Addressing Marine Plastics

A Roadmap to a Circular Economy

Addressing Marine Plastics
A Systemic Approach

UN environment programme

gef

NEW PLASTICS ECONOMY

Ocean Conservancy

GRID ARENDAL
A Centre Collaborating with UNEP

Addressing Marine Plastics: A Roadmap to a Circular Economy

Contributors:
Sandra Averous-Monnery, UN Environment Programme
Christopher Corbin, UN Environment Programme
Sander Defruyt, Ellen MacArthur Foundation
Olivia Finch, Ellen MacArthur Foundation
Keondra Bills Freemyn, Ocean Conservancy
Jean Hillstrom, Ocean Conservancy
Tiina Kurvits, GRID Arendal
Sunday Leonard, Scientific and Technical Advisory Panel of the Global Environment Facility (GEF STAP)
Liana Talaue McManus, GRID Arendal
Llorenç Mila i Canals, UN Environment Programme
Jill Raval, UN Environment Programme
Heidi Savelli, UN Environment Programme
Elisa Tonda, UN Environment Programme
Isabelle Vanderbeck, UN Environment Programme
Feng Wang, UN Environment Programme
Peter Whalley, GEF Consultant
Ran Xie, UN Environment Programme

Suggested citation:
Wang, F., L. Talaue McManus, R. Xie (eds.). *Addressing Marine Plastics: A Roadmap to a Circular Economy*. UN Environment Programme, 2019.

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.

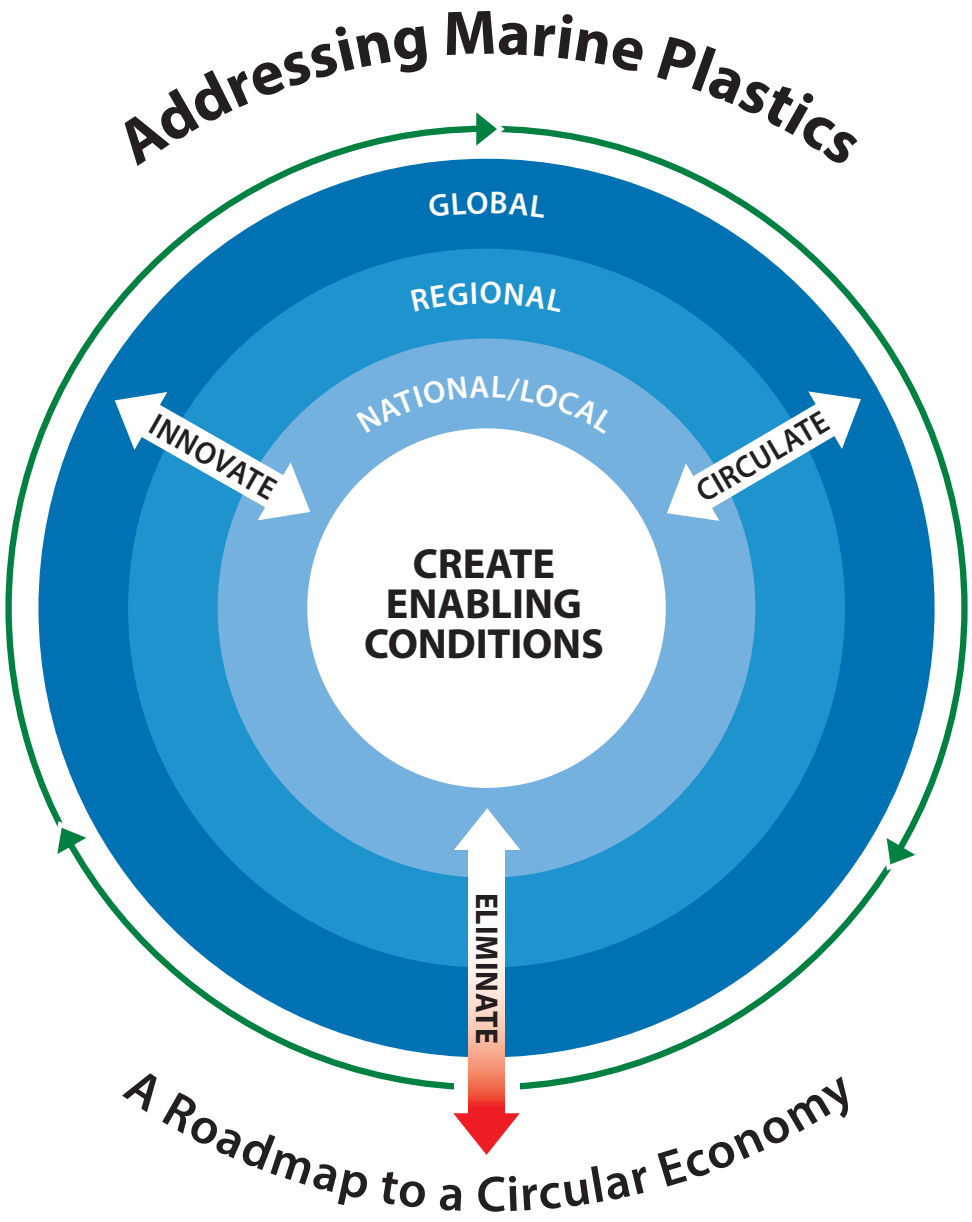
2. ***Eliminate*** all problematic and unnecessary plastic products, including toxic additives;

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

Outcome indicators for Monitoring and Evaluation (M&E)

- Improved circularity of the plastic sector (reduction in production of virgin materials and consumption of plastics, as well as reduction in waste generation; increase in reuse rate, product life time, recycling rate, recycled content in new products etc.; improvement in waste management and infrastructure)
- Reduction of plastics (in tonnage or percentage) entering the environment, including marine environment
- Reduction of impacts on ecosystem service/biodiversity, human toxicity, climate change and resource scarcity

Type of action	**Output indicator for M&E**	**Key actions** (see Annex 2 for detailed list)	**2020–2025**	**2025–Onwards**
Create cross-cutting enabling conditions in terms of policy, finance, research and knowledge, capacity etc.	• Number of multi-stakeholder action groups operating as hubs of circular economy at different geographical scales • Number of baseline analysis completed and made public • Number of methods or tools provided to support decision making in policy and business • Number of policies on circular economy for plastics developed • Number of EPR systems established • Number of governments and/or businesses supported in capacity development and campaigns	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	X	X
		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	X	
		Support research to quantify sources, leakage and impacts of plastics as a country baseline	X	
		Support the government tracking and measuring the progress towards a circular economy for plastic	X	
		Develop and improve methodologies to evaluate the impacts of plastics and their alternatives (such as Life Cycle Assessment)	X	X
		Research transforming secondary materials into high quality "raw" materials	X	X
		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.)	X	
		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	X	
		Provide consumers with better sustainability information (such as eco-labels and standards) and generate incentives for behavior change	X	X
		Develop targeted and effective consumer campaigns, or campaigns in specific sectors (tourism, fishing, etc.)	X	
		Provide funds from EPR system and other channels to sustain investment	X	X
		Develop good practice within governments and businesses, promote the sharing of best practices and innovative solutions, and strengthen capacity development to allow peer learning	X	X

Type of action	Output indicator for M&E	Key actions	2020–2025	2025–Onwards
Eliminate (reduce the consumption and production of problematic and unnecessary plastic products)	• Number of countries banning or restricting problematic and unnecessary plastic products • Percentage of plastics products containing chemicals of concern being eliminated	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	X	
		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)	X	X
		Eliminate chemicals of concern in plastic products	X	X
Innovate (product and system innovation)	• Number of new polymers or alternative materials to replace problematic plastic products identified and applied • Number of new business models identified and applied	Innovate on new polymers, to improve its reusability and recyclability back into high quality materials	X	X
		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	X	X
		Innovate and set up pilots to scale up the most viable new product/packaging designs	X	
		Develop technologies to sort, recycle, process and dispose of plastics after use into high quality raw materials; or technologies on composting	X	X
		Develop new business model and strategy to shift from single-use to reusable plastic packaging and products	X	X
Circulate (reuse, recycling and disposal)	• Percentage of plastics being reusable, recyclable or compostable • Reduction in waste generation • Increase in reuse rate of specific plastic products • Increase in collection rate of plastic waste • Increase in recycling and recovery of plastic waste	Develop policies, incentives and actions to reduce the generation of waste plastics	X	X
		Engage with consumers and users to promote sustainable purchasing, reuse and responsible disposal of plastic products, through education, training and campaigns	X	X
		Form partnerships to significantly improve the management of municipal solid waste (incl. collection, sorting, recycling and disposal)	X	X
		Form partnerships to significantly increase the coverage of wastewater and effluent treatment	X	X
		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	X	X
		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	X	X

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 Pacts (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.

Annex 1: Key deliverables of the GEF Marine Plastics Project, 2017–2019 (https://gefmarineplastics.org)

Seeding circularity ...

Component 1	Component 2	Component 3	Component 4
NEW PLASTICS ECONOMY	Ocean Conservancy	UN environment programme	GRID ARENDAL

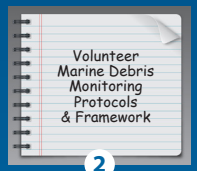
National & Local Systemic Actions

1

Unites all key stakeholders at the national or regional level to implement solutions towards a circular economy.

2

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.



2

Implements volunteer marine debris monitoring protocols.

2

Integrates the role of gender in waste management.

Global & Regional Systemic Actions

1

Unites businesses, governments and other organizations behind a common vision and targets to address plastic waste and pollution at its source.

1

Brings together innovators to develop systemic solutions that prevent plastic from becoming waste in the first place.

3

Networks among multi-stakeholder groups globally & through the UN Regional Seas Programme on marine litter issues.

1

Analyzes the impacts of marine plastics on global ecosystem services.

1

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

... so ecosystems become plastic-free

Component 1 — NEW PLASTICS ECONOMY

Component 2 — Ocean Conservancy

Component 3 — UN environment programme

Component 4 — GRID ARENDAL

National & Local Systemic Actions

2

Assesses baseline level of marine debris in Xuan Thuy National Park, Vietnam.

2

Develops Vietnam's National Action Plan on Marine Debris.

2

Identifies available vs necessary budget to implement a waste management strategy and mechanisms to bridge the gap

Global & Regional Systemic Actions

3

Takes stock of existing knowledge & actions.

3

Maps plastic leakages to identify hotspots along global value chain.

3

Recommends systemic actions to achieve a circular economy.

2

Recommends actions offered to Canada and the G7 ministers to support their ambitious goals for reducing marine plastics.

2

Puts in place necessary elements to ensure effective cooperation and measurable impact to end plastic pollution.

3 4 1 2

Identifies key actions for both short (2020 to 2025) and medium to long terms (from 2025 onwards) to achieve a circular economy for plastics.

Annex 2: List of detailed recommended actions

Type of action	Action domain	Action description	Scale	Time frame	Leading stakeholder	Supporting stakeholder	Main life cycle stage
Create cross-cutting enabling conditions	Advocacy/ capacity building	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	Global, regional, national and sub-national	Short to medium term	Intergovernmental organization/ regional organizations/ National governments	all the other stakeholders	cross-cutting
Create cross-cutting enabling conditions	Advocacy/ capacity building	Develop effective consumer campaigns to encourage consumers demand sustainable options and act at individual level to reduce plastics usage	National	short-term	Civil society organizations	Consumers	consumption and reuse
Create cross-cutting enabling conditions	Advocacy/ capacity building	Deliver awareness-raising campaigns to recreational users of coastal areas on the importance of avoiding littering and preventing losses of fishing gear	National and sub-national	short-term	Local governments	Local waste collectors, recyclers	consumption and reuse
Create cross-cutting enabling conditions	Advocacy/ capacity building	Raise awareness, and provide reliable sustainability information to consumers	National	Medium to long term	National governments, brands, producers	Civil society organizations	consumption and reuse
Create cross-cutting enabling conditions	Knowledge creation	Research to quantify marine-based sources of plastics	Global and national	short-term	Researchers/ academia	National governments/ Intergovernmental organization	cross-cutting
Create cross-cutting enabling conditions	Knowledge creation	Agree on common definitions and methodologies to allow for harmonized data on plastic material flows and consistent sampling of marine litter and microplastics	Global	short-term	Researchers/ academia	Intergovernmental organization/ regional organizations	cross-cutting
Create cross-cutting enabling conditions	Knowledge creation	Develop and maintain databases, with regularly updated data on plastic material flows (including production, consumption, collection, recycling, waste management)	Global	Medium to long term	National governments	Intergovernmental organization/ regional organizations	cross-cutting
Create cross-cutting enabling conditions	Knowledge creation	Develop and improve methodologies to evaluate the impacts of plastics and their alternatives (such as Life Cycle Assessment)	Global	Medium to long term	Researchers/ academia	Intergovernmental organization/ regional organizations	raw material

Type of action	Action domain	Action description	Scale	Time frame	Leading stakeholder	Supporting stakeholder	Main life cycle stage
Create cross-cutting enabling conditions	Knowledge creation	Research transforming secondary materials into high quality "raw" materials	Global	Medium to long term	Global brands	Researchers/ academia	raw material
Create cross-cutting enabling conditions	Knowledge creation	Develop consistent terminology for waste data and consistent methodologies for waste sampling and waste characterization	Global	Medium to long term	Intergovernmental organization/ regional organizations	Researchers/ academia	Collection, sorting, processing and disposal
Create cross-cutting enabling conditions	Knowledge creation	Research to better understand what drive consumer behavior with regards to single-use plastic consumption and littering	National	Medium to long term	Researchers/ academia	Consumers	consumption and reuse
Create cross-cutting enabling conditions	Policy/ regulatory/ voluntary agreements	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	Global	short-term	National governments	National producers	production
Create cross-cutting enabling conditions	Policy/ regulatory/ voluntary agreements	Provide incentives for industry to use secondary polymers, such as through recycled content standards, voluntary commitments, minimum requirements, green public procurement, etc.	Global and national	short-term	National governments	Intergovernmental organization/ regional organizations	raw material
Create cross-cutting enabling conditions	Policy/ regulatory/ voluntary agreements	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	Regional and national	Medium to long term	Global brands	National governments	cross-cutting
Create cross-cutting enabling conditions	Policy/ regulatory/ voluntary agreements	Governments set up policies on sustainable public procurement to create demand for recycled plastics	National	short-term	National governments	National producers	consumption and reuse
Create cross-cutting enabling conditions	Policy/ regulatory/ voluntary agreements	Establish economic incentives to reward sustainable consumption	National	Medium to long term	National governments	Consumers	consumption and reuse
Create cross-cutting enabling conditions	Policy/ regulatory/ voluntary agreements	Implement standards for product labelling (including on packaging) to provide consumers with understandable and reliable information on sustainable choices	National	Medium to long term	National governments	National producers	consumption and reuse

Type of action	Action domain	Action description	Scale	Time frame	Leading stakeholder	Supporting stakeholder	Main life cycle stage
Create cross-cutting enabling conditions	Policy/ regulatory/ voluntary agreements	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	National and sub-national	Short-term	National governments	Producers, waste management companies	Collection, sorting, processing and disposal
Create cross-cutting enabling conditions	Policy/ regulatory/ voluntary agreements	Develop public-private partnerships, with brands/industry contributing to the set-up of initiatives and infrastructure to manage their products after use	Sub-national	Medium to long term	Brands, waste management companies and governments (including local governments)	Intergovernmental organizations/ National governments	Collection, sorting, processing and disposal
Eliminate	Technical product/ service innovation	Voluntary elimination of problematic and unnecessary plastic products (possibly stimulated or adapted by policy)	Global and regional	Short-Term	Global brands	Intergovernmental organization/ regional organizations	production
Eliminate	Policy/ regulatory/ voluntary agreements	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	Global and national	Medium to long term	National governments	National producers	raw material
Eliminate	Policy/ regulatory/ voluntary agreements	Ban or otherwise restrict products with high plastic losses to the environment (such as microbeads)	National	short-term	National governments	Researchers/ academia	production
Innovate	Technical product/ service innovation	Innovate on new polymers, to improve its reusability and recyclability back into high quality materials	Global	Medium to long term	Global brands	Researchers/ academia	raw material
Innovate	Technical product/ service innovation	Innovation in business models to shift from single-use to reusable plastic packaging and products	Global and regional	Short to Medium term	Global brands/ producers	National producers	production

Type of action	Action domain	Action description	Scale	Time frame	Leading stakeholder	Supporting stakeholder	Main life cycle stage
Innovate	Technical product/ service innovation	Design for recyclability in plastics formation (i.e. reducing/avoiding additives that make plastic difficult to recycle)	Global and national	Short-term	Global brands	Researchers/ academia	raw material
Innovate	Technical product/ service innovation	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)	Global and national	Medium to long term	Global brands	Researchers/ academia	production
Innovate	Technical product/ service innovation	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	Global and sub-national	Medium to long term	Local waste collectors, Recyclers	Consumers; local waste collectors, recyclers	Collection, sorting, processing and disposal
Circulate	Policy/ regulatory/ voluntary agreements	Improve the collection efficiency from municipalities and other collection channels for plastics products and work with informal sector where relevant	National and sub-national	Medium to long term	National governments and local governments	Industry and waste management companies	Collection, sorting, processing and disposal
Circulate	Policy/ regulatory/ voluntary agreements	Form partnerships to significantly improve the management of municipal solid waste (in particular plastic wastes)	Sub-national	Medium to long term	Local governments	Industry and wastewater management companies	Collection, sorting, processing and disposal
Circulate	Policy/ regulatory/ voluntary agreements	Form partnerships to significantly increase the coverage of wastewater and effluent treatment	Sub-national	Medium to long term	Local governments	Industry and waste management companies	Collection, sorting, processing and disposal
Circulate	Financing	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	Sub-national	Medium to long term	Local governments		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.