesia sets an overall target of reducing marine litter by 70% in 2025 and Vietnam aims to reduce marine litter by 50% in 2025, increasing to 75% by 2030.

⁴⁰⁰ UNEP/AHEG/2018/1/2 para. 18 (table)

⁴⁰¹ UNEP, 2019a. Addressing marine plastics: A systemic approach. Recommendations for action.

⁴⁰² As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)).

⁴⁰³ UNEA Res. 4/6, para. 7(c), Vietnam submission for response options

⁴⁰⁴ EIA, 2020. Convention on Plastic Pollution Toward a new global agreement to address plastic pollution.

⁴⁰⁵ UNEP/AHEG/2018/1/2, Section III D.

⁴⁰⁶ UNEA Res. 2/11, para. 14

⁴⁰⁷ The Republic of Korea has had 3 successive national National Marine Litter Management Plans, starting in 2009 with a duration of 5 years each.

191. **Operational targets** listed in NAP-MaLis include quantitative and qualitative aims. In the NAP-MaLis assessed, there is a mix of timelines and quantitative values in operational targets. For example, the Canadian government aims to work with industry and other orders of governments to recycle and reuse at least 55% of plastic packaging by 2030 and recover 100% of all plastics by 2040.⁴⁰⁸ The Strategy on Zero Plastic Waste defines a baseline of waste sent to disposal by Canadians at 706 kg per person (as of 2014), and targets a 30% reduction to 490 kg per person by 2030 and a 50% reduction to 350 kg per person by 2040.⁴⁰⁹ In another example, the Finnish government aims to increase significantly the recovery of plastic waste, with measures including separate waste collection and neighbourhood collection points.⁴¹⁰ In Vietnam, by 2025 80% of tourist areas must not use single-use plastic or non-biodegradable bags and 50% of abandoned, lost, or discarded fishing gear must be collected. For marine protected areas, 80% should be free of plastic litter by 2025.⁴¹¹ These three targets increase to 100% by 2030. Nationwide beach clean-up campaigns are planned at least twice a year. A three-year plan is proposed in Kenya to operationalise producer responsibility organisations for all plastic streams.⁴¹²

192. **Local capacity building and development** has been emphasised especially in training and skills development, and in enabling innovation and incubation of new and emerging solutions. Management officials in coastal areas are targeted for enhanced plastic waste managerial capacity and experience.⁴¹³ To share knowledge, experience and challenges, NAP-MaLis aim to ensure optimum communication through online platforms, databases and working groups. Professional support from research institutes are to be provided.⁴¹⁴ As an example, in 2021, Vietnam plans a technical workshop to develop capacity of all stakeholders in implementing the Circular Economy Roadmap (CER) for plastics.⁴¹⁵

193. Sources of **funding** are identified, and some are planned at different levels. At the national level, the ministry of finance is to allocate funding for the NAP-MaLis. At the regional and international level, strategic fundraising through regional and bilateral cooperation or from international organisations and partnering countries are expected. Increase in funding for the removal of abandoned and derelict vessels (ADVs) and clean-ups is planned.⁴¹⁶ For industry and investment, the ability to co-fund plastic waste collection and recycling systems, as well as to mobilise greater capital investment for equipment and infrastructure are planned.⁴¹⁷ Revenues from tax incentives and EPR are collected to support a more sustainable funding mechanism. The implementation of the polluters pay principle could provide some financial assistance for further implementation of NAP-MaLis. National budget allocations are planned for research on the circular economy, recycling materials and the compostability of bioplastics.⁴¹⁸ Examples of funding sources include the Clean Oceans through Clean Communities (CLOCC) Project which develops ways of raising finance or investments from the private sector. It assists with the development of sorting centres to develop financially sound business models and bankable projects.⁴¹⁹ In another example, Japan has allocated 3.33 billion yen for its 2019 financial year to build a domestic resource circulation system by installing plastic product recycling facilities through the 'Project for promoting the installation of advanced equipment such as CO2 saving type recycling'.⁴²⁰

194. Most NAP-MaLis incorporate and require **monitoring**. The investigation, enumeration, classification and evaluation of land-, ocean- and island-based plastic sources are planned into the management of drainage basins, coastal metropolises and estuaries. Inspection and monitoring of enforcement of regulation on plastic waste are to be expanded to insular and non-habited features, where remote sensing could be utilised.⁴²¹ As an example, the Marine Debris Monitoring and Assessment Project in the United States conducts national monitoring activities to collect, analyse and share knowledge of marine debris sources. Some monitoring indicators are suggested to evaluate strategy effectiveness in managing marine debris.⁴²² Another example is the Oceanographic Institute of São Paulo University which has launched the Project 'Building knowledge to combat marine litter: the plan of monitoring and assessment of marine litter of São Paulo state, Brazil', to create a stakeholders' network to build a participatory plan for monitoring and assessing marine litter.⁴²³

⁴⁰⁸ Government of Canada, 'Ocean Plastic Charter' (2018).

⁴⁰⁹ Canadian Council of Ministers of the Environment, 2018. Strategy on Zero Plastic Waste

⁴¹⁰ Ministry of the Environment, 'Reduce and refuse, recycle and replace. A plastics Roadmap for Finland' (2018).

⁴¹¹ Ministry of Natural Resources and Environment, Vietnam, 'National action plan for ocean plastic waste management by 2030' (2020).

⁴¹² Kenya Association of Manufacturers, 'Kenya Plastic Action Plan' (2019).

⁴¹³ Ministry of Natural Resources and Environment, Vietnam, 'National action plan for ocean plastic waste management by 2030' (2020).

⁴¹⁴ Ministry of Infrastructure and Water Management, 'Plastics Pact NL 2019-2025 Frontrunners to do more, with less plastic in the circular economy' (2019); NOAA, '2018 Hawai'i Marine Debris Action Plan' (2018).

⁴¹⁵ Ministry of Natural Resources and Environment, Vietnam, 'National action plan for ocean plastic waste management by 2030' (2020).

⁴¹⁶ NOAA, '2017 Florida Marine Debris Reduction Guidance Plan' (2017).

⁴¹⁷ World Economic Forum, 'Radically Reducing Plastic Pollution in Indonesia: A Multistakeholder Action Plan National Plastic Action Partnership' (2020).

⁴¹⁸ Kenya Association of Manufacturers, 'Kenya Plastic Action Plan' (2019).

⁴¹⁹ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)).

⁴²⁰ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)).

⁴²¹ Ministry of Natural Resources and Environment, Vietnam, 'National action plan for ocean plastic waste management by 2030' (2020).

⁴²² See <https://marinedebris.noaa.gov/research/marine-debris-monitoring-and-assessment-project>

⁴²³ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)).

195. **Reporting** is defined in some NAP-MaLis at different levels. Designated Ministries are to report on an annual basis, with reports developed for the Prime Minister every five years.⁴²⁴ Annual reports on results are suggested, particularly where supported by online reporting systems.⁴²⁵ Others only require an implementation report at the end of the plan's implementation period, with mid-term review reports.⁴²⁶ Authorities may also be designated to analyse and publish findings.⁴²⁷

196. Consistent and effective **evaluation and review** of mechanisms for marine plastic litter management have been incorporated in NAP-MaLis. Reviews of NAP-MaLis are scheduled on a regular basis. Workshops for discussions of reviews and newsletters of updates to partners may be arranged, with two progress check-ins scheduled annually for participants to share information on actions and objectives.⁴²⁸ Mid-plan reviews are conducted to better achieve goals and objectives, as well as plan future actions.⁴²⁹

197. **Domestic stakeholders** and participants at different levels are included in NAP-MaLis, including non-governmental organisations, research institutes, civil societies, youth and industries.⁴³⁰ Activities to be conducted include clean-ups, resource mobilisation, awareness-raising and education, direct implementation and innovations of recycling materials. Capacity-building programs and training and skills development are planned and arranged for domestic stakeholders. Innovative participation methods including online suggestions platforms are promoted.

198. A number of examples can be found. Kenya plans to integrate informal sectors to develop a sound plastic Producer Responsibility Organisation, and include grassroots business and formal enterprises in recycling infrastructure.⁴³¹ It further plans to build a platform for involved stakeholders including government, importers, manufacturers, distributors, consumers, collectors, aggregators, recyclers and converters.⁴³² The state of Oregon engages local communities in plastic pollution policy education and reduction campaigns.⁴³³ In Nova Scotia, Canada, provincial and municipal government as well as NGOs provided technical input to develop the Plastic Bags Reduction Act.⁴³⁴ Extensive stakeholder engagement contributed to the development of the Canadian Strategy on Zero Plastic Waste.⁴³⁵ The United Nations Development Programme (UNDP) engaged local communities and relevant stakeholders in the coastal areas of Ha Long Bay to participate voluntarily and actively in collecting plastic waste and mitigating environmental pollution from plastic waste in the bay.⁴³⁶ Under the framework of the Project Transforming Tourism Value Chains, a communication campaign was developed to raise awareness among the tourism sector to reduce and eliminate the consumption of disposable plastic during vacations in the Dominican Republic, St. Lucia, Mauritius and the Philippines.⁴³⁷ To solve marine plastic issues, Japan promotes the 'Plastics Smart' campaign, encouraging cooperation and collaboration among a wide range of stakeholders.⁴³⁸

199. **International capacity building** through collaboration with international communities, including international and regional organisations and partner States is emphasised in NAP-MaLis. International technical assistance and investment in the prevention and reduction of marine litter are important for developing States to transition to a circular economy and green growth. Institutional arrangements for international capacity building are discussed and promoted. For industries, international cooperation and knowledge sharing are encouraged. A number of examples exist. South Korea participated in regional joint workshops and focal point meeting organised by regional organisations under the UNEP Regional Seas Programme, with a focus on marine pollution.⁴³⁹ The United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) has institutionalised the Asia-Pacific Day for the Ocean, bringing together active participation from all stakeholders, including government, academia, the private sector, non-governmental organisations, individual citizens and the youth; and with delegates, participants and speakers from different sub-regions in Asia, including the Pacific. Marine pollution, especially in the form of plastic, stood out as one of the main issues.⁴⁴⁰ Since 2018, the United States Environmental Protection Agency (EPA) has worked through the Commission for Environmental Cooperation (CEC) to address marine litter in North American border watersheds through stakeholder engagement at the local level. The CEC projects have totalled over \$1 million and have engaged

⁴²⁴ Ministry of Natural Resources and Environment, Vietnam, 'National action plan for ocean plastic waste management by 2030' (2020).

⁴²⁵ NOAA, 2018 Washington Marine Debris Action Plan.

⁴²⁶ Ministry of Energy, Science, Technology, Environment & Climate Change (MESTECC), Malaysia. Malaysia's Roadmap Towards Zero Single-Use Plastics 2018-2030

⁴²⁷ Ministry of Infrastructure and Water Management, 'Plastics Pact NL 2019-2025 Frontrunners to do more, with less plastic in the circular economy' (2019).

⁴²⁸ NOAA, '2020 Great Lake Marine Debris Action Plan' (2020).

⁴²⁹ NOAA, '2020 Great Lake Marine Debris Action Plan' (2020).

⁴³⁰ Ministry of Infrastructure and Water Management, 'Plastics Pact NL 2019-2025 Frontrunners to do more, with less plastic in the circular economy' (2019).

⁴³¹ Kenya Association of Manufacturers, 'Kenya Plastic Action Plan' (2019).

⁴³² Kenya Association of Manufacturers, 'Kenya Plastic Action Plan' (2019).

⁴³³ NOAA, '2019 Oregon Marine Debris Action Plan' (2019).

⁴³⁴ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)).

⁴³⁵ Canadian Council of Ministers of the Environment, 2018. Strategy on Zero Plastic Waste

⁴³⁶ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)).

⁴³⁷ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)).

⁴³⁸ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)).

⁴³⁹ Progress in Addressing Marine Litter in Korea, see <https://wedocs.unep.org/handle/20.500.11822/26499>

⁴⁴⁰ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)).

stakeholders in the Salish Sea and Tijuana River watersheds to address land-based sources of marine litter. Projects in the watersheds focused on installing stormwater trash capture devices in Vancouver, Canada, and Bellingham, Washington, US and monitoring the devices to better identify sources and types of litter entering the watershed.⁴⁴¹ Under the ‘Marine Initiative’ Japan will support empowerment in developing countries to promote waste management, recovery of marine litter, and innovation, including the provision of training for 10,000 officials engaging in waste management all over the world by 2025. Specifically, Japan provides support to ASEAN countries, based on the ASEAN+3 initiative, for various initiatives such as awareness-raising of local governments, citizens and business units; development of national action plans on marine litter; capacity building for proper waste management including waste-to-energy infrastructure; as well as the establishment of knowledge-hub to promote knowledge-sharing on marine litter management.⁴⁴²

200. Environmental benefits of reducing marine litter and microplastics are at the core of NAP-MaLis. Life cycle assessments of alternatives are suggested for contributions to climate change, energy and resource efficiency and other environmental issues.⁴⁴³ The most significant social **co-benefits** recognised in NAP-MaLis are public health. The Indonesian NAP-MaLi aims to improve public health outcomes by reducing air pollution, improving solid waste management and mitigating the risk of flooding due to blocked drains. It also aspires to advance gender equality and social justice for women, migrants and poor communities who are at higher risk for harm and exploitation.⁴⁴⁴ The most significant economic benefits in national actions for marine litter are the innovation in relevant industries and the creation of job opportunities. As examples, Kenya expects more affordable labour cost and high need for employment, particularly in the recycling sector,⁴⁴⁵ and Indonesia aims to create more than 150,000 direct jobs and yield economic benefits for local communities that derive livelihoods from fisheries or tourism.⁴⁴⁶

Performance indicators

201. **Outputs** of NAP-MaLis as a response option could include the monitoring activities and awareness-raising projects to the public. Korea has started marine debris monitoring at 20 sites since 2008. During its implementation of the 2nd National Marine Litter Management Plan (2014-2018), South Korea increased the number of marine debris monitoring sites to 40, where 25 sites involve local non-governmental organisations.⁴⁴⁷ At the managerial level, it established the MALI Centre and Marine Litter Information System and conducted the National Marine Litter Monitoring Programme.⁴⁴⁸ Under the NOAA Marine Debris Program, the Great Lakes area established the Great Lakes Marine Debris Collaborative Portal for coordinating activities including clean-ups, outreach and monitoring.⁴⁴⁹ To conduct a gap analysis on research needs in the Great Lake area, a synthesis paper on plastic marine debris research was published to provide guidance for researchers and decisionmakers.⁴⁵⁰ The Great Lakes area also organised local awareness-raising campaigns for the public concerning land-based marine debris, in forms of surveys, workshops and clean-ups. Themes of workshops include reducing waste, microplastics, local marine debris conditions; participants range from teachers, business owners and researchers.⁴⁵¹ Under the G20 Framework for Actions on Marine Plastic Litter, France organised awareness-raising actions for fishers to combat pollution and started the collection of fishing gears and aquaculture waste. For the public, it launches an advertising campaign on littering annually; additionally, two working groups have been working with local authorities to prevent and sanction littering.⁴⁵²

202. The assessment of the **outcomes** of NAP-MaLis could include the volume of marine debris removed and reduced. South Korea reported an annual amount of 78,000 tons of removed marine litter in 2018. It expanded its removal project from shoreline and port marine debris, mostly fishery and commercial debris, to sunken and floating litter. To achieve better waste management result, South Korea enhanced reception and collection facilities including bilge management, collection bins, receptacles and subsidies for fishers. According to its 2019 accomplishment report, voluntary organisations in the Great Lakes area removed approximately 153.3 tons of land-based marine debris from 2014-2019. To enhance the effectiveness of marine debris removal, a revised Clean Marina Program Tiered Checklist and a list of best management practices (BMPs) were provided.⁴⁵³ Japan organised a nationwide clean-up event during

⁴⁴¹ As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)).

⁴⁴² As submitted to the Stocktake survey (UNEP Resolution 4/6, para 7(a)).

⁴⁴³ Kenya Association of Manufacturers, ‘Kenya Plastic Action Plan’ (2019).

⁴⁴⁴ World Economic Forum, ‘Radically Reducing Plastic Pollution in Indonesia: A Multistakeholder Action Plan National Plastic Action Partnership’ (2020).

⁴⁴⁵ Kenya Association of Manufacturers, ‘Kenya Plastic Action Plan’ (2019).

⁴⁴⁶ World Economic Forum, ‘Radically Reducing Plastic Pollution in Indonesia: A Multistakeholder Action Plan National Plastic Action Partnership’ (2020).

⁴⁴⁷ Progress in Addressing Marine Litter in Korea, see <https://wedocs.unep.org/handle/20.500.11822/26499>

⁴⁴⁸ See http://eascongress2018.pemsea.org/wp-content/uploads/2018/12/S2.2-4.-National-Marine-Litter-Management-Program-in-Ro-Korea_CSooYeon.pdf

⁴⁴⁹ NOAA, ‘Great Lakes Land-based Marine Debris Action Plan Accomplishments Report’ (2019).

⁴⁵⁰ NOAA, ‘Great Lakes Land-based Marine Debris Action Plan Accomplishments Report’ (2019).

⁴⁵¹ NOAA, ‘Great Lakes Land-based Marine Debris Action Plan Accomplishments Report’ (2019).

⁴⁵² Ministry of the Environment, Japan, ‘G20 Report on Actions against Marine Plastic Litter First Information Sharing based on the G20 Implementation Framework’ (2019).

⁴⁵³ NOAA, ‘Great Lakes Land-based Marine Debris Action Plan Accomplishments Report’ (2019). These BMPs include :

the ‘Zero Marine Litter Week’ in 2019 with a turnout of around 400,000 participants.⁴⁵⁴ It reported 16,700 tons of marine plastic litter cleaned up, out of 45,819 tons of litter cleaned up in the 2017 financial year.⁴⁵⁵

Summary of indicators

203. The assessment of instruments and measures relevant to national marine litter action plans are summarized in Table 18, providing insight into the input, process and performance of this response option.

Table 18: Summary of indicators for national marine litter action plans

Indicator Type	Indicator	Description	Evaluation
INPUT	Scope	International, regional or national	National
	Maturity	Operational years - high, medium, low	Medium – in place since at least 2009 with some revisions undertaken
	Scale	Level of adoption	Small – few examples exist of NAP-MaLis. Some developed by industry.
PROCESS	Governance	Management targets	Yes – very limited for overall reduction in marine litter Yes – these include targets for recycling, reuse and recovery, use of single-use plastic or non-biodegradable bags, collection of ALDFG.
		Operational targets	
	Management	Local capacity building	Yes – this is strong in NAP-MALis and includes a wide range of stakeholders.
		Ongoing funding secured	Yes – sources of funding are varied, from government funding to EPR schemes.
		Monitoring in place	Yes – a wide range of geographic zones are covered
		Reporting in place	Yes – includes annual, mid-term and final implementation reports at end of implementation timeframe.
Review process defined	Yes – evaluation of implementation suggested, including stakeholder feedback		
Co-operation	Domestic stakeholder inclusion International capacity building	Yes – this is strong in NAP-MALis and includes a wide range of stakeholders. Yes – in-practice examples exist, but not explicitly mentioned in NAP-MaLis	
Co-benefits recognised	Environmental	Yes – including climate change, energy and resource efficiency	
	Social	Yes – a strong feature of many NAP-MALis, including informal sector and social equity	
	Economic	Yes – mostly creation of employment in recycling, fisheries and tourism sectors	
PERFORMANCE	Outputs	Workshops on microplastics, marine litter status and awareness raising. Monitoring activities across the countries, with non-governmental organisations involved.	
	Outcomes	Removal and reduction of marine litter. Enhancing reception and collection facilities.	

- Cigarette disposal containers are available for patrons and staff.
- Collection bins for solid recyclables are available throughout the marina.
- Trash cans are emptied and litter pick-ups are conducted within the marina and along the shoreline daily.
- Derelict vessels are removed from the property.
- Shrink wrap is recycled or dry rack storage is available for winterization of boats.
- All storm drains are labelled to notify patrons of outfall points (i.e., “No Dumping, Drains to Lake”).
- Boaters are required to sign an environmental commitment pledge.

⁴⁵⁴ Ministry of the Environment, Japan, ‘G20 Report on Actions against Marine Plastic Litter First Information Sharing based on the G20 Implementation Framework’ (2019).

⁴⁵⁵ Ministry of the Environment, Japan, ‘G20 Report on Actions against Marine Plastic Litter First Information Sharing based on the G20 Implementation Framework’ (2019).

4.6.3. Discussion on effectiveness

204. The above analysis of measures to address the life cycle, together with the analysis of indicators, inform the following assessment of the effectiveness of national marine litter action plans (NAP-MaLis) in contributing to the global goal of elimination of discharge of marine litter and microplastics to the ocean.

Maturity

205. **Medium.** National marine litter action plans have been in place for at least four years, with some subsequent reviews. However, their adoption by Member States is limited.

Feasibility

206. **Medium.** Feasibility has been demonstrated to be moderate, with a number of national plans being active. As major participants in international trade and contributors to economic increase, G20 countries have been proactive with regard to adopting marine litter NAP-MaLis. However, the number of these NAP-MaLis is still limited, especially in the case of developing countries not equipped with capacity-building programmes and secured funding.

207. Local capacity-building under NAP-MaLis is carried out in various ways including working groups, research institutions and online platforms. These methods require a high level of scientific knowledge and organizing capacities, as well as some degree of regional collaboration. This could be a barrier for countries with limited capacities with regard to research and innovation activities and stakeholder engagement. Diverse funding sources including stakeholder involvement and innovative funding mechanism (e.g. EPR schemes) are therefore critical for industrial innovation and updating technologies. Where large infrastructure investments are required, capacity may be lacking to incentivize private sector investment and manage public-private partnerships.

Time frame

208. **Medium.** Most NAP-MaLis have adopted a medium time frame (two to five years), with specific dates set for the achievement of particular activities and projects as well as regular reviews.

Impact

209. **High.** Well-designed NAP-MaLis could address most pressures and barriers identified across all actors within the life cycle. NAP-MaLis operate on national and subnational scales. Wider adoption by Member States could greatly increase their impact on a global scale.

Overall comments

210. To be effective, NAPs would require broader adoption by more Member States from different regions and in different stages of economic development. For the mandates, management and operational targets of the NAPs, all life cycle phases could be included to have greater impacts on long-term elimination of discharge to the oceans.

211. Domestic sources of financing waste management services could be strengthened and include multiple actors, including through EPR and other schemes.

212. Domestic capacity building programmes for stakeholders increase the effectiveness of NAPs. Transfer of technology and collaborative programmes between Member States could assist in the development and implementation of NAPs.

213. The effectiveness is limited by a lack of standardised monitoring and reporting to inform review processes. To enhance effectiveness, NAPs could include monitoring guidelines and harmonised indicators for measuring progress.

214. Knowledge gaps of marine litter could limit the outcomes of NAPs, making research and development critical. Promotion and support of research on policy interventions, including socio-economic studies, could enhance effectiveness.

4.7. STRENGTHENING SOLID WASTE MANAGEMENT USING REGULATORY AND MARKET-BASED INSTRUMENTS

215. A national strategy to strengthen solid waste management using regulatory and market-based instruments is an existing response option that aims to prevent discharge of waste into the environment by improving recycling across all life cycle phases.⁴⁵⁶ This strategy predominantly targets land and freshwater **environmental zones** for protection, with all marine areas benefiting. The **geographic range** is all terrestrial zones and the coastal zone, with **actions** focusing on prevention. The **scale** rating for adoption remains small but could be expanded as more Member States develop

⁴⁵⁶ Canadian Council of Ministers of the Environment, 2018. Canada-wide action plan on zero plastic waste. Phase 1; Kenya Association of Manufacturers, 'Kenya Plastic Action Plan' (2019).

integrated strategies. Relevant measures may be included within NAP-MaLis or be adopted as stand-alone instruments and may be voluntary or mandatory to suit the Member State context.

4.7.1. Analysis of measures to address the life cycle

Upstream activities

216. The pressure influencing the **source materials phase of the life cycle** is unsustainable materials management (SMM).⁴⁵⁷ Strengthening implementation of the 3R waste hierarchy could improve resource efficiency⁴⁵⁸ and SMM. Lack of understanding of the effects of particular measures on different sectors, actors and stakeholders⁴⁵⁹ across the life cycle may undermine the effectiveness of efforts to manage waste according to a 3R waste hierarchy. This barrier could be overcome by carrying out comprehensive socio-economic studies and engaging all stakeholders⁴⁶⁰ in the design phase.

217. The pressure influencing the **product manufacture phase of the life cycle** is unsustainable design.⁴⁶¹ Design improvements that meet eco-design principles could be incentivised through well-designed EPR schemes⁴⁶² and other market-based instruments.⁴⁶³ The effectiveness of design improvements may be reduced by governance and administration challenges,⁴⁶⁴ economic challenges, including failure to stimulate adoption of Design for Environment (DfE) principles, and start-up issues concerning social impacts, investor uncertainty and free riders⁴⁶⁵ (including with respect to Internet sales). These barriers could be overcome by clearly defining the roles of government and industry; developing methods to ensure transparency by and comparable data from industry; and providing strong enforcement mechanisms.⁴⁶⁶ The design of EPR schemes should take into account: products/range targeted, voluntary or mandatory, individual or collective, organizational/financial responsibility for waste management, responsibility among stakeholders and cost coverage (transparency about cost calculations of end-of-life treatment, full/partial allocation of costs to producers).⁴⁶⁷ Investor confidence in the scale of operations could be strengthened by improving certainty about the volume of waste estimated to be collected for recycling, including through identifying and addressing channels of discharge from informal recyclers and legal/illegal trade of waste.⁴⁶⁸ At start-up, informal recycling facilities could be transitioned into the formal EPR scheme or alternate employment opportunities could be provided.⁴⁶⁹ DfE may be more widely adopted when modulated fees are applied and based on environmental performance criteria of products and processes.⁴⁷⁰

218. The pressure influencing the **use phase of the life cycle** is the increasingly high rate of consumption of avoidable and unnecessary products, leading to waste generation.⁴⁷¹ The effect of this pressure could be reduced by reducing or eliminating avoidable or problematic products.⁴⁷² However, controls may be hampered by uncertainty about impacts along the value chain⁴⁷³ and lack of incentives for consumers to alter purchasing choices. These barriers could be overcome through research on alternatives and socio-economic costs and benefits, and stakeholder engagement to determine impacts.⁴⁷⁴ The effect of the rate of consumption pressure could be reduced through imposing bans and taxes

⁴⁵⁷ G20 Implementation Framework for Actions on Marine Plastic Litter

⁴⁵⁸ G20 Implementation Framework for Actions on Marine Plastic Litter; Switzerland, EU, Japan submissions for response options, UNEP/AHEG/2018/1/2, para. 18 (table)

⁴⁵⁹ OECD, 2018b. *Improving Markets for Recycled Plastics: Trends, Prospects and Policy Responses*. <http://dx.doi.org/10.1787/9789264301016-en>

⁴⁶⁰ OECD, 2016b. *Policy Guidance on Resource Efficiency*. OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264257344-en>

⁴⁶¹ UNEP/AHEG/2018/1/2, para. 13 (table), para. 18 (table), para 23

⁴⁶² UNEP/AHEG/2018/1/2, para. 13 (table)

⁴⁶³ OECD, 2018b. *Improving Markets for Recycled Plastics: Trends, Prospects and Policy Responses*. <http://dx.doi.org/10.1787/9789264301016-en>

⁴⁶⁴ OECD, 2016a. *Extended Producer Responsibility: Updated Guidance for Efficient Waste Management*. OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264256385-en>

⁴⁶⁵ Producers which do not contribute financially to any compliance scheme, but still benefit from their existence and action (Bio by Deloitte (2014). *Development of Guidance on Extended Producer Responsibility (EPR)*. In collaboration with Arcadis, Ecologic, Institute for European Environmental Policy (IEEP) and Umweltbundesamt (UBA). European Commission – DG Environment. https://www2.deloitte.com/content/dam/Deloitte/fr/Documents/sustainability-services/deloitte_sustainability-les-filieres-a-responsabilite-elargie-du-producteur-en-europe_dec-15.pdf.

⁴⁶⁶ Bio by Deloitte, 2014. *Development of Guidance on Extended Producer Responsibility (EPR)*. In collaboration with Arcadis, Ecologic, Institute for European Environmental Policy (IEEP) and Umweltbundesamt (UBA). European Commission – DG Environment

⁴⁶⁷ Ibid.

⁴⁶⁸ OECD, 2018c. *Improving Plastics Management: Trends, policy responses, and the role of international co-operation and trade*. OECD Environment Policy Paper No. 12. ; OECD, 2016a. *Extended Producer Responsibility: Updated Guidance for Efficient Waste Management*. OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264256385-en>

⁴⁶⁹ OECD, 2016a. *Extended Producer Responsibility: Updated Guidance for Efficient Waste Management*. OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264256385-en>; OECD, 2016b. *Policy Guidance on Resource Efficiency*. OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264257344-en>

⁴⁷⁰ OECD, 2016b. *Policy Guidance on Resource Efficiency*. OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264257344-en>

⁴⁷¹ UNEP/AHEG/2018/1/2, para. 1, para. 13 (table)

⁴⁷² UNEP/AHEG/2018/1/2, para. 13 (table)

⁴⁷³ Dauvergne, P., 2018. *Why is the global governance of plastic failing the oceans?* Glob. Environ. Change-Human Policy Dimens. 51, 22-31. [10.1016/j.gloenvcha.2018.05.002](https://doi.org/10.1016/j.gloenvcha.2018.05.002)

⁴⁷⁴ OECD, 2016b. *Policy Guidance on Resource Efficiency*. OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264257344-en>

on products to reduce consumption, and by promoting reuse practices.⁴⁷⁵ Participation in initiatives aimed at increasing reuse may be limited by design and infrastructure constraints.⁴⁷⁶ These barriers could be overcome by promoting design for reuse (see Section B on global design standards) and providing infrastructure, such as return and refill schemes, by retailers and manufacturers, possibly through EPR schemes.⁴⁷⁷ Repairing products is another way to reduce high rates of consumption,⁴⁷⁸ but it could be hampered by lack of information on how to obtain repairs and access parts. This barrier could be overcome by establishing certified repair partners or making repair instructions and parts readily available.⁴⁷⁹ Promoting design for repair, including disassembly, is important in this regard.⁴⁸⁰

Summary of upstream activities

219. The upstream pressures, controls, and barriers for strengthening solid waste management are summarized in Table 19, providing insight into enabling conditions for this response option.

Table 19: Summary of upstream and midstream activities for strengthened solid waste management

	Source Materials	Product Manufacture	Use
Pressures	<ul style="list-style-type: none"> Unsustainable materials management 	<ul style="list-style-type: none"> Unsustainable design 	<ul style="list-style-type: none"> High rate of consumption of avoidable and unnecessary products
Prevention Controls	<ul style="list-style-type: none"> Strengthen 3R waste hierarchy 	<ul style="list-style-type: none"> Market-based instruments to incentivise eco-design 	<ul style="list-style-type: none"> Reduce or eliminate avoidable or problematic products Promote reuse and repair
Barriers	<ul style="list-style-type: none"> Uncertainty of outcomes 	<ul style="list-style-type: none"> Governance & administration challenges Economic challenges Start-up issues (social impacts, investor uncertainty, free riders) 	<ul style="list-style-type: none"> Uncertainty of impacts across value chain Lack of incentives for consumers Lack of infrastructure and information for reuse and repair
Barrier Controls	<ul style="list-style-type: none"> Socio-economic studies Engage all stakeholders in the design phase 	<ul style="list-style-type: none"> Define roles of government and industry Develop methods to ensure transparency by industry Develop strong enforcement mechanisms 	<ul style="list-style-type: none"> Research on alternatives, socio-economic costs and benefits Stakeholder engagement Bans and taxes Develop reuse and repair systems with manufacturers & retailers

Downstream activities

220. The pressure influencing the **end-of-life phase of the life cycle** is low economic feasibility of environmentally sustainable treatment of waste – limiting private investment in these services,⁴⁸¹ placing financial burdens on local governments, and leading to underdeveloped collection and recycling systems in some Member States.⁴⁸² The economic feasibility of collection, sorting and recycling could be enhanced by increasing the quantity and quality of recycled material available to recyclers⁴⁸³ as well as increasing collection and sorting of recyclable materials. The effectiveness of quality improvements is reduced by contamination of recyclables.⁴⁸⁴ The effect of this barrier may be reduced by improving sorting, including separation at source of organic, biodegradable and compostable materials.⁴⁸⁵ Design for recycling could reduce the use of additives of concern, resins, glues, labels and other material that increase the cost of sorting and disassembly.⁴⁸⁶ Container deposit schemes could assist in reducing contamination, as could education of both households and commercial enterprises. The effectiveness of increasing the quantity of recyclable material made available for recycling may be reduced by low recyclable content in products; littering and dumping;⁴⁸⁷ and landfilling

⁴⁷⁵ Ocean Conservancy, 2019. *Plastics Policy Playbook. Strategies for a Plastic-Free Ocean.*

⁴⁷⁶ Ibid.

⁴⁷⁷ Ibid.

⁴⁷⁸ Rossi, M., Germani, M., Zamagni, A., 2016. *Review of ecodesign methods and tools. Barriers and strategies for an effective implementation in industrial companies.* J. Clean Prod. 129, 361-373. <https://doi.org/10.1016/j.jclepro.2016.04.051>

⁴⁷⁹ See <https://www.ifixit.com/> for an example of repair instructions and sale of parts

⁴⁸⁰ OECD, 2018b. *Improving Markets for Recycled Plastics: Trends, Prospects and Policy Responses.* <http://dx.doi.org/10.1787/9789264301016-en>

⁴⁸¹ OECD, 2018c. *Improving Plastics Management: Trends, policy responses, and the role of international co-operation and trade.* OECD Environment Policy Paper No. 12.

⁴⁸² UNEP/AHEG/2018/1/2, para. 13 (table)

⁴⁸³ OECD, 2018c. *Improving Plastics Management: Trends, policy responses, and the role of international co-operation and trade.* OECD Environment Policy Paper No. 12.

⁴⁸⁴ Ocean Conservancy, 2019. *Plastics Policy Playbook. Strategies for a Plastic-Free Ocean.*

⁴⁸⁵ Kenya Association of Manufacturers, 'Kenya Plastic Action Plan' (2019) ; OECD, 2016a. *Extended Producer Responsibility: Updated Guidance for Efficient Waste Management.* OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264256385-en>

⁴⁸⁶ OECD, 2018c. *Improving Plastics Management: Trends, policy responses, and the role of international co-operation and trade.* OECD Environment Policy Paper No. 12.

⁴⁸⁷ Ibid.

and incineration of recyclables. These barriers could be overcome by promoting recycled content in products through mandatory and voluntary mechanisms, ensuring littering and dumping fines are high enough to deter such behaviour, and placing a ban on the landfilling and incineration of recyclable materials.⁴⁸⁸ Rates of collection are made less effective in the case of many local governments by lack of funds.⁴⁸⁹ This barrier could be overcome by establishing a national fund for collection and sorting to support recycling activities. Sources of funds include EPR schemes, advanced recycling fees (ARFs) linked to regulation or licensing schemes, advanced disposal fees (ADFs), pay-as-you-throw (PAYT) schemes, taxes applied to relevant actors across the value chain, environmental levies, fines for littering and dumping, and landfill disposal fees.⁴⁹⁰ Transport could be diversified to cover more geographic areas, including through schemes for deposit return, reverse logistics and backloading.⁴⁹¹

221. **Monitoring and evaluation** activities are hampered by lack of information, particularly comparable industry information. In the case of EPR schemes, evaluation of economic performance is limited by lack of transparency about fees and costs while evaluation of technical performance is limited by lack of high-quality comparable data on quantities of products placed on the market resulting in waste and final treatment. This hampers development of indicators and targets against which to report,⁴⁹² further limiting aggregation of results at the global level. EPR schemes could establish producer responsibility organisations (PROs) to gather and manage the data necessary to calculate costs of collection and treatment, in order to inform the fees paid into the EPR fund. The data collected could include quantities of targeted products and materials placed on the market, waste generated and the rate of collection and treatment⁴⁹³ of items covered by market-based instruments. This information could be collated in national inventories to track production, consumption, treatment and trade of products.⁴⁹⁴

Summary of downstream activities

222. The downstream pressures, controls, and barriers for strengthening solid waste management are summarized in Table 20, providing insight into enabling conditions for this response option.

Table 20: Summary of downstream activities for strengthened solid waste management

	End-of-life	Monitoring & Evaluation
Pressures	<ul style="list-style-type: none"> • Low economic feasibility of environmentally sustainable waste management 	<ul style="list-style-type: none"> • Lack of indicators and targets to track progress
Prevention Controls	<ul style="list-style-type: none"> • Increase quantity of secondary material • Increase quality of secondary material 	<ul style="list-style-type: none"> • National inventories
Barriers	<ul style="list-style-type: none"> • Lack of funds for waste management • Low collection rate • Low recyclable content • Littering, dumping, landfilling, incineration • Contamination of recyclables 	<ul style="list-style-type: none"> • Lack of comparable information • Data management
Barrier Controls	<ul style="list-style-type: none"> • Economic instruments to fund collection • Separation at source • Deposit-return schemes • Reverse logistics, backloading • Design for recycling 	<ul style="list-style-type: none"> • Engage PROs in the role of data collection and management for EPR schemes

4.7.2. Analysis of indicators

Input

223. The **scope** of this response option is national, being adopted as standalone instruments or in NAP-MaLis. Most of the regulatory instruments and MBIs discussed in this section were adopted in the recent decade. As changes in behaviours and manufacture take time to emerge and to be examined, most of the predicted outcomes and outputs are still expected. The **maturity** of this concept is therefore **low**. The adoption and implementation of solid waste management using regulatory and MBIs as a response option have been fragmented and limited. With limited practices of this response option globally, the **scale** rating of this response option is therefore **low**.

Process indicators

⁴⁸⁸ Ibid.

⁴⁸⁹ UNEP/AHEG/2018/1/2, para. 13 (table)

⁴⁹⁰ Ocean Conservancy, 2019. *Plastics Policy Playbook. Strategies for a Plastic-Free Ocean.*

⁴⁹¹ Ibid.

⁴⁹² EIA, 2020. *Convention on Plastic Pollution Toward a new global agreement to address plastic pollution.*

⁴⁹³ Bio by Deloitte, 2014. *Development of Guidance on Extended Producer Responsibility (EPR).* In collaboration with Arcadis, Ecologic, Institute for European Environmental Policy (IEEP) and Umweltbundesamt (UBA). European Commission – DG Environment

⁴⁹⁴ UNEP/AHEG/2018/1/3, Annex III

224. Overarching **management target** for solid waste management could include timelines of introducing bans and gradually phasing out single-use plastic products.⁴⁹⁵ The African Union aims to achieve a recycling rate of at least 50 per cent of municipal waste by 2023. The Kenyan government requires a recycling rate of 30 % for the manufacture of any plastic bag, with respective labelling.⁴⁹⁶ Specific **operational targets** regarding regulatory instruments and MBIs include return or recycling rates for certain plastic products. European Union (EU) set regional and national targets of at least 70% of the beverage packaging are refillable by 2030. It is to implement the deposit return scheme for remaining one-way beverage packaging that covers all materials.⁴⁹⁷

225. **Local capacity building and development** is an important element in strengthening solid waste management as this involves training and skill development for practitioners. EU has developed quiz on extended producer responsibility and included it in its training package on EU Waste Legislation.⁴⁹⁸ In its nationwide action plan for the EPR scheme, Canada recognised the essentiality of training and education of staff working for the EPR program's Producer Responsibility Organisations to ensure compliance with environmental and occupational health and safety requirements and best management practices. For this purpose, Canada has adopted the Guidance Manual for Establishing, Maintaining and Improving Producer Responsibility Organisations.⁴⁹⁹ Inclusion and development of the informal sector and small to medium enterprises is also promoted.⁵⁰⁰

226. Sources of **funding** are from a diverse range of sources, including revenues from MBIs. In Canada, funding for EPR program is provided by different stakeholders in different states, including producer responsibility organisation, producers, fees collected from consumers and government fund.⁵⁰¹ Kiribati introduced a container deposit system, which was supported by the national Special Funds (Waste Material Recovery) Act 2004.⁵⁰² The Chinese government established e-waste disposal fund scheme in 2012 and collects charges from producers and importers of electronic and electrical products through the State Taxation Administration and China Customs. The collected funds are provided to certified recyclers as subsidies to support the development of the e-waste recycling industry.⁵⁰³

227. The **monitoring** of solid waste management using regulatory instruments and MBIs enhances the transparency of implementation. For the purpose of this and also to enhance the compatibility of data, Austria designated a governmental agency to act as clearinghouse for data collection and monitoring on producers and producer responsibility organisations.⁵⁰⁴ To limit the export of waste regulated by the EPR scheme, a clearinghouse collecting data and monitoring product flows of Waste Electrical & Electronic Equipment (WEEE) in the EU Member States was established.⁵⁰⁵

228. **Reporting** for solid waste management using regulatory instruments and MBIs is limited. As commented by EPR Canada, independent program reporting is not required and no punishment will be imposed for non-performance or not meeting the targets.⁵⁰⁶ As the main purpose of the EPR scheme is to increase recycling rate, poor data reporting of the plastic recycling sector therefore prevents strategic decision-making and discourages new market entrants. As suggested by OECD, mandatory data reporting mechanisms for plastics recycling could be introduced in response to this problem,⁵⁰⁷ and designed to provide comparability.⁵⁰⁸

229. Under the existing solid waste management using regulatory instruments and MBIs, some regions and countries include regular **evaluation and review** of instruments. Reviews of EPR programs and legislation were conducted by the Canadian states or EPR Canada to enhance understanding of the implementation status and compliance with the EPR scheme.⁵⁰⁹ In its nationwide action plan of EPR, an overall review of it within five years of its adoption was also required. The review of the EPR action plan includes verification of performance against listed targets for EPR implementation; evaluation of the progress of enhanced waste diversion; and the assessment of improved product performance after the promotion of less toxic materials and other environmental strategies.⁵¹⁰

⁴⁹⁵ African Union Agenda 2063: The Africa We Want, see

<https://au.int/en/agenda2063/overview#:~:text=The%20declaration%20marked%20the%20re,the%20continent%20intends%20to%20achieve.>

⁴⁹⁶ Government of Kenya, Draft Environmental Management and Co-ordination Regulations, Plastic Bags Control and Management, 2018.

⁴⁹⁷ See <https://mk0eeborgicuyptuf7e.kinstacdn.com/wp-content/uploads/2019/09/DRS-Manifesto.pdf> and https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2019.155.01.0001.01.ENG.

⁴⁹⁸ See https://ec.europa.eu/environment/legal/law/6/quiz_3.htm

⁴⁹⁹ Canadian Council of Ministers of the Environment, 'Canada-wide Action Plan for Extended Producer Responsibility' (2009).

⁵⁰⁰ <https://petco.co.za/unique-recycling-programme-a-boost-for-informal-sector>; <https://infrastructurenews.co.za/2018/07/20/pet-industry-lends-support-to-recycling-smmes>

⁵⁰¹ EPR Canada, '2016 Extended Producer Responsibility Summary Report' (2016).

⁵⁰² UNEP, 'Global Waste Management Outlook' (2015).

⁵⁰³ OECD, 'The State of Play on Extended Producer Responsibility (EPR): Opportunities and Challenges' (2014).

⁵⁰⁴ OECD, 'The State of Play on Extended Producer Responsibility (EPR): Opportunities and Challenges' (2014).

⁵⁰⁵ OECD, 'The State of Play on Extended Producer Responsibility (EPR): Opportunities and Challenges' (2014).. Also see <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:197:0038:0071:EN:PDF>.

⁵⁰⁶ EPR Canada, '2016 Extended Producer Responsibility Summary Report' (2016).

⁵⁰⁷ OECD, 'The State of Play on Extended Producer Responsibility (EPR): Opportunities and Challenges' (2014).

⁵⁰⁸ Bio by Deloitte, 2014. Development of Guidance on Extended Producer Responsibility (EPR). In collaboration with Arcadis, Ecologic, Institute for European Environmental Policy (IEEP) and Umweltbundesamt (UBA). European Commission – DG Environment

⁵⁰⁹ EPR Canada, '2016 Extended Producer Responsibility Summary Report' (2016).

⁵¹⁰ Canadian Council of Ministers of the Environment, 'Canada-wide Action Plan for Extended Producer Responsibility' (2009).

230. To involve **domestic stakeholders and participants** in the EPR scheme is critical to its implementation. In its transition from product stewardship to a full EPR scheme, Canada actively included multiple stakeholders, including producers, product design sector and finance sector.⁵¹¹ Canadian Council of Ministers of the Environment supports producers and other stakeholders in achieving reductions in packaging and packaging sustainability.⁵¹² In its process of initiating the EPR scheme, South Africa hosted workshops for stakeholders for better understanding of plastic recycling and the EPR concept.⁵¹³ The Ellen MacArthur Foundation launched the Plastics Economy Programme, which brings together stakeholders across the supply chain to innovate product design and packaging. This programme includes a dialogue mechanism for stakeholders including consumer goods companies, retailers, producers and packaging manufacturers.⁵¹⁴

231. **International capacity building** and cooperation are emphasized especially in combating illegal export of waste and hazardous materials to countries that are not capable of safe processing waste which could leave negative impacts on the environment and public health. As introduced above, a clearinghouse was established by the EU to trace the product flows of waste electrical and electronic equipment. With increasing globalization, reinforced collaboration with customs authorities are implemented and recommended by OECD.⁵¹⁵

232. Recognition of the environmental benefits is demonstrated in the goals of increased collection and recycling rates. Additional social **co-benefits** are also recognized through the inclusion of the informal sectors, as illustrated above. Although economic incentives could be expensive to operate,⁵¹⁶ they are successful at internalizing the costs of pollution, a strong principle underpinning these schemes aimed at reducing costs of waste management for local authorities and taxpayers.

Performance indicators

233. The assessment of the **performance** of strengthening solid waste management using regulatory and MBIs as a response option could include reduction in the use of single-use plastic products, reduction from voluntary agreements with industries, EPR schemes and labelling, demonstrating both **outputs and outcomes**. As predicted by the European Commission, through measures to reduce marine litter from single-use plastics, the use of cutlery, straws and stirrers could be reduced 30% by 2025 and 50% by 2030.⁵¹⁷ After the introduction of a plastic bag ban in Queensland, Australia, it was recorded that 900 million plastic bags were saved in during the first year of the ban.⁵¹⁸ In South Australia, after its bag ban coming into force in 2009, a 45% waste stream reduction was witnessed.⁵¹⁹

234. The Luxembourg Trade Confederation signed a voluntary agreement on national packaging waste prevention with the Ministry of Sustainable Development and Infrastructure, Environmental Agency. As a result of this voluntary agreement and two extensions after, consumers' habits had changed significantly. As reported in 2015, over 85% of customers use reusable bags for shopping, two-thirds of which are 'eco-bags'. This voluntary agreement had avoided the use of 560 million single-use bags; the European Commission, therefore, declared it as a best practice in waste prevention.⁵²⁰ Finland uses a deposit-based return system for beverage packages, which achieves over 90% recycling rate in 2017 and recorded a slight decrease of recycling rate in 2019 (Can-95%, PET-bottle 90% and glass bottle-87%).⁵²¹ Through providing incentives for returning beverage containers, the proportion of them found in coastal areas from states with incentives was around 40 per cent less than in states without incentives.⁵²² As a self-regulating South African PET recycling company, PETCO reported an annual PET recycling rate increase from 52% of post-consumer bottle PET in 2015 to 55% in 2016, and compared well with the global PET recycling rates.⁵²³ The Green Dot has been used worldwide to enhance producer responsibility. With its widespread use in 31 countries, it has included 29 packaging recovery organisations and 150,000 companies into its licencing system.⁵²⁴ In some European countries, EPR schemes for packaging have led to recycling rates of up to 75% and recovery rates of 80%.⁵²⁵

⁵¹¹ EPR Canada, '2016 Extended Producer Responsibility Summary Report' (2016).

⁵¹² Canadian Council of Ministers of the Environment, 'Canada-wide Action Plan for Extended Producer Responsibility' (2009).

⁵¹³ Department of Environmental Affairs and Tourism, South Africa, 'National Waste Management Strategy Implementation' (2005).

⁵¹⁴ OECD, 'Improving Markets for Recycled Plastics Trends, Prospects and Policy Responses' (2018).

⁵¹⁵ OECD, 'Improving Markets for Recycled Plastics Trends, Prospects and Policy Responses' (2018).

⁵¹⁶ Bio by Deloitte, 2014. Development of Guidance on Extended Producer Responsibility (EPR). In collaboration with Arcadis, Ecologic, Institute for European Environmental Policy (IEEP) and Umweltbundesamt (UBA). European Commission – DG Environment

⁵¹⁷ European Commission, 'Assessment of measures to reduce marine litter from single use plastics-Final report and Annex' (2018).

⁵¹⁸ See <https://www.brisbanetimes.com.au/national/queensland/900-million-plastic-bags-saved-in-queensland-during-first-year-of-ban-20190701-p522wz.html>.

⁵¹⁹ Schnurr, R.E., Alboiu, V., Chaudhary, M., Corbett, R.A., Quanz, M.E., Sankar, K., Srain, H.S., Thavarajah, V., Xanthos, D., Walker, T.R., 2018. *Reducing marine pollution from single-use plastics (SUPs): A review*. Marine pollution bulletin 137, 157-171.

⁵²⁰ UNEP, 'Global Waste Management Outlook' (2015).

⁵²¹ See <https://www.palpa.fi/beverage-container-recycling/deposit-refund-system/>.

⁵²² Schuyler, Q., Hardesty, B.D., Lawson, T.J., Opie, K., Wilcox, C., 2018. *Economic incentives reduce plastic inputs to the ocean*. Marine Policy 96, 250-255. 10.1016/j.marpol.2018.02.009 Vince, J., Hardesty, B.D., 2018. *Governance solutions to the tragedy of the commons that marine plastics have become*. Frontiers in Marine Science 5, 214.

⁵²³ <https://petco.co.za/plastic-bottle-recycled-tonnage-grown-822-since-2005/>

⁵²⁴ <https://www.pro-e.org/about-us>

⁵²⁵ Bio by Deloitte, 2014. Development of Guidance on Extended Producer Responsibility (EPR). In collaboration with Arcadis, Ecologic, Institute for European Environmental Policy (IEEP) and Umweltbundesamt (UBA). European Commission – DG Environment

Summary of indicators

235. The assessment of instruments and measures relevant to strengthened solid waste management services are summarized in Table 21, providing insight into the input, process and performance of this response option.

Table 21: Summary of indicators for strengthened solid waste management

Indicator Type	Indicator	Description	Evaluation
INPUT	Scope	International, regional or national	National, sub-national
	Maturity	Operational years - high, medium, low	High – numerous measures have been in place across many countries for a number of years. However, international assistance could target greater adoption of context-sensitive economic instruments in developing countries to increase the global impact of this response option
	Scale	Level of adoption	Small – most operate at the national or sub-national level and target a few product ranges
PROCESS	Governance	Management targets	Yes – mostly targeting overall recycling rates. Could be expanded to include overall rates of reuse and repair
		Operational targets	Yes – mostly targeting recycling rates for specific product categories. Could be expanded to include rates of reuse and repair for specific product categories
	Management	Local capacity building	Yes – recognition of informal sector and small to medium enterprises
		Ongoing funding secured	Yes – multiple sources of funding for waste management are in place, but greater adoption of economic instruments could assist developing countries in this regard.
		Monitoring in place	Yes – monitoring and data management is built into the design of economic instruments and conducted by scheme administrators and/or government
		Reporting in place Review process defined	Yes – limited and comparability is difficult Yes – commonly reviewed every five years
Co-operation	Domestic stakeholder inclusion International capacity building	Yes – this is a strong feature of design and implementation of economic instruments. Yes – recognition of the role of customs officials in combating illegal trade of wastes	
Co-benefits recognised	Environmental	Yes – objectives are reduced discharge to the environment for relevant product categories	
	Social	Yes – inclusion of the informal sector is well recognised	
	Economic	Yes – underpinned by the polluter pays principle, reducing costs to local authorities and taxpayers	
PERFORMANCE	Outputs		Adoption of economic instruments is increasing
	Outcomes		Increased recycling and recovery rates are strongly demonstrated for product ranges covered by economic instruments.

4.7.3. Discussion on effectiveness

236. The above analysis of measures to address the life cycle, together with the analysis of indicators, provides the following assessment of the effectiveness of solid waste management using regulatory and market-based instruments in contributing to the global goal of elimination of discharge of marine litter and microplastics to the ocean.

Maturity

237. **High.** This response option has been adopted across a range of products in many Member States.

Feasibility

238. **Medium.** Feasibility has been demonstrated through a high number of national examples with regard to particular products and product ranges. Schemes for producer fees could take a long time to develop and require strong government enforcement. Infrastructure and legislation may need to be adapted in some Member States. Strong stakeholder engagement is necessary. Consideration of impacts on small and medium-sized enterprises (SMEs) and the informal waste sector could also be needed. Collection of data for evaluation may present challenges, particularly in developing countries and where many SMEs exist.⁵²⁶

Time frame

239. **Medium to long.** Some measures may require less time to implement, such as pay-as-you-throw schemes, and those that target partial contributions to the cost of end-of-life treatment. The development of methods to determine full and real-time costs may take longer.

Impact

240. **High.** Well-designed regulatory and market-based instruments could be effective in overcoming pressures and barriers by including multiple actors across all life cycle phases, thereby improving waste management services and preventing marine litter. Wider adoption by Member States would greatly increase impact on a global scale.

Overall comments

241. To be effective, the use of regulatory and market-based instruments to strengthen solid waste management needs extensive stakeholder engagement in the design phase and strong government enforcement during implementation.

242. A number of examples exist in different Member States at different levels of economic development that could assist in reviewing appropriateness in different national contexts.

243. Careful consideration is needed of the impact of regulatory and market-based instruments on small and medium enterprises,⁵²⁷ e.g. for transition to eco-design and participation in collection, reuse and repair schemes, as well as the role of and impacts on the informal sector due to formalising of collection and sorting systems.

4.8. NATIONAL STRATEGIES TO PREVENT POLLUTION BY MICROPLASTICS

244. A national strategy to prevent pollution by all forms of microplastics is a **potential** response option that aims to prevent and reduce to the minimum pollution by microplastics during all life cycle phases.⁵²⁸ **Environmental zones** currently targeted for protection by existing microplastics measures are the marine areas and freshwater environments that lead to the oceans, with emerging recognition of soil and air pollution.⁵²⁹ A comprehensive strategy to prevent pollution by microplastics could target all **environmental zones** for protection. Current instruments are generally binding, with some voluntary programmes agreed with industry. **Actions** include those of a preventive and mitigative nature, but also monitoring & evaluation. The **geographic range** is predominantly land-based. The **scale** rating is small but could increase to medium or high as more Member States adopt these strategies. Relevant measures may be included within NAP-MaLis or be adopted as stand-alone instruments.

⁵²⁶ ENEC, 2019. Motivations for and Barriers to Ecodesign in Industry.

⁵²⁷ Ibid.

⁵²⁸ UNEA Res. 1/6, para 7

⁵²⁹ Dris, R., Gasperi, J., Saad, M., Mirande, C., Tassin, B., 2016. *Synthetic fibers in atmospheric fallout: A source of microplastics in the environment?* Marine Pollution Bulletin 104, 290-293. <http://dx.doi.org/10.1016/j.marpolbul.2016.01.006>; Dris, R., Gasperi, J., Mirande, C., Mandin, C., Guerrouache, M., Langlois, V., Tassin, B., 2017. *A first overview of textile fibers, including microplastics, in indoor and outdoor environments.* Environmental Pollution 221, 453-458. <http://dx.doi.org/10.1016/j.envpol.2016.12.013>, *ibid.* ; Evangelidou, N., Grythe, H., Klimont, Z., Heyes, C., Eckhardt, S., Lopez-Aparicio, S., Stohl, A., 2020. *Atmospheric transport is a major pathway of microplastics to remote regions.* Nature Communications 11. 10.1038/s41467-020-17201-9 ; Kay, P., Hiscoe, R., Moberley, I., Bajic, L., McKenna, N., 2018. *Wastewater treatment plants as a source of microplastics in river catchments.* Environmental Science and Pollution Research 25, 20264-20267. 10.1007/s11356-018-2070-7 ; Stubenrauch, J., Ekardt, F., 2020. *Plastic Pollution in Soils: Governance Approaches to Foster Soil Health and Closed Nutrient Cycles.* Environments 7. 10.3390/environments7050038

4.8.1. Analysis of measures to address the life cycle

Upstream activities

245. The pressure influencing the **source materials phase of the life cycle** is industry losses of microplastics from resin-producing facilities and the transport sector. Best practices, such as those developed under Operation Clean Sweep, could reduce the effects, but may be limited by low industry engagement in recommended best practices. This could be addressed by including losses in environmental quality standards⁵³⁰ and mandating adherence to recognized industry best practices. In lieu of national policies, NGOs are actively promoting industry engagement in Operation Clean Sweep.⁵³¹ Current standards and best available techniques (bat) reference documents⁵³² could be updated to include OCS best practices, including as strengthened by work currently underway by OSPAR.⁵³³ Implementation of OCS measures could be a mandatory component of permits for pellet producers, users, packagers and transporters, as proposed in the US.⁵³⁴ Certification and labelling schemes to indicate compliance and accreditation with industry best practices zero pellet loss could strengthen industry engagement.⁵³⁵

246. The pressures influencing the **product manufacture life cycle phase** are intentionally added (primary) microplastics, abrasion during use of products (e.g. automotive tyres, synthetic textiles resulting from wear, washing machines and dryers, road markings, artificial turf and fishing gear)⁵³⁶ resulting in releases of secondary microplastics, and losses due to poor industry practices. Intentionally added microplastics could be targeted for elimination,⁵³⁷ but industry engagement may be slow. This could be addressed through voluntary phase-out programmes. Reducing the effects of abrasion requires design improvements. The parameters that may affect the release of fibres from clothing include fibre length, yarn twist, linear density (yarn count), fabric density, textile auxiliaries.⁵³⁸ Slow industry engagement in sustainable design principles⁵³⁹ could be addressed through the banning of intentionally added microplastics, the development of standards and regulations and the adoption of certification and labelling schemes.⁵⁴⁰ Examples are the development of design criteria for tyres to prevent abrasion may be based on standards already in place, such as ISO 9352:2012: Plastics — Determination of resistance to wear by abrasive wheels⁵⁴¹ and ASTM D4060 – 19: Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.⁵⁴² Legislation may prohibit the inclusion of microbeads in rinse-off personal care products, but definitions may exclude other non-rinse of personal care products. Non-cosmetic microbeads are often excluded, such as the industrial application in medicine, oil and gas exploration.⁵⁴³ However, the European Chemicals Agency (ECHA) has a proposal in progress to include “consumer and professional products in multiple sectors, including cosmetic products, detergents and maintenance products, paints and coatings, construction materials and medicinal products, as well as various products used in agriculture and horticulture and in the oil and gas sectors.”⁵⁴⁴ Industry losses of pellets are addressed in the same way as in the source materials life cycle phase.

247. The pressure influencing the **use phase of the life cycle** is poor consumer behaviour. The effect of providing alternatives that are less polluting⁵⁴⁵ is reduced in the absence of strong consumer awareness of the issues and of options available to them. Consumer choice is an important driver for product design change by industry. However, promotion of alternatives to polluting products is a control that could alleviate this pressure, together with awareness of the issues and choices available to consumers, including reducing their use of polluting products.⁵⁴⁶ The provision of eco-friendly alternatives on the market⁵⁴⁷ is important should prohibitions limit options for consumers, but also where market restrictions are not feasible. These options could be strengthened through certification and labelling schemes to drive responsible consumer choices.⁵⁴⁸ Awareness campaigns exist that could be expanded on, for example Beat the

⁵³⁰ EIA submission for response options

⁵³¹ <https://www.tangaroablue.org/pelletalertproject/zero-pellet-loss-through-operation-clean-sweep/>

⁵³² See, for example, <https://eippcb.jrc.ec.europa.eu/reference/production-polymers>

⁵³³ OSPAR, 2018. OSPAR Background document on pre-production Plastic Pellets. (Sections 5.3.1, 7.1).

⁵³⁴ <https://www.tomudall.senate.gov/news/press-releases/udall-introduces-legislation-to-prevent-corporations-from-dumping-plastic-pellets-into-the-oceans-and-other-waterways>

⁵³⁵ AHEG-1, Co-Chairs Summary, Annex I, para 8; UNEP/AHEG/2018/1/3

⁵³⁶ De Falco, F., Cocca, M., Avella, M., Thompson, R.C., 2020. *Microfiber Release to Water, Via Laundering, and to Air, via Everyday Use: A Comparison between Polyester Clothing with Differing Textile Parameters*. Environmental Science & Technology 54, 3288-3296.

10.1021/acs.est.9b06892 ; Eunomia, 2018. Investigating options for reducing releases in the aquatic environment of microplastics emitted by (but not intentionally added in) products.

⁵³⁷ UNEA Res 4/6, para 4a

⁵³⁸ https://www.plasticsoupfoundation.org/wp-content/uploads/2017/08/Position-Paper.Microfiber-release-from-clothes-after-washing.PSF_.pdf

⁵³⁹ Eunomia, 2018. Investigating options for reducing releases in the aquatic environment of microplastics emitted by (but not intentionally added in) products.

⁵⁴⁰ EIA, 2020. Convention on Plastic Pollution Toward a new global agreement to address plastic pollution.

⁵⁴¹ <https://www.iso.org/standard/55507.html>

⁵⁴² <https://www.astm.org/Standards/D4060.htm>

⁵⁴³ <https://www.bdlaw.com/publications/nationwide-ban-on-plastic-microbeads-in-cosmetics/>

⁵⁴⁴ <https://echa.europa.eu/it/-/echa-proposes-to-restrict-intentionally-added-microplastics>

⁵⁴⁵ UNEA Res. 4/9, para 2

⁵⁴⁶ <https://theconversation.com/ten-stealth-microplastics-to-avoid-if-you-want-to-save-the-oceans-90063>

⁵⁴⁷ UNEP, 2018b. SINGLE-USE PLASTICS: A Roadmap for Sustainability.

⁵⁴⁸ AHEG-1, Co-Chairs Summary, Annex I, para 8; UNEP/AHEG/2018/1/3

Microbead, an international campaign to remove microplastics from cosmetics,⁵⁴⁹ as well as Hubbub's campaign #WhatsInMyWash, providing options to consumers to reduce the impacts of washing their clothes while also placing a call to industry to assist in solving the problem,⁵⁵⁰ and the Ocean Clean Wash campaign initiated by the Plastic Soup Foundation in 2016.⁵⁵¹

Summary of upstream activities

248. The upstream pressures, controls, and barriers for national strategies to prevent pollution by microplastics are summarized in Table 22, providing insight into enabling conditions for this response option.

Table 22: Summary of upstream and midstream activities for national microplastics strategies

	Source Materials	Product Manufacture	Use
Pressures	<ul style="list-style-type: none"> Industry losses 	<ul style="list-style-type: none"> Intentionally added Abrasion Industry losses 	<ul style="list-style-type: none"> Poor consumer behaviour
Prevention Controls	<ul style="list-style-type: none"> Best practices for zero pellet loss 	<ul style="list-style-type: none"> Voluntary phase-out Eco-design 	<ul style="list-style-type: none"> Provide alternatives
Barriers	<ul style="list-style-type: none"> Low industry engagement 	<ul style="list-style-type: none"> Low industry engagement 	<ul style="list-style-type: none"> Poor consumer awareness
Barrier Controls	<ul style="list-style-type: none"> Include in environmental quality standards Mandate programme for industry best practice Certification and labelling scheme 	<ul style="list-style-type: none"> Bans for intentionally added Environmental standards Certification and labelling schemes. 	<ul style="list-style-type: none"> Certification and labelling schemes Awareness campaigns

Downstream activities

249. The pressure influencing the **end-of-life phase of the life cycle** is lack of options to capture microplastics before they are discharged to the environment. Knowledge on the primary sources of microplastics has increased greatly over recent years.⁵⁵² However, the solutions that best prevent each source are less well understood.⁵⁵³ This is particularly true for microfibres released from synthetic textiles. Research methods vary, further complicating comparison of the findings. For instance, studies have shown the shedding of microfibres and the ability for washing machine devices to capture them⁵⁵⁴ could be affected by different textile parameters⁵⁵⁵ including the porosity of the polymer,⁵⁵⁶ the type of washing machine (low water, front loader, top loader),⁵⁵⁷ the washing powder and fabric softener used.⁵⁵⁸ It is therefore important that further research is conducted in this regard in order to inform effective policy interventions. Specific devices have been developed and tested for effectiveness in capturing microfibers released during the washing of synthetic textiles. These include the Guppy Friend,⁵⁵⁹ the Cora Ball⁵⁶⁰ and the Lint LUV-R filter.⁵⁶¹ These options require spending by consumers post-purchase which might reduce uptake of that solution. This could be addressed through legislation that mandates the inclusion of washing machine filters by manufacturers prior to sale. Alternatively, performance criteria for washing machines and dryers could be developed for the capture of microplastics released from

⁵⁴⁹ <https://www.beatthemicrobead.org/>

⁵⁵⁰ <https://www.whatsinmywash.org.uk/>

⁵⁵¹ <https://www.oceancleanwash.org/campaign/>

⁵⁵² Connors, K.A., Dyer, S.D., Belanger, S.E., 2017. *Advancing the quality of environmental microplastic research*. Environmental Toxicology and Chemistry 36, 1697-1703. 10.1002/etc.3829

⁵⁵³ Swanberg, Å.S., Nordzell, H., Hasselström, L., 2019. The Ecodesign Directive as a driver for less microplastic from household laundry, Swedish Environmental Protection Agency.

⁵⁵⁴ McIlwraith, H.K., Lin, J., Erdle, L.M., Mallos, N., Diamond, M.L., Rochman, C.M., 2019. *Capturing microfibers – marketed technologies reduce microfiber emissions from washing machines*. Marine Pollution Bulletin 139, 40-45. <https://doi.org/10.1016/j.marpolbul.2018.12.012>

⁵⁵⁵ De Falco, F., Cocca, M., Avella, M., Thompson, R.C., 2020. *Microfiber Release to Water, Via Laundering, and to Air, via Everyday Use: A Comparison between Polyester Clothing with Differing Textile Parameters*. Environmental Science & Technology 54, 3288-3296. 10.1021/acs.est.9b06892

⁵⁵⁶ Browne, M.A., Ros, M., Johnston, E.L., 2020. *Pore-size and polymer affect the ability of filters for washing-machines to reduce domestic emissions of fibres to sewage*. PLoS ONE 15. doi.org/10.1371/journal.pone.0234248

⁵⁵⁷ Lant, N.J., Hayward, A.S., Peththawadu, M.M.D., Sheridan, K.J., Dean, J.R., *ibid.* *Microfiber release from real soiled consumer laundry and the impact of fabric care products and washing conditions*. 16. doi.org/10.1371/journal.pone.0233332

⁵⁵⁸ Carney Almroth, B.M., Åström, L., Roslund, S., Petersson, H., Johansson, M., Persson, N.-K., 2018. *Quantifying shedding of synthetic fibers from textiles; a source of microplastics released into the environment*. Environmental Science and Pollution Research 25, 1191-1199. 10.1007/s11356-017-0528-7 ; Pirc, U., Vidmar, M., Mozer, A., Kržan, A., 2016. *Emissions of microplastic fibers from microfiber fleece during domestic washing*. Environmental science and pollution research international 23, 22206-22211. <https://dx.doi.org/10.1007/s11356-016-7703-0>; De Falco, F., Gullo, M.P., Gentile, G., Di Pace, E., Cocca, M., Gelabert, L., Brouta-Agnés, M., Rovira, A., Escudero, R., Villalba, R., Mossotti, R., Montarolo, A., Gavignano, S., Tonin, C., Avella, M., 2018. *Evaluation of microplastic release caused by textile washing processes of synthetic fabrics*. Environmental Pollution 236, 916-925. 10.1016/j.envpol.2017.10.057

⁵⁵⁹ <https://guppyfriend.com/>

⁵⁶⁰ <https://coraball.com>

⁵⁶¹ McIlwraith, H.K., Lin, J., Erdle, L.M., Mallos, N., Diamond, M.L., Rochman, C.M., 2019. *Capturing microfibers – marketed technologies reduce microfiber emissions from washing machines*. Marine Pollution Bulletin 139, 40-45. <https://doi.org/10.1016/j.marpolbul.2018.12.012>

textiles.⁵⁶² The European Parliament has suggested the inclusion of filters in washing machines could be mandated under the Ecodesign Directive.⁵⁶³

250. Post-discharge **mitigative activities** include closing knowledge gaps with regard to the various sources and pathways of microplastic pollution. Capture of microplastics once they have left the source are mostly limited to wastewater treatment plants. It is estimated that municipal wastewater treatment facilities are the most significant pathway for microplastics to enter the marine environment⁵⁶⁴ and therefore the most effective point of capture. It is further estimated that sewage treatment processes could retain approximately 90% of microplastics, accumulating them in sludge.⁵⁶⁵ This sludge may then be used as fertiliser, releasing between 0.2 and 8 milligrams of microplastics per hectare per inhabitant to agricultural soils in Europe annually. This practice is therefore to be avoided. Germany is working towards prohibiting the use of sewage sludge as fertiliser.⁵⁶⁶ The Group of Chief Scientific Advisors has recommended that policy at the EU level be broadened to include prevention and reduction of microplastic pollution in water, air and soil.⁵⁶⁷ Upgrades to treatment plants require significant capital outlay. In addition, microplastics captured in sewage sludge could be used as fertilizer, contaminating soils with microplastics. Public-private partnerships could be considered for upgrades to treatment plants.⁵⁶⁸ Efforts are under way to prevent use of sewage sludge as fertilizer.

251. **Monitoring and evaluation** activities are a dominant feature of current efforts, characterized by research to estimate the rate of discharge from different sources, including sea-based sources, and the rate of capture by different technologies. This would assist in obtaining baseline data against which progress could be measured. Standard methods could be developed for the detection and monitoring of microplastics, including for releases from textiles⁵⁶⁹ and tyres.⁵⁷⁰ Some national guidelines are provided.⁵⁷¹

Research on the quantities of discharge may serve as baselines where none exist, such as:

- A per-capita discharge by mass of tyre abrasion ranges from 0.2 to 5.5 kg.⁵⁷²
- In the US, daily discharge of microplastics from wastewater treatment facilities ranged from ~50,000 to nearly 15 million particles, resulting in a release of over 4 million microparticles per facility per day.⁵⁷³
- In the EU, releases of intentionally added microplastics are estimated at 42,000 tonnes/year. Releases from infill material used in artificial turf pitches are estimated at 16,000 tonnes/year.⁵⁷⁴
- A number of baselines have been estimated in the EU for releases of pre-production pellets, automotive tyres, washing of synthetic textiles, artificial turf, road markings, building paint and from wastewater treatment facilities, together with estimated annual costs per tonne of prevention at source.⁵⁷⁵ Others are provided in *Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change*⁵⁷⁶ (see Table 5.5).
- In Hong Kong, treated sewage and stormwater effluents contained up to 10,816 pieces per m³ of microplastics with an average daily discharge rate of 3.5 mg per capita.⁵⁷⁷

⁵⁶² Swanberg, Å.S., Nordzell, H., Hasselström, L., 2019. The Ecodesign Directive as a driver for less microplastic from household laundry, Swedish Environmental Protection Agency.

⁵⁶³ ECDDPM, 2019. Sewing the pieces together: towards an eu strategy for fair and sustainable textiles. Discussion paper no. 264.

⁵⁶⁴ McCormick, A., Hoellein, T.J., Mason, S.A., Schluep, J., Kelly, J.J., 2014. *Microplastic is an Abundant and Distinct Microbial Habitat in an Urban River*. Environmental Science & Technology 48, 11863-11871. 10.1021/es503610r

⁵⁶⁵ Carr, S.A., Liu, J., Tesoro, A.G., 2016. *Transport and fate of microplastic particles in wastewater treatment plants*. Water Res. 91, 174–182. 10.1016/j.watres.2016.01.002

⁵⁶⁶ Stubenrauch, J., Ekardt, F., 2020. *Plastic Pollution in Soils: Governance Approaches to Foster Soil Health and Closed Nutrient Cycles*. Environments 7. 10.3390/environments7050038

⁵⁶⁷ EU, 2019. Environmental and Health Risks of Microplastic Pollution. Group of Chief Scientific Advisors Scientific Opinion 6/2019.

⁵⁶⁸ UNEP, 2019a. Addressing marine plastics: A systemic approach. Recommendations for action.

⁵⁶⁹ Swanberg, Å.S., Nordzell, H., Hasselström, L., 2019. The Ecodesign Directive as a driver for less microplastic from household laundry, Swedish Environmental Protection Agency.

⁵⁷⁰ <https://data.consilium.europa.eu/doc/document/ST-14649-2019-INIT/en/pdf>

⁵⁷¹ See Ministry of the Environment, JAPAN (2020).

Guidelines for Harmonizing Ocean Surface Microplastic Monitoring Methods. Available at: https://www.env.go.jp/en/water/marine_litter/guidelines/guidelines.pdf

⁵⁷² Baensch-Baltruschat, B., Kocher, B., Stock, F., Reifferscheid, G., 2020. *Tyre and road wear particles (TRWP) - A review of generation, properties, emissions, human health risk, ecotoxicity, and fate in the environment*. Science of The Total Environment 733, 137823. <https://doi.org/10.1016/j.scitotenv.2020.137823>

⁵⁷³ Mason, S.A., Garneau, D., Sutton, R., Chu, Y., Ehmann, K., Barnes, J., Fink, P., Papazissimos, D., Rogers, D.L., 2016. *Microplastic pollution is widely detected in US municipal wastewater treatment plant effluent*. Environmental Pollution 218, 1045-1054. <https://doi.org/10.1016/j.envpol.2016.08.056>

⁵⁷⁴ <https://echa.europa.eu/it/-/rac-backs-restricting-intentional-uses-of-microplastics>

⁵⁷⁵ Eunomia, 2018. Investigating options for reducing releases in the aquatic environment of microplastics emitted by (but not intentionally added in) products.

⁵⁷⁶ UNEP, 2016. *Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change*. United Nations Environment Programme, Nairobi. <http://www.unep.org/about/sgb/Portals/50153/UNEA/Marine%20Plastic%20Debris%20and%20Microplastic%20Technical%20Report%20Advance%20Copy.pdf>

⁵⁷⁷ Mak, C.W., Tsang, Y.Y., Leung, M.M.-L., Fang, J.K.-H., Chan, K.M., 2020. *Microplastics from effluents of sewage treatment works and stormwater discharging into the Victoria Harbor, Hong Kong*. Marine Pollution Bulletin 157, 111181. <https://doi.org/10.1016/j.marpolbul.2020.111181>

Summary of downstream activities

252. The downstream pressures, controls, and barriers for national strategies to prevent pollution by microplastics are summarized in Table 23, providing insight into enabling conditions for this response option.

Table 23: Summary of downstream activities for national microplastics strategies

	End-of-life	Mitigative Controls	Monitoring & Evaluation
Pressures	<ul style="list-style-type: none"> Lack of capture devices 	<ul style="list-style-type: none"> Knowledge gaps on sources, pathways and effective options for capture post-discharge 	<ul style="list-style-type: none"> Lack of baselines against which to measure progress
Prevention Controls	<ul style="list-style-type: none"> Install washing machine filters 	<ul style="list-style-type: none"> Research on sources, pathways and effective options for capture post-discharge 	<ul style="list-style-type: none"> Knowledge gaps on rate of discharge from various sources and pathways and rate of capture/prevention for different solutions
Barriers	<ul style="list-style-type: none"> Additional customer expense 	<ul style="list-style-type: none"> Costs of improvements to sewage and wastewater treatment plants Sewage sludge used as fertilizer 	<ul style="list-style-type: none"> Lack of standardised data to enable comparison
Barrier Controls	<ul style="list-style-type: none"> Mandate inclusion by manufacturers 	<ul style="list-style-type: none"> Regulations to prevent use of contaminated sewage sludge as fertilizer. 	<ul style="list-style-type: none"> Harmonised methods of monitoring discharge of microplastics and accumulation in environmental compartments

4.8.2. Analysis of indicators

Input indicators

253. The **scope** of a strategy to prevent microplastics is national, with some measures defined in legal instruments. National controls for microplastics have been taken by States across varied timelines. With the increasing recognition of the importance of controls to reduce the release of microplastics in recent decades, and with examples found in national action plans, the **maturity** of the concept is regarded as medium. The adoption and implementation of controls for microplastics is mostly limited to a small range of microbeads, constituting a small component of the total releases, providing a current **scale** rating low, but as adoption of national strategies increases, a scale rating of high could be achieved.

Process indicators

254. The overarching **management targets** adopted by States or suggested by professional international organisations (Operation Clean Sweep, for instance) include quantitative and qualitative values. No overall management targets have been set for microplastics in general, but some targets have been set for individual sources, particularly microbeads in cosmetics.

255. Some **operational targets** are adopted or suggested to achieve high-level management targets. Few targets have been set due to a need for further research. Examples of operational targets include:

- As the leading program for combating microplastic pollution by pre-production pellets, Operation Clean Sweep aspires to achieve zero pellet loss.
- Where microbeads are prohibited, the operational target is set at zero leakage.
- As required in the Australian voluntary phasing-out of microbeads from rinse-off cosmetic, personal care and cleaning products, the phasing-out should be completed by no later than 1 July 2018. Environment Ministers stated that if the voluntary phase-out was not effective, a ban would be implemented.

256. States recognize the importance of adequate and effective **capacity building and local development** programmes to enhance the outcomes of the implementation of a national strategy to prevent microplastic pollution. Increasing investment in research and development in areas directly relevant to achieving the goals of combating microplastics, as well as developing networks among different stakeholders are commonly targeted in existing national action plans. For example:

- For a better understanding of the Microbeads in Toiletries Regulations in Canada, the government provides retailers with useful information through pre-recorded webinar and information sheets.⁵⁷⁸
- For better understanding and implementation of the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) of EU, European Chemical Agency organised stakeholder workshop on intentional uses of microplastic particles.⁵⁷⁹
- PlasticsEurope organised an Operation Clean Sweep workshop in 2018; national plastics associations were involved to encourage the organisation of OCS workshops at the local level.⁵⁸⁰

257. Sufficient and **ongoing funding** remains an essential element to ensure effective outcomes of national management strategies for microplastics. Activities including product design, research and development, awareness raising are funded by national governments in practice. For example:

- To better understand marine litter including microplastics, the NOAA Marine Debris Program funds research projects across the United States for projects including its sources, its movement in the environment and impacts on the environment and economy.⁵⁸¹
- The Save Our Sea Act 2.0 (H.R. 3969/S. 1982 – SOS 2.0 Act) creates a Marine Debris Trust Fund available to NOAA to respond to certain marine debris events; it also creates a Marine Debris Foundation to support Marine Debris Program activities.
- Through the Canadian Plastic Innovation Challenge, the government is investing nearly Can\$ 19 million to support Canadian innovators and small businesses to develop solutions for plastics challenges. The targeted sectors include reducing microfibers from textiles, finding sustainable alternatives to plastic packaging, research on sustainable fishing and aquaculture gear and improving the compostability of bioplastics.⁵⁸²

258. **Monitoring** and assessment of the national situation of microplastics provides a scientific foundation for policy making and planning. Appropriate selection of criteria and indicators for data collection, surveying, monitoring and assessment are considered by States for better enforcement. For example:

- NOAA launched the Marine Debris Monitoring and Assessment Project under its Marine Debris Program, introducing diverse monitoring methods and tools. The Marine Debris Monitoring and Assessment Project is a citizen science initiative that engages partner organisations and volunteers to participate in shoreline marine litter surveys. It provides litter tracking software for mobile phones, a toolbox and monitoring protocol and guidance for participants.
- The San Francisco Bay Microplastics Project aims to develop critical baseline data and inform solutions. To achieve this aim, it determined a baseline for future monitoring of microplastics in San Francisco Bay, therefore establishing the first comprehensive assessment of quantities and characteristics of microparticles and microplastics in the San Francisco Bay environment.
- Result Area 8 of the Canadian Strategy on Zero Plastic Waste suggests effective research and monitoring systems could inform decision-making as well as performance measurement. Suggested research areas include the understanding of sources of microplastics pollution and its impacts on human health and the environment.
- According to the Australian government assessment on the industry-led voluntary phase out of microbeads from rinse-off cosmetic, personal care and cleaning products, a compliance and monitoring protocol was finalised to include actions to ensure that the phase-out continued to be effective on an ongoing basis.

259. The **reporting** mechanism is an essential part of the national strategy for microplastics as it allows Member States to efficiently evaluate and assess implementation and amend measures accordingly. Examples of reporting practices could be found in existing programmes.

- As a participant in the OCS programme, the Port of Antwerp will publish the Operation Clean Sweep Port of Antwerp Activity Report on a two-year cycle, where both polymer producers and logistics companies are involved. This series of reports covers actual pellet losses as well as preventive measures taken as a response to its zero-pellet loss commitment.
- OCS Blue provides for voluntary reporting by participating organisations.⁵⁸³
- Under the United States Marine Debris Act, Biennial Progress Reports are required. The report shall include the status of implementation, programs conducted and marine debris removal activities. The Interagency Marine Debris Coordinating Committee is in charge of the Biennial Progress Reports.

⁵⁷⁸ <https://www.youtube.com/watch?v=Jd9U2QiesbY&feature=youtu.be>

⁵⁷⁹ <https://echa.europa.eu/-/stakeholder-workshop-on-microplastic-particles>

⁵⁸⁰ https://issuu.com/plasticseuropeebook/docs/annualreport2018_plasticseurope_web

⁵⁸¹ NOAA Marine Debris Program, 2019. Accomplishments Report National Oceanic and Atmospheric Administration Marine Debris Program.

⁵⁸² <https://www.unenvironment.org/news-and-stories/story/canada-leads-push-safeguard-worlds-oceans>

⁵⁸³ <https://www.opcleansweep.org/pledge/ocs-blue/>

- Under the Canadian Zero Plastic Waste Initiative, a list of reporting items is provided which could include microplastics:⁵⁸⁴
 - kilograms of plastic litter diverted (captured or removed) from the environment
 - number of partners or organizations participating/ contributing to the project
 - number of participants or Canadians reached
 - number of best practices or tools developed leading to plastic pollution prevention/ reduction
 - number of tools developed/ adopted to assess plastic pollution
 - number of citizen science initiatives developed/ implemented
 - total number of sites at which data were collected.

260. **Evaluation and review** are included in national management strategies as a response to changing conditions in implementation. Evaluation and review are included in most American states' action plans on marine litter. Progress on reduction of microplastics pollution could be a component of these reviews. Examples of these practices include:

- Two progress check-ins annually are included in the 2020 Great Lake Marine Debris Action Plan, allowing participants to share information on measures and actions. The NOAA Marine Debris Program will also facilitate a mid-plan review and evaluation to better understand which goals, objectives, and actions are well supported and achievable, while some may require further assistance.
- The overall duration for both the 2019 Oregon Marine Debris Action Plan and the 2018 Washington Marine Debris Action Plan are six years, with a two-year operational cycle. At the end of an operational cycle, partners will participate in workshops to update these Action Plans.

261. To have **domestic stakeholders included** in the process of decision making is critical for better implementation results. Many domestic processes include this element:

- In its process of adopting the Microbeads in Toiletries Regulations, the Canadian government published the proposed Microbeads in Toiletries Regulations in the Canada Gazette (Part I: Vol. 150, No. 45 – November 5, 2016) for a 75-day public comment period.
- Under the Netherland: Plastics Pact NL 2019-2025, stakeholder participation is strongly demonstrated in measures and actions to achieve the objectives in this Plastic Pact (article 1). Specifically, as provided in article 7, civil society organisations, regional and local authorities, trade associations, technology suppliers, knowledge institutions could participate in working groups to facilitate the successful implementation of the Plastics Pact.
- In the Australian voluntary phase out of microbeads from rinse-off cosmetic, personal care and cleaning products, the national industry association represented a variety of stakeholders including manufacturers and suppliers of hygiene, cosmetic and specialty products, their raw material suppliers and service providers.

262. **International capacity building** promotes exchange of information, statistics and experience regarding microplastic control, prevention and reduction. Technology transfer, experience and information sharing, as well as robust scientific research are possible through international cooperation between States. Examples of international cooperation on capacity building for prevention of microplastics pollution include:

- Under the Netherland: Plastics Pact NL 2019-2025, the Ministry of Infrastructure and Water Management encourages internationally operating Plastics-Using Companies to share at international level the knowledge and experience gained in circular design tracks, and the Ministry Infrastructure and Water Management will support them in disseminating knowledge.
- In 2015, the European Commission adopted an EU Action Plan for A Circular Economy. The supporting document, the European Strategy for Plastics in a Circular Economy, notes that international action will remain key to tackling the most significant sources of plastics litter in the oceans, i.e. insufficient waste management infrastructure in developing countries and emerging economies.

263. Combating microplastics in the environment is the aim of national management strategies for microplastics. **Environment benefits** are therefore the most relevant positive outcomes of their implementation. The most discussed **social benefits** in national management strategies for microplastics is public health. Examples of this positive outcomes include:

- The Hawai'i Marine Debris Action Plan (first published in 2010), was the first of its kind in the United States that aimed to reduce the ecological, health and safety impacts of all marine debris in the Hawai'ian islands by 2020.
- As the independent scientific advice to the European Commission to inform policy making, the Group of Group of Chief Scientific Advisors provided scientific advice on the risks and its impact on the environment and human health from microplastic pollution, albeit in the absence of comprehensive and detailed evidence.

⁵⁸⁴ <https://www.canada.ca/en/environment-climate-change/services/environmental-funding/programs/zero-plastic-waste-initiative.html>

The Group subsequently published a report on Environmental and Health Risks of Microplastic Pollution in 2019.⁵⁸⁵

- Due to the concern about microbeads used in consumer products that enter the waterways with potential long-term risks to marine organisms and human health, Australia launched the industry-led, voluntary phase out of microbeads from rinse-off cosmetic, personal care and cleaning products.

264. The most discussed **economic benefit** in national management strategies for microplastics is the creation and maintenance of a circular economy. Examples of this positive outcomes include the Hawai'i Marine Debris Action Plan, mentioned above, which aims to reduce the economic impacts of marine debris in the Hawai'ian islands by 2020. The European Strategy for Plastics in a Circular Economy aims to achieve a modern, low-carbon, resource and energy-efficient economy and will make a tangible contribution to reaching the 2030 Sustainable Development Goals and the Paris Agreement.

Performance indicators

265. Loss of microplastics into the environment, including pre-production pellets, is not well quantified.⁵⁸⁶ Determining the effectiveness of controls and the setting of operational and reduction targets may be difficult, except where elimination is targeted through bans. Baselines need to be set for release, capture and accumulation rates for the different sources. Preliminary data is available which could act as baseline estimates.

Examples of measures in place:

- USA Microbead-Free Waters Act of 2015⁵⁸⁷ prohibits the manufacturing, packaging, and distribution of rinse-off cosmetics containing plastic microbeads.
- Canada – (2015) microbeads added to the List of Toxic Substances managed by the Government under the *Canadian Environmental Protection Act, 1999*. Information was gathered to identify uses & sources of microbeads, including options for those not required to report but considered a stakeholder to complete a voluntary Declaration Stakeholder Interest form.⁵⁸⁸
- ECHA's proposal to restrict the use of microplastics that are intentionally added to products on the EU/EEA market, in concentrations of more than 0.01 % weight by weight.⁵⁸⁹
- Austria - legislation classifies plastic as a filterable substance. A discharge limit of 30 mg/L as set by the legislation potentially permits emissions of 94.5 tons/year.⁵⁹⁰
- NPDES regulations for storm-water discharge, published by the US EPA in 1990, define plastic pellet discharges as significant and therefore should be subject to regulations requiring industries to obtain NPDES permits under the Clean Water Act for storm sewers that lead to public waterways.⁵⁹¹
- California State Water Board adopted an official definition of microplastics in drinking water, providing a basis for further work at the Water Board under the California Safe Drinking Water Act (Act). In addition, the Water Board is required to establish a standard methodology for four years of testing of drinking water and reporting of results, including public disclosure of the findings.⁵⁹²
- Australia Government aimed to secure a voluntary agreement from industry to phase out microbeads in personal care, cosmetic & cleaning products within two years (no later than 1 July 2018). This is supported by a monitoring and assurance protocol outlining the government's expectations of the relevant Industry Association. The relevant Industry Association awareness campaign promoted industry engagement.⁵⁹³
- Cosmetics Europe published a recommendation to members to discontinue use of plastic microbeads for cleansing and exfoliating purposes in wash-off cosmetic & personal care products.
- A new labelling scheme is in place in the EU for car and truck tyres which aim to increase consumer awareness on abrasion. Labels must be clearly visible to consumers, including at point of sale and online, and include a QR code.⁵⁹⁴

⁵⁸⁵ EU, 2019. Environmental and Health Risks of Microplastic Pollution. Group of Chief Scientific Advisors Scientific Opinion 6/2019.

⁵⁸⁶ Eunomia, 2018. Investigating options for reducing releases in the aquatic environment of microplastics emitted by (but not intentionally added in) products.

⁵⁸⁷ <https://www.congress.gov/bill/114th-congress/house-bill/1321/text>

⁵⁸⁸ <http://canadagazette.gc.ca/rp-pr/p1/2015/2015-08-01/html/notice-avis-eng.html>

⁵⁸⁹ <https://echa.europa.eu/it/-/rac-backs-restricting-intentional-uses-of-microplastics>

⁵⁹⁰ Lechner, A., Ramler, D., 2015. *The discharge of certain amounts of industrial microplastic from a production plant into the River Danube is permitted by the Austrian legislation*. Environ. Pollut. 200, 159-160.

⁵⁹¹ US EPA, 1992. Plastic Pellets in the Aquatic Environment: Sources and Recommendations - Final Report. EPA842-B-92-010. United States Environmental Protection Agency, Office of Water (WH556F). See <https://www.epa.gov/npdes/about-npdes>

⁵⁹² https://www.waterboards.ca.gov/press_room/press_releases/2020/pr06162020_microplastics.pdf

⁵⁹³ <https://accord.asn.au/sustainability/beadrecede/>

⁵⁹⁴ <https://www.europarl.europa.eu/news/en/press-room/20200512IPR78920/new-tyre-labels-to-include-information-on-energy-consumption-and-grip>

- A pilot project is proposed involving an OCS certification system to be jointly developed by PlasticsEurope and its member companies, including a third-party auditing programme as part of existing environmental or quality management systems.⁵⁹⁵
- OCS launched in Australia by NGO Tangaroa Blue⁵⁹⁶

Examples of guidelines and research for methodologies:

- Review of BAT and BEP in Urban Wastewater Treatment Systems focusing on the reductions and prevention of stormwater related litter, including micro-plastics, entering the Marine Environment.⁵⁹⁷
- Guidelines for the Monitoring and Assessment of Plastic Litter and Microplastics in the Ocean.⁵⁹⁸
- Laboratory Methods for the Analysis of Microplastics in the Marine Environment.⁵⁹⁹
- Methodology to monitor riverine inputs of microplastics.⁶⁰⁰
- Recommendations for atmospheric microplastic sampling and measurement.⁶⁰¹
- Review and assessment of data quality for microplastics in freshwaters and drinking water.⁶⁰²
- Review of methodologies used to collect, quantify, and characterize microplastics in both wastewater and drinking water.⁶⁰³
- Some problems and practicalities in design and interpretation of samples of microplastic waste.⁶⁰⁴
- Primary Microplastics in the Oceans: a global evaluation of sources.⁶⁰⁵

Examples of quantitative outcomes include:

- OCS action plan developed for the Port of Antwerp resulted in a reported decrease in volume of losses from 15m³ in 2017 to 7m³ in 2018.⁶⁰⁶
- PlasticsEurope adopts new Operating Rules in June 2019, making OCS compulsory for all members from January 2020.⁶⁰⁷
- ECHA's proposal to restrict the use of microplastics is expected to prevent over 90 % of current releases, equivalent to 500,000 tonnes of microplastic over a 20-year period.⁶⁰⁸
- Cosmetics Europe's recommendation led a decrease of 97.6% (4250 tons) in the use of plastic microbeads for cleansing and exfoliating purposes in wash-off cosmetic and personal care products (2012-2017).⁶⁰⁹
- The Australia Government's voluntary agreement assessed that 94% of all products surveyed contained no microbeads or other non-soluble plastic polymers. Some categories of rinse-off products, such as body washes, did not contain any microbeads or other non-soluble polymers. It was determined that legislation is not needed at this stage.⁶¹⁰
- A certification scheme for the EU labelling scheme for car and truck tyres is estimated to reduce a cumulative 600,000 tonnes to surface waters in the EU for the years 2017 to 2035 and is estimated to be the most cost-effective⁶¹¹
- Filters reduced polyester fibres in effluent by > 65% (micrometre-sized pores) 74% (millimetre-sized pores).⁶¹²

⁵⁹⁵ PlasticsEurope, 2019. Operation Clean Sweep@ Port of Antwerp Activity Report 2019.

⁵⁹⁶ <https://www.tangaroablue.org/pelletalertproject/operation-clean-sweep-australia/>. See also <http://www.opcleansweep.org.au/>

⁵⁹⁷ OSPAR, 2019a. Review of BAT and BEP in Urban Wastewater Treatment Systems focusing on the reductions and prevention of stormwater related litter, including micro-plastics, entering the Marine Environment

⁵⁹⁸ GESAMP, 2019. Guidelines for the Monitoring and Assessment of Plastic Litter in the Ocean.

⁵⁹⁹ Masura, J., Baker, J., Foster, G., Arthur, C., 2015. Laboratory Methods for the Analysis of Microplastics in the Marine Environment: Recommendations for quantifying synthetic particles in waters and sediments (NOAA Technical Memorandum NOS-OR&R-48).

⁶⁰⁰ Coalition Clean Baltic, 2017. Guidance on concrete ways to reduce microplastic inputs from municipal stormwater and waste water discharges, Uppsala, Sweden.

⁶⁰¹ Zhang, Y., Kang, S., Allen, S., Allen, D., Gao, T., Sillanpää, M., 2020. *Atmospheric microplastics: A review on current status and perspectives*. Earth-Science Reviews 203, 103118. <https://doi.org/10.1016/j.earscirev.2020.103118>

⁶⁰² Koelmans, A.A., Mohamed Nor, N.H., Hermesen, E., Kooi, M., Mintenig, S.M., De France, J., 2019. *Microplastics in freshwaters and drinking water: Critical review and assessment of data quality*. Water Research 155, 410-422. <https://doi.org/10.1016/j.watres.2019.02.054>

⁶⁰³ Elkhatib, D., Oyanedel-Craver, V., 2020. *A Critical Review of Extraction and Identification Methods of Microplastics in Wastewater and Drinking Water*. Environmental Science & Technology 54, 7037-7049. [10.1021/acs.est.9b06672](https://doi.org/10.1021/acs.est.9b06672)

⁶⁰⁴ Underwood, A.J., Chapman, M.G., Browne, M.A., 2017. *Some problems and practicalities in design and interpretation of samples of microplastic waste*. Analytical Methods, 1332-1345. [10.1039/C6AY02641A](https://doi.org/10.1039/C6AY02641A)

⁶⁰⁵ IUCN, 2017. *Primary Microplastics in the Oceans: a Global Evaluation of Sources*. International Union for Conservation of Nature (IUCN). [dx.doi.org/10.2305/IUCN.CH.2017.01.en](https://doi.org/10.2305/IUCN.CH.2017.01.en)

⁶⁰⁶ PlasticsEurope, 2019. Operation Clean Sweep@ Port of Antwerp Activity Report 2019.

⁶⁰⁷ Ibid.

⁶⁰⁸ <https://echa.europa.eu/it/-/rac-backs-restricting-intentional-uses-of-microplastics>

⁶⁰⁹ <https://cosmeticseurope.eu/news-events/over-97-plastic-microbeads-already-phased-out-cosmetics-cosmetics-europe-announces/>

⁶¹⁰ <https://www.environment.gov.au/protection/waste-resource-recovery/publications/assessment-voluntary-phase-out-microbeads>

⁶¹¹ Eunomia, 2018. Investigating options for reducing releases in the aquatic environment of microplastics emitted by (but not intentionally added in) products.

⁶¹² Browne, M.A., Ros, M., Johnston, E.L., 2020. *Pore-size and polymer affect the ability of filters for washing-machines to reduce domestic emissions of fibres to sewage*. PLoS ONE 15. doi.org/10.1371/journal.pone.0234248

- The Lint LUV-R has been shown to capture an average of 87% of by count in washing machines, while the Cora Ball captures 26% by count.⁶¹³
- An overall efficiency of 79% in terms of particle number and 89% in terms of particle mass was estimated for biofiltration at wastewater treatment facilities.⁶¹⁴

Summary of indicators

266. The assessment of instruments and measures relevant to a national strategy to prevent pollution by microplastics are summarized in Table 24, providing insight into the input, process and performance of this response option.

Table 24: Summary of indicators for national microplastics strategies

Indicator Type	Indicator	Description	Evaluation
INPUT	Scope	International, regional or national	National
	Maturity	Operational years - high, medium, low	Low – national strategies are not well-established. Some level of confidence is provided from instruments adopted in a small number of Member States.
	Scale	Level of adoption	Small - limited adoption of measures targeting a small range of sources at the national and subnational level.
PROCESS	Governance	Management targets	Low – No high-level targets set for microplastics in general or for categories, such as primary, secondary, etc.
		Operational targets	Low – Not many adopted beyond a few examples of zero pellet loss and zero discharge of microbeads.
	Management	Local capacity building	Yes – where measures have been adopted, education has generally been provided.
		Ongoing funding secured	Yes – where binding measures have been adopted, some secured funding has been provided by governments. Industry-led initiatives are funded by industry.
		Monitoring in place	Yes – Where measures are in place, these are accompanied by monitoring programmes. Research on emissions could serve as baselines for some sources.
		Reporting in place	Yes – Where measures are in place, these are accompanied by reporting requirements. Baselines and indicators are required against which to measure progress.
	Review process defined	Yes – mostly biannual, some mid-term reporting where timeframes are specified for action plans.	
Co-operation	Domestic stakeholder inclusion	Yes – public comment periods are provided for binding measures. Civil society and industry engagement are strong.	
	International capacity building	Yes – this is limited for activities specific to microplastics.	
Co-benefits recognised	Environmental Social Economic	Yes – inherent to the objectives Yes – limited. Protecting human health is listed despite poor evidence of harm.	

⁶¹³ McIlwraith, H.K., Lin, J., Erdle, L.M., Mallos, N., Diamond, M.L., Rochman, C.M., 2019. *Capturing microfibers – marketed technologies reduce microfiber emissions from washing machines*. Marine Pollution Bulletin 139, 40-45. <https://doi.org/10.1016/j.marpolbul.2018.12.012>

⁶¹⁴ Fan Liu, F., Nord, N.B., Bester, K., Vollertsen, J., 2020. *Microplastics Removal from Treated Wastewater by a Biofilter*. Water Air Soil Pollut. 12. 10.3390/w12041085

			Yes – limited. Included in recognition of economic impacts from all marine litter.
PERFOR- MANCE	Outputs	Legislation, guidelines, research	Yes – a number of policy and legislative examples exist, but for a limited range of products. Some definitions developed.
	Outcomes		Yes – guidelines are limited to monitoring methodologies. Some quantitative research on discharge rates that could serve as baselines.

4.8.3. Discussion on effectiveness

267. The above analysis of measures to address the life cycle, together with the analysis of indicators, informs the following assessment of the effectiveness of a national strategy to prevent pollution by microplastics in contributing to the global goal of elimination of discharge of marine litter and microplastics to the ocean.

Maturity

268. **Low.** This response option has not been adopted as a holistic strategy, but there are examples of limited adoption or inclusion of individual measures by Member States, including within NAP-MaLis, which are discussed in section 5.6 above.

Feasibility

269. **Medium.** Feasibility has been demonstrated through a limited number of national practices for particular sources only. To provide a holistic and full life cycle approach addressing all sources, a number of additional measures would be needed that include developing design standards, labelling and certification schemes and possibly amending environmental quality standards. With limited national strategies in place specific to prevention of microplastic pollution, or clear inclusion in NAP-MaLis, the feasibility of this response option is medium.

Time frame

270. **Medium to long.** Some measures may require less time to implement, whereas others such as development of standards and certification schemes could take longer and require ongoing administration.

Impact

271. **High.** Effective national strategy to prevent pollution by microplastics could address most pressures and barriers identified across all actors within the life cycle. A microplastics strategy would operate at the national and subnational level, but wider adoption by Member States could greatly increase impact on a global scale.

Overall comments

272. To be effective, a national strategy to prevent pollution from microplastics would require additional research into the generation of microplastic pollution across all life cycle phases and applications. This would assist in setting trusted baselines and development of robust monitoring and evaluation tools.

273. Product design that creates fewer microplastics in the manufacture and use phases could present challenges, reducing the overall effectiveness of the response option. However, greater adoption of bans and voluntary phase-out of intentionally added microplastics, as well as adoption of best practices for pellet loss, could increase the effectiveness of the response option the shorter term.

274. Due to the features of microplastics (difficult to trace and high mobility), technology transfer and capacity building for monitoring would be required.

5. Summary of the global contribution of response options

275. Findings are summarized in Table 25, providing an overview of the contribution of the response options to solving the global problem. The factors influencing effectiveness are summarized.

Explanation of the ratings used:

Scale	<p>High = near-global adoption</p> <p>Medium = strong adoption at the national or regional level.</p> <p>Small = limited adoption at the national and subnational level</p>	Feasibility	<p>High = feasibility has been demonstrated</p> <p>Med = feasibility has been demonstrated, but requires additional factors to be in place</p> <p>Low = feasibility has not yet been demonstrated, has potential, but requires additional factors to be in place</p>
Maturity	<p>High = well-established over many years in many Member States</p> <p>Medium = well-established for over a few years in only a few Member States</p> <p>Low = not well-established yet in many Member States, recent examples exist.</p>	Impact	<p>High = addresses most pressures and barriers, could scale well</p> <p>Med = addresses some pressures and barriers, can possibly scale well</p> <p>Low = addresses a small number of pressures and barriers, may be challenging to scale</p>

Table 25: Summary of the contributions of response options to solving the global problem

Response option (existing or potential)	Scope	New, existing, strengthen	Primary life cycle phase	Primary geographic range	Environmental zone	Scale	Maturity	Feasibility	Impact	Factors influencing effectiveness
Strengthen existing global framework (potential)	I	S	All	All	All	High	High	Medium	High	Instruments are strengthened within their mandate. A global body/platform is needed to coordinate activities and reporting across instruments. Barriers of lack of enforcement, limited national bodies dedicated to the issue and lack of funding may not be addressed.
Global design standards (potential)	I	N	All	All	All	Medium - High	Low	Medium	High	Strong technical support and engagement with multiple actors across the life cycle are needed. Strong governmental support is needed to establish an enabling political and economic

Response option (existing or potential)	Scope	New, existing, strengthen	Primary life cycle phase	Primary geographic range	Environmental zone	Scale	Maturity	Feasibility	Impact	Factors influencing effectiveness
										environment that incentivises industry investment. Slow integration of global design standards in national standards and legislation could limit effectiveness.
New international framework (potential)	I	N	All	All	All	High	Low	Medium	High	Needs a global approach to capacity-building and funding for NAP development. Effectiveness is enhanced by developing standards for sustainable design. This requires engagement of multiple actors across the life cycle to develop appropriate and effective global design standards, global targets and indicators. Effectiveness may be limited by lack of information across all actors in the value chain and all life cycle phases.
Strengthen existing regional framework (potential)	R	S	All	All	Fresh-water, marine	High	High	High	High	Fourteen Regional Seas have adopted binding conventions (13 are in force), nine Regional Seas have adopted protocols to prevent marine pollution from land-based sources (five are in force). Limited adoption of regional dumping protocols. Currently dominant in the post-discharge phase of monitoring, with some providing a mandate to implement upstream preventive measures. Strong engagement with industry and capacity-building in this regard is needed.
Regional marine litter action plans (existing)	R	E	End-of-life, monitoring	Entire water catchment, forests or mangroves, freshwater rivers and lakes, urban environment, waste disposal sites coastal	Fresh-water, marine	High	High	High	High	RAP-MaLis are dominant in the post-discharge areas of monitoring and removal. The life cycle phases of source materials, product manufacture and use could be strengthened, but opportunities to engage with industry in upstream preventive measures may be limited. The effectiveness could be constrained by limited funding at the regional level, as well as lack of capacity, technologies and facilities at the national level.

Response option (existing or potential)	Scope	New, existing, strengthen	Primary life cycle phase	Primary geographic range	Environmental zone	Scale	Maturity	Feasibility	Impact	Factors influencing effectiveness
				zones, maritime areas within national jurisdictions						Capacity-building is focused on monitoring and removal activities and could be strengthened for policy and regulatory interventions for upstream prevention.
National marine litter action plans (existing)	N	E	End-of-life	All	Land, fresh-water, marine	Small	Medium	Medium	High	Adoption of NAP-MaLis is low. Management and operational targets should cover all life cycle phases. Effectiveness is limited by knowledge gaps, as well as lack of standardized monitoring and reporting to inform design and review processes. Promotion and support of research on policy interventions, including socio-economic studies, could enhance effectiveness.
Strengthen solid waste management using regulatory & market-based instruments (existing)	N	E	Product manufacture, end-of-life	Urban environment, waste disposal sites, coastal zones, maritime areas within national jurisdictions	All	Small	High	Medium	High	There is a need for extensive stakeholder engagement in the design phase and strong government enforcement during implementation. Many mature examples exist in Member States. Careful consideration needs to be given to the impact on small and medium-sized enterprises (SMEs) and the informal sector of formalizing collection and sorting systems.
Microplastics (potential)	N	N	All	All	All	Small	Low	Medium	High	Effectiveness is reduced by lack of knowledge on all sources and pathways. Improvements to product design may be challenging, but consideration to the elimination of pollution by intentionally added microplastics and pellets should be given as a high priority. Technology transfer and capacity-building are required to ensure robust monitoring methods.

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