



# **Waste and Circular Economy (W&CE)**

**Advancing a global agenda towards  
an inclusive circular economy**



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



## G20 Environmental and Climate Sustainability Working Group (ESCWG)

### Waste and Circular Economy (W&CE) Technical Paper: Advancing a global agenda towards an inclusive circular economy

#### ● Executive summary

Waste is a consequence of our production and consumption patterns and the linear economic model, embedded at every stage of most products' and services' lifecycles. Therefore, the idea of a circular economy (CE)—in which nature is regenerated and the generation of waste is avoided or minimized by designing products and materials for a longer use period, as well as to be reused, redistributed, repaired, remanufactured, recycled or recovered—has emerged as a key contribution to achieving sustainable consumption and production patterns. Recognizing that the impacts of waste generation and mismanagement are felt more intensely by underprivileged communities, particularly in developing countries, it becomes crucial to ensure that circularity is also inclusive. This technical paper offers a multi-level perspective on addressing those challenges, focusing on the adoption of an inclusive circular economy as a path towards a more sustainable, safer, cleaner and fairer world.

**Previous G20 actions on waste management and circular economy.** Important contributions of past G20 presidencies include the creation of the G20 Resource Efficiency Dialogue by Germany's Presidency (2017); efforts from Japan's Presidency (2019) to promote resource efficiency, circular economy and waste management as pathways to tackle pollution; discussions under Italy's Presidency (2021) on how circular economy can address climate change and serve as an important lever for achieving the SDGs; and significant contributions from India's Presidency (2022) in recognizing waste management as a global challenge and proposing a worldwide circular economy approach to address both pollution and climate change.

**Waste management: a global challenge.** Waste generation is linked to significant environmental, social and economic challenges. Unsound waste management significantly impacts public health and the environment, leading to pollution that causes irreversible damage and biodiversity loss, and can facilitate the spread of diseases through vectors like insects and rodents. Improving waste management worldwide presents three primary challenges: (i) ensuring universal waste collection, as 2.7 billion people still lack regular collection services; (ii) adequately managing municipal solid waste (MSW), as 38 per cent of global MSW was still disposed of in an uncontrolled manner in 2020; and (iii) improving controlled waste destination in favour of higher strategies in the waste management hierarchy. Socioeconomic implications of waste management are also critical, especially for workers in the informal waste sector. To evolve towards a more sustainable and inclusive future scenario, it is essential to address health and safety concerns alongside waste management, recognize the contributions of the informal waste sector and promote their formalization and empowerment as a legitimate workforce.



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



**Circular economy as an innovative pathway to sustainable consumption and production patterns and ecosystem regeneration.** Circular economy has emerged as a guiding vision for achieving sustainability. This approach distinguishes between biological and technical cycles, allowing renewable materials to regenerate ecosystems while keeping non-renewable materials in circulation, without contaminating the biosphere or wasting their value. Circular actions can be categorized into four areas: (i) interventions at the design phase of products and services, aiming to add value and reduce material consumption; (ii) changing consumption habits and adopting reuse models for products and packaging; (iii) recovering value from used products through repair, refurbishment and remanufacturing; and (iv) increasing recovery value through repurposing products and recycling materials. The transition to a CE can help countries address the challenges of waste management, and significantly reduce the amount of waste needing treatment and disposal. The potential benefits of a CE for developing countries are particularly substantial: the approach could help them leapfrog over traditional linear development patterns, supported by international cooperation provided by developed nations that are front runners in circular economy best available practices and techniques.

**Proposed concept and principles for an inclusive circular economy.** The Brazil G20 Presidency invites G20 Members to collaborate on building a shared concept from the following proposal:

*“An inclusive circular economy, as a contribution to achieving sustainable consumption and production patterns, is one that aims to keep products and materials in circulation at their highest value, decoupling economic prosperity and human well-being from environmental degradation, while integrating social equity and inclusion across all sectors to ensure that benefits are shared equitably among all stakeholders— including waste pickers, informal workers, women, youth, marginalized and vulnerable communities, Indigenous Peoples and small businesses—and is developed globally through international cooperation and solidarity to help reduce development gaps within and between nations.”*

To advance the adoption of this concept, the Presidency also proposes the following set of principles of an inclusive circular economy: Social equity, inclusion and justice; environmental equity; decent and just work; community recognition and engagement; health protection; access to funding; inclusive design; education and awareness; innovation and technology; collaboration and partnerships; and international cooperation.

**Proposed actions for raising ambitions in an inclusive circular economy.** The transition to a circular economy poses different challenges for all countries, and the road ahead differs from one country or region to another. However, low- and medium-income nations tend to face additional burdens due to the actual lack of infrastructure, financing or adequate legal frameworks. Within this context, the Presidency proposes action on four areas to exemplify how to advance in the implementation of the concept and principles of an inclusive CE: (i) closing dumpsites, through a phased approach involving analysis, planning, stakeholder engagement and monitoring; (ii) empowering informal waste sector workers, integrating them into formal MSW systems and Extended Producer Responsibility (EPR) schemes, improving working conditions and ensuring fair remuneration; (iii) reducing and managing food loss and waste, which currently affect one third of global food production, valued at US\$1 trillion, and account for eight to ten per cent of global greenhouse gas emissions; and (iv) fostering CE to tackle plastic pollution, by both preventing plastic

pollution at its source through circular design strategies and improving waste management to prevent leakage to the environment, including through international cooperation.

**Conclusion: The promotion of an inclusive circular economy.** The promotion of an inclusive circular economy can be organized into three main fronts:

- (i) Exploring opportunities for an inclusive CE in each G20 Member's policies:** addressing local priorities, such as: closing dumpsites, enhancing material recovery and formalizing informal waste workers; renewing industrial policy, emphasizing technology transfer; developing strategies to guide the transition to an inclusive CE and address local issues; embedding resilience, taking advantage of local conditions; strengthening local governance for circular cities; and equalizing access to resources for the entire population while providing opportunities for resilience and climate adaptation, leaving no one behind.
- (ii) Creating the enabling conditions for the transition to CE approaches:** developing domestic regulatory frameworks; mainstreaming sustainable resource use and encouraging the uptake of circular strategies by the private sector; establishing specific policies to support the development of circular products and business models; fostering research and innovation; creating novel finance mechanisms; addressing social dimensions through tailored policies and economic incentives; and encouraging new solutions for international financing, and
- (iii) Supporting an inclusive circular economy agenda through partnership and collaboration:** different aspects of international cooperation can help leverage local capacities to ensure adequate means of implementation, for example: mainstreaming circular economy in the global sustainability agenda, focusing on delivering Agenda 2030; promoting multilateral investments, aligning circular economy with climate change and biodiversity protection; advancing bilateral cooperation, mainly in developing countries receiving technical and financial resources from higher income countries; using private resources to scale-up circular economy projects, including extended producer responsibility (EPR) schemes; harnessing regional and international trade to open new circular economy opportunities, in conformity with international trade rules and avoiding unjustifiable or discriminatory measures or disguised restrictions to trade; cooperating at international level to accelerate a just transition, using multilateral organizations, and providing developing countries with capacity-building opportunities and cooperation in science, technology and innovation; and strengthening existing circular economy fora for knowledge and lesson-sharing at the international level, engaging developing countries proactively.



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



## 1. Introduction

The growing generation of waste presents significant environmental, social and economic challenges, which vary across countries and regions. Waste is a consequence of our production and consumption patterns and the linear economic model, embedded at every stage of most products' and services' lifecycles. Therefore, the idea of circular economy (CE) approaches—in which nature is regenerated and the generation of waste is avoided or minimized by designing products and material for a longer use period, as well as to be reused, redistributed, repaired, remanufactured, recycled or recovered—has emerged as a key contribution to achieving sustainable consumption and production patterns, as emphasized in UNEA Resolution 5/11 (United Nations Environment Assembly [UNEA] 2022a).

However, a global transition towards CE approaches will depend on common goals and commitments from all countries and sectors, to address the challenges and share the benefits of eliminating waste and pollution, circulating products and materials at their highest value, and regenerating ecosystems and communities worldwide. In this context, it is crucial to recognize that the impacts of waste generation and mismanagement are felt more intensely by underprivileged communities, particularly in developing countries, where infrastructure is often inadequate, and significant progress is still needed to ensure the protection of human health and the environment.

Hence, it is important to ensure that circularity is also inclusive, which requires reinforcing multilateral cooperation from all countries to ensure a transition to CE approaches that leaves no one behind. This Technical Paper aims to offer a multi-level perspective on addressing those challenges, focusing on the adoption of an inclusive CE as a path towards a more sustainable, safer, cleaner and fairer world.

In this context, the Brazil G20 Presidency invites G20 Members to collaborate on building a shared concept and a set of guiding principles for an inclusive circular economy – and putting them into practice.

## 2. Previous G20 actions on waste management and circular economy

Many G20 Leaders' Declarations have raised the importance of sustainability issues, mentioning for example food security (France, 2011), sustainable growth (Mexico, 2012), Millennium Development Goals (Russia, 2013), the avoidance of food loss and waste and the Sustainable Development Goals (Türkiye, 2015).

Resource efficiency became a G20 topic in 2017, in Germany, with the creation of the G20 Resource Efficiency Dialogue (G20 RED). This initiative, aimed to promote cooperation towards a resource-efficient and sustainable global economy, makes these themes a core element in the G20 agenda. Since then, events and debates have been organized by G20 Presidencies on different issues, such as resource efficiency best practices, CE and finance, tackling marine litter, circular fashion, food waste reduction, green public procurement and circular design of products, amongst others. In 2019, in Japan, the G20 proposed resource efficiency, CE and waste management as pathways to tackle pollution, and specifically marine plastic litter. The G20 RED achieved great progress at the same year, with the development of a first roadmap for action.

In 2021, in Italy, an important discussion on circular cities was held, highlighting the potential of CE to mitigate greenhouse gas (GHG) emissions, including focus on methane reduction from food loss and waste. The G20 Environmental Ministers committed to advance on the 2030 Agenda with an increase in resource efficiency through circular approaches, according to national priorities and



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



circumstances. Also, it calls for action on sustainable and circular resource use, placing CE as key to achieving multiple G20 expected outcomes and SDGs goals, especially SDG 12. Besides, the role of the G20 RED was recognized, and a commitment was made to continue to collaborate. During the recovery from the COVID-19 pandemic in 2022, under the Indonesian Presidency, the discussions focused on food security issues. Notwithstanding, CE and resource efficiency were recognized as important strategies to tackle environmental challenges.

Finally, in 2023, in India, waste management was highlighted as a great challenge for many G20 countries, with relevant propositions, such as: the inclusion of waste pickers in international labour classification; the importance to address food loss and waste; and the urgency to enhance environmentally sound waste management in developing countries. More specifically, CE was presented as a strategy to address both plastic pollution and climate change, suggesting the inclusion of CE approaches in nationally determined contributions (NDCs), under the Paris Agreement. A call for designing a worldwide CE approach was made, including: the launch of the Resource Efficiency and Circular Economy Industry Coalition (RECEIC); proposals of a CE model for the steel sector; incentives for EPR schemes adoption; and advances on the circular and sustainable bioeconomy with an integrated approach to land, water, energy and biomass use.

#### ***Circular economy approaches in the United Nations Environmental Assembly***

In parallel to the G20 meetings, the United Nations Environmental Assembly (UNEA) has recognized CE approaches as a strategy for the 2030 Agenda, particularly in SDG 12. In 2019, UNEA Resolution 4/1 (UNEA 2019) acknowledged the role of the circular strategies and recommended their adoption by member states in national plans and sectoral policies. The UNEA Resolution 5/11 (UNEA 2022) specifically pointed to the potential of CE approaches to address climate change, biodiversity loss, soil degradation, water stress and pollution, and recognized that circular policies should establish effective infrastructure for waste management and recycling. The document reinforced the importance of member states adopting circular approaches in their national plans to meet commitments at different Multilateral Environmental Agreements (MEAs), the need for the private sector to improve product design, and the potential for cooperation to disseminate best practices and technologies along value chains.

Governments were also encouraged, in line with their national circumstances, to cooperate with the private sector to enhance the design of products, and to adopt mechanisms for knowledge management, communication, training and raising societal awareness, as well as enabling financing, especially for SMEs and developing countries. In the same year, UNEA Resolution 5/14 (UNEA 2022b) created an intergovernmental negotiating committee (INC) to negotiate an international legally binding instrument on plastic pollution, including in the marine environment, welcoming efforts from different organizations, including G20 initiatives. More recently, in 2024, UNEA Resolution 6/1 (UNEA 2024) specifically addressed circularity in the sugarcane agroindustry and recommended the adoption of circular strategies in the sector's activities.

The Brazilian G20 Presidency praises the high commitment of previous G20 Presidencies to leveraging resource efficiency, circular economy approaches and environmentally sound waste management. This Presidency reiterates its support to the G20 Resource Efficiency Dialogue as an appropriate forum for discussions on improved waste management practices and circular economy approaches.

### 3. Waste management: a global challenge

#### a. Waste figures worldwide

In 2023, the world generated 2.3 billion tons of municipal solid waste (MSW), and a 56 per cent increase (to 3.8 billion tons per year) is estimated until 2050 in a *business-as-usual* scenario (United Nations Environment Programme [UNEP] 2024). Significant variations in the volume of waste production are observed among countries and regions, with more than a half of the projected increase expected to occur in just eight countries – all of which are fast-growing, and low- to medium-income nations, with limited capacities to expand and improve their waste management infrastructure (UNEP 2024a).

On a global average, MSW is primarily composed of organic matter (more than 50 per cent and consisting of food and garden waste), followed by recyclable materials (around 40 per cent and consisting of paper and cardboard, plastic, metals and glass), and other materials (less than 10 per cent) (UNEP 2024a). This scenario presents a simultaneous challenge to increase recovery in both recycling and composting, as well as reducing food loss and waste.

In terms of MSW management, the first challenge is to ensure universal waste collection services. Currently, 2.7 billion people do not have access to a regular collection service, resulting in 540 million tons of waste per year (or 27 per cent of the total waste generated) being directly dumped or littered. The global average of MSW collection is 75 per cent, but there is significant variation among countries, with some developing nations with collection rates below 40 per cent (UNEP 2024a).

A second challenge is effectively managing MSW after collection, ensuring it becomes “controlled MSW”. This term refers to waste that is collected and subsequently recycled or disposed of in a controlled facility (UNEP 2024a), with environmentally sound technologies and infrastructure. In 2020, 38 per cent of global MSW was disposed of in an uncontrolled manner, including lack of collection, disposal in dumpsites<sup>1</sup>, open burning or even direct leakage into the environment. Irregular disposal of MSW is still on the rise and could reach 41 per cent by 2025, resulting in 1.6 billion tons of uncontrolled waste annually. These percentages of uncontrolled MSW vary significantly among regions, with less than 10 per cent in higher income countries, but up to 87 per cent in some of the poorest regions of the world (UNEP 2024a).

Another challenge involves managing controlled MSW, which is estimated as 62 per cent of the global waste generation (30 per cent is landfilled, 13 per cent is converted into energy through different waste-to-energy technologies<sup>2</sup> and only 19 per cent is recycled, each with distinct efficiency and value recovery levels). Regulatory and institutional landscapes, income, technology, and cultural factors also influence these percentages, with regions varying from 9 per cent to 61 per cent for landfill, up to 42 per cent for waste-to-energy and 4 per cent to 56 per cent for recycling (UNEP 2024a). Although waste-to-energy and landfilling are considered as 'controlled' methods for handling solid waste, they rank very low in the waste management hierarchy, since materials that are burned or buried are permanently removed from the resource cycle, preventing their use in new processes.

In addition to management itself, improving data on waste is crucial for better policy development. The Global Alliance on Circular Economy and Resource Efficiency (GACERE) suggests that

---

<sup>1</sup> Dumpsites are defined as places where collected waste has been deposited in a central location and where the waste is not controlled through daily, intermediate or final cover, thus leaving the top layer free to escape into the natural environment through wind and surface water (UNEP 2024a).

<sup>2</sup> Waste-to-energy refers to generating energy, such as electricity or heat, from the incineration or other thermal treatment of waste materials.

governments ensure that comprehensive data on waste generation is gathered, extending their efforts to cover all types of solid waste, including industrial, construction and hazardous waste, and not limit efforts solely to MSW (GACERE 2024).

## **b. Social, environmental and economic impacts associated with waste**

Unsound waste management is widely recognized as a major contributor to many public health and environmental issues (UNEP 2024a). Uncontrolled waste disposal can cause pollution of soil, water and air, often resulting in irreversible damage. This pollution is also a major driver of biodiversity loss, with high impacts on flora, fauna and the provision of ecosystem services (UNEP 2024a). Specific waste types can contain harmful and toxic substances, such as e-waste; some can pose sanitation risks, like untreated medical waste; and others can facilitate the proliferation of disease vectors such as insects and rodents. It is estimated that in the Global South alone, between 400,000 and 1 million people die each year from diseases related to mismanaged waste, such as diarrhoea, malaria, cancer and heart conditions (UNEP 2024b).

Furthermore, unsustainable waste management can significantly aggravate climate change. In 2016, the waste sector was responsible for 1.6 billion tons of CO<sub>2</sub> eq./year (3.2 per cent of the world GHG emission in 2015<sup>3</sup>), with projections suggesting this could rise to 2.6 billion tons of CO<sub>2</sub> eq./year by 2050. While these estimates are challenging, due to data collection limitations, there is an urgent need to incorporate CE approaches and emissions from the waste sector into NDCs under the Paris Agreement, particularly concerning short-lived climate pollutants (SLCP) such as methane. Acting in accordance with the waste hierarchy presents a valuable opportunity: prioritizing waste prevention, followed by re-use, recycling, recovery and adequate disposal, enables countries to lower short-term climate pressure, particularly by reducing methane emissions from landfills and minimizing food loss and waste (UNEP 2024a).

In addition to environmental and climate concerns, the waste crisis is exacerbated by the prevalence of dumpsites in many low- and middle-income countries, highlighting significant social challenges. Beyond the contamination of soil, water and air, many people still scavenge through untreated waste in these sites for a living — sometimes even for food. This situation not only perpetuates degrading living conditions but also exposes these vulnerable populations to numerous health risks. Addressing this issue underscores the urgent need to close dumpsites and advance a just transition towards an inclusive CE, as will be discussed in the following chapters of this paper.

Besides, the socioeconomic implications of waste management are critical, especially for workers in the informal waste sector – those involved in solid waste collection, recovery and recycling activities that are either not covered or insufficiently covered by formal arrangements (UNEP 2024a). To evolve towards a more sustainable future scenario, it is essential to address health and safety concerns alongside the socioeconomic aspects of waste management. This involves recognizing the contributions of the informal waste sector and promoting their formalization and empowerment as a legitimate workforce. Finally, the global cost of managing MSW in 2020 was approximately US\$252 billion, with collection services being the primary expense. However, this figure does not account for externalities such as impacts on human health, climate change and ecosystems, which added another US\$361 billion to this estimation. Without urgent improvements in waste management, these external costs are projected to escalate up to US\$640 billion annually by 2050. Conversely, it is estimated that

---

<sup>3</sup> Emissions Database for Global Atmospheric Research (EDGAR) at [https://edgar.jrc.ec.europa.eu/report\\_2023#data\\_download](https://edgar.jrc.ec.europa.eu/report_2023#data_download)



adopting CE approaches could transform these expenses into a net gain of US\$108 billion per year (UNEP 2024a).

## 4. Circular economy as an innovative pathway to sustainable consumption and production patterns and ecosystem regeneration

### a. A guiding vision: circularity by design

The concept of a circular economy (CE) has emerged as a guiding vision for achieving sustainability by decoupling economic development and human well-being from environmental degradation. CE approaches aim to maintain materials at their highest value for as long as possible by fundamentally changing the way we design, make, use and dispose of products (UNEP 2024c).

In the ISO 59.004:2024 technical standards, a CE is defined as an “*economic system that uses a systemic approach to maintain a circular flow of resources, by recovering, retaining or adding to their value, while contributing to sustainable development*” (International Standardization Organization [ISO] 2024). UNEA's resolution 5/11 speaks of a more circular economy as “*one in which products and materials are designed in such a way that they can be reused, remanufactured, recycled or recovered and thus maintained in the economy for as long as possible, along with the resources of which they are made, and the generation of waste, especially hazardous waste, is avoided or minimized, and greenhouse gas emissions are prevented or reduced*” (United Nations Environment Assembly [UNEA] 2022a).

Many CE approaches emphasize the distinction between biological and technical cycles, with various distinct possibilities for creating intentionally restorative industrial systems. Following this logic, biological (renewable) materials can be safely returned to the biosphere as nutrients, contributing to ecosystem regeneration, while technical (non-renewable) materials are optimized for disassembly and reuse, maintaining their value in industrial cycles instead of being wasted and contaminating the biosphere (Ellen Macarthur Foundation [EMF] 2014).

Another representation, from UNEP (Reike, Vermeulen and Witjes 2018), organizes circular action in four categories, that can be described as:

- **Reduction by design:** promoting interventions at the design phase of a product or service lifecycle aiming to add value and reduce material consumption.
- **From a user-to-user perspective:** change consumption habits and patterns, and adopt reuse models for products and packaging.
- **From a user-to-business perspective:** implement strategies to recover value from used products through repair, refurbishment and remanufacturing.
- **From a business-to-business perspective:** increase recovery value, through repurposing used products and recycling materials – both technical and biological.

Across the various conceptualizations of a CE, it is widely acknowledged that the transformation towards circularity must be intentionally considered since the design stage of materials, products, and processes. This approach aims to add, maintain or recover the maximum value of a product or material over time, and enhance the effectiveness of waste management systems, ultimately eliminating

pollution and waste. GACERE suggests that transitioning to a CE can assist governments in addressing the challenges that solid wastes pose to countries' sustainable development, as circular practices can significantly reduce the quantities of solid wastes that require treatment and disposal (GACERE 2024).

### **b. Circular Economy, the Waste Management Hierarchy and policy levers**

Considering that actions by governments and policy makers can be a key lever for this transformation, countries looking to develop their CE strategies and instruments may find resonance with the Waste Management Hierarchy, which is a well-established and fundamental principle in waste legislations. It states that (a) the highest priority should be given to preventing waste from being generated; (b) the amount of waste should be reduced to the greatest extent feasible; (c) waste should be reused directly, with little or no pre-processing; (d) waste should be recycled or composted; (e) energy from waste should be recovered; and (f) when all other options have been exhausted, any remaining waste should be safely disposed of in landfills.

Thus, by designing products and systems that prevent and minimize waste while also encouraging the reuse or recycling of materials, CE approaches can significantly promote the higher, preferred levels of the waste hierarchy over the lower ones (GACERE 2024). The transition towards a CE is also recognized as key to delivering many commitments of MEAs, including the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), the Basel, Rotterdam and Stockholm Conventions (BRS) and many others (UNEP 2024d). Several policy levers are essential to advancing CE, including promoting circular product design, implementing resource management strategies, and creating economic conditions that support the transition across sectors. Investing in innovation, infrastructure, and skills development, as well as fostering collaboration across value chains, are key to driving system-wide transformation.

### **c. Challenges in transitioning towards a Circular Economy**

Transitioning to a CE presents significant challenges, including the need for systemic thinking, innovation and new circular business models, investment, technology, re-skilling and also on the demand side, rethinking consumption patterns and behaviours. There are also significant disparities across nations at various stages of development.

Since the 1970s, industrialized economies have advanced hazardous waste and MSW management gradually, adopting more rigorous environmental standards. By the 1990s, governance and financing strategies evolved to include extended producer responsibility (EPR) schemes and mandatory source segregation to improve recycling rates. Recent advancements have expanded EPR to other products, applying the polluter-pays principle, and introduced new legislation to support CE practices (Wilson 2023).

In contrast, many developing countries still need to advance legal frameworks and improve waste segregation, collection, and management systems, often facing institutional and financial constraints. Achieving progress will require substantial investments and resource mobilization. In this context, external financial support from developed countries for developing countries is critical. Mobilization of various sources will also be needed, including from the private sector. International cooperation also plays a fundamental role in supporting capacity building, technical assistance and technology transfer for developing countries. Besides, there are risks to developing countries of the trade barriers if they fail to meet increasingly rigorous CE standards in export markets and services, like reclamation

and remanufacturing. For that reason, international cooperation and solidarity are much needed, so no one is left behind.

The potential benefits of a CE for developing countries are substantial. CE approaches could help them leapfrog over traditional linear development patterns, supported by international cooperation provided by developed nations that are front runners in circular economy best available practices and techniques. A CE can mitigate resource depletion, climate change and environmental pollution - it is estimated that up to 85 per cent of opportunities to enhance resource productivity are found in developing countries, highlighting the immense potential for these regions to benefit from circular economy initiatives through a just transition process (United Nations Industrial Development Organization [UNIDO] 2017).

## 5. Proposed concept and principles for an inclusive circular economy

Although environmental and economic performance are central to most CE approaches, integrating social dimensions is equally important, but not always prioritized. Ensuring inclusivity and fairness will be crucial for achieving sustainable and equitable CE progress globally. This calls for a shared understanding of what constitutes an “inclusive circular economy”, as proposed by Brazil's G20 presidency.

The International Labour Organization (ILO) (2022) defines a just transition as “*greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind.*” United Nations Human Settlements Programme (UN-HABITAT) applies this concept to waste management, describing a just transition as one that designs and promotes the transition to sustainable consumption and production patterns in a manner that is as fair, inclusive and equitable as possible, particularly for informal waste and recovery systems, while generating and preserving decent work opportunities and ensuring no one is left behind (UN-HABITAT and Norwegian Institute for Water Research [NIWR] n.d.).

In the context of a CE, a just transition should also consider international relations, to prevent widening development gaps between countries, respect human rights and ensure that natural resources essential for a CE remain accessible to all countries, including through the facilitation of global markets for secondary raw materials, and in a way that developing countries also benefit locally from the industrial processes that add value to their natural resources.

A global CE is most effective when it is inclusive by design. To further promote a worldwide transition towards an inclusive CE, the Brazil G20 Presidency proposes the following concept:

### **Box: Proposed inclusive circular economy concept**

An inclusive circular economy, as a contribution to achieving sustainable consumption and production patterns, is one that aims to keep products and materials in circulation at their highest value, decoupling economic prosperity and human wellbeing from environmental degradation, while integrating social equity and inclusion across all sectors to ensure that benefits are shared equitably among all stakeholders— including waste pickers, informal workers, women, youth, marginalized and vulnerable communities, Indigenous Peoples and small businesses—and is developed globally through international cooperation and solidarity to help reduce development gaps within and between nations.

To advance the adoption of this concept, the Presidency also proposes a set of principles that address the most relevant aspects of an inclusive circular economy, as a contribution to achieving sustainable

consumption and production patterns, drawing from key references (UN-HABITAT and NIWR n.d.; UNIDO 2017; Preston, Lehne and Wellesley 2019; ILO 2022; UNEP 2023a; Wilson 2023).

**Box: Proposed principles of an inclusive circular economy**

- **Social equity, inclusion and justice:** Ensure that the environmental, social and economic benefits of CE approaches are accessible to all and shared equitably. This includes just treatment and meaningful involvement of all members of society, regardless of socioeconomic status, gender, ethnicity, geographic location, tribal affiliation or disability, with a special focus on populations in situation of vulnerability.
- **Environmental equity:** Address environmental degradation and inequalities, including those related to climate change. Ensure that everyone has access to healthy ecosystems by fairly distributing the benefits of sustainability. Prioritize the most affected communities in efforts to regenerate ecosystems, conserve natural resources, prevent waste and pollution, and protect biodiversity throughout the entire lifecycle of products and services.
- **Decent and just work:** Create inclusive working opportunities for all, including those negatively affected by the transition to a CE. Ensure safe and clean working conditions, fair wages, and community empowerment within the workforce, with a special focus on recognizing the role of the informal waste sector and promoting small and medium-sized enterprises (SMEs).
- **Community recognition and engagement:** Recognize the value of traditional knowledge and skills, particularly those of Indigenous Peoples and local communities, actively engaging them, alongside civil society, including women and youth, in participatory decision-making and project implementation to ensure that their perspectives, knowledge and priorities are considered.
- **Health protection:** Ensure that CE practices do not harm ecosystems or human health. Address workers' occupational health concerns and the presence of hazardous wastes or toxic chemicals in product compositions, which may persist or even be concentrated during recovery cycles.
- **Access to funding:** Ensure that everyone can participate in a just transition to an inclusive CE by accelerating access to the necessary resources, including access to technologies, financing and adequate infrastructure, particularly by developing countries.
- **Inclusive design:** Incorporate the principles of an inclusive CE into the design stage of products, infrastructure, and services, considering the needs and preferences of diverse user groups, including people with disabilities, different cultural backgrounds and other specific requirements.
- **Education and awareness:** Promote broad public awareness and education on sustainability and CE among diverse stakeholders – such as children in formal educational systems, workers, Indigenous Peoples, corporations and consumers.

- **Innovation and technology:** Foster innovation, research and development in social and technological arrangements related to product design, materials science, recycling and other recovering technologies, and circular business models. Facilitate access to technology transfer by developing countries.
- **Collaboration and partnerships:** Encourage collaboration and partnerships among stakeholders such as governments at all levels, businesses, civil society, academia and communities to co-create and implement solutions, with a focus on innovating business models, advancing eco-design and improving waste management and resource recovery practices.
- **International cooperation:** Cooperate to reduce regional and global inequalities, within and among nations, through financing, capacity building, technical assistance and technological transfer, and other collaborative efforts to ensure an inclusive CE.

G20 countries can play an important role promoting an inclusive CE agenda. The Brazilian G20 Presidency invites G20 Members to discuss the presented proposals for the concept of and the principles for an inclusive circular economy.

## 6. Proposed actions for raising ambitions in an inclusive circular economy

The transition to a CE poses different challenges for all countries, and the road ahead differs from one country or region to another. However, low and medium-income nations tend to face additional burdens, mainly due to the actual lack of infrastructure, financing, sufficient institutions or adequate legal frameworks. Within this context, the Brazilian G20 Presidency proposes action on four areas to exemplify how to advance the implementation of the concept and principles of an inclusive CE: closing dumpsites, empowering informal waste sector workers, reducing and managing food loss and waste, and fostering CE to tackle plastic pollution.

This Presidency invites each G20 Member to consider the following elements according to its national needs, circumstances and priorities.

### a. Closing of dumpsites

On average, almost 40 per cent of the world's MSW is disposed of in an uncontrolled manner, including in dumpsites, with some regions exceeding 85 per cent of inadequate disposal (UNEP 2024a). Dumpsites differ from landfills, since they generate much more serious environmental impacts, such as air, soil and water pollution and GHG emissions, and are a source of social and public health concerns. In many places, waste pickers collect recyclables or even food leftovers in dumpsites, posing further threats to their health.

In advancing global waste management systems towards more circular practices, a priority must be the diversion of waste from final disposal, as much as possible, and to ensure the adequate and controlled disposal of what cannot be recovered, including the closure of dumpsites in a safe manner, making sure that legacy pollutants are duly controlled. Notwithstanding, this is a challenging task, because of financial, logistical and technical constraints for many local governments in developing

countries. Additionally, there is a need to support the population involved in such operations, such as waste pickers, during the phase-out, assisting them with a decent way of living. In many countries, this is addressed by promoting the empowerment of informal workers to ensure their recognition and integration into waste management systems – as proposed in the next topic.

Benefits from the safe closure of dumpsites, with social and economic inclusion of the waste pickers eventually present there, are substantial and encompass various dimensions, such as: environmental (reduction of pollution to air, soil and water; mitigation of GHG emissions, especially methane; and increased material recovery); public health (improved sanitation and water quality, cleaner cities and neighbourhoods; decrease in waste-related diseases; reduction of vectors; lower levels of noise, dust, odour and local pollution); social (decrease in social vulnerability, provision of dignity and fairness, job generation within MSW systems and enhanced worker safety and health); and economic (decreased public health and environmental costs, recovery of value from diverting recyclables, reducing recycling costs and heightened attractiveness for business) (International Solid Waste Association 2016; UNEP 2021).

Many countries, regions and organizations have made significant efforts to facilitate conditions for dumpsites closures. Those efforts encompass governance arrangements (to support local and sub-national governments), establishment of regulatory frameworks (to prohibit and/or facilitate the closure of dumpsites), and governmental planning (development of roadmaps for gradual closure) at various scales. However, progress remains limited, largely due to the absence of key components, such as (UNEP 2021): technical capacity of local governments, financial resources, political will, institutional capacity, inadequate governance structures, as well as a lack of policy levers to place the shared responsibility of pollution also on producers and incentivize them to adopt circularity in their products and services, including through EPR schemes.

When dumpsites are closed, it is important that alternative destinations are available—which demands investment in proper waste collection and treatment facilities—including the possibility to convert the former dumpsite into a CE approach facility, whenever possible.

While detailing each aspect of this challenge exceeds the scope of this document, a general proposal is to establish a planning framework based on the following phases (UNEP 2021):

- **Analysis of dumpsites:** Evaluate the current situation of the area according to its environmental and social issues, including the presence of waste pickers and other people engaging in socioeconomic activities.
- **Identification of alternatives, priorities and targets:** Before closing a dumpsite, it is essential to identify opportunities to divert as much waste as possible from final disposal, through CE approaches and material recovery. This will reduce the environmental pressures in new landfills and extend their lifetime. It then becomes necessary to identify new or existing infrastructure alternatives for controlled waste disposal and plan the necessary interventions in the impacted area, by selecting a closure and waste removal method and promoting area recovery.
- **Development of a closure plan, rehabilitation and post-closure management:** Prepare a closure plan involving technical, social, governance, environmental education and financial aspects of the process. The plan should assess potential impacts and provide information, training and education to people prior to closure. After closure, it is crucial to ensure proper management of the area to prevent threats to human health and the environment.

- **Stakeholder engagement, social equity and inclusion, and gender considerations:** Identify and address all stakeholders in a fair manner to ensure their engagement at all stages of the process, since the analysis and evaluation. Ensuring equity and inclusion for people who earn a living from waste picking is essential, and developing a specific “inclusion plan” is recommended.
- **Implementation, monitoring and evaluation:** Once planned, the closure plan must be implemented through practical actions to effectively close the dumpsite. During the process, consider important aspects, such as communication, financing, housing, enforcement of legal determinations and data collection. Establish a monitoring system for the area (e.g. groundwater quality and methane emission) and people (success of inclusion plan) and promote the disclosure of reports.

In the planning process to close dumpsites, social equity and inclusion of waste pickers—with attention to gender aspects—plays a central role, which is part of “empowering informal waste sector workers”, in the next proposed element for action. The Presidency proposes to the G20 Members to combine their best efforts to support the closing of the world's dumpsites as quickly as possible, collaborating to improve health conditions and environmental protection in countries that still face this challenge.

## **b. Empowering informal waste sector workers**

In many countries there is a robust network of informal waste sector activities, primarily focused on the collection, sorting and recovery of recyclables. This occurs particularly when formal MSW systems are lacking or insufficient, or when there are not enough social programmes for vulnerable and marginalized populations. Although different segments of the population can be affected, there is a wide recognition that women are disproportionately affected by informal work, due to the overlap with homecare work and a lack of health protections and policy support.

Conservative estimates suggest that 15 to 20 million people are worldwide engaged in the informal waste sector<sup>4</sup>, responsible for collecting around 58 per cent of all the post-consumer plastic waste collected for recycling globally. In some developing countries, this figure exceeds 80 per cent of the recovered waste (UNEP 2021), making waste pickers the backbone of the recycling supply chain. Waste pickers provide valuable collection and sorting services to society, delivering positive economic, social and environmental impacts to their communities (Women in Informal Employment: Globalizing and Organizing [WIEGO] 2013). Recognizing and acknowledging their essential role is crucial in striving for a fair and inclusive CE.

Waste pickers activity can take various forms, including working as dump pickers at dumpsites, shifting through street garbage and serving as informal street collectors. More recently, waste pickers have organized themselves into socio-productive arrangements (WIEGO 2013). These generally lead to creation of waste picker cooperatives or associations, where individuals come together to engage in collection, sorting and sometimes processing operations.

The presence of organized waste pickers in many countries allows diverting waste from dumpsites and landfills, reducing the likelihood of waste leakage into the environment, including in marine

<sup>4</sup> Data from 2020, presented in a International Labor Organization report available at [https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@ed\\_emp/@gjp/documents/publication/wcms\\_905814.pdf](https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@ed_emp/@gjp/documents/publication/wcms_905814.pdf)

ecosystems, and lowering MSW management costs for local governments. However, despite their crucial role and importance, informal waste pickers remain largely unrecognized at the national, regional and local levels in many places. This lack of recognition leads to unsafe and unhealthy working conditions, low or irregular incomes and limited access to information, markets, finance, training, technology and social benefits (UNEP 2023a).

To promote a just transition towards an inclusive CE, it is crucial to formalize, empower and organize waste pickers into associations or cooperatives, integrating them into formal MSW systems. This transition enables waste pickers to move from informal street collection or open dumpsites to working in door-to-door collection services or structured material sorting and recovering facilities. This integration not only enhances their working conditions and labour rights, but also creates opportunities for waste pickers cooperatives to be contracted by local governments, private companies, large waste generators and EPR systems—thereby providing social recognition and improving their income and livelihoods (UN-HABITAT and NIWR n.d.). People involved in the process vary according to cultural, local and specific aspects, and local circumstances must be respected during this process, reflecting the voices and interests of waste pickers – once there is no one-size-fits-all approach to waste picker organization and inclusion (UNEP 2021).

Nevertheless, there are some key elements that can be considered when designing a just transition process in waste management (UN-HABITAT and NIWA n.d.; WIEGO 2013; UNEP 2021; UNEP 2023a), as follows:

- **Recognize waste pickers as formal workers:** A first step is to publicly acknowledge their role, raising awareness about their importance and dispelling negative perceptions and stigma.
- **Adjust labour legislation to recognize waste pickers' socio-productive work:** National and regional legislation should acknowledge waste picking as a legitimate occupation, in line with ILO recommendation R204. Social protection measures should also be implemented, as well as measures ensuring safe access to waste and providing necessary safety equipment.
- **Provide an adequate waste legal framework:** Governments need to enact regulations that recognize and empower waste pickers, especially regarding clarifying their role on EPR schemes, including defining sources for financial support.
- **Engage key actors from planning stage:** In designing inclusion strategies, it is crucial to involve waste pickers themselves, along with other stakeholders such as recyclers, producers, civil society including labour unions and local authorities. Open communication channels are essential for maintaining direct contact and identifying policy gaps.
- **Enhance infrastructure, skills and capabilities:** Waste pickers often work in precarious, unsafe and low-tech environments. An inclusive agenda should ensure they have access to proper facilities, equipment, and administrative support to enhance business operations. In the case of proposing more ambitious CE approaches, workforce training to develop new skills is fundamental, as well as other supportive measures as transportation and stipends for participation in debates.



- **Ensure fair remuneration:** Waste pickers often struggle to receive fair prices for recyclable materials. Solutions may involve creating networks to benefit from economies of scale and facilitating direct sales to recyclers. Collection and sorting services should be recognized and adequately rewarded.
- **Integrate waste pickers strategy with EPR requirements:** Waste pickers can play a significant role in collecting and sorting waste, particularly in EPR systems for packaging. Adequate investments in infrastructure, capacity-building, business strategy development and stable income sources for these services are essential.
- **Collect and disclose data on waste pickers:** Understanding the demographics and working conditions of waste pickers is crucial for designing tailored support measures, such as infrastructure upgrades, equipment provision, technical assistance and support for better sales of recovered materials.
- **Provide additional financing:** In addition to revenue from selling recyclable materials and EPR services, waste pickers may benefit from other income sources such as government contracts, microcredit programmes, industry initiatives or international organization projects.
- **Incorporate waste pickers into Multilateral Environmental Agreements (MEAs):** Waste pickers can play an important role in different MEAs, not only in waste management (e.g. the Basel Convention<sup>5</sup>), but also in chemicals (e.g. Rotterdam, Stockholm and GFC) and others (e.g. the UNFCCC, CDB and the future legally binding instrument on plastic pollution). It is recommended to address waste pickers issues in national and local action plans at different MEAs, as well as at innovative financial mechanisms to support developing countries to integrate waste pickers into their systems.

Considering not only the Principles for an Inclusive Circular Economy presented in this document, but also the significant environmental and economic relevance of waste pickers in many G20 countries, this Presidency calls on G20 countries to provide technical and financial support to promote the recognition, empowerment and integration of waste pickers into formal MSW systems. This includes proposing specific initiatives that can be coordinated under multilateral environmental agreements, international agencies and development banks.

### **c. Reducing and managing food loss and waste**

Food loss and waste (FLW) is a significant global issue. While a substantial portion of the world's population still faces hunger, one third of food production is lost or wasted from agricultural production to final consumption. In 2023, FLW was estimated to total 1.3 billion tons, valued at approximately US\$1 trillion (Food and Agriculture Organization of the United Nations [FAO] 2011). FLW accounts for 30 per cent of the world's food production, with 13 per cent occurring during

<sup>5</sup> For this purpose it is useful to consider the “Guidance on how to address the environmentally sound management of wastes in the informal sector” developed under the Basel Convention - <https://www.basel.int/Portals/4/download.aspx?d=UNEP-CHW-IMPL-CLI-ESM-Toolkit-10-20190430.English.pdf>

upstream activities, such as cultivation and transportation, before reaching retailers (classified as food loss) and 17 per cent at downstream stages, including retailers, food services and households (classified as food waste) (FAO 2011).

FLW occurs at each stage of the food lifecycle (FAO 2011). Losses begin at the agricultural stage, where unharvested crops result from mechanical inefficiencies, market disruptions or labour shortages. Post-harvest handling and storage challenges, such as inadequate practices, lead to spoilage and pest infestations. During food processing, inefficiencies and waste occur during trimming and preparation. Distribution issues, including poor infrastructure and handling, further contribute to spoilage or damage. Finally, at the retail and consumption stages, waste arises due to overstocking, strict cosmetic standards and fluctuating consumer demand, as well as various forms of waste generated during food preparation and consumption, both in food services and households.

Relevant efforts have been made to address FLW, and scaling these initiatives globally could yield multiple benefits: contributing to “zero hunger” (SGD 2); mitigating GHG emissions (SGD 13), by reducing short-lived climate pollutants (SLCPs) from decomposing organic waste; minimizing waste generation; promoting composting and anaerobic digestion; and avoiding food waste disposal in landfills. Within the framework of SDG 12 on sustainable consumption and production patterns, Target 12.3 specifically aims to “*halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses*” by 2030. This presents a significant challenge for countries, regions and local governments. An example of a related initiative is the Lowering Organic Waste Methane (LOW-Methane) project, launched at COP28 by a coalition of governments and international organizations (Global Methane Pledge 2023). This initiative aims to dramatically cut methane emissions from the waste sector, which accounts for roughly 20 per cent of global methane emissions from human activities (UNEP 2024a).

Preventing FLW represents a triple-win outcome in terms of environmental, social and economic impacts:

- **Environmental Impact:** FLW has substantial environmental repercussions throughout the food lifecycle, contributing to, amongst others, pollution of air, water and soil. Notably, FLW accounts for eight to ten per cent of global GHG emissions, a significant portion that could be mitigated with relatively low investment.
- **Social Impact:** Preventing FLW offers significant social benefits. In 2022, 29.6 per cent of the global population faced moderate or severe food insecurity, with up to 783 million people affected by hunger. Reducing FLW can enhance food availability, thereby lessening hunger and malnutrition. Additionally, addressing FLW helps reduce inequalities by ensuring that food wasted in some areas, due to consumer behaviour or inefficient supply chains, can be better utilized in regions facing food scarcity and hunger.
- **Economic Impact:** FLW represents a major economic challenge, with an annual loss estimated at US\$1 trillion (Reike, Vermeulen and Witjes 2018). This economic waste reflects the inefficiencies in the food supply chain and highlights the potential for financial gains through preventing FLW. Addressing FLW and its negative impacts requires an integrated and comprehensive approach that includes waste prevention, improved logistics, and incentivizing changes in consumer behaviour. Some recommendations are (Silva Filho *et al.* 2024):

- **Develop and implement policies and governmental strategies:** Governments at all levels should create specific strategies to address FLW, aligning with SDG 12.3. These strategies should focus on preventing, recovering and recycling FLW throughout the entire food lifecycle. Recommended actions include incorporating CE approaches into planning, integrating FLW strategies into NDCs and conducting comprehensive assessments to diagnose FLW causes and identify potential interventions.
- **Monitor progress in FLW prevention and management:** Data availability in sufficient quality and quantity is a major challenge for effective FLW management (UNEP 2024e). Reliable information is crucial for measuring FLW, identifying priority areas for intervention, and supporting evidence-based decision-making. Adopting standardized methodologies for measuring FLW will facilitate comparisons across different contexts and enable tracking of progress over time.
- **Ensure adequate food waste recovery infrastructure:** It is crucial to provide adequate conditions to divert food waste from dumpsites and landfills, when prevention is not possible. Food recovery networks should be planned to redistribute surplus food to both human and animal feed. Additionally, infrastructure to recover organic waste is needed, utilizing technological possibilities such as composting, anaerobic digesters, biodigesters and others. Engaging professional cooks, chefs and promoting public-private partnerships can be useful, especially for sub-national governments.
- **Stimulate prevention through economic instruments:** Economic incentives are needed to make prevention or recovery of FLW feasible. A broad set of alternatives are available, including subsidies, tax incentives, direct grants and public-private partnerships to fund infrastructure evolution (UNEP 2024e). Private incentives can also be proposed, such as sustainable bonds, impact investments, climate-related finance mechanisms (especially for methane mitigation), microfinance products, specific rural insurance and investments in supply chain efficiency.
- **Foster innovation and collaboration along the supply-chain:** Support for research, innovation and collaborative implementation of projects can be directed towards FLW prevention and management. This includes new business models and technologies, projects to improve efficiency, transformative changes in agri-food systems, improvements in the supply-chain and more. Sustainable packaging is a specific area of concern, creating standards and incentives for alternatives that enhance life extension and food quality, thus reducing FLW.
- **Support on research and development:** Innovation is needed in different areas, such as: treatment options; methods and approaches to quantify methane and other GHG emissions; and identifying sources and mechanisms for removal of contaminants (e.g. Per- and polyfluoroalkyl substances (PFAS), microplastics) in food waste.
- **Empower subnational governments and cities:** Cities, regions and other sub-national governments play a key role in preventing and managing FLW and should be empowered by central governments and multinational agencies through planning, policy support, capacity building and financial resources. Practical actions can include establishing composting infrastructure, urban and local agriculture, education campaigns to raise awareness and promote behaviour change, among others.

- **Promote knowledge sharing and awareness:** Broad awareness-raising efforts are essential to motivate all stakeholders to engage and play their individual roles. Governments can create platforms for knowledge sharing and exchange of best practices, disseminating innovative solutions for reducing FLW and integrating composting and urban agriculture programmes. Specific efforts targeting consumers should educate them about the importance of preventing FLW, and provide practical tips for application at home to promote a more sustainable lifestyle.
- **Ensure the means of implementation through international cooperation:** Many of the previous recommendations will require new knowledge, skills and investments in technology, which can be challenging for developing countries. International cooperation efforts can be developed to reduce these and ensure the improvement of local circumstances and capacities to promote FLW reduction.

But individual country efforts do not seem to be enough to reduce FLW on a more significant scale. According to the latest report on SDGs (United Nations [UN] 2024), in 2021 more than 800 million people still face hunger worldwide, falling short of the SDG target 12.3. This underscores the urgent need to address FLW through investments in technical cooperation for developing countries, transfer of technologies on mutually agreed terms, new infrastructure, education and data collection and monitoring. Although there are significant regional differences in FLW, the generation of waste at the household level is similar across all regional groups, emphasizing the need for action in all countries.

To effectively reduce FLW on a global scale, it will be also necessary to establish a coordinated effort throughout the entire food supply chain, from production to consumption, involving different stakeholders in collaborative networks with a shared goal. This can be achieved through voluntary agreement or a public-private partnership, which bring together various stakeholders along the food system, each with their role to play in FLW prevention. Some experiences have already tested this type of governance arrangement, with meaningful impacts on FLW reduction, tackling food insecurity and reducing costs (FAO 2011).

In this regard, it is worth mentioning the “Food is Never Waste Coalition”, launched at the World Food Systems Summit (2021), whose aim is to halve food waste by 2030 and to reduce food losses by at least 25 per cent. Food loss and waste reductions in line with SDG 12.3 can be achieved through investment in food loss prevention technologies and sustainable cold chains, value chain collaboration, consumer behaviour change programmes and circular food systems transitions.

Tackling food loss and waste is urgent and requires dedicated policies informed by data, as well as investments in technologies, infrastructure, education and monitoring. The Presidency suggests that G20 Members establish national plans and commitments, and cooperate internationally to tackle FLW, as few G20 countries have food waste estimates suitable for tracking progress (UNEP 2024e).

#### **d. Fostering circular economy and waste management to tackle plastic pollution**

The importance of plastics in modern society is unquestionable, but plastic pollution has also been a source of major health and environmental concern. An estimated 19 to 23 million tons/year of plastics leak into aquatic ecosystems, affecting biodiversity and threatening various species. Pollution occurs

at all stages of the plastic lifecycle, with various substances being released into the air, water and soil, and the impacts of microplastics<sup>6</sup> on human health and the environment are still not fully assessed (UNEP, Republic of Côte d'Ivoire and Ministry of Infrastructure and Waste Management of the Netherlands 2023).

Since its initial development, global plastic production has been on the rise, increasing from 2 Mt in 1950 to 460 Mt in 2019. Moreover, plastic waste has more than doubled in the span of ten years, escalating from 156 Mt in 2000 to 353 Mt in 2019. The environmental challenges associated with plastic pollution are exacerbated by inadequate products' design and inefficient waste management systems, particularly in developing countries. Globally, 46 per cent of plastic waste is landfilled, 17 per cent is incinerated, only 15 per cent is collected for recycling (with 9 per cent effectively recycled), and the remaining 22 per cent is littered (Organization for Economic Cooperation and Development [OECD] 2022).

On a positive note, a great number of initiatives have been put forward, responding to the challenges posed by plastic waste and pollution. These encompass different efforts aimed at curbing plastic pollution, as new regulations at both the national, regional and local levels; voluntary commitments and initiatives by governments and private companies; and actions from civil society, academia and international organizations (UNEP, Republic of Côte d'Ivoire and Ministry of Infrastructure and Waste Management of the Netherlands 2023). An important G20 contribution was the “Osaka Blue Ocean Vision”<sup>7</sup>, endorsed by the G20 Leaders at the G20 Osaka Summit, which aims to reduce additional pollution by marine plastic litter to zero by 2050, through a comprehensive life-cycle approach that includes reducing the discharge of mismanaged plastic litter by improved waste management and innovative solutions, while recognizing the important role of plastics for society.

From a technical perspective, the urgent need to tackle plastic pollution can benefit from a two-folded strategy: first, measures to ensure that plastic products that enter the economy are designed to keep their value in the economy, both as products through reuse and repair systems, and as material through recycling systems; and second, improving waste management through adequate collection and recycling infrastructure, to ensure the value of plastic material stays within the economy and prevent the leakage of plastic waste into the environment (UNEP, Republic of Côte d'Ivoire and Ministry of Infrastructure and Waste Management of the Netherlands 2023; UNEP 2023b). It is critical to work on both approaches in synergy. In addition to the technical changes, addressing individual and social behaviour change through incentives and awareness is vital.

The first set of measures includes the promotion of sustainable production and consumption patterns for plastics. This shift requires each country to promote societal changes by adjusting domestic policies, practices, social norms, and mindsets to ensure that industry responsibly designs, produces and manages plastic, while consumers use plastic responsibly. It can involve various CE approaches at different stages of plastics lifecycle, including incentives for better product and systems design, foreseeing next uses and ensuring toxic-free plastic products; promoting circular business models that encourage reusing and remanufacturing; and implementing policies to incentivize the use of recycled

---

<sup>6</sup> Microplastics are small plastic particles, typically less than 5 millimeters in size, that can be harmful to the environment and marine life.

<sup>7</sup> Details are available on the portal site created by the Ministry of the Environment, Japan and managed by the Institute for Global Environmental Strategies (IGES) under the initiative of the G20 Implementation Framework for Actions on Marine Plastic Litter <https://g20mpl.org/>

plastic content and renewable sources, amongst others (UNEP 2023b). Moreover, encouraging a rethinking of consumption patterns is a critical issue, particularly in higher-income countries, as the average *per capita* plastic consumption varies significantly, ranging from 156 kg/person/year in OECD countries, to 39 kg/person/year in non-OECD countries (OECD 2022).

The adoption of CE approaches to tackle plastic pollution is also expected to bring many socioeconomic benefits, including: the opportunity for creating around 700,000 new jobs globally; improved conditions for workers in informal waste management activities (more than 15 million workers worldwide); public and private savings of US\$1.3 trillion until 2040 globally; prevention of 0.5 Gt CO<sub>2-eq</sub> GHG annually around the world; avoidance of social and environmental externalities whose global costs are estimated at US\$3.3 trillion until 2040; and reduced exposure to health and environmental risks (UNEP 2023b).

The second set of measures deals with the need of supplementing CE approaches with significant improvements in waste management to fully address the plastic pollution crisis, especially in developing countries (Tanner *et al.* 2024). Currently, around 2.7 billion people lack access to regular MSW collection, and unsound disposal practices account for 82 per cent of all plastic leakage into the environment (OECD 2022). Therefore, a key priority should be to strengthen the environmentally sound collection and recycling of plastic waste to ensure it can be reintroduced into the economy, thus preventing plastic pollution.

To enhance MSW management systems, measures such as closing dumpsites, expanding waste management infrastructure, implementing regulatory policies (like EPR schemes, amongst others), and creating incentives to reduce waste generation at its source, become essential. These measures must also consider social concerns, ensuring that they align with national circumstances and priorities. Promoting a just transition by empowering waste pickers and other informal workers is crucial, but the selection of measures will depend heavily on the specific national context, needs and priorities.

Addressing plastic pollution also requires coordinated efforts on a global scale. In March 2022, the UN Environment Assembly made significant progress by adopting UNEA Resolution 5/14, which aims to develop an international legally binding instrument to combat plastic pollution, including in the marine environment. To achieve this, an Intergovernmental Negotiating Committee (INC) was established with the goal of completing negotiations by the end of 2024. Currently, these negotiations are ongoing and encompass many of the previously mentioned provisions, such as promoting more sustainable consumption and production patterns of plastic products, sustainable design, adopting EPR schemes, improving waste management systems and ensuring an inclusive and just transition.

Although many interventions are related to domestic policy, a true market shift will depend on coordinated international efforts within the framework of the INC negotiations. Additionally, each country should seek to align these efforts with its obligations, commitments, and guidance under existing Multilateral Environmental Agreements (MEAs), such as the Rotterdam, Basel, and Stockholm Conventions (BRS)<sup>8</sup>, as well as international trade treaties, including those adopted within the World Trade Organization context.

---

<sup>8</sup> As the “Technical Guidelines on Plastic Waste”, under the Basel Convention - <https://www.basel.int/Implementation/Plasticwaste/Technicalguidelines/Overview/tabid/7992/Default.aspx>

In practice, alongside the anticipated outcomes from the INC negotiations, governments can advance and take several practical steps (UNEP, Republic of Côte d'Ivoire and Ministry of Infrastructure and Waste Management of the Netherlands 2023):

- **Participate and contribute to the INC process** to achieve an ambitious outcome that effectively addresses plastic pollution, including in the marine environment, in line with UNEA Resolution 5/14.
- **Drive change through domestic legislation and policies** engaging all sectors of society to prevent plastic waste and pollution. This involves designing products so they can be reintegrated into future use cycles, such as recycling, remanufacturing, and reuse using tools like design for disassembly or the use of mono-materials, as appropriate. It also includes providing information on the composition and recyclability of products and packaging materials, as appropriate, according to national capacities, supporting circular businesses and incentivizing more sustainable consumer behaviour.
- **Adopt sustainable procurement strategies** to prevent plastic waste generation and promote CE approaches among the government product and service providers.
- **Enhance MSW management systems**, by expanding the collection of general MSW and recyclable waste, closing dumpsites and banning open burning of waste and investing in robust recycling schemes. Where possible, include organized waste pickers as an integral part of MSW management operations.
- **Implement or advance EPR schemes** tailored to national and sub-national contexts to encourage higher value retention, increased diversion rates and eco-design innovation.
- **Promote harmonized and comparable methodologies** for measuring and monitoring plastic pollution, with a focus on marine plastic litter and microplastics.
- **Allocate resources and secure investments** within national budgetary limits and through international cooperation to develop infrastructure for the environmentally sound management of plastic waste, including recycling facilities, particularly in developing countries. Additionally, invest in innovation for effective solutions to address MSW and recycling technologies, including through international cooperation.
- **Commit to practical actions across the plastics lifecycle** in collaboration with multilateral institutions, through bilateral cooperation and external financing, as well as with civil society, private companies and other stakeholders, as done in the New Plastics Economy Global Commitment, among others.
- **Encourage cooperation among stakeholders** through cross-industry collaboration, public-private partnerships and collective initiatives globally to exchange information, and foster innovation and research on CE approaches, including through international cooperation, and other measures to combat plastic pollution.

- **Develop or strengthen environmental education programmes** and public campaigns to raise awareness, educate people, influence behaviour, and promote social change towards more sustainable consumption patterns, following the necessary system changes by governments and industry to ensure alternatives and infrastructure are available to citizens.

The Presidency urges G20 Members to collaborate during the INC negotiations to achieve the objectives of UNEA Resolution 5/14, and to implement domestic actions while cooperating internationally. This call for cooperation should leverage the best abilities and capacities of each Member, including technical expertise, available technologies, and financial resources. North-South, South-South and triangular cooperation should be promoted to exchange best practices and innovative policies and solutions. Additionally, collaboration with the scientific community and academia is incentivized, to effectively address plastic pollution.

## 7. Conclusion: the promotion of an inclusive circular economy

The Presidency understands that the promotion of the inclusive circular economy principles can be organized into three fronts (Preston, Lehne and Wellesley 2019):

- (i) Exploring opportunities for an inclusive CE in each G20 Member policies:** Address local priorities through inclusive CE approaches, creating synergies with national, regional and local governmental plans and strategies by:
  - Closing dumpsites, enhancing material recovery and formalizing informal waste workers, where appropriate
  - Promoting social equity and inclusion of workers, with special attention to waste pickers who previously worked directly in dumpsites
  - Renewing industrial policy, emphasizing the need for more circular products, services and business models, technology transfer, job creation, economic diversification and access to higher-value markets
  - Developing strategies, tailoring approaches to guide the transition to an inclusive CE and address local issues
  - Embedding resilience, taking advantage of local conditions, such as environmentally sustainable biomaterials and biofuels, aligning CE with climate, biodiversity and pollution strategies, and adhering to the waste management hierarchy
  - Strengthening local governance for circular cities, enhancing the quality of life for residents, and supporting biodiversity. Additionally, this approach seeks to equalize access to resources for the entire population while providing opportunities for resilience and climate adaptation, leaving no one behind
- (ii) Creating the enabling conditions for the transition to CE approaches:** Accelerating the pace toward CE approaches will depend on multiple enablers, such as:
  - Developing domestic regulatory frameworks, including a general policy for CE and specific instruments suitable for local conditions, government resources and cultural aspects



- Mainstreaming the conservation and sustainable use of natural resources through CE approaches in national policy, and encouraging the uptake of circular strategies by the private sector
  - Establishing specific policies to support the development of circular products and business models, regulating and creating markets for these products, and providing economic incentives, particularly for micro, small and medium enterprises
  - Fostering research and innovation, including through international cooperation, tailored to local circumstances and challenges to facilitate the development of material substitutes, local water treatment and reuse, production of local and renewable energy, and traditional products. Additionally, it involves creating novel finance mechanisms, including through international support, to scale up these solutions
  - Addressing the social dimensions of a CE through specific policies and stimuli, including new models for labour legislation and specific programmes to help low-income populations
  - Encouraging investors to offer new solutions for international financing, such as blended-financing mechanisms to de-risk early investment in CE value chains
  - Promoting sustainable consumption and behavioural change to support the shift to CE, including through consumer information, market incentives, sustainable products and education and awareness raising for sustainable lifestyles.
- (iii) **Supporting an inclusive CE agenda through partnership and collaboration:** Different aspects of international cooperation can help leverage local capacities, ensuring adequate means of implementation for circular CE strategies in developing countries, as for example:
- Mainstreaming CE in the global sustainability agenda, focusing on delivering Agenda 2030 and their SDGs, in particular sustainable and consumption patterns (SDG 12), through circular strategies
  - Promoting multilateral investments, such as those by Multilateral Investment Banks, aligning CE investments with climate change mitigation and adaptation, biodiversity protection and sustainable development
  - Advancing bilateral cooperation, mainly through projects in developing countries receiving technical and financial resources from higher income countries
  - Using financial, technical, and logistical resources of multinational private corporations to scale-up CE projects, mainly to create infrastructure, waste management systems, EPR schemes and awareness campaigns, particularly in developing countries
  - Harnessing regional and international trade to open new CE opportunities, encompassing the establishment of governance and technological arrangements in product design, materials science, recycling technologies and business models, in conformity with international trade rules and avoiding unjustifiable or discriminatory measures or disguised restrictions to trade
  - Cooperating at international level to accelerate a just transition, using multilateral organizations, building on existing networks and other information exchange channels, and providing developing countries with capacity-building opportunities and cooperation in science, technology and innovation



MINISTÉRIO DAS  
**RELAÇÕES  
EXTERIORES**

MINISTÉRIO DO  
**MEIO AMBIENTE E  
MUDANÇA DO CLIMA**



- Strengthening existing CE fora for knowledge and lesson-sharing at the international level, engaging developing countries proactively

The Brazilian G20 Presidency thanks G20 Members for the cooperation and invites all to discuss and support the presented proposals of an inclusive circular economy, implementing effective actions to move this agenda forward.

## References

- Ellen MacArthur Foundation (2014). *Towards the circular economy Vol. 1: an economic and business rationale for an accelerated transition*.  
<https://emf.thirdlight.com/file/24/xTyQj3oxiYNMO1xTFs9xT5LF3C/Towards%20the%20circular%20economy%20Vol%201%3A%20an%20economic%20and%20business%20rationale%20for%20an%20accelerated%20transition.pdf>
- Food and Agriculture Organization of the United Nations (2011). *Global food losses and food waste – Extent, causes and prevention*. Rome: FAO. <https://www.fao.org/4/mb060e/mb060e.pdf>
- Global Alliance on Circular Economy and Resource Efficiency (2024). *Circular Economy and Solid Waste - Working Paper*. [https://www.unido.org/sites/default/files/unido-publications/2024-06/Working%20Paper\\_Circular%20Economy%20and%20Solid%20Waste.pdf](https://www.unido.org/sites/default/files/unido-publications/2024-06/Working%20Paper_Circular%20Economy%20and%20Solid%20Waste.pdf)
- Global Methane Pledge (2023) Lowering Organic Waste Methane Initiative (LOW-Methane). Available at: <https://www.globalmethanepledge.org/news/lowering-organic-waste-methane-initiative-low-methane>.
- International Labour Organization (2022). *Green Jobs, Green Economy, and Just Transition Concepts and Definitions: The UN-ILO perspective*. 1st meeting of the G7 ETF under German Presidency. Berlin: ILO/ G7 Germany. <https://www.ilo.org/media/280921/download>
- International Solid Waste Association/Avfallnorge. (2016). *A Roadmap for closing Waste Dumpsites The World's most Polluted Places*. Rotterdam: ISWA. <https://www.iswa.org/closing-the-worlds-biggest-dumpsites-task-force/?v=19d3326f3137>
- International Standardization Organization (2024). ISO 59.004: *Circular economy - Vocabulary, principles and guidance for Implementation*. International Standard. Geneva: ISO, 2024.
- Organization for Economic Cooperation and Development (2022). *Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options*. Paris: OECD. [https://www.oecd-ilibrary.org/environment/global-plastics-outlook\\_de747aef-en](https://www.oecd-ilibrary.org/environment/global-plastics-outlook_de747aef-en).
- Preston, F., Lehne, J. and Wellesley, L. (2019). *An Inclusive Circular Economy- Priorities for Developing Countries*. Chatham House. London.  
<https://www.chathamhouse.org/sites/default/files/publications/research/2019-05-22-Circular%20Economy.pdf>
- Reike, D., Vermeulen, W.J.S and Witjes, S. (2018). The circular economy: New or Refurbished as CE 3.0? — Exploring Controversies in the Conceptualization of the Circular Economy through a Focus on History and Resource Value Retention Options. *Resources, Conservation and Recycling* 135:246-264 <https://doi.org/10.1016/j.resconrec.2017.08.027>
- Silva Filho, C., Ramola, A., Ribeiro, F.d.M., Morton, C., Monga, P. and Ceccarelli, G. (2024). *Towards a Low Carbon Future: Circular Production and Consumption to Reduce Food Loss and Waste*. TF02, Subtopic 2. (to be published)

Tanner L., Cook E., Wilson D.C., O'Hare P., Gower R. and Velis C.A. (2024). *Solid waste management in the UN Plastics Treaty*. Tearfund, University of Leeds, Imperial College London and University of St Andrews. <https://learn.tearfund.org/en/resources/research-report/solid-waste-management-in-the-un-plastics-treaty>

United Nations (2024). *The Sustainable Development Goals Report Special edition – 2023*. New York: UN. Available at: <https://unstats.un.org/sdgs/report/2023/The-Sustainable-Development-Goals-Report-2023.pdf>

United Nations Environment Assembly (2019). Resolution 4/1: Innovative pathways to achieve sustainable consumption and production (15 March 2019). Available at: <https://wedocs.unep.org/bitstream/handle/20.500.11822/28517/English.pdf?sequence=3&isAllowed=y>

United Nations Environment Assembly (2022a). Resolution 5/11: Enhancing circular economy as a contribution to achieving sustainable consumption and production (2 March 2022). Available at: <https://wedocs.unep.org/bitstream/handle/20.500.11822/39920/ENHANCING%20CIRCULAR%20ECONOMY%20AS%20A%20CONTRIBUTION%20TO%20ACHIEVING%20SUSTAINABLE%20CONSUMPTION%20AND%20PRODUCTION.%20English.pdf?sequence=1&isAllowed=y>

United Nations Environment Assembly (2022b). Resolution 5/14: End plastic pollution: towards an international legally binding instrument (2 March 2022). Available at: <https://wedocs.unep.org/bitstream/handle/20.500.11822/39764/END%20PLASTIC%20POLLUTION%20-%20TOWARDS%20AN%20INTERNATIONAL%20LEGALLY%20BINDING%20INSTRUMENT%20-%20English.pdf?sequence=1&isAllowed=y>

United Nations Environment Assembly (2024). UNEP/EA.6/Res.1: Circularity of a resilient and low-carbon sugar cane agro-industry (1 March 2024). Available at: <https://documents.un.org/doc/undoc/gen/k24/007/77/pdf/k2400777.pdf>

United Nations Environment Programme (2021) *Roadmap for the progressive closure of dumpsites in Latin America and the Caribbean*. Coalition for the closure of dumpsites at Latin America and the Caribbean. Available at: [https://wedocs.unep.org/bitstream/handle/20.500.11822/34919/Roadmap\\_EN.pdf?sequence=7&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/34919/Roadmap_EN.pdf?sequence=7&isAllowed=y)

United Nations Environment Programme (2023a). *Topic Sheet: Just Transition*. Nairobi. Available at: [https://wedocs.unep.org/bitstream/handle/20.500.11822/42231/just\\_transition\\_sheet.pdf?sequence=3&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/42231/just_transition_sheet.pdf?sequence=3&isAllowed=y)



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



- United Nations Environment Programme (2023b). *Turning off the Tap - How the world can end plastic pollution and create a circular economy*. Nairobi: UNEP. Available at: <https://www.unep.org/resources/turning-off-tap-end-plastic-pollution-create-circular-economy>
- United Nations Environment Programme (2024a). *Global Waste Management Outlook 2024: Beyond an age of waste– Turning rubbish into a resource*. Nairobi: UNEP. Available at: <https://doi.org/10.59117/20.500.11822/44939>
- United Nations Environment Programme (2024b). *Waste Pollution: A primer on how unsustainable production and consumption habits have escalated the waste pollution crisis*. Beat waste pollution – zero waste day. Available at: <https://www.unep.org/interactives/beat-waste-pollution/#:~:text=These%20pollutants%20bioaccumulate%20in%20the,diseases%20related%20to%20mismanaged%20waste.>
- United Nations Environment Programme (2024c). *Understanding circularity*. UNEP Circularity Platform. Available at: <https://buildingcircularity.org/>
- United Nations Environment Programme (2024d). *Circularity to advance sustainable development*. Speech prepared for the Fifth UN Environment Assembly. Available at: <https://www.unep.org/news-and-stories/speech/circularity-advance-sustainable-development>
- United Nations Environment Programme (2024e). *Food Waste Index Report 2024*. Think Eat Save: Tracking Progress to Halve Global Food Waste. Nairobi: UNEP. Available at: <https://www.unep.org/resources/publication/food-waste-index-report-2024>
- United Nations Environment Programme, Republic of Côte d'Ivoire and Ministry of Infrastructure and waste management of the Netherlands (2023). *Beat Plastic Pollution - Practical Guide*. World Environmental Day 2023. Available at: [https://wedocs.unep.org/bitstream/handle/20.500.11822/42437/Plastic\\_Pollution\\_WED23EN.pdf?sequence=21&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/42437/Plastic_Pollution_WED23EN.pdf?sequence=21&isAllowed=y)
- United Nations Human Settlements Programme and Norwegian Institute for Water Research. *Leaving no one behind*. Available at: [https://unhabitat.org/sites/default/files/2022/11/un-habitat\\_niva\\_report\\_leaving\\_no\\_one\\_behind\\_1.pdf](https://unhabitat.org/sites/default/files/2022/11/un-habitat_niva_report_leaving_no_one_behind_1.pdf)
- United Nations Industrial Development Organization (2017). *Circular Economy*. Available at: [https://www.unido.org/sites/default/files/2017-07/Circular\\_Economy\\_UNIDO\\_0.pdf](https://www.unido.org/sites/default/files/2017-07/Circular_Economy_UNIDO_0.pdf)
- Wilson, D. (2023). Learning from the past to plan for the future: An historical review of the evolution of waste and resource management 1970–2020 and reflections on priorities 2020–2030 – The perspective of an involved witness. *Waste Management & Research* 41(12): 1754–1813. Available at: <https://doi.org/10.1177/0734242X231178025>
- Women in Informal Employment: Globalizing and Organizing (2013). *Waste Pickers: The Right to Be Recognized as Workers*. Available at: <https://www.wiego.org/sites/default/files/resources/files/WIEGO-Waste-Pickers-Position-Paper.pdf>



MINISTÉRIO DAS  
**RELAÇÕES  
EXTERIORES**

MINISTÉRIO DO  
**MEIO AMBIENTE E  
MUDANÇA DO CLIMA**



## G20 Environmental and Climate Sustainability Working Group (ESCWG) Waste and Circular Economy (W&CE)

### Annex A. Waste & Circular Economy (W&CE) - Case Studies submitted by G20 members

This annex presents a collection of case studies on Waste and Circular Economy, gathered from G20 members between June and August 2024. These case studies demonstrate how some of the innovative approaches described in the Technical Paper have been implemented across various contexts and scenarios. Each entry includes a brief description of the project, the challenges encountered and results achieved, and links for further information.

The case studies are presented as submitted, in alphabetical order by country, without any editing, to preserve the original perspectives and insights shared by each member.

### Table of contents

<b>Australia</b>	<b>3</b>
Australian Waste Exports Program	3
Environmentally Sustainable Procurement Policy	4
<b>Brazil</b>	<b>5</b>
National Circular Economy Strategy	5
Empowering Waste Pickers for Sustainable Livelihoods and Efficient Plastic Waste Sorting	6
<b>Canada</b>	<b>8</b>
Ghost Gear Fund	8
<b>European Union</b>	<b>10</b>
The EU Circular Economy Action Plan	10
<b>France</b>	<b>11</b>
Extended Producer Responsibility (EPR)	11
<b>Germany</b>	<b>12</b>
National Circular Economy Strategy	12
<b>Indonesia</b>	<b>13</b>
Toward a Circular Economy: A System Dynamic Model of Recycling Framework for Aseptic Paper Packaging Waste in Indonesia	13
<b>Italy</b>	<b>14</b>
National Strategy for the Circular Economy	14
<b>Japan</b>	<b>16</b>
Project for safe closure, which included application of the Fukuoka Method (semi-aerobic landfill method for waste	

landfills) in Mozambique	16
Harmonized monitoring and data compilation of marine plastic litter	16
<b>Mexico</b>	<b>18</b>
Design and Validation of Methodological Instruments That Strengthen the Formulation of Strategies for Management Sustainable Materials and Plastic Waste in Coast Zones	18
<b>Netherlands</b>	<b>19</b>
Cradle to Cradle design of carpets: Desso	19
<b>Portugal</b>	<b>19</b>
Reducing food loss and waste	19
<b>South Africa</b>	<b>21</b>
Circular Economy and Extended Producer Responsibility Regulations Implementation in South Africa	21
<b>Türkiye</b>	<b>22</b>
Türkiye Zero Waste Project	22
<b>United Arab Emirates</b>	<b>23</b>
UAE Circular Economy Policy and UAE Circular Economy Agenda	23
<b>United Kingdom</b>	<b>25</b>
Extended Producer Responsibility for packaging in England	25
UK Govt Investment to the SSPP through UKRI	26
<b>United States of America</b>	<b>26</b>
National Recycling Strategy and Draft National Plastics Strategy	26
National Strategy to Reduce Food Loss and Waste and Recycle Organics	27
Solid Waste Infrastructure for Recycling program and the Recycling Education and Outreach program	28
U.S. Food Loss & Waste 2030 Champions	30

## ● **Australia**

### ○ **Australian Waste Exports Program**

**Institution:** Department of Climate Change, Energy, the Environment and Water

**Period:** 2020 – current

**Further information:**

<https://www.dcceew.gov.au/environment/protection/waste/exports>

Australia’s waste exports regulations ensure Australia appropriately manages the environmental and human health impacts of the waste material it sends offshore.

The waste exports regulations are established within the *Recycling and Waste Reduction Act 2020* (the RaWR Act). The regulations restrict what waste can be exported and require businesses to hold a licence to export certain waste types. The regulations commenced in January 2021 with waste glass. Since then, the export of mixed plastic (July 2021), whole baled waste tyres (December 2021), unprocessed single-polymer plastic exports (July 2022) and mixed paper and cardboard (July 2024) have been regulated.



Administering the regulations involves assessing licence applications to ensure regulated entities are processing waste to a specification which allows it to be an input for reuse or remanufacture in receiving countries.

Businesses which seek to export regulated material are covered by the regulations, including large waste management businesses and small operators such as freight forwarding firms. The regulations also impact Australia’s waste management and recycling sectors which collect, sort, process, recycle, reuse, remanufacture and convert waste into new products.

**Challenges and results:** By ensuring that only properly processed waste glass, plastic, tyres and paper and cardboard is exported, the regulations prevent Australia’s waste overwhelming waste management infrastructure in receiving countries and waste ending up in the world’s rivers and oceans.

Prior to the waste export regulations taking effect in July 2020, Australia was exporting over 4.2 million tons of waste annually. Waste plastic, paper and cardboard, glass and tyres made up over 30 percent of this waste (over 1 million tons). In 2022–23, when compared with 2019–20, exports of waste plastic had decreased by 60 per cent; waste glass had decreased by 96 per cent; and waste tyres had decreased by 33 per cent.

A significant challenge that came with the introduction of the waste export regulations was increased pressure on the domestic recycling industry, including on infrastructure and local processing capacity to manage the increase in waste staying onshore. A complementary program was established—the Recycling Modernisation Fund—to directly address necessary infrastructure investments in this space.

- **Environmentally Sustainable Procurement Policy**

**Institution:** Department of Climate Change, Energy, the Environment and Water

**Period:** 2024–2029

**Further information:**

[https://www.dcceew.gov.au/environment/protection/waste/sustainable-procurement;](https://www.dcceew.gov.au/environment/protection/waste/sustainable-procurement)

<https://www.dcceew.gov.au/environment/protection/waste/sustainable-procurement/environmentally-sustainable-procurement-policy>

The Australian Government recognises it has an opportunity to drive change toward a net zero and circular economy through more sustainable public procurement. The Environmentally Sustainable Procurement Policy (ESP Policy) was introduced to support this transition. It leverages the Australian Government’s substantial spend to stimulate industry investment and innovation in environmentally sustainable products.

The policy aims to improve environmental sustainability across three focus areas – climate, the environment and circularity. It also promotes the important role design and innovation play in sustainability.



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



The ESP Policy came into effect on 1 July 2024 for construction services procurement valued at or above \$7.5 million from (local currency). From 1 July 2025, the policy will extend to tenders for information and communication technology (ICT) goods, textiles, and furniture, fittings and equipment at or above \$1 million.

Research and consultation highlighted these categories have the greatest opportunity for environmental outcomes, align with international practice and have credible certification schemes to mitigate greenwashing.

Using thresholds and a staged implementation, the policy captures a high proportion of government spend relative to the impacted proportion of procurements. For example, for construction services, the policy will apply to two per cent of central government construction services procurement contracts but capture 50 per cent of the value of all construction services contracts.

Businesses bidding for in-scope procurements must deliver goods or services that meet the sustainability principles of the policy. The principles include products that minimise greenhouse gas emissions, are safe for the environment and/or retain their value for longer.

Procurers are required to report on environmental outcomes. For construction services this will relate to: waste recovered; use of low embodied carbon materials; use of recycled content and innovation. Metrics for the other categories are under development. With sufficient data, a baseline will be established to inform future ambition.

**Challenges and results:** The ESP Policy came into effect on 1 July 2024. The first whole-of-government report is due in late 2025.

An impact analysis was undertaken for the policy. This found that the evaluated benefits exceeded the costs. These benefits were predominantly in the potential reduction in greenhouse gas emissions through using low embodied carbon construction materials.

---

## ● Brazil

### ○ National Circular Economy Strategy

**Institution:** Ministry of Development, Industry, Commerce, and Services (MDIC); Ministry of Environment and Climate Change (MMA) and Ministry of Finance (MF)

**Period:** 2024 – current

**Further information:**

[https://www.planalto.gov.br/ccivil\\_03/\\_ato2023-2026/2024/decreto/D12082.htm](https://www.planalto.gov.br/ccivil_03/_ato2023-2026/2024/decreto/D12082.htm)

<https://www.gov.br/mdic/pt-br/assuntos/noticias/2024/junho/governo-federal-lanca-a-estrategia-nacional-de-economia-circular>

In June 2024, the Brazilian government established the National Circular Economy Strategy (ENEC). The national strategy aims to shift from a linear production model to a circular economy, promoting



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



the efficient use of natural resources and embedding sustainable practices across the entire production chain. The program is part of the Ecological Transformation Plan, led by the Ministry of Finance.

The strategy's core guidelines include eliminating pollution and reducing waste generation; maintaining the value of materials; regenerating natural systems; decreasing dependency on natural resources; fostering sustainable production and consumption; extending the life cycle of all materials; and ensuring a just, inclusive and equitable transition that addresses disparities based on gender, race, ethnicity or socioeconomic status.

Beyond creating a favourable regulatory and institutional environment for a circular economy, the strategy seeks to drive innovation, culture, education and skills development aimed at reducing, reusing, and promoting the circular redesign of production processes. Additional objectives include reducing resource consumption and waste generation to preserve material value; proposing financial instruments to support the circular economy—such as financing, public procurement and suitable tax policies—and fostering cross-sector cooperation while engaging workers in this transition.

A key element of the Strategy is the establishment of the National Circular Economy Forum, a governance body tasked with formulating the National Circular Economy Plan, which will set out goals, standards, and indicators to guide the implementation of a circular economy in Brazil. The Forum, chaired by the Minister of Industry (MDIC) and with the Ministry of Environment and Climate Change (MMA) serving as the Executive Secretariat, will include participation from other ministries and government agencies, as well as from industry associations and civil society representatives.

The Circular Economy is also one of the pillars of the Ecological Transformation Plan, coordinated by the Ministry of Finance (MF); of the New Industry Brazil, an industrial policy launched in early 2024; and of the Climate Plan, led by the Ministry of Environment and Climate Change (MMA).

**Challenges and results:** The transition to a circular economy is expected to yield numerous benefits, including job creation and income generation through circular business models, a reduction in greenhouse gas emissions (GHGs), the reversal of biodiversity loss, and a decrease in pollution of air, soil and water pollution – ultimately improving the quality of life for Brazilians. Redesigning production processes and products will help reduce dependency on virgin materials, lower energy consumption, and cut waste management costs, delivering positive economic impacts while boosting innovation and enhancing the competitiveness of products in the domestic market.



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



- **Empowering Waste Pickers for Sustainable Livelihoods and Efficient Plastic Waste Sorting**

**Institution:** Secretariat of the Basel, Rotterdam and Stockholm Conventions

**Period:** 2021–2023

**Further information:**

[www.basel.int/Implementation/Plasticwaste/Technicalassistance/Projects/ProjectsMap/projectsdetails/tabid/8783/pid/4196508/Default.aspx](http://www.basel.int/Implementation/Plasticwaste/Technicalassistance/Projects/ProjectsMap/projectsdetails/tabid/8783/pid/4196508/Default.aspx)

[cooperlinia.coop.br/cases-e-projetos/guias-de-formacao-e-formalizacao-de-cooperativas-de-reciclagem/best-practices-blueprint/arquivo-best-practices-blueprint/](http://cooperlinia.coop.br/cases-e-projetos/guias-de-formacao-e-formalizacao-de-cooperativas-de-reciclagem/best-practices-blueprint/arquivo-best-practices-blueprint/)

[cooperlinia.coop.br/cases-e-projetos/guias-de-formacao-e-formalizacao-de-cooperativas-de-reciclagem/business-model-roadmap/arquivo-business-model-roadmap/](http://cooperlinia.coop.br/cases-e-projetos/guias-de-formacao-e-formalizacao-de-cooperativas-de-reciclagem/business-model-roadmap/arquivo-business-model-roadmap/)

[cooperlinia.coop.br/cases-e-projetos/guias-de-formacao-e-formalizacao-de-cooperativas-de-reciclagem/global-impact-toolkit/arquivo-global-impact-toolkit/](http://cooperlinia.coop.br/cases-e-projetos/guias-de-formacao-e-formalizacao-de-cooperativas-de-reciclagem/global-impact-toolkit/arquivo-global-impact-toolkit/)

The present case study is one of the 38 pilots being implemented under the pilot project programme of the Basel Convention’s Partnership on Plastic Waste (PWP) established by the Conference of the Parties in 2019. The PWP is one of the various actions carried out under the Basel Convention to address plastic waste. It has been established to mobilise business, government, academic and civil society resources, interests and expertise to improve and promote the environmentally sound management (ESM) of plastic waste at the global, regional and national levels and to prevent and minimize its generation. One of the overall tasks of the PWP is to undertake pilot projects that are expected to deliver benefits for developing country Parties or Parties with economies in transition in four areas: (i) Plastic waste prevention and minimization; (ii) Plastic waste collection, recycling and other recovery including financing and related markets; (iii) Transboundary movements of plastic waste; and (iv) Outreach, education and awareness-raising. The 38 pilot projects implemented under PWP provide support to 50 countries for a total of US\$5.7 million.

The present case study aims at showcasing a concrete initiative aimed at replicating the successful experience of Cooperativa de Profissionais da Área de Reciclagem do Brasil (Cooperlinia), which is a cooperative of waste pickers in Brazil that was established twenty years ago and which has now the highest efficiency rates in Brazil for the manual sorting of plastic waste and other recyclables. Cooperlinia was able to reduce waste management costs for the city budget, provide a safe working environment and fair income for its members, and protect the environment by avoiding landfilling.

The PWP project allowed Cooperlinia to develop tools and provide assistance to relevant actors working in the informal sector in Brazil towards organizing themselves into cooperatives for effective sorting of plastic wastes.



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



The partner developed a Best practices Blueprint and Business Model Roadmap as well as conducted training workshops for members of the informal sector as well as matchmaking sessions for fostering new business opportunities, involving municipalities and industry associations.

**Challenges and results:** The material developed for the Cooperlinia initiative represent significant advancements in the Brazilian cooperative scene. These materials were crafted not only to enhance the operations of already established cooperatives but also to serve as a foundational reference for new initiatives that are yet to formalize their practices. This dual approach ensured that the resources were inclusive and beneficial across different stages of cooperative development.

Key achievements of the project include the provision of unique materials to the cooperative community in Brazil, which were made available for free. This democratization of knowledge has played a pivotal role in spreading cooperative values and sustainable practices across a wide spectrum of sectors, from academia to private industry. The matchmaking sessions organized as part of the project effectively bridged the gap between theory and practice, bringing together various stakeholders to explore synergistic opportunities. Furthermore, the training workshops conducted both locally and nationally via online platforms have disseminated established knowledge to numerous institutions. These entities now have documented references to guide their efforts towards sustainable and efficient waste management.

One of the challenges faced in this project was the development of materials without any existing benchmarks specific to waste segregation cooperatives. This lack of precedent required the project team to pioneer new approaches and solutions tailored to the unique needs of this sector. Another significant challenge was ensuring that the comprehensive and occasionally technical content of the materials was accessible to individuals with varying educational backgrounds within the cooperatives. Simplifying complex concepts without diluting their effectiveness was critical to ensure that all members could understand and apply the information effectively.

Overall, these efforts have not only enhanced operational efficiencies and knowledge within cooperatives but have also contributed to a broader understanding and implementation of sustainable practices, establishing a robust foundation for future developments in waste management and cooperative organization.

---

## ● Canada

### ○ Ghost Gear Fund

**Institution:** Fisheries and Oceans Canada

**Period:** 2020–2024



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



**Further information:**

<https://www.dfo-mpo.gc.ca/fisheries-peches/management-gestion/ghostgear-equipementfantome/program-programme/index-eng.html>

The Ghost Gear Fund is a federally funded program led by Fisheries and Oceans Canada, intended to support Canada's commitment to preventing and mitigating the risk of ghost fishing and encouraging the development of sustainable fishing practices, particularly as it applies to abandoned, lost or otherwise discarded fishing gear (ALDFG or ghost gear) domestically and abroad. This work is being carried out as part of the Government of Canada's broader commitments to support national and international efforts to reduce plastics in our oceans and the use of plastics in government operations and to reduce the occurrence and effects of ghost gear around the world.

**Challenges and results:** Between 2020 and 2024, Fisheries and Oceans Canada has provided more than \$58.3M to 143 projects; 133 within Canada and 9 internationally, to assist Indigenous groups, fish harvesters, the aquaculture industry, non-government organisations and communities in taking concrete action in the fight against ghost gear (local currency). Since work began, the Department has supported the retrieval of 37,153 units of gear, accounting for more than 2,261 tons of abandoned, lost or otherwise discarded fishing gear removed from Canada's waters, as well as 885 km of rope. The program was also able to identify 4,293 tagged and reusable gear to the owners of which 2,652 were returned.

In 2020 Canada also implemented mandatory lost gear reporting for all commercial fisheries, and to support lost gear reporting requirements, the Fishing Gear Reporting System (FGRS) was developed; a user-friendly application for harvesters to report lost and retrieved fishing gear. FGRS has resulted in data that produced maps that inform retrieval operations and will be used in future fisheries management decisions.

In 2022, a condition of licence was added for all Canadian commercial fisheries prohibiting the discharge of garbage from fishing vessels. This condition, as well as establishing options for disposal and recycling locations across Canada is of critical importance to ensure end-of-life fishing gear is not abandoned or disposed of at sea by harvesters, but brought to shore and disposed of responsibly. In 2022, Canada became the first country to share its lost gear reporting data with the Global Ghost Gear Initiative's global data portal.

We are now using the information gathered under the Ghost Gear Fund to inform the development of a Canadian Ghost Gear Action Plan for 2027. The Ghost Gear Action Plan will:

- Address the role of climate change on fishing gear loss;
- Identify methods to strengthen a cyclical approach to the plastics used in fishing gear;
- Identify regulatory impediments to facilitate lost gear retrieval;
- Support the development of new tools to reduce the amount of gear loss in Canadian fisheries.

## ● European Union

### ○ The EU Circular Economy Action Plan

**Institution:** European Commission

**Period:** 2020 – current

**Further information:**

[eur-lex.europa.eu/resource.html?uri=cellar:9903b325-6388-11ea-b735-01aa75ed71a1.0017.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:9903b325-6388-11ea-b735-01aa75ed71a1.0017.02/DOC_1&format=PDF)

The European Commission adopted the new circular economy action plan (CEAP) in March 2020. It is one of the main building blocks of the European Green Deal, Europe’s agenda for sustainable growth. The EU’s transition to a circular economy will reduce pressure on natural resources and will create sustainable growth and jobs. It is also a prerequisite to achieve the EU’s 2050 climate neutrality target and to halt biodiversity loss.

The new action plan announces initiatives along the entire life cycle of products. It targets how products are designed, promotes circular economy processes, encourages sustainable consumption, aims to ensure that waste is prevented and the resources used are kept in the EU economy for as long as possible.

It introduces legislative and non-legislative measures targeting areas where action at the EU level brings real added value. Measures that will be introduced under the new action plan aim to

- make sustainable products the norm in the EU.
- empower consumers and public buyers.
- focus on the sectors that use most resources and where the potential for circularity is high such as: electronics and ICT, batteries and vehicles, packaging, plastics, textiles, construction and buildings, food, water and nutrients
- ensure less waste.
- make circularity work for people, regions and cities.
- lead global efforts on circular economy.

**Challenges and results:** Since the CEAP adoption in 2020, the EU has strived to implement all the envisaged actions. Among others, main achievements include: the launch, in cooperation with UNEP and UNIDO, of the Global Alliance on Circular Economy and Resource Efficiency (GACERE) in 2021, which brings together governments and relevant networks and organisations to advance a global circular economy and take forward partnership initiatives; the adoption of a EU Strategy for Sustainable and Circular Textiles in 2022, which proposes coordinated actions to change how we produce and consume textiles along the whole value chain; the adoption in 2023 of the new Batteries Regulation aiming to make batteries sustainable throughout their entire life cycle and support Europe’s clean energy transition and independence from fuel imports. and the adoption of a new



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



Regulation on waste shipments in 2024, to ensure that the EU does not export its waste challenges to third countries and contributes to environmentally sound management of waste.

Particularly worth noting is the recent adoption of the Ecodesign for Sustainable Products Regulation (ESPR), which will enter into force in July 2024, and is the cornerstone of the EU's approach to more environmentally sustainable and circular products. The ESPR aims to improve the circularity, energy performance and other environmental sustainability aspects of products placed on the EU market. It enables the setting of performance and information requirements—known as ‘eco-design requirements’—for almost all categories of physical goods (with some exceptions, such as food and feed).

The ESPR introduces a Digital Product Passport (DPP), a digital identity card for products, components, and intermediate products, which will store relevant information to support products' sustainability, promote their circularity and strengthen legal compliance.

---

## ● France

### ○ Extended Producer Responsibility (EPR)

**Institution:** Ministry of Ecological Transition and Territorial Cohesion

**Period:** 1975 – current

**Further information:**

<https://www.ecologie.gouv.fr/politiques-publiques/cadre-general-filieres-responsabilite-elargie-producteurs>

<https://filieres-rep.ademe.fr/producer-responsibility-organisations>

The first person to place a product on the market under an EPR scheme (i.e. the person who manufactures, imports or distributes a product for the national market under their own brand name for the first time. Resellers are not concerned) must join one of the Ministry-approved PRO (producer responsibility organizations) for this scheme or meet their obligations themselves by setting up an individual system. Thereafter, for each product placed on the market, they pay a contribution to this PRO, which determines the amount of this contribution. It varies according to the objectives to be met by the sector. Since the “AGEC Act” (French anti-waste law for a circular economy, 2022), this amount can be reduced for manufacturers conceiving their products in an ecological manner. On the other hand, it can be increased through penalties if the product does not meet these criteria. Nevertheless, producers can theoretically choose to, with particularly demanding specifications.

**Challenges and results:** In 2022, the EPR schemes will have put 21.9 million tons of waste on the market, collected 10.1 million tons and recycled 8.3 million tons. In addition, €1.898 billion have been collected by PRO and €826 million distributed by PRO to municipalities.



## ● Germany

### ○ National Circular Economy Strategy

**Institution:** Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection

**Period:** 2024 – current

**Further information:**

<https://www.bmu.de/themen/kreislaufwirtschaft/kreislaufwirtschaftsstrategie>

The German government is currently developing a National Circular Economy Strategy (Nationale Kreislaufwirtschaftsstrategie [NKWS]). The strategy will bring together goals and measures for circular economy and resource conservation from all relevant strategies of the Federal Government - with the overarching goal of reducing the consumption of primary raw materials. The strategy also creates the framework for Germany to become a global technology leader in the circular economy. The NKWS aims to help prevent waste from being generated in the first place. This can be achieved if products are cleverly designed, efficiently manufactured, can be used for longer and are easier to repair, and if all raw materials are kept in the cycle as long as possible. All stages of the lifecycle are taken into account.

The development of the draft strategy was supported by an extensive stakeholder participation process as well as a research project. Through various formats such as round tables, dialogue forums and online participation, representatives from business, associations, civil society, academia and administration were able to contribute their perspectives to the development process.

The overarching goals of the strategy are:

1. Reducing the consumption of primary raw materials
2. Closing material cycles
3. Increasing independence from raw material imports
4. Preventing waste.

The strategy contains various measures to achieve the above-mentioned goals in different fields of action - from legislative initiatives, the use of digital technologies and funding programmes to research, training, public procurement and knowledge transfer. The measures take into account all relevant areas of the circular economy, such as:

- Strengthening digitalization
- Realigning product design
- Resource-efficient production



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



- Promoting sustainable consumption
- Using public procurement as a lever

The circular economy strategy is currently undergoing consultation between the ministries. The aim is to have the strategy adopted by the cabinet in fall 2024.

---

## ● Indonesia

- **Toward a Circular Economy: A System Dynamic Model of Recycling Framework for Aseptic Paper Packaging Waste in Indonesia**

**Institution:** Ministry of Environment and Forestry

**Period:** 2021 – current

**Further information:**

<https://www.sciencedirect.com/science/article/abs/pii/S0959652621011203>

The study addresses the critical issue of managing aseptic paper packaging waste in Indonesia. This type of packaging, used extensively for products like milk and juice, presents significant recycling challenges due to its composite materials. The primary objective of the study is to develop a system dynamic model to simulate and evaluate the recycling process for aseptic paper packaging. Key stakeholders involved include government agencies, recycling companies, packaging manufacturers and consumers. The main targets are to enhance recycling rates, reduce environmental impact and demonstrate economic benefits through job creation and cost savings on raw materials. The study's system dynamics approach allows for the simulation of various scenarios, predicting outcomes of different recycling strategies over time. The findings indicate that adopting a circular economy framework for this waste stream can lead to substantial reductions in landfill waste and greenhouse gas emissions, alongside economic gains. Policy recommendations include implementing recycling incentives, raising public awareness, and improving waste management infrastructure. This case study is highly relevant to the circular economy transition as it showcases a practical application of circular principles, emphasizing the importance of closing the loop in product lifecycles to achieve sustainable environmental and economic outcomes.

**Challenges and results:** The case study has yielded significant results and encountered notable challenges. Key quantitative results include projections of reduced landfill waste and lowered greenhouse gas emissions due to increased recycling rates. Qualitatively, the study identified improved economic viability through cost savings on raw materials and job creation in the recycling sector. Challenges primarily revolve around infrastructure limitations for waste collection and

processing, as well as initial consumer and industry resistance to adopting recycling practices for aseptic packaging. Despite these challenges, key success factors include effective policy incentives for recycling, public awareness campaigns promoting environmental responsibility and collaborative efforts among stakeholders including government, industry and communities. Lessons learned underscore the importance of comprehensive stakeholder engagement, adaptive policy frameworks that incentivize recycling behaviour, and continuous investment in recycling infrastructure. The study's findings highlight the feasibility and benefits of transitioning toward a circular economy model for aseptic paper packaging in Indonesia, emphasizing the need for integrated approaches to achieve sustainable waste management solutions.

---

- **Italy**

- **National Strategy for the Circular Economy**

**Institution:** Ministry of Environment and Energy Security

**Period:** 2022–2035

**Supplementary Source:** <https://www.mase.gov.it/pagina/riforma-1-1-strategia-nazionale-l-economia-circolare>

The "National Strategy for the Circular Economy" intends to define new administrative and fiscal tools in order to strengthen the market of secondary raw materials with the purpose to make them competitive in terms of availability, performance and costs compared to virgin raw materials. To this end, the National Strategy produces its effects on the material purchase chain (Minimum Environmental Criteria for green purchases in the Public Administration), on the criteria on the basis of which a waste shall cease to be a waste (End of Waste), on the EPR, on the role of the consumer and on the widespread of sharing practices and "product as a service". Furthermore, the Strategy represents an essential tool in order to achieve the climate neutrality objectives and to define a roadmap of actions and measurable targets from now until 2035.

Relevant contributions were included in the document after the public consultation launched on 30 September 2021 by the Ministry for the Ecological Transition.

This Strategy contains all the elements required by the European Commission as part of the Operational Arrangements of the PNRR: a new digital waste traceability system; tax incentives to support the recycling activities and the use of secondary raw materials; a revision of environmental taxation system on waste in order to make recycling more convenient than landfilling and incineration across the national territory; right to reuse and repair; reform of the EPR and Consortia system in order to support the achievement of EU targets through the creation of a specific supervisory body,

under the presidency of MITE, with the aim of monitoring the functioning and the effectiveness of the Consortia systems; support to the existing regulatory tools: End of Waste legislation (national and regional), Minimum Environmental Criteria under Green Public Procurement; support to industrial symbiosis project through regulatory and financial instruments.

**Challenges and results:** Below is a non-exhaustive list of the National Circular Economy Strategy targets achieved:

- Establishment of the National Observatory for the Implementation of the Circular Economy Strategy for the purpose of monitoring, setting and quantifying intermediate targets, and annually updating the timeline for the integration of all measures of the Strategy.
- Adoption of a new digital waste traceability system (R.E.N.T.R.I.) <https://www.rentri.gov.it/>.
- Tax incentives to support recycling activities and use of secondary raw materials (Recycled Products Tax Credit, Recovery Materials Tax Credit);
- Identification of Environmentally Harmful Subsidies that hinder the implementation of the National Strategy for the Circular Economy and regulatory actions for their elimination
- Use of mandatory Minimum Environmental Criteria in public procurement as an incentive to reuse and repair goods: MEC interior furniture; MEC construction and demolition, MEC waste, MEC Cultural Events
- Approval of the Ministerial Decree regarding the end of waste (EoW) of construction and demolition waste

---

## ● Japan

- **Project for safe closure, which included application of the Fukuoka Method (semi-aerobic landfill method for waste landfills) in Mozambique**

**Institution:** Ministry of the Environment

**Period:** 2018 – current

**Link:** <https://www.youtube.com/watch?v=M8YarTSwXp8>

MOEJ provided technical assistance for the implementation of grant aid project by Japanese government which was engineering works to improve safety for the area of the Hulene landfill that collapsed in February 2018 due to torrential rain and inadequate landfill management. These



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



engineering works were based on the so-called “Fukuoka Method”, which aimed to create a stabilized landfill by creating semi-aerobic conditions through the installation of gas-ventilating pipes, leachate collection system and terrace-like slopes.

MOEJ have been providing technical assistance for improved capacity toward adequate management through online and field training using heavy machinery donated by the Government of Japan.

MOEJ compiled and provided the manual of the Fukuoka Method in Portuguese to Maputo.

With the knowledge obtained through the online and field trainings, Maputo is able to conduct general daily management of the Hulene landfill, as well expand to the rest of the landfill the improvements based on the Fukuoka Method implemented up to the present, including slope stabilization, gas ventilation pipe installation and leachate collection and treatment.

**Challenges and results:** Fukuoka Method emphasizes not only of the design philosophy of structures but also the significance of daily operations.

For this, it is essential that the necessary material and financial resources be adequately secured by the Maputo City Council.

- **Harmonized monitoring and data compilation of marine plastic litter**

**Institution:** Ministry of the Environment

**Period:** 2016 – current

**Further information:**

International Workshop on Marine Debris Data Harmonization ([https://www.env.go.jp/page\\_00929.html](https://www.env.go.jp/page_00929.html)) Atlas of Ocean Microplastics (AOMI) (<https://aomi.env.go.jp/>) International Workshop on Marine Debris Data Harmonization ([https://www.env.go.jp/en/press/press\\_02143.html](https://www.env.go.jp/en/press/press_02143.html)).

Microplastic pollution of the marine environment is recognized as a serious international issue; Determining the current distribution and quantity of ocean microplastics is important for policymaking and implementation based on concrete scientific knowledge. Microplastic monitoring is performed by many institutions worldwide using various methods. However, different sampling and analytical methods are used depending on the purpose of the survey in each country and research institution; hence, there is a fundamental lack of comparability among currently available data.

In G20 Implementation Framework for actions on Marine Plastic Litter, the importance of promoting harmonization of plastic monitoring was emphasized. After the summit, we have seen numerous initiatives by member countries, including “Guidelines for Harmonizing Ocean Surface Microplastic Monitoring Methods” in 2019, and “Marine plastic litter mapping database system” since 2020, enhancing collaboration among international experts from developed as well as developing countries. These guidelines contribute to improve the comparability of monitoring data on ocean surface microplastics. However, global monitoring data have not yet been compiled in a comparable manner. Therefore, Japan proposed a new global monitoring data-sharing system at the G20 Workshop held by the MOE Japan in September 2020.



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



Based on the opinions of international experts, we are happy to announce a release of a database system called the Atlas of Ocean Microplastics (AOMI) in May 2024, which is a perfect example of G20 delivering on its commitment made at the 2019 G20 Osaka summit. The AOMI contains monitoring data on ocean surface microplastics from researchers, institutions, and governments around the world and provides the collected data with 2D maps of sampling locations and microplastic distribution.

**Challenges and results:** The AOMI has been operated since May 2024, however there are still lack of monitoring data in some regions, such as Africa, South-East Asia and South America. The next important challenge is to promote these guidelines and the AOMI to accumulate further monitoring data. From this perspective, the MOEJ has committed to support for developing countries, especially in South-East Asia, through training projects of plastic monitoring. The MOEJ will continue to contribute to this issue collaborating other countries and relevant organizations.

In addition, data infrastructure distributed globally remains limited by insufficient level of coordination between efforts which deal with data comparability, availability, and quality assurance and control. EMODnet and NOAA are also accumulating monitoring data in their own database systems, as well as the MOEJ. Additionally, the UNEP GPML Community of Practice on Data Harmonization has begun considering UNEP's federated model on the UNEP GPML Digital Platform. On the other hand, at present, the data items (metadata) have not been standardized, which limits the usability and comparability of the data. For this reason, the MOEJ held an international workshop in August 2023, inviting international experts including scientists from Brazil, in collaboration with IMDOS to detect data items (metadata) necessary for federated data management systems. Specifically, based on the data items of the database systems in MOEJ, NOAA, and EMODnet, data items that are considered as minimum requirements and supplementary information in the federated data management system were detected.

---

## ● Korea / The Republic of Korea

- **Development of Korea's Waste Management and Resources Circulation Policy (1986 – 2023)**

**Institution:** Information not provided.

**Period:** 1986 – 2023

**Further information:** In **December 1986**, the *Wastes Control Act* was enacted to ensure **safe treatment** of waste (enforced in April 1987). In **December 1992**, the *Act on the Promotion of Saving and Recycling of*

**Resources** was enacted to **reduce waste generation at source** and **promote recycling** (enforced in June 1993). In particular, a waste disposal fee was introduced to charge manufacturers and importers of products, including pesticide and toxic containers, chewing gum, antifreeze, disposable diapers, cigarettes, plastic products, and ice packs made of super absorbent resin that cannot be recycled the **cost of waste disposal** (since 1993). In addition to those, a **volume-based garbage system** was implemented to **reduce the generation of waste** in response to conflicts and disputes over the construction of landfills (since 1995). The **Allbaro System (e-manifest system)**, a transparent online management system which requires the entry of **handover and acquisition information** from the point of waste discharge from business operations to transport and final treatment, was established and went into operation by this Act.

In the early 2000s, the concept of **resource circulation** was **introduced to promote reuse and recycling through** the Beverage Container Deposit System (2002) and Extended Producer Responsibility System (EPR, 2003), among other initiatives. In the 2020s, a new economic system, the “**circular economy**,” appeared in the lexicon, promoting **recycling** and **circular use** of resources that create **high added value**.

To go a step further, the *Act on Resource Circulation* enacted in 2016 was wholly amended into the **Act on Promotion of Transition to Circular Economy and Society** (2022) to **lay the foundation** for the **transition to a circular economy**. In the Act, waste materials with high utilization value as resources are recognized (or designated) as **circular resources** and **exempted from waste regulations**.

#### **Challenges and results:**

**a. Closing Dumpsites:** Until recently, the **267 landfills** in Korea are managed to **dispose** of waste in an **eco-friendly** and **hygienic manner**. In particular, The **Metropolitan Landfill**, the largest in Korea that size is 16 million m<sup>2</sup> or equivalent to about 2,300 football fields, generates **USD 15 million (KRW 20 billion)** in **revenue annually** by **capturing methane gas for power generation**. An eco-friendly substitute on a globally unprecedented scale was created using reclaimed land, and the newly built Metropolitan Landfill has become the standard for sanitary landfills. The **Sudokwon Landfill Site Management Corporation**, the agency operating the Metropolitan Landfill, also actively promotes an **international reduction project** to capture methane gas from overseas landfills. In addition, a circular landfill maintenance project is being promoted. This project stabilizes the landfilled waste early on, then (i) the waste is excavated and sorted to recover organic waste, (ii) combustible waste is converted into energy, and (iii) landfill soil is recycled.

#### **b. Reducing Food Loss and Waste:**

- **Reduction through pay-as-you-throw** – A nationwide pay-as-you-throw food waste system aims to contribute to raising awareness of the need to reduce food waste by charging disposal fees for the amount of food thrown away, and improve convenience by expanding an RFID (radio frequency identification) discharge system that accurately measures the amount of food waste and induces less food waste at home.
- **Feed, compost and energy generation** – Local governments are provided with subsidies to construct infrastructure to recycle generated food waste into new resources, such as feed and compost, and biogas production. To achieve carbon neutrality, focus is placed on the “**bio-gasification**” project, which produces biogas through anaerobic digestion of food waste and utilizes it as a heat source, electricity, city gas, CNG (compressed natural gas), etc.

- **Public-private partnership** – To reduce food waste, citizen participation is emphasized through continued promotion of food waste reduction campaigns in partnership with private organizations.

**c. Fostering a Circular Economy and Waste Management to Address Plastic Pollution:**

- **Establishment of a legal foundation** – The *Act on Promotion of Transition to Circular Economy and Society* (wholly amended in December 2022 and enforced in January 2024) was enacted to establish a legal foundation for moving toward a circular economy throughout the product life cycle from production to consumption to disposal. Moreover, the *Wastes Control Act* (since 1987) and *Act on the Promotion of Saving and Recycling of Resources* (since 1993) are enforced, laying a solid foundation for recycling and waste management.

- **Construction of a plastic circulation loop** – Efforts are underway to achieve a circular economy in the plastics industry in particular, including establishment of the Plastic-Free Measures across Entire Life-Cycle (October 2022).

➤ **Proliferation of multi-use containers:** Efforts are underway to replace single-use products with multi-use containers by providing incentives to the multi-use container industry and collaborating with public institutions and local governments.

➤ **Collection of transparent PET bottles:** A circulation loop was created by collecting transparent PET bottles separately and reusing them as food containers (implementation of separate collection policy in 2021, revision of food container standards in 2024).

➤ **Production of renewable raw materials:** The use of at least 30% of renewable raw materials in the production of PET food containers and other products will become mandatory by 2030.

➤ **AI sorting facility:** Collection and sorting facilities will be upgraded using AI and other state-of-the-art technologies.

- **Extended Producer Responsibility (EPR) System** – For more than 20 years, Korea has been operating the EPR, which makes producers responsible for the disposal of their products. It is known as a global best practice. A just transition was achieved by including waste collectors outside the EPR system as it was introduced.

- **IT-based basic statistics** – Establishing an IT-based system to accurately and quickly build basic statistics that are the foundation of waste-related policies.

➤ **Waste from business operations:** the Allbaro System manages the entire process, from discharge to handover to treatment, online, and efforts are underway to prevent blind spots in illegal dumping through establishment of an automatic transmission system for on-site information from October 2022.

➤ **Domestic waste:** the government is currently planning an information management system to monitor domestic waste by type.

To sum up, Korea's success in reducing waste generation and the amount of waste going to landfills with a significant increase in waste recycling, is anchored in a concrete policy and regulatory framework for waste management and circular economy.



## ● Mexico

- **Design and Validation of Methodological Instruments That Strengthen the Formulation of Strategies for Management Sustainable Materials and Plastic Waste in Coast Zones**

**Institution:** Instituto Nacional de Ecología y Cambio Climático

**Period:** 2024

**Further information:**

For the line of formulation of strategies with a technical methodological basis, the identification, development and validation of methodological instruments that contribute to the implementation of public policy on the sustainable management of plastic materials and waste in coastal areas is contemplated. In this context, the operational axis of the project is oriented towards the development of strategies through the use of methodological instruments considering each of the stages of the cycle of sustainable management of plastic materials and waste. The development of methodological instruments is designed with a comprehensive approach that favours the progressive advancement of different elements and lines of work to address the problem in a local, strategic and systematised way. Using this the implementation of pilot projects that allow the use and evaluation of different models and procedures to improve the sustainable management of plastic materials and waste and the prevention of their leakage into bodies of water, as well as their evaluation in based on relevant and measurable criteria.

**Challenges and results:** The project is currently in development, two pilots have been carried out and work is being done on the integration of the instrument package.

---

## ● Netherlands

- **Cradle to Cradle design of carpets: Desso**

**Institution:** Desso

**Period:** 2011 – current

**Further information:**

<https://calrecycle.ca.gov/epr/>, [CA@carpetrecovery.org](mailto:CA@carpetrecovery.org) (to contact CARE), and [carpet@calrecycle.ca.gov](mailto:carpet@calrecycle.ca.gov) (for more information)

<https://www.ellenmacarthurfoundation.org/circular-examples/cradle-to-cradle-design-of-carpets>

Flooring company Desso has been one of the pioneers of the Cradle to Cradle approach. The company continues to innovate around circular economy principles, developing take-back programmes and products with recyclable yarn that can be separated from the backing and used over and over again. This ongoing transition to a circular business model has demanded an ambitious strategy with challenging milestones. Designers and materials experts have also experimented in the biosphere, notably taking yarn from bamboo, which has the benefit that once the carpet is worn, it can be safely returned to the food-farming system. DESSO uses 100 per cent renewable electricity (hydropower) in production locations in Waalwijk and Dendermonde.

---

## ● Portugal

### ○ Reducing food loss and waste

**Institution:** Ministry of the Environment and Energy of Portugal

**Period:** 2016 – current

**Further information:**

Establishment in 2016 of the National Commission to Combat Food Waste (CNCDA)

Approval in 2018 of the National Strategy to Combat Food Waste (ENCDA) and the respective Action Plan; the operational objectives have tended to be met, through the 14 Measures of the Action Plan, although some of the targets have not been met;

The current RGGR, which transposes the Waste Framework Directive, places special emphasis on prevention, especially of food waste production. This law defines the following targets and measures in this area:

- Reducing the amount of food waste in collective and commercial catering establishments as well as in production and supply chains, including agri-food industries, catering companies, supermarkets and hypermarkets, by 25 per cent in 2025 and 50 per cent in 2030 (compared to 2020 figures);
- Catering establishments with bio-waste production of more than 9 tons/year must adopt measures to combat food waste by 31 December 2023;
- Agri-food industries, catering companies, supermarkets and hypermarkets employing more than 10 people must adopt measures to combat food waste by 31 December 2023;
- From 1 January 2024, food retail businesses, the food production industry, food wholesalers and catering establishments are prohibited from disposing of food that can still be consumed, provided that there are safe ways of disposing of it.

The National Waste Management Plan (PNGR) 2030, published by Resolution of the Council of Ministers no. ° 31/2023, of 24th of March, includes the strategic objective of “Promoting the fight against food waste, throughout all the stages involved.” In order to achieve this, it is necessary to maintain the effort to pursue the strategic objectives of the ENCDA and the respective Action Plan, “(...) continuing to work on measures and objectives that have not yet been fully realised, such as the implementation of a collaborative platform to identify availability by type of foodstuffs and the development of a system for measuring and reporting information on food waste at the different stages of the chain. Thus, this measure aims to support the actions needed to implement the platform and measurement system mentioned above, as well as other actions in terms of information, awareness-raising and the definition of good practices to be developed in the fight against food waste.”

**Challenges and results:** In Portugal, there are EPR schemes in place for packaging waste from households and for premises whose daily production does not exceed 1,100 litres, including packaging made from paper and cardboard, ferrous metals, aluminium, glass, plastics, wood and composite packaging. Excluded are all industrial and commercial (non-household) sources whose daily production exceeds 1,100 litres. Further, Portugal has implemented EPR schemes for other specific types of packaging, including pesticide, fertilizer, seed and plant packaging and medical and pharmaceutical packaging.

---

## ● South Africa

### ○ Circular Economy and Extended Producer Responsibility Regulations

#### Implementation in South Africa

**Institution:** Department of Forestry, Fisheries and the Environment

**Period:** 2020 – current

**Further information:**

<https://sawic.environment.gov.za/EPR>.

South Africa is implementing Circular Economy and this has been initially through the inclusion of the principle of circular economy at the national policy level, which is the National Waste Management Strategy 2020. The Extended Producer Responsibility Regulations were also developed in 2020 for implementation. The implementation of the Extended Producer Responsibility Regulations started in 2021 and is currently ongoing. This is complemented by initiatives on small medium and micro-enterprises support through collaboration between government Departments and the Producers and Producer Responsibility Organisations. The EPR Regulations makes provision for the remuneration of the information collectors, the waste pickers or the waste reclaimers. This makes the EPR implementation and circular economy transition to be inclusive of all the stakeholders across



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



the value chain for the different products. Currently, there are EPR Schemes for the Paper and Packaging; Electrical and Electronic waste, Lighting, Pesticides, Lubricant oils and portable batteries. This makes six waste streams for which there EPR is implemented as a way of diverting waste away from landfill, while creating jobs and contributing to growing the economy.

**Challenges and results:** Very successful in certain aspects such as providing employment to the informal sector, diverting waste away from landfill, creating formal jobs, implementing circular economy, implementation waste policies and legislation.

There is room for improvement in other aspects such as dealing with the free riders, improving the reporting, meeting the targets, capacity for implementation, capacity for awareness raising, education and skills transfer and capacity for compliance and enforcement of the EPR Regulations.

---

## ● Türkiye

### ○ Türkiye Zero Waste Project

**Institution:** Ministry of Environment, Urbanization and Climate Change

**Period:** 2017 – current

**Further information:**

[zerowaste.gov.tr/](http://zerowaste.gov.tr/)

The Türkiye Zero Waste Project was initiated in 2017 by Ministry of Environment, Urbanization and Climate Change under the patronage of First Lady Ms.Emine ERDOĞAN. It aims to use resources efficiently, prevent and reduce waste generation, sorting wastes at source, reduce the amount of waste to be sent to landfill and promote sustainable production and consumption habits within the framework of circular economy principles.

At first, The Project started on a pilot scale in the Presidential Complex and the Ministry's headquarters then we realised the great interest in zero waste in Turkish society, we adopted the By Law on Zero Waste within the scope of the Project in 2019. It was prepared for adopting and disseminating the zero waste management approach; focused on awareness-raising activities to disseminate awareness in society.

According to By-Law on Zero Waste, buildings and premises and municipalities are obliged to establish this system. It is required to declare their activities such as separate collection of waste at source, delivery to recycling facilities or municipal collection system, and training and awareness activities to the Ministry through the Zero Waste Information System and to obtain a Zero Waste Certificate.

As a ministry, we support and donate the implementation of the system in local authorities. Many municipalities established diverse zero waste points where waste is collected separately as well as awareness-raising activities that encourage the participation of citizens.

Provincial Zero Waste Management System Plan was prepared by all of 81 provinces.

In 2022, The United Nations General Assembly adopted the resolution on “Promoting zero-waste initiatives to advance the 2030 Agenda for Sustainable Development” presented by Türkiye. This resolution addresses the efforts for sustainable development through zero waste initiatives launched in 2017. The General Assembly declared March 30 as International Day of Zero Waste in the resolution also.

**Challenges and results:**



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



Achievements and goals:

- About 188 thousand buildings/premises have been implementing zero waste management system since June 2017, and Basic Level Zero Waste Certificate was issued to these buildings/campuses.
- Provincial Zero Waste Management System Plans has been prepared by for 81 provinces.
- 11 zero waste management system implementation guidelines have been prepared for different sectors
- 21 million people have been educated on zero waste.
- Our recovery rate which was 13 per cent in 2017, increased to 27.2 per cent in 2021 and to 30.13 per cent in 2022 and further to 34.92 per cent in 2023.
- We aim to increase our recycling rate to 60 per cent by 2035.
- 59.9 million tons of waste recycled.
- Economic saving is about 185 billion Turkish Lira.

**Challenges:**

In this project, we aimed to change our individual and social habits on waste. The main challenge we encounter is current individual and social habits. However, we continue our intensive and diverse awareness activities on the issue.

Another challenge is the approach of municipalities and the way of addressing this issue. While some municipalities give less importance to this issue, some consider it as a priority.

---

## ● United Arab Emirates

### ○ UAE Circular Economy Policy and UAE Circular Economy Agenda

**Institution:** Ministry of Climate Change and Environment (MOCCAEE)

**Period:** 2021–2031

**Further information:**

The UAE government seeks to move away from a linear economy and move towards a circular, renewable economy approach, so that consumption and production are sustainable within environmental boundaries, ensuring the wellbeing of current and future generations.

The purpose of the CE policy and Agenda is to outline some of the ways in which the UAE can transition towards a more circular economy where the country's natural, physical, human and financial resources are used in the most efficient and sustainable way to improve the quality of life of all residents while also protecting or even enhancing the local and global environment.

The objectives of Circular Economy Policy are to:

- Achieve sustainable management of the economy and efficient use of natural resources
- Promote circular economy and Sustainable Consumption Production patterns that reduce environmental stress and meet basic needs
- Encourage the private sector to shift to cleaner industrial production methods and techniques including the use of Artificial Intelligence

While the UAE is keen for all sectors to adopt circular economy principles, four priority sectors have been identified based on their current role in the national economy and on their potential for stimulating and developing a UAE circular economy. These are:

1. Sustainable Manufacturing
2. Green Infrastructure
3. Sustainable Transportation
4. Sustainable food production and consumption

Transitioning to a circular economy will require concerted effort from national and local government, the private sector and public society and the agenda may be a call to action for all stakeholders in all sectors to consider engaging into more circular way of production and services support the country transition to a successful, sustainable circular economy aligned fully with the UAE Centennial 2071.

**Challenges and results:** EPR is one of the main projects under the national integrated waste management Agenda (2023–2026).

The main purpose of this project is to put in place an implementation program for the extended producer responsibility (EPR) in the UAE. This shall include defining the responsibilities of stakeholders, products definition, action plan and setting targets.

The focus shall be on three waste streams: E-waste, waste batteries and packaging waste.

The project, which is still in the study phase, consists of several Stages to effectively review, analyse, advise and establish an effective EPR implementation program based on the status of infrastructure and waste data for each emirate and at the UAE level for the targeted streams of waste and the targeted producers in collaboration with the relevant stakeholders.

---

## ● United Kingdom of Great Britain and Northern Ireland

### ○ Extended Producer Responsibility for packaging in England

**Institution:** Department for Environment Food & Rural Affairs

**Period:** 2025–current

**Further information:**



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



A system of packaging producer responsibility has been in place in all parts of the United Kingdom since 1997. The current system requires packaging producers to demonstrate they have met their recycling obligations by acquiring evidence that packaging waste has been recycled, often referred to as the ‘PRN system’. Whilst the current packaging producer responsibility system has contributed to the overall UK packaging waste recycling rate increasing from 25 per cent in the late 1990s to 64.9 per cent in 2023, it does not require producers to cover the full costs of disposing of packaging waste and does not incentivise producers to use less packaging or use packaging that can be recycled.

We are reforming the packaging producer responsibility scheme to focus on making the scheme and its implementation as effective as possible. Packaging Extended Producer Responsibility (pEPR) aims to address the limitations of the current system by extending producers’ responsibilities to include financial responsibility for the net costs of managing household packaging waste. pEPR will require businesses to pay the costs of dealing with household packaging waste and of the provision of public information about the disposal of packaging waste, and in doing so, shift the costs of managing packaging waste from taxpayers and councils to the businesses who use and supply the packaging (applying the ‘polluter pays principle’). It will require producers to continue to meet packaging recycling targets through the Packaging Recycling Notes (PRN) system and to label packaging to indicate to consumers if the packaging can be recycled or not. Collectively these measures are intended to reduce the impact of packaging on the environment and encourage businesses to use less packaging and packaging that is easier to recycle when it is discarded or can be used more than once which in turn will support the move to a circular economy where less waste is generated, and resources are kept in use for longer.

**Challenges and results:** The Draft Producer Responsibility Obligations (Packaging and Packaging Waste) Regulations 2024 were notified to the European Union (EU) in respect of Northern Ireland under the Windsor Framework, and the labelling requirements were notified to the World Trade Organisation (WTO). Producers are required to report packaging data under the packaging data collection and reporting regulations which have been in force since 2023 and were amended with effect from April 2024. Under current plans, a review of pEPR will be conducted two years after the introduction of the new scheme. Each administration in the UK will monitor and evaluate this policy as part of their respective strategies and individual contexts.

- **UK Govt Investment to the SSPP through UKRI**

**Institution:** Department for Environment Food & Rural Affairs

**Period:** 2019–2025

**Further information:**

<https://www.ukri.org/what-we-do/browse-our-areas-of-investment-and-support/smart-sustainable-plastic-packaging/>

The UK Government invested £60 million to fund projects through the Smart Sustainable Plastic Packaging (SSPP) Challenge, run by UK Research and Innovation (UKRI). The fund focuses on





MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



projects that address the challenges around plastic, this includes both upstream solutions like more sustainable product design, and downstream solutions such as recycling infrastructure. Projects funded range from startups to educational institutions and recycling plants. In addition to the £60 million from government, an additional £149 million has been invested by industry.

Stakeholders include the plastic industry, the government, educational institutions, recycling plants, and startups funded by the SSPP. The case study supports a transition to a circular economy as it focuses on many of the challenges posed by the usage of plastic in its current state, funding the development of solutions to some of these problems.

**Challenges and results:** The SSPP has funded over 90 different projects.

---

## ● United States of America

### ○ National Recycling Strategy and Draft National Plastics Strategy

**Institution:** Environmental Protection Agency

**Period:** 2021 – current

**Further information:**

<https://www.epa.gov/circulareconomy/national-recycling-strategy>

<https://www.epa.gov/circulareconomy/draft-national-strategy-prevent-plastic-pollution>

<https://www.epa.gov/circulareconomy/circular-economy-implementation-plan-online-platform>

The National Recycling Strategy is focused on enhancing and advancing the national municipal solid waste (MSW) recycling system and identifies strategic objectives and stakeholder-led actions to create a stronger, more resilient, and cost-effective domestic MSW recycling system. It is part one of a series dedicated to building a circular economy for all. Subsequent parts of the series are currently under development, including a Draft National Strategy to Prevent Plastic Pollution, which focuses on actions to reduce, reuse, collect, and capture plastic waste. The vision includes the full impact of materials while also recognizing the need to achieve environmental justice priorities.

**Challenges and results:** The National Recycling Strategy recognizes the need to implement a circular economy approach for all – reducing the creation of waste with local communities in mind and implementing materials management strategies that are inclusive of communities with environmental justice concerns. The National Recycling Strategy is aligned with and supports implementation of the National Recycling Goal to increase the recycling rate to 50 percent by 2030. To ensure the U.S. is making progress in advancing recycling, EPA is working collaboratively with stakeholders to develop a plan for implementing the strategy. EPA has created the Circular Economy Implementation Plan Online Platform which helps interested parties identify opportunities to join in



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



collective action and contribute their expertise to the effort. The Platform currently has 48 action-items and invites the contributions of both new and current partners to continue to expand the content and ambitions contained within this Implementation Plan.

- **National Strategy to Reduce Food Loss and Waste and Recycle Organics**

**Institution:** U.S. Environmental Protection Agency, U.S. Department of Agriculture and U.S. Food and Drug Administration

**Period:** 2024 – current

**Further information:**

<https://www.epa.gov/circulareconomy/national-strategy-reducing-food-loss-and-waste-and-recycling-organics>

Globally, food loss and waste represent 8 per cent of anthropogenic GHG emissions. In the U.S., more than one-third of the municipal waste stream is organic waste, of which food is the majority. Wasting food impacts the climate, releases air pollutants, contributes to water scarcity and biodiversity loss, and degrades soil and water quality. To combat this issue, on 12 June, 2024, the U.S. Environmental Protection Agency, the U.S. Department of Agriculture and the U.S. Food and Drug Administration announced the “National Strategy for Reducing Food Loss and Waste and Recycling Organics” as part of President Biden’s whole-of-government approach to tackle climate change, feed people, address environmental justice, and promote a circular economy. This strategy drives progress toward the National Food Loss and Waste Reduction Goal to reduce the loss and waste of food by 50 per cent by 2030. In addition, this strategy supports the U.S. Methane Emissions Reduction Action Plan. Because methane is both a powerful GHG and short-lived compared to carbon dioxide, achieving significant reductions to food loss and waste would have a rapid and significant effect on reducing GHG emissions. The strategy highlights four objectives: 1) prevent food loss; 2) prevent food waste; 3) increase the recycling rate for all organic waste; 4) support policies that incentivize and encourage the prevention of food loss and waste and organics recycling. For each objective, the strategy highlights actions that the EPA, FDA or USDA could take. Examples of specific EPA actions include: 1) develop and lead a national consumer education and behaviour change campaign; 2) test innovative approaches to reducing food waste across the supply chain; 3) support the development of additional organics recycling infrastructure through grants and other assistance for all communities, and especially those that are underserved; and 4) expand the market for products made from recycled organic waste.

**Challenges and results:** Given that this strategy was released less than a month ago, quantitative indicators and qualitative outcomes are not yet available. However, the actions detailed in this strategy are aimed at helping the United States 1) meet its national food loss and waste reduction goal to halve food loss and waste by 2030; 2) contribute to achieving the National Recycling Goal to



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



achieve a 50 per cent recycling rate by 2030, and 3) contribute to global achievement of the United Nations SDG Target 12.3. Preventing food loss and waste and recycling food and other organic waste will also reduce landfill methane emissions, in support of the U.S. Methane Emissions Reduction Action Plan. Coordinated efforts to reduce food loss and waste will complement the Administration's additional efforts to reduce methane emissions from landfills and agriculture (e.g. supporting anaerobic digestion). These efforts are part of the Administration's whole-of-government methane strategy including actions to cut emissions from landfills and food waste, agriculture, the oil and gas sector, abandoned mines, and other major sources, while improving measurement and monitoring. They help fulfil the Global Methane Pledge, which aims to reduce anthropogenic methane emissions by at least 30 per cent by 2030 from 2020 levels.

- **Solid Waste Infrastructure for Recycling program and the Recycling Education and Outreach program**

**Institution:** Environmental Protection Agency

**Period:** 2022–2026

**Further information:**

[www.epa.gov/infrastructure/solid-waste-infrastructure-recycling-grant-](http://www.epa.gov/infrastructure/solid-waste-infrastructure-recycling-grant-program)

[program www.epa.gov/infrastructure/consumer-recycling-education-and-outreach-grant-program](http://www.epa.gov/infrastructure/consumer-recycling-education-and-outreach-grant-program)

The Solid Waste Infrastructure for Recycling (SWIFR) grant program is a new grant program funded through the Infrastructure Investment and Jobs Act, also referred to as the Bipartisan Infrastructure Law (BIL). BIL provides US\$275 million for SWIFR grants to support Building a Better America. The SWIFR provides grants to implement the National Recycling Strategy to improve post-consumer materials management and infrastructure; support improvements to local post-consumer materials management and recycling programmes; and assist local waste management authorities in making improvements to local waste management systems. The program can provide funding to states and territories, tribes and intertribal consortia, and communities.

The Bipartisan Infrastructure Law also provides US\$75 million for grants to fund a new Recycling Education and Outreach (REO) Grant Program. Projects funded through the grant program will: inform the public about residential or community recycling or composting programmes; provide information about the materials that are accepted as part of residential or community recycling or composting programmes; and increase collection rates and decrease contamination across the nation.

**Challenges and results:** In 2023, under the SWIFR grants, U.S. Environmental Protection Agency (EPA) announced 59 selectees representing Tribes and Intertribal Consortia to receive over US\$60 million; 25 communities to receive grants totalling more than US\$73 million; and made available US\$32 million for states and territories to improve solid waste management planning, data collection and implementation of plans. The SWIFR grants for Tribes and Intertribal Consortia enable Tribes to



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



make improvements to their recycling and waste management systems, meeting Congress' goal to create a stronger, more resilient and cost-effective U.S. municipal solid waste recycling system.

EPA also named 25 selectees to receive over US\$33 million in Recycling Education and Outreach (REO) grants. The Recycling Education and Outreach grant projects will help inform the public about local recycling and composting programmes and focus on increasing collection rates and decreasing contamination of recycling streams across the nation.

Both of these programmes advance the President's Justice40 Initiative, which set the goal that 40 per cent of the overall benefits of certain federal investments flow to disadvantaged communities that are marginalized by underinvestment and overburdened by pollution. Over US\$83 million of the new funding will support 72 projects that include organics recycling, composting or anaerobic digestion. The activities outlined in these projects are critical in mitigating the effects of climate change and building more circular economies.

- **U.S. Food Loss & Waste 2030 Champions**

**Institution:** Department of Agriculture & Environmental Protection Agency

**Period:** 2016 – current

**Further information:**

[www.usda.gov/foodlossandwaste/champions](http://www.usda.gov/foodlossandwaste/champions)

In 2016, the U.S. Department of Agriculture and U.S. Environmental Protection Agency created the U.S. Food Loss and Waste 2030 Champions to recognize businesses that have made a public commitment to reduce food loss and waste in their operations in the United States by 50 per cent by the year 2030. The 2030 Champions group highlights food waste reduction leaders to inspire other businesses to take up this important challenge. Since the 2016 launch, over 50 food businesses representing grocery stores, restaurants, food processors, food manufacturers, food service, hospitality and entertainment companies have joined to become 2030 Champions.

**Challenges and results:** From 2021, USDA and EPA have released annual reports providing updates reported by the Food Loss and Waste 2030 Champions on their progress towards the national goal of reducing food loss and waste in their U.S. operations. Most recent progress highlighted in annual Milestones Report (2022), including more than one billion pounds (454,000 metric tons) of surplus food donated to food banks in a year.



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



## G20 Environmental and Climate Sustainability Working Group (ESCWG) Waste and Circular Economy (W&CE)

### **Annex B. Waste & Circular Economy (W&CE) – Extended Producer Responsibility (EPR) experiences submitted by G20 members**

This annex presents a collection of experiences with Extended Producer Responsibility (EPR), gathered from G20 members between June and August 2024. These accounts demonstrate how EPR programmes and schemes have been implemented across various contexts and scenarios. Each entry includes the start date of mandatory EPR programmes in the respective country, the sectors and product categories covered, collection targets, whether the scheme operates monopolistically or competitively, and whether producers' responsibilities are operational, financial, or both.

The accounts are presented as submitted, in alphabetical order by country, without any editing, to preserve the original perspectives and insights shared by each member.

### **Table of contents**

<b>Brazil</b>	
<b>European Union</b> .....	<b>3</b>
<b>France</b> .....	<b>5</b>
<b>Indonesia</b> .....	<b>6</b>
<b>Italy</b> .....	<b>7</b>

Japan.....	8
Mexico .....	9
Portugal .....	10
South Africa.....	10
Türkiye .....	11
United Arab Emirates .....	12
United Kingdom.....	12

## ● Brazil

### a) Date from which the country has implemented mandatory EPR programmes:

The National Policy on Solid Waste, approved in 2010, established mandatory reverse logistics (EPR) for several waste chains, under the concept of shared responsibility of manufacturers, importers, distributors and traders. Before the law was approved three waste chains had already implemented reverse logistics schemes: lubricating oils (2005), batteries (2008) and tyres (2009). Since the approval of the National Policy on Waste Management, the following waste chains started operating: lubricating oil packaging (2013), pesticides, their residues and packaging (2014), packaging in general (glass, paper, plastic and metals) (2015), fluorescent lamps, sodium and mercury vapor lamps and mixed lamps (2015), steel packaging (2018), lead-acid batteries (2019), electric and electronic equipment (2019), medicines and their packaging (2020), aluminium cans (2020) and glass (2022). Updated systems with specifically targets for plastic, papers and metal packaging are under final approval in 2024.

### b) Sector or product categories covered by these programmes:

Packaging, lubricant oil, tyres, pesticides, batteries, lead-acid batteries, lamps, electric and electronics, and medicines

### c) Collection targets for each type of product or packaging:

**Electric and electronic equipment:** The target, gradual, was to collect 1 per cent of what was sold in 2021, 3 per cent in 2022, 6 per cent in 2023, 12 per cent in 2024 and 17 per cent in 2025.

**Fluorescent lamps, sodium and mercury vapour lamps, and mixed lamps:** The goal was to collect 60,000,000 units by 2022. This target is currently under revision.

**Lubricant oil:** The target was to achieve a 47.5 per cent recycling rate in 2023. The sector exceeded this goal, reaching 51 per cent. The target is under review.

**Lubricant oil packaging:** In 2022, 4,926 tons of lubricant oil packaging were recycled through the system.

**Tyres:** Two separate targets exist for tyres: national manufacturers collected 91 per cent of their production, while importers collected 47 per cent of the quantity imported.



MINISTÉRIO DAS  
RELAÇÕES  
EXTERIORES

MINISTÉRIO DO  
MEIO AMBIENTE E  
MUDANÇA DO CLIMA



**Steel packaging:** The goal was to collect 54,000 tons by 2021. This target was met, and the goal needs to be updated.

**Aluminium cans:** 98.7 per cent of aluminium cans traded are recycled.

**Lead-acid batteries:** Up to 2021, 290,342 tons of lead-acid batteries were collected.

**Packaging:** The National Plan for Solid Waste (2020) established recovery targets for packaging through the reverse logistics system as follows: 35 per cent by 2028, 40 per cent by 2032, 45 per cent by 2036 and 50 per cent by 2040.

Brazil is now implementing new regulations for each packaging chain to enhance the systems and address their specific needs.

**Glass packaging:** The reverse logistics regulation for glass packaging includes new targets: 35 per cent recycling by 2028, 36.25 per cent by 2029, 37.5 per cent by 2030, 38.75 per cent by 2031 and 40 per cent by 2032. For post-consumer recycled content, the targets are 31 per cent by 2028, 32 per cent by 2029, 33 per cent by 2030, 34 per cent by 2031 and 35 per cent by 2032.

**Plastics:** New regulations for the reverse logistics of plastics, including targets for recycling 30 per cent (2025) – 50 per cent (2040), 24 per cent (2025) – 40 per cent (2040) post-consumer recycled content, are expected to be approved by the end of 2024.

**Paper, cardboard and metals:** Regulations for paper and cardboard are anticipated to be introduced by the end of 2024, along with new regulations for metals (2025).

**d) EPR scheme operation (monopolistic / competitive):**

In Brazil, each reverse logistics system is overseen by a Managing Entity (Entidades Gestoras or PRO), which represents companies within the respective sectors and is responsible for the organization and implementation of the reverse logistic system. Costs are distributed among the affiliates, and, whenever feasible, waste picker cooperatives and associations are integrated into the systems funded by the materials they sell as well as by credits for recycling.

Recently, the Ministry of Environment and Climate Change approved a set of regulations that specify: (1) the criteria for entities to be classified as Managing Entities specifically for the reverse logistics of packaging in general, and (2) the criteria for entities to be classified as Result Verifiers, to guarantee traceability and auditing practices for the Managing Entities across all systems.

**e) Producer's responsibility (operational / financial / both):**

Brazil uses an EPR system, in which the funding, implementation and operation of reverse logistics systems are the responsibility of the Managing Entities (representing industries, distributors, retailers and importers), and the associated revenues are generated from the companies affiliated with each system.

## ● European Union

### **a) Date from which the country has implemented mandatory EPR programmes:**

The EU is one of the frontrunners with regards to EPR schemes, which have been in place since 2008, as part of the Waste Framework Directive (Directive 2008/98/EC). The Commission has proposed in July 2023 a targeted revision of the Waste Framework Directive, with a focus on textiles and food waste. In particular, the Commission is proposing to introduce mandatory Extended Producer Responsibility (EPR) schemes for textiles in all EU Member States. Also, in EU legislation, EPR schemes are in place under the context of the EU Waste from Electrical and Electronic Equipment (WEEE) Directive, the EU Batteries Regulation, the end-of-Life vehicles Directive, the Single Use Plastics Directive and, as of 2025, the Packaging and Packaging Waste Directive. With regards to the latter, The EU has revised and amended its laws on packaging several times. These amendments include providing for mandatory setting up of packaging Extended Producer Responsibility (EPR) schemes as part of the legislative proposals adopted under the circular economy package in 2018. The Packaging and Packaging Waste Directive will be replaced by the homonymous Regulation in 2025. The text has been provisionally agreed in March 2024 and provides for further harmonisation of EPR systems in the packaging sector, notably by obliging producers to register in each EU Member State where they make packaging available on the market for the first time, and to appoint an EPR representative in each EU Member State where they are making packaging available on the market for the first time if they are not established in that EU Member State. In addition, the Regulation harmonises the granularity and the frequency of producers' reporting and obliges Member States to set up transparent and inter-connected national EPR registers.

### **b) Sector or product categories covered by these programmes:**

Packaging (as of 2025), batteries, electric and electronic equipment, end-of-life vehicles and single-use plastics.

### **c) Collection targets for each type of product or packaging:**

Packaging and packaging waste: the EU Commission has proposed a revision of the Packaging and Packaging Waste Directive in 2022. According to the proposed revision, by December 2030 a minimum of 70 per cent by weight of all packaging waste will be recycled and the following minimum targets by weight for recycling will be met for specific materials: 55 per cent of plastic; 30 per cent of wood; 80 per cent of ferrous metals; 60 per cent of aluminium; 75 per cent of glass; 85 per cent of paper and cardboard. In addition, under the existing, as well as the forthcoming, packaging legislation, Member States have the obligation to ensure that systems and infrastructures are set up to provide for the return and separate collection of all packaging waste. Under the provisionally agreed new Regulation, the possibilities for derogation from this obligation are substantially reduced and packaging designed for recycling should no longer be landfilled or incinerated. EU Member States will also need to reach a 90 per cent separate collection rate per year (by weight) of single-use plastic beverage bottles with the capacity of up to three litres and single use metal beverage containers with a capacity of up to three litres via mandatory deposit and return systems. This obligation is subject to certain exemptions and possibilities of derogation for Member States which will achieve a very high separate collection rate of these packaging formats by 2026. All these obligations are designed in order to ensure high rate of, and sufficiently pure, collected packaging waste that can then be recycled to high quality materials that have value and can find their way back into the packaging and products.



**Batteries:** the new Batteries Regulation will ensure that, in the future, batteries have a low carbon footprint, use minimal harmful substances, need less fresh raw materials from non-EU countries, and are collected, reused and recycled to a high degree and according to high standards. Collection targets for waste portable batteries will increase from 45 per cent by 31 December 2023, to 63 per cent by 31 December 2027 and to 73 per cent by 31 December 2030. Collection targets for waste light means of transport (LMT) batteries are 51 per cent by 31 December 2028 increasing to 61 per cent by 31 December 2031. All waste starting, lighting and ignition (SLI, formerly so called “automotive”) batteries, all waste industrial batteries and all waste electric vehicle batteries are to be collected separately. Targets for recycling efficiency, material recovery and recycled content will be introduced gradually from 2025 onwards. All collected waste batteries will have to be recycled and high levels of recovery will have to be achieved, in particular of critical raw materials such as cobalt, lithium and nickel.

**Electrical and electronic equipment:** the WEEE Directive requires the separate collection and proper treatment of WEEE and sets targets for their collection, recovery and recycling. Collection targets for WEEE increased from 45 per cent of the average weight of EEE placed on the market in the three preceding years by 31 December 2016, to 65 per cent by 31 December 2019, with specific derogations provided to some EU Member States. Alternatively, from 2019 the WEEE collection rate can be calculated on the basis of the quantity of WEEE generated on the territory of an EU Member State in a given year and the relevant target is 85 per cent. The WEEE Directive also includes the obligation that all separately collected WEEE undergoes proper treatment and sets recovery targets by category of electrical and electronic equipment that increase over time.

**End-of-life vehicles:** although the current ELV Directive and the new ELV Regulation proposal do not contain collection targets, both include the obligation that all ELVs need to be handed over to Authorised Treatment Facilities, which means a 100 per cent collection rate. export provisions in the new proposal will only allow to export used vehicles with a valid roadworthiness test. This, in combination with fully automated custom controls, will drastically reduce the export of low quality and polluting vehicles to third countries.

**d) EPR scheme operation (monopolistic / competitive):**

This varies according to the EU Member State which sets up the EPR scheme. Both types therefore exist in the EU. If the system is competitive (there are several producer responsibility organisations), Article 8a(5) of the Waste Framework Directive, as well as the new Packaging and Packaging Waste Regulation, requires the EU Member State concerned to appoint at least one body independent of private interests or entrust a public authority to oversee the implementation of extended producer responsibility obligations, in particular the eco-modulation of EPR fees and the coverage of the necessary cost. Furthermore, EU Member States must ensure that such systems cover the territory of the entire EU Member State.

**e) Producer's responsibility (operational / financial / both):**

Article 3 point 21 of the Waste Framework Directive defines that “extended producer responsibility scheme” means a set of measures taken by Member States to ensure that producers of products bear financial responsibility or financial and organisational responsibility for the management of the waste stage of a product’s life cycle. According to recital 14 of Directive (EU) 2018/851 amending the Waste Framework Directive, this includes responsibility for separate collection, sorting and treatment operations. That obligation can also include organisational responsibility and a responsibility to contribute to waste prevention and to the reusability and recyclability of products. Producers of

products can fulfil the obligations of the extended producer responsibility scheme individually or collectively.

---

## ● France

### **a) Date from which the country has implemented mandatory EPR programmes:**

Extended producer responsibility (EPR) schemes are a waste management model that has been voted in France since 1975, based on the “polluter pays” principle. Producers, importers and distributors can be required to contribute to the disposal of waste from their products. The household packaging waste was the first EPR scheme put in place in 1992.

### **b) Sector or product categories covered by these programmes:**

Packaging and paper; construction products and materials; electrical and electronic devices; batteries; chemical products and containers; medicines; perforating medical devices used by self-treatment patients; furniture; clothing, footwear and household linen; toys; sporting and leisure goods; DIY and garden items; cars; tyres; mineral or synthetic lubricating or industrial oils; pleasure and sports boats; tobacco products.

### **c) Collection targets for each type of product or packaging:**

Packaging: 70 per cent (plastic: 55 per cent; wood: 30 per cent; metal: 80 per cent; Aluminium: 60 per cent; glass: 75 per cent; paper and board: 85 per cent); electrical and electronic devices: 85 per cent; batteries: 45 per cent; furniture: 51 per cent.

### **d) EPR scheme operation (monopolistic / competitive):**

In France, PRO are private companies, but they have a public interest remit: they must comply with a set of specifications imposed by the State. In certain sectors, there is a single eco-organization (packaging paper, tyres, boats, etc.) but there may be several (two for electrical waste, two for batteries, three for furniture, etc.) if producers have decided to do so. The PRO can call on the services of "operators" (collection, transport, sorting and treatment). But for certain types of waste that are already collected, or even sorted and by local authorities, producers or eco-organizations may use (and, in this case finance) the municipal infrastructures.

### **e) Producer's responsibility (operational / financial / both):**

Both: the EPR schemes encourages producers to meet ambitious objectives, in order to decrease their environmental impacts and finance the collect, management, treatment and recycling of waste by the producers themselves.

---

## ● Indonesia

### **a) Date from which the country has implemented mandatory EPR programmes:**

Yes, Indonesia has mandatory EPR programmes. The Mandatory Packaging Reporting (MPR) framework was introduced on early 2020, with companies required to report data annually on the

amount of packaging they put into the market and develop 3R plans for packaging starting from 2021. Additionally, the Ministry of Environment and Forestry (MoEF) has been developing a national EPR portal to facilitate EPR compliance for producers since January 2022.

**b) Sector or product categories covered by these programmes:**

Manufacture producers including food and beverage industry, body care industry and home care industry. Then retail that include modern market, traditional market, mini market and shopping mall. The last ones are in hotel restaurant and cafe sector.

**c) Collection targets for each type of product or packaging:**

The collection targets for each type of product or packaging under Indonesia's EPR scheme are focused on achieving a 30 per cent waste reduction at the source.

**d) EPR scheme operation (monopolistic / competitive):**

The EPR schemes in Indonesia operate in a competitive environment. While the regulatory framework is in place, the implementation and compliance with EPR regulations are still evolving. The schemes are designed to encourage producers to take responsibility for the waste generated by their products and packaging, but the environment is not yet fully monopolistic.

**e) Producer's responsibility (operational / financial / both):**

In Indonesia, the producer's responsibility under the EPR scheme is primarily operational and financial. Producers are required to implement operational practices such as reducing, reusing and recycling waste, as well as managing the end-of-life stage of their products. Financially, producers are responsible for the costs associated with waste management, including collection, processing and disposal of their products.

---

 **Italy**

**a) Date from which the country has implemented mandatory EPR programmes:**

The Italian regulatory system provides specific EPR schemes for the end-of-life management of different product supply chains.

**b) Sector or product categories covered by these programmes:**

EPR schemes are provided for the following product supply chains/waste flows: packaging and packaging waste (e.g. plastic, paper, wood, glass, steel, aluminium, bioplastics) (from Legislative Decree No. 22 of 5 February, 1997, as later amended by Legislative Decree No. 152 of 3 April, 2006); exhausted vegetable and animal oils and fats (from Legislative Decree No. 5 February 1997, No. 22, as later amended by Legislative Decree No. 152 of 3 April, 2006); used mineral oils (from Legislative Decree No. 95 of 27 January, 1992, as later amended by Legislative Decree No. 152 of 3 April, 2006); waste from electrical and electronic equipment (from Legislative Decree No. 151 of 25 July, 2005, as later amended by Legislative Decree No. 49 of 14 March, 2014); end-of-life tyres (from Legislative Decree no. 152 of 3 April, 2006); polyethylene goods and related waste (from Legislative Decree no. 5 February, 1997, no. 22, as later amended by Legislative Decree no. 3 April, 2006, no. 152); batteries and accumulators and related wastes (from Legislative Decree No. 188 of 20 November, 2008).

**c) Collection targets for each type of product or packaging:**

• Packaging and packaging waste: only recovery and recycling targets are set. By 31 December, 2025: 65 per cent by weight relative to all packaging waste; 50 per cent for plastics, 25 per cent for wood,

70 per cent for ferrous metals, 50 per cent for aluminium, 70 per cent for glass, 75 per cent for paper and cardboard. By 31 December, 2030: 70 per cent by weight relative to all packaging waste; 55 per cent for plastics, 30 per cent for wood, 80 per cent for ferrous metals, 60 per cent for aluminium, 75 per cent for glass, 85 per cent for paper and cardboard. • There are no specific targets for the waste vegetable and animal oils and fats and used mineral oils supply chains. • Collection targets for waste from electrical and electronic equipment: 65 per cent compared to the average placed on the market for the previous three years. • Collection targets for end-of-life tyres: 95 per cent compared to the previous year's placed on the market. • Waste polyethylene goods: no collection targets, only recycling targets set at 15 per cent. • Collection targets for batteries, accumulators and related waste: 45 per cent compared to put on the market (Legislative Decree No. 188/2008). Targets will be adjusted to the requirements of the new "Battery Regulation" No. 1542/2023, which stipulates for portable battery waste a collection rate of 63 per cent by the end of 2027 and 73 per cent by the end of 2030, and for light-duty vehicle battery waste 51 per cent by the end of 2028 and 61 per cent by the end of 2031.

**d) EPR scheme operation (monopolistic / competitive):**

PROs (Producer Responsibility Organizations, collective compliance scheme) and individual systems (individual compliance scheme) operate in a competitive environment, with the exception of the used mineral oil supply chain, where, at present, legislation does not provide for the possibility of establishing an autonomous system as an alternative to the statutory PRO.

**e) Producer's responsibility (operational / financial / both):**

The responsibility envisaged in EPR schemes is both financial and organizational, as required by the extended producer responsibility provisions set out in recent European circular economy EU directives.

 **Japan**

**a) Date from which the country has implemented mandatory EPR programmes:**

- ① Containers and Packaging Recycling Law (1995)    ② Home Appliance Recycling Law (2001)
- ③ Automobile Recycling Law (2005)

**b) Sector or product categories covered by these programmes:**

- ① Containers and packaging    ② Home appliances    ③ Automobile

**c) Collection targets for each type of product or packaging:**

- ① Glass containers, PET Bottles, paper containers and wrapping, Plastic containers, wrapping, and styrene foam trays;    ② air conditioners, TVs (CRT, liquid crystal and plasma TVs), refrigerators and freezers, washing machines and clothes dryers;    ③ Automobile

**d) EPR scheme operation (monopolistic / competitive):**

- ① The Containers and Packaging Recycling System in Japan will fulfil its responsibility to efficiently invest and manage recycling fees paid by the specified business entities in recycling operations.
- ② Monopolistic (manufacturers have an obligation to recycle resources)    ③ Monopolistic (Automobile manufacturers have an obligation to recycle resources)

**e) Producer's responsibility (operational / financial / both):**

① financial ② Operational ③ Operational

---

## ● Mexico

**a) Date from which the country has implemented mandatory EPR programmes:**

No, there are voluntary initiatives.

**b) Sector or product categories covered by these programmes:**

Disposable packaging.

**c) Collection targets for each type of product or packaging:**

**d) EPR scheme operation (monopolistic / competitive):**

In general in a monopolistic environment.

**e) Producer's responsibility (operational / financial / both):**

Both.

## ● Portugal

**a) Date from which the country has implemented mandatory EPR programmes:**

Yes, since 2017.

**b) Sector or product categories covered by these programmes:**

In Portugal, there are EPR schemes in place for packaging waste from households and for premises whose daily production does not exceed 1,100 litres, including packaging made from paper and cardboard, ferrous metals, aluminium, glass, plastics, wood and composite packaging. Excluded are all industrial and commercial (non-household) sources whose daily production exceeds 1,100 litres. Further, Portugal has implemented EPR schemes for other specific types of packaging, including pesticide, fertilizer, seed and plant packaging and medical and pharmaceutical packaging.

**c) Collection targets for each type of product or packaging:**

65 per cent recycling target for packaging waste in 2025 as well as the material specific packaging waste recycling targets (50 per cent of plastic; 25 per cent of wood; 70 per cent of ferrous metals; 50 per cent of aluminium; 70 per cent of glass; 75 per cent of paper and cardboard).

**d) EPR scheme operation (monopolistic / competitive):** Information not provided.

**e) Producer's responsibility (operational / financial / both):** Both.

---

## ● South Africa

**a) Date from which the country has implemented mandatory EPR programmes:**

Yes, since 2020.

**b) Sector or product categories covered by these programmes:**

Paper and packaging; electrical and electronic waste, lighting, pesticides, lubricant oils and portable batteries.

**c) Collection targets for each type of product or packaging:**

Indicated in the regulations and specific notices for each waste stream.

**d) EPR scheme operation (monopolistic / competitive):**

Competitive environment.

**e) Producer's responsibility (operational / financial / both):**

Both.

---

## ● Türkiye

**a) Date from which the country has implemented mandatory EPR programmes:**

Before the implementation of GEKAP, the EPR obligation was fulfilled through producer responsibility organisations (PROs) for the products in question. PRO implementation started in 2005 for packaging and batteries, 2008 for waste mineral oils, 2009 for tyres and 2015 for electronic equipment. In Türkiye, the Recovery Contribution Share (GEKAP), which is an arrangement based on the principle of extended producer responsibility covering the product groups (tyres, batteries, batteries, electronics, mineral and vegetable oil, pharmaceuticals and packaging) included in the annexed list No. 1 of the Environmental Law, has been in force since 2020.

**b) Sector or product categories covered by these programmes:**

Tyres, batteries, batteries, electronics, mineral and vegetable oil, pharmaceuticals and packaging.

**c) Collection targets for each type of product or packaging:**

**d) EPR scheme operation (monopolistic / competitive):**

Türkiye has a unique EPR system which calls Recovery Contribution Share (GEKAP). Responsible generators have to pay a contribution for recycling: The contribution fee rates vary according to the type of product stipulated by the Environmental Law.

**e) Producer's responsibility (operational / financial / both):**

Financial.

---

## ● United Arab Emirates

### **a) Date from which the country has implemented mandatory EPR programmes:**

EPR is one of the main projects under the national integrated waste management Agenda (2023–2026).

### **b) Sector or product categories covered by these programmes:**

The focus shall be on three waste streams: E-waste, waste batteries and packaging waste.

**c) Collection targets for each type of product or packaging:** Information not provided.

**d) EPR scheme operation (monopolistic / competitive):** Information not provided.

**e) Producer's responsibility (operational / financial / both):** Information not provided.

---

## ● United Kingdom

### **a) Date from which the country has implemented mandatory EPR programmes:**

2025.

### **b) Sector or product categories covered by these programmes:**

Packaging.

### **c) Collection targets for each type of product or packaging:**

Producers of packaging will continue to use the PRN system to demonstrate they have met their recycling obligations. Material specific recycling targets for each year from 2025 to 2030, are included in the draft regulations

([https://members.wto.org/crnattachments/2024/TBT/GBR/24\\_02787\\_00\\_e.pdf](https://members.wto.org/crnattachments/2024/TBT/GBR/24_02787_00_e.pdf)) that will bring pEPR into force (Schedule 5). The targets are based on the proposals set out in the 2022 and available packaging recycling data for 2022 and 2023.

### **d) EPR scheme operation (monopolistic / competitive):**

The PRN system and cost of the recycling evidence notes is determined by the market based on the supply of material for recycling and the demand for recycled materials, reflecting a competitive environment.

### **e) Producer's responsibility (operational / financial / both):**

EPR will introduce both financial and operational obligations, including data reporting, targets, labelling and the payment of fees to cover costs in managing household packaging waste.