

# **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.**

Note by the Secretariat

## **I. Introduction**

1. At its first meeting in Nairobi 29-31 May 2018, the Ad Hoc open-ended Expert Group on marine litter and microplastics, requested the Secretariat to consolidate the four background discussion papers<sup>1</sup>, drawing on the four Information Documents<sup>2</sup>, to facilitate discussions at its second meeting in 2019. The four discussion papers are:

- a) “Barriers to combating marine litter and microplastics, including challenges related to resources in developing countries” (UNEP/AHEG/2018/1/2), which provides information on legal, financial, technological and information barriers and the challenges related to resources in developing countries;
- b) “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), which presents information on four, non-exclusive response categories: legal and policy, technological, economic, and educational and informational. Indicative examples of each category, at the national, regional and international level, are given, with reference made to those which could be mutually supportive according to different socio-economic circumstances. The paper contains an annex of submissions from member States on existing policies and activities;
- c) “Environmental, social and economic costs and benefits of different response options” (UNEP/AHEG/2018/1/4), which looks at future options to better address marine litter and microplastics, both binding and non-binding. The paper mainly focuses on international policy response options include: maintaining the status quo but strengthening the implementation of current efforts (Option 1); reviewing and revising existing frameworks to address marine plastic litter and microplastics with the addition of a component to co-ordinate industry (Option 2); and creating a new global architecture with a multi-layered governance approach, in two phases (Option 3). There is also a short summary of the economic, social and environmental impacts and costs of marine plastic litter; and
- d) “Feasibility and effectiveness of different response options” (UNEP/AHEG/2018/1/5) examines the technical and political feasibility of the three international policy options, and the degree to which the instrument or policy is successful in reaching the intended goal of reducing marine litter and plastics.

2. The discussion papers and this consolidated paper also draw upon the following three Information Documents:

- a) “Marine plastic debris and microplastics: global lessons and research to inspire action and guide policy change” (UNEP 2016; UNEP/AEHG/2018/INF/), which was mandated by the first

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<sup>1</sup>UNEP/AHEG/2018/1/2; UNEP/AHEG/2018/1/3; UNEP/AHEG/2018/1/4; UNEP/AHEG/2018/1/5

<sup>2</sup>UNEP/AEHG/2018/INF/3; UNEP/AEHG/2018/INF/4; UNEP/AHEG/2018/1/INF/5

session of the UN Environment Assembly<sup>3</sup> and provides a broad overview of the state of our knowledge on the sources, fate and effects of marine plastics and microplastics, and sets out a number of approaches and potential solutions to address this multifaceted conundrum;

- b) “Combating marine plastic litter and microplastics: an assessment of the effectiveness of relevant international, regional and sub regional governance strategies and approaches – a summary for policymakers” (UN Environment 2017; UNEP/AHEG/2018/1/INF/3), which was prepared in response to a resolution at the second session of the UN Environment Assembly<sup>4</sup> and examines 18 international and 36 regional instruments based on their objectives of pollution prevention, protection of biodiversity and species or chemicals and waste management. It concludes that the main overarching problem is the absence of an international legal instrument where marine litter is the primary objective. This had led to an absence of institutions with mandates to coordinate efforts under different agreements, monitor progress or establish global targets and standards for marine litter and plastics. As a consequence, current governance strategies and approaches are fragmented and do not address such issues as the global extraction of raw materials, design and use phases of plastic polymers, or handling of hazardous additives in final treatment and disposal processes; and
- c) the report prepared by the Secretariat of the Basel, Rotterdam and Stockholm Conventions entitled “Possible options available under the Basel Convention to further address marine plastic litter and microplastics” (UNEP/AHEG/2018/1/INF/5), which presents possible actions under the Basel Convention to further address marine plastic litter and microplastics for consideration by the Conference of the Parties to the Basel Convention at its fourteenth meeting, in 2019.

3. This consolidated paper presents the issues and options set out in the four background papers and three reports as discussed by the Ad hoc Expert Group in the following sections: II. Background to the issues; III Barriers to action, gaps and success factors; IV. National, regional and international response options; V. Environmental, social and economic costs and benefits of different, international policy response options; and VI. Feasibility and effectiveness of different, international policy response options.

## **II. Background to the issues**

4. For the past 60 years, plastics have brought economic, environmental and social advantages. However, the growth in use and promotion of disposable products have caused an exponential increase in the amount of plastic waste generated by both land- and sea-based activities, creating significant economic, environmental and social issues. Dealing with this, as well as addressing the legacy of waste and plastic pollution is a daunting task and will require concerted actions at all levels of governance and across multiple geographic scales.

5. In its first two sessions, the United Nations Environment Assembly of the United Nations Environment Programme adopted two resolutions, calling for reports on research and gaps in knowledge on marine plastic litter and microplastics, and on the effectiveness of relevant governance strategies and approaches. At the third session of the United Nations Environment Assembly, it was decided to establish an Ad hoc open-ended Expert Group on marine litter and marine plastics, which would discuss the findings of these reports and further examine the barriers to and options for combating marine plastic litter and

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<sup>3</sup> UNEP/EA.1/Res.6

<sup>4</sup> UNEP/EA.2/Res.11

microplastics, especially from land-based sources<sup>5</sup>. The group was to meet at least once before the fourth session of the Environment Assembly in 2019, when it would present its findings.

6. The reports and discussion papers prepared for United Nations Environment Assembly and the Ad hoc open-ended Expert Group, underscore the strong moral case for not allowing the oceans to become polluted by plastics, stressing the importance of taking social attitudes into account, when designing strategies and policies to tackle the problem. In two background reports highlighted the need for i) an improved governance framework, ii) greater stakeholder engagement, iii) better identification of the sources and leakage of plastics into the marine environment, iv) improvements to solid waste management, v) implementation of appropriate reduction, recovery and restoration measures, vi) greater understanding of the impacts of macro-plastics and the uncertainties around microplastics on economic sectors, human health, trophic flows and sensitive habitats, vii) strengthening and harmonising monitoring methods, viii) improved administrative and regulatory capacities, and ix) introduction of global standards and definitions to streamline approach and assess the effectiveness of different policies and measures.

7. The reports also identified a wide range of research needed to support future response options, including on i) the effectiveness of different types of governance mechanisms, ii) properties of plastics in marine environments, including the factors controlling degradation, iii) how to minimize the use of additives, iv) sources (including those arising from catastrophic events), presence, transport, fate and pathways of macro- and microplastics in the marine ecosystems, v) risk and uncertainty assessment methods, and vi) the economics of recycling and demand for plastic and recycled products.

8. The resolutions adopted by the United Nations Environment Assembly, and the creation of the Ad hoc open-ended Expert Group represent the latest step in a long journey to tackle the problem of marine litter. Beginning in 1995, when member States adopted the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, marine litter has been identified as one of the key source categories of marine pollution. It is now one of the most prominent issues on the international agenda, reinforced by the adoption of a dedicated sustainable development goal and target on pollution in the oceans (Sustainable Development Goal 14, target 14.1<sup>6</sup>) by the United Nations General Assembly, the launching of the Global Partnership on Marine Litter in 2012 based on the Honolulu Strategy and Commitment<sup>7</sup>, and other initiatives such as the UN Environment CleanSeas campaign.

9. The Global Partnership on Marine Litter is especially important as it provides a comprehensive package of contributions aimed at reducing the impacts of marine litter worldwide, enhancing international cooperation and coordination through the Honolulu Strategy and Commitment – a multi-stakeholder pledging process, promoting knowledge management, information sharing and monitoring progress of the strategy, promoting resource efficiency and economic development through waste prevention (reduce, re-use, recycle and re-design) and recovery of valuable material and/or energy from waste, increasing awareness on sources of marine litter, their fate and impacts, assessing emerging issues connected to the fate and potential influence of marine litter, including microplastics uptake in the food web and associated transfer of pollutants and impacts, and the conservation and welfare of marine fauna.

10. Over this same period, numerous reports and conferences on oceans began reporting on the pervasive nature of marine litter and plastics, underscoring the fact that micro- and macro-plastics can now be found in every ocean, on the deep ocean floor and in the most remote parts of the world. With plastic

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<sup>5</sup> UNEP/EA.3/Res.7

<sup>6</sup> Sustainable Development Goal target 14.1 “by 2025, prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution”.

<sup>7</sup> The three global multi-stakeholder partnerships under the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities include: Global Partnership on Nutrients, Global Partnership of Marine Litter and the Global Wastewater Initiative.

production now projected to increase by up to 40 per cent over the next 10 years, achievement of the Sustainable Development Goal reduction target 14.1, and other pollution reduction targets presents a particularly difficult challenge.

11. The Ad hoc Expert Group recognises that tackling marine litter and microplastics will require an holistic approach, involving legal frameworks, incentives, the adoption of waste management plans and many other actions by national and local governments, robust international cooperation, continued active engagement by civil society in informing the public, generation of new knowledge, greater transparency and accountability, and the development and scaling up of innovative and successful solutions.

12. Governments, civil society and businesses have been stepping up their efforts in these areas. Examples such as the adoption in 2018 by the European Commission of a bold strategy on plastic pollution, entitled “A European Strategy for Plastics in a Circular Economy”, and the adoption of measures to reduce plastic pollution by Governments across the globe, including those of China, Eritrea, India, Indonesia, Kenya, Malawi, Rwanda and the United Kingdom of Great Britain and Northern Ireland are all moving in the right direction. However, the Ad hoc Expert Group sees that the magnitude of the problem and its transboundary nature will require global, bold and innovative solutions, with effective actions at national, regional and international levels<sup>8</sup>. Moreover, for these efforts to succeed, plastic pollution needs to become an issue of concern to all citizens, through education and outreach activities that can reach all segments of the population.

### **III. Barriers to action, gaps and success factors**

13. The discussion paper on barriers defines four types: legal (any impediment or barrier established by, founded upon or generated by law, the absence of it or the lack of its implementation and/or enforcement); financial (when high costs make a certain activity difficult to afford or implement; some also constitute economic barriers); technological (including aspects related to the production, manufacturing and design of products, consumption systems and all aspects of waste collection, management and recovery); and information (access to data, research, transparency, and education and awareness). A non-exhaustive list of barriers was presented and is summarized in Annex 1.

14. Examples of legal barriers include i) the lack of any internationally binding agreement with a primary objective to reduce marine plastics and microplastics; ii) measurable targets or global standards; iii) geographical gaps in coverage of existing agreements such as on the high seas, and gaps in signatories to agreements and their instruments; iv) poor implementation of policies and enforcement, often the result of no single authority being responsible for overseeing the management of marine litter; and v) a general absence of legal and market-based instruments to reduce consumption of difficult-to-recycle products and to stimulate industry’s involvement in solutions.

15. In terms of the wider issue of implementing a circular economy to tackle plastic waste, there are a range of legal barriers such as the lack of definitions, clear targets and hard numerical limits in regulations; gaps in legislation, including sustainable public procurement; lagging or incomplete implementation or enforcement of legislation; inconsistent national implementation of international legislation; and legislation conflicting values, for example hygiene regulations conflicting with regulations on food waste.

16. Examples of financial barriers include i) fossil fuel subsidies; ii) a chronic lack of funds in developing countries for waste infrastructure; iii) the absence the polluter pays principle, especially in areas such as the high seas, leaving governments with the burden of clean-up costs; iv) limited cross-border

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<sup>8</sup> UNEP/AHEG/2018/1/6

investments; v) absence of global and national markets for end-of-life plastics; and vi) a failure to internalize or make explicit the costs to human health and the environment.

17. Examples of technological barriers exist for all aspects of the production, manufacturing and design of products, waste collection and recovery. In the absence of global standards, there has been a proliferation of widely different approaches to recovery, sorting and reprocessing technologies, across the informal and formal sectors and between developing and developed countries, undermining the viability of financially viable and effective markets. Waste management is often highly fragmented, with rural areas very often poorly serviced.

18. Regarding upstream processes, there is a clear disconnect between innovation in the design and production phases and after-use systems, and little prioritization of the reduce-reuse-recycle waste hierarchy, for example how to increase the recycled content of products. There are also gaps in understanding of the best available technologies especially in how to deal with new alternative materials appearing in the market-place.

19. Whilst there are multiple barriers relating to information, access to data, research, education and awareness raising, and transparency in reporting, which hamper decision-making and priority-setting, they are not sufficient to stop concrete actions in the short-term in parallel to longer-term responses. In other words, there is enough knowledge to act immediately in many areas. Indeed, over the past five years, there has been an upsurge in major research initiatives that are delivering new data and evidence at an unprecedented rate, for example on the extent of macro-and micro-plastics in the marine environment. However, significant efforts are still needed to close the knowledge gaps on the levels and sources of marine litter and microplastics, their accumulation in organisms and associated impacts on human health and ecosystem functioning. These gaps have contributed in part to the general lack of recognition in society and international policy of the potential risks to human health of plastics, especially micro- and nano-sized particles. In addition, without a greater understanding of the extent of plastics in the marine environment from improved monitoring, and in the absence of global standards and greater transparency, the economic consequences are that trade in plastic waste remains a source of illegal revenues and lost taxes.

20. The challenges for developing countries in dealing with marine litter and plastic waste are even greater. These countries are often recipients of plastic products that have been designed elsewhere, with little or no regard for the prevailing conditions in the receiving countries, such as poor infrastructure and limited enforcement of environmental regulations. Rapid urban expansion, especially in the developing world, has also led to many areas being poorly serviced in terms of solid waste leading to an increase in illegal dumping sites. These are often close to rivers with the risk of waste ending up in the aquatic and marine environments. As waste management is often the domain of the informal sector, individual pickers selectively remove high-value plastics and leave behind the low-value, low-weight plastic. Overall, the list of barriers in developing countries is a long one, running from inadequate financing, legal and regulatory deficits, low administrative capacities, lack of public awareness about good sanitary practices, to limited enforcement.

21. Small island developing States are particularly vulnerable to marine litter and plastics. They have limited on-island production and waste management facilities, such as port reception areas, combined with the complication of geographical distance from other waste collection centres, meaning that they are unlikely to attract private investment. Their proximity to the ocean and exposure to natural hazards also increases the risk of near-shore and ocean contamination.

22. Even when there is a robust legally binding agreement in place, barriers remain. For example, key challenges remain for the Mediterranean Action Plan under the Barcelona Convention<sup>9</sup>, including a lack of: financial and other resources, measures to support circular economy strategies, knowledge about the extent

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<sup>9</sup> UNEP(DEPI)/MED WG.444/Inf.12)

of marine plastics in the Mediterranean Sea, in part owing to very patchy monitoring and assessment systems; availability or access to data produced by Governments; and coordination, in particular with the private sector and industry

23. The Ad hoc Expert Group agreed on the need to prioritise the barriers in terms of short, medium and long-term actions and identify key success factors. They saw an urgent need to remove barriers through upstream solutions, improving designs and product labelling, addressing fossil fuel subsidies, and working with the private sector, to re-orientate production processes that reflect the reduce-reuse-recycle aspects of the circular economy.

24. With plastic production set to rise over the next decade, even the positive developments that are happening on the ground may simply be overshadowed unless there is a change in thinking about waste prevention amongst industry as well as individual consumers coupled to actions at the global level. Thus, the identification of success factors likely to support national and international efforts will be crucial in establishing a strong basis for tackling marine litter and plastics. Examples of success factors include: (a) adopting an integrated, holistic approach to waste management; (b) embedding reduce-reuse-recycle thinking into all aspects of the economy, including producer responsibility; (c) using a source-to-sea approach given the importance of rivers as conduits for the delivery of plastic litter to the marine environment; (d) building on successful regional and global mechanisms such as the Regional Seas and Basel, Rotterdam and Stockholm Conventions<sup>10</sup>, the Strategic Approach to International Chemicals Management and the Global Programme of Action; and (e) creating a global architecture that includes new, voluntary as well as potentially binding legal instruments, in a multilayered, governance approach, that could be extended to other institutions such as the World Trade and Tourism Organizations and industry initiatives such as Global Plastics Alliance, which has undertaken over 350 projects in 40 countries to address marine debris, Closed Loop Ocean, which is a fund to finance waste management infrastructure in developing economies supported by the World Plastics Council and others in the plastics industry, and Operation Clean Sweep. Success factors, such as these, could help to ensure the effectiveness of local and national solutions, including financial incentives, best available technologies and awareness raising campaigns, and give greater leverage and impact.

## **IV. National, regional and international response options**

25. Four categories of response options are presented in the background discussion paper, to classify actions at the national, regional and international levels: legal and policy, technological, economic and education and information responses. Some response options are mutually beneficial across the three levels, reinforcing the concept of adopting an holistic approach as a key success factor.

### **A. National response options**

26. At the national level, two major types of legal and policy responses exist: framework law and specific product actions<sup>11</sup>. Overarching framework laws, such as Japan's Law for the Promotion of Marine Litter Disposal (2009), and the Republic of Korea's Marine Environmental Management Act (2009) mandate the development of plans and responsibilities to sub-national governments. Other countries, such as Indonesia, have developed national action plans that contain reduction targets and dates. National plans are more likely to succeed when they identify priority actions, baseline values and reduction targets, and

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<sup>10</sup> UNEP/AHEG/2018/1/INF/5

<sup>11</sup> UNEP 2016 *Marine litter legislation: A toolkit for policymakers*.

when possible, are supported by monitoring and assessment programmes. These can then be directly linked to measuring progress on achieving Sustainable Development Goal targets, especially 14.1.

27. There are many national laws governing the production and use of land-based materials causing marine litter. These include import bans on items such as plastic bags, in Kenya and Rwanda, and plastic waste, in China, and those prohibiting, regulating and disincentivizing the manufacture or retailing of specific goods, such as the banning of single-use or “biodegradable” plastic bags, expanded polystyrene. Others require adoption of best management practices, such as the manufacture, handling and transport of nurdles and microbeads in personal care products<sup>12</sup> or the prohibition of smoking on beaches. Extended producer responsibility is also an important policy approach, in which producers accept significant responsibility for the treatment or disposal of products.

28. The success of the plastic bag ban in Kenya is due to a number of reasons including the constitutional right of Kenyans to a clean and healthy environment and the application of the precautionary principle in ensuring that right; political support at the presidential level; regional examples of best practice, as in Rwanda; realisation of national responsibilities under the 2030 Agenda for Sustainable Development; support from the global community, including international leaders and partners; a growing public awareness of the environmental threats posed by plastics; and significant co-benefits such as improved drainage during the heavy rains, entrepreneurial opportunities to develop innovative packaging solutions, and the revival of the cotton sector in the manufacture of packaging alternatives. Certain challenges remain concerning the differential impact of high fines on people of low income; the need for more data on the impacts of the ban to enable evaluation of progress made; and cross-border movement of plastic bags from countries yet to implement a ban.

29. Member States have also set in place a range of binding legislative actions to improve waste management. These generally fall into one of four categories of disposal: i) land-based waste disposal, for example landfills; ii) land-based waste clean-up such as community beach clean-up programmes, or public programmes such as in the Republic of Korea that provides funds for fishermen to return their litter to port; iii) abandoned, lost and discarded fishing gear; and iv) litter from ships. New Zealand has put further restrictions on landfill locations to ensure that they are sited away from the coast. Disasters and natural hazards can also result in a large increase in marine litter, so many governments have put in place disaster debris management plans to help prevent litter from entering waterways and for its removal afterwards. Environmentally sound incineration continues to play an important part in waste disposal and for example in Japan funding is made available for facilities to use waste-to-energy methods.

30. Litter from ships is largely covered by the International Convention for the Prevention of Pollution from Ships MARPOL protocol; this deals with vessel-borne waste and disposal and has been adopted in the national legislation of many countries, some taking a very stringent view on what must be removed in ports and disposed of properly. Regarding plastics associated with fishing gear, St Kitts and Nevis prohibit any use of plastics, whilst other countries seek to minimize losses at sea. Some countries have adopted anti-dumping legislation regulating the creation of artificial reefs from waste materials, as these may affect ecosystem functioning.

31. Within the national context, there are also non-binding, voluntary measures to supplement legislative measures. For example, voluntary nurdle management efforts by the private sector in Japan, Mexico, Portugal, Spain and the United States of America, voluntary phasing out of microbeads in cosmetics and a range of voluntary certification and labelling schemes.

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<sup>12</sup> Bangladesh has banned the manufacturing of all polythene shopping bags, China the production, sale and use of ultrathin bags, California the manufacture of nurdles and Canada, the United Kingdom of Great Britain and Northern Ireland and United States of America the use of microbeads in personal care products.

32. Today, there are many technological response options being developed around the world. One key area is the redesign of plastic items and packaging; it has been estimated that the negative externalities of packaging reach \$40 billion each year<sup>13</sup> and so the development of alternative, degradable materials has been a clear priority for many governments and industry. Technological improvements in waste management, such as mobile units, improved recycling of polymers, capture of micro-fibres in washing machines and microbeads in wastewater systems, appropriately scaled waste to energy systems, conversion of dumpsites to sanitary landfills and removal of litter using floating booms, can also make a positive difference to the effectiveness of existing national facilities. Improving the technologies for monitoring the extent of marine litter and plastics is also an important response and vital for establishing the effectiveness of different policies.

33. Economic response options used by governments include incentives, taxes, levies and fines, to reduce the production and consumption of plastics, as well as putting in place take-back and deposit-refund schemes for plastic items such as bottles. Coupled with these are educational and information awareness-raising responses in society-at-large and within specific industries. For example, in Germany the plastic manufacturers and the chemicals industry have launched an initiative called “Zero Pellet Loss” to raise employee awareness on how to manage pellets properly and Operation Clean Sweep encourages industry to prevent the accidental loss of plastic resin into the environment. Activities such as beach clean-ups, engagement of citizens in monitoring beach litter, the rescue of marine organisms affected by litter and the adoption of beaches and cultural events, information sharing workshops, national campaigns such as those found in support of e.g. CleanSeas and mobile applications such as “Beat the Microbead” have been used to raise awareness and are now an integral part of many national action plans.

## **B. Regional response options**

34. At the regional level, co-operation is crucial to addressing the problems of marine litter and microplastics as no single country can manage the oceans in isolation. Regional approaches also allow for concerted actions to be taken in a way that matches the specific environmental and socioeconomic context. With the establishment of the Regional Seas Programme in 1973, the United Nations Environment Programme adopted a regional approach to addressing the environmental degradation of the marine and coastal environments. More than 143 Member States participate in one or more of the 18 Regional Seas programmes, 14 of which are underpinned by legally binding conventions. Nine regions have adopted protocols specific to land-based activities, seven already have action plans on marine litter and six more are developing them. MAP legally binding

35. Other regional response options that support the conservation of the marine environment include the regional fisheries bodies and the Code of Conduct for Responsible Fisheries which encourages the prevention of loss of fishing gear; regional policy co-ordination such as the European Union’s Marine Strategy Framework Directive, a legally binding instrument, and the European Strategy for Plastics in a Circular Economy; and the Association of Southeast Asian Nations (ASEAN) Conference on Reducing Marine Debris in the ASEAN Region which produced recommendations on a regional agreement for sustainable management of debris pollution. The Group of Seven and Twenty also developed action plans to combat marine litter to provide valuable mechanisms for action, raising awareness, establishing co-operation on technical matters and engaging multiple sectors of society.

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<sup>13</sup> United Nations Environment Programme (2014) Valuing Plastic: The Business Case for Measuring, Managing and Disclosing Plastic Use in the Consumer Goods Industry.



36. Regional technical and economic response options follow along similar lines, with the European Union's Horizon 2020 research and innovation programme funding work on marine litter and the Secretariat of the Pacific Regional Environment Programme developing regional projects to improve solid waste management in the Pacific islands. In terms of regional action, educational and information responses, the United Nations Environment Programme has supported the creation of regional nodes of the Global Partnership on Marine Litter in the North-West Pacific, the Wider Caribbean, Mediterranean and the Pacific regions, to strengthen inter-regional and regional co-operation and awareness raising efforts. Other examples include new legislation being proposed by the European Union to reduce the use of the ten most commonly found single-use plastics on beaches and in fishing gear, representing 70 percent by count, by promoting less harmful alternatives when available, better informing consumers, using extended producer responsibility schemes when no alternatives existed, and ensuring that certain products entered the existing separation and collection and recycling circuit.

### C. International response options

37. When considering responses at the international level, even though coastal communities and small island States suffer visible impacts, all member States, including land-locked countries are affected and contribute to marine litter and microplastics. In its assessment of the effectiveness of relevant international, regional and sub-regional governance strategies and approaches<sup>14</sup>, the assessment set out three response options: at the international level: (Option 1) maintaining the status quo or business as usual; (Option 2) review and revise existing frameworks to address marine plastic litter and microplastics, and add components to address industry; and (Option 3) a new global architecture with a multi-layered governance approach. (Annex 2)

38. Considering legal and policy response options, binding measures under Option 1 would involve strengthening the implementation of existing instruments, such as the Regional Seas programmes and other relevant multilateral environmental agreements<sup>15</sup>. The International Maritime Organization Assembly has recently recognised that marine plastic pollution requires further consideration in order to “significantly reduce marine pollution of all kinds by 2025”, and its Marine Environment Protection Committee has invited member States and others to submit concrete proposals for the development of an action plan on litter from shipping. Similarly, the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter and its London Protocol will discuss a statement of concern regarding the disposal of fiberglass-reinforced plastic vessels at sea at the governing bodies of the two treaties are to discuss in November 2018. Option 2 looks at strengthening existing instruments to specifically address marine litter and microplastics, amending the mandate of an existing international body to co-ordinate the efforts of various institutions and establish a voluntary framework/framework to increase industry's participation to address binding measures on marine litter. Option 3 is the establishment of a new global binding mechanism, avoiding duplicating

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<sup>14</sup> UN Environment (2017); UNEP/AHEG/2018/1/INF/3

<sup>15</sup> (a) The United Nations Convention on the Law of the Sea; (b) The 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; (c) The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 and its 1996 protocol; (d) Annex V of the International Convention for the Prevention of Pollution from Ships; (e) The Convention on Biological Diversity; (f) The Convention on the Conservation of Migratory Species of Wild Animals; (g) The Stockholm Convention on Persistent Organic Pollutants; (h) The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal; (i) Regional instruments, including the Regional Seas Conventions and Action Plans

efforts under existing instruments; this could either address the general issue of marine litter and plastics or be highly focused on specific areas such as microplastics, or labelling and certification.

39. Voluntary measures and responses can also be included in all three options. Relevant examples include the Global Partnership on Marine Litter, a multi-stakeholder partnership that engages more than 150 partners to tackle sources and sinks, the Global Ghost Gear Initiative, established to tackle lost and abandoned fishing gear, and the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, an existing intergovernmental mechanism that brings together diverse stakeholders to address marine pollution in an integrated manner, focusing on nine source categories including marine litter.

40. During the meeting of the Ad hoc Expert Group a combined, three-pillar approach was explored, drawing on the options in the background paper. Pillar 1 represents a strengthened cooperation under the regional seas conventions; Pillar 2 the establishment of a platform for knowledge-sharing and cooperation among industry, relevant authorities, non-governmental organizations and other stakeholders, as well as a forum for voluntary and coordinated commitments by member States; and Pillar 3 the amendment of the Basel Convention to comprehensively address plastic waste as a waste of concern. It was agreed that the three pillar proposal, plus inputs from the meeting on other types of options should be kept open during the next stage, to allow a range of options to be developed, as defined in the mandate of the expert group.

41. Technological and economic response options covering enhanced international coordination, collaboration on research and development to better understand the pathways and impacts of marine litter and potential solutions, and technology innovation, for example the Virtuous Circle project, together with overseas development assistance to improve waste management and recycling facilities in developing countries, will be necessary features of any new global mechanism. The government of Norway has taken the initiative to establish a multi-donor trust fund in the World Bank to improve waste management and prevent marine litter, inviting other donors to add to their initial contribution. Other suggestions for a global funding mechanism to support these features included using tax levies on plastic products.

42. Education and global awareness-raising responses will play a crucial role in any option. Campaigns, such as the five-year global CleanSeas launched by United Nations Environment Programme, marine organisations such as ocean aquaria and museums, and platforms such as the Global Partnership on Marine Litter will all play an important part in developing a global outreach response, along with conferences and events on the subject such as the International Marine Debris Conferences.

## **V. Environmental, social and economic costs and benefits of different, international policy response options**

### **A. Costs and benefits**

43. The discussion paper on the environmental, social and economic costs and benefits of different response options, based on the 2017 United Nations Environment Programme report<sup>16</sup> focuses mainly on the international policy options. These include (Option 1) maintaining the status quo; (Option 2) revising and strengthening existing frameworks with components to address industry and (Option 3) a new global architecture with multi-layered governance approach. While it was not feasible to carry out a detailed analysis that would lead to monetary figures for the three options, it was possible to identify examples of costs and benefits at national, regional and international levels for up- and down-scaling.

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<sup>16</sup> UN Environment (2017); UNEP/AHEG/2018/1/INF/3

44. One major challenge in estimating the costs and benefits of marine plastics is the extent of institutional and knowledge gaps that exist. At the regional and global levels, there are gaps in: (i) the mandate to manage upstream interventions; (ii) geographical scope; (iii) recognition of risks to human health; (iv) solid waste management and wastewater treatment; (v) the regulation of dumping; (vi) management of microplastics; (vii) the regulation of industry pollution and emissions into waterbodies; and (viii) the adoption of due diligence within the plastics industry.

45. From a knowledge perspective, most of the literature is about the prevalence and forms of marine litter, but little is written about the magnitude of costs that marine plastics impose on society, such as the social impacts of impaired human welfare caused by marine plastic litter. Comprehensive analyses and measurement of the social impacts such as these, require economic and econometric models to be applied, but historically, most policy interventions have been examined within a technical or “engineering” context without such a supplemental perspective, the analysis of the costs and benefits of alternative actions, or from the perspective of the benefits arising from employment opportunities, new investments in enterprise, improvement in quality of life or protection of ecosystems.

46. All these issues make it difficult to arrive at monetary figures for the different options. For example, the cost of manufacturing biodegradable alternatives to plastic bags is often higher than the costs of the original bag, however these costs rarely include the external costs to the environment or human health. What are needed are better life-cycle assessments, particularly for products and polymers, for the evaluation of materials using recycled and alternative materials and for product redesign.

47. As a first step, the background discussion paper<sup>17</sup> identifies examples of costs and benefits relating to future actions which can scale from the national to the regional and international levels. Some of most common impacts where costs can be estimated include environmental costs of entanglements and ghost fishing, ingestion (intestinal blockage, malnutrition and poisoning) by fish and other marine animals, blockage of filter feeding mechanisms of whales and other marine animals from small particulate (neustonic) plastic debris, physical damage and smothering of reefs, seagrasses, mangroves and other habitats, vectors for marine pests including invasive species, reduced resilience to climate change owing to cumulative impacts.

48. Areas of social costs which can be estimated include the loss of aesthetics and/or visual amenity, loss of indigenous values, antagonism against perceived polluters, perceived or actual risks to health and safety, including from additives and microplastics, food security, perceived or actual risks to human health including from microplastics and from exposure to hazardous chemicals in containers washed ashore.

49. Economic costs, for which estimates can be derived, include abatement costs by local government, cost to tourism (loss of visual amenity and obstruction to beach use), cost to vessel operators (downtime and damage owing to entanglements), losses to fishery and aquaculture operations owing to damage or entanglements, and costs for cleanup, animal rescue operations, recovery and disposal. Public safety costs including navigational hazards (loss of power or steerage at sea is potentially life threatening), hazards to swimmers and divers (entanglements). cuts, abrasion and stick (puncture) injuries, and leaching of poisonous chemicals.

50. These costs can also be analysed according to categories such as preventative costs, direct damage costs, remedial costs (for example clean-up after a natural disaster) and indirect costs (for example loss of ecosystem services). Direct economic costs from marine litter refer to the additional expenditures incurred by different economic sectors and are directly related to impacts from marine litter. Indirect economic costs from marine litter refer to the negative impacts on the marine environment, human health and productivity

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<sup>17</sup> UNEP/AHEG/2018/1/4

across different marine sectors, and ultimately the gross domestic product of each country. Given that estimates of damage and avoidable damage costs are generally very high, they can help to point out the seriousness of the problem to governments and the need for preventative measures.

51. The valuation of damage costs is usually based on the impacts to marine industry users; however, this represents only a small fraction of the marine economy itself. In the report on Valuing Plastics, (see 12), the United Nations Environment Programme estimated the damage to the value of marine environments globally to be at least \$8 billion per annum. The National Oceanographic and Atmospheric Administration, in the United States of America, estimated that reducing marine debris, even by 25 per cent at beaches in and near Orange County, could save residents roughly \$32 million during three months in the summer by not having to travel longer distances to other beaches<sup>18</sup>. Similarly, it has been estimated that communities in California, Oregon and Washington, spent around half a billion dollars per year to control litter and reduce marine debris<sup>19</sup>.

52. Some efforts have also been made in estimating the environmental costs of plastics production. According to one study, the “environmental cost to society of consumer plastic products and packaging was over \$139 billion in 2015, equivalent to almost 20 per cent of plastic manufacturing sector revenues, and is expected to grow (to \$209 billion by 2025) if current trends persist”<sup>20</sup>.

53. The potential cost savings achieved through prevention are savings to the economy, achieved through reductions in the cost of resources being consumed, the costs of remediation needed and the benefits of environmental and ecosystem health. In establishing actions under the three response options, prevention should thus be included as one of the main goals. In an Annex to the background discussion paper, economic, social and environmental costs and benefits are listed for each option. For Option 1, maintaining the status quo, international policy actions include (i) strengthening the implementation of existing mechanisms and (ii) monitoring developments under the Basel Convention. Costs include increased staffing and workloads related to meetings and potential conflicts lined to enforcement, and benefits include increased awareness of different multilateral instruments with possible minor environmental improvements.

54. For Option 2, the review and revision of existing frameworks with the addition of industry, international policy actions include (i) expanding the mandate of existing international bodies such as the Basel Convention and regional Seas, promoting and developing the Sustainable Development Goals, (ii) strengthening and adding measures specific to marine plastic litter and microplastics in Regional Seas Programmes and other applicable instruments, (iii) revising for example the Honolulu Strategy to encourage improved implementation at the national level and agree on indicators of success, and (iv) adopting a voluntary agreement measures for standardizing global, regional and national reporting on production, consumption and final treatment of plastics and additives, introducing voluntary national reduction targets and developing/improving global industry guidelines (e.g. for the management of polymers and additives or the adoption of global labelling and certification schemes). Examples of costs include the need for increased human resources, meetings and negotiations and their carbon footprint, possible antagonism between countries and industries and the costs of monitoring and evaluating new agreements. Examples of benefits include cost savings from a more coordinated approach, raised awareness and a reduction in the impacts of plastics on the marine environment.

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<sup>18</sup> NOAA (2014) “Assessing the Economic Benefits of Reductions in Marine Debris: A Pilot Study of Beach Recreation in Orange County, California”

<sup>19</sup> Stickel, B. H., A. Jahn and W. Kier (2012) “The Cost to West Coast Communities of Dealing with Trash, Reducing Marine Debris”, Kier Associates for the United States Environmental Protection Agency.

<sup>20</sup> Lord, R. (2016) “Plastics and Sustainability: A Valuation of Environmental Benefits, Costs and Opportunities for Continuous Improvement”, Trucost.

55. For Option 3, establishing a new international, legally binding architecture, will incur economic costs broadly relating to the international negotiation process and the establishment and operation of a fully-fledged secretariat. The main social costs are the increased burdens on governments in undertaking the negotiations and possible conflicts amongst stakeholders, Governments and business, whilst the environmental costs are the carbon emissions associated with the negotiation meetings and the potential drop in funding of existing responsibilities. In developing voluntary and eventually binding measures various other costs are likely to emerge; for example (i) increased costs for Governments and industry linked to new reporting requirements, monitoring, development of and compliance with global standards and new/amended legislation; (ii) the administration of labelling and certification schemes; (iii) increased regulation and monitoring of trade in non-hazardous plastic waste; (iv) the administration and contributions to a global funding mechanism to assist remediation in those countries, particularly small island developing States, that are an accumulation zone for marine plastic litter; as well as (v) the social costs of perceived inconvenience of tougher environmental legislation such as bans on disposable plastic bags and levies on plastic products. Benefits are likely to include long-term reductions in abatement measures with significant industry savings; reductions in damage costs and through more efficient use of plastics; support for Governments and industry for improving transparency and disclosure in achieving reduction targets; reduced harmful impacts of marine plastics and the knowledge that future generations will have access to a healthy environment; and a reduction in the harmful effects of marine plastics on marine ecosystems and an increase in resilience.

56. In establishing the costs and benefits of international policy response options, such as those listed above, more clarity is needed on the efficacy of existing partnerships and initiatives, the costs of inaction and benefits of avoided costs and prevention regarding social and environmental impacts of marine litter and plastics, the benefits of using a life-cycle approach across the design and production chain, and the economic, social and environmental costs of improving the governance framework to combat marine litter and microplastics. Development of standardized methodologies and approaches for each of these would also allow comparison of different actions and options and an evaluation of their feasibility and effectiveness.

## **VI. Feasibility and effectiveness of different, international policy response options**

57. The analysis of the feasibility and effectiveness of response options, such as the three international policy response options proposed<sup>21</sup>, is based on the costs, technical and political feasibility, and the degree to which the instrument or policy can be successful in reaching the intended goal of reducing marine litter and even achieving a zero-plastic-waste society. Ideally this would be based on a standardized, quantitative measure. However, in the absence of any such indicator and the data to measure effectiveness by, proxy indicators such as reductions in the production and consumption of certain product types that are commonly found in the environment can be used as proxies. More details of the feasibility and effectiveness of the three international policy response options can be found in the 2017 United Nations Assessment report<sup>22</sup>.

58. In summary, Option1, maintaining the status quo across different national, regional and international instruments, such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, is, by definition, technically and politically feasible. Strengthening the implementation of existing instruments would require new compliance and reporting mechanisms, but it

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<sup>21</sup> UNEP/AHEG/2018/1/5

<sup>22</sup> UNEP/AHEG/2018/INF3

could help improve their overall effectiveness. However, it would be difficult to address the issue of marine litter from an holistic perspective as not all existing instruments currently do not address the entire life-cycle of products. Given that none of these steps would necessarily halt or reduce the increase in marine litter, Option 1 was not seen to be effective overall.

59. Option 2, revising and strengthening existing frameworks, adding components to address industry could include (i) expanding the mandate of an international body to include the co-ordination of institutions dealing with marine litter; (ii) adding measures specific to tackling marine litter and plastics such as in Regional Seas programmes; (iii) revising the Honolulu Strategy, the framework for a comprehensive and global effort to reduce the impacts of marine debris; and (iv) adopting a voluntary agreement that incorporates industry. Whilst Option 2 is both technically and politically feasible, the political feasibility of the voluntary agreement would depend upon the precise nature of the commitments and targets and sufficient engagement with stakeholders, without which it could undermine the effectiveness of the option. It would involve negotiations if the mandate of a legal instrument was to be expanded, and should a voluntary agreement be developed, technical assistance would need to be provided to countries to help set voluntary national reduction targets and for monitoring and reporting. Overall Option 2 could be effective, insofar as strengthened or additional measures were implemented, as it builds on synergies and increases coordination.

60. Option 3, a new global architecture with a multi-layered governance approach, would establish a legally binding architecture, using a phased approach. It is technically feasible, but depending on the different modalities adopted, it would need political support from member States and could be affected by the economic impacts of the instruments and the severity of its compliance mechanism. It would involve Option 2 being launched as a first phase, to take stock, develop voluntary measures and gather experiences and data, followed (or in parallel) by a second phase to support the development and implementation of a legally binding architecture, procedures and measures. Option 3 is likely to be effective as it allows for an international, coordinated approach, however it is contingent upon suitable implementing and compliance mechanisms.

## **VII. Conclusions**

61. Whilst the Ad hoc Expert Group recognised that there was sufficient information to take action on marine litter and plastics, it was agreed that a robust analysis of different response options was required based on (i) a deeper understanding of the gaps in existing mechanisms and agreements, including what is covered and what is working well; (ii) a greater understanding of the challenges facing existing programmes and institutions, (iii) an exploration of how existing platforms such as Global Programme of Action for the Protection of the Marine Environment from Land-based Activities and the Global Partnership on Marine Litter might be extended, or whether a new structure is needed; (iv) clarification on the need for global coordination; (v) identification of opportunities for short-term, as well as medium and longer-term actions; and (vi) how improved data from monitoring of marine litter and plastics could be used to inform upstream processes and interventions. The Ad hoc Expert Group considered that addressing these issues would help bring them closer to finding solutions for the overall goal of long-term elimination of the discharge of litter and plastics into the oceans, as reflected in United Nations Environment Assembly Resolution 3/7.

62. To support these discussions and deliberations at the second meeting, the Ad hoc Expert Group requested the secretariat to consolidate the four discussion papers and assessment reports, in order to clarify the links between the measures, barriers, success factors, such as life-cycle approaches, gaps, costs, including more details on the costs of inaction, and the status quo so that the added value and feasibility of each option could be examined more thoroughly, for continued work and consideration by the United Nations Environment Assembly.

## Annex 1 Major barriers and response options for combating marine litter and microplastics

Major barriers occur in four areas: legal (any impediment or barrier established by, founded upon or generated by law, the absence of it or the lack of its implementation and/or enforcement); financial (when high costs or lack of markets make a certain activity difficult to afford or implement); technological (relating to the production, manufacturing and design of products, consumption systems and all aspects of waste collection, management and recovery); and information (access to data, research, transparency, and education and awareness).

The meeting suggested that it would be useful to have a priority barriers extracted from the extensive list of barriers presented to the first meeting. The secretariat therefore prepared the list below as a non-exhaustive list of priority barriers based on the discussions that took place in Geneva. This list will be open for discussions during the second meeting.

| Area  | Barrier   | National  | Regional   | International  |
|-------|---|---|--|--|
| Legal | <ul style="list-style-type: none"> <li>Lack of harmonized standards or an international legally binding agreement on the reduction of marine litter and microplastics including contamination regulations for foods and ecosystems, or measurable targets or timelines at the global level for the reduction of marine pollution, particularly from land-based sources</li> </ul> | <ul style="list-style-type: none"> <li>Existing legislative instruments for disposal covering: i) land-based waste disposal, for example landfills; ii) land-based waste clean-up schemes; iii) abandoned, lost and discarded fishing gear; and iv) litter from ships.</li> <li>Develop framework law which covers the whole life cycle of plastics including their use in products with design targets, management and multiple-Rs and safe disposal from land-based and sea-based sources such as abandoned, lost and discarded fishing gear; and litter from ships.</li> </ul> | <ul style="list-style-type: none"> <li>Co-operate regionally to align with relevant action plans e.g. G7 and G20 on combatting marine litter, raising awareness, establishing co-operation on technical matters and engaging multiple sectors of society;</li> </ul> | <ul style="list-style-type: none"> <li>Option 3 A legally binding architecture to be implemented in two phases:<br/> <i>Phase I:</i> Extend existing and new voluntary measures, including introduction of self-determined national reduction targets; development/improvement of industry led design standards that promote recovery and recycling.<br/> <i>Phase II:</i> Develop a binding agreement to include:<br/>                     ratification/accession procedures to confirm commitment by member states;<br/>                     an obligation to set self-determined national reduction targets;<br/>                     develop and maintain national inventories on production, consumption, final treatment and trade of plastics and additives.<br/>                     fixed timelines to review &amp; improve national reduction targets;<br/>                     a duty to cooperate to determine global technical standards to ensure basic level environmental and quality controls by industry.<br/>                     a duty to cooperate to determine global industry standards for reporting, labeling &amp; certification</li> </ul> |

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|   |  |  |   | measures to regulate international trade in non-hazardous plastic waste; compliance measures, monitoring and reporting; legal basis set for mechanisms for liability & compensation, funding and information sharing; and consideration of the needs of developing countries and regional differences (e.g. exemptions and extensions). |
| <ul style="list-style-type: none"> <li>Limited use of legal instruments or incentives to reduce unnecessary, difficult to recycle plastics or shedding of microplastics during use, such as due diligence, “polluter pays” principle, Extended Producer Responsibility schemes, or any form of global liability and compensation mechanism</li> </ul> | <ul style="list-style-type: none"> <li>Identify and ban undesirable and unnecessary products and hazardous chemicals in production and recycling processes (Reduce).</li> <li>All plastic types are collected, sorted and recycled irrespective of ‘value.’</li> </ul> | <ul style="list-style-type: none"> <li>Regional co-operation on legal instruments and incentives to ban undesirable and unnecessary products e.g. the European Union’s legislative action to reduce the use of the ten most commonly found single-use plastics on beaches and in fishing gear, representing 70 percent by count, by promoting less harmful alternatives when available, better informing consumers, using extended producer responsibility schemes when no alternatives exists, and ensuring that certain products enter the existing separation and collection and recycling circuit.</li> <li>Support regional compliance with sustainable global recycling standards.</li> <li>Participate in establishment of global standards for waste stream definitions, criteria and labeling to assist in purifying waste streams to increase their value</li> </ul> | <ul style="list-style-type: none"> <li>Establishment of sustainable global recycling standards</li> <li>Global ban on undesirable and unnecessary products and hazardous chemicals in production and recycling processes</li> <li>Establishing global standards for waste stream definitions, criteria and labeling to assist in purifying waste streams to increase their value and limit harmful exposures and impacts</li> </ul> |   |
| <ul style="list-style-type: none"> <li>Lack of targets and effective compliance and enforcement mechanisms for existing standards and regulations as well as a fragmented approach at regional levels.</li> </ul>   | <ul style="list-style-type: none"> <li>Effective EIA, SEA processes in place</li> <li>Set national collection targets, landfill reduction targets, recycling targets, and post-consumer content targets for different types of plastics</li> </ul>                     | <ul style="list-style-type: none"> <li>Co-ordination under: <ul style="list-style-type: none"> <li>(i) Regional Seas Programme: support adoption of legally binding protocols on land-and based and marine sources of litter and plastics;</li> <li>(ii) Regional Fisheries Bodies: adopting and implementation of</li> </ul> </li> </ul>  | <ul style="list-style-type: none"> <li>Core element of option 3</li> </ul>  |   |



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|                  |   | <ul style="list-style-type: none"> <li>Identify enforcement mechanisms and engage in regional activities on improving compliance</li> </ul>                                    | <p>Code of Conduct for Responsible Fishing;</p> <p>(iii) Regional policy co-ordination to achieve regional targets e.g. zero leakage to ocean from all sources;</p> <p>(iv) European Union's Marine Strategy Framework Directive; European Strategy for Plastics in a Circular Economy;</p> <p>(v) Association of Southeast Asian Nations (ASEAN) Conference on Reducing Marine Debris in the ASEAN Region</p> <ul style="list-style-type: none"> <li>Participate in regional improving classification of hazardous components of plastic production and treatment under the Basel, Stockholm and Rotterdam Conventions, and ensure hazardous substances are eliminated from lifecycle of plastics, highly regulated where not possible to eliminate.</li> <li>Establish regional co-operation on design and 3Rs (reduce, reuse, recycle).</li> </ul> |   |
|                  | <ul style="list-style-type: none"> <li>Lack of single authority or body responsible for overseeing the management of waste and marine litter prevention and enforcement of binding instruments, particularly in areas beyond national jurisdiction</li> </ul> | <ul style="list-style-type: none"> <li>Establish dedicated government body to oversee solid waste management policies, implementation and monitoring.</li> </ul>               | <ul style="list-style-type: none"> <li>Strengthen the role of regional bodies to deal with areas beyond national jurisdiction</li> </ul>  | <ul style="list-style-type: none"> <li>Options 2 and 3 both have the potential to establish a single authority to take forward this element especially in relation to areas beyond national jurisdiction</li> </ul> |
|                  | <ul style="list-style-type: none"> <li>Widespread absence of policies to incentives and transform markets by stimulating supply of recyclable plastics and products with recycled content,</li> </ul>   | <ul style="list-style-type: none"> <li>Establish industrial policies and approaches to design for products with recycled content</li> </ul>                                    | <ul style="list-style-type: none"> <li>Create regional markets for products with recycled content</li> </ul>  | <ul style="list-style-type: none"> <li>Establish new international arrangements on green design with recognized levels of recycled material content</li> </ul>  |
| <b>Financial</b> | <ul style="list-style-type: none"> <li>Lack of funds and implementation of market-based instruments and tax incentives to stimulate</li> </ul>  | <ul style="list-style-type: none"> <li>Identify new sources of funding and implement economic incentives at national level to promote 6Rs, focusing on reduction of</li> </ul> | <ul style="list-style-type: none"> <li>Establish new regional funds to incentivize investment in infrastructure, especially where</li> </ul>  | <ul style="list-style-type: none"> <li>Establish new sources of international funding to encourage design of products using recycled materials and to enable technology</li> </ul>                                  |

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|                      | investment for local infrastructure for collection, treatment or disposal and environmentally and financially sustainable end-of-life treatment of plastic waste   | unnecessary and undesirable products, incentives to design products for reuse, the infrastructure, collection, sorting required, diversion from landfill, and sustainable recycling practices.  | shared facilities in neighbouring states make sense  | transfer to increase extent of sustainable recycling facilities  |
|                      | <ul style="list-style-type: none"> <li>Continued use of fossil fuel subsidies and a lack of sustainable and profitable end-markets for all end-of-life plastics, allowing new plastic to remain a cheaper source of raw material compared to recycled plastic</li> </ul>   | <ul style="list-style-type: none"> <li>Removal of perverse incentives allowing new plastic to remain a cheaper source of raw material compared to recycled plastic</li> </ul>   | <ul style="list-style-type: none"> <li>Identify and encourage regional bodies to remove perverse incentives allowing new plastic to remain a cheaper source of raw material compared to recycled plastic</li> </ul>  | <ul style="list-style-type: none"> <li>Working with the World Trade Organisation and other relevant bodies identify sources of perverse incentives and establish alternative ways to enable materials containing recycled plastic to be recognized in the global product classification</li> </ul> |
| <b>Technological</b> | <ul style="list-style-type: none"> <li>Insufficient use of recycled materials in products in part due to insufficient involvement of industry in design, production and after-use systems and limited capacities in public authorities</li> </ul>  | <ul style="list-style-type: none"> <li>Identify technological needs to increase reuse, for example by recycling required components to enable this, identify design products for reuse and improve the infrastructure required (identification, collection, sorting, dismantling, etc.)</li> </ul>  | <ul style="list-style-type: none"> <li>Establish funds for technology transfer in the design and use of recycled plastic materials</li> </ul>  | <ul style="list-style-type: none"> <li>Establish funds for technology transfer in the design and use of recycled plastic materials</li> </ul>  |
|                      | <ul style="list-style-type: none"> <li>Fragmented and low spread of innovative technological infrastructure, especially in rural areas, for waste management and recycling, dealing with alternative materials, retention of microplastics in waste water treatment and sludge and monitoring and diagnostic technologies to enable national bodies to evaluate performance environmental standards</li> </ul> | <ul style="list-style-type: none"> <li>Improve technology uptake in local areas of infrastructure including the collection, transport, storage, sorting and disposal services with the aim of diverting waste from the oceans and preventing leakage in all lifecycle components.</li> <li>Improve sorting services to meet requirements of domestic and international recycling industry (where exported), make more plastic types recyclable, meet landfill reduction targets.</li> </ul> | <ul style="list-style-type: none"> <li>Improve technology transfer across the region to support better infrastructure including the collection, transport, storage, sorting and disposal services with the aim of diverting waste from the oceans and preventing leakage in all lifecycle components.</li> </ul> | <ul style="list-style-type: none"> <li>Encourage an open data and technology approach to waste and plastic infrastructure, use and design</li> </ul>   |
|                      | <ul style="list-style-type: none"> <li>Absence of a coordinated development and adoption of labelling standards for reuse and recyclability of products</li> </ul>   | <ul style="list-style-type: none"> <li>Establish national guidelines and coordination for the development and adoption of labelling standards for reuse and recyclability of products</li> </ul>  | <ul style="list-style-type: none"> <li>Encourage at the regional level, a coordinated development and adoption of labelling standards for reuse and recyclability of products</li> </ul>   | <ul style="list-style-type: none"> <li>Encourage globally, the coordinated development and adoption of labelling standards for reuse and recyclability of products</li> </ul>  |
| <b>Information</b>   | <ul style="list-style-type: none"> <li>Lack of research and harmonized, monitoring</li> </ul>  | <ul style="list-style-type: none"> <li>Undertake analyses of the sources, flows and extent of plastics and</li> </ul>   | <ul style="list-style-type: none"> <li>Co-operate in regional research and innovation programmes on research</li> </ul>  | <ul style="list-style-type: none"> <li>Establish global, international research programmes on the sources</li> </ul>   |

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|  | <p>methodologies and data on the sources, flows and extent of plastics and microplastics in the marine environment, their impacts on human health, food chains and ecosystems and associated costs</p>   | <p>microplastics in the national marine environment, their impacts on human health, food chains and ecosystems and associated costs</p>   | <p>and innovation e.g. European Union's Horizon 2020 research and innovation programme funding work on marine litter; Secretariat of the Pacific Regional Environment Programme developing regional projects to improve solid waste management in the Pacific islands; UNEP - Global Partnership on Marine Litter in the North-West Pacific, the Wider Caribbean, Mediterranean and the Pacific regions, to strengthen inter-regional and regional co-operation and awareness raising efforts</p> | <p>and flows of plastics in the environment and their impacts on human health, food chains and ecosystems</p>  |
| <ul style="list-style-type: none"> <li>• Lack of global and national reporting standards on the production, consumption, use, end-of-life/final treatment and trade of plastic that will eventually become waste, including if traded waste is mismanaged, by going to landfill rather than licensed facilities</li> </ul> | <ul style="list-style-type: none"> <li>• Participate in regional and global activities on reporting standards for production, consumption, use, end-of-life/final treatment and trade of plastic going to waste</li> <li>• Participate in processes to set global standards for waste stream definitions, criteria and labeling to assist in purifying waste streams to increase their value.</li> <li>• Participate in processes to improve classification of hazardous components of plastic production and treatment under national and international agreements such as the Basel, Stockholm and Rotterdam Conventions.</li> <li>• Enhance support for research into secondary and tertiary recycling with a view to establishing national (and global) reporting standards</li> </ul> | <ul style="list-style-type: none"> <li>• Establish harmonized reporting standards within existing regional agreements on production, consumption, use, end-of-life/final treatment and trade of plastic that will eventually become waste, including if traded waste is mismanaged, by going to landfill rather than licensed facilities</li> </ul> | <ul style="list-style-type: none"> <li>• See under Option 3</li> </ul>  |  |
| <ul style="list-style-type: none"> <li>• Lack of transparent, inclusive decision-making and public awareness preventing a broader discussion on cultural barriers, responsibilities, risks and types of behavioural changes and voluntary schemes that</li> </ul>  | <ul style="list-style-type: none"> <li>• Encourage dialogue to put in place non-binding, voluntary measures to supplement legislative measures. For example, voluntary nurdle management, phasing out of microbeads in cosmetics and launch</li> </ul>   | <ul style="list-style-type: none"> <li>• Undertake regional outreach and public participation programmes aligned with monitoring and information requirements of existing agreements</li> </ul>   |   | <ul style="list-style-type: none"> <li>• Continue to support global efforts such as CleanSeas, Global Programme on Marine Litter and other public engagement activities</li> </ul> |

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|  | society is willing to undertake | of voluntary certification and labelling schemes. <ul style="list-style-type: none"><li>• Public campaigns on links between plastic pollution to air and water quality standards, particularly primary microplastics, additives, chemicals used for recycling, release of toxins from incinerators.</li></ul> |  |  |
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