Addressing Marine Plastics
A Roadmap to a Circular Economy
Addressing Marine Plastics: A Roadmap to a Circular Economy

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Why a roadmap?

Background

The attention on marine plastics has been intensifying in recent years among national governments and the global community. It remains a challenge to define an effective strategy to address marine plastics in a systemic way, because of the complexity of the plastics value chain, numerous types of polymers and plastics applications, diverse pathways and fates of various plastics, and unquantified magnitudes of impacts on environment including marine ecosystems.

Gaps in addressing plastic pollution exist in various aspects. Gaps in knowledge around marine plastics include: stocks, flows, pathways and fates of macro- and microplastics into the oceans, the environmental and socio-economic impacts of marine plastics, consumer behaviour and cultural drivers of plastics consumption, and tools to assess innovative sector-relevant solutions. Numerous national and regional initiatives have been implemented around the world, but gaps in policy remain. In particular, there is a need for nationally or globally coordinated policies, agreements or action plans to support implementation of upstream solutions (such as eco-design and product life time extension), improve recyclability, incentivise demand for recycled plastics, and streamline downstream plastic management. Gaps in technology and action are evident across the plastics value chain. Coordinated systems standardising materials for reuse and recycling are lacking, along with technology challenges for more efficient collection, sorting, recycling and recovery of plastics. There is a lack of alternative products and solutions available to consumers, who mostly have no option to avoid single-use plastic products. Coordinated financing and incentives to support upstream solutions to plastic pollution and to prevent the leakage of plastics into the environment (especially the financing of waste management) are notable gaps in financing and awareness.

What is clear is that this issue needs to be addressed along the entire value chain (including production, distribution, consumption, reuse, collection and recycling, as well as final disposal of plastics), by making a systemic and fundamental shift from a linear to a circular economic model for plastics.

Purpose of the Roadmap

This document provides an action-oriented strategy by identifying a core set of priority solutions to be implemented by targeted stakeholders from the whole plastics value chain under different time horizons, and at different geographical scales. It aims to reduce the leakage of plastics into the (marine) environment as well as its associated impacts, and improve the circularity of the plastics value chain. The recommendations proposed in the Roadmap aim to reduce the adverse environmental, ecological, and socio-economic impacts from marine plastics, while transforming the linear “take-make-dispose” economy into a circular economy. Together, these actions support the 2030 Agenda for Sustainable Development, particularly Sustainable Development Goal (SDG) 12 on Responsible Consumption and Production, and SDG Target 14.1, which aims to significantly reduce marine pollution, including marine debris, by 2025.

The roadmap is founded on the Global Environment Facility (GEF)-funded project (2017-2019): “Addressing Marine Plastics - A Systemic Approach”. It capitalizes on the latest baseline assessment of key polymers, applications, pathways (hotspots) throughout the life cycle of plastics, and the impacts of marine plastics at different geographical scales. It also builds on the successful policies, experiences from initiatives and pilot projects, and most innovative and effective solutions to date as identified by the GEF project (Annex 1).

The evidence supporting the design of this Roadmap is based on scientific evaluation from desktop studies, analyses, and modelling within this project, which have been peer-reviewed by academia and stakeholders from both the public and the private sectors. The global experience on establishing multi-stakeholder initiatives on the circular plastics economy, as well as a pilot project on sustainable waste management in Asia-Pacific bring in first-hand learning from stakeholder engagement and field work.

* https://gefmarineplastics.org/

This roadmap can be used as a reference by funding agencies, governments and civil society organizations to define the scope of their respective strategies on specific working areas and topics, and to facilitate and scale up the interventions on plastic pollution.

The vision: transition towards circular economy for plastics

We envision: a world without negative impacts from plastics, where plastics retain their highest value along the value chain, no plastics leak into and damage the environment, and maximal circularity for plastic materials is reached at scale and around the globe.

As such, we need to fundamentally shift away from a linear plastics economy (almost exclusively based on single-use plastic products), to a circular economy by eliminating unnecessary plastics and circulating all the plastics we do need. We look forward to a scenario where only toxin-free plastics are reused and recycled, and where non-recyclables and chemicals of concern are eliminated from production and use.

Approach

Overall, this roadmap takes a systemic approach to address marine plastics by tackling the issue at the source to achieve a circular economy for plastics.

- Such systemic change should involve all stakeholders to rethink and redesign an entire economic system. This systemic thinking needs to take into account the entire value chain, and propose strategic intervention points at the design, production, consumption, waste management, or mitigation phases. The interventions need to be coordinated and synergistic, involving all actors of the value chain: governments, companies, research institutions, waste sector, finance sector, consumers, at multiple scales

- Such a systemic approach needs to exclude chemicals of concern in the production and recycling of plastics to ensure there is no damage to humans and ecosystems, and to enable higher degree of recyclability. It would ultimately ensure a toxin-free circular economy of plastics.
• Solutions and actions should follow life cycle thinking and adhere to the ‘Reduce, Reuse, Recycle’ hierarchy.

The roadmap highlights the actions in specific life cycle stages, as well as the cross-cutting solutions to link upstream and downstream stakeholders of the value chain to avoid actions done in isolation. It incorporates key upstream interventions including designing products for maximum durability and reusing products which can contribute to reducing plastic waste generation. It integrates downstream actions that address waste streams generated by the current business-as-usual linear economy.

The roadmap identifies 4 building blocks to achieve a circular economy for plastics, including:

1. **Create cross-cutting enabling conditions** including institutions in terms of legal arrangements and policy, research and knowledge, stakeholder engagement and dialogue, financing and capacity development.

2. **Eliminate** all problematic and unnecessary plastic products, including toxic additives;

3. **Innovate** design, production and business models to ensure that the plastics we do need are reusable, recyclable, or compostable, and free of toxic additives;

4. **Circulate** all plastic products at their highest value within the economy to keep them out of the environment.

Corresponding to the urgency and feasibility of various actions, the roadmap organizes the recommended actions in the following time frames:

- Short-term: < 5 years (2020-2025)
- Medium to long term: > 5 years (2025 +)
What are the benefits of a circular economy for plastics?

The benefits of a circular economy model for plastics will go far beyond improving marine ecosystems, with clear co-benefits of improved human health and livelihoods. There are also clear economic benefits, with significant opportunities for innovation in new materials and product systems. The challenges ahead will lie in catalysing the innovation required and creating the environment and partnerships for sustainable business models to flourish. It will be essential that the innovations are tested and based on the best available sciences to avoid unintended consequences or trade-offs.

**Net environmental benefits**

The actions proposed by the Roadmap will bring benefits to the environment, including:

- **Increased resource efficiency**: Keeping plastics at their highest value, reducing the production and consumption of unnecessary plastic products, and improving reuse and recycling will ensure that resources are used in an efficient manner, at their highest potential, and reduce virgin plastic production and related fossil feedstock extraction.

- **Decrease in greenhouse gas emissions**: More circularity in the plastics value chain will mitigate the effects from the consumption of fossil fuels to produce virgin polymers and reduce the emission from incineration of plastics at their end-of-life.

- **Reduction in toxicity risks to human and ecosystem health**: Eco-design, green manufacturing, state-of-the-art recycling of plastics will reduce the emissions of chemicals (such as POPs) to the environment from different life cycle stages of plastic products and thus the associated impacts on human and ecosystem health.

- **Protection of biodiversity and ecosystem services**: Reducing plastics in the marine environment will help to protect marine species from entanglement and ingestion of plastics, and promote enhanced fish stocks for subsistence and commercial harvest.

**Net socio-economic benefits**

The proposed actions in the Roadmap will benefit coastal communities and ocean-dependent economies including:

- **Reduction in ocean plastics-induced loss of marine natural capital**: Healthy marine ecosystems ensure the provision of ecosystem services that support ocean-based economies including fisheries, marine tourism and maritime transport. Moreover, the reduction of marine plastics will indirectly save costs of clean-up operations and activities, and other expenditures for ecological remediation, climate adaptation and mitigation.

- **Increased efficiency in the informal waste recycling sector**: In developing countries where over half of the world's plastic waste originate, a large portion of the recovery and recycling of plastic waste are done by waste pickers, sorters and community-based recycling enterprises without formal oversight for just compensation or environmental protection. Formal recognition and full support of this labor sector, including promotion of gender parity, are essential in improving waste-based livelihoods and reducing leakage of plastics in developing economies and globally.

- **Development of novel livelihoods in circular plastics economy**: Innovation in the delivery of plastic products and in recycling (upcycling) plastic waste will generate novel livelihoods and institutional arrangements, which have the potential to add value to quality of life and community well-being.
Systemic actions

This section presents key actions for a circular economy for plastics. The main objectives for actions are listed for both short- and long-term time frames below.

Short-term (5 years, 2020-2025)

1. **Create cross-cutting enabling conditions**
   - Strengthened collaboration and coordination among relevant stakeholders at national and regional scale
   - Established national baselines of marine plastics for national priority and target setting
   - Increased investment in innovative solutions, business models, and technologies

2. **Eliminate**
   - Extensive elimination of production and use of problematic and unnecessary plastic products (e.g. single use plastic packaging).

3. **Innovate**
   - Increased reusability, recyclability, and compostability of plastic products
   - The emergence of more business models of better reuse, repairing, remanufacturing and recycling

4. **Circulate**
   - Increase in the percentage of reusable, recyclable, or compostable plastics relative to total plastic products
   - Increase in the use of recycled materials in new products
   - Increase in the rates of plastics effectively reused, recycled or composted in practice

Medium to long term (>5 years, 2025 onwards)

1. **Create cross-cutting enabling conditions**
   - More harmonised vision and international policies addressing plastic pollution at the global scale
   - Knowledge, best practices, and innovative solutions are shared among countries and implemented at the national and local levels
   - Sustainable financing and investment are in place to support the circular economy of plastics at all geographical levels

2. **Eliminate**
   - More extensive elimination of production and use of non-reusable, non-recyclable, and non-compostable plastic products
   - Plastic products containing chemicals of concern phased out

3. **Innovate**
   - Full-scale business models of reuse, repairing and recycling
   - Problematic plastics causing substantial impacts to the marine environment substituted with alternative materials with net positive impacts on environment verified by life cycle assessment

4. **Circulate**
   - Zero-waste technology for plastics developed and mismanaged plastic waste minimized
   - Significant increase in reuse, collection, sorting and recycling rates
   - Significant increase in the use of recycled materials in new products
   - Significantly improved waste management in developing countries
   - Plastic products that are 100% reusable, repairable, recyclable or compostable

To support countries and stakeholders to assess progress and impacts of the actions in the Roadmap, two types of indicators are recommended:

- **Output indicators**: to measure progress made by taking recommended actions (direct products and deliverables of the actions)
- **Outcome indicators**: to measure structural and behavioural changes that occur over time and will lead to long-term achievements, as a result of the implemented activities

The assessment of progress and impact of the implementation of the systemic actions necessitate an appropriate Monitoring and Evaluation (M&E) programme to clearly demonstrate achievements against targets defined by stakeholders.

The recommendations for systemic actions are summarized in the following table. They need to be taken by relevant stakeholders at global, regional, national and sub-national scales.
### Summary Table of Key Actions and Indicators

<table>
<thead>
<tr>
<th>Type of action</th>
<th>Output indicator for M&amp;E</th>
<th>Key actions (see Annex 2 for detailed list)</th>
<th>2020–2025</th>
<th>2025–Onwards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create cross-cutting enabling conditions in terms of policy, finance, research and knowledge, capacity etc.</td>
<td>- Number of multi-stakeholder action groups operating as hubs of circular economy at different geographical scales&lt;br&gt;- Number of baseline analysis completed and made public&lt;br&gt;- Number of methods or tools provided to support decision making in policy and business&lt;br&gt;- Number of policies on circular economy for plastics developed&lt;br&gt;- Number of EPR systems established&lt;br&gt;- Number of governments and/or businesses supported in capacity development and campaigns</td>
<td>Set up and strengthen common platforms with cross-value chain representation at global, regional, national and local scales for developing, implementing and coordinating action plans to address plastic pollution&lt;br&gt;Set up global consensus on the nomenclature and methodologies to allow for harmonized analysis on plastic material flows and consistent sampling of marine litter and microplastics&lt;br&gt;Support research to quantify sources, leakage and impacts of plastics as a country baseline&lt;br&gt;Support the government tracking and measuring the progress towards a circular economy for plastic&lt;br&gt;Develop and improve methodologies to evaluate the impacts of plastics and their alternatives (such as Life Cycle Assessment)&lt;br&gt;Research transforming secondary materials into high quality “raw” materials&lt;br&gt;Develop policy and financial mechanism to reduce the amount of plastic waste generated, promote reuse and remanufacturing, increase demand for recycled content (e.g. recycled content standards, voluntary commitments, minimum requirements, public procurement, etc.)&lt;br&gt;Develop extended producer responsibility (EPR) policy and support its implementation in relevant sectors, to encourage design for reuse and recycling, while taking care of end-of-life products by setting up collection and recycling systems&lt;br&gt;Provide consumers with better sustainability information (such as eco-labels and standards) and generate incentives for behavior change&lt;br&gt;Develop targeted and effective consumer campaigns, or campaigns in specific sectors (tourism, fishing, etc.)&lt;br&gt;Provide funds from EPR system and other channels to sustain investment&lt;br&gt;Develop good practice within governments and businesses, promote the sharing of best practices and innovative solutions, and strengthen capacity development to allow peer learning</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Type of action</td>
<td>Output indicator for M&amp;E</td>
<td>Key actions</td>
<td>2020–2025</td>
<td>2025–Onwards</td>
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<tr>
<td><strong>Eliminate</strong> (reduce the consumption and production of problematic and unnecessary plastic products)</td>
<td>• Number of countries banning or restricting problematic and unnecessary plastic products</td>
<td>Define a list of materials or additives that are known to cause adverse environmental and health impacts, have a high probability to end up in the environment or have little/no chance of being reused, recycled or composted</td>
<td>X</td>
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<tr>
<td></td>
<td>• Percentage of plastics products containing chemicals of concern being eliminated</td>
<td>Implement policy to ban or restrict on problematic and unnecessary plastics, and provide alternative solutions and substitutions based on full life cycle assessment (incl. compulsory and voluntary instruments)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eliminate chemicals of concern in plastic products</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Innovate</strong> (product and system innovation)</td>
<td>• Number of new polymers or alternative materials to replace problematic plastic products identified and applied</td>
<td>Innovate on new polymers, to improve its reusability and recyclability back into high quality materials</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>• Number of new business models identified and applied</td>
<td>Innovate and develop cost-effective alternatives (in particular develop sector-relevant alternatives for products with high use phase losses and for products where reuse or recycling rates are especially low), with lower impacts on the environment</td>
<td>X</td>
<td>X</td>
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<td></td>
<td></td>
<td>Innovate and set up pilots to scale up the most viable new product/packaging designs</td>
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<td></td>
<td></td>
<td>Develop technologies to sort, recycle, process and dispose of plastics after use into high quality raw materials; or technologies on composting</td>
<td>X</td>
<td>X</td>
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<tr>
<td></td>
<td></td>
<td>Develop new business model and strategy to shift from single-use to reusable plastic packaging and products</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>Circulate</strong> (reuse, recycling and disposal)</td>
<td>• Percentage of plastics being reusable, recyclable or compostable</td>
<td>Develop policies, incentives and actions to reduce the generation of waste plastics</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>• Reduction in waste generation</td>
<td>Engage with consumers and users to promote sustainable purchasing, reuse and responsible disposal of plastic products, through education, training and campaigns</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>• Increase in reuse rate of specific plastic products</td>
<td>Form partnerships to significantly improve the management of municipal solid waste (incl. collection, sorting, recycling and disposal)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>• Increase in collection rate of plastic waste</td>
<td>Form partnerships to significantly increase the coverage of wastewater and effluent treatment</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>• Increase in recycling and recovery of plastic waste</td>
<td>Develop public-private partnerships, with brands/industry contributing to the set-up of initiatives and treatment infrastructure to recycle and dispose of end-of-life plastics</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Develop and implement policy to incentivize the organization of informal waste collectors and sorters that can operate with independent financing with fair wage and thus not vulnerable to unscrupulous middlemen waste collectors</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
The GEF Marine Plastics Project, 2017 – 2019

The GEF Marine Plastics Project aimed to seed the development of a circular economy for plastics, engaging major stakeholder groups along the entire plastics value chain to explore synergies, frame a common vision, and identify priority actions to address marine plastics using the best available science and best practices.

Annex 1 highlights the key deliverables of the GEF Marine Plastic Project, and which have all been completed as of December 2019. All action-oriented deliverables have been designed so that governments, civil society organizations, producers, recyclers and consumers, at multiple scales, may build on the pioneer activities and scale these to their respective needs.

Each partner agency of the project continues to:

- expand the coverage of and strengthen the Global Commitment and the national and supra-regional Plastic Facts (Ellen MacArthur Foundation New Plastics Economy, Component 1 lead);
- collaborate with local and national partners in South and Southeast Asia to develop local and national action plans on marine debris, including financing mechanisms; and with international governmental economic fora, to keep marine plastics a high-priority policy issue in multi-scale economic agenda (Ocean Conservancy, Component 2 lead);
- pursue science and actions necessary to realize the circular economy utilizing the governmental platform of UN Environment Assembly (UNEA), and the multi-stakeholder networking through the UNEP Global Partnership on Marine Litter (the UN Environment Programme's Economy and Ecosystems Divisions, Component 3 lead); and
- communicate the accumulating evidence underpinning a growing body of experience and best practices to transform the linear (take – make – dispose) model to a restorative approach (reuse – repair – recycle) for plastics (GRID Arendal, Component 4 lead).

Concluding remarks

The roadmap provides the critical actions to develop a circular economy for plastics, at global, regional, national and sub-national scales. It can support donors and other stakeholders to shape strategies to address plastic pollution including marine plastic pollution to a broader extent. Annex 2 provides a detailed list of recommended actions, with suggested scale of action and timeframe, as well as leading and supporting stakeholders.
**National & Local Systemic Actions**

1. **Global Commitment 100% by 2025**
   - Unites businesses, governments and other organizations behind a common vision and targets to address plastic waste and pollution at its source.

2. **Circulate Capital**
   - Identifies, incubates and invests in opportunities to intercept ocean plastic at the source by collecting, sorting, processing and recycling waste in South and Southeast Asian countries.

3. **Volunteer Marine Debris Monitoring Protocols & Framework**
   - Implements volunteer marine debris monitoring protocols.

4. **Integrates the role of gender in waste management.**

**Global & Regional Systemic Actions**

1. **Global Commitment 100% by 2025**
   - Unites businesses, governments and other organizations behind a common vision and targets to address plastic waste and pollution at its source.

2. **Innovation Prize**
   - Brings together innovators to develop systemic solutions that prevent plastic from becoming waste in the first place.

3. **Global Partnership on Marine Litter**
   - Networks among multi-stakeholder groups globally & through the UN Regional Seas Programme on marine litter issues.

4. **Examines reuse business models to replace single-use plastic packaging.**

**Seeding circularity ...**

- **Component 1:** Global Platform for Circular Economy
- **Component 2:** Ocean Plastic Conservancy
- **Component 3:** UN Environment Programme
- **Component 4:** G-E-D Agenda

**Annex 1: Key deliverables of the GEF Marine Plastics Project, 2017–2019**

[https://gefmarineplastics.org](https://gefmarineplastics.org)
... so ecosystems become plastic-free

National & Local Systemic Actions

2 2 2
Assesses baseline level of marine debris in Xuan Thuy National Park, Vietnam.
Identifies available vs necessary budget to implement a waste management strategy and mechanisms to bridge the gap.

Global & Regional Systemic Actions

3 3 3
Takes stock of existing knowledge & actions.
Maps plastic leakages to identify hotspots along global value chain.
Recommends systemic actions to achieve a circular economy.

1...
<table>
<thead>
<tr>
<th>Type of action</th>
<th>Action domain</th>
<th>Action description</th>
<th>Scale</th>
<th>Time frame</th>
<th>Leading stakeholder</th>
<th>Supporting stakeholder</th>
<th>Main life cycle stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Advocacy/ capacity building</td>
<td>Set up and strengthen common platforms with cross-value chain representation at global, regional, national and local scales for developing, implementing and coordinating action plans to address plastic pollution</td>
<td>Global, regional, national and sub-national</td>
<td>Short to medium term</td>
<td>Intergovernmental organization/ regional organizations/ National governments</td>
<td>all the other stakeholders</td>
<td>cross-cutting</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Advocacy/ capacity building</td>
<td>Develop effective consumer campaigns to encourage consumers demand sustainable options and act at individual level to reduce plastics usage</td>
<td>National</td>
<td>short-term</td>
<td>Civil society organizations</td>
<td>Consumers</td>
<td>consumption and reuse</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Advocacy/ capacity building</td>
<td>Deliver awareness-raising campaigns to recreational users of coastal areas on the importance of avoiding littering and preventing losses of fishing gear</td>
<td>National and sub-national</td>
<td>short-term</td>
<td>Local governments</td>
<td>Local waste collectors, recyclers</td>
<td>consumption and reuse</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Advocacy/ capacity building</td>
<td>Raise awareness, and provide reliable sustainability information to consumers</td>
<td>National</td>
<td>Medium to long term</td>
<td>National governments, brands, producers</td>
<td>Civil society organizations</td>
<td>consumption and reuse</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Knowledge creation</td>
<td>Research to quantify marine-based sources of plastics</td>
<td>Global and national</td>
<td>short-term</td>
<td>Researchers/ academia</td>
<td>National governments/ Intergovernmental organization</td>
<td>cross-cutting</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Knowledge creation</td>
<td>Agree on common definitions and methodologies to allow for harmonized data on plastic material flows and consistent sampling of marine litter and microplastics</td>
<td>Global</td>
<td>short-term</td>
<td>Researchers/ academia</td>
<td>Intergovernmental organization/ regional organizations</td>
<td>cross-cutting</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Knowledge creation</td>
<td>Develop and maintain databases, with regularly updated data on plastic material flows (including production, consumption, collection, recycling, waste management)</td>
<td>Global</td>
<td>Medium to long term</td>
<td>National governments</td>
<td>Intergovernmental organization/ regional organizations</td>
<td>cross-cutting</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Knowledge creation</td>
<td>Develop and improve methodologies to evaluate the impacts of plastics and their alternatives (such as Life Cycle Assessment)</td>
<td>Global</td>
<td>Medium to long term</td>
<td>Researchers/ academia</td>
<td>Intergovernmental organization/ regional organizations</td>
<td>raw material</td>
</tr>
<tr>
<td>Type of action</td>
<td>Action domain</td>
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<td>Scale</td>
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</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Knowledge creation</td>
<td>Research transforming secondary materials into high quality “raw” materials</td>
<td>Global</td>
<td>Medium to long term</td>
<td>Global brands</td>
<td>Researchers/ academia</td>
<td>raw material</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Knowledge creation</td>
<td>Develop consistent terminology for waste data and consistent methodologies for waste sampling and waste characterization</td>
<td>Global</td>
<td>Medium to long term</td>
<td>Intergovernmental organization/ regional organizations</td>
<td>Researchers/ academia</td>
<td>Collection, sorting, processing and disposal</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Knowledge creation</td>
<td>Research to better understand what drive consumer behavior with regards to single-use plastic consumption and littering</td>
<td>National</td>
<td>Medium to long term</td>
<td>Researchers/ academia</td>
<td>Consumers</td>
<td>consumption and reuse</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Policy/ regulatory/ voluntary agreements</td>
<td>Create enabling conditions for design for reuse and recyclability, such as by requiring extended producer responsibility in relevant sectors and placing disincentives on single-use plastic products</td>
<td>Global</td>
<td>short-term</td>
<td>National governments</td>
<td>National producers</td>
<td>production</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Policy/ regulatory/ voluntary agreements</td>
<td>Provide incentives for industry to use secondary polymers, such as through recycled content standards, voluntary commitments, minimum requirements, green public procurement, etc.</td>
<td>Global and national</td>
<td>short-term</td>
<td>National governments</td>
<td>Intergovernmental organization/ regional organizations</td>
<td>raw material</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Policy/ regulatory/ voluntary agreements</td>
<td>Develop guidance and create incentives for producers to track their product distribution at regional and local scales, to identify hotspots of leakages of own products, to redesign products for enhanced sustainability, and to efficiently recycle waste products</td>
<td>Regional and national</td>
<td>Medium to long term</td>
<td>Global brands</td>
<td>National governments</td>
<td>cross-cutting</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Policy/ regulatory/ voluntary agreements</td>
<td>Governments set up policies on sustainable public procurement to create demand for recycled plastics</td>
<td>National</td>
<td>short-term</td>
<td>National governments</td>
<td>National producers</td>
<td>consumption and reuse</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Policy/ regulatory/ voluntary agreements</td>
<td>Establish economic incentives to reward sustainable consumption</td>
<td>National</td>
<td>Medium to long term</td>
<td>National governments</td>
<td>Consumers</td>
<td>consumption and reuse</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Policy/ regulatory/ voluntary agreements</td>
<td>Implement standards for product labelling (including on packaging) to provide consumers with understandable and reliable information on sustainable choices</td>
<td>National</td>
<td>Medium to long term</td>
<td>National governments</td>
<td>National producers</td>
<td>consumption and reuse</td>
</tr>
<tr>
<td>Type of action</td>
<td>Action domain</td>
<td>Action description</td>
<td>Scale</td>
<td>Time frame</td>
<td>Leading stakeholder</td>
<td>Supporting stakeholder</td>
<td>Main life cycle stage</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
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</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Policy/ regulatory/voluntary agreements</td>
<td>Develop extended producer responsibility (EPR) policy and support its implementation in relevant sectors, to encourage design for reuse and recycling, while taking care of end-of-life products by setting up collection and recycling systems</td>
<td>National and sub-national</td>
<td>Short-term</td>
<td>National governments</td>
<td>Producers, waste management companies</td>
<td>Collection, sorting, processing and disposal</td>
</tr>
<tr>
<td>Create cross-cutting enabling conditions</td>
<td>Policy/ regulatory/voluntary agreements</td>
<td>Develop public-private partnerships, with brands/industry contributing to the set-up of initiatives and infrastructure to manage their products after use</td>
<td>Sub-national</td>
<td>Medium to long term</td>
<td>Brands, waste management companies and governments (including local governments)</td>
<td>Intergovernmental organizations/ National governments</td>
<td>Collection, sorting, processing and disposal</td>
</tr>
<tr>
<td>Eliminate</td>
<td>Technical product/service innovation</td>
<td>Voluntary elimination of problematic and unnecessary plastic products (possibly stimulated or adapted by policy)</td>
<td>Global and regional</td>
<td>Short-Term</td>
<td>Global brands</td>
<td>Intergovernmental organization/ regional organizations</td>
<td>production</td>
</tr>
<tr>
<td>Eliminate</td>
<td>Policy/ regulatory/voluntary agreements</td>
<td>Instigate bans or restrictions on products, materials or additives that are known to cause adverse environmental and health impacts, have a high probability to end up in the environment or have little/ no chance of being reused, recycled or composted. This needs to be done providing alternative solutions and substitutions with less impacts</td>
<td>Global and national</td>
<td>Medium to long term</td>
<td>National governments</td>
<td>National producers</td>
<td>raw material</td>
</tr>
<tr>
<td>Eliminate</td>
<td>Policy/ regulatory/voluntary agreements</td>
<td>Ban or otherwise restrict products with high plastic losses to the environment (such as microbeads)</td>
<td>National</td>
<td>short-term</td>
<td>National governments</td>
<td>Researchers/ academia</td>
<td>production</td>
</tr>
<tr>
<td>Innovate</td>
<td>Technical product/service innovation</td>
<td>Innovate on new polymers, to improve its reusability and recyclability back into high quality materials</td>
<td>Global</td>
<td>Medium to long term</td>
<td>Global brands</td>
<td>Researchers/ academia</td>
<td>raw material</td>
</tr>
<tr>
<td>Innovate</td>
<td>Technical product/service innovation</td>
<td>Innovation in business models to shift from single-use to reusable plastic packaging and products</td>
<td>Global and regional</td>
<td>Short to Medium term</td>
<td>Global brands/ producers</td>
<td>National producers</td>
<td>production</td>
</tr>
<tr>
<td>Type of action</td>
<td>Action domain</td>
<td>Action description</td>
<td>Scale</td>
<td>Time frame</td>
<td>Leading stakeholder</td>
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</tr>
<tr>
<td>Innovate</td>
<td>Technical product/service innovation</td>
<td>Design for recyclability in plastics formation (i.e. reducing/avoiding additives that make plastic difficult to recycle)</td>
<td>Global and national</td>
<td>Short-term</td>
<td>Global brands</td>
<td>Researchers/academia</td>
<td>raw material</td>
</tr>
<tr>
<td>Innovate</td>
<td>Technical product/service innovation</td>
<td>Develop cost-effective alternatives (in particular develop sector-relevant alternatives for products with high use phase losses and for products where reuse and recycling rates are especially low)</td>
<td>Global and national</td>
<td>Medium to long term</td>
<td>Global brands</td>
<td>Researchers/academia</td>
<td>production</td>
</tr>
<tr>
<td>Innovate</td>
<td>Technical product/service innovation</td>
<td>Further improve/develop technologies to sort and process plastics after use into high quality raw materials, especially for fractions currently of little economic value to recycle</td>
<td>Global and sub-national</td>
<td>Medium to long term</td>
<td>Local waste collectors, Recyclers</td>
<td>Consumers; local waste collectors, recyclers</td>
<td>Collection, sorting, processing and disposal</td>
</tr>
<tr>
<td>Circulate</td>
<td>Policy/regulatory/voluntary agreements</td>
<td>Improve the collection efficiency from municipalities and other collection channels for plastics products and work with informal sector where relevant</td>
<td>National and sub-national</td>
<td>Medium to long term</td>
<td>National governments and local governments</td>
<td>Industry and waste management companies</td>
<td>Collection, sorting, processing and disposal</td>
</tr>
<tr>
<td>Circulate</td>
<td>Policy/regulatory/voluntary agreements</td>
<td>Form partnerships to significantly improve the management of municipal solid waste (in particular plastic wastes)</td>
<td>Sub-national</td>
<td>Medium to long term</td>
<td>Local governments</td>
<td>Industry and wastewater management companies</td>
<td>Collection, sorting, processing and disposal</td>
</tr>
<tr>
<td>Circulate</td>
<td>Policy/regulatory/voluntary agreements</td>
<td>Form partnerships to significantly increase the coverage of wastewater and effluent treatment</td>
<td>Sub-national</td>
<td>Medium to long term</td>
<td>Local governments</td>
<td>Industry and wastewater management companies</td>
<td>Collection, sorting, processing and disposal</td>
</tr>
<tr>
<td>Circulate</td>
<td>Financing</td>
<td>Develop and implement policy to incentivize the organization of informal waste collectors and sorters that can operate with independent financing with fair wage and thus not vulnerable to unscrupulous middlemen waste collectors</td>
<td>Sub-national</td>
<td>Medium to long term</td>
<td>Local governments</td>
<td></td>
<td>Collection, sorting, processing and disposal</td>
</tr>
</tbody>
</table>

- **Type of action**: Innovate or Circulate
- **Action domain**: Technical product/service innovation, Policy/regulatory/voluntary agreements, Financing
- **Action description**: Descriptions of specific actions to innovate or circulate products.
- **Scale**: Global and national, Global and sub-national, National and sub-national, Sub-national
- **Time frame**: Short-term, Medium to long term
- **Leading stakeholder**: Global brands, Local waste collectors, Recyclers, National governments and local governments
- **Supporting stakeholder**: Researchers/academia, Consumers; local waste collectors, recyclers, Industry and waste management companies
- **Main life cycle stage**: Raw material, Production, Collection, sorting, processing and disposal
This document provides an action-oriented strategy by identifying a core set of priority solutions to be implemented by targeted stakeholders from the whole plastics value chain under different time horizons, and at different geographical scales. It aims to reduce the leakage of plastics into the (marine) environment as well as its associated impacts, and improve the circularity of the plastics value chain. The recommendations proposed in the Roadmap aim to reduce the adverse environmental, ecological, and socio-economic impacts from marine plastics, while transforming the linear “take-make-dispose” economy into a circular economy.

This roadmap can be used as a reference by funding agencies, governments and civil society organizations to define the scope of their respective strategies on specific working areas and topics, and to facilitate and scale up the interventions on plastic pollution.