



The Ocean Plastics Reduction Guide

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Abbreviations

ADB	Asian Development Bank
AfDB	African Development Bank
ASEAN	Association of Southeast Asian Nations
CDP	Cassa Depositi e Prestiti
COI	Clean Oceans Initiative
EIB	European Investment Bank
UNDP	United Nations Development Programme

Preamble

The objective of this guide is to raise awareness about the crucial socioeconomic, environmental and climate importance of the oceans, and the growing existential threats posed by plastics discharged into and accumulating in the oceans.

The guide illustrates how the lack of or substandard management systems for solid waste and wastewater in many coastal cities, especially in sub-Saharan Africa and Asia, contribute to the problem. It then highlights how the problem will increase unless action is taken due to increasing global production and use of plastics.

After presenting the key regulatory, institutional, technical and financing challenges and barriers to addressing the ocean plastics problem, the guide discusses ways to reduce and prevent plastic discharge by addressing these challenges and barriers.

Given the importance of financing, the guide identifies numerous sources of financing for plastic-reduction projects, including the Clean Oceans Initiative,¹ under which the European Investment Bank and four other European financing institutions support projects that reduce ocean plastics discharge.

The guide is intended to inspire policymakers, planners, project promoters and other stakeholders to engage in addressing the ocean plastics problem and catalyse impactful action and change.

While the guide concentrates on oceans, the problems highlighted are equally important and solutions proposed equally relevant for the seas and for larger lakes and rivers.

¹ See section 6.2.

1. Introduction

1.1. The oceans

Oceans and seas cover about 75% of the earth's surface, contain nearly 200 000 identified species,² and generate more than 50% of the planet's oxygen.³

Oceans are a global public good benefiting most countries and people, including current and future generations, by providing essential ecosystem services and natural resources, including food and feed; new active ingredients for improved plant, animal and medical products; and renewable energy. As such, oceans play a vital role in the world economy and will be central to the post-COVID-19 global economic recovery.

According to the United Nations Development Programme (UNDP), more than 3 billion people depend on coastal and marine biodiversity for their livelihood, while the global market value of marine and coastal resources and industries is approximately \$3 trillion per year (5% of global gross domestic product).⁴ Ocean-based industries make a significant contribution to employment growth. The sector is projected to provide about 40 million full-time equivalent jobs by 2030.⁵ Strong growth is expected in tourism, aquaculture, fish processing, offshore wind, shipbuilding and repair.

The oceans are the world's largest active carbon reservoir, absorbing about 30% of human CO₂ emissions to the atmosphere.⁶ Oceans also absorb a large share of the excess heat caused by increasing greenhouse gas emissions into the atmosphere. As such, oceans are essential in regulating the global climate.

2 "Goal 14: Life below water," United Nations Development Programme (UNDP). ([link](#))

3 "How much oxygen comes from the ocean?" National Oceanic and Atmospheric Administration. ([link](#))

4 "Goal 14: Life below water," UNDP. ([link](#))

5 "The ocean economy in 2030," Organisation for Economic Co-operation and Development. ([link](#))

6 "Goal 14: Life below water," UNDP. ([link](#))

1.2. Threats to the oceans

Oceans face several threats, with the increasing accumulation of plastics being one of the most alarming. There are more than 5 trillion pieces of plastic afloat in the oceans.⁷ About 8 million tonnes of plastic litter⁸ and 1.5 million tonnes of microplastics are discharged into the oceans every year,⁹ primarily from coastal or riverine cities with limited waste and wastewater collection and no or substandard systems of waste disposal and wastewater treatment. Rivers collectively discharge between 0.47 million and 2.75 million tonnes of plastics into the oceans per year.¹⁰

Just ten rivers, eight in Asia and two in Africa, carry about 93% of river-transported plastics to the oceans.¹¹ The Yangtze in China discharges approximately 1.5 million tonnes of plastic waste into the Yellow Sea every year,¹² while the Indus and the Ganges flowing through India carry the second and sixth highest quantities of plastic wastes to the oceans.¹³ The other rivers on this list are the Amur, Hai, Pearl, Mekong and Yellow River in Asia, and the Niger and Nile in Africa.

Ocean plastics are discharged in different forms, most common of which are single-use items such as bags, water bottles, straws, food containers and cutlery. These items are used and discarded quickly but can circulate in the oceans for centuries if not properly managed on land. A large share of the ocean plastics break down into tiny pieces or microplastics that further endanger marine ecosystems.

Oceans also face other threats, such as coastal pollution, for example from nutrients and pollutants in untreated wastewater or from unsustainable agriculture; oil spill; overfishing; acidification; and global warming. Untreated wastewater from industrial plants and factories, and agrochemical run-off end up in the oceans, resulting in oxygen depletion that threatens marine plants and fish. In addition, overfishing has been identified as a major challenge in most parts of the world. The United Nations Food and Agriculture Organization estimates that close to 31.4% of fish stocks are either fished to capacity or overfished.¹⁴ Consequently, the ocean's natural assets are under enormous pressure, with the health of many ocean ecosystems already in steep decline.¹⁵

7 "Plastic pollution in the world's oceans: more than 5 trillion plastic pieces weighing over 250,000 tons afloat at sea," Eriksen, Marcus, et al. *PLoS ONE* 9, no. 12, 2014. ([link](#))

8 "Plastic waste inputs from land into the ocean." Jambeck, Jenna, et al. *Science* 347, no. 6223, 2015. ([link](#))

9 "Primary microplastics in the oceans: A global evaluation of sources," Boucher, Julien, and Damien Friot. International Union for Conservation of Nature, Gland, Switzerland, 2017. ([link](#)).

10 "Stemming the Plastic Tide: 10 Rivers Contribute Most of the Plastic in the Oceans," Patel, Prachi. *Scientific American*, 2018. ([link](#))

11 *Ibid.*

12 *Ibid.*

13 "Export of plastic debris by rivers into the sea," Schmidt, Christian, Tobias Krauth, and Stephan Wagner. *Environmental Science & Technology* 51, no. 21, 2017. ([link](#))

14 "The state of world fisheries and aquaculture," Food and Agriculture Organization, 2016. ([link](#))

15 "Global Assessment Report on Biodiversity and Ecosystems Services," Brondizio, Eduardo., et al . IPBES Secretariat, Bonn, Germany, 2019. ([link](#))

1.3. The need for ocean conservation

Conservation and sustainable use of the world’s oceans are recognised in UN Sustainable Development Goal 14 (Life below Water). Moreover, many countries, international organisations and companies producing or using plastics have announced their priority given to conserving and protecting the oceans, recognising the significance of the ocean environment for the economy and climate regulation. There is growing realisation that marine litter greatly reduces the total economic value of the marine environment.

The European Commission’s Communication on a Sustainable Blue Economy¹⁶ aligns the EU’s ocean and maritime policy with the goals of the European Green Deal. It commits the EU to a climate-neutral blue economy and to the targets for protecting marine biodiversity and pollution-free seas and oceans in the Zero pollution action plan for air, water and soil¹⁷.

The European Commission has identified “healthy oceans, seas, coastal and inland waters” as one of five major research and innovation missions under the Horizon Europe programme, which forms part of the 2021–2027 Multiannual Finance Framework.

Figure 1: Plastic waste accumulating in pristine waters



¹⁶ EU Communication on a Sustainable Blue Economy ([link](#))

¹⁷ EU Zero pollution action plan for air, water and soil. ([link](#))

2. Ocean plastic pollution

2.1. Global plastic production and waste handling

The annual production of plastics increased nearly 200-fold from around 1950, when industrial-scale production started, to 2015.¹⁸ The cumulative global production of plastics during 1950–2015 was 8.3 billion tonnes,¹⁹ of which an estimated 6.3 billion tonnes became waste. Only around 9% of this waste has been recycled, with 12% incinerated and the remaining 79% accumulating in landfills or the natural environment, including the oceans.²⁰ This shows the great need and potential to increase the level of plastic recycling, which would also reduce the share reaching the oceans.

Figure 2: Plastics in an open dumpsite in Mukdahan Province, Thailand



18 "Plastic pollution," Ritchie, Hannah, and Max Roser. Our World in Data, September 2018. ([link](#))

19 "More than 8.3 billion tons of plastics made: Most has now been discarded," ScienceDaily. University of Georgia, 19 July 2017. ([link](#))

20 "Production, use, and fate of all plastics ever made," Geyer, Roland, Jenna Jambeck and Kara Lavender Law. Science Advance 3 no. 7, 19 July 2017. ([link](#))

Plastics can be very useful materials; their many contributions include reducing food wastage and the weight of vehicles. However, plastic waste that is dumped, rather than collected, or disposed in dumpsites or substandard landfills can be carried by the wind and stormwater drainage systems to rivers and then oceans. It has been estimated that up to 80–90% of plastic wastes generated across some countries in sub-Saharan Africa and South Asia are inadequately disposed of and consequently end up in the environment or oceans²¹ with devastating impact on flora and fauna.

The problem of mismanaged plastic wastes cuts across different geographical regions and countries, with particular concentration in low- and medium-income countries. Table 1 lists the top ten ranked countries for amount of mismanaged plastic wastes in 2010.

Table 1: Top ten global rankings for mismanaged plastic wastes in 2010

Rank	Country	Mismanaged plastic wastes (tonnes)	% of global total of mismanaged plastic wastes	Plastic marine debris (tonnes)
1.	China	8.82	27.7	1.32–3.53
2.	Indonesia	3.22	10.1	0.48–1.29
3.	Philippines	1.88	5.9	0.28–0.75
4.	Vietnam	1.83	5.8	0.28–0.73
5.	Sri Lanka	1.59	5.0	0.24–0.64
6.	Thailand	1.03	3.2	0.15–0.31
7.	Egypt	0.97	3.0	0.15–0.39
8.	Malaysia	0.94	2.9	0.14–0.37
9.	Nigeria	0.85	2.7	0.13–0.34
10.	Bangladesh	0.79	2.5	0.12–0.31

Source: Jambeck et al., 2015

21 “Plastic pollution,” Ritchie, Hannah, and Max Roser. Our World in Data, September 2018. ([link](#))

Approximately 80% of ocean plastics originate from land-based littering and poor disposal practices. Inadequate disposal of old fishing nets, ropes and lines also contributes a significant share of ocean plastics. It is important to note that plastic debris floating on the surface accounts for only about 5% of all plastic litter discharged into the oceans. The remaining 95% is submerged, with a large share accumulating on the sea floor.²²

The Breaking the Plastic Wave study²³ predicts that if we fail to act, by 2040:

- the volume of plastic on the market will double compared to 2016;
- the annual volume of plastic entering the ocean will almost triple, from 11 million tonnes in 2016 to 29 million tonnes in 2040;²⁴
- ocean plastic stocks will quadruple to over 600 million tonnes compared to 2016.

Figure 3: Plastics washed ashore on a beach next to the Panama Canal



22 "Marine plastic pollution," Ocean Unite, 2020. ([link](#))

23 "Breaking The Plastic Wave: Top findings for preventing plastic pollution," Reddy, Simon, and Winnie Lau. The PEW Charitable Trusts, 2020. ([link](#))

24 Ibid.

2.2. Sources of plastics discharge into the oceans

There are various sources of macro- and microplastics discharged into the oceans, including:

- land-based plastics discharged in **coastal cities and towns**;
- plastics accumulating in rivers, compounding the land-based discharges from **upstream riverine cities and towns**;
- plastics discharged from **oceanic activities**;
- microplastics in **non-collected or non-treated wastewater or stormwater** discharged into rivers and oceans.

The main reasons for these plastics discharges are presented below.

Illegal plastic littering is caused by lack of or poor waste collection services, a problem more pronounced in informal settlements not served by formal waste collection services. The estimate that about 2 billion people lack access to organised waste collection services²⁵ illustrates the extent of this problem.

Figure 4: Waterway filled with plastics in Manila, the Philippines



²⁵ "The mounting problem: World's cities produce up to 10 billion tonnes of waste each year, UN study estimates," UN Environment Programme, 7 September 2015. ([link](#))

Illegal and substandard waste dumping and disposal is caused by a lack of properly sited, designed and operated landfills and dumpsites leading to clandestine waste dumping. When such dumpsites are located next to rivers or the coast, they may discharge waste when full or during storm or flood events. Some communities without disposal sites even dispose of collected waste directly in rivers. An estimated 3 billion people have no access to adequate waste disposal facilities,²⁶ showing the scale of this issue.

Plastics of marine origin emanate from ships of different kinds, discharge or loss of fishing gear at sea, and plastic waste from sea-based aquaculture.²⁷

No or insufficient stormwater/wastewater collection and treatment leads to the discharge of microplastics into water bodies. These microplastics originate, for example, from tyre abrasion, cosmetic microbeads, and fibres released from synthetic clothing during washing.

During rainy seasons/days, **run-off water transports plastics and other waste from streets and open spaces to stormwater drains and canals, where their accumulation** reduces hydraulic capacity. Storms and heavy rains may then lead to flooding until the flow is high enough to transport the accumulated plastics and waste to rivers, lakes or oceans.

Finally, **environmental and natural factors** such as wind and ultraviolet radiation result in fragmentation and plastic dispersion.

2.3. Impact of ocean plastics on marine ecosystems

Marine litter has been found inside birds, turtles, mammals, and fish of different types and sizes. Microplastics have also been detected in some filter-feeding organisms such as mussels. The United Nations estimates that at least 800 species of marine organisms and microorganisms are affected by plastic debris.²⁸ The most visible and disturbing effects of plastics in the oceans are presented below.

Ingestion of plastic debris increases susceptibility to blockage of and physical damage to the intestinal tract. Uptake of polychlorinated biphenyl in the marine food chain causes reproductive health complications due to ingested plastic weight. **Entanglement** in ropes, plastic debris and abandoned fishing nets causes lacerations, infections, reduced mobility and internal injuries for many marine species. Plastics can also affect turtles' **reproduction rates** by changing the temperature of the sand in which they incubate eggs.

26 "The mounting problem: World's cities produce up to 10 billion tonnes of waste each year, UN study estimates," UN Environment Programme, 7 September 2015. ([link](#))

27 "Sources, transport, and accumulation of different types of plastic litter in aquatic environments: A review study," Schwarz, Anne, Tom Ligthart, Elise Boukris, and Toon van Harmelen. *Marine Pollution Bulletin* 143, June 2019. ([link](#))

28 "Microplastics, microbeads and single-use plastics poisoning sea life and affecting humans," UN News, 9 November 2019. ([link](#))

Plastics kill more than a million seabirds every year and raise other species' susceptibility to contamination; for example, dolphins are vulnerable to plastic ingestion through their prey. Microplastics are likely to concentrate persistent organic pollutants in the food chain through biomagnification. Floating plastics can also serve as a **vector for the spread of species with slow mobility, invasive species and bacteria** that are detrimental to the marine ecosystem, particularly its diversity.

Figure 5: Small crab entangled in a plastic bag



2.4. Impact of ocean plastics on fisheries and other economic activities

Plastic waste clogs waterways and disrupts essential socioeconomic activities such as aquaculture, fisheries, tourism and shipping.

In **aquaculture**, marine debris damages propellers and equipment, resulting in staff downtime.

In **fisheries**, marine litter can negatively affect fishing vessels' propellers and fishing equipment, thereby reducing efficiency and revenues. Ghost fishing, whereby derelict gear and lost/abandoned nets remain in the marine environment, can trap fish and other marine life for long periods, entangling and potentially killing marine species.²⁹ This can reduce fish stocks and catch available. In a study to investigate the economic impact of marine litter on coastal communities in the Northeast Atlantic region, John Mouat et al. (2010) identified that among surveyed Scottish fishing vessels, 86% had experienced a restricted catch due to marine litter, 82% had encountered a contaminated catch, and 95% had snagged their nets on debris on the seabed.³⁰

Figure 6: Ghost fishing in an abandoned fishing net



29 "Economic Impacts of Marine Litter," Mouat, John, Rebeca Lopez Lozano, and Hannah Bateson. Kommunernes Internasjonale Miljøorganisasjon, 2010. ([link](#))

30 Ibid.

Coastal communities and tourism incur extra costs to keep beaches clear of litter. Waste affects the aesthetic value of vital tourist attractions along coastal shores and oceans, leading to decreased tourism-related revenues. For example, a South African study found that 85% of tourists and residents would not visit a beach with more than two debris items per metre.³¹

Figure 7: Plastics accumulating on Kuta Beach, Bali



The **shipping sector** faces increased costs from ocean plastics damaging vessels, in some cases necessitating emergency rescue operations. In 2008 there were 286 rescue operations to vessels with fouled propellers in UK waters, costing between €830 000 and €2 189 000.³² Entanglement of vessels in plastic debris and the fouling of vessel propellers are major causes of mechanical breakdowns and ocean accidents. The costs of litter removals and management in harbours and marinas are also rising. Another serious hazard is the entanglement of divers and swimmers in abandoned fishing nets and plastics.

The **long-term accumulation of plastic debris** in all levels of the **food web** poses an existential threat to the welfare of coastal communities and their economic activities, including fishing, retail and restaurant trades, and sea navigation.

³¹ "Economic Impacts of Marine Litter," Mouat, John, Rebeca Lopez Lozano, and Hannah Bateson. Kommunernes Internasjonale Miljøorganisasjon, 2010. ([link](#))

³² Ibid.

2.5. Impact of ocean plastics on climate

Exposure to sunlight and heat triggers the breakdown of plastics, resulting in emissions of ethylene and methane, which are greenhouse gases that contribute to climate change.³³

Ocean plastic also endangers the lanternfish (myctophids) population responsible for carbon sequestration that reduces human-induced CO₂ emissions in the atmosphere by about 20–35% through daily mass migration in all seven seas.³⁴ Lanternfish sequester carbon by feeding on carbon-rich zooplankton and depositing carbon-rich waste on the seabed. However, it is estimated that the ratio of ocean plastic debris to zooplankton in the North Pacific is 6 to 1, raising concerns that lanternfish could mistake plastic fragments for food, and thus consume harmful, potentially deadly substances.³⁵ Ingestion of ocean plastics by lanternfish might explain the recent disappearance of mass quantities of plastics from the surface waters of the world's five major gyres.

Figure 8: Lanternfish



33 "Double trouble: plastics found to emit potent greenhouse gases," Ferguson, Brian. UN Environment Programme, 24 August 2018. ([link](#))

34 "Commentary: Plastics in ocean have a substantial effect on climate," Mosko, Sarah. Los Angeles Times, 3 November 2017. ([link](#))

35 Ibid.

3. The challenges of ocean plastics

A key goal in addressing ocean plastics is to find circular solutions to plastic pollution, through reducing, reusing and recycling plastics. To this end, it is necessary to focus particularly on related challenges, which can be grouped into technical, regulatory and governance, institutional and financing challenges.

3.1. Technical challenges

The main technical challenges of preventing plastics discharge into the oceans involve identifying sustainable ways and means to increase the collection of plastics and other waste, particularly in peri-urban and informal settlements not serviced by formal collection systems. This is especially challenging for plastics that may be difficult to recycle and thus have low or zero value.

Almost 95% of all plastics are produced from virgin feedstock, namely fossil fuels that benefit from scale economies and abundance in supply.³⁶ By contrast, the structural cost premium (marginal cost per tonne required for collection, transfer, and processing recyclables) and low recycling rates greatly influence the costs of collecting, sorting and recycling plastics. The problem is aggravated by most recycling systems being small and decentralised.

A disconnect between the benefits, costs and negative effects of plastics production and use adversely affects prevention strategies.³⁷ Financial benefits from plastic manufacturing are often skewed more towards developed countries with low plastic leakage, while the harmful effects of plastic pollution and leakage from widespread mismanagement are concentrated in less economically developed countries.

In the absence of technologies, methodologies or tools to track materials and validate industry behaviour across plastic value chains, it is more difficult to promote circularity, prevent plastics consumption and ensure proper management of plastic waste.³⁸

Substitution of single-use plastics with reusable or non-plastic materials is a priority measure, but it can be challenging to find suitable alternative materials and designs, and to convince packaging producers and consumers to opt for more circular alternatives.

³⁶ "Clearing a path through the waste: Essential transparency in the plastics supply chain," Mindereroo Foundation and SYSTEMIQ, 2020. ([link](#))

³⁷ Ibid.

³⁸ Ibid.

The introduction of bio-based and compostable polymers remains a concern for the plastic recycling industry as most countries lack the required infrastructure for separate collection and the commercial facilities required to compost such plastics. Composting of biodegradable polymers can be affected by the presence of contaminants, such as additives used to improve physical properties, leading to low-quality compost or the release of harmful chemicals into the environment. The mistaken belief that biodegradation in the environment occurs quickly can result in increased littering of biodegradable materials. Some bio-based plastics can also negatively affect recycling when mixed with fossil plastics.

Consumer plastics are formed of various polymers, and some packaging (e.g. multimaterial trays) includes more than one type of plastic to give particular properties. Additives of different kinds may also be added. In combination, these factors lead to varying recycling potential and resilience to contamination. Consequently, in setting up plastics collection and recycling systems, the following challenges must be properly considered: the incompatibility of some plastics in recycling; the negative impact of some additives; the difficulties of properly sorting different types of plastics; and different potentials for recycling.

Plastics collection approaches and efficiency directly affect the cost and revenue potential of recycling. Extracting plastics from mixed waste produces a contaminated feedstock that is more difficult to recycle than if the different types of plastics are collected separately. A better approach is to establish source segregation and separate collection systems, but these may be challenging to organise and require the participation of waste generators. The cleaner and better separated (by type and colour) the collected materials, the easier it is to produce good quality recyclable materials, leading in turn to higher revenues. Creating a balance between collection efficiency, costs and revenues affects the economics of sustainable recycling programmes.

Some types of plastic waste, such as old fishing gear or plastics retrieved from rivers, may be expensive to recycle because of the additional cost of removing organic contaminants and build-up materials prior to recycling.

Figure 9: Old fishing gear



The market for recycled plastics is often limited by lack of demand from producers. Recycled materials face competition from virgin materials based on price, quality and availability. A lack of quality standards, particularly for food-grade applications, may also limit the trust of plastic products and packaging producers in recycled plastic alternatives. Therefore, recycling companies may face difficulties securing offtake of their produced materials, which may reduce the chances of securing financing.

For microplastics, the source and origin vary and may be difficult to properly capture. The smaller the fragments, the greater the difficulty of discovery, extraction and proper treatment. In addition, the processing time increases as plastic components disintegrate into smaller particles. This may be solved through developing or expanding wastewater collection systems and establishing wastewater treatment plants that capture microplastics through common treatments (pre-treatment, primary, secondary and tertiary treatment). However, microplastics end up in sewage sludge and, if the sludge is used in agriculture, microplastics can re-enter the natural environment, with unknown consequences.

Further to the direct discharge of microplastics, a large share of plastic litter discharged into oceans degrades over time into smaller microplastic fragments. After such fragmentation, microplastics can sink into river and ocean beds, which further complicates detection and collection.

3.2. Regulatory and governance challenges

Several regulatory and governance challenges can affect the planning and implementation of projects to prevent discharge of plastics into the oceans.

The legal framework on ocean governance and plastic pollution prevention is loose and disjointed, and there are no binding international conventions regulating ocean plastic pollution. This complicates the formulation and implementation of ecosystem-based, precautionary solutions to ocean governance challenges. There is also a lack of specific international regulations to protect the ocean ecosystem from rising point and non-point sources of pollution like shipping and anthropogenic activities. The current ocean regulatory framework is summarised in Annex A.

Effective compliance and enforcement measures and mechanisms and related capacity needed for solid waste management and plastic litter reduction are often lacking at local, regional and international levels. Consequently, neither the international community's interest in protecting ocean ecosystems nor local communities' interests in preserving local environment and resources are properly safeguarded.

Capacity is also often inadequate to enforce precautionary tools like environmental impact assessments, strategic environmental assessments, marine spatial planning, and area-based monitoring and reporting measures.

Bureaucratic custom processes and licensing procedures often hinder or delay the transport of plastics and other waste types for recycling between countries. Without such shipments, it may be difficult for recycling facilities to reach economies of scale.

Significant public knowledge gaps persist on the importance and benefits of plastics reduction, reuse, and recycling, as well as the adverse impact on the environment, public health and climate from waste littering and dumping. This makes it difficult to introduce, improve or expand separate plastic collection systems.

There is also large diversity in relevant policies, legal frameworks and commitments, and varying levels of implementation and reporting. Consequently, it is challenging to hold relevant parties accountable for implementing ambitious and verifiable actions to support the transition to more circular models.³⁹

3.3. Institutional challenges

No global organisation has responsibility for sustainable management and utilisation of shared, transboundary resources like oceans. There is also no international agency overseeing solid waste management and the application of conservation principles in all industrial and human activities.

It is often unclear how responsibility is distributed among the different national and local stakeholders involved in solid waste management. This lack of clear mandates complicates the planning and implementation of projects and the provision of solid waste services. Under a sectoral approach, different institutions or agencies tend to develop and implement programmes on marine conservation independently. This is particularly challenging for stakeholder participation, transparency, accountability and equitable sharing of resources.

Provision of waste collection and disposal services may prove difficult to organise and finance in developing cities. These challenges are most pronounced in peri-urban and informal settlements, which can be inaccessible to conventional collection vehicles and where authorities may be reluctant to provide such services.

Standardised or coordinated systems for monitoring and retrieving ocean plastic debris are yet to be established. Furthermore, the relevant institutions do not exchange information or collaborate on identifying marine litter hotspots and attempting to retrieve such marine litter or lost fishing gear.

39 Clearing a path through the waste: Essential transparency in the plastics supply chain," Minderoo Foundation and SYSTEMIQ, 2020. ([link](#))

3.4. Financing challenges

Solid waste management is a vital service for making cities clean, liveable and resilient, and for preventing the discharge of plastics into the oceans. However, financing for such investments and services is often difficult to access, especially in developing countries.

Solid waste management programmes often require a substantial portion of the municipal budget. However, equipment and facilities required for proper services may not be regarded as priority investments for governments already struggling with scarce budgetary resources.

The lack of clear mandates and responsibilities for waste collection and recycling may make it difficult to secure financing for required investments. Many recycling initiatives are small and operated by private enterprises that may lack the skills for developing a bankable project.

Investors and corporates are also unaware of or not properly considering linear plastic value chain risks related to possible future negative externalities, increasing awareness of customers, and the costs of waste management, environmental clean-up and increased costs for healthcare caused by exposure to waste and toxic chemicals.⁴⁰

Many cities in developing countries have no or only limited user charges to cover the costs of solid waste service provision, while affordability constraints limit the prospects of full cost recovery when user charges are introduced. There may also be a lack of political will to introduce or raise such user charges. In these cases, investment grants and operational subsidies are required to cover the costs of upgraded systems, facilities and services, which may be difficult to secure and guarantee for the life of a project.

For recycling facilities, it may be difficult to secure plastic feedstock and recycled material offtake contracts and guarantees, which could undermine the bankability of projects.

⁴⁰ Clearing a path through the waste: Essential transparency in the plastics supply chain," Minderoo Foundation and SYSTEMIQ, 2020. ([link](#))

4. Technical solutions to ocean plastic pollution

Addressing the increasingly alarming problem of plastics leaking into and accumulating in the oceans will require extensive, coherent efforts in many areas. The Breaking the Plastic Wave study⁴¹ suggests that to reduce plastic leakage into the oceans, the global community must: 1) prioritise research and development investments and innovations beyond known solutions to eliminate plastics that consumers do not need; 2) promote circularity, alternative business practices, material substitutes, and refill systems; and 3) scale up waste reduction, collection, recycling and controlled disposal, particularly in middle- and low-income countries.

The rest of this section presents concrete examples of technical solutions to ocean plastic pollution.

4.1. Plastic reduction and prevention

A key approach to reducing plastics in the oceans is to avoid and prevent the generation of plastic waste, in line with the waste hierarchy. Some potential plastic reduction and prevention measures are as follows:

- **Design changes**, such as lightweighting, can reduce the use of plastics (e.g. in packaging) and thereby also reduce the generation of plastic waste.
- **Bulk dispensing systems**, such as for beverages and grains, are an efficient way to reduce the use of single-use plastic packaging and related litter. The technology is operational in many parts of Africa (e.g. Kenya), particularly in informal and low-income settlements. While this is a promising approach, the uptake has so far been slow.

Figure 10: Fresh milk from farm vending machine at farmers market in Ljubljana, Slovenia



41 "Breaking The Plastic Wave: A comprehensive assessment of pathways towards stopping ocean plastic pollution," Reddy, Simon, and Winnie Lau. The PEW Charitable Trusts, 2020. ([link](#))

- **Reusable packaging, bags, etc.** will reduce the use and discharge of single-use plastic bags and other products. Kenya banned single-use plastic bags on 28 August 2017 to promote reusable or biodegradable fibre bags. Kenyan citizens are encouraged to bring their own bags or carry goods in buckets as a strategy for ensuring plastic waste prevention. Similar bans have been introduced in Botswana, Eritrea, Mauritania, Morocco, Rwanda, Uganda and Tanzania. In total, 16 African countries have introduced total or partial bans on the manufacture, import and use of disposable plastic bags within their borders.⁴²
- **Non-plastic material replacements**, such as fibre, wood and bamboo, can replace plastics in products and packaging, thereby reducing the consumption of single-use plastics. It is important, though, to properly consider the performance and environmental footprint of the alternative materials.
- **Ocean biodegradable plastics** can be produced from renewable biomass like cellulose, starch and chitosan. If designed to quickly and fully degrade in an ocean environment, any non-collected plastics of such types that reach the ocean will only have a short-term negative impact on the environment and marine life. Ideally, such plastics should be bio-based, rather than derived from fossil fuels, thereby reducing the impact on the climate. The potential negative impact of co-recycling such plastics with conventional plastics must be properly considered.
- **Compostable plastics** are sometimes suggested as a means to reduce the impact of plastic waste. However, the mistaken belief that such plastics will quickly degrade can result in them being discarded in the natural environment. Industrial-scale composting facilities are often needed to ensure full biodegradation of such plastics.
- **Engineered plastic-consuming enzymes** can be used to break down polymer chains on an industrial scale. Such systems can be used in recycling facilities or added to polymers to accelerate degradation.
- Implementing **life-cycle assessment** for products with plastic components can provide a basis for improving their design. Eco-design improvements can aim to increase the reusability and recyclability of products and packaging, and to reduce toxicity and energy intensity.
- **Tools and technologies** for improved material tracking and data collection and analysis enable better control of material flows and facilitate circularity in value chains. This can comprise innovative combinations of hardware (e.g. satellite communication and remote sensing) and software: for instance, artificial intelligence and machine learning can be combined to enable data analysis and visualisation. Human networks, including citizen science, crowd-sourced data and open innovation, can also play a role.⁴³

42 "34 plastic bans in Africa: A reality check," Greenpeace Africa, 19 May 2020. ([link](#))

43 Ibid.

4.2. Improved solid waste management

Improved solid waste management in coastal and riverine cities is a key measure for reducing the discharge of plastics into the oceans. Investments can support the efficient collection, treatment and disposal of discarded materials, emphasising plastic reduction, reuse and recycling to the extent these activities are economically feasible. The key components of improving solid waste management systems are as follows:

- Undertaking a **baseline study to map the effects of mismanaged plastics and assess the costs and benefits of improved waste management** will guide planners and decision-makers in formulating impactful legislation and allocating sufficient budgets. Such a study would also build public awareness and mobilise the support of NGOs to promote more effective consumer behaviour.
- **Developing standard measures and analyses** to support benchmarking of municipalities' waste management activities and related outcomes will create learning opportunities and unlock outcomes-based finance.
- **Expanded and improved waste collection**, particularly in unserved or poorly served peri-urban and informal settlements, will contribute to minimising littering and illegal dumping of waste. Such waste collection development should consider the potential for collaboration with informal waste collectors by providing opportunities, equipment, and incentives to participate in waste collection, sorting and recycling initiatives.
- **Source segregation and separate collection** of plastics and other materials will increase the quantity and quality of collected materials, thus increasing recycling and circularity while also reducing the share of plastics disposed of in landfills. Authorities should make efforts to work with and support the informal sector, where relevant. A good first step can be to shift from mixed waste collection to separately collecting dry and wet organic waste streams. This makes it possible to sort recyclable materials from dry waste in material recovery facilities, and either compost or digest the organic waste to produce soil conditioner and (from the digestion process) biogas.

Figure 11: Waste bins for separate collection



- Where justified by the scale of collection, **recycling facilities** for plastics and other waste streams should be established, improved or upgraded. Due consideration should be given to the quality requirements of offtakers, to ensure stable revenue streams for the recycling facilities.
- Businesses can include a **deposit on packaging** to encourage clients to return it for recycling.
- **Plastic buy-back centres** offer consumers the option to sell or exchange plastic bottles, packaging, etc. for money, tokens or waste bags. This solution can be especially effective in informal settlements.
- **Some non-recyclable plastics can be transformed into products**, such as garbage bags or simple garden, construction or pavement products. This option can be considered if acceptable occupational health and environmental conditions during production can be ensured and if the risk of microplastics discharge during use can be minimised.
- **Production of refuse-derived fuel** from non-recyclable plastics can be considered if the offtaker (e.g. a cement kiln) can meet relevant emission standards.
- **Expanding and upgrading the waste reception and segregation facilities in ports and harbours** is an effective way to reduce the discharge of plastics and fishing gear at sea.
- **Plastics collection and clean-up systems in rivers, estuaries and lagoons** reduce leakage of plastics into the oceans. For example, specially designed small devices can be installed in rivers and harbours to trap and collect plastics floating downstream. There are also autonomous vessels and drones, some of which are solar-powered, that collect plastics and other waste in harbours and lagoons.

4.3. Improved wastewater and stormwater management

There are different ways **to reduce the discharge of plastic litter that accumulates in stormwater systems** and is later transported to rivers and seas:

- Constructing or upgrading **drainage and stormwater management systems**, where possible shifting from open to closed systems, reduces the accumulation of plastics in drains and canals.
- By installing **plastic litter filters and traps in drains, canals and rivers**, and establishing systems for regular recovery of such plastics, clogging can be limited and the discharge of plastics into rivers and oceans reduced. These installations can range from simple filters in drains and smaller canals to booms, screens and air-bubble barriers in canals and rivers.

- **Wetlands and mangrove forests** in deltas and along coastlines can naturally filter out floating plastics. Specially designed vessels can then collect the accumulated plastics.

Figure 12: Mangrove forest



- **To reduce the discharge of microplastics**, one possible solution is using **laundry balls** in the washing machine to capture microfibrils from synthetic fibres.
- **Improved wastewater collection and treatment** reduces the discharge of microplastics. Technologically advanced secondary treatments, such as biofilters and activated sludge, may remove up to 99% of microplastic particles ranging from 20 micrometres to 5 millimetres in diameter. Tertiary wastewater treatment systems with membrane filtration technology provide another way to further reduce the discharge of microplastics.

Figure 13: Garbage filtering system across a river in Cebu City, the Philippines



5. Regulatory and institutional solutions to ocean plastic pollution

5.1. Regulatory measures

On the regulatory side, the following measures can be considered for reducing the discharge of plastics into the oceans:

- **Coastal zone improvement initiatives** can contribute to reducing plastic pollution. One example is regulating open ocean aquaculture to reduce the discharge of discarded equipment or untreated waste.
- **Bans on plastic bags and other single-use plastic and styrofoam items** can effectively counter some symptoms of plastic overuse. Some African countries, such as Rwanda and Kenya, have already introduced bans. Plastic bag prohibition is generating tangible benefits, especially in countries that prioritise externally dependent sectors like tourism. The initiatives by the governments of Rwanda and Kenya have enhanced both nations' green credentials, leading to increased economic growth.
- Establishing **extended producer responsibility (EPR)** has proven to be effective in supporting material recovery and plastic recycling. Based on the polluter-pays principle, such systems involve levying a charge on packaging that is used to finance proper management and recycling of packaging waste. EPR regulation on packaging has been enacted in Mozambique and Kenya, for example. However, successful implementation of EPR measures can be hindered by lack of effective enforcement mechanisms, free-riding and challenges associated with establishing and managing collective schemes.
- Formulating and enforcing **regulatory instruments, such as prohibitions on and standards for adding microplastics to products** (e.g. microbeads in cosmetics), is one way to reduce the discharge of microplastics. Such instruments can offer guidelines on the chemical content in plastic products, including thresholds and lists of authorised substances.
- Establishing **quality standards for recycled plastics**, including food-grade plastic standards, is a very efficient way to increase confidence in and, thus, demand for recycled plastics. To the extent possible, such standards should be harmonised across regions to facilitate trade.
- **Plastic manufacturers or users can be compelled or encouraged to disclose plastic footprints** and report on toxic content in products and packaging. Such disclosure will promote the transition to a circular plastics economy by creating consumer awareness that encourages corporations to reduce production and use of unnecessary plastics, facilitate reuse and increase plastic recycling.

Governments can also support the reduction of plastic litter discharge into the oceans in various other ways:

- Undertake **country-level analysis of the effects and costs of mismanaged plastic waste, and the costs and benefits of plastics reduction infrastructure**. The findings will help municipalities to allocate resources more effectively, and enable policymakers to formulate more impactful legislation, such as plastic bans or extended producer responsibility.
- Support the **development and promotion of sustainable alternatives to single-use plastics**, and incentivise efforts to replace or recycle single-use plastic items.
- Promote **sustainable plastic alternatives** to progressively phase out single-use plastics. This can involve economic incentives and supporting pilot projects for single-use plastic substitution.
- **Support research and development of green technologies and new materials** with desirable performance features, such as biodegradable and reusable plastic alternatives.
- Adopt and promote **green public procurement** at municipal level to support the establishment of more circular approaches to plastics management.
- Promote **citizens' engagement** through awareness building focused on waste reduction, reuse and recycling, aiming to increase ocean-friendly behaviour and purchasing decisions.
- **Support pilot projects for plastics collection and recycling**, and **support markets and demand for recycled plastics and eco-friendly alternatives** to single-use and other plastics.
- **Encourage and incentivise local people** to establish plastics collection systems or improve their efficiency. Supporting initiatives like buy-back centres, where plastics and other recyclable materials can be exchanged for money, tokens or waste bags, can improve collection, especially in informal settlements.
- Promote **sustainable land-based aquaculture systems** and **public engagement initiatives** like “fishing for litter” and “adopt-a-beach.”

5.2. Market-based instruments and voluntary agreements

Market-based instruments such as taxes, user charges, subsidies, extended producer responsibility, and deposit refund schemes can be effective means to address the ocean plastics problem. Such initiatives can incentivise substitution of single-use plastics and increased source separation. They can also generate revenues to support upgraded waste management services, focused on source segregation and recycling.

Voluntary agreements on plastic waste prevention can be promoted among relevant stakeholders and organisations in a region. Such approaches entail formulating joint interventions and agreed targets for recycled plastic use, supported by monitoring systems to ensure compliance.

6. Clean ocean financing

6.1. Approaches to financing ocean plastics reduction

Measures and activities to reduce the discharge of plastics into the oceans can be financed in various ways.

Local taxes, such as on property, are collected by local, regional or national authorities to fund public services including waste collection and recycling, stormwater management, and wastewater collection and treatment.

User charges can be levied on households or businesses to cover the costs of waste management and other municipal services. The level of these charges can be based on the quantity or volume of waste, the number of household occupants, the size of the property, or other criteria. User charges can be levied as direct charges or as indirect surcharges, for example on water or electricity bills. In addition to covering waste management costs, user charges create an economic incentive to reduce waste generation and encourage recycling initiatives, particularly where charges are higher for collection of mixed, unseparated waste and lower for source-separated waste.

Investment grants and operational subsidies from government institutions, municipalities and international institutions may be required where limited revenues and affordability constraints prevent full cost recovery. Such grants and subsidies can cover part of the investment costs and, in exceptional cases, part of the operation and maintenance costs of solid waste management systems and infrastructure.

Loans from the capital market, government and financial institutions, such as the European Investment Bank (EIB), can finance capital spending on new recycling and waste management equipment and facilities.

Guarantees issued by an authority or other party, such as the European Union (EU) may enable a public or commercial bank to provide loan financing to a project whose risk profile is not sufficiently attractive. Therefore, guarantees could be an effective means to increase access to financing for small and medium-sized enterprises involved in recycling and other activities that can promote cleaner oceans.

Blending is the combination of different forms of financing, such as loan, equity, grant and/or guarantee, to support a project. It can be offered on the condition that relevant regional, national or overarching policy priorities are pursued. The European Union offers grants, equity and guarantees to achieve desired policy purposes and with a view to improving the risk profile of and attracting additional financing for important investments in EU partner countries.

Public-private partnerships involve agreements between the government and one or more private sector parties to design, build, operate and possibly also finance infrastructure. Services like waste collection or management of facilities can also be carried out by the private sector under contracts.

The urgent need to support measures that reduce discharge of plastics into the oceans is becoming increasingly clear. Accordingly, there are now numerous entities and institutions that offer funding dedicated to plastic-reduction projects and activities. The remainder of this section outlines some of these funding sources.

6.2. The Clean Oceans Initiative

In October 2018 the EIB, the KfW (Kreditanstalt Für Wiederaufbau) Group and the Agence Française de Développement (AFD) launched **the Clean Oceans Initiative (COI)**.⁴⁴ Two new partners subsequently joined the COI in 2020: the promotional banks Cassa Depositi e Prestiti (CDP) and Instituto de Crédito Oficial (ICO).

The COI aims to support the development and implementation of sustainable, viable, low-carbon projects that reduce plastic discharge into rivers, seas and oceans. The goal is to commit €2 billion to financing public and private sector clean ocean projects by 2023. Eligible projects should demonstrate efficient and effective ways of reducing plastic waste or the discharge of microplastics.

The **COI target sectors** are summarised in Annex B. **The COI target groups and promoters** comprise local authorities and municipalities and their public utilities; regional, national and local organisations (including NGOs, research institutions and universities); and private sector companies involved in solid waste, wastewater and stormwater management. The COI will support these stakeholders to develop and implement transformative projects with high impact and replication potential.

To support the preparation of COI projects in sub-Saharan Africa, the EIB launched in 2020 the **Clean Ocean Project Identification and Preparation (COPIP)** programme.⁴⁵ This programme aims to identify and prepare COI projects for financing, focusing particularly on the solid waste management sector.

Other **clean ocean initiatives** are presented in Annex C.

⁴⁴ The Clean Oceans Initiative. ([link](#))

⁴⁵ The Clean Ocean Project Identification and Preparation (COPIP) programme ([link](#))

6.3. Other sources of clean ocean financing

The ADB Oceans Financing Initiative ([link](#)) is an investment and technical assistance programme operated by the Asian Development Bank. The ADB committed to providing \$5 billion between 2019 and 2024 to leverage public sector funds and create opportunities for the private sector to stimulate blue economy investments aimed at improving ocean health. The initiative offers technical assistance grants and funding from other donors and the ADB to reduce the financial and technical risks of projects. Key partners include the World Wide Fund for Nature (which has supported the design and implementation), the Association of Southeast Asian Nations (ASEAN) Infrastructure Fund, and the Republic of Korea.

In 2021, the ADB and the EIB began cooperating on ocean protection under **the Clean and Sustainable Ocean Partnership** ([link](#)).

The Africa Circular Economy Facility ([link](#)) is a multidonor trust fund established by the African Development Bank (AfDB) to support the adoption and diffusion of circular practices in Regional Member Countries. The facility provides technical assistance grants, supports business incubation, and supports feasibility studies targeting activities by small and medium enterprises.

The Africa Green Loop Fund ([link](#)), operated by FS Impact Finance, is an asset and fund manager focused particularly on developing countries and emerging markets. The fund supports small and medium-sized enterprises to redevelop the waste value chain to underpin the transition from a linear to a circular business model.

Africa50 ([link](#)) is an independent infrastructure investment fund established by the AfDB. It aims to contribute to Africa's growth by developing and investing in bankable projects, thereby catalysing public sector capital and mobilising private sector funding with differentiated financial returns and impact in the following sectors. The fund focuses on the following sectors:

- Power (generation, transmission and distribution)
- Transport (roads, airports and ports)
- Water (production, distribution and waste management)
- Gas (midstream, downstream)

The Althelia Sustainable Ocean Fund ([link](#)) promotes investments in scalable businesses in the real asset sectors that build resilience in coastal ecosystems and create sustainable economic growth and livelihoods.⁴⁶ The fund is investing in three areas that support a healthy ocean:

- Sustainable seafood – provision of capital and technical resources from production through the supply chain to increase efficiency and sustainability from input to the point of sale.

46 "Sustainable Ocean Fund," Althelia. ([link](#))

- Circular economy – investment into key coastal infrastructure and business projects to unlock the value from waste and pollution and to upcycle products that would otherwise damage the oceans. The fund is particularly focused on plastics and wastewater management.
- Ocean conservation – investment into coastal protection and management to improve biodiversity and resilience in coastal communities, creating business opportunities through tourism, payments for ecosystem services, and blue economy infrastructure.

CDP Matchmaker ([link](#)) works with cities to highlight projects in flood control, waste management, sustainable transport, renewable energy, water management and energy efficiency to the investment community. It also supports projects by building the capacity of city government staff, but does not provide direct finance to projects. CDP Matchmaker’s key focus areas are:

- renewable energy
- water, sanitation and waste
- transport/mobility
- low-carbon technology (ICT/open data)
- urban public and green space
- energy efficiency
- land use and nature-based solutions
- adaptation and resilience.

DFC Ocean Plastics Initiative ([link](#)) is a \$2.5 billion infrastructure investment initiative run by the US International Development Finance Corporation. Its purpose is to catalyse private sector investment to address the urgent need to clean up and conserve the oceans and waterways. Towards this end, the initiative deploys equity financing, debt financing, political risk insurance, feasibility studies and technical assistance. The focus areas of supported projects in eligible emerging markets include waste collection, waste-to-energy, and the recycling value chain.

The Fund for African Private Sector Assistance ([link](#)) is a multi-donor thematic trust fund operated by the AfDB. The fund offers untied grants for technical assistance and capacity building to African governments, regional economic communities and similar intergovernmental organisations, NGOs, business associations, market regulatory institutions, business development service providers, business training and research institutions, and public and private enterprises.⁴⁷ The grants increase the AfDB’s role in the project preparation cycle, thereby reinforcing the quality of its pipeline of bankable private sector transactions. The fund’s resources may also be used to promote innovative programmes that specifically support small and medium-sized enterprises.

⁴⁷ “Fund for African Private Sector Assistance,” African Development Bank. ([link](#))

PROBLUE ([link](#)) is a multi-donor trust fund hosted by the World Bank that supports the development of integrated, sustainable and healthy marine and coastal resources. PROBLUE is founded on the Blue Economy Action Plan to contribute to implementing Sustainable Development Goal 14.⁴⁸

The four principal focus areas are:

- management of sustainable fisheries and aquaculture;
- addressing threats posed to ocean health by marine pollution, including litter and plastics, from marine or land-based sources;
- sustainable development of key oceanic sectors such as tourism, maritime transport, and offshore renewable energy;
- building governments' capacity to manage marine resources, including nature-based infrastructure such as mangroves, in an integrated way to deliver more and long-lasting benefits to countries and communities.

Seed Capital Assistance Facility ([link](#)) aims to increase the availability of investment for early-stage development of projects pursuing low-carbon sustainable development, economic growth, poverty reduction and climate change mitigation in Southeast Asia and sub-Saharan Africa. The facility offers financial support on a cost-sharing and co-financing basis through private equity funds, venture capital funds and project development companies.

48 "PROBLUE: Healthy Oceans, Healthy Economies, Healthy Communities," The World Bank. ([link](#))

7. Impact measurement and monitoring

Different stakeholders are developing and promoting innovative measures to detect and quantify solid/plastic waste footprints, with the aim of guiding decision-making on prevention, reuse, recycling, treatment and safe disposal. This section outlines several examples of existing impact measurement and monitoring systems.

Earthwatch Europe’s Online Plastic Footprint Calculator ([link](#)) is a methodology for raising awareness of the current plastics crisis and offering practical solutions to reduce plastic waste discharge. The calculations are based on usage of the top plastic pollutants, including plastic bags, food and beverage containers, and cigarette packaging, commonly classified as “on-the-go” plastics.

The online calculator provides a breakdown of the plastic footprint for such items in kilograms. Users can re-enter their data over time and track changes against previous results.

The International Solid Waste Association Plastics Pollution Calculator ([link](#)) was developed by the University of Leeds as part of the International Solid Waste Association Task Force on Marine Litter. The calculator facilitates modelling the generation of item-specific plastic waste and its movement throughout the waste management system and environment, including locations, conditions and pathways for plastic leakage into the environment. The tool facilitates developing area-specific, localised and targeted engineering-based interventions.

The City MSW Rapid Assessment Data Collection Tool ([link](#)) was developed for the World Bank’s Climate & Clean Air Coalition MSW Initiative. The tool’s purpose is to facilitate collecting data on municipal solid waste to enable rapid assessment of the main aspects of managing solid waste in any city.

River Plastic Pollution Sources ([link](#)) is a probabilistic model developed by The Ocean Cleanup that calculates the likelihood of plastic waste reaching a river and subsequently the ocean. The model presents geographically distributed data on rivers, precipitation, wind, and land use, which are critical in determining regions with high potential to discharge plastics into the oceans. It also includes interactive graphical presentations of mismanaged plastic waste and plastic river discharge for all major rivers.

The United Nations Human Settlement Programme (UN-Habitat) “Waste Wise Cities Tool” ([link](#)) was developed under the African Clean Cities Platform and the Waste Wise Cities campaign, and is based on the monitoring methodology for Sustainable Development Goal indicator 11.6.1. The tool provides an overview of waste flows and amounts in a city, including data on waste generated, collected and managed in controlled facilities. Data assessment and coordination with the relevant stakeholders supports the development of bankable projects to ensure the long-term sustainability of interventions. The primary target users of the tool include individuals, businesses, and government.

Annex A The ocean regulatory framework

The **UN Convention on the Law of the Sea of 1982** defines the rights and responsibilities of nations with respect to their use of the world's oceans.

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal of 1989 protects human health and the environment against the negative effects of hazardous wastes. It covers the transboundary transport of a broad range of wastes based on origin, composition, characteristics, including incinerator ash and household waste. On 1 January 2021, new provisions were added to the Convention for cross-border transport of plastics. Most categories of non-hazardous plastic scrap and waste, including mixed plastics, and plastics classified as hazardous waste are now subject to Basel Convention rules for prior notification and consent from the recipient country before a shipment is made. Only pre-sorted, clean and uncontaminated plastic scrap that meets strict criteria and is destined for recycling in an environmentally sound manner can be freely shipped between countries.

The Rotterdam Convention is a UN treaty signed on 10 September 1998 and effective from 24 February 2004. The treaty promotes shared responsibility on the import of hazardous chemicals through information exchange, and calls on exporters of these products to include proper labelling, guidelines on safe handling, and information on any known restrictions or bans.

The Stockholm Convention is a UN treaty signed on 22 May 2001 and effective from 17 May 2004. It aims to safeguard human and environmental health by restricting or eliminating the production and use of persistent organic pollutants.

The Global Programme of Action for Protection of the Marine Environment from Land-based Activities is a comprehensive, multi-sectoral instrument for collaboration and coordination of different interventions targeting land-based activities with adverse effects on oceans. Specifically, the programme targets sewage, persistent organic pollutants, radioactive substances, heavy metals, oils (hydrocarbons), nutrients, sediment mobilisation, litter, and physical alteration and destruction of coastal zones.

Agenda 21: Earth's Action Plan is a non-binding 2030 blueprint of the United Nations concerning sustainable development, specifically social and economic growth and the conservation and management of resources for development. It aims to strengthen major groups' role and means of implementation.

The United Nations Environment Programme's Regional Seas Conventions foster regional cooperation for conservation and sustainable management of the coastal environment. The conventions have protocols and legal agreements for addressing land-based pollution, protecting and restoring blue-carbon ecosystems, and promoting marine-protected areas.

Annex B The Clean Oceans Initiative target sectors

Solid waste management, with a focus on plastics:

- Collection, pre-treatment, recycling or recovery of plastics, other recyclable materials and bio-waste
- Safe disposal of residual waste in a sanitary landfill
- Waste management in ports and harbours to reduce marine littering
- Innovative plastics projects that contribute to reducing plastics discharge into the oceans, or to developing new/improved reusable/recyclable plastics or biodegradable plastics
- Institutional support for plastic prevention and market development: extended producer responsibility, bans of single-use plastic articles, green public procurement, value-chain integration and support, public awareness building, etc.

Coverage: Plastics and waste on land, in rivers, and near-coastal parts of the sea; also covering informal settlements, the informal sector, new forms of collection such as buy-back centres, and value chain support.

Wastewater management systems:

- Wastewater treatment plants
- Wastewater collection networks
- Sludge management systems.

Coverage: The systems must reduce the discharge of plastics (including microplastics) into waterways, rivers and oceans, e.g. through screens, traps and other similar measures in inlet/pre-treatment/outflows. Projects should include acceptable handling of extracted plastics/waste.

Urban stormwater management systems:

- New drainage and stormwater management systems
- Renovation and upgrades of existing drainage and stormwater management systems.

Coverage: Objects/components that contribute to preventing waste/plastics discharge into drains, waterways and the ocean through control of stormwater. Projects should include plastic/waste traps or other similar measures to prevent the discharge of plastics, together with acceptable handling of extracted plastic/waste.

Annex C Clean ocean initiatives

[Alliance to End Plastic Waste \(link\)](#)

Alliance to End Plastic Waste is an international non-profit organisation including Veolia, Suez, Proctor & Gamble, and a number of plastics producers. These organisations collaborate with environmental and economic development NGOs, governments and communities to end plastic waste pollution in the environment. The alliance focuses on four key strategic areas: green infrastructure, education, engagement and innovation. As of August 2020, the alliance had about 50 member companies and supporters working across the plastic value chain.

[Global Ghost Gear Initiative \(link\)](#)

Global Ghost Gear Initiative is the world's largest multi-stakeholder alliance committed to providing solutions to the problem of lost, abandoned and discarded fishing gear worldwide. World Animal Protection founded the coalition in September 2015 to promote a safer, cleaner ocean by offering economically viable and sustainable solutions to the challenge of ghost fishing. The initiative aims to improve the health of the marine ecosystem, protect marine animals from harm, and safeguard human health and livelihoods. The initiative includes representatives from the fishing industry, the private sector, academia, governments, intergovernmental organisations and NGOs. Initiative partners work locally, regionally and globally across three working groups to build resilience, define best practice and inform policy, and catalyse and replicate solutions.

[Global Partnership on Marine Litter \(link\)](#)

The Global Partnership on Marine Litter is a voluntary open-ended association of international agencies, NGOs, governments, academics, businesses, civil society organisations, and individuals. It was launched in June 2012 during the United Nations Conference on Sustainable Development (Rio+20). The global partners are committed to coordinating their activities and pooling resources to protect human health and the environment by reducing and managing marine litter.

The partnership focuses on three overarching goals:

- Reduced levels and effects of land-based litter and solid waste introduced into the aquatic environment.
- Reduced levels and effects of sea-based sources of marine debris, including solid waste, lost cargo, abandoned, lost or otherwise discarded fishing gear (ALDFG) and abandoned vessels introduced into the aquatic environment.
- Reduced levels and effects of accumulated marine debris on shorelines, aquatic habitats and biodiversity.

Global Plastic Action Partnership ([link](#))

The Global Plastic Action Partnership is a structured initiative bringing together the public, private and civil society sectors and their initiatives. It offers a platform for discussion and collaboration on a range of emerging efforts to eradicate plastic pollution and to translate commitments to reduce plastic pollution and waste into concrete action at the global and national levels, especially in emerging and developing economies. The initiative also promotes structured action through focused proof-of-concept partnerships in ASEAN countries, African nations, and Small Island Developing States.

Declaration of the Global Plastics Associations for Solutions on Marine Litter ([link](#))

Under the umbrella body of the Global Plastics Alliance, plastics organisations from many countries have signed the Global Declaration for Solutions on Marine Litter. Its aims include raising awareness, advancing research, promoting best policies, spreading knowledge, enhancing recovery, and preventing (plastic resin) pellet losses.

Ocean Conservancy's Trash Free Seas Alliance ([link](#))

Ocean Conservancy launched the Trash Free Seas Alliance in 2012 to enhance collaboration between industry, science and conservation leaders with a shared interest in healthy oceans, free of trash and plastic pollution. The alliance focuses on incubating and promoting innovative and pragmatic solutions to reduce ocean plastic pollution and other types of marine litter. Corporate members have collectively committed millions of dollars to supporting research on strategies to improve waste collection and recycling in regions highly affected by ocean plastic pollution.⁴⁹ Alliance partners have also pledged to replace or eliminate 0.5 million tonnes of virgin plastic from product packaging every year. The partners share their insights through research, policy recommendations, and collaborations across individual initiatives.

Ocean Bound Plastic Certification Program ([link](#))

This programme was developed by the NGO Zero Plastic Oceans and the certification group Control Union with the objective of protecting the environment from continuous discharge of ocean-bound plastics from land-based activities.

The scheme comprises two sub-programmes: *Ocean Bound Plastic Recycling* and *Ocean Bound Plastic Neutrality*. The purpose is to encourage the removal of ocean-bound plastics from the environment by effective collection and treatment before these plastics enter the oceans. This certification programme covers both commercially recyclable and non-commercially recyclable ocean-bound plastics.

49 "Fighting for Trash Free Seas," Nature Conservancy. ([link](#))

PREVENT Waste Alliance ([link](#))

The PREVENT Waste Alliance is a multi-stakeholder exchange and cooperation platform launched in 2019 by the German Ministry for Economic Cooperation and Development. It brings together stakeholders from the private sector, civil society, academia and government institutions with shared interests in minimising waste, eliminating pollutants and maximising reuse of resources in the economy worldwide. Platform members commit to contributing to waste prevention, collection, recycling and increased uptake of secondary resources in developing economies, with particular focus on single-use products, electronic wastes and plastics.

Prevented Ocean Plastic ([link](#))

Prevented Ocean Plastic is a global recycling initiative aimed at enabling people around the world to earn a living, clean their coastlines and prevent ocean plastic. Plastic collectors are encouraged to pick up plastic bottles from areas at risk of ocean pollution and transfer the bottles to local collection centres for payment. These centres then sort and press the materials for transport to recycling factories. The recycled plastics have certified traceability from the coastline until they are transformed into sustainable recycled packaging materials.

Project STOP ([link](#))

Project STOP is a frontline action programme launched in 2017 by SYSTEMIQ and Borealis. This €4 million initiative aims to improve waste management infrastructure in South-East Asia. Project STOP partners with industry, including Nestle, Nova Chemicals, Borouge, Schwartz Group, Veolia and SWI, as well as the governments of Indonesia and Norway to reduce marine litter by building sustainable waste systems. The aim is to develop effective and more circular waste management systems to prevent the discharge of plastics into the environment, enhance resource efficiency, and provide benefits for local people.

SEAQUAL INITIATIVE ([link](#))

SEAQUAL INITIATIVE is a collaborative community of individuals, organisations and companies working together to clean the oceans, raise awareness about ocean plastics and highlight existing ocean clean-up programmes worldwide. SEAQUAL also works with waste management and recycling industries to identify and demonstrate ways to utilise collected ocean plastics, e.g. for creating inspiring sustainable products.

The Benioff Ocean Initiative and the Coca-Cola Foundation ([link](#))

The Benioff Ocean Initiative combines science and technology to improve ocean health. In 2020 the Benioff Ocean Initiative entered into a partnership with the Coca-Cola Foundation to disburse a total of \$11 million over the next three years to support nine river clean-up programmes across the world. The partnership combines the Coca-Cola Foundation's commitment to supporting behavioural change in recycling and the Benioff Ocean Initiative's expertise in developing innovative ways to address the plastics crisis by collecting and analysing waste from rivers and oceans.

The Commonwealth Blue Charter – Commonwealth Clean Ocean Alliance ([link](#))

The Commonwealth Blue Charter is an agreement by the 54 Commonwealth countries to collaborate on pursuing fair, inclusive and sustainable ocean protection and economic development. The aim is to ensure cooperation towards achieving commitments on sustainable ocean development and solving ocean-related problems. Member countries of the Commonwealth Clean Ocean Alliance are encouraged to commit to one or more of the following goals:

- Initiate projects to eliminate all avoidable single-use plastic waste.
- Ensure significant reduction of single-use plastic carrier bags by 2021.
- Ban the manufacture and sale of microbeads in rinse-off cosmetic and personal care products by 2021.

The Circulate Initiative ([link](#))

The Circulate Initiative aims to “end ocean plastic and build thriving, inclusive economies” by providing policymakers and investors with the knowledge and skills needed to develop, incentivise, support and implement plastic waste-reducing, inclusive and circular economies.

The approach to ending ocean plastics is based on three core strategies, namely to incubate, measure and amplify investments and best practices in circular economy and waste management.

The **Circulate Initiative's Knowledge Bank** ([link](#)) is a platform for research, resources and tools to address and measure the impact of ocean plastics.

The **Urban Ocean Program** ([link](#)) jointly implemented by the Circulate Initiative, Ocean Conservancy and the Global Resilient Cities Network works with willing cities and partners to identify and support the preparation of scalable waste management solutions and advance resilient, circular economies.

The Ocean Plastics Charter ([link](#))

In 2018, the European Union and five countries (Canada, France, Germany, Italy and the UK) adopted the Ocean Plastics Charter, which is signed by a larger number of Governments and industry partners invited to implement the objectives and commitments of the Charter and report on their progress.

The Charter calls for working with industry to make all plastics reusable, recyclable or recoverable by 2030. The Charter sets targets to increase recycled content by at least 50% in plastic products, reuse or recycle 55% of plastic packaging by 2030, recover all plastics by 2040 and significantly reduce single-use plastics.

The Ocean Cleanup ([link](#))

The Ocean Cleanup is a non-profit organisation specialised in providing solutions and advanced technologies to reduce ocean plastics. It is developing a passive clean-up method that uses natural oceanic forces to clean up plastics already in the oceans. The organisation has also developed the Interceptor ([link](#)), which is 100% solar-powered, extracts plastics autonomously, and is capable of operating in the most plastic-polluted rivers in the world.

Waste Free Oceans ([link](#))

Waste Free Oceans has the principal aim of reducing the global impact of ocean plastic litter by making optimal use of available resources and raising awareness of plastic pollution. The foundation collaborates with recyclers, fishermen, manufacturers and policymakers in the Middle East, the Americas, Asia and Africa to collect and transform ocean plastic into new, innovative products.

World Business Council Roadmap for Reducing Ocean Waste ([link](#))

The roadmap is a commitment by stakeholders along the plastic value chain to invest in business solutions or on-land solutions for ocean waste. It has four main deliverables:

- Deliverable 1: Facilitate the development of a clear business case for firms to prioritise investment in on-land interventions to prevent plastic marine debris.
- Deliverable 2: Lay the foundation for developing a business toolkit or catalogue for firms on existing land-based solutions along the plastic value chain.
- Deliverable 3: Ensure proper application of the toolkit solutions to targeted geographies and support formulation of business recommendations for policymakers.
- Deliverable 4: Select a city for a pilot project.



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The Ocean Plastics Reduction Guide