Tackling Plastics Pollution: Towards experience-based policy guidance
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Pathways Out of Plastic Pollution Series:
Technical report
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Abbreviations and Acronyms

3R  Reduce, reuse, and recycle
3P  World Bank’s Pathways out of Plastics pollution Program
ABS  Acrylonitrile butadiene styrene
ASA  Advisory Services and Analytics, World Bank
BILS  Bangladesh Institute of Labour Studies
C&C  Command-and-control
CBO  Community-based organization
DRS  Deposit refund scheme
EC  European Commission
EPR  Extended Producer Responsibility
EPS  Expanded polystyrene
EU  European Union
GHG  Greenhouse gas
GPP  Green Public Procurement
HDPE  High density polyethylene
IEEP  Institute of European Environmental Policy
LDPE  Low density polyethylene
LLDPE  Linear low density polyethylene
MBI  Market-based instruments
MDPE  Mid density polyethylene
MRF  Material recovery facility
MT  Million metric tonnes
NEP  National Environmental Policy
NGO  Non-governmental organization
PAYT  Pay-as-you-throw
PC  Polycarbonate
PE  Polyethylene
PET  Polyethylene terephthalate
PMMA  Polymethyl methacrylate
POP  Persistent organic pollutant
PP  Polypropylene
PPP  Public private partnership
PRO  Producer responsibility organization
PS  Polystyrene
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>PUR</td>
<td>Polyurethane</td>
</tr>
<tr>
<td>PVC</td>
<td>Polyvinyl chloride</td>
</tr>
<tr>
<td>SME</td>
<td>Small and medium-sized enterprise</td>
</tr>
<tr>
<td>SWM</td>
<td>Solid waste management</td>
</tr>
<tr>
<td>TBS</td>
<td>Tanzania Bureau of Standards</td>
</tr>
<tr>
<td>UNEP</td>
<td>United Nations Environment Programme</td>
</tr>
<tr>
<td>US$</td>
<td>United States Dollar</td>
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</table>
Acknowledgements

This report is the final output of the ex-post policy study of the World Bank’s Advisory Services and Analytics (ASA) program “Pathways out of Plastics pollution (3P)” which was funded by PROBLUE, a multi-donor Trust Fund administered by the World Bank. The study, which included case studies of ten countries or states, was executed by Wood Group UK Ltd and the Institute of European Environmental Policy (IEEP) and managed by Jian Xie (Senior Environmental Specialist/Task Team Leader) of the World Bank. The study and this report benefited from the guidance and support of Christian Albert Peter (Practice Manager of Environment, Natural Resource and Blue Economy Global Practice), Grzegorz Peszko and Delphine Arri (Task Team Leaders of the 3P ASA) and the technical support of Milagros Cecilia Aime and Solvita Klapare at the World Bank. The project team would also like to thank Eolina Petrova Milova, Silpa Kaza, Katelijn Van den Berg and others of the World Bank for their valuable comments and suggestions.

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Executive Summary

1. **Plastics pollution threatens public health, local economies, and ecosystems including the marine environment, and its environmental impact is growing at an alarming rate.** According to a number of recent studies, the global production of plastics was over 438 million metric tonnes in 2017 and it is expected this figure will double between 2020 and 2040 and triple by 2050. The implementation of end-of-life solutions, such as recycling and safe disposal, to reduce plastics has not kept pace with the amount of waste generated, resulting in an estimated 75 million to 199 million metric tonnes of plastics already in the ocean with up to 11 million additional tonnes entering the ocean each year. Exposure to chemicals and pathogens associated with plastics, microplastics, and the burning of plastics, has direct impacts on human health and economies, and the environmental costs of marine plastic pollution are significant. Plastics pollution presents a serious threat to marine life through entanglement, starvation, and toxicological harm, and is understood to alter the global carbon cycle.

2. **A comprehensive approach to addressing plastic pollution in the lifecycle of plastics has been promoted by the World Bank Group (WBG) and other government agencies and international organizations.** Technical and financial support through the WBG’s PROBLUE program for marine pollution control has focused on three interventions: (i) **Stopping the leakage**, a multisector approach from solid waste management to wastewater management; (ii) **Encouraging a circular economy**, including actions of rethinking the source to reduce, redesign, repair and remanufacture, reuse and recycle plastics; (iii) **Restoring ecosystems**, through necessary actions for ecosystem recovery. To be effective and sustainable, this approach needs to be supported by policy reforms – both fiscal and regulatory – that create incentives and generate financial resources to improve waste management systems, expedite the transition to circular economy, and reduce plastics use.

3. **Many countries, including developing countries, have begun to implement a range of public policies to manage plastic pollution, but as yet there is little evidence about their effectiveness or guidance on their application.** For example, more than 60 countries have applied bans, taxes and levies to curb plastic waste and its impacts. Inventories of policies used to manage plastic pollution and studies have been developed to assess plastics policies and their effectiveness. Most policies currently in operation have a focus on banning plastic bags and foamed plastic products as well as on the prevention and management of plastic waste, reduction of plastics production or on the incorporation of renewable or recycled content into plastics. However, as yet little is known about the effectiveness of many of the plastics policies implemented.

4. **To address this gap, this report builds on a review of the existing literature and summarizes the findings of an ex-post analysis of the effectiveness of plastics policies in ten case study countries.** The case studies were conducted in Bangladesh, Bulgaria, Fiji, Italy, Malaysia, Morocco, Rwanda, Saint Lucia, Tanzania, and the State of Kerala in India. They were selected to cover diversity in geography, economies, and policies, as well as in plastics policies and implementation experience.

5. **The purpose of this report is to review experiences and lessons learned from the development and implementation of policies to manage plastic pollution and provide evidence-based guidance for policy development.** The report is aimed at policy makers and stakeholders involved in the design, implementation, and evaluation of policies to manage plastic pollution.

6. **Key entry points for policy interventions are in promotion of circular economy for upstream plastic waste reduction across plastics value chains, improvement of solid waste management, and strengthening of institutional arrangements and governance.** The “circular economy” is a system-wide approach that considers the entire value chain, focusing on reducing the use of non-renewable materials, increasing recycling and the use of renewable and recycled materials, preventing pollution, and extending the lifespan of products, while regenerating natural systems. It considers the entire plastics life cycle with: (i) **upstream** (extraction and production) policies to prevent upstream waste and pollution including those which encourage manufacturers to reduce waste by environmentally friendly design and build durability,
repairability, reusability and recyclability into products, use recycled and renewable materials, and reuse products; (ii) **midstream** (including use) policies to keep existing products and materials in use for as long as possible and encourage waste prevention and recycling behavior; and (iii) **downstream** policies to improve solid waste management systems particularly regarding collection, reuse, recovery, and recycling of resources. Global municipal solid waste is expected to increase by 73 percent from 2.24 billion tonnes in 2020 to 3.88 billion tonnes by 2050. Improving the efficiency of solid waste management systems helps cut the amount of plastic waste entering the environment and reduce environmental impacts of plastic pollution. Finally, better governance (e.g., strategy, targets, information disclosure, transparency, accountability, coordination) ensures the alignment of policies and reduces fraud and corruption.

7. A variety of policy instruments has been used for environmental management, solid waste management, and plastic pollution control. According to the plastics policy inventory developed by Duke University’s Nicholas Institute, countries around the world have adopted a total of 571 public policies addressing plastic pollution control since 2000. The policy instruments can be grouped into command & control (C&C) or regulatory measures, market-based instruments (MBIs) or economic measures and information and other measures. Extended Producer Responsibility (EPR) measures further provide a blended approach offering both restrictions and financing mechanisms. In the ten case study countries, all except two (Bulgaria, Malaysia) incorporated policies banning or restricting plastics products, with all but four (Bangladesh, Malaysia, Rwanda) having taxes, levies, or fees on plastics products. Three of the countries (Bulgaria, Italy, Saint Lucia) had existing EPR measures and five others (Bangladesh, Fiji, Kerala, Malaysia, Morocco) were in the process of considering EPR measures. Kerala State of India was the only case study focused on sub-national responses, with product bans in place at both national and sub-national level and EPR under discussion nationally. Other policies reviewed focused on governance, behavioral change, and public and private financing and investment or encouraging voluntary action by industry.

8. **Policy development needs to be well-designed and technically sound to strengthen its robustness and impact.** Policy development proceeds in stages – pre-design, design, implementation, monitoring and evaluation, and revision. The report summarizes the experience and lessons learned in each stage of policy making and implementation in the case studies and provides evidence-based policy guidance.

9. The **pre-design stage is an opportunity for policymakers to set the agenda, define the problem, and decide how to address it.** The cases studies and literature review indicate that many developing countries lack basic data and a good diagnosis of their solid waste management (SWM) systems and plastic pollution problems, and face weak institutional and financial capacity, low political commitment, and poor stakeholder participation. To address such gaps, the following elements are necessary for the pre-design stage:

- Fully understand the development context including local and cultural specificities.
- Conduct diagnostics on the plastics problem by collating and assessing available information and evidence, through among others, litter surveys, data on plastics production, consumption, and impact studies.
- Identify, map, and consult with stakeholders across the value chain to improve the evidence base.
- Assess institutional and waste management capacity to avoid shortfalls in design and implementation.
- Develop a national vision and political will and commitment.
- Explore financing and cost recovery mechanisms.
- Strengthen cross-government engagement and international cooperation.

10. The **policy design stage is where targets are set, policy options/alternatives are assessed and selected, and the approaches are developed for funding, implementation, enforcement, monitoring, reporting, evaluation, and revision.** The cases studies highlighted the importance of
setting targets and clarifying policies, an appropriate policy mix and sequencing to enhance the effectiveness of policies, stakeholder engagement, policy impact assessment, financing arrangements, and policy monitoring and evaluation in the design of plastics policies. The following tasks are key at the design stage:

- Use data to set targets.
- Develop a policy mix and ensure policy clarity.
- Consider timing and sequencing of policy implementation to ensure the various policy instruments will work in tandem.
- Engage stakeholders to increase participation, transparency, and accountability in policymaking.
- Conduct policy impact assessments to understand and plan for optimal response and effectiveness.
- Set the details for how a policy will be funded, implemented, enforced, monitored, reported, evaluated, and revised.

11. **The implementation to revision stages** involve putting policies into effect, enforcing execution, monitoring, reporting, and evaluating the results, and revising policies whenever necessary. Evaluations inform policy revisions as needed. The case studies found that the mechanism for policy enforcement, monitoring and evaluation is weak or largely missing in many developing countries. Key elements are:

- Implementation.
- Enforcement.
- Monitoring and reporting.
- Policy evaluation and revision.

12. **Cross-cutting issues need to be incorporated and addressed throughout the process of policy development and implementation.** The study identified the following cross-cutting findings from case studies and emphasizes that they are broadly applicable across all stages of policy making.

- **Build institutional capacity.** Policy implementation, particularly in decentralized governance models, requires national technical and financial support and oversight. All case studies of low-income countries cited shortcomings in institutional and financial capacity and expertise, typically due to a lack of funding.

- **Improve solid waste management.** An effective system for the management of solid waste integrated with management of plastic waste was shown to provide the most effective means for managing plastics at end of life.

- **Opportunities to strengthen and develop human capital** were highlighted in case studies:
  - **Provide work and empowerment opportunities for low-skilled workers.**
  - **Fill gaps in service provision.** Most case study countries have an active informal sector, which can be responsible for most of the waste collection, sorting, and bulking.
  - **Improve working conditions and training for waste management workers.** The case study countries had examples of inadequate health and safety, and poor wages and working conditions.
  - **Engage and integrate the informal sector.** The informal sector is seen as a competitor to the regulated sector and has shown a willingness to be “formalized,” for example, by cooperatives. Public-private models that include the informal sector also exist.
• **Private sector investment and innovation are necessary to develop recycling.** The cost of making products from recycled materials may be higher than that of products made from virgin materials, resulting in a difficult viability for green businesses. There is a need for financial incentives (e.g., subsidies) and disincentives (e.g., taxes) to drive the incorporation of recycled content (e.g., for technology, capacity building, meeting environmental standards).

• **Poverty and government corruption are linked to the mismanagement of plastic waste.** Corruption is noted as a barrier to policy effectiveness in some case study countries and has to be addressed.

13. **Overall, the study concluded that the effectiveness of policies to address plastic pollution can be substantially improved through careful design, implementation, and evaluation.** Key elements include building institutional capacity, aiming for circularity, involving all relevant public and private stakeholders, and adequate provisions for the monitoring, evaluation, and revision of policies. A combination of policy types can be used to create incentives and generate financial resources which work to shift product design, consumer behavior and waste management systems towards supporting plastics circularity.
1. Introduction

The growth and impacts of plastic pollution have emerged as a major environmental challenge globally. The unique properties of synthetic plastics (e.g., their durability, impermeability, resistance to chemicals, lightness) and their sheer versatility, combined with low manufacturing costs, have led to their use in a wide range of consumer, industrial, construction, healthcare, power, and transport applications. Global production and use of plastics are expected to double between 2020 and 2040 (UNEP, 2021a; Lebreton and Andrady, 2019) and triple by 2050 (Geyer, 2020). However, the implementation of solutions to manage plastic pollution is not keeping pace with production volumes, and current recycling rate of global plastic waste is estimated to be only around 18 percent (Geyer, 2020). An estimated 76 percent of plastics ever produced have been discarded (Geyer, 2020) with between 75 million and 199 million metric tonnes estimated to already be in the ocean (Lau et al, 2020; Pew Charitable Trusts and SYSTEMIQ 2020) and up to 11 million tonnes more plastics entering the oceans every year (Geyer, 2020).

Plastic pollution has a wide range of impacts on public health, ecosystems, biodiversity, and economies and can occur during each stage of the plastic lifecycle, from extraction of raw materials, production and use through to end-of-life. Plastic waste pollutes air, water, and land. Exposure to chemicals and pathogens associated with plastics, microplastics, as well as the burning of plastics, have direct impacts on human health (Hermabessiere et al., 2017). Plastic pollution presents a serious threat to ecosystems and biodiversity, including marine life (through entanglement, starvation, toxicological harm), and a variety of economic activities, such as aquaculture, waterway transport, and tourism. It is understood to alter the global carbon cycle and cause significant environmental costs (UNEP, 2021a).

Many countries have started to implement policies to manage plastic pollution and its impact, but as yet there is little evidence about their effectiveness or guidance on their application. The literature shows a clear recognition of the need for governments to develop and implement policies to reduce the impact of plastics and plastic waste (UNEP, 2021a; IRP, 2021; Karasik et al, 2020). Governments play a critical role in managing plastics and preventing pollution, and several influential studies have carried out global assessments of national and subnational policies. According to a recent analysis of the plastics policy inventory developed by Duke University’s Nicholas Institute (Karasik et al. 2022), there have been a total of 571 public policies to plastic pollution since 2000, as compared to 291 reported in Karasik et al. 2020. About 60% of these policies are regulatory (e.g., bans), close to a quarter are economic measures (e.g., taxes, fees, or subsidies), and the rest are related to information and other measures described further in this report.

Governments can use policies to target and adjust behavior at multiple stages in the value chain. Policies targeted at specific stages include bans or restrictions on the use of certain resins and requirements to separate plastic waste for recycling (UNEP, 2021a; EMF, 2021a; Watkins et al., 2019). Combinations of individual policies, or more complex, blended policies can be used to influence actors across the value chain, including through the implementation of extended producer responsibility (EPR) schemes. There is, however, a need for governments to better understand which policies (or combinations of policies) work, and how to make plastics policies more effective – this requires a better understanding of context, better data, and wider engagement of stakeholders.

The purpose of this report is to review the experiences and lessons learned from the development and implementation of policies to manage plastic pollution and provide evidence-based policy guidance. It is based on an assessment of the experiences in ten selected countries supplemented by information from the relevant literature. The report is aimed at policy makers and stakeholders involved in the design, implementation, and evaluation of policies to manage plastic pollution. The case study countries considered for this study were Bangladesh, Bulgaria, Fiji, Italy, the State of Kerala in India, Malaysia, Morocco, Rwanda, Saint Lucia, and Tanzania.
The analysis used a range of qualitative and quantitative methods to identify and assess public policies for plastic waste management, including a review of the literature, stakeholder mapping and engagement, structured online surveys, and targeted, semi-formal interviews. The study assessed the use of plastics policies through case studies of the above ten countries, along with relevant literature, to develop a set of practical, evidence-based considerations to help policy makers guide the design, implementation, enforcement, and review of policy packages to effectively address plastic pollution at national and subnational levels. Policies identified in each case study country were assessed to provide insight into what had worked well and where opportunities lay for improvement of the development process and the implementation, evaluation, and review of policies.

A key challenge the ex-post policy analysis encountered in the case study countries relates to the availability of robust and comparable data, particularly regarding the plastics value chain. Wherever possible, an extensive literature review and consultation with local stakeholders allowed the team to select the best available data for use in the case studies. Throughout the case studies, efforts were made to validate data wherever possible, and in every case, the study used the best available data identified. To expand discussions and fill gaps where information was light or lacking in the case study findings, relevant literature was reviewed and cited.

The study faced a number of constraints and limitations, from the availability of data to the COVID-19 pandemic. The degree of quantitative assessment and evaluation possible was limited due to the availability of data and information from case study countries. In addition, the COVID-19 pandemic impacted normal stakeholder interactions and their ability to engage. Stakeholder engagement was below expectations in some countries, leading to a limited sample for some case studies. In many cases, the ex-post assessment was limited to, or dependent on, secondary data from the literature. The deliberate selection of countries for the development of case studies, chosen in part for the type and maturity of the country’s policies in place, has inherent bias and makes quantification and generalization challenging in this report. In some countries this was further hampered, where a lack of literature existed, and in others, where there were discrepancies in the available data.

The structure of this report is as follows. Following this Introduction, Chapter 2 provides an overview of plastics and their uses and impacts, entry points for plastic pollution control, and the basics of plastics policies. Chapter 3 examines the experience and lessons learned from policy making and implementation in the set of country case studies, supplemented by information from relevant literature. It identifies what policy aspects have worked and which were less effective or missing across the design, implementation, enforcement, monitoring, reporting and evaluation of policies. Chapter 4 summarizes key issues regarding plastics policies and concludes with considerations for the guidance of a successful policy design and implementation process to manage plastic pollution.
2. Fundamentals of Plastic Pollution Management

This chapter provides an overview of plastics and their uses and summarizes the context of plastic pollution and impacts across its lifecycle. It identifies entry points for policy interventions and discusses the historical context of policies designed to manage plastic waste and the types of policy measures available. The chapter then introduces the stages and elements of policy making relevant to policies that manage plastic pollution.

2.1 Plastics and their uses

Plastics have changed many aspects of modern society. They are polymeric materials that can be manufactured from a wide variety of feedstocks (including both fossil fuels and biobased materials such as cellulose, starch, oils, proteins, and sugars), using a range of different processes. Their versatility and, in the case of conventional, fossil fuel-based or synthetic plastics, their low manufacturing costs have made plastics the preferred material in many consumers and industrial applications.

Global production and use of plastics have increased rapidly since the 1950s. Production of plastics has risen from two million metric tonnes globally in 1950 (EEA, 2019) to over 438 million metric tonnes (MT) in 2017 (Geyer, 2020), and a projected 398 million metric tonnes in 2020 (IEA, 2020). The global plastics market was estimated at US$ 580 billion in 2020 (UNEP, 2021a) and following recent growth rates, global production is expected to double within the next 20 years (Lebreton and Andrady, 2019), and triple by 2050 (Geyer, 2020). The bulk of plastics production is in Asia (China – 32 percent; Japan – 3 percent; elsewhere in Asia – 17 percent), with the remainder produced in North America (19 percent), Middle East & Africa (7 percent), Latin America (4 percent) and the rest of the world (3 percent) (PlasticsEurope, 2021).

Plastics are lightweight, durable, impermeable, and moldable and can resist some chemicals. Plastic products can be made of single or multiple polymers combined using different subcomponents or laminated with other materials (PlasticsEurope, 2021). They are used across every sector of the global economy; with 26 percent of the total volume of plastics used in packaging (EMF, 2021b) and most of the remainder used in construction, textiles, consumer goods, transportation and electronics (UNEP, 2018a). The polymers most frequently used as well as their unique properties and primary uses (both in virgin and recycled form) are presented in Table 2-1.

1 Synthetic plastics are those derived from crude oil, natural gas or coal. 99% of plastics is made from chemicals sourced from fossil fuels.
2 According to Geyer (2020), this comprises 348 MT polymer resins, 62 MT polymer fibers and 27 MT additives. Plastics Europe report the total global production figure for 2020 as 367 MT including thermosets, elastomers, adhesives, coatings and sealants and PP-Fibers and excludes PET-, PA- and Polyacryl-Fibers.
3 IEA (2020) report the total production figure for 2020 to be 398 MT (although it is not clear whether this includes or excludes fibres and additives). Another key source is PlasticsEurope which reports the total global production figure for 2020 as 367 MT, including thermosets, elastomers, adhesives, coatings and sealants and PP-Fibers and excludes PET-, PA- and Polyacryl-Fibers, however they do not provide a breakdown by polymer.
# Table 2-1. Common polymers and key information

<table>
<thead>
<tr>
<th>Polymer name</th>
<th>Properties</th>
<th>Projected global production capacity in (2020) (MT per year) (^1)</th>
<th>Examples of virgin polymer uses</th>
<th>Global plastic waste by polymer (% of total plastic waste in 2015) (^2)</th>
<th>Recycling category and examples of uses of recycled polymer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thermoplastics (melt when heated, harden when cooled; can be done repeatedly)</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Polypropylene (PP)</td>
<td>Strong film, able to handle higher temperatures</td>
<td>75.4</td>
<td>Food and drink containers, wrappers, bottle caps, microwave containers, pipes, automotive parts, bank notes, diapers, lab plastics, etc.</td>
<td>18.2 %</td>
<td>Category 5. Garden tools, battery cables, ice scrapers</td>
</tr>
<tr>
<td>Polyethylene, low density (LDPE) and linear low density (LLDPE)</td>
<td>Durable, flexible, transparent; stable electrical qualities</td>
<td>69.4</td>
<td>Reusable bags, trays and containers, agricultural film, food packaging film, squeeze bottles, grocery bags, cable applications, etc.</td>
<td>18.9 %</td>
<td>Category 4. Not commonly recycled. Lumber, garbage cans and furniture</td>
</tr>
<tr>
<td>Polyethylene, high density (HDPE) and mid density (MDPE)</td>
<td>Chemical stability</td>
<td>48.5</td>
<td>Freezer bags, milk bottles, shampoo bottles, snack food packages, pipes, toys, housewares, motor oil containers, chemical containers, etc.</td>
<td>13.2 %</td>
<td>Category 2. Plastic lumber, fencing or storage crates</td>
</tr>
<tr>
<td>Polyvinyl chloride (PVC)</td>
<td>Ability to resist most chemicals and bacteria</td>
<td>40.3</td>
<td>Window frames, floor / wall covering, pipes, cable insulation, synthetic leather, dashboards, medical tubing, cosmetic containers, etc.</td>
<td>5.0 %</td>
<td>Category 3. Drainpipes, medical equipment, food packaging</td>
</tr>
<tr>
<td>Polyethylene terephthalate (PET)</td>
<td>Chemical and moisture resistance</td>
<td>27.3</td>
<td>Bottles for water, soft drinks, juices, cleaners, microwavable food trays, hair combs, rope, etc.</td>
<td>10.6 %</td>
<td>Category 1. Carpet, fiber fill, cassette tapes, sails</td>
</tr>
<tr>
<td>Other thermoplastics e.g., acrylonitrile butadiene styrene (ABS), polycarbonate (PC), polymethyl methacrylate (PMMA)</td>
<td>Engineering plastics</td>
<td>110.9</td>
<td>Hub caps (ABS); roofing sheets (PC); touch screens (PMMA)</td>
<td>unknown</td>
<td></td>
</tr>
<tr>
<td><strong>Thermosets (heating causes these polymers to create a stable three-dimensional network which cannot be re-melted/reformed)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polystyrene (PS), expanded polystyrene (EPS)</td>
<td>Rigid (EPS) or foam (PS) form</td>
<td>26.6</td>
<td>Food packaging, insulation, electrical and electronic equipment, fridge liners, etc.</td>
<td>5.6%</td>
<td>Category 6. Insulation, license plate frames.</td>
</tr>
<tr>
<td>Other common thermosets e.g., polyurethane (PUR), phenolic, epoxide melamine and urea resins</td>
<td>unknown</td>
<td>unknown</td>
<td>PUR: building insulation, pillows and mattresses, insulating foams for fridges, etc.</td>
<td>unknown</td>
<td></td>
</tr>
</tbody>
</table>

Source: \(^1\) Production data for 2020 is projected by IEA, 2020; \(^2\) Waste breakdown is based on 2015 data, provided by Geyer et al (2017). Other; IEA PlasticsEurope (2020); \(^1\) UNEP (2021), PlasticsEurope (2021) Geyer (2020)
Plastics packaging has important benefits, including lightening weights and increasing fuel efficiency across all forms of transport (National Geographic, 2019; EMF, 2021b). These benefits, along with a continued increase in demand for consumer goods, the growth of the construction industry in emerging markets, and a move toward resource efficiency are driving a continued increase in global plastics production (National Geographic, 2019).

2.2 Plastic pollution and environmental impacts

The amount of plastic waste generated is increasing globally, with much of it poorly managed, causing plastic pollution with impacts on public health, ecosystems, biodiversity, and economies. This section explores plastic waste and the challenges and impacts it causes.

Global plastic waste generation increases rapidly and appears to vary by income level. An estimated 380 million tonnes of plastic waste were generated globally in 2017 (Geyer, 2020) which is expected to double by 2040 (IRP, 2021). The regions generating the greatest amount of plastic waste are East Asia and the Pacific (24 percent), Europe and Central Asia (19 percent), and North America (14 percent) (Kaza et al, 2018). On average, 12 percent of all municipal solid waste (MSW) comprises plastics, with variation by income level (Meijers et al, 2021); 6.4 percent of municipal waste generated in low-income countries in 2015 was plastics, compared to 13 percent in high income countries (Kaza et al, 2018).

The availability of cheap and versatile plastics has encouraged a shift in many sectors from multiple-use products to disposable or short-lifetime plastic alternatives, for instance, 95 percent of the value of plastic packaging ($USD 80–120 billion) is estimated to be lost from the economy after its first use (EMF, 2021b). Globally, single use products (e.g., plastic bags, food wrappers) account for 40 percent of annual plastics production (National Geographic, 2019). The COVID-19 pandemic created a further surge in the production of single use plastic products, e.g., masks, gloves, test kits, and takeaway containers (Xu and Ren, 2021; Filho et al, 2021).

Plastic enters the environment via both land and marine sources, with domestic, industrial, and fishing activities the most important contributors. The best available estimates suggest that 11 million metric tonnes of plastics currently enter the ocean every year from land-based sources (e.g., agriculture, building and construction, transport, and unregulated landfill) (UNEP, 2021a; Geyer, 2020; Jambeck et al., 2015); a figure expected to triple by 2040 (IRP, 2021; UNEP, 2021a). In addition, between 75 and 199 million metric tonnes are estimated to already be in the oceans (Lau et al, 2020; Pew Charitable Trusts and SYSTEMIQ 2020). Estimates in the literature suggest 20-30 percent of ocean plastics come from marine sources although the figure is higher in some areas, thought to be due to intensive fishing activities (Lebreton et al., 2018). Figure 2.1 presents the pathways of plastics entering the environment with global annual estimates for 2017.
The management of plastics end-of-life pollution is not effective at the global level. As with other forms of solid waste, reports cite poor management of plastic waste streams in lower income countries. Although higher income countries produce proportionately more MSW (Kaza et al, 2018), they generally manage waste more effectively (Lebreton and Andrady, 2019). However, on average, only an estimated 18 percent of all plastic waste was recycled globally in 2017, another 26 percent was incinerated, and the rest was discarded (Geyer, 2020).

Nearly half of municipal plastic waste is currently discarded into the environment and causing air, water, and land pollution problems. An estimated 60 to 99 million metric tonnes of plastic waste produced globally in 2015 was mismanaged, and where the management of waste is poor, the incidence of plastic pollution on air, water and land is higher. Studies confirm that mismanagement of plastic waste more often arises in low-to-middle income countries, where waste management systems have often failed to keep pace with the rate of plastic waste generated (Meijers et al, 2021; Ritchie and Roser, 2018; Jambeck et al, 2015). Without significant investment in waste management infrastructure alongside GDP growth, plastic waste mismanagement is expected to triple by 2060 (Lebreton and Andrady, 2019).

Although most mismanaged plastic waste appears to remain on land, plastic waste is entering in the ocean at an alarming rate and its persistence further poses a specific challenge for pollution management. The most recent study (Meijers et al. 2021) indicates that up to 98.5 percent of plastic waste accumulates on land, where it progressively pollutes inland waterways. However, the likelihood of plastic entering the marine environment increases due to inadequate control of plastic waste on land. An estimated 5.3 billion tonnes (76 percent) of all plastics ever produced had already been discarded into landfills, dumps, or the environment by 2017 (Geyer, 2020). According to best available data, between 75 and 199 million metric tonnes of plastics are already in the ocean (Lau et al, 2020; Pew Charitable Trusts and SYSTEMIQ 2020). Similarly, UNEP’s International Resource Panel (IRP, 2021) estimated that 150 million tonnes of plastic had already entered in the ocean by 2016 and the amount is expected to quadruple to 646 million tonnes by 2040.

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\[footnote{4} \text{UNEP (2021a) cites global recycling rates at less than 10% but the study by Geyer (2020) has made a comprehensive recalculation of global plastics production, plastic waste and end of life. Figure 2.1 uses data from Geyer, 2020 although it is important to recognize that there is no one agreed upon set of data.} \]

\[footnote{5} \text{Estimates for ocean plastics vary, for example with IRP (2021) estimating that by 2016, there was 150 MT of plastic already in the oceans.} \]
Apart from increased production volume, another specific challenge of all synthetic plastics is that they can persist in the environment for many years.

Environmental impacts are evident across the plastics lifecycle, from the extraction of raw materials, production and use through the end-of-life phase. Understanding the specific impacts of each stage of the plastic lifecycle provides context for policies that may target various stages which are described briefly in this section and summarized in Figure 2.2.

The upstream (extraction and production) phases of plastics have multiple impacts on land, water and air. The refining of raw materials and manufacture of plastic products from fossil-based feedstocks requires water and energy as well as facilities and equipment (OECD, 2018). In addition, several additives used in plastics are toxic and have been shown to be harmful to human health and the environment, including persistent organic pollutants (POPs) (UNEP, 2021a; Hermabessiere et al., 2017). The extraction and production of feedstocks for biobased plastics also have impacts, including from land, water, energy and chemicals use (European Bioplastics, 2019).

The midstream (use) phase of plastics accounts for the impacts associated with product use. Most plastic products, particularly single use plastics, fall into the ‘passive’ product category and do not generate environmental impacts during the use phase. However, reusable household or industrial products made from plastics, such as textiles, are ‘active’ products and will have impacts in the use phase, e.g., from washing, using both energy and water.

The largest source of plastic leakage into the environment occurs downstream in the value chain, at the end-of-life phase (UNEP, 2018c). End-of-life impacts are associated with landfill disposal, energy recovery, reuse, recycling, or improper disposal (e.g., litter). Impacts also occur from plastic leakage, when plastics are unintentionally released into the environment (e.g., mismanaged waste and microplastics). Discarded plastics are then landfilled, incinerated, recycled, or released into the environment:

- **Landfills** generate direct impacts from (i) leachate⁶ that affects wildlife and ecosystems, agricultural output and human health; (ii) GHG and other toxic emissions that affect global warming and air quality; (iii) potential land use changes that affect biodiversity; (iv) potential noise of landfill operations, odor and/or visual impacts that affect nearby properties and amenity values; and (v) facility construction and management (SL Recycling, 2021).

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⁶ Leachate refers to liquids produced as waste breaks down which can contaminate the soil, ground and surface water.
Incineration of plastic waste is a complex chemical process which releases more GHGs than other end-of-life options (CIEL, 2019; USEPA, 2018; WEF, 2016), and can contribute to air pollution (Verma et al., 2016) with impacts on human health and the environment (Client Earth, 2021; Nagy and Kuti, 2016).

Recycling of plastic waste has impacts, and inappropriate and unsafe recycling processes for e-waste has a significant impact on human and animal health and the environment (affecting soil, air and water quality) (UK Gov, 2013). However, recycling generally has lower environmental impacts than other end-of-life options, primarily due to the benefits of avoided virgin plastic production (HPRC, 2015).

Improper disposal and leakage (which occurs in all phases) are the most visible reasons for plastic waste accumulating in large quantities on land and in aquatic environments (Meijers et al., 2021; Ocean Conservancy, 2019; OECD, 2018; Schmidt et al, 2017). Left unmanaged, land-based litter (e.g., plastic bags, films, and other light plastics) can accumulate, clogging drainage systems and increasing the likelihood and extent of flooding (van Emmerik and Schwarz, 2019). Land based animals and birds can ingest plastic packaging leading to a range of health issues (Carlin et al, 2020). Marine litter (of which plastics are the largest and most persistent fraction at over 80 percent), presents a threat to all marine life (UNEP, 2021a; Addamo et al, 2017). Contamination by and accumulation of macro- and microplastics in marine animals can directly affect humans through food chains and also directly impacts ecosystems and climate change (CIEL, 2019).

Several key types of plastic products account for a high proportion of land-based and beach litter. A meta study for the EU identified the top 10 marine litter items on EU beaches as plastic caps and lids, cigarette butts and filters, food wrappers, string and cord, plastic fragments, cotton-tipped sticks, medical items, and paraffin wax (Addamo et al, 2017); this correlates with the top five items of litter logged during a range of land-based (including beach) surveys carried out across the globe by research group eXXpedition from 2019 to 2021. The eXXpedition group found that the main plastic items collected were predominantly cigarette-related, hard plastic fragments, plastic food wrappers and plastic bottles (eXXpedition, 2021). These types of surveys can help to identify the problem plastics.

Plastic litter also has an adverse economic impact on coastal and marine communities; particularly affecting ships and fishing boats, fishing gear, aquaculture, tourism, and the cleanliness of coastal areas (Meijers et al., 2021; UNEP, 2021a; UNEP, 2018a; OECD, 2018).

GHG emissions are released across most stages of the plastic lifecycle, with the highest carbon impacts seen in the production phase and end-of-life incineration phase (UNEP, 2021a; CIEL, 2019; WEF, 2016). Left unchanged, GHGs from the production, recycling and incineration of plastics is anticipated to account for 19 per cent of the remaining global carbon budget by 2040 (UNEP, 2021a; Pew Charitable Trusts and SYSTEMIQ 2020). Similarly, Zheng and Suh (2019) concluded that, if the whole plastics lifecycle were a country, it would be the fifth largest emitter of greenhouse gases and they further predicted that by 2050 the lifecycle emissions of plastic are predicted to be 6.5 billion tonnes CO2e per year, cumulatively taking up 15 per cent of the entire remaining carbon budget.

2.3 Entry points for plastic pollution management interventions

This section identifies entry points for plastic pollution management interventions. It first considers how to move beyond the concept of ‘waste’ and towards a ‘circular economy’, how to embed this with an effective after-use plastics economy, touching on how to increase demand for renewable and recycled plastics feedstocks. It then moves on to opportunities to improve the management of solid wastes and to consider institutional and financial arrangement and governance issues related to plastic pollution management.
Promoting a circular economy

Promoting “Circularity” is increasingly recognized by governments as an effective way to rethink the concept of waste and reduce the consumption of non-renewable raw materials. The ‘circular economy’ aims to reduce the use of natural resources and energy, and to minimize waste by keeping resources in use for as long as possible. The approach involves extracting the maximum value from materials while in use, then recovering and regenerating products and materials at the end of their service life. The overall intent is to reduce the consumption of non-renewable materials, reduce waste, and extend the lifespan of products, while regenerating natural systems.

There are key entry points for policy intervention which can increase plastics circularity, as outlined below:

- **Upstream (including extraction and production)** – Policies can incentivize manufacturers to design durability, repairability, reusability and recyclability into products. They can also encourage or require manufacturers to incorporate recycled and renewable content into products and facilitate the development of infrastructure for their reuse.

- **Midstream activities (including use)** – Policy intervention can be used to facilitate product repair and reuse; to develop infrastructure, systems and communications needed to keep existing products and materials in use for as long as possible; and to encourage waste prevention and recycling behaviors.

- **Downstream activities (including end-of-life)** – Policy intervention can be used to link consumers (e.g., sorting and disposing of waste) and waste management services (e.g., collecting, bulking, and distributing used plastics) with the recycling and reprocessing of products and materials. Instruments can be used to enable cost recovery for waste and recycling collections, as well as to facilitate scaling-up of innovative technologies and materials, ultimately driving down the use of virgin raw materials in new products.

The “waste hierarchy” concept provides a framework for managing waste materials as valuable resources and keeping them in productive use for as long as possible (Resource, 2019). Developed within the Waste Framework Directive, the European Union uses the waste hierarchy (Figure 2.3) as an umbrella concept to design instruments intended to manage plastics across the whole lifecycle. Policy interventions can be used to prioritize waste prevention, followed by reuse and material recycling, then energy recovery and finally the disposal of non-recyclable waste (EC, 2008).

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Driving up the demand for alternatives

Unnecessary, avoidable, and particularly problematic plastic items should be phased out and replaced with alternative materials, products, and services (UNEP, 2021a). Decisions around what material(s) to use for a particular product are made at the design stage and include consideration of whether to incorporate recycled or biobased feedstock and how long a product can last. These choices are based on various factors such as consumer demand, regulation, technologies, industry initiatives and the price and availability of feedstocks (PlasticsEurope, 2019). Policy interventions can be used to drive up the demand for alternative (recycled or biobased) feedstocks and for plastic products which are designed for reuse and recyclability. Key entry points are:

- **Influencing the choice of materials to increase recycled content and recyclability of products.** The choice of materials directly impacts future and end-of-life opportunities for a product. Some companies are already designing recyclability into their plastic products (Watkins et al, 2020). Another option is to redesign a plastic product using non-plastic base materials. A recent study found that substituting plastic raw materials with paper, coated paper, and compostables for key products could decrease plastic leakage into the environment by 17 percent (Pew Charitable Trusts and Systemiq, 2020). Policy intervention can be used to shift producers away from using fossil fuel-based plastics in products where the risk of leakage is higher, to increase recycled content in plastic products, and to encourage the design of recyclable and reusable products.

- **Restricting the use of single-use items for which alternatives exist.** Many packaging products are designed for single use (e.g., drinks and food containers and disposable cutlery) or to provide a single portion (e.g., sachets) and only about 20 percent of plastic packaging can be easily reused (EMF, 2021b). The so called ‘sachet economy’ facilitates purchase by consumers of individual or small portions of a product and is increasingly prevalent in some low-income countries (Gaia, 2020). Many types of personal and home-care packaging, beverage bottles and carrier bags can already be reused (EMF, 2021b). Policy interventions can be used to restrict the production, sale and use of single use

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8 Further to this, the World Bank commissioned a report on the lifecycle impacts of ten mainstream plastic products and substitute materials, which compared plastic products and their alternatives (World Bank and RebelGroup International, 2021).

9 An example of this would be using policy to encourage or require the use of biodegradable materials for agriculture, where the risk of microplastics pollution of soil and plastic leakage to the environment is high (various e.g., Corbin et al, 2013).
items for which alternatives exist. Examples of interventions are, implementing container-deposit or deposit-refund schemes (e.g., for drinks bottles), raising consumer awareness of reusable products, and incentivizing businesses to offer consumers opportunities to have their own container refilled.

**Strengthening solid waste management**

**Effective SWM is critical to plastic waste management but represents a growing challenge for municipalities.** Global municipal waste is expected to increase by 73 percent—from 2.24 billion tonnes in 2020 to 3.88 billion tonnes by, of which 12 percent is plastic (Kaza et al, 2018). This includes plastic waste at the end-of-life stage as well as waste arising earlier in the lifecycle. Several factors are driving this challenge, each with possible policy interventions:

- **Provision of effective solid waste management services.** Plastic waste mainly enters the environment through open dumping, unregulated landfill, open burning, and littering onto land and in waterways (Meijers et al, 2021; Ritchie and Roser, 2018; Jambeck et al, 2015). Without increasing access to and use of solid waste management services globally, the mismanagement of plastic waste is expected to triple by 2060 (Lebreton and Andrady, 2019). Policy intervention can be used to develop and improve SWM services particularly in urban areas, to increase public awareness and use of waste management services, and to increase the capture and recycling of plastics.

- **Financing SWM infrastructure and services.** Lack of funding for improving SWM systems is a big financial challenge for many municipalities in low-income countries, where the cost for SWM often represents the largest budget item (Kaza et al, 2018). Policy interventions such as taxes or fees can be used to integrate and internalize the cost and impact of plastic pollution management into the production cost of new plastic products and/or generate financial resources for investments in SWM infrastructure and services.

**Unpacking the challenges of recycling**

**Recycling is an essential part of the circularity and waste management concept, and it has technical and financial challenges to address.** Policy interventions including economic incentives and regulatory controls can be used to increase the capture and recycling of plastic waste and the incorporation of recycled content into products (EMF, 2021a). Challenges around recycling which require policy attention include:

- **Driving innovation.** Investment in recycling technologies, particularly new and innovative technologies, may be commercially risky (UNPRI, 2019). Policy interventions such as subsidies and favorable interest rates can be used to de-risk and encourage private sector investment in recycling technologies and facilities, drive innovation, restrict the use of landfill and incineration for recyclable materials, encourage the production of recyclable products, and scale up adoption of recycled and reusable plastic products.

- **Stabilizing prices and enhancing financial sustainability.** The price of recycled plastics is not only influenced by supply of recycled feedstock and the costs of waste collection, sorting and recycling (Van Leuven, 2020), but also by the fluctuation of virgin feedstock prices which are often directly linked to crude oil prices (S&P Global, 2019). The viability of recycling businesses is thus subject to financial uncertainty and risk. Policy interventions can de-risk plastics recycling investments, e.g., using green public procurement (GPP) to guarantee the purchase price of quality recycled products and establishing public-private partnerships (PPP) for financing recycling facilities. Policy interventions can also be used to drive up the demand for recycled plastic products and increase the collection and recovery of waste plastics, for example by eliminating subsidies for fossil fuels which otherwise keep virgin plastic feedstock prices artificially low and recycled plastics less competitive in price.

- **Improving recycled feedstock quality and uptake.** A report by the Ellen MacArthur Foundation (EMF, 2021a) found that while only two percent of plastic packaging is currently made from recycled
plastic, the availability of quality recycled feedstock can promote its demand and uptake. Policy interventions can be used to promote waste separation at source and develop quality standards for plastic recycling regarding capturing quality recyclable material, e.g., introducing Deposit Refund Schemes (DRS).

- **Recognizing the socio-economic benefits of recycling.** Recycling is labor intensive and, in many cases, involves informal waste pickers and recyclers. Policy interventions can create jobs and improve the socio-economic status of low-income people while upgrading recycling businesses.

Strengthening institutional arrangements and governance for waste management

**Strategy and targets.** Strategy development with clear targets will help create an overarching framework for making effective policies. For nation-wide waste management, national governments have the responsibility for developing strategy and setting targets, while municipal and local governments play a key role in implementation. Since plastics lifecycle waste management involves various stakeholders, including government agencies at national and local levels, effective coordination between different actors is necessary. Coordination, cooperation, and other relevant interventions will help confirm the overarching strategy and targets, clarify responsibilities, capacity needs, and reporting requirements of each agency, and allocate financing as well as ensure integration between different agendas.

**Data collection and information sharing.** For national governments to develop strategy and set targets and municipalities to select appropriate management methods and plan for future demand, collecting data and developing information management systems for plastics and plastic waste are essential steps to understanding how much waste is generated, where it is generated, the types of waste being generated and the opportunities within the value chain to recycle and reuse resources. Policy interventions can be used to create an information framework, set data requirements, and define responsibilities for the collection and reporting of data and metrics.

**Policy financing.** Policy implementation, enforcement, and monitoring need to be well-funded. Studies have shown that environmental tax revenues do not necessarily cover environmental protection expenditures and there is a need to consider financing these policies differently, by focusing on recurrent funding, e.g., by earmarking the revenue from environmental taxes, fees, and levies to finance environmental enforcement, rather than fund projects (ODI, 2008). Other options include dedicated budgets at the national and sub-national level to build capacity and incentivize recycling, implementing a polluter-pays mechanism, considering tipping fees to drive down landfill disposals while also making it pay for itself, and providing a clear strategy for mobilizing private sector investments in plastic waste management, particularly for the capture, segregation and recycling of plastic waste.

**Policy transparency and accountability.** Some economic or financial instruments (e.g., taxes and fees) are open to fraud and corruption if not correctly designed and managed. Mechanisms to ensure policy transparency and public accountability can be an effective tool to discourage and prevent corruption. Interventions can be used to close regulatory loopholes while also providing opportunities to appeal enforcement actions, submit complaints and provide transparency in the application and reporting of policy outcomes with the aim of increasing public awareness and trust in interventions and their chances of success.

**Stakeholder engagement and cooperation.** Managing plastic waste requires engaging stakeholders and enhancing their cooperation across the entire plastics value chain. Policy intervention can be used to select and engage key stakeholders and interested parties and facilitate early identification of challenges and opportunities to be addressed by policies. For example, stakeholders must be consulted while making policy requirements for changing the inputs, product design and manufacturing processes which can directly influence the use and disposal options for plastics products. This will help avoid undesired consequences, if the policies are poorly designed (e.g., lead to the use of an alternative material that has a negative environmental impact or for which no recycling opportunity exists).
2.4 Overview of plastics policies

Plastics pollution is a result of market and policy failures in plastics production and consumption. Effective plastics policies and other measures are necessary to address the problem of negative externalities. To control plastic pollution, governments must effectively use a variety of policy instruments to target appropriate points in the plastics lifecycle and influence decision-making by individuals or multiple actors across the plastics value chains. This section provides an overview of plastics policies to tackle the impact of plastics and plastic pollution, covering the types of policies, their combination and timing, and then a brief history of plastics policies.

Types of policies for plastic pollution management

Government policy to manage plastic pollution can be generally categorized into “market-based instruments” (MBIs), “command-and-control (C&C)” measures, and a variety of ‘other’ instruments designed to improve governance, drive behavior change and stimulate investment.

Market-based Instruments (MBIs), also referred to as economic or price-based instruments, seek to incentivize producers and consumers to change behavior, use resources more efficiently, and reduce the negative impacts of resources. MBIs include a variety of instruments such as taxes and fees that recognize the social and/or environmental costs of production or consumption activities in the cost of a product or material; use of DRS to apply a surcharge on a product when purchased and a rebate when the packaging is returned; provision of subsidies to encourage the manufacture or uptake of a “better” product (e.g. a reusable product over a single use one); or implementation of mandatory labelling or design requirements for particular products.

Command and Control (C&C) or regulatory measures can be used by public authorities to mandate the level of performance required or the technologies to be used and to restrict the production or consumption of certain materials or products. They include bans, emissions standards, and discharge or input thresholds or limits as well as product design standards or requirements which can be applied at different (or multiple) points across the plastics value chain.

Typical policy instruments used to control plastic pollution are further summarized in Table 2-2 below. Insights into the application of some of the instruments at different stages of the plastics lifecycle are explored in Figure 2.4.
Table 2-2. Typical policy instruments for managing plastic pollution

<table>
<thead>
<tr>
<th>Policy type</th>
<th>Description</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Specific examples</th>
</tr>
</thead>
</table>
| **Taxes & fees**  | Taxes and fees are a collective term to describe the variety of financial instruments available to governments. **Taxes** largely finance government activity. A **levy** is an obligatory payment to the Government or another organization. **Fees** are paid for provision of a service. | • Can disincentivize production of specific polymers/products or increase competitiveness of alternative, more sustainable materials.  
• Market incentive; can make recycled polymers more cost comparable.  
• Can be used to drive environmental change. | • Requires strong institutional capacity.  
• Difficult to implement in the informal sector and unregistered businesses.  
• Unintended environmental consequences, if poorly designed. | • **Taxes:** landfill tax, virgin plastic tax, problematic and/or unnecessary products taxes; carbon tax.  
• **Fees:** tipping (to landfill), advanced disposal, consumer fees and/or levies; packaging materials, DRS, pay as you throw (PAYT).  
• **Extended Producer Responsibility** (EPR): mandatory modulated EPR, pre-competitive voluntary EPR. |
| **Subsidy**       | A defined **sum of money** granted by a public body to help an industry or business keep the price of a commodity or service affordable. | • Can address price variance between fossil-based and alternative materials.  
• Can encourage innovation.  
• Can help overcome technological barriers in nascent industries.  
• Can generate reliable supply of materials to scale-up recycling. | • Will require the diversion of tax revenues from other government activities.  
• Unintended consequences if poorly designed.  
• Can impair established collection and recycling systems. | • Financial drivers might include reuse system subsidies, feed-in tariffs, research and innovation grants, etc.  
This category includes **tax incentives** e.g., preferential import/export tariffs. |
| **Bans & standards** | Legislated (mandatory) or industry-driven (voluntary) requirement to adhere to specific conditions. Implemented to drive targeted change, for example around particular products or materials, to address challenges involving nonrecyclable or difficult to recycle plastics/materials. Can be certified to international (e.g., ISO) or local requirements. | • Can work in countries with strong governance systems.  
• Can contribute to greater consumer engagement.  
• Permits create a financial incentive to pollute less. | • Require widespread consumer support and the availability of viable alternatives.  
• Time required for industry to change.  
• Standards can be difficult to establish.  
• Data required to enable quantification and measurement. | • **Product or material bans** on single use plastics can reduce generation and leakage of plastic waste.  
• **Voluntary standards and requirements** (e.g., labeling, product design requirements, incorporation of recycled content) can improve quality and supply of recycled material and recyclability of products.  
• **Mandatory standards** such as eco-design can be used where alternatives products exist on the market.  
• **Sustainability standards** can provide reassurance for consumers, stimulating market demand for recycled content in products. |
In addition to the policies above, other types of instruments are used to manage plastics and reduce plastic pollution including ones that:

- **Improve governance:** policy measures can improve governance through the incorporation of measures that disclose information, create accountability, and encourage public support for policies to manage plastic pollution (e.g., by setting targets, improving transparency in reporting and enforcement, and mandating public data collection reporting) (Watkins et al., 2019).

- **Drive behavioral change:** policy measures can educate the public, raise public awareness, and drive behavioral change (e.g., around waste minimization and littering) (Watkins et al., 2019). Other measures can introduce and scale-up outreach programs (e.g., authorities cooperating with informal waste pickers) and locally alleviate plastic pollution (e.g., investing in beach clean-ups) in a relatively low-cost way. Such policies may also apply disincentives such as anti-littering and anti-dumping penalty notices or fines, to tackle hotspots.

- **Drive financing & investment:** policy measures can be designed to directly finance interventions, to stimulate investment in infrastructure (e.g., collection, sorting, landfills, incinerators, composting, recycling and re-use infrastructure), and to stimulate research and development (e.g., in materials, product design and innovative technologies) (Watkins et al., 2019). Infrastructure investment could be facilitated through public-private partnerships which blend public, private, or philanthropic capital to spur investment in waste management projects and through tradeable credit systems which enable producers to meet their obligations by purchasing recycling certificates issued by accredited re-processors or recyclers based on the amount of plastic waste recycled. Financial measures such as subsidies can also be used to de-risk investment.

- **Support voluntary industry action:** there are numerous examples around the world of brands, manufacturers and retailers working to reduce the social and environmental impacts of products under voluntary agreements. The plastics sector is no exception, e.g., the Plastics Pact (EMF, 2021b); VinylPlus (Defra, 2018); and design for recyclability standards (Watkins et al, 2020). Government policies and initiatives (e.g., EU Ecodesign Directive, EU circular economy action plan) can be used to encourage sustainability improvements in products on a voluntary as well as mandatory basis (EU, 2020).

**Combination and timing of policy instruments**

The instruments and measures available to governments can be applied at different points across the plastics value chain as well as at different points in time. The potential application of some of these instruments and measures across the value chain is explored in Figure 2.4, which highlights how different policies might be strategically combined and timed to both incentivize desired behaviors (e.g., incorporation of sustainable design into the manufacture of certain products) and disincentivize unwanted ones (e.g., restricting use of specific polymers or disposal mechanisms). The timing and sequencing of policy applications is explored in Section 3.3.
### Figure 2.4. Applicability of examples of instruments and measures at different stages of the plastics lifecycle

<table>
<thead>
<tr>
<th>Upstream</th>
<th>Midstream</th>
<th>Downstream</th>
<th>Litter &amp; pollution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraction &amp; import (raw materials &amp; polymers)</td>
<td>Manufacturing &amp; import of products</td>
<td>Marketing &amp; sale</td>
<td>Use</td>
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<tr>
<td><strong>Tax, import duty, levy</strong></td>
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<tr>
<td></td>
<td>Apply tax/ duty on importation, production of certain plastic products, product types and resin types (e.g. microbeads in cosmetics, PP carrier bags, PS containers)</td>
<td>Apply levy on sale, use of certain products/types (e.g. lightweight carriers)</td>
<td>Apply (fixed or variable) tax on landfilling of particular/ all wastes; charge gate fees</td>
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<tr>
<td><strong>Subsidy, import duty cut</strong></td>
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<tr>
<td></td>
<td>Incentivise importation, production and sale of products, product types, processes and feedstocks through provision of subsidies, grants</td>
<td>Incentivise use of certain products / polymers</td>
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<tr>
<td><strong>Product and material bans, landfill bans</strong></td>
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<tr>
<td></td>
<td>Restrict/ ban importation, production, sale and use of specific materials/ products (e.g. microbeads, single use plastics)</td>
<td>Ban landfill/ incineration of e.g., packaging, recyclable products</td>
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<tr>
<td><strong>Green design, recyclability standards</strong></td>
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<td>Develop and apply (mandatory or voluntary) sectoral standards (e.g. sustainable chemicals, eco-design, recyclability)</td>
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<tr>
<td><strong>Expansion of SWM (particularly collection)</strong></td>
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<td><strong>Drivers to increase access to recycling</strong></td>
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<td><strong>Green public procurement</strong></td>
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<tr>
<td><strong>Measures aimed at improving economics of collection (e.g. EPR)</strong></td>
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<tr>
<td></td>
<td>Implement polluter pays measures (e.g., EPR)</td>
<td>Improve uplift of waste; expand access to recycling; reduce landfill / incineration; reduced leakage</td>
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<tr>
<td><strong>Behaviour change measures</strong></td>
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<td></td>
<td></td>
<td>Improve public understanding of impact of littering, availability of recycling, recyclability of products, reuse through awareness campaigns</td>
<td></td>
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<tr>
<td><strong>Litter management measures</strong></td>
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<tr>
<td></td>
<td></td>
<td>Apply fines for littering</td>
<td>Carry out clean-up activities</td>
</tr>
<tr>
<td><strong>Research &amp; evidence building measures</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Collection of import/ export data</td>
<td>Collection of data on plastics industry (e.g., value, employment, polymers)</td>
<td>Collection of data on sale and use of plastics (e.g., types, products, sectors)</td>
<td>Collection of data on plastics waste (e.g., volume, value, jobs, recycling, landfill)</td>
</tr>
</tbody>
</table>
Different types of measures can be combined for greater impact across the value chain and to aim for system level change. Individual policies can target different stages of the plastics lifecycle and different stakeholder groups. However, individual policy interventions often may not solve a complex problem like plastic pollution in isolation (Pew Charitable Trusts and Systemiq, 2020; Watkins, 2019). A package of policies (combined within a framework) can more effectively drive desired outcomes (e.g., promoting collection/production and use of alternative or recycled materials), penalize undesired outcomes (e.g., restricting landfill waste disposal), and use additional strategies to enhance outcomes (e.g., increasing consumer awareness, improving data collection). Government policies must address the impact of plastic in a coordinated way if they are to keep up with the scale and speed of change evident in the value chain both upstream and midstream (EMF, 2021b; UNEP, 2021a; IRP, 2021; Pew Charitable Trusts and Systemiq, 2020; EU, 2020).

A brief history of policies to manage plastic pollution

A brief history of plastics policies is presented below. It starts with an overview of international initiatives and conventions and then the evolution of the approaches adopted by governments to manage plastic waste across plastics value chain.

International initiatives and treaties have helped pave the way for policy actions and reforms on policies to manage plastic pollution (UNEP, 2021a). The first Honolulu Conference on Marine Debris in 1984 explored research which attempted to quantify and understand the impacts and fate of marine debris (including plastics). More recently, the Ocean Plastics Charter, a voluntary international framework to reduce plastic waste, was signed in 2018 as an outcome of the G7 summit in Charlevoix (Government of Canada, 2018). A summary of the key international initiatives, laws, and policies related to protections from the impact of marine litter and plastic pollution is provided in Figure 2.5.

To date, governments have used a variety of policies to address the negative impacts of plastics and plastic waste (EMF, 2021b; UNEP, 2021a). According to a recent analysis of the plastics policy inventory at Duke University’s Nicholas Institute (Karasik et al. 2022), there have been a total of 571 public policies to plastic pollution since 2000, as compared to 291 reported in Karasik et al. 2020. About 60% of these policies are regulatory (e.g., bans), close to a quarter are economic measures (e.g., taxes, fees, or subsidies), and the rest are related to information and other measures.

Many plastics policies focus directly on specific product types (e.g., banning or restricting lightweight plastic bags) or usage. Policies have applied restrictions and conditions on use of individual or combinations of certain polymers and types of plastic products, e.g., polypropylene carry bags, PET bottles, or polystyrene food and drink containers (Pew Charitable Trusts and Systemiq, 2020; Ocean Conservancy, 2019; UN, 2018). More than 60 countries use bans, taxes, and levies to restrict unwanted single-use plastic bags or other plastic products at the source (UNEP, 2021a; Ocean Conservancy, 2019; WEF, 2016). A number of countries successfully operate DRS which incentivize the return of plastic containers into reuse and recycling systems (e.g., Germany, UK, USA) (UNEP, 2021a; UNEP, 2020).

A progression toward policies focusing on upstream interventions earlier in the plastic lifecycle (e.g., waste prevention at the design and production stages) is evident. Instruments such as EPR are becoming widely implemented. EPR provides a mechanism to target the environmental, economic, and social costs of the disposing of plastics products, while mandating waste collection and prevention, and raising awareness (UNEP, 2021a; Ocean Conservancy, 2019). Other policies focus on reducing the use of hazardous chemicals in plastics products (EEA, 2019).

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There is a growing understanding that policies addressing individual aspects of plastics management are not effective in isolation. Multiple system interventions are required, applied in combination at different levels of government, to adequately reduce the impact of plastic production, improve the management of waste plastics, reduce the leakage of plastic into the environment and tackle plastic pollution. The development of an overarching strategy or umbrella framework which considers the entire plastic lifecycle, including production, consumption, and end-of-life disposal can be an effective way to create coherency, while tailoring the precise interventions to the meet specific national or regional requirements (UNEP, 2021a; EMF, 2021a; Watkins et al., 2019).

More recently, governments have started to adopt a circular economy approach as the framework to manage plastics. In 2016, the European Union adopted a circular economy framework which includes a strategy on plastics, a target to increase plastic packaging recycling to 55 percent, a binding target to reduce landfill, and a total ban on landfilling all separately collected waste (UNEP, 2021a; EU, 2020). Other countries, such as the United Kingdom (Defra, 2020) have released Circular Economy strategies or statements, that include plastics in their scope.

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11 A European Strategy for Plastics in a Circular Economy (COM/2018/028 final)
2.5 The stages of policy making

Policy development proceeds in stages, each of which needs to be well-designed and technically sound to strengthen its robustness and impact. The main stages are briefly described below. Lessons learned from the case studies in each of these stages are discussed in Chapter 3 and the policy cycle used is summarized in Figure 4.1:

- **Pre-design** includes conducting diagnostics to identify and understand the problem and the wider context; gathering evidence to clarify the sources of the problem, as well as understanding the market and potential opportunities. An assessment is conducted of plastic substitution and mitigation measures as well as stakeholder mapping. Feasibility and financing mechanisms are explored.

- **Policy design** is the phase where policy instrument(s) are selected and policy features are set, determining how a policy is implemented, enforced, monitored, reported, and evaluated. Financing for these elements is determined. Incorporation of policy impact assessments, combined with further stakeholder engagement at this stage, can help ensure success.

- **Implementation** is the stage when a policy proposal is put into effect and the policy is executed by the respective government departments and agencies, in conjunction with other organizations as required.

- **Enforcement** typically comprises two components – detection of policy non-compliance and acting when a non-compliance occurs, usually by issuing a penalty, fine or custodial sentence.

- **Monitoring and reporting.** Monitoring a policy’s progress involves the regular tracking of activities, outcomes, and impacts. Reporting results with appropriate frequency (e.g., annually) and making it available to stakeholders offers transparency into policy progress.

- **Evaluation** is the stage where the effectiveness, efficiency, relevance, and coherence of policy are examined, and recommendations are made for policy improvement (EC, 2021). Evaluations should assess all significant economic, social, and environmental impacts of interventions and, where possible, consult with stakeholders.

- **Policy revision** is informed by policy evaluation and aims to increase policy effectiveness after which the cycle begins again. Given the complexity and evolution of the plastics problem, intentional policy revision is a crucial step to facilitate a process striving for continual increases in policy effectiveness.
3. Findings and Lessons Regarding Policies to Manage Plastic Pollution

This chapter examines various aspects of policy making and implementation as observed in the country case studies, supplemented by policy examples, analysis and other relevant information from the literature. It provides context regarding the case study countries, identifies what policy aspects have worked and those that were less effective or noted as missing across the design, implementation, enforcement, monitoring, reporting and evaluation of policies aimed at the management of plastic pollution.

3.1 Summary of state of play in case study countries

Analysis in this report is largely based on case studies in ten countries. To provide context on policy implementation, this section provides a summary of the socio-economic context in each country.

The case study countries were selected to provide diversity in geography, economies, and policies, as well as in plastics policies and implementation experiences. The countries represent a variety of regions and vary in size and population as well as in income level. Two countries (Fiji and Saint Lucia) are small island developing states (SIDS) having fewer than one million people, compared to 163 million in Bangladesh. The countries also range in income from low (Rwanda) to high income (Italy), with four countries ranking as lower middle income and another four as upper middle income, according to World Bank economic classifications.

Table 3-1 presents the geographic, socio-economic, and demographic context of each country, along with the relative levels of domestic plastic production and consumption, waste generation and management. Context is provided by a graduated color code where green represents ‘high’ and yellow represents ‘low’ for each category. For example, as noted above, Bangladesh has the highest population of all case study countries and is dark green, while Saint Lucia, with the lowest, is yellow.
### Table 3-1. Development context of plastics and plastic waste in each case study country

<table>
<thead>
<tr>
<th>Country name</th>
<th>Bangladesh</th>
<th>Bulgaria</th>
<th>Fiji*</th>
<th>Kerala, India</th>
<th>Italy</th>
<th>Malaysia</th>
<th>Morocco</th>
<th>Rwanda</th>
<th>Saint Lucia*</th>
<th>Tanzania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region</td>
<td>South Asia</td>
<td>SE Europe</td>
<td>South Pacific</td>
<td>South Asia</td>
<td>South Europe</td>
<td>SE Asia</td>
<td>North Africa</td>
<td>Central-East Africa</td>
<td>Eastern Caribbean</td>
<td>East Africa</td>
</tr>
<tr>
<td>World Bank income level (^)</td>
<td>Lower middle</td>
<td>Upper middle</td>
<td>Upper middle</td>
<td>Lower middle</td>
<td>High</td>
<td>Upper middle</td>
<td>Lower middle</td>
<td>Low</td>
<td>Upper middle</td>
<td>Lower middle</td>
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<td>Country size (km(^2))</td>
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<td>Population size (millions)</td>
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<td>GDP (US$ billions)</td>
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<td>Urban population (% of total)</td>
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<td>Total domestic plastics production (million tons per year)</td>
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<td>Per-capita plastic waste generation (kg/capita/year)</td>
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<tr>
<td>Plastic waste recycling rate (%)</td>
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<tr>
<td>Plastic waste landfilled and/or incinerated rate (%)</td>
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<tr>
<td>Plastic waste littered and/or mismanaged (%)</td>
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</tbody>
</table>

Key: Green represents 'high' and yellow represents 'low' for each category.
\(^*\) Denotes a Small Island Developing State (SIDS).
A variety of characteristics of the plastics value chain were also considered for review within each country (see Table 3-2). There is a large range of plastics production levels in the case study countries, with Italy, Bangladesh, Malaysia, and Morocco all having significant plastics sectors.

Table 3.2. Country case studies and rationale for their selection

<table>
<thead>
<tr>
<th>Country</th>
<th>Reason for selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>Bangladesh was the first country to ban plastic bags in 2002. It has a large plastics industry with many small and medium-sized enterprises (SMEs); a requirement to use jute fiber packaging in the trade of industrial goods; and a sizeable informal component to the waste management sector.</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>Bulgaria has one of the European Union’s (EU’s) highest rates of plastic packaging recycling. It implemented some of the world’s earliest policies regarding plastic pollution, including a plastic bag tax (2011); EPR on packaging (2001); and regulations on reuse, recycling, recovery and disposal of plastic packaging.</td>
</tr>
<tr>
<td>Fiji</td>
<td>Fiji is one of the most developed economies in the Pacific region and, as an island nation, is particularly at risk from the effects of environmental challenges such as climate change and marine plastic pollution. Fiji’s policy approach includes a levy on plastic bags and ban on single use plastic bags.</td>
</tr>
<tr>
<td>Italy</td>
<td>Italy was the first EU country to attempt a ban on non-biodegradable plastic bags ban. It implemented EPR legislation, taxes and tax breaks for use of recycled materials. The country is a major producer of plastic products, and its beaches are particularly sensitive to marine pollution from plastics, which can directly impact the tourism sector. It has a well-established recycling industry and history of EPR policies.</td>
</tr>
<tr>
<td>Kerala, India</td>
<td>Kerala is a state within India that’s seen a recent expansion of the middle class with an associated increase in plastic consumption and waste. Kerala produces some plastics but is a net importer of polymer and plastic products.</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Malaysia is a net exporter of plastics, producing many manufactured plastic goods. It has a range of policy measures, many recently implemented, including bans and standards on plastic products and waste; governance and behavior change measures to address waste management; taxes on plastic products; and infrastructure investment for waste management.</td>
</tr>
<tr>
<td>Morocco</td>
<td>Morocco has taken significant steps to reduce plastic pollution, particularly with respect to marine plastics. It implemented a “National Programme for Collection and Disposal of Plastic Bags” a tax on plastics, a ban on bags and has recently set plastic recycling targets.</td>
</tr>
<tr>
<td>Rwanda</td>
<td>Rwanda has introduced a structured approach to sustainable waste management and adopted bans on the manufacture, import, use and sale of plastic bags and other single-use plastic items. It promotes public support for pollution reduction through its “Umuganda” community service program.</td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>Saint Lucia is a small island state with policies targeting imported and locally manufactured plastic goods. The Caribbean is the second most plastic-contaminated sea after the Mediterranean (UNEP, 2019), and Saint Lucia has a high level of plastic marine debris on its beaches. The country banned the import, manufacture, and sale of Styrofoam and plastic food service containers.</td>
</tr>
<tr>
<td>Tanzania</td>
<td>Tanzania has taken significant steps toward addressing plastic pollution by implementing some of the strictest measures against plastic bag use. It has implemented a ban on the import, manufacture and use of plastic bags.</td>
</tr>
</tbody>
</table>

3.2 Findings and lessons in the policy pre-design stage

At the pre-design stage, policy makers set the agenda, define the problem, and decide how to address it. The cases studies and literature review show that many developing countries lack basic data on and a diagnosis of their SWM and plastic pollution problems, and face weak institutional and financial capacity, low political commitment, and poor stakeholder participation.
This report highlights the following necessary elements for an effective pre-design stage:

- Fully understand the development context, including local and cultural specificities.
- Conduct initial diagnostics.
- Identify, map, and consult stakeholders.
- Assess institutional and waste management capacity.
- Develop a national vision, including broader circular economy ambitions, and build political will and commitment.
- Explore financing and cost-recovery mechanisms.
- Strengthen cross-government engagement and international cooperation.

**Fully understand the development context**

The first step in pre-design is to fully understand the development context, including local and cultural specificities, and to conduct diagnostics on the plastic problems by collating and assessing available information and evidence through, e.g., litter surveys, data on plastic production, consumption, and impact studies. These elements are further explored below.

**Policies need to consider subnational, local, and cultural specificities and promote locally produced, more sustainable alternative materials.** Tanzania promoted national culture and locally made products by designing and implementing the successful promotion of traditional woven baskets as alternatives to plastic products, using social media to reach customers. In Bangladesh, implementation of a packaging regulation, the Jute Packaging Act 2010, sought to build local demand for jute, an important locally produced resource. The regulation, combined with a plastic bag ban (the 2002 Notification-ban), drove local research, development, and innovation in jute-based bioplastics.

**Policies must be flexible to allow for local cultural expectations.** In Malaysia, halal-compliant plastic standards illustrate the need for policy makers to address the impact of cultural aspects in policy development. Halal recycled packaging (which requires traceability and inspection at all stages) is supported in Malaysia as 61 percent of Malaysians identified as Muslim in 2010 (Department of Statistics Malaysia, 2015) and most trust halal certified products (Abdullah and Ireland, 2012). While the development of halal recycled plastic faces obstacles including complexities and costs, the logistics of halal recycled plastic can be supported by existing supply chains.

**Conduct initial diagnostics**

Diagnostics at the pre-design stage of plastics policy development should seek to fully define and understand the problem and the context. The evidence considered will vary depending on the focus of the policy, but problem definition involves identification of the types of plastics and plastic products that are problematic, understanding the source(s) and impacts of the problem(s), linked consumer behaviors and the public’s level of awareness of the problems.

**To supplement publicly available data, policy makers can prepare and release a ‘call for evidence’.** This process includes a description of a government’s intentions and reasoning, and invites stakeholders to provide feedback (EC, 2021). The process can take different formats and be targeted to concerned stakeholders or to the public, depending on the importance or sensitivity of the topic and level of change the intervention requires. In every case, the process used to share information and to invite responses (e.g., via a web portal, email or written) should be sensitive to the local context. Engagement of stakeholders is discussed further below and the policy design phase in Section 3.3.
Before policy instruments such as product bans or restrictions are introduced, it is essential to have available substitutes and alternatives analyzed and understood. In Italy and Bulgaria, the EU conducted research prior to implementing plastics policies intended to support transposition of European Directives. For the EU Single Use Plastics (SUP) Directive, this provided a better understanding of which SUP items were problematic from litter picking and beach clean-up data, the impact of plastic pollution, the current and projected state of the plastics sector across the region and within EU Member States, and the availability of substitutes for plastic products of interest (EC, 2018; EC, n.d.). This process allowed the EU to develop the policy to control the ten SUP product groups most commonly found on Europe’s beaches. Where affordable non-SUP products are available on the market (e.g., cotton bud sticks, cutlery, plates, straws, stirrers, sticks for balloons and polystyrene food and beverage containers), the relevant SUP versions are banned from the markets of EU Member States. For other SUP products which affordable alternatives are not yet available, the Directive limits their use by:

- Reducing consumption through awareness-raising of the use of carrying bags, food and beverage containers, packets and wrappers, cups for beverages, tobacco products, wet wipes, balloons, sanitary items, etc.
- Introducing product design requirements, e.g., a requirement to connect caps to bottles.
- Implementing labelling requirements to inform consumers about the presence of plastics and alternative waste management options.
- Emphasizing the data collection, awareness raising, waste management, and clean-up obligations of producers for their plastics products.

Further diagnostics help develop a clear understanding of local constraints and opportunities. For example, SIDS are typically geographically isolated with small populations, reducing economies of scale, and almost totally relying on import for resources and consumer goods (Kowlesser, 2020; Agamuthu and Herat, 2014). This results in unique challenges in the waste management, e.g., land availability for infrastructure, high waste management costs, and limited capacity. The insignificant recycling rate and subsequent reliance on landfill or incineration in both Fiji and Saint Lucia is evident from the information presented in Table 3-2.

Table 3-2. Comparison of plastic waste management in Fiji and Saint Lucia

<table>
<thead>
<tr>
<th>Country name</th>
<th>Fiji</th>
<th>Saint Lucia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region</td>
<td>South Pacific</td>
<td>Eastern Caribbean</td>
</tr>
<tr>
<td>World Bank Income level</td>
<td>Upper-middle</td>
<td>Upper-middle</td>
</tr>
<tr>
<td>Size (km2)</td>
<td>18,333 km2</td>
<td>616 km2</td>
</tr>
<tr>
<td>Urban population (% of total)</td>
<td>56.8%</td>
<td>18.6%</td>
</tr>
<tr>
<td>Domestic plastic production</td>
<td>None or insignificant</td>
<td>None or insignificant</td>
</tr>
<tr>
<td>Plastic waste (kg/capita/year)</td>
<td>41.4 kg/capita/year</td>
<td>190 kg/capita/year</td>
</tr>
<tr>
<td>Plastic recycling rate (%)</td>
<td>5%</td>
<td>None or insignificant</td>
</tr>
<tr>
<td>Plastic landfilled and/or incinerated rate (%)</td>
<td>95%</td>
<td>96%</td>
</tr>
</tbody>
</table>

Source: Case study data developed by Wood and IEEP for this study

Identify, map, and consult with stakeholders

Identification, mapping, and consulting with stakeholders from across the value chain is critical to understanding stakeholders and their needs and facilitating evidence-based policy design. The plastics value chain is complex and involves various stakeholders (see Figure 3.1Figure 3.1), so early identification and engagement of actors and interested parties facilitates the identification of problems. Stakeholder engagement continues throughout policy design, implementation, and evaluation. The key elements regarding stakeholders
Experiences of all case study countries emphasize the importance of identifying, mapping, and consulting with stakeholders early in the policy making process. Key actors across the value chain can be identified and mapped to consider the level of expertise, interest and influence they have on the topic (EC, 2021). These can be combined with other government departments, consumer groups, academia, the informal sector and small businesses. Part of the success Rwanda experienced in the implementation of its plastics policies was attributed to stakeholder input, including a direct response to drain blockages caused by plastic bag litter. Stakeholders in Bangladesh also spoke highly of the multi-stakeholder engagement process supporting development of the National Plastic Industry Development Policy (NPIDP) 2020, identifying it as driving positive change in policy making.

Assess institutional and waste management capacity

The next element of pre-design is to assess the institutional and waste management capacity, which involves the following steps.

Address competing priorities and budget constraints faced by governments which pose challenges to meeting the needs of waste infrastructure financing. Understanding where constraints exist (e.g., budget, accountability, training) and where they have caused policy to be ineffective in the past (e.g., implementation, enforcement) helps the design and revision of policy. In Bangladesh, weak governmental institutional arrangements at national and city levels (Hossain and Shams, 2020; Alam, 2016) were identified as a barrier to implementation of environmental policies (Datta Roy, 2019). Datta Roy (2019) highlights the challenges for local government, including those due to the size and complexity of the plastics value chain, a lack of a functioning partnership between the layers (formal, community, informal) of Bangladesh’s waste management system, and a lack of consistent data, strategy, skills, and capacity to facilitate, develop and procure PPP contracts. In Tanzania, stakeholders commented that a lack of capacity within national authorities impacted the implementation of the country’s 1997 National Environmental Policy (NEP). Public health issues deriving from waste in Tanzania also compete with other issues of public health (Palfreman and Theron, 2015). The National Environmental Policy (NEP) highlighted the need for priority actions to boost coordination between government departments, non-governmental organizations (NGOs), and community-based organizations (CBOs) with a set of principles and objectives for an integrated approach to addressing environmental issues including waste management.

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Assess existing waste management capacity to support decisions for ensuring adequate, locally appropriate waste management services. The level of detail required and extent to which this is possible will vary, but the literature includes details regarding how this can be done (e.g., SEPA, 2017; EU, 2016). At a basic level, decision-making is supported by considering the type, quantity, and sources of waste generated within a territory, waste shipped from or to a territory, the number, location and type of businesses, current and projected waste generation, as well as the current and planned infrastructure. Assessment of how a waste management service is currently managed will provide important context, e.g., waste management in Bangladesh is a highly manual process, operating across three cross-cutting tiers: formal, community (or semi-formal) and informal (see Figure 3.2). These considerations can be made in the context of data on current and projected waste generation. Where capacity issues are not addressed, municipalities may otherwise need to rely on private sector operators to deliver services; as seen in Tanzania where private enterprises and CBOs are contracted to fill gaps in service provision due to capacity constraints (Palfreman and Theron, 2015).

![Figure 3.2. Three-tier system of waste management in Bangladesh](source)

Develop a national vision and build political will and commitment

Having a clearly articulated national vision which considers wider ambitions (e.g., towards a circular economy) and developing strong political will and commitment provide a foundation for the successful development of policies to manage plastic pollution. These steps are explored further below.

Defining a national vision and objectives for waste management and plastic pollution control includes setting targets, creating visible public branding, and providing clear, consistent communications to create momentum for change and encourage public support. Strong leadership is also required at the subnational level to understand and implement solutions. Government commitment can arise from public pressure, as was the case in Bali, Indonesia where citizens collected over 100,000 signatures requesting government action to phase out plastic bags, and in New Zealand, where citizen support led to mayors across the country signing on to request that central government impose a nationwide plastic bag levy (UNEP, 2018a). Examples from the case studies are provided below.

- Rwanda’s Vision 2020, issued in 2012, is a national strategy developed with six pillars for reconstruction of the nation, one of which is solid waste management. The strategy aims to ensure
that rural and urban areas have basic infrastructure for sufficient sewage and disposal systems. It also includes plans for each town to be equipped with a treatment-and-compressing unit for solid wastes and for households to practice waste disposal measures such as the separation of waste and avoidance of burning waste. Rwanda’s Vision 2050, issued in 2020, builds on Vision 2020 with a target for the country to become a developed, climate-resilient, low-carbon economy by 2050.

- In Morocco, a national framework is in place to enable the government to legislate and act against plastic pollution. The 2017 National Strategy for Sustainable Development (SNDD) 2030 is the new driving force behind Morocco’s sustainability actions. The strategy also links to the UN’s Sustainable Development Goals. However, stakeholders considered that the legal framework is lacking clear direction for a reduction in plastic pollution.

- In Bangladesh, despite having a number of policies and regulatory notifications aimed at improving environmental quality issued over the last three decades, evidence is still lacking on concerted and concrete implementation efforts (Hossain and Shams, 2020). Datta Roy, (2019) pointed out the challenges local governments faced due to a lack of consistent data, strategy, skills and capacity. Stakeholders also cited a lack of government commitment regarding implementation of the National 3R strategy as a concern (Hossain and Shams, 2020).

- In Saint Lucia, stakeholders mentioned that a lack of an overall waste management strategy is a deficiency which needs to be addressed.

**Consider the ‘big picture’ policy ambitions at the pre-design stage of plastics policies to help ensure that policy integrates with wider issues.** Plastic pollution is multi-faceted, complex, and has transboundary challenges that cannot be solved with simple solutions targeting a single problem (UNEP, 2016; Watkins, 2019; Pew Charitable Trusts and Systemiq, 2020). Ambitions around a broader circularity context were explored within case study countries, including the following:

- **Waste hierarchy principles that support development of a circular economy for plastics production, consumption, and waste management.** Following the waste hierarchy (see Figure 2.3), can identify priorities to prevent plastic waste by reducing unnecessary use, encouraging product design for reuse and recycling, and promoting the substitution of alternative materials which do not increase the overall environmental footprint. For example, Bangladesh’s National 3R (Reduce, Reuse and Recycle) Strategy for Waste Management defines the roles various actors have in promoting 3R practices and guides the creation of enabling conditions which would lead to successful implementation. In Morocco, the National Strategy of Reduction and Valorization of Waste (SNRVD) provides a mechanism for initiating circular economy practices at the regional level by developing waste recovery channels that create green jobs. SNRVD objectives include the application of the waste hierarchy in plastic waste treatment methods to assist the transition to a circular economy.

- **Policies that enable circularity of plastics by facilitating the increased collection of plastic waste, improving the quality of feedstocks, increasing renewable and recycled content, and stimulating eco-design** (EMF, 2021a; EMF, 2021b; Ocean Conservancy, 2019). Incentives to scale recycling infrastructure, with an initial focus on highly recycled plastics, can complement the collection of post-consumer recyclable plastic and, if coupled with the development of flexible end-market solutions for non-recyclable plastics, can increase collection and prevent resource loss and the leakage of plastic waste into the environment.

- **Locally appropriate, affordable quality standards for plastic products, which can improve recycled feedstock quality and help to ‘close the loop’ locally.** In Bangladesh, the development of quality standards was identified as a mechanism to help businesses integrate local recycled feedstocks into plastic products that are produced locally by multinationals.
Explore public and private financing and cost-recovery mechanisms

In developing countries, public waste management services are often underfunded. Adequate financing measures and cost-recovery mechanisms are necessary to ensure sufficient capital investments in infrastructure cover and sustainable funding for operations and maintenance (O&M). Table 3-3 provides examples of measures for financing waste management.

Table 3-3. Examples of measures for financing waste management

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>tipping fees</td>
<td>Charges levied on waste disposal, based on the quantity (weight or volume) of waste disposed.</td>
</tr>
<tr>
<td>pay as you throw</td>
<td>A policy instrument, typically used at the local level, whereby households are charged a fee for waste collection. This could be a flat monthly fee, an amount based on the frequency of waste collection, or an amount calculated per the measure of the generated waste (e.g., weight, number of bins).</td>
</tr>
<tr>
<td>taxes and levies</td>
<td>Market-led measure that can disincentivize usage of specific plastics.</td>
</tr>
<tr>
<td>EPR/Packaging material fee</td>
<td>Producers pay fees depending on the amount of packaging material put on the market or their plastic recycling/recovery targets. Pooled fees are used to fund packaging waste management activities through a producer responsibility organization (PRO).</td>
</tr>
<tr>
<td>deposit return scheme</td>
<td>Refundable fee levied on an individual product at the point of purchase. The entire fee, or a portion of it, is refundable when the used product is returned to the point of sale or at a specified drop-off site.</td>
</tr>
<tr>
<td>plastic credits system</td>
<td>Producers meet their obligations by purchasing recycling certificates issued by accredited reprocessors or recyclers based on the amount of plastic waste recycled.</td>
</tr>
<tr>
<td>municipal union</td>
<td>Collective structures established by neighboring municipalities to handle waste management activities in collaboration, including facilities setup and operations (e.g., inter-municipality agreement on shared setup and operations of trash racks for Riverside municipalities).</td>
</tr>
<tr>
<td>voluntary EPR</td>
<td>Inter- or cross-industry players join efforts to implement a voluntary and non-regulated extended producer responsibility (EPR) scheme.</td>
</tr>
<tr>
<td>blended financial instruments</td>
<td>Use of public, private, or philanthropic capital to spur investment in projects aimed at improving waste management in developing countries.</td>
</tr>
</tbody>
</table>

Sources: Various, including Ocean Conservancy (2019)

Engaging the private sector in financing and operating waste management activities is increasingly important. There are various forms of PPP which governments can explore within their local situation to encourage private sector participation and financing. EPR offers an opportunity to better align collection fees with recycling volumes and incentivize the transition away from non-recyclable materials. Examples of EPR schemes in the case study countries are presented in Table 3-7.

Strengthen cross-government engagement and international cooperation

Engagement across all levels of government and alignment with international sustainability ambitions can help anchor support for improved management of plastic pollution. Relevant elements are explored below.

All case study countries participate in international environmental conventions and programs of action; including the UN Convention on Biological Diversity, the Montreal Protocol, and the Paris Agreement (see Figure 2.5). The attendant commitments often require that a country takes action to help meet global goals. Examples of involving case study countries in combatting plastic pollution include:

- The East African Community (EAC) is credited with pushing for national legislation on plastic bags in member countries, which include Burundi, Kenya, Rwanda, South Sudan, Tanzania, and Uganda. The East African Legislative Assembly passed the EAC Polythene Materials Control Bill, aiming to prohibit the manufacturing, sale, importation and use of polythene materials (Behuria, 2019).

- Malaysia participates in an international effort to reduce plastic leaks in South Asian waste management systems by involving stakeholders throughout the plastics value chain, from plastics
producers to waste managers to those in coastal communities suffering the impacts of plastic pollution. The effort is funded by Sweden, UNEP, and the Coordinating Body on the Seas of East Asia (COBSEA) (UNEP, 2018b).

- Morocco is a member of the Abidjan Convention which provides the overall legal framework for the prevention, reduction, and fight against pollution of the marine environment, coastal waters, and related fluvial waters in the region of West and Central Africa and, in particular, the Moroccan Atlantic coast.

- India and Germany have a bilateral cooperation agreement on plastic waste management. The initiative aims to support action plans to provide circular economy solutions and combat marine littering.

- Italy, as an EU Member State, follows many EU strategies designed to guide policies for managing plastic pollution. European Directives are implemented through Italian legislation (including Law 205/2017; Law 123/2017; Law 196/2006; Legislative Decree n. 152/2006; Legislative Decree 22/97). In accordance with European Directive 94/62/EC on packaging and packaging waste, Italy must report data annually as part of a required report on packaging and packaging waste, such as on the annual consumption of plastic bags made of lightweight material.

Aligning actions with broader national and international commitments through inter-government collaboration, however, can be a challenge, particularly for local governments in developing countries. While Morocco’s National Strategy for Sustainable Development (SNDD) is linked to Morocco’s 17 sustainability goals (which are aligned with UN Sustainable Goals), during consultations for the Morocco case study, some stakeholders commented on the complexities of the legal framework and implementation challenges at the local level.

To boost policy effectiveness, opportunities for subnational, regional, and local alignment and cooperation should be considered. Many policies stem from a ‘top-down’ approach, i.e., national (or multi-national) authorities establish goals, and policies that require implementation at the subnational, regional, and local levels (UN-Habitat, 2020). In Morocco, the “Stratégie Nationale de Réduction et de Valorisation des Déchets,” was designed for development of a circular economy and strengthening the regulatory framework on waste reduction and recovery and was aligned cross-regionally to account for the various capabilities of the country’s 12 regions, economic conditions, and relevant sectors. Morocco’s “2008 Plan National de Gestion des Déchets Ménagers,” which aimed to rehabilitate the country’s landfills and close open dumps which were illegal, has also focused on local and regional issues.

3.3 Findings and lessons in policy design

The policy design stage is where targets are set, policy options/alternatives are assessed and selected, and the approaches for funding, implementation, enforcement, monitoring, reporting, evaluation, and revision are developed. The cases studies highlighted the importance of target setting and policy clarity, the need for appropriate policy mixes and sequencing to enhance the effectiveness of policies, as well as stakeholder engagement, policy impact assessment, and the consideration of financial arrangements, monitoring and evaluation in the design of plastics policies. The following elements are highlighted:

- Use data to set targets.

- Develop a policy mix and ensure policy clarity.

- Consider timing and sequencing.

---

13 The Convention for Cooperation in the Protection, Management and Development of the Marine and Coastal Environment of the Atlantic Coast of the West, Central and Southern Africa Region (Abidjan Convention)
Use data to set targets

Data collected during the pre-design stage and supplemented with stakeholder engagement are used to define metrics, indicators, and data needs, consider how to remove barriers and enhance opportunities around data collection, and post implementation reporting. These elements are explored below.

Successful policies clearly identify core metrics, indicators, and data needs. Quality data are needed to determine a baseline, build policy, set targets, monitor impacts, report results, and allow for policy evaluation and improvement. A robust data management framework allows countries to track changes in the plastics value chain using trade data (e.g., value of imports and exports, by type of resins/products), market data (e.g., types and tonnages of resins/products sold, number of businesses registered, employees), sources of plastic waste, their movements, and destinations (e.g., tonnages collected, recycled, recovered, or disposed). A data management framework also enables governments to identify opportunities for future interventions (e.g., taxes and subsidies, additional infrastructure, national awareness campaigns).

Most case studies cited the lack of data as a major challenge for determining baselines, setting targets and monitoring performance. When carrying out the assessment of case study policies, the availability of data was a ubiquitous challenge, resulting in an inability to effectively assess policy performance. In Bangladesh, information gained from stakeholder engagement was used to supplement scarce published data to develop an understanding of the baseline conditions before policy implementation and to assess the current conditions.

Where data gaps exist, data collection can be initiated by setting a timeframe and format and allocating resources for the provision and collection of data. Where available, acquiring and integrating data from private and informal waste collectors into a central dataset can improve data regarding plastic waste management systems.

Develop a policy mix and ensure policy clarity

The key elements for producing clear policy and developing a policy mix which incentivizes desired outcomes and disincentivizes undesired ones are explored below.

Ensuring policy clarity avoids confusion and the potential for unintended consequences in implementation. In Bulgaria, a lack of specifics about policy implementation led to multiple entities being allowed to implement different collection systems, leading to confusion among stakeholders and the public. A more straightforward, transparent approach would involve the development of a single, cohesive approach to the operation of the system, led by the national government (Federal Ministry for Economic Cooperation and Development, 2013). Stakeholders in Bangladesh reported that the company registration system is complex, as is the process for gaining certification (UN-ESCAP, n.d.). Lack of registration of small plastics producers resulted in unregulated local production and the sale of cheap unlabeled plastic carrier bags (media articles, e.g., Al Amin, 2019).

Designing policy exemptions with care will avoid causing confusion and creating loopholes. In Rwanda, exemptions to the ban on polythene bags were important to prevent negative consequences in specific situations, including economic harm to specific industries for which suitable alternatives could not be sourced, e.g., for Rwandan exporters of fruits and vegetables. The ability to specify well-defined and controlled exemptions has helped limit the impact on businesses and avoid non-compliance (Ministry of Trade and Industry, 2011). In Bangladesh however, stakeholders commented that the addition of exemptions in 2008 for
plastic packaging (particularly for export) complicated matters and created loopholes in the 2002 Notification-ban for plastic carry bags.

**To effectively prevent and manage plastic pollution, a combination of policy instruments may be employed to incentivize behavioral change.** Policies can be combined to incentivize desired outcomes (e.g., incorporating recycled content, applying recyclability standards) and penalize undesired ones (e.g., taxing landfill disposal). The case studies assessed 33 policies from 10 countries (see Table 3-4), eight included regulatory conditions (C&C), seven were market-based (MBIs), two focused on governance and one focused on driving change in behavior.

Nearly half of the policies assessed blended measures of more than one type, with all but two intervening at multiple stages in the plastics value chain. Analysis of the available literature indicated that no single policy intervention will sufficiently reduce leakage of plastics (UNEP, 2021a; Lau et al, 2020). The majority of assessed policies focused on the production (23) and/or use (22) phases of the value chain, while few focused either on litter (13) or the import of plastics and their feedstocks (14). In terms of product groups, the policies focused on plastic bags (12), management of waste (11), single use items (6) and plastic packaging (4), as shown in Table 3-4.

**Product restrictions and bans were found to be an effective instrument provided that affordable alternatives were available, targets were set, and enforcement mechanisms were effective.** Some case study countries successfully used product bans, particularly those targeting plastic bags, e.g., in Fiji, Rwanda, and Tanzania. In Saint Lucia, there was a need for policy revision, with stakeholders stating that the impact of the ban on expanded polystyrene was compromised by exemptions. In Kerala (India), Bangladesh and Morocco, stakeholders suggested increased enforcement was required for the bans to have an impact, whereas in Italy, the ban on plastic bags stimulated an increase in the production of biodegradable and compostable bags but had not led to a decrease the overall quantity of plastic bags used. Stakeholders surveyed during the study urged a sustained effort on targeting single use plastics. In some cases, the effectiveness of bans hinged on binding force (e.g., penalties or charges linked to a ban followed by strong enforcement). Further information regarding restrictions and bans is presented in Table 3-5.
### Table 3-4. Plastics policy types assessed in each case study country

<table>
<thead>
<tr>
<th>Country</th>
<th>Name of policy</th>
<th>Policy type</th>
<th>Value chain focus</th>
<th>Product group focus</th>
<th>Determined to have met objectives? (Yes, Partially, No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>Notification Ban on Use of Plastic Carry Bags, 2002</td>
<td>✓</td>
<td>Governance</td>
<td>Blended, Import, Production, Use, Waste, Litter</td>
<td>Polythene carrier bags</td>
</tr>
<tr>
<td></td>
<td>Jute Packaging Act, 2010</td>
<td>✓</td>
<td>Behavior change</td>
<td></td>
<td>Plastic packaging</td>
</tr>
<tr>
<td></td>
<td>National 3R Strategy 2010</td>
<td>✓</td>
<td>Investment</td>
<td></td>
<td>Management of waste</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>The EPR Scheme, 2001</td>
<td>✓ ✓ ✓</td>
<td>Governance</td>
<td>Blended</td>
<td>Packaging and packaging waste</td>
</tr>
<tr>
<td></td>
<td>The Ordinance on Packaging and Packaging Waste, 2004</td>
<td>✓ ✓ ✓</td>
<td>Behavior change</td>
<td>Blended</td>
<td>Packaging and packaging waste</td>
</tr>
<tr>
<td></td>
<td>The Waste Management Act, 2012</td>
<td>✓ ✓ ✓</td>
<td>Investment</td>
<td>Blended</td>
<td>Management of waste</td>
</tr>
<tr>
<td>Fiji*</td>
<td>Environment and Climate Adaptation Levy (Plastic Bags) Regs, 2017</td>
<td>✓ ✓ ✓</td>
<td>Governance</td>
<td>Blended</td>
<td>Polythene carrier bags</td>
</tr>
<tr>
<td></td>
<td>Environmental Management (Budget Amendment) Act, 2019</td>
<td>✓ ✓ ✓</td>
<td>Behavior change</td>
<td>Blended</td>
<td>Plastic carrier bags &lt; 50 microns</td>
</tr>
<tr>
<td>Italy</td>
<td>Law 205/2017 — Disincentivizing of single-use plastics</td>
<td>✓</td>
<td>Governance</td>
<td>Blended</td>
<td>Biodegradable &amp; single use plastics</td>
</tr>
<tr>
<td></td>
<td>Law 123/2017 — Gradual elimination of bags from non-renewable materials</td>
<td>✓ ✓</td>
<td>Behavior change</td>
<td>Blended</td>
<td>Lightweight (LW), ultra-LW plastic bags</td>
</tr>
<tr>
<td></td>
<td>Law 296/2006 — Reduction of non-biodegradable bags commercialization</td>
<td>✓ ✓</td>
<td>Behavior change</td>
<td>Blended</td>
<td>Non-biodegradable plastic bags</td>
</tr>
<tr>
<td></td>
<td>Law 160/2019 — Disincentivizing of single-use plastic</td>
<td>✓ ✓ ✓</td>
<td>Investment</td>
<td>Blended</td>
<td>SUP (food service items)</td>
</tr>
<tr>
<td>Kerala, India</td>
<td>Plastic Waste Management Rules, 2016 (India)</td>
<td>✓ ✓ ✓ ✓</td>
<td>Behavior change</td>
<td>Blended</td>
<td>Plastic, packaging, bags</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Roadmap Towards Zero Single-Use Plastics 2018-2030</td>
<td>✓ ✓ ✓</td>
<td>Governance</td>
<td>Blended</td>
<td>Biodegradable &amp; single use plastics</td>
</tr>
<tr>
<td></td>
<td>National Strategic Plan (NSP) for Solid Waste Management</td>
<td>✓ ✓ ✓ ✓</td>
<td>Behavior change</td>
<td>Blended</td>
<td>Management of waste</td>
</tr>
<tr>
<td></td>
<td>Acts 672 and 673 on Solid Waste and Public Cleansing Management, 2007</td>
<td>✓ ✓ ✓ ✓</td>
<td>Investment</td>
<td>Blended</td>
<td>Management of waste</td>
</tr>
<tr>
<td></td>
<td>Separation at Source, 2015 and National Solid Waste Management Policy, 2016</td>
<td>✓ ✓ ✓ ✓</td>
<td>Investment</td>
<td>Blended</td>
<td>Paper, plastic, other, bulky waste and garden waste</td>
</tr>
<tr>
<td>Country</td>
<td>Name of policy</td>
<td>Policy type</td>
<td>Value chain focus</td>
<td>Product group focus</td>
<td>Determined to have met objectives?</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>-------------</td>
<td>-------------------</td>
<td>---------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Morocco</td>
<td>National Cleanliness Policy, 2019</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>Plastic bags &amp; Management of waste</td>
<td>Insufficient data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Financial Law No.115-12, 2013</td>
<td>✓</td>
<td>Plastic materials</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Law No.77-15 (Zero Mika), 2015</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>Plastic carrier bags</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PNDM (National Household Waste Programme) 2008</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>Management of waste</td>
<td>Partially</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SNRVD (National Strategy, Reduction &amp; Valorization of Waste), 2019</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>Management of waste</td>
<td>Insufficient data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Law No 53/2007 Umuganda</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>Management of waste</td>
<td>Partially</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Law No. 57/2008 Plastic Bag Ban</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>Polythene carrier bags</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Law No. 17/2019 Plastic bag and single use plastic ban</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>All SUP items</td>
<td>Insufficient data; early signs are good</td>
<td></td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>The Styrofoam &amp; Plastics Food Service Containers (Prohibition) Act, 2019</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>Polystyrene food service products</td>
<td>Insufficient data; early signs are good</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Environmental Protection Levy Act, 2008</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>Import goods packaging</td>
<td>Insufficient data</td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>The Environment Management (Prohibition of Plastic Carrier Bags) Regulations, 2019</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>Plastic carrier bags</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>National Environmental Policy (NEP), 1997</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>Plastic materials &amp; Management of waste</td>
<td>Partially</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Environment Management Act (EMA), 2004</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>Plastic materials &amp; Management of waste</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
### Table 3-5. Use of single use plastics restrictions/bans in the case study countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Policies with indications of success</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Fiji</strong></td>
<td>The Ban on the Manufacture, Sale, Supply or Distribution of Thin (Single Use) Plastic Carrier Bags, 2020 banned the manufacture, sale, supply or distribution of plastic carrier bags less than 50 microns thick. The ban does not apply to primary packaging e.g., plastic bags for carrying bread, garbage bags, or bags over 50 microns in thickness. Early indications from stakeholders are that most thin single-use plastic bags have been removed from the market and are no longer appearing in beach surveys, suggesting success. This should be treated with a degree of caution as stakeholders also indicated that thicker, reusable bags were starting to appear in beach litter surveys.</td>
</tr>
</tbody>
</table>
| **Rwanda**  | Rwanda has two relevant policies.  

- **Law No. 57/2008 Plastic Bag Ban** introduced an absolute prohibition of polythene bag manufacturing, usage, importation, and sale in Rwanda.  
- **Law No. 17/2019 Plastic Bag and Single Use Plastic Ban** built extended the ban to include all single-use plastic items and provides definition of what constitutes a single use plastic item. The law also imposed a levy on imported consumer goods packaged in SUP.  
Indications from stakeholders are that plastic bags are largely unavailable and pollution within water treatment systems has reduced. |
| **Tanzania**| The Environment Management (Prohibition of Plastic Carrier Bags) Regulations, 2019 introduced a ban on the import, export, manufacturing, sale, and use of plastic carrier bags regardless of their thickness. The regulations include economic and financial incentives for the production and importation of alternative plastic bags. Best available information indicates that this policy has significantly reduced the number of plastic bags in circulation through a combination of strict enforcement and successful communications. |
| **Saint Lucia** | The Styrofoam and Plastics Food Service Containers (Prohibition) Act, 2019 introduced a ban on the import, manufacture, or sale of expanded polystyrene food service products. A decrease in the quantity of plastic litter in the local marine environment was reported by stakeholders. Concerns were however raised regarding exemptions of certain Styrofoam and plastic containers and packaging resulting in inconsistency. |
| **Bangladesh** | The Notification–Ban on Use of Plastic Carry Bags, 2002 aimed to restrict the manufacture, import, marketing, sale, distribution and commercial use of polyethylene and polypropylene bags, and containers of less than 55-micron thickness used to carry goods. Initially applied to Dhaka, then countrywide, this policy was not found to have met its objectives; with best available data suggesting both an increase in use of plastic bags (Datta Roy, 2019) and a return to the congestion of waterways by plastic bags (Islam, 2019). According to reports, the policy quickly became ineffective due to a lack of affordable alternatives (Datta Roy, 2019). However, there is some hope following commercialization of bags produced locally (e.g., Sonali bag) and the 2021 High Court of Bangladesh instruction that the government enforce, report on and extend the ban. |
| **Kerala, India** | The Plastic Waste Management Rules, 2016 (India) introduced bans on certain types of plastic; registration of producers; labeling of packaging/carryer bags. Subsequently, Government Orders No 6/2019, No. 7/2019, No. 8/2019, No 2/2020, No 4/2020 (Kerala) introduced a complete ban on production, transport, sale and use of single use plastic (packaging, cups and plates, cutlery, straws, bags and pouches). A lack of data made assessment of these policies challenging but stakeholders suggested that increased enforcement was required for the bans to be effective. |
| **Morocco** | The Law No.77-15 (Zero Mika), 2015 prohibited the import, export, and manufacture of plastic bags. The law was supplemented by the implementing decrees relating to control and specifying the technical characteristics, as well as the marking or printing of bags excluded from the scope of the law. Effectiveness of this policy was hampered by customer expectations and by a lack of enforcement with continued plastic bag manufacturing in the informal sector. |
| **Italy**   | The Law 123/2017 Gradual Elimination of Bags from Non-Renewable Materials legislated for a gradual increase of the minimum level of biodegradable and compostable material content in ultra-weight plastic bags with minimum... |
Best available data indicate that there has been a decrease in the use of bags made from non-compostable and non-biodegradable bags since implementation. This law was part of a package including a range of MBIs disincentivizing single-use plastics through a combination of plastic levies and subsidies. For example, Law 205/2017 — Disincentivizing Single-Use Plastics introduced financial penalties for the use of single use plastic, while also introducing financial rewards for industries that invest in infrastructure to reduce single use plastic consumption.

Set the right level of taxes or fines. Many countries are using MBIs such as taxes, fees, and fines to help incentivize producers, consumers, and recyclers in plastic waste reduction. For instance, fines have been a common instrument for enforcement of the laws of plastic bag bans or other legal requirements for plastic waste reduction (see Table 3-6). In some countries the maximum level of fines was set too low to deter non-compliance. An ‘optimum’ level for a fine can be defined as meeting the criterion that the marginal cost of enforcement or of the fine should equal the marginal social benefit of deterrence. In some cases, countries may set the level of fines (so-called punitive fines) greater than the optimum with the intention of changing behavior. Stakeholders in Fiji and Tanzania indicated that the level of fines was sufficiently high to deter non-compliance, while in Saint Lucia the level of fines was viewed as lower than ‘optimum’ and less effective. When fines or other penalties are used, it is also necessary to clearly consider what targeted activities (e.g., manufacture, sale, or import) should incur a penalty, to whom (e.g., businesses or consumers) the fine will apply, and the optimum level of fines necessary to deter non-compliance. The effectiveness of deterrence also depends on the probability of detection.

<table>
<thead>
<tr>
<th>Country</th>
<th>Policy</th>
<th>Penalty for non-compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiji</td>
<td>Ban on the manufacture, sale, supply, or distribution of thin (single use) plastic carrier bags.</td>
<td>• Manufacture: up to US$500,000 fine, up to seven years imprisonment, or both.&lt;br&gt;• Sale, supply, or distribution: up to US$150,000 fine, up to two years imprisonment, or both.</td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>The Styrofoam and Plastics Food Service Containers (Prohibition) Act (2019).</td>
<td>• Import, manufacture, sale, use, distribution: up to US$5,600.&lt;br&gt;• Sale of food in prohibited containers: up to US$1,700.&lt;br&gt;• Burning: up to US$1,900.</td>
</tr>
<tr>
<td>Tanzania</td>
<td>The Environment Management (Prohibition of Plastic Carrier Bags) Regulations, 2019.</td>
<td>• Manufacturing or importation: US$8,600 – US$431,200 or imprisonment for up to two years or to both.&lt;br&gt;• Exportation: US$2,200 – US$8,600 or imprisonment for up to two years or to both.&lt;br&gt;• Storing, supplying, and distributing: US$2,200 – US$21,600 or imprisonment for up to two years or to both.&lt;br&gt;• Selling: US$40 – US$200 or imprisonment for up to three months or to both.&lt;br&gt;• Possessing and using: US$15 – US$100 or imprisonment for up to seven days or to both.</td>
</tr>
</tbody>
</table>

All the case study countries incorporated the use of financial instruments, such as taxes and levies, to raise revenue to finance policy implementation. The instruments help ensure that funding is sufficient for policy implementation, such as enforcement, and for improvements to waste collection and management systems and recycling infrastructure.

EPR schemes were shown to be an effective mechanism to increase the recycling of plastics and to reduce the costs of managing plastic pollution (WWF, 2020; Watkins et al, 2017). EPR can be used to facilitate the creation of efficient collection schemes, reduce disposal, and increase recycling, reducing the burden on public budgets for municipal waste management and increasing the cost efficiency of collection and recycling processes.
Applications of EPR in Europe and Korea have reduced disposal rates, increased recycling rates, and lowered waste management costs by reducing the burden on public budgets and encouraging producers to optimize efficiency (Watkins et al, 2017). Case study countries where EPR is used increased its effectiveness by making it mandatory to avoid free riding (by extending it to all producers and importers), clearly allocating responsibilities across EPR stakeholders, and specifying the steps the private sector is expected to take. EPR has been identified as a potential policy tool for holding manufacturers accountable for the end-of-life impacts of their plastic products and packaging in Malaysia (WWF, 2020) and Fiji (UN General Assembly, 2019) but progress towards this was not evident in either country. Table 3-7 presents information regarding how EPR is used or in development for use in the case study countries. An upgraded or more ambitious EPR approach, referred to as “eco-modulation” (IEEP 2017), stresses that fees should be set specifically based on criteria related to the environmental impact, instead of the weight, of the plastics products. This means that the benefits of aspects such as recyclability may be considered and eco-design improvements upstream encouraged.

### Table 3-7. Use of Extended Producer Responsibility schemes in the case study countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgaria</td>
<td>Use of EPR in Bulgaria broadly met its objectives by bringing structure to the sector (bringing the country in line with EU standards and ambitions); reducing waste levels (from 200 million tonnes in 2004 to 130 million tonnes in 2018) (Eurostat, 2018a); and increasing plastic packaging recycling and recovery rates. However, municipal performance is underperforming with only 33 out of 265 municipalities achieving the 2018 recycling target; lower recycling rates for municipal wastes and non-packaging plastic wastes than intended (22%); and moderate negative financial impacts reported by businesses and consumers. Stakeholders have recommended improving data management and enforcement and aiming for full cost recovery of litter and waste management costs.</td>
</tr>
<tr>
<td>Italy</td>
<td>Producers and importers of plastic packaging participate in an EPR scheme and are required to pay an environmental fee to a PRO for every tonne of plastic packaging produced or imported. The environmental fee was US$ 224 per tonne (€188 per tonne) in 2017 (Corepla, 2018). Citizens are asked to sort plastic packaging waste. Municipalities are responsible for organizing and implementing the collection of plastic waste and receive financial compensation from the PRO of around US$ 362 per tonne (ANCi and Corepla, 2014). After collection, material is transported to the Material Recovery Facility (MRF), represented by private companies contracted by the PRO to sort materials. Being the legal owner of the sorted plastic, the PRO sells the bales through open auctions to recyclers.</td>
</tr>
<tr>
<td>Countries with EPR in development</td>
<td></td>
</tr>
<tr>
<td>Kerala, India</td>
<td>EPR Guidelines in India allow for different models e.g., a collective system with a PRO and individual action by producers (Ministry of Environment, Forests and Climate Change, 2020). EPR schemes are at an early stage of development in Kerala (KSPCB, 2020).</td>
</tr>
<tr>
<td>Morocco</td>
<td>EPR is included in Morocco’s objectives (Law No. 99-12 of 2014 on the Environment Charter). The Stratégie Nationale de Réduction et de Valorisation des Déchets (SNRVD) recommends putting a regulation in place on the responsibility of companies (producers, importers, and distributors) contributing to the marketing of products with a view to the effective application of EPR.</td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>The Management of Containers Bill is in development and is intended to apply EPR principles to plastic beverage containers manufactured, deposited, sold, or distributed in Saint Lucia.</td>
</tr>
</tbody>
</table>

Challenges to the implementation of EPR schemes include inconsistent application and burdensome administration (Watkins et al, 2017). Collective schemes can dilute responsibility and lead to free riding. How fees and charges are calculated (e.g., at the point of entry to the market or from waste/litter collection statistics) and allocated (e.g., proportionate to production levels or otherwise) varies. Some schemes do not cover full waste costs, and it is not possible to determine whether EPR measures have incentivized packaging producers towards eco-design. According to the literature, transparency, and consistency of EPR policy development are important for providing the confidence the private sector requires to plan and invest.
Consider timing and sequencing

The next stage in policy design is to consider the timing and sequencing of policy implementation to ensure that policy instruments will work well together. This is further explored below.

The timing of policy measures needs to consider the reaction of and impact on the market, e.g., implementation of product bans, restrictions, taxes, and levies needs to consider whether (and when) affordable alternative products are available on the market. Allowing a phased approach to policy implementation provides companies time to prepare and adapt prior to achieving compliance. Case study experience indicates that where alternative products are lacking, policy design should identify locally available, affordable alternatives to the affected materials/products. In Bangladesh, the absence of cost-effective alternatives to synthetic polymer bags was cited as hindering the effectiveness of the 2002 Notification-Ban on Plastic Carry Bags (Uddin et al., 2019). The Bangladesh government subsequently implemented the Jute Packaging Act, 2010, providing a clear policy message to the market for the development and use local jute-based alternatives to plastic packaging. See Figure 3.3 for the timeline of policy implementation in Bangladesh.

Figure 3.3. Plastics policy implementation timeline in Bangladesh

![Figure 3.3. Plastics policy implementation timeline in Bangladesh](image)

Figure developed by Wood for Bangladesh Case Study report. Sources: Nurul Amin (2017), Datta Roy (2019) and others.

The sequencing of policies in a policy mix should also be considered in the design stage. For example, appropriate collection and recycling systems are required before efforts are focused on raising awareness regarding separating waste at source. A market study for plastics circularity in Thailand (World Bank and PROBLUE, 2021b) describes how sequencing action plans can create a steady progression in management of plastic pollution over time:

- Years 1-2: Initial policies intended to “Lay the Foundation” by acting on waste sorting and MRFs.
- Years 3-5: Policies are directed to “Strengthen the Demand” by developing awareness and behavioral change campaigns, and providing opportunities for integrating the informal sector, an important post-consumer plastic collector in Thailand.
- Beyond 5 years: Strategies aim to “Maximize the Value” by digitalizing recyclables collection and implementing PAYT usage-pricing.

Engage stakeholders

Following the identification, mapping, and initial consultation of stakeholders from across the value chain in the pre-design phase, there are several opportunities for stakeholder engagement in the policy design phase. These elements are explored further below.
Stakeholder engagement at the design phase increases transparency and accountability in policy making and ensures that policies are based on the best available evidence (OECD, 2016). Engagement with key stakeholders, identified through stakeholder mapping, was shown in Bulgaria to instill a sense of ownership and participation. Stakeholder groups can also provide important information for designing practical and enforceable policy. EU experience is that consultation at the design stage improves legislation (OECD, 2016). In Saint Lucia, stakeholders indicated that the maximum level of fines set for breaching laws regarding plastics was not high enough to ensure compliance; such information can advise policy makers adjust the level fines and improve the effectiveness of future policy.

Coordination and cooperation are needed between different levels of government as well as government agencies and institutions. Bangladesh established a National Council to encourage cooperation across government agencies and with other stakeholders including academia and the private sector. The Council was designed to oversee implementation and monitoring of the National Plastic Industry Development Policy 2020 (NPIDP, 2020) and has responsibility for its integration with other national policies.

Involvement and cooperation of local governments and industries strengthen policy design. Local governments and industries provide important information to help design effective policies. For example, just five percent of Bulgaria’s 265 municipalities have adopted the Municipal Waste Management Plan, as portions of the Plan were perceived locally as not implementable, and consequently were disregarded by local policymakers. In Malaysia, the Levy on plastic bags, 2019 was slow to be adopted nationally due to opposition from the plastic industry (MPMA 2010).

Clarifying roles and responsibilities of stakeholders can align expectations, encourage participation, and set a clearly defined process for participation. In Kerala, the Plastic Waste Management Rules 2016 were introduced with specific responsibilities assigned to various stakeholders. In response, stakeholders further suggested that establishing the timeline of intermediate steps (i.e., segregation, collection, recycling) to be taken by each group of stakeholders would make it clear what each group will need to do toward achieving the objectives. Stakeholders also recommended that a monitoring framework should accompany the timeline, to enable checking on whether agreed upon steps were being taken and progress towards the objectives was being made.

Conduct policy impact assessment

Assessing policy proposals to identify the range of potential industry impacts helps to plan for an optimal industry response (e.g., deterring fraud, driving innovation, and ensuring that alternative products or materials are available and affordable if policy involves a ban on certain products or materials). These elements are explored further below.

A policy impact assessment (IA) examines and quantifies the possible impacts of a proposed policy (e.g., environmental, social, and economic). As part of an IA, the environmental assessment considers the impacts of a policy on ecosystems and biodiversity, the economic assessment considers implications for consumers, businesses, and workers, and the social assessment considers the impacts the policy has on citizens and society. Little evidence of the use of IA was found during analysis of the case studies. However, IA was conducted by the EU prior to implementation of the SUP Directive (e.g., EU, 2018, EC, 2018). The IA report outlined the rationale behind the policy, provided a summary of the baseline policies in place to influence the consumption and management of SUPs, defined the range of measures that would feasibly tackle the items targeted by the Directive and then assessed the projected impact of these measures against the baseline.

The case studies highlight the need to assess the potential policy impacts on SMEs and smaller market vendors. In Bangladesh, the 2008 Notification-exemption included a provision to facilitate traceability of plastic carrier bags and wrappers to registered producers, however, only a small proportion of SMEs in the plastics value chain was registered since company registration is complex (UN-ESCAP, n.d.). Stakeholders indicated that this resulted in the presence of cheap unlabeled (and therefore unregulated) plastic carrier bags on the local market (Al Amin, 2019). In Tanzania, the certification to use the required Tanzania Bureau of Standards (TBS)
The logo for permissible plastic alternatives was noted to be costly and not affordable to many small and individual producers, who had not been adequately consulted on the policy decision and therefore had difficulty complying. In Fiji, some stakeholders commented that the ban on thin plastic carrier bags (2020), which had not been widely consulted on, had not provided adequate support to SMEs, micro businesses, and market vendors to implement the ban.

**Assessment at policy design needs to consider and avoid unintended unfairness and imbalance across the plastics value chain e.g., between importers and domestic producers.** In Morocco, implementation of a plastic ecotax involved inconsistencies between the aims of the tax and the products taxed, for example, full water and drinks bottles are exempt from the tax if imported but subjected to the tax if manufactured locally.

**Assessing potential business responses also includes examining ways to deter fraud, assess the unregulated market and minimize loopholes.** In Tanzania, some manufacturers, retailers, and consumers bypassed a single use packaging ban by increasing the use of exempt packaging (such as bread packaging). The government plans to close this loophole by introducing stricter standards. Bangladesh and Tanzania both reported that a plastic packaging ban led to packaging production by the unregulated market. Strong penalties with a strategic monitoring and enforcement approach can be effective in deterring such unregulated markets. In Rwanda, a plastic bag ban led to illegal bag imports. In response, Rwanda implemented border checks, fines, and punishments for non-compliance.

**Define how policy will be implemented, enforced, monitored, reported, evaluated, and revised**

Policy design includes not only selecting which policy instruments or combination/mix of policy instruments to use, but also defining when and how the policy will be implemented, enforced, monitored, reported, evaluated, and revised, including the responsibilities of each actor and financing arrangements for each stage. Table 3-8 presents the elements to be specified in the policy design phase and Section 3.4 discusses them in further detail.

### Table 3-8. Policy elements to be set during the design phase

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description of elements</th>
<th>Examples of details to specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation</td>
<td>Specifications for how the policy will be put into effect and executed by government departments and agencies, in conjunction with other organizations.</td>
<td>• Government and waste management capacity needs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Communication plans.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• How implementation will be funded.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Stakeholder roles and responsibilities.</td>
</tr>
<tr>
<td>Enforcement</td>
<td>The criteria and method by which non-compliance will be detected and the repercussions of non-compliance (e.g., penalty or fine).</td>
<td>• Penalty amount – high enough to encourage compliance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enforcement measures at local and national levels.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Funding, particularly for local enforcement.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Staffing needs and staff training objectives and procedures.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Stakeholder roles and responsibilities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Procedures for collecting data on non-compliance.</td>
</tr>
<tr>
<td>Monitoring, reporting, evaluation and revision</td>
<td>The procedures to track and share progress of a policy and make policy improvements.</td>
<td>• Data needs and data collection systems.</td>
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<tr>
<td></td>
<td></td>
<td>• Targets and goals: metrics to be used.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Funding needs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reporting content and frequency.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Stakeholder roles and responsibilities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Procedures for policy adjustments.</td>
</tr>
</tbody>
</table>
3.4 Findings and lessons in policy implementation, enforcement, monitoring and reporting, evaluation, and revision

This section presents successes and challenges and identifies key themes related to:

- Policy implementation.
- Policy enforcement.
- Monitoring and reporting.
- Policy evaluation and revision.

Policy implementation

Implementation is the stage in which a policy proposal is put into effect and executed by the respective government departments and agencies, in conjunction with other organizations as required.

National leadership provides a boost to policy implementation. Implementation of the 2019 ban on plastic bags in Tanzania was supported by strong national leadership. This was effective at garnering support and virtually eliminating plastic bags from the market. The success was supported with a coherent and effective combination of both social and traditional media campaigns.

Allocation of a budget for implementation at the appropriate level(s) of government is necessary. In lower income countries the cost for SWM generally represents the largest budget item for municipalities (Kaza et al, 2018), often requiring multiple sources of funding (OECD, 2019). In Bangladesh, implementation of the Jute Packaging Act, 2010 identified that high financial costs were experienced by government departments required to purchase jute-based packaging rather than plastic bags.

Consistent and clear communication is a key aspect of policy implementation, together with programs using a variety of media to reach a wide audience and raise awareness. Examples from the case study countries include the Clean Kerala campaign which used a mixture of media such as murals, local meetings, handbooks, social media, and webpages to emphasize the importance of avoiding littering and separate waste collection, and involving the entire population. In Tanzania, the government ran a successful social and traditional media campaign to promote the plastic bag ban, successfully raising awareness among the public. In Bulgaria, according to stakeholder input, government institutions at all levels instilled new behaviors and attitudes through successful awareness-raising campaigns. In Bangladesh, the government effectively used the media for campaigns supporting implementation of the notification-ban and jute packaging act. These findings are consistent with experiences of many countries, that education campaigns are a key aspect of raising awareness and that effective programs use both traditional and social media.

Strong public awareness and community engagement can encourage implementation success. In Rwanda, public culture is a driver for implementation success (see Error! Reference source not found.). Rwandans are committed to reducing litter accumulations across

Box 1: Rwanda’s implementation success

Notable implementation features of Rwanda’s successful policy to ban plastic bags include:

- Gradual implementation, which provided businesses time to transition.
- No costs imposed on businesses.
- Support available for businesses to adopt new alternatives.
- “Umuganda” - strong community engagement allowing residents to stay informed of policies and provide input.
- Budget allocation for enforcement.
communities and are critical of those who litter, or who do not participate within the “Umuganda” community service initiative. This social pressure is an example of community or social enforcement.

Where communications fall short, lack of clarity and confusion can arise. Communication plans can be developed using a variety of media including social media to help reach a wider audience. Elements may be specified for consistent communications from various entities, planning for both the short and long term. In Fiji, a robust communication plan helped the 2017 Levy on Plastic Bags implementation to succeed. However, stakeholder feedback indicated that following the policy launch, communication was lacking regarding an increase in the Levy and subsequent implementation in 2020 of the Ban on Thin Plastic Carrier Bags. Uncoordinated awareness campaigns led to confusion and poor implementation, highlighting the need for clear, coordinated communications across stakeholder groups.

Designating a phased-in approach to implementation enables companies time to prepare. Providing sufficient “lead in” time for businesses in advance of policy implementation was helpful for implementing the Plastic Bag Ban in Rwanda; this strategy was subsequently included as a feature in the ban on single-use plastic items. In Malaysia, according to stakeholders, gradual implementation of the 2019 Levy on Plastic Bags was requested by the plastics industry. In Bangladesh, the Jute Packaging Act was implemented in 2010 and not enforced until 2014. Additional enforcement began in 2018, primarily due to requests for stronger enforcement from the jute industry.

Policy enforcement

Enforcement is critical to policy implementation and typically comprises two components – detection of policy non-compliance and acting when a non-compliance occurs, usually by issuing a notice, penalty, fine or custodial sentence.

It is necessary to designate and fund enforcement mechanisms and capacity for detection of non-compliance. Most country case studies cited the need for capacity and funding for enforcement – particularly at the local level. The experience of Malaysia illustrates the need for clear designation of enforcement roles nationally and locally, and the need for enforcement capacity, including staff training and funding. In 2007, Malaysia’s establishment of a ‘SWCorp’ provided executive authority to take over SWM from local authorities, however, local authorities did not have adequate funding to systematically monitor compliance, or to train enforcement officers (Mohamed et al., 2018). In Bangladesh, the direct cost of enforcing the plastic bag ban to the government was not reported; however, it was clear from the literature (e.g., Molla, 2018) and from stakeholders, that municipalities and water authorities experienced costs relating to clearing up blockages in drains and canals caused by continuing plastic bag litter.

Where penalties are used, they must be set at a level which encourages compliance; strong penalties have been found to be important for reaching high compliance rates for regulatory measures. In Fiji, the Department of Environment reported near full compliance from businesses during inspections on the first day of the ban on thin plastic carrier bags (2020). The Fiji Revenue and Customs Service stated that the threat of heavy fines imposed for ignoring the ban provided an effective deterrent.

Non-compliance requires enforcement action, e.g., by applying penalties, fines, or enforcement notices. In Tanzania, according to stakeholders, the Ban on Plastic Bags was clear and well enforced from the start. The threat of a fine and potential jail sentence proved to be an effective deterrent for retailers and the public. Members of the public and sellers are known to have been fined, particularly at the early stages of the ban. The policy’s implementation was effective, as many feared prosecutions. Rwanda’s plastic bag ban led to illegal imports of bags which in turn led to increased enforcement actions for noncompliance. The plastic bag ban in Bangladesh led to an increase in unregulated packaging production against which enforcement actions were

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14 SWCorp established through the Solid Waste and Public Cleansing Management Act 2007 (Act 672) (which contains provisions for a labelling system to promote plastic recycling and for meeting recycling targets)
not made; however, in 2021, the High Court of Bangladesh instructed the government to enforce, report on and extend the ban.

**Monitoring and reporting**

Monitoring a policy’s progress involves the regular tracking of its activities, outcomes, and impacts. Reporting results at an appropriate frequency (e.g., annually), and making them available to stakeholders, provides transparency of policy progress.

**Monitoring to track progress and reporting to share the results of a policy provides transparency and invokes greater accountability.** Most country case studies reported a lack of data and challenges with monitoring policy effectiveness and determining the degree of policy success. Better reporting and monitoring in Bangladesh were cited by stakeholders as key requirements for future policies. In Tanzania, policy monitoring (e.g., public perception of visible plastic bag litter) is built into the policy plan (Nkya, 2020). In Bulgaria, the government reported national waste recycling data, including plastic bag usage, and collected fees (such as from taxes accrued from the Plastic Bag Tax). However, the quality of published data has been questioned and there is a lack of transparency in the sorting of collected wastes, which has eroded public trust in the use of the services and led to a decline in participation in collection services. In addition, the lack of public reporting and transparency regarding the Ordinance on Packaging and Packaging Waste (2004) have been highlighted as a problem (Za Zemiata, 2019).

**Defined indicators and metrics can be used to collect and report on data and metrics.** Both qualitative and quantitative information should be considered to confirm performance including whether targets are being met, what is working well or needs improvement, and what changes are attributable to the policy. As noted above, most country case studies reported a lack of data and systems for monitoring policy performance, and often no requirement in the policy to monitor and report data to enable evaluation of policy effectiveness. To be effective, metrics and indicators need to be specific to the policy ambitions, as well as being SMART (Specific, Measurable, Attainable, Relevant, and Time-bound). Sample indicators for monitoring effectiveness of plastics policy are total plastics produced or imported, plastics waste generated per capita, and total plastics waste recycled.

**Technology options can be explored to improve data collection and management.** In Bulgaria, technology (e.g., for scanning at collection points) was found to improve data (e.g., on the quantity, and quality, of captured materials) required for monitoring and improvement of a scheme and to provide service users with instant feedback regarding compliance. Measures to improve data were emphasized by an interviewee in Morocco, who recommended introduction of a single system for data collection and reporting of recycling and waste data to ensure the quality and consistency of quantitative data.

**Policy evaluation**

Evaluation is the stage which examines the effectiveness, efficiency, relevance, and coherence of policy, based on which recommendations are made for policy improvement (EC, 2021; OECD, 2020; World Bank Group and IDB, 2016). Evaluations should assess significant economic, social, and environmental impacts of interventions and, where possible, consult with stakeholders.

**Complex economic, social, and environmental challenges, and the system-wide responses required to address them, make it challenging for governments to understand whether an individual policy has been successful** (OECD, 2020). Policy evaluation can demonstrate evidence-led decision making that provides an appropriate response to the problem. However, according to OECD (2020) there is limited use of evaluation results in policy-making and limited availability or capacity for evaluation and the management of evidence (including data). Most of the policies assessed in the case studies lack defined evaluation processes.

**Literature review and stakeholder consultations were used to identify additional evidence for assessing the effectiveness of policies in case study countries.** The literature review included extensive use of academic
studies examining whether targets were met, government reporting (where available), and both industry and stakeholder perspectives. For key areas of interest, an assessment was made using defined indicators which provided standardized rating allowing for the comparison of policies and assessment of the whole policy package. Although a quantitative assessment is preferable, none of the case studies had sufficient data to enable this. Highlights from the policy evaluation carried out as part of this study are provided below, with further details in Table 3-4:

- Policies in Bangladesh were assessed to have varying levels of success. Assessment of the Voluntary National 3R Strategy detected an apparent growth in the recycling industry, including in the development of new jobs, although this growth was reliant on the informal sector which is exposed to a range of health and safety risks.

- In Rwanda, the ban on plastic bags and application of subsidies for the manufacture of alternatives led to the emergence of small businesses producing paper bags, textile bags and bags made of hemp, papyrus, bamboo, or banana peel. As seen in Table 3-1, Rwanda has very little plastic production, and most plastic materials are imported. However, most of the alternative materials now used for carrier bags are locally manufactured.

- In Bulgaria, plastics policies such as the Plastic Bag Tax were found to have generated positive economic impacts: new business opportunities emerged (e.g., reprocessors) to manage plastic waste, and new manufacturers developed alternative products.

Assessment of the financial costs of policy implementation was hampered by a lack of robust and comparable data. In some cases, it was possible to identify the current cost implications of non-performance and compare it with historical data. In Bangladesh, the direct cost of implementation of the plastic bag ban to the government was unavailable; however, data on municipality costs relating to the clearing of blockages in drains and canals caused by plastic bags were available from the literature (Molla, 2018). Assessment of the Jute Packaging Act and the Notification ban on the use of plastic bags identified that high financial costs were experienced by government actors and consumers due to the increased cost of materials. Other financial data that are often available include average regional costs of clean ups which can be compared to the global average (Deloitte, 2019).

Policy revision

Policy revision is informed by policy evaluation and aims to increase the effectiveness of policy through improvements in design, thereby starting the policy cycle again. Intentional policy revision facilitates continual increases in effectiveness and policy improvement and, given the complexity and changing nature of the plastics problem, is a crucial step.

Several of the case studies illustrated how governments have revised policy in response to ineffective policy features. Others illustrated the need for improvements. Examples include:

- **Strengthened enforcement to prevent illegal production or imports.** In Bangladesh, following the plastic bag ban, there was an increase in unregulated packaging production to which the High Court responded in 2021 by instructing the government to enforce the ban, report on progress and extend enforcement to coastal areas. Rwanda’s plastic bag ban led to illegal imports of bags, to which the Government responded by extending policy actions to implement border checks, fines, and punishments for noncompliance. The government also worked with airlines to ensure that visitors do not bring plastic bags into the country.

- **Revisions to close loopholes.** Tanzania introduced stricter standards to close a loophole in its single-use packaging ban to prevent manufacturers, retailers and consumers by-passing the ban by increasing the use of exempt packaging (e.g., bread packaging).
- **Revisions to support local markets.** Rwanda revised a plastic packaging ban to allow fruit and vegetable exporters to apply for an exemption to import preferred plastic packaging for produce destined for export. In Morocco, in 2016 the Ecotax rate (Financial Law No.115-12, 2013. Plastic Ecotax) was reduced from 1.5 percent to 1.0 percent *ad valorem* following requests from industry (L’Usine Nouvelle, 2016).

- **Awareness of the need to provide alternatives.** In Fiji, a ban on single use plastic bags led to increased use of other equally or more environmentally harmful alternatives, such as thicker bags without handles. Some stakeholders claimed this was because the scope of the ban was too narrow. It has been recommended that Fiji incentivize the development of environmentally friendly alternatives through customs tariffs (EIA, 2020).

- **Awareness of the need to tackle waste theft.** In Bulgaria, informal waste pickers pick and scavenge recyclables in urban settlements and landfills, and derive income from the sale of the materials, which reduces the revenue that could be raised and then invested on improving waste management infrastructure. The government responded by outlawing waste picking, but due to staff shortages in enforcement agencies the practice remains prevalent. Regulators are considering the closure of buy-back centers to reduce informal collecting and waste picking and improve collection efficiencies.

- **Revisions to improve industry performance.** Industry bodies in Morocco prepared a policy paper for the Government providing advice for improvements to help achieve recycling rates.

### 3.5 Cross-cutting findings

This section explores findings that are broadly applicable across all stages of policy making. It covers building institutional capacity, incentivizing private sector innovation, integrating the informal sector, and addressing poverty and corruption.

**Build institutional capacity**

Policy implementation, particularly in decentralized governance models, requires national technical and financial support and oversight. These elements are further discussed below.

**All case studies cited shortcomings in institutional capacity and expertise.** Stakeholders consulted in case study countries reported that increased training at the national and local level was important and that funding increases are crucial for building capacity. Strategies for improving capacity include:

- Encouraging or facilitating knowledge-sharing platforms to allow municipalities to share best practices, knowledge and lessons learned so that other municipalities can replicate successes.

- Building institutional capacity (including through training) regarding collection, analysis and reporting of relevant datasets at the right levels of government and the value chain.

- National training on materials and waste management issues such as compliance, monitoring, enforcement, and on litigation and prosecution of waste legislation (SPREP, 2016).

In Tanzania, stakeholders commented that a lack of capacity among national authorities has impacted implementation of the National Environmental Policy (NEP) 1997. Public health issues derived from waste compete with other public health issues (Palfreman & Theron, 2015). The NEP prioritizes actions to boost coordination between government departments, NGOs, and community-based organizations (CBOs) with a set of principles and objectives for an integrated approach to addressing environmental issues including waste management. Many local authorities contract private enterprises and CBOs in an effort to fill gaps in service provision due to capacity constraints. Dar es Salaam was the first to do so in 1994, followed by many
municipalities (Palfreman and Theron, 2015). According to stakeholders, the private sector dominates waste collection today.

**Insufficient budget to deliver plastics policies was highlighted as an issue in all but three case study countries** (Fiji, Italy, and Morocco) where specific financial measures (including taxation) had been implemented. Governments have competing priorities, with budgets that may be insufficient to meet the needs of capital-intensive waste management infrastructure. Even where waste management is prioritized, the highly decentralized governance model of many countries means that ensuring widespread implementation can be a challenge unless technical and financial support and oversight is provided nationally (Ocean Conservancy, 2017).

**Improve solid waste management**

An effective system for the management of solid waste with integrated management of plastic waste is shown to provide the most effective means to manage plastics at end-of-life. While this study does not aim to indicate how SWM can be improved in general, case study findings provide evidence of how the management of plastics waste can be enhanced within general SWM systems and are described below.

**Setting up collaborations between small and large waste management systems and facilities enables economies of scale for infrastructure improvements and confers other benefits.** Stakeholders in Kerala recommended setting up collaborations between municipalities to enable economies of scale for waste management infrastructure. In Tanzania, a lack of waste transfer stations accessible to individual waste collectors was seen as a barrier for material capture and ultimately resulted in waste collectors dumping waste in rivers and on highways. Setting up waste transfer stations in areas of need that are accessible to individual waste collectors can deter improper disposal.

**Banning unauthorized burning and unregulated landfills reduces plastic pollution.** This can be accomplished by addressing potential obstacles to proper disposal (e.g., lack of feasible or affordable alternatives) and increasing monitoring and enforcement. In some locations in Kerala, burning wastes occurs due to a lack of collection (Suchitwa Mission, 2020) and improving waste collection has been found to have positive impacts on health, with a decrease in waste burning and littering. In Tanzania, 70 percent of inhabitants have insufficient waste collection infrastructure in place, resulting in much waste being mismanaged through open burning or illegal dumping.

**Sorting at source increases the quantity and quality of recyclables and reduces leakage.** Aiming to achieve 100 percent segregation of collected household waste (e.g., into at least three categories: landfill, compost, and recycling) helps the efficiency of sorting and recycling plastics. This can be aided by a prohibition of the landfilling of recoverable plastics (and other recoverable) waste. Sorting at the source does however entail costs which are borne by households.

**Strengthen/develop human capital**

Opportunities to strengthen and develop human capital were highlighted in several case studies and are further discussed below.

**Waste management provides income opportunities for low-skilled workers and empowerment for women.** Stakeholders in Bangladesh highlighted the provision of training and/or education as an opportunity to grow the informal sector in a way that also builds capacity in its people. In Kerala, women’s groups are employed in the waste management sector, with a positive impact on income and empowerment of women. Opportunities for future development include extending the role of women’s groups for collecting and sorting at local level, while ensuring that adequate wages are provided, and worker health and safety is protected through improvements in working conditions and the provision of appropriate protective equipment.
The informal sector can fill gaps in waste management systems and create jobs. In Malaysia, the informal sector is responsible for most waste sorting and aggregation. It includes individual material pickers, faith groups and maids. Some stakeholders reported friction between the formal and informal sectors regarding collection of valuable recyclables including plastics. The informal sector was observed to collect recyclables before large concessionaires on designated ‘recyclable collection days’ when households put out recyclables for collection (WWF, 2020; Jereme, 2015). While large concessionaires view the informal sector as extracting value from their waste stream, the informal sector complements the formal sector’s collection efforts overall and is thought to help improve plastic waste collection. In Brazil, waste picking cooperatives were recognized as service providers and a comprehensive Solid Waste National Policy in 2010 created mechanisms to integrate informal workers into the country’s formal system (WIEGO, 2010). The focus was on establishing safe disposal systems, decreasing waste generation, and increasing reuse and recycling, through the combined efforts of the government, private, and informal waste sectors.

Due to their unregulated nature, informal sector jobs are often without health and safety measures and may be characterized by poor wages and working conditions. In Malaysia, most business for waste dealers and material recovery from landfill is carried out in unregistered, cramped, and unsafe workplaces lacking sanitary facilities (WWF, 2020; Jereme et al., 2016). In Morocco, insufficient waste collection and sorting has led to a rise in the informal sector including marketers, waste pickers, recyclers and reprocessors, whereby recyclable materials are sold and reprocessed. These informal sector enterprises are most often not controlled by health and safety regulations nor by the tax office, but they do have well-organized recycling units. They are seen as competitors to the regulated sector and have shown a willingness to be “formalized,” for example, by incorporation into cooperatives. In Saint Lucia, stakeholders claimed that informal workers in the waste sector are exposed to a range of health and safety risks, often suffer from poor working conditions, and lack social protections.

Examples of positive moves to strengthen the informal sector focus on improving working conditions, implementing waste handling rules, and providing training and a living wage. In Bangladesh, health and safety at jute mills is generally poor (various, including ILO, 2019; Sah and Mishra, 2019) and the Bangladesh Institute of Labor Studies (BILS) reported unhealthy environments, lack of awareness and lack of personal protective equipment (BILS, 2015). The Government of Bangladesh has encouraged its domestic manufacturing industries (including jute) to improve health and safety standards, awarding “consistently high” performers with Good Practice Awards; in 2019, the jute industry received this award (ILO, 2019).

Government responses to the informal sector have varied and need to be carefully examined. There are examples of moves to legislate against the informal sector. In Bulgaria, informal waste pickers pick and scavenge recyclables in urban settlements and landfills. While their practice does not impact the overall recycling rate, they collect fees which reduce government revenue that could be reinvested on improving waste management activities. The government has tried to outlaw informal waste picking, but the practice remains prevalent due to staff shortages in enforcement agencies. Regulators are considering closing buy-back centers to reduce informal collectors and waste pickers and improve collection efficiencies.

Public-private models of informal sector inclusion include NGO-supported microenterprises, cooperatives and collectives. Models driven by private business include Independent Waste Banks; Franchisee Development and Supplier Development (see Table 3-9 for descriptions of models for informal sector inclusion) Ocean Conservancy (2019).
Table 3-9. Models for informal sector inclusion

<table>
<thead>
<tr>
<th>Collection driven by public-private arrangements</th>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGO-supported microenterprises</td>
<td>Under a PPP model, independent waste collectors and an NGO enter into a service agreement with local government to provide it with legal collection rights. The role of the NGO is to provide oversight and technical guidance.</td>
<td></td>
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<tr>
<td>Cooperatives and collectives</td>
<td>Under a PPP model, formally registered collectives, such as cooperatives or self-help groups (SHGs) of independent waste collectors, enter into service agreements with local government for collection under concession and management contracting model.</td>
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<tr>
<td>Independent waste banks</td>
<td>Independent small traders act as local collection centers wherein consumers maintain passbooks. In lieu of waste deposited, consumers receive points which are redeemable in the form of products of daily use such as groceries.</td>
<td></td>
</tr>
<tr>
<td>Franchisee development</td>
<td>Individual independent waste collectors or small traders act as franchisees of the waste management company. Franchisee owners manage the collection from customer accounts (generally, bulk generators) allocated to it by the waste management company.</td>
<td></td>
</tr>
<tr>
<td>Supplier development</td>
<td>Individual independent waste collectors or small traders act as direct suppliers to MRFs to assist upgrading and enable them to manage greater quantities while supporting with social welfare activities and improving health and safety.</td>
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</tbody>
</table>

Source: Ocean Conservancy (2019)

Best practices supporting informal sector collaboration for national and local governments, private sector and non-profit organizations include (Ocean Conservancy, 2019):

- **Actions for national and local governments:** Provide waste collectors with occupational identity cards; align with independent waste collector associations through public-private partnerships; clarify ownership rights on recyclable waste collection; provide working capital to waste collector microenterprises; and bring waste collector livelihood improvement programs together with national social security schemes on health and safety, improved working conditions, sanitation, and education.

- **Actions for the private sector:** Design innovative approaches (e.g., EPR) to be socially inclusive and integrate existing infrastructure (e.g., waste banks and incentivized collection of problematic plastic); allocate Corporate Social Responsibility (CSR) funds to NGOs for independent waste collector welfare projects; provide cooperatives with a foundation for continuous improvement that focuses on working conditions, productivity and basic management systems; and invest in small operations to help with scale.

- **Actions for non-profit organizations:** Provide technical support to improve earnings through training on better sorting, value addition and responsible waste handling; support worker collectives, such as cooperatives or self-help group formation; and ensure financial inclusion, workplace safety, rehabilitation, and interventions for marginalized groups (e.g., child labor).

Drive private sector investment and innovation

Private sector investment and innovation is necessary to grow recycling, particularly as the cost of making products from recycled materials may be higher than that of products made from virgin materials resulting in challenges for the competitiveness of green businesses. Findings from the case study are discussed below.
Policies can be designed to drive production of and demand for materials and products which incorporate recycled content. The costs of making products from recycled materials may be higher than that of products made from virgin materials, which can make it difficult for green businesses to be competitive (Jereme et al., 2016). To facilitate the economic viability of recycling, policies are used to 1) incentivize innovation in the use of recycled plastic materials; and 2) promote demand for recycled content and for recycled and recyclable plastic products. In Bangladesh, the development of quality standards was identified as a mechanism to help businesses integrate local recycled feedstocks into plastic products produced locally by multinationals.

While some countries have made progress in facilitating the recycled plastics business, most case studies identified a need for better policies to promote the circular economy. In Bangladesh, stakeholders cited a need for financial incentives (e.g., subsidies) and disincentives (e.g., taxes) to drive the incorporation of recycled content (e.g., for technology, capacity building, meeting environmental standards). Stakeholders encouraged adoption of GPP mechanisms and local standards (e.g., via inclusion of minimum recycled content for construction, textiles, and packaging materials) to drive demand for locally produced recycled feedstocks. Stakeholders also mentioned that incentivizing the use of local feedstocks could be more effective when tied to a mechanism to level the playing field with imported products (e.g., disincentives such as bans or taxes on imported plastics materials and products). In Rwanda, stakeholders suggested supporting local industries to incorporate recycled materials into manufacturing processes. Existing incentives, such as business rate cuts, can be supplemented through grants to support the investigation and ultimate adoption of these materials within manufacturing processes.

Reducing subsidies for fossil fuels helps to level the playing field between virgin and recycled plastics. Ninety-nine percent of plastics are made from fossil fuels which receive billions of dollars annually in public subsidies (effectively subsidizing the production of virgin plastic). Artificially low virgin plastic prices can undermine the value of recycled plastic material, leading domestic producers to procure virgin material (Jereme et al., 2016). Instead, deterrent taxes or levies, increasing over time, can be placed on virgin materials, creating an incentive to use recycled plastic feedstock. Approaches that address conflicting policies, such as subsidies for fossil fuels which keep virgin plastic feedstock prices artificially low, can also be developed.

Combat poverty and government corruption

Combating poverty and government corruption are shown to be effective in reducing plastic pollution. Highlights from the case studies are presented below.

The commoditization of waste as a resource has attracted criminal behavior, engaging in misclassification and the illegal transport and disposal of waste (BIG, 2021; UK Gov, 2018). A global model (Cordier et al, 2021) estimates that fighting corruption reduces the global annual amount of inadequately managed plastic waste by 28% in 2050 compared to 1990 levels. In Tanzania, corruption in the allocation of waste management contracts was identified as one of the barriers to effective policies for managing plastic pollution. Within the plastics value chain in Bulgaria, stakeholders noted a connection between the management of waste and corruption. In response, the government amended the Public Procurement Act to limit the ability of ‘shell’ companies winning government contracts and so prevent the use of public funds being used for criminal activities (the effectiveness of this action is not yet known) (Government of Bulgaria, 2017). Also, stakeholders commented that a conflict of interest exists for municipalities that own landfills and receive waste disposal fees, which can be a greater priority to municipalities than increasing recycling rates. Therefore, decoupling landfill revenues (by altering the landfill fee systems) and increasing incentives for municipalities to deter landfilling can incentivize the landfilling of waste and increase recycling rates.

The literature highlights further links between plastic pollution and poverty and level of education. According to a recent study, countries with both a high population density and a high poverty index have a higher incidence of plastic pollution (Schuyler et al, 2021). Another study used a global model and suggested
that extending education could reduce the global annual amount of inadequately managed plastic waste by 34% by 2050 compared to the BAU scenario in 1990 (Cordier et al., 2021).
This chapter presents key issues regarding the development and implementation of emerging approaches and policies to address plastic pollution. It concludes with a synthesis of considerations for successful policy design and implementation process to manage plastic pollution.

### 4.1 A rethinking of public policies to tackle plastic pollution

Plastics have revolutionized many aspects of modern society. Projected along present growth rates, the global production of plastic is expected to double between 2020-2040 and triple by 2050. The environmental impacts from plastics occur not only from extracting and producing raw material feedstock; the material's refinement and manufacturing; and use, but also from each plastics end-of-life pathway whether recycling, incineration, landfilling or improper disposal and leakage. Therefore, each lifecycle stage of plastics entails various forms of pollution as well as opportunities for policy interventions.

#### Towards a circular economy approach

A circular economy approach, which aims to reduce the use of natural resources and energy and keep resources in use for as long as possible, can be effective for addressing plastic pollution. A lifecycle approach that focuses on reducing the use of non-renewable materials, reducing waste and pollution, and extending the lifespan of products while regenerating natural systems forms the backbone of effective policies to manage plastic pollution.

The following are key entry points for policies to manage plastic pollution and increase circularity in the plastics value chain:

- **Upstream (including extraction and production)** – apply design standards and regulations that promote durability, repairability and recyclability of plastic products, drive down their use of virgin raw materials, and lessen their waste and pollution.

- **Midstream (including use)** – enable policies that facilitate product repair and reuse and keep existing products and materials in use for as long as possible.

- **Downstream (including end-of-life)** – link consumers (e.g., sorting and disposing of waste) and waste management services (e.g., collecting, bulking, and distributing used plastic) with the recycling and reprocessing of products and materials. Policies may include taxes and bans to drive down the use (and disposal) of non-recyclable products and enable cost-recovery for collections and subsidies to facilitate the scaling-up of innovative technologies and materials for reuse and recovery.

#### Effective public policies

Plastics pollution reduction aims to overcome the negative externalities from the lifecycle of plastics due to market failure and protect the natural environment including marine ecosystems and human health. It requires effective public policies to overcome market failure and avoid policy failure. Public policies to manage plastic pollution can generally be categorized into “market-based instruments (MBIs)”, “command-and-control (C&C)” measures and a variety of ‘other’ instruments designed to improve governance, drive behavior change and stimulate investment. MBIs include taxes and fees, subsidies, and deposit-refund schemes. C&C measures include bans, standards, and other regulations for enforcement.

Policymakers can select a policy or a combination of policies to incentivize desired outcomes and disincentivize undesired outcomes. Ensuring the clarity of policy design will help avoid confusion and potential weaknesses. A well targeted implementation plan is needed.
Today there are more than 60 countries using various policies including bans, taxes, and levies to curb plastic waste. Policy action has been seen in low-income and lower-middle income countries in direct response to the threat of plastic waste to natural environment and economies. In 2002, Bangladesh and India were among the first countries to develop policies directly aimed at tackling plastic pollution (Karasik et al, 2020). While many plastics policies have focused on individual polymers and product types (e.g., polyethylene bags), there has been a progression towards policies that target waste prevention, and interventions that cover all phases of the plastic lifecycle. International initiatives and treaties have also helped pave the way for policy actions and reforms on policies to manage plastic pollution.

4.2 Summary of findings and lessons from country case studies

Many countries have implemented policies to manage plastic pollution, yet little evidence exists around their effectiveness. For decades, policies to control plastic pollution were considered part of the solid waste management system, with solutions sought in the downstream part of the plastic lifecycle – after plastic products were consumed and became waste. Failure to solve the plastic pollution problem downstream, as part of a waste management system, broadened interest in covering the whole plastic lifecycle. It also showed that effective solutions require interventions in the choices made by firms and consumers before plastic products become waste. It has become evident that a progression towards upstream policy interventions i.e., waste prevention at the design and production stages, is necessary.

The country case studies show that plastics policy instruments can be grouped into regulatory, economic, informative, and behavioral policies. The instruments most frequently used have been bans or taxes on specific plastic products such as lightweight plastic bags. Bans have had varying levels of success in targeting and reducing the production or use of specific plastic bags. In some countries, bans have incentivized the introduction of alternatives to single-use plastics. There are several plastics policies aimed specifically at plastic packaging and waste. Several countries successfully operate deposit return schemes (DRS) which incentivize the return of plastic containers for reuse and recycling systems.

There is a growing understanding that policies addressing individual aspects of plastic or waste management are not effective in isolation. Rather, it is necessary to combine implementation of complementary policy instruments throughout the plastic cycle at various levels of government. This approach is becoming common and shown to be rational and effective in improving the management of plastic waste and tackling plastic pollution, while also supporting other economic, environmental, and social benefits.

All of the case study countries rely on a mix of instruments, depending on their environmental objectives and bottlenecks in the plastic management system of each country. The case studies show that a package of complementary policies can have greater impact by incentivizing desired outcomes, penalizing undesired outcomes, and promoting behavioral change. However, when policy instruments provide conflicting incentives to economic agents, they become ineffective and even wasteful.

Evidence shows that a policy mix can be more effective through careful sequencing of interventions. For example, where alternative products are lacking, policy effectiveness requires that access to alternatives be provided before or as part of the introduction of a ban or tax on plastic products. There is also evidence that banning specific types of plastic products without providing or setting a plan for suitable and affordable alternatives can trigger a switch to equally or more environmentally harmful alternatives.

Extended producer responsibility (EPR) has been increasingly used as it incorporates both upstream incentives for product substitution and redesign, as well as incentives for the downstream plastics value chain which might not otherwise be commercially viable. EPR is also aligned with the polluter pays principle. The case studies evidence successful implementation of EPR schemes in developing countries and point to the benefits that extending EPR to producers and importers brings to avoid free riding, allocate responsibilities across EPR stakeholders, and specify the steps that the private sector is expected to take.
4.3 Considerations for developing and implementing policies to manage plastic pollution

This study has identified many opportunities for improving processes and procedures at each stage of developing policies to manage plastic pollution. These opportunities emerged from a review of the literature and a thorough examination of the experiences in ten case study countries.

The cycle of policy making including cross-cutting themes to be considered is presented in Figure 4.1. The stages and activities that can guide successful delivery of plastics policies are summarized in the section.

Figure 4.1. Cycle of developing policies for plastic pollution management (including cross-cutting themes)

The pre-design stage is an opportunity for policymakers to define the problem and decide how to address it. The cases studies and literature review indicate that many developing countries lack basic data and a good diagnosis of their SWM and plastic pollution problems, and face weak institutional and financial capacity, low political commitment, and poor stakeholder participation. To address such gaps, the following are elements necessary for the pre-design stage:

- Fully understand the development context including local and cultural specificities.
- Conduct diagnostics on the plastics problem by collating and assessing available information and evidence (e.g., from litter surveys and data on plastics production, consumption, and impact studies).
- Identify, map, and consult with stakeholders across the value chain to improve the evidence base.
- Assess institutional and waste management capacity to avoid shortfalls in design and implementation.
- Develop a national vision and political will and commitment.
- Explore financing and cost recovery mechanisms.
- Strengthen cross-government engagement and international cooperation.

The policy design stage is where targets are set, policy options/alternatives are assessed and selected, and approaches are developed for funding, implementation, enforcement, monitoring, reporting, evaluation, and revision. The cases studies highlight the importance of setting targets and clarifying policies,
the need for an appropriate policy mix and sequencing to enhance the effectiveness of policies, stakeholder engagement, the specification of financing arrangements, and provisions for policy impact assessment, monitoring and evaluation. The following tasks are key:

- Use data to set targets.
- Develop a policy mix and ensure policy clarity.
- Consider timing and sequencing of policy implementation to ensure that various policy instruments will work in tandem.
- Engage stakeholders to increase participation, transparency, and accountability in policymaking.
- Conduct policy impact assessments to understand and plan for optimal response and effectiveness.
- Specify how a policy will be funded, implemented, enforced, monitored, reported, evaluated, and revised.

**The implementation to revision stages** involve putting policies into effect, enforcing execution, monitoring, reporting, and evaluating the results, and revising policies whenever necessary. Evaluations inform policy revisions. The case studies found that the mechanism for policy enforcement, monitoring and evaluation is weak or largely missing in many developing countries. Key elements are:

- Implementation.
- Enforcement.
- Monitoring and reporting.
- Policy evaluation and revision.

**Cross-cutting issues need to be incorporated and addressed in policy development, and range from institutional and waste management capacity, incentivizing private sector innovation and integrating the informal sector, to addressing poverty and corruption.** The study identified the followings that are broadly applicable across all stages of policy making:

- **Build institutional capacity.** Policy implementation, particularly in decentralized governance models, requires national technical and financial support and oversight. All case studies of low-income countries cited shortcomings in institutional and financial capacity and expertise, typically due to a lack of funding.

- **Improve solid waste management.** An effective system for the management of solid waste integrated with management of plastic wastes was shown to provide the most effective means for managing plastics at end of life.

- **Opportunities to strengthen and develop human capital** were highlighted in case studies:
  - **Provide work and empowerment opportunities for low-skilled workers.**
  - **Fill gaps in service provision.** Most case study countries have an active informal sector, which can be responsible for most of the waste collection, sorting, and bulking.
  - **Improve working conditions and training for waste management workers.** The case study countries had examples of inadequate health and safety, and poor wages and working conditions.
  - **Engage and integrate the informal sector.** The informal sector is seen as a competitor to the regulated sector and has shown a willingness to be “formalized”, for example, through cooperatives. Public-private models that include the informal sector also exist.
- **Private sector investment and innovation are necessary to grow recycling.** The cost of making products from recycled materials may be higher than that of products made from virgin materials, challenging the viability of green businesses. There is a need for financial incentives (e.g., subsidies) and disincentives (e.g., taxes) to drive the incorporation of recycled content (e.g., for technology, capacity building, meeting environmental standards).

- **Poverty and government corruption are linked to the mismanagement of plastic waste.** Corruption is noted as a barrier to policy effectiveness in some case study countries and needs to be addressed.

Overall, the study concluded that the effectiveness of policies to address plastic pollution can be substantially improved through careful design, implementation, and evaluation. Key elements include building institutional capacity, aiming for circularity, involving all relevant public and private stakeholders, and adequate provisions for the monitoring, evaluation, and revision of policies. A combination of policy types can be used to create incentives and generate financial resources which work to shift product design, consumer behavior and waste management systems towards supporting plastics circularity.
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