

Background Paper

Expert Group Meeting on Resource Circularity and Solid Waste Management to Accelerate National to Local Progress on the Sustainable Development Goals

A Shift to Zero-waste and National Policy Support

21–23 November 2023 – Incheon, Republic of Korea



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Disclaimer

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Executive Summary

In December 2022, the United Nations General Assembly¹ adopted 30 March as the International Day of Zero Waste with a new resolution to strengthen zero-waste initiatives from national to local levels. With only seven years left to deliver the 2030 Agenda, a shift towards zero-waste and resource circularity can ensure a more sustainable development pathway and reduce human impact while advancing economic opportunities and innovation. Yet, waste volumes continue to increase across the planet, amid rapid urbanization and production and consumption practices based on a take-make-waste model. Currently, humanity generates an estimated 2.24 billion tons of municipal solid waste (MSW) annually and waste generation rates could rise by more than 73 per cent by the end of 2050.²

This background paper presents a baseline on the current status of solid waste management policies to accelerate progress on the Sustainable Development Goals towards zero-waste production and consumption patterns. Among the several capacity barriers countries face, data and knowledge gaps are key barriers to effectively implementing policy actions for more resource circularity.

A recent report from the UN shows that SDG 11, which entails most of the performance indicators for SWM, has the most insufficient data available for progress assessment among the 17 SDGs (UN, 2023). Equally, SDG 12.5 measured by data on national recycling rates and tons of material recycled, has amassed little to no data for most developing countries. National Recycling Rate data is defined as the quantity of material recycled in the country plus quantities exported for recycling out of total waste generated in the country, minus material imported intended for recycling.³ This data is essential to compare global to national progress on shifting to a circular, less resource intensive economy. Closing data gaps on what is often an informal sector in developing countries is a key priority for the UN system in advance of 2030 and beyond (UN, 2023).

One of the most significant problems in the mismanagement of waste is open waste dumping and burning, often linked to informal and unregulated activities. Only 55 per cent of MSW⁴ generated is managed in controlled facilities across the world and developing countries discard approximately 90 per cent of waste in large unregulated dumpsters which they then burn openly and uncontained creating poor air quality and actively spreading germs into the air. Informality in the waste sector increases the vulnerability of workers – especially women who are the most marginalized within the sector (UNEP, 2022) – and their communities. It is estimated that over 400,000 people in developing countries die each year due to diseases from mismanaged waste.

Advancing a circular economy around key resources presents co-benefits and synergies to accelerate progress across the SDGs and key social, economic and environmental targets. Solid waste management and

¹ UN General Assembly Resolution, Promoting zero-waste initiatives to advance the 2030 Agenda for Sustainable Development, Resolution adopted by the General Assembly on 14 December 2022. www.undocs.org/Home/Mobile?FinalSymbol=A%2FRES%2F77%2F161&Language=E&DeviceType=Desktop&LangRequested=False

² International Day of Zero Waste, United Nations. <https://www.un.org/en/observances/zero-waste-day>

³ UN Statistics <https://unstats.un.org/sdgs/dataportal> and <https://www.unep.org/explore-topics/sustainable-development-goals/why-do-sustainable-development-goals-matter/goal-12-6>

⁴ According to UN statistics on SDG 12.5, Municipal Solid Waste (MSW) includes waste originating from households, commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings). It also includes bulky waste (e.g., old furniture, mattresses) and waste from selected municipal services if managed as waste. Further information on MSW is defined in the SDG indicator methodology for 11.6.1.

a shift to resource circularity is directly linked to 12 out of 17 SDGs and mainly covered by SDG 11 and SDG 12 (11.6.1, 12.3.1, 12.4.1, 12.4.2, 12.5.1). However, sound waste and material flows management can contribute to achieving 17 SDGs as a strong driver for many SDG targets, whether directly or indirectly.

Effective management of MSW needs to be based on integrated, circular and/or holistic management approaches, starting from source segregation, storage, collection/transport, treatment, and final disposal considering 3R principles. Although many governments have made progress on implementing a 3R approach in waste management, many local municipalities suffer from technical, financing and capacity gaps in implementing proper policies and strategies at national and sub-national levels to address growing waste volumes.

In this context, the United Nations Office for Sustainable Development (UNOSD), serving as a technical arm of the United Nations Department of Economic and Social Affairs (UNDESA), aims to develop a policy support system that can bridge data, technical and capacity gaps to advance resource circularity in solid waste management across developing countries. This work builds on the engagement of UN DESA on zero-waste through the International Partnership for Expanding Waste Management Services of Local Authorities (IPLA) from 2011-2015. These series of meetings and global agreements strengthened global awareness, knowledge and advanced a community of practice for zero-waste policymaking in the run up to the 2030 Agenda for Sustainable Development. With the support of the Republic of Korea's Ministry of Environment and the Korea Environment Corporation (K-eco), the system will strengthen policy support on circular approaches to waste management in target countries through a multi-year and multi-stakeholder process. Expert consultations, research and partnerships will inform the development of the system to measurably improve national to local solid waste management and resource circularity policy action.

I. Background

The globe is experiencing a surge in waste generation due to rapid urbanization and population growth. According to the World Bank's report, the world generates 2.01 billion tons of Municipal Solid Waste (MSW) annually and it is expected to rise by 70 per cent over the next 30 years to 3.4 billion tons of waste generated annually (World Bank, 2018). A key challenge is that developing countries lack the means of implementation (capacity, finance and technologies) to properly manage rapidly increasing amounts of waste. Unfortunately, at least 33 per cent of the waste generated across the world is not managed in an environmentally safe manner and over 90 per cent of waste in low-income countries is openly dumped or burned. Mismanaged waste is detrimental to human health, hurts the environment and climate, and negatively affects economic development. While technology-oriented, capital-intensive approaches, such as Waste-to-Energy (WtE) incineration are often explored as an alternative to open dumping and open burning, concerns persist regarding health and climate impacts, lack of resource circularity, low energy-efficiency, and the mismanagement of incineration ash (UNEP, 2019).⁵

In recent decades there has been a global trend towards increased natural resource use and demand for materials, compounding the increase in resultant waste outputs. In addition, the COVID-19 pandemic led to an increase in demand for single-use plastic, intensifying plastic pollution (OECD, 2022). Plastic waste has become a critical social, environmental, and economic issue, and important new steps have been taken to improve the global governance of plastic pollution.

Of late, the global community has witnessed two historic moments: In March 2022, UN Member States participating in the United Nations Environment Assembly (UNEA) endorsed a resolution to address the full lifecycle of plastic, including its production, design and disposal and to forge an international legally binding agreement by 2024 in order to end plastic pollution, it also proclaimed 30 March to be the International Day of Zero Waste to be observed annually.⁶ In June 2023, the UN High Seas Treaty was adopted, the Treaty aims to provide a framework for the conservation and sustainable use of marine areas that fall outside of country jurisdiction. It contains provisions based on the polluter-pays principle and countries must assess the potential environmental impacts of any planned activities beyond their jurisdictions.⁷

Global plastics make up 44 per cent of global waste composition (World Bank, 2018a). Plastic waste mainly enters the environment when it is poorly managed, such as through open dumping, open burning, and disposal in waterways. The challenge to curb plastic litter remains significant, with one-fourth of waste dumped openly and many formal disposal sites managed improperly.⁸ Key negative externalities from plastic pollution are the deterioration of marine biodiversity and habitat, microplastics into the food chain, and the deterioration of freshwater quality, as well as resultant impacts on human health (UN, 2023; UNEP, 2023). Recent research has found that the number of plastics entering the oceans is expected to triple by 2040 and that there could be more plastic in the oceans than fish by 2050 (Ellen MacArthur Foundation *et al*, 2020). Plastic waste is also traded across borders for disposal and recycling. Despite efforts to reduce exports of plastic waste under the amended Basel Convention, developed economies remain net exporters and accounted for nearly 80 per cent of the global plastic waste trade in 2021 (UNCTAD, 2021).

Evidently, plastic waste is a global issue that urgently needs to be addressed. However, there are many more solid waste material outputs that also require attention, and an integrated approach to solid waste management is needed from national to local levels. This is because waste composition differs from higher income to lower income countries and even within countries. Recent data show consumption patterns matter, and higher income countries consequently generate more dry waste such as plastic and metal, but less food and green waste. Lower income countries on the other hand generate less dry recyclable waste (only 20 per cent) but more organic waste. These differences also occur within countries, as higher income or urban households have consumption and waste outputs that differ from lower-income and rural households.

Waste outputs differ between regions as well, given global differences in production, economic sectors,

⁵ Added at the request of the Global Alliance of Incinerator Alternatives (GAIA) during a review of this background paper in the *Expert Group Meeting on Resource Circularity and Solid Waste Management to Accelerate National to Local Progress on the Sustainable Development Goals, 21-23 November 2023 – Incheon, Republic of Korea*.

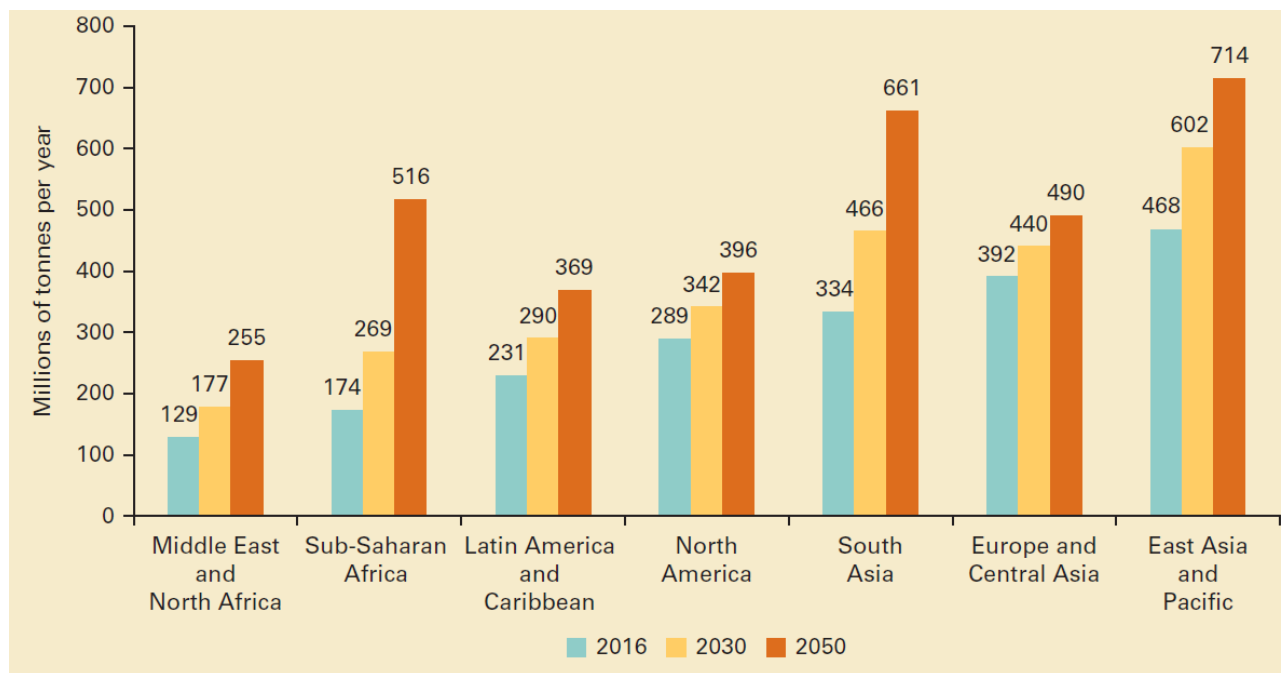
⁶ A/RES/77/161 Promoting zero-waste initiatives to advance the 2030 Agenda for Sustainable Development <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N22/756/33/PDF/N2275633.pdf?OpenElement>

⁷ Draft agreement under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction <https://documents-dds-ny.un.org/doc/UNDOC/LTD/N23/073/63/PDF/N2307363.pdf?OpenElement>

⁸ https://datatopics.worldbank.org/what-a-waste/tackling_increasing_plastic_waste.html

population and more. Data projections for solid waste up to 2050 and by region show the East Asia and Pacific region generates most of the world’s waste, given its population ([Figure 1](#)). The fastest developing regions are sub-Saharan Africa and South Asia, where total waste generation is expected to account for 35 per cent of the world’s total waste production by 2050. The need to achieve zero waste and greater resource circularity transcends borders and demands global solutions.

Figure 1. Waste Projections and Distribution by Region



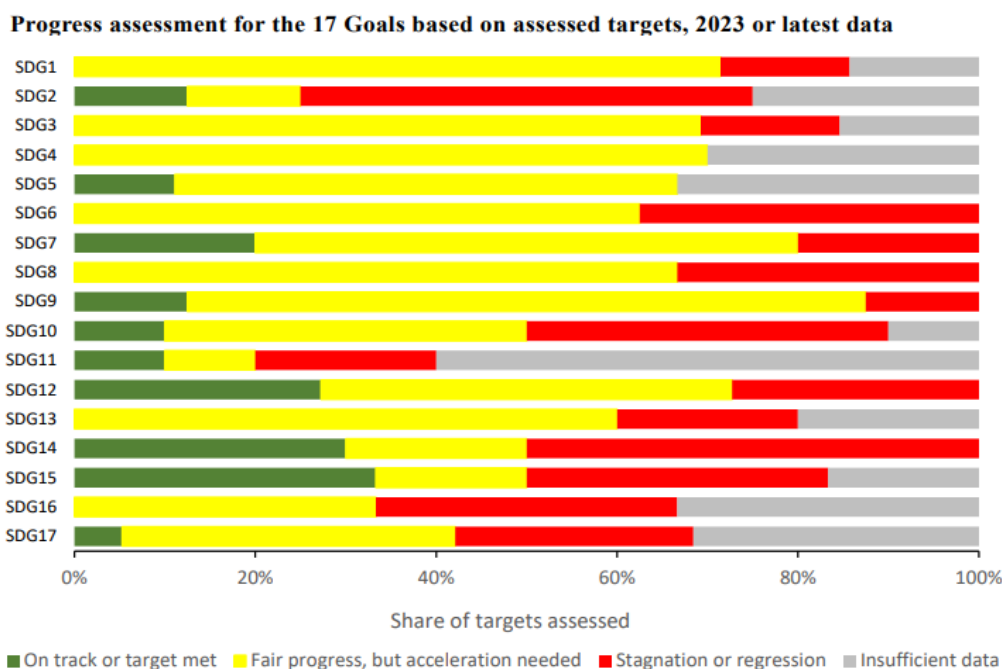
Source: World Bank, 2018

The Sustainable Development Goals and Data Gaps for Solid Waste Management

Advancing a circular economy around key resources presents co-benefits and synergies to accelerate progress across the SDGs and key social, economic and environmental targets. In fact, effective, integrated waste management contributes to all 17 UN Sustainable Development Goals (UNEP, 2019a). [Section 3.1. on the Sustainable Development Goals](#) outlines the implicit and explicit links.

A key obstacle to achieving sustainable waste and resource management in countries is limited data availability. Waste-related SDG Indicators have mostly Tier II level data which means it is not produced regularly by countries (UN, 2023b). In particular, SDG 11, which entails the primary indicator to monitor Solid Waste Management, has the most insufficient data among 17 SDGs ([Figure 2](#)). In general, the level of waste-data reported to the international community varies depending on national capacities.

Figure 2. Available Data for progress assessment on the SDGs



Source: UN, 2023.

II. The Global Context on Solid Waste and Zero Waste Initiatives

a. Global Governance on Solid Waste

This section reviews recent progress related to global agreements and declarations for solid waste management. With 187 member states or parties, the Basel Convention is the main global governance instrument for the hazardous impacts of waste. The *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal* was adopted on 22 March 1989 by the Conference of Plenipotentiaries in Basel, Switzerland, and entered into force in 1992. The Basel Convention aims to protect human health and the environment against the adverse effects of a wide range of hazardous wastes, according to origin and/or composition, as well as two types of wastes defined as “other wastes” - household waste and incinerator ash.

The Basel Convention aims for i) the reduction of hazardous waste generation and the promotion of environmentally sound management of hazardous wastes, wherever the place of disposal; ii) the restriction of transboundary movements of hazardous wastes except where it is perceived to be in accordance with the principles of environmentally sound management; and iii) a regulatory system applying to cases where transboundary movements are permissible.

Many countries, however, differ in their classification of household waste as hazardous and are struggling to meet challenges of what is classified as non-hazardous waste, such as plastics, textiles, organic and more solid waste streams – in fact, this is a general challenge within the sector, with terminology varying by country ([Table 1](#) provides examples of terminology and classification from 5 countries).

Table 1. Differences in Terminology and Classification for Waste Across Countries⁹

Term	Korea	Viet Nam	Morocco	Cambodia
Waste	<ul style="list-style-type: none"> • Trash, combustion materials, sludge, waste oil, waste acid, waste alkali, and animal carcasses, etc., that have become unnecessary for human life or business activities 	<ul style="list-style-type: none"> • Solid, liquid, gaseous and other forms of substances discharged from production, services, business, daily life and other activities 	<ul style="list-style-type: none"> • Residues from extraction, development, transformation, production, consumption, use, control or filtration processes 	<ul style="list-style-type: none"> • Using thing and products remained or generated from human daily activities and livelihood which does not consist of toxic substances or hazardous wastes
Classification	<ul style="list-style-type: none"> • Classification by legal provisions - Household Waste - Workplace waste - Designated waste - Medical Waste 	<ul style="list-style-type: none"> • Classification of Statutory Provisions - Household Solid Waste - Industrial Solid Waste - Hazardous Waste 	<ul style="list-style-type: none"> • Classification of Statutory Provisions - Household Waste - Household-like Waste - Industrial Waste - Medical and pharmaceutical waste - Hazardous Waste - Inert Waste - Agricultural Waste - End-of-life waste - Biodegradable waste 	<ul style="list-style-type: none"> • Glossary Classification - Municipal Solid Waste - Industrial Waste - Hazardous Waste
Waste management Steps	<ul style="list-style-type: none"> • Definition - Receiving, transporting, storing, treating, and disposing of waste, and all activities for this purpose 	<ul style="list-style-type: none"> • Definition - None 	<ul style="list-style-type: none"> • Definition - The collection, storage, sorting, transportation, landfilling, treatment, recovery, recycling, and disposal of waste 	<ul style="list-style-type: none"> • Definition - None
	<ul style="list-style-type: none"> • Scope - Transportation - Storage - Treatment - Disposal 	<ul style="list-style-type: none"> • Scope - Disposal - Reuse - Recycling 	<ul style="list-style-type: none"> • Scope - Collection - Storage - Treatment - Disposal - Recovery 	<ul style="list-style-type: none"> • Scope - Sorting - Disposal - Recycling - Reuse
Treatment	<ul style="list-style-type: none"> • Type - Collection/Transportation - Storage - Recycling - Disposal 	<ul style="list-style-type: none"> • Type - None 	<ul style="list-style-type: none"> • Type - Physical Treatment - Chemical Treatment - Thermal Treatment - Biological Treatment 	<ul style="list-style-type: none"> • Type - None
Disposal	<ul style="list-style-type: none"> • Type - Incineration - Neutralization /Shredding - Solidification - Landfill - Ocean Discharge 	<ul style="list-style-type: none"> • Type - Abatement /Elimination - Separation/Isolation - Incineration - Landfill 	<ul style="list-style-type: none"> • Type - Storage - Incineration - Dumping(Control) - Other operations 	<ul style="list-style-type: none"> • Type - None

The scope of this paper and policy support it covers does not include hazardous waste materials as governed by the Basel Convention and other agreements.

This background paper aims to focus on integrated solid waste management and household waste from a non-hazardous perspective, where this waste is often destined towards landfills, open burning and potential resource recovery schemes to achieve a circular economy and sustainable development.

⁹ Korea: Waste Control Act, Viet Nam: Law on protection of the environment; Morocco: Law No. 28-00, on waste management and disposal; Cambodia: No 113 ANKr.BK – Sub decree on Management of Garbage and Solid Waste of Downtowns

Sustainable Development Goals

Adopted unanimously by UN member states in 2015, Waste management is well embedded within the 2030 Agenda and its 17 Sustainable Development Goals (SDGs). Waste management has strong linkages to a range of other global challenges that the Sustainable Development Goals equally aim to tackle while leaving no one behind including health, climate change, poverty reduction, security, and sustainable consumption and production – waste-related goals are explicit or implicit in all 17 SDGs ([Table 2](#)). Further details on the SDG waste-related indicators can be found in [Section 3.3 SDG Waste indicators](#).

In this context, the Global Waste Management Outlook (UNEP, 2015) highlights waste management as a priority that will facilitate the progress of most of the SDGs. Moreover, it also emphasizes “resource management” which has been the current mainstream within the ‘circular economy’, addressing the waste problem at its source through effective and efficient planning to prevent its generation, otherwise known as *designing out waste (DoW)*.

Table 2. Contribution of integrated waste management to the Sustainable Development Goals

The Importance of Integrated Waste Management to Achieving		1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	4 QUALITY EDUCATION	5 GENDER EQUALITY	
							
	Waste picking is an important livelihood for the urban poor	Organic waste can fertilize new food	Integrated Waste Management prevents disease and food contamination	Environmental and health training awareness	Relieve undue burden of poor waste management on women		
							
	Better Integrated Waste Management goes hand-in-hand with better WASH	Waste to energy as an optional energy source	Green job growth in collection, reuse, recycling and treatment	Research and Development in reduction, recycling and treatment innovation	Integrated Waste Management can increase the economic potential of the urban poor	Integrated Waste Management makes cities more sustainable	
							
Shift to waste reduction and resource management	Reduce greenhouse gases through less dumping and burning	Protect the marine environment from land-based activities	Less land pollution leads to healthier environments	Better governance of environment and resources	Work together and create public-private partnerships		

Graphic supplied with assistance from Zoë Lenkiewicz, WasteAid UK and contributor to Be Waste Wise

Source: UNEP, 2019a.

UN DESA International Partnership for Expanding Waste Management Services of Local Authorities (IPLA)

The UN DESA Centre for Regional Development started the International Partnership for Expanding Waste Management Services of Local Authorities (IPLA) in 2010 to focus primarily on supporting and promoting sustainable waste management practices at the local level. IPLA facilitates knowledge exchange, capacity-building, and partnerships between local authorities, relevant stakeholders, and international organizations to address waste management challenges and zero waste practices at the local level. Through the creation of advisory boards, networks and multiple bodies, this international partnership has advanced the concept of zero waste with local governments over many years, starting with a declaration in 2011. An overview of the declarations is in [Table 3](#), below.

Table 3: International Partnership for Expanding Waste Management Services of Local Authorities (IPLA) Declarations

Declaration	Date and Place	Description
Moscow IPLA Declaration on Regional Cooperation for Waste Exchange and Resource Recovery towards Circular Economic Development	6-8 October 2015, Moscow, Russian Federation	This declaration recognized the importance of exchanging practical experiences and ideas in 3R and waste management areas among different regions to foster a circular economy.
São Paulo Declaration of Municipalities and Local Authorities for Scaling up of National and International Public-Private Partnerships in Waste Sector for Achieving Sustainable and Resilient Cities	8-10 September 2014, São Paulo, Brazil	By capitalizing on the expertise and resources of both public and private sectors, this declaration aimed to strengthen waste management systems, promote sustainable practices, and enhance overall urban resilience.
Borås Declaration of the Private Sector on Moving Towards Resource Efficient and Zero Waste Societies	9-11 September 2013, Borås, Sweden	This declaration recognized that the private sector has a crucial role in driving change and catalyzing sustainable development.
Marrakech declaration towards "Greening" the Waste Sector	15 to 17 May 2012 Marrakech, Morocco	This declaration recognized the urgent need to address the environmental and social impacts of waste management.
Declaration for Moving towards Zero Waste through IPLA	18 October 2011, Daegu, Republic of Korea	This declaration acknowledged the critical role of local authorities in addressing waste management challenges and aimed to encourage collaboration between governments, communities, and relevant stakeholders.

Source: UNCRD, 2023.

UN resolution: Promoting zero-waste initiatives to advance the 2030 Agenda for Sustainable Development

UN resolution A/RES/77/161, adopted by the General Assembly on 14 December 2022, focuses on promoting zero-waste initiatives as a crucial means of advancing the 2030 Agenda for Sustainable Development. Through this resolution, the UN reaffirms its commitment to achieving a more sustainable and waste-free future.

Recognizing the urgent need to address global waste generation and its environmental impact, this resolution emphasizes the importance of transitioning towards a more sustainable and circular economy. The resolution encourages member states to adopt and implement policies that promote waste reduction, recycling, and resource recovery in all sectors. A/RES/77/161 highlights the role of innovation, technology transfer, and capacity-building in driving the shift towards zero waste, recognizing that waste management systems need to be efficient, equitable, and environmentally sound. By aligning zero-waste initiatives with the 2030 Agenda, the resolution seeks to contribute to sustainable consumption and production patterns, protect ecosystems, mitigate climate change, and promote inclusive and sustainable economic growth. It calls for international cooperation, partnerships, and knowledge sharing to accelerate the adoption of zero-waste practices worldwide, emphasizing collaboration between governments, civil society, private sector, and other stakeholders.

Importantly, it acknowledges the significance of success stories from Member States in developing and implementing innovative solid waste management solutions and technologies to foster environmentally sound waste management, reduction and prevention. In this regard, the resolution highlights knowledge transfer as key to driving sound waste management and requests an advisory board be set up for a period of three years to “promote local and national zero-waste initiatives through, inter alia, the dissemination of best practices and success stories, based on the work of, and without duplication with, relevant existing regional and global platforms, the United Nations Environment Programme and the United Nations Human Settlements Programme (UN-Habitat), within their respective mandates.”

Finally, as mentioned earlier in the report, the resolution also proclaimed 30 March to be the International Day of Zero Waste to be observed annually, whereby, raising global awareness of the global waste crisis, providing an opportunity for education and information sharing, and acting as a platform for advocacy.

The above section is a non-exhaustive look at global governance thus far for solid waste management.

b. Global outreach and support

i. International Organizations Associated with Waste

The following provides an overview of the international organizations (IOs) associated with waste. Please refer to [Annex 1](#) for the list of IO key publications on waste from 2021–2022.

United Nations Environment Programme (UNEP): As the leading global authority on the environment, UNEP serves as the custodian for 25 SDG indicators, including 8 of the 12 indicators for SDG 12. In March 2022, the 5th UN Environment Assembly (UNEP's governing council) resolved to establish a 'Binding international agreement to combat plastic pollution' with the goal of completing it by 2024. That December, the 'Kunming-Montreal Global Biodiversity Framework' was officially adopted, setting a global target to reduce the consumption footprint by halving food waste and reducing overconsumption and waste generation by 2030. In September 2023, UNEP held the 5th International Conference on Chemicals Management (ICCM 5), where, in support of a planet free of harm from chemicals and waste, member states adopted the Global Framework on Chemicals outlining a roadmap for countries and stakeholders to collaboratively address the lifecycle of chemicals, including products and waste, the Bonn Declaration, and a UNEP Administered Global Framework on Chemicals Fund.¹⁰

United Nations Human Settlements Programme (UN-Habitat): As a custodian institution for SDG indicator 11.6.1: Municipal Solid Waste Management, UN-Habitat supports local governments in addressing the increase of municipal solid waste and promoting a circular economy. The "Waste Wise Cities" campaign provides a platform for sharing experiences and best practices in waste management at the local level. UN-Habitat developed the "Sustainable Solid Waste Management Framework" to improve municipal waste management and resource efficiency by providing waste data, monitoring, training and outreach, and project finance, as well as financing feasibility assistance for project proposals.

United Nations Department of Economic and Social Affairs (UNDESA) – Statistics Division (UNSD): Since 1999, the UNDESA Statistic's Division has collected biennial Environmental Statistics Surveys of UN member states to collect data on waste and water. European Union and OECD member countries, as well as candidate countries for accession, are not surveyed, however, the OECD/Eurostat Questionnaire on Environmental Statistics provides the data for OECD and EU member countries, whereby, complementing the UNSD/UNEP questionnaire.¹¹

In September 2022, the 10th round of data collection on waste and water was conducted through the 2022 Environmental Statistics Survey, covering approximately 163 countries. Data outputs were made publicly available in the form of environmental indicators, country files¹², and country snapshots or as customized queries upon request. The survey also provides waste generation, collection, and recycling data by type of waste (hazardous, municipal solids, and, as a result of a collaboration with UNITAR, e-waste¹³). UNDESA Statistics Division usually publishes statistical compilations, including specialty areas as seen in Figure 3 below.

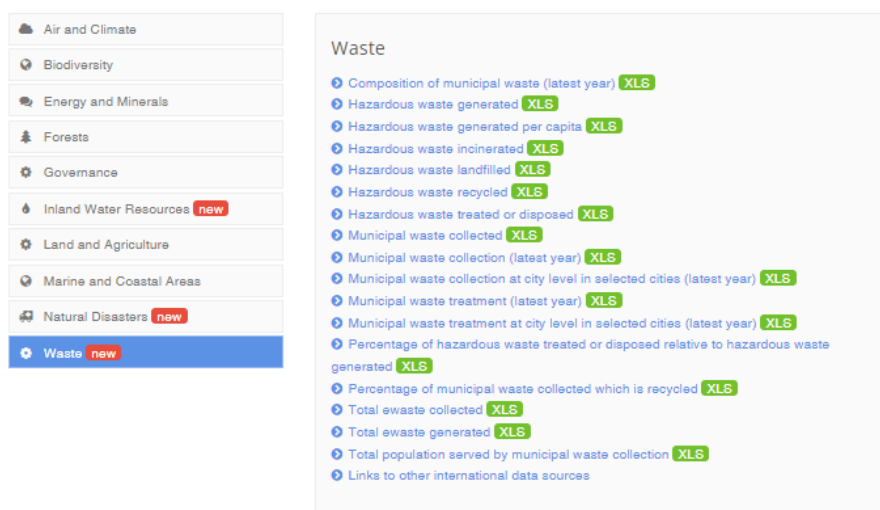
¹⁰ <https://staging.saicm.org/events/iccm5>

¹¹ OECD/Eurostat questionnaire data: <https://stats.oecd.org/>; <https://ec.europa.eu/eurostat/data/database>

¹² UNSD/UNEP Country Files: https://unstats.un.org/unsd/envstats/country_files

¹³ UNITAR's global and regional e-waste monitors: <https://ewastemonitor.info/>

Figure 3. Data on waste among the UN Statistics Division environmental indicators



Source: UN DESA Statistics Division 2023.

Food and Agriculture Organization of the United Nations (FAO): FAO collects, analyzes, and disseminates reliable statistics on the agricultural sector to support data-driven food security policy formulation. The “2022-31 Strategic Framework” was launched in 2021 to provide a clear and concrete policy roadmap for food loss and waste reduction at the food supply chain, food environment and consumer levels (FAO, 2021).




FAO operates workshops and e-learning courses to develop statistical capacity on SDG monitoring and indicator measurement; provide training on calculation methods for managing the Food Loss Index, a sub-indicator for SDG 12.3.1: *Global Food Loss and Waste*; and undertake food loss analyses in selected food supply chains, through case study methodology, whereby identifying key loss points and recommending feasible strategies.



World Trade Organization (WTO): WTO is the only global international organization dealing with the rules of trade between nations. Its recent Dialogue on Plastics Pollution and Environmentally Sustainable Plastics Trade has resulted in a draft statement outlining shared principles and concrete actions related to trade aimed at reducing plastics pollution, an official statement is planned at the WTO ministerial conference in 2024 (WTO, 2023). The dialogue and statement demonstrate the WTO's strong commitment to implementing a future binding agreement on plastics pollution and the assertion that environmentally sustainable plastics trade can create economic opportunities, drive innovation, and contribute to achieving the SDGs.

ii. International Guidelines and Tools for National Waste Management

The United Nations system has produced a variety of national guidelines to strengthen policy for national waste management, as have other development actors. The following table summarises these key guidelines and knowledge documents.

UNEP

Title	Main content
<p>INTEGRATED WASTE MANAGEMENT SCOREBOARD: A tool to measure performance in municipal solid waste management (2005)</p> 	<ul style="list-style-type: none"> ■ Purpose: To improve solid waste management practices in local governments ■ Key Takeaways: Provides methodologies for evaluating solid waste programs and systems at the national, state, provincial, regional, city, community, and institutional levels <p>Example of Performance Indicators by Waste Management Stages</p> <p>General: Demographic information, Waste generation, Waste characterization</p> <p>Collection, Transportation, Resource recovery, Final disposition: Performance indicators, Resource input indicators, Efficiency indicators</p>
<p>Developing ISWM Plan: Training Manual (2009)</p> 	<ul style="list-style-type: none"> ■ Purpose: To respond to capacity building and technology transfer under the Bali Strategic Plan. ■ Key Takeaways <p>Vol.1 (Waste Characterization and Quantification with Future Prediction)</p> <ul style="list-style-type: none"> ○ Collecting and analyzing waste data consists of Sample collection - Waste quantification - Waste characterization - Data analysis - Waste composition determination' <p>Vol. 2 (Current Waste Management System and Gap Assessment)</p> <ul style="list-style-type: none"> ○ The concept of ISWM is categorized into 3 types: life-cycle, source, management-based ○ Considering the following points when evaluating solid waste: Policy, Institution, Financial mechanism, Technology infrastructure, Stakeholder engagement <p>Vol. 3 (Goals and Concerns for ISWM)</p> <ul style="list-style-type: none"> ○ The goal-setting phase consists of setting goals, setting targets, communicating with stakeholders, and reviewing progress ○ Issues on Waste Type and Management Stage <ul style="list-style-type: none"> ● Waste type: Urban solid waste, industrial waste ● Management stage: Separate Collection, Collection, Transportation, Treatment, Disposal, Recycling <p>- Vol. 4 (ISWM Plan)</p> <p>Strategic planning is a proactive, goal-oriented methodology that involves selection among alternatives, prioritization of choices, and timing of implementation, taking into account social, environmental, and economic factors simultaneously.</p>
<p>Guidelines for National Waste Management Strategies (2013)</p> 	<ul style="list-style-type: none"> ■ Purpose: To improve disorganized and unplanned waste management approaches in developing countries ■ Key Takeaways: 6 Steps to Developing a National Strategy <p>Step 1: Collect essential information and provide a rationale through an analysis of implementing actors and a baseline study</p> <p>Step 2: Analyze the basic elements of the national strategy (scope, objectives and target identification, benefits, financing and capacity, timeline, national policy linkages, etc.)</p> <p>Step 3: Identify and engage stakeholders relevant to waste management (national, local government, private sector, service providers, informal sector, etc.)</p> <p>Step 4: Analyze the situation and gaps (applicable technical infrastructure, legal and institutional settings, human resources and capacities, etc.)</p> <p>Step 5: Set priorities (consider key issues such as collection and treatment)</p> <p>Step 6: Policy selection and draft national strategy</p>

Title	Main content
<p>Waste Wise Cities Tool (2021)</p> 	<ul style="list-style-type: none"> ■ Purpose: To monitor SDG 11.6.1 indicator consistent with other waste statistics systems around the world ■ Key Takeaways <p>The data collection methodology for municipal solid waste generated, collected, and managed at controlled facilities consists of seven steps. SDG 11.6.1 present three data items required for the calculation of the indicator and three additional data for evaluation.</p> <ol style="list-style-type: none"> ① Data items (total municipal solid waste generated, total municipal solid waste collected, total municipal solid waste managed in controlled facilities) ② Additional data items (per capita municipal solid waste generation rate, municipal solid waste composition, and uncollected waste)
<p>Waste Wise Cities Advocacy Toolkit (2019)</p> 	<ul style="list-style-type: none"> ■ Purpose: To raise awareness of urban authorities to community waste management issues and promote support for improvement ■ Key Takeaways <p>Education and awareness strategy campaign to achieve sustainable resource and solid waste management in cities</p>

c. International Statistics and Data on Solid Waste

i. UNDESA Statistics Division

Currently, data for key indicators under relevant municipal solid waste targets is completed through data collection effort such as the UNSD/UNEP Questionnaire on Environment Statistics (waste section). The original meta data is sourced from national governments, including National Statistical Offices (NSOs), Ministries of Environment and other relevant organizations. The custodian agencies for key targets such as 12.5 are United Nations Environment Programme (UNEP), United Nations Institute for Training and Research (UNITAR) and ultimate the UNDESA Statistics Division. The UN DESA Statistics Division conducts a "Questionnaire on Environment Statistics" every two years to collect data on waste and water among other areas.¹⁴

- Data items: Municipal solid waste, hazardous waste, e-waste
- Data collection period: 26 years (1990, 1995-2019)
- Reporting countries*: 148 countries (high-income countries: 53, upper-middle-income countries: 45, lower-middle-income countries: 34, low-income countries: 16)

* All countries reporting at least one data item more than once during the collection period

UNDESA Statistics Division analyzed seven items with data available to identify the collecting period and aggregated from the UN, OECD, and Eurostat.

- Data items analyzed: municipal solid waste (collection volume, recycling rate), hazardous waste (generation volume, incineration volume, landfill volume, recycling volume, treatment and disposal volume)

* Data on the rate of treatment and disposal of hazardous waste data were excluded to prevent duplicated analysis.

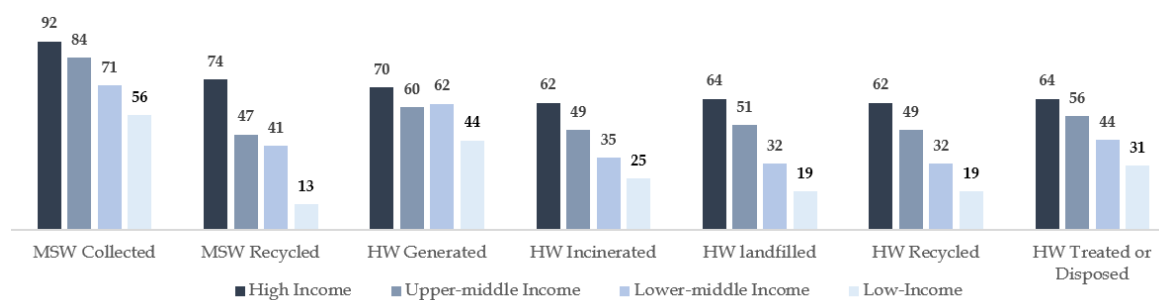
¹⁴ <https://unstats.un.org/unsd/envstats/index.cshtml>

Item	Target Period	Reporting items	Calculation Method
Reporting rate	26 years total (1990, 1995-2019)	7 items 1. Municipal solid waste - Collection volume, recycling rate	Number of countries reporting per item/ Total number of countries Ratio (%)
Reporting Fulfillment Rate			Years of data retention (During the entire reporting period) Years_
Data recency		2. Hazardous Waste - Amount generated, incineration, landfill, recycling, treatment, and disposal	Average of the most recent data per item per reporting year
Average number of items reported		11 items 1. Municipal Solid Waste - Collection volume, recycling rate, treatment volume, composition 2. Hazardous Waste - Amount generated, incineration, landfill, recycling, treatment, and disposal 3. Electronic Waste - Amount Generated, Amount Collected	Average number of reportable items (11) by income group

Reporting rate

The highest reporting rate was found for the "Municipal solid waste collection" category, with a trend toward higher reporting rates at higher income levels. In particular, low-income countries reported significantly lower rates of recycling than other categories ([Figure 4](#)).

Figure 4. Reporting Rate by Income Level (%)

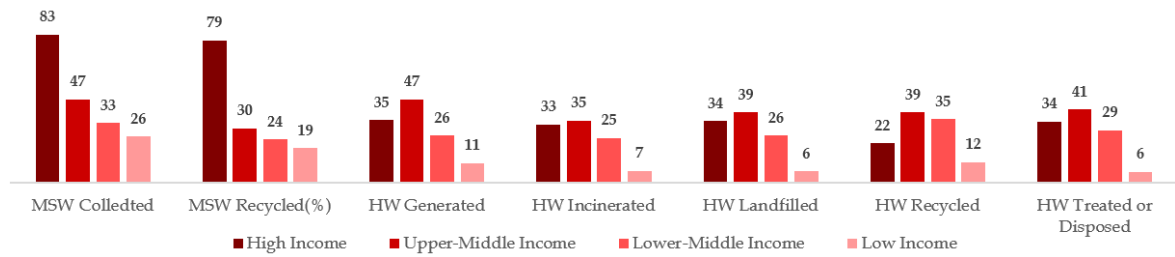


Reporting fulfillment rate

High-income countries have a high reporting rate of about 80 per cent for the target period in the category of municipal solid waste.

Excluding this, the reporting rate is less than 50 per cent, indicating a Tier 2 result. Low-income countries have a very low reporting rate of around 10 per cent for the hazardous waste category, as per the Basel Convention.

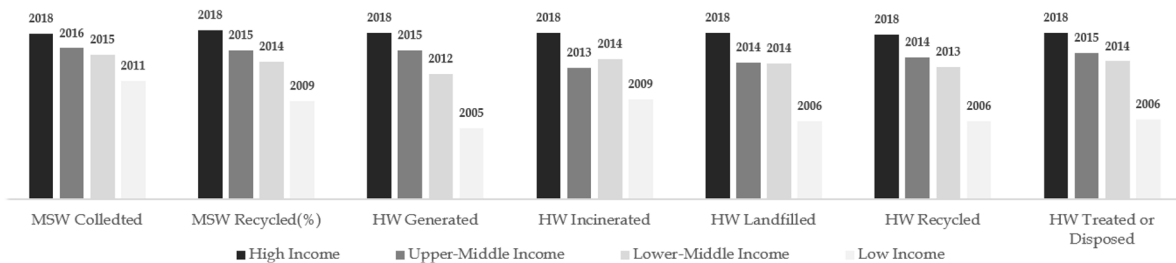
Figure 5. Reporting fulfillment rate by income level (%)



Data recency

High-income countries reported the most recent data of 2018 for all seven categories, given that the data collection period runs through 2019 (Figure 6). Low-income countries reported data on municipal solid waste in 2010 and hazardous waste in 2006, indicating a lack of up-to-date data.

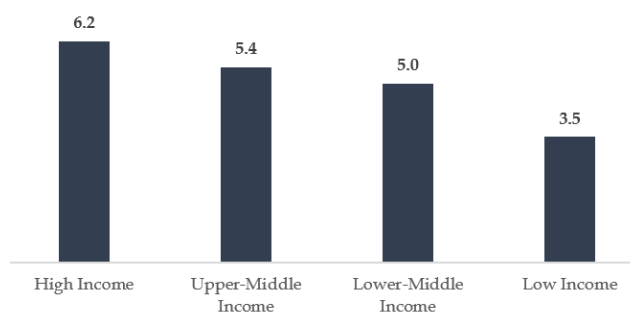
Figure 6. Data recency by income level (year)



Average number of items reported

The average number of reported items in high-income countries is 6.2, and the average in low-income countries is 3.5, with a correlation between a country’s income and data reporting on solid waste.

Figure 7. Average number of report items by income level (pcs.)



ii. SDG Waste Indicators and data

The SDG waste indicators are internationally recognized and provide countries and institutions with a clear methodology for data collection. The indicators relating to waste management are detailed in [Table 4](#):

Table 4. SDG Indicators with direct focus on waste

SDG	Indicator
11	<ul style="list-style-type: none"> 11.6.1: Municipal Solid Waste Management
12	<ul style="list-style-type: none"> 12.3.1: Food Loss and Waste 12.4.1: Information Transmitted under Chemicals and Waste Conventions 12.4.2: Hazardous Waste Generated and Treated 12.5.1: National Recycling Rate
14	<ul style="list-style-type: none"> 14.1.1: Coastal Eutrophication and Plastic Debris Density

Source: UN, 2023c.

SDG indicator data is disaggregated by country/group (region, income, etc.) according to SDG indicators: 11.6.1, 12.1.1, 12.3.1, 12.4.1, 12.4.2, 12.5.1

- Data collection period: Varies by SDG indicator

Countries reporting: 202 countries (high-income countries: 67, upper-middle-income countries: 54, lower-middle-income countries: 53, and low-income countries: 28) (Table 5, below).¹⁵

Table 5. Data information by SDG indicator

SDG Indicators	Data Collection Period	Number of countries covered	Reporting Items
11.6.1	2001~2018	109	<ul style="list-style-type: none"> Municipal solid waste collection coverage by city (%)
12.1.1	2017	25	<ul style="list-style-type: none"> Number of countries mainstreaming sustainable consumption and production policies Countries with sustainable consumption and production policy instruments Number of policies, instruments and mechanisms in place for sustainable consumption production
12.3.1	2019	202	<ul style="list-style-type: none"> Food waste volume Food waste per capita
12.4.1	2015~2019	193	<ul style="list-style-type: none"> Parties to Basel Convention obligations Parties to the Minamata Convention Parties to the Montreal Convention obligations Parties to the Rotterdam Convention Parties to Stockholm Convention obligations
12.4.2	2016, 2019~2020	108	<ul style="list-style-type: none"> E-waste collected (kg per capita) E-waste collection rate (%) E-waste collected (tons) E-waste generated (kg per capita) E-waste generated (tons) Hazardous Waste Exported (tons) Hazardous waste generated per GDP (Kg per US\$ in 2015) Hazardous waste generated (tons) Hazardous waste imported (tons) Hazardous waste generated per capita (Kg) Hazardous waste treated by treatment type (tons) Percentage of hazardous waste treated or processed (%) Hazardous waste treated or disposed of (tons) Urban waste collected (tons) Urban waste generated (tons) Disposed of municipal waste by treatment type (%) Total waste generated by activity (tons)
12.5.1	2016, 2019	53	<ul style="list-style-type: none"> E-waste recycled (tons) E-waste recycled per capita (kg) Urban waste recycled (tons)

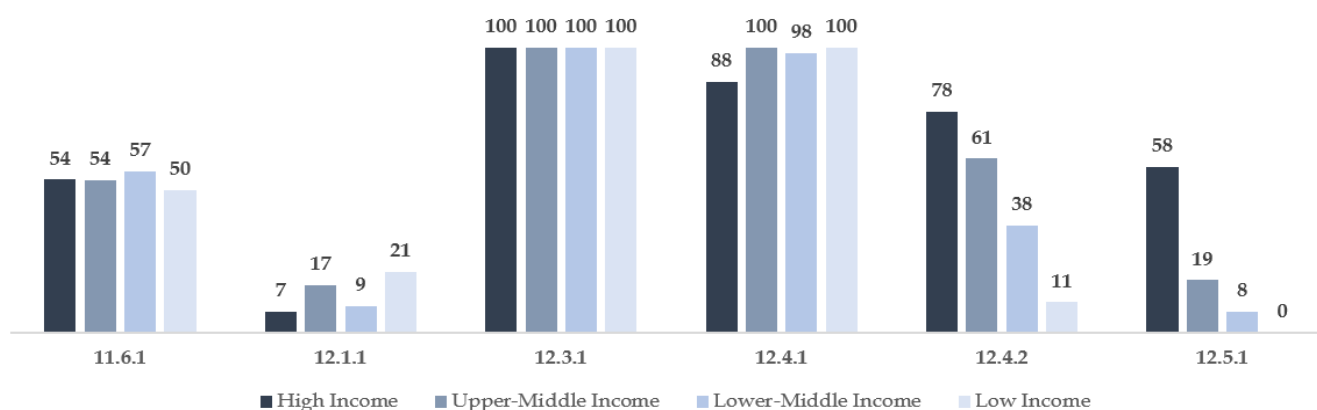
¹⁵ <https://unstats.un.org/sdgs/dataportal/database> (Geographic Areas (Countries)>Only country>Except overseas>Territory (ex. Anguilla))

i. Reporting rates

The reporting rates of SDG indicators show different characteristics depending on the income level.

- 11.6.1: No significant differences in reporting rates by income level
- 12.1.1, 12.4.1: Low-income countries tend to have higher rates
- 12.3.1: 100 per cent reporting by all countries
- 12.4.2, 12.5.1: Global gaps in reporting rates by income level

Figure 8. SDG indicator reporting rates by income level (%)

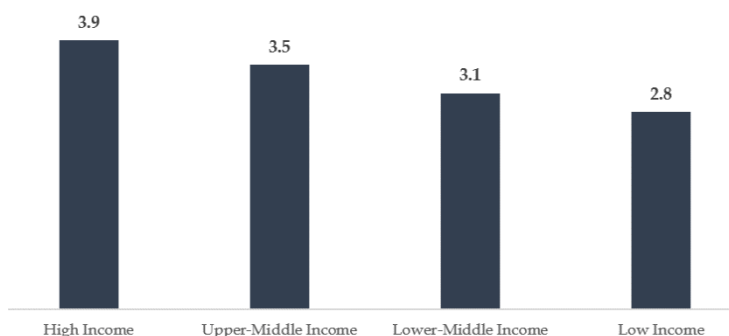


ii. Average number of SDG indicators reported

The average number of SDG indicators reported by high-income countries is 3.9, while low-income countries report an average of 2.8.

Low-income countries have gaps in the number of indicators reported, especially for 12.4.2 (hazardous waste) and 12.5.1 (recycling).

Figure 9. Average number of SDG indicators reported by income level

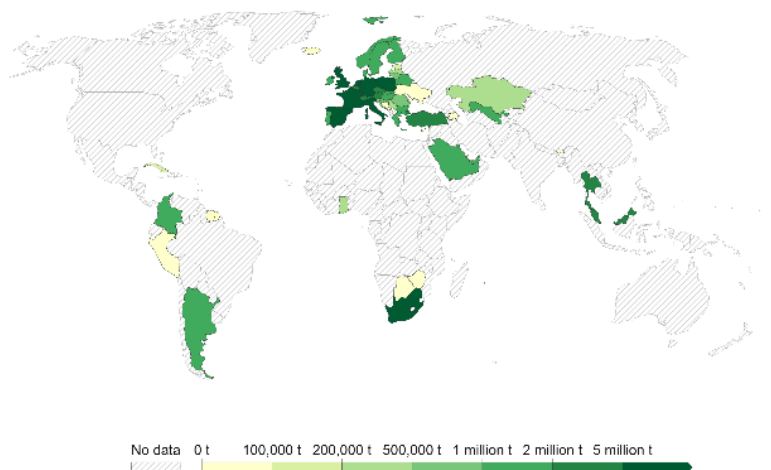


When it comes to 12.5.1, which tracks the national recycling rate including municipal (household) waste and electronic waste, very limited data is available globally. As most of the municipal waste data would be collected by local authorities, this shows a lack of capacity to overcome data gaps at local level. It also shows that there is a need for national to local data coordination to strengthen monitoring and reporting at country level on national recycling rates for example. Figure 10 below shows that municipal waste on recycling is mostly being reported in European and some developing countries, however national recycling rate data is vastly underreported for nearly all countries.

Figure 10. Municipal waste recycled, SDG 12.5.1

Municipal waste recycled, 2021

Municipal waste is waste from households and businesses, that would be collected by local authorities.



Source: UN Statistics Division

OurWorldInData.org/waste-management • CC BY

There are further data gaps in strengthening global country data on non-hazardous solid waste recycling and recovery. For specific waste streams such as plastics, e-waste, and hazardous waste, UN and government initiatives have strengthened available data but more needs to be done to provide an integrated picture on national solid waste recycling and management.

Finally, closing data gaps on what is often an informal sector in developing countries is a key priority for the 2030 Agenda to ensure the principles of Leaving No One Behind can be fully achieved. Many countries today rely on informal recycling and resource recovery initiatives, which is advancing resource circularity and zero-waste but often with in situations of vulnerability and with limited data on the positive or negative externalities, limited the reach and impact of policy. Gender differences and women's vulnerability is particularly apparent in the sector, which absorbs women unable to work formally with lower wages than men operating in the sector as data from country field studies show.¹⁶ The sector's critical role needs to be fully acknowledged by establishing and securing the legal frameworks and policies necessary to improve the working conditions and standards of living for those within the sector.

Data on National Waste Management Challenges as reported in Voluntary National Reviews

Based on nationally reported data, the Voluntary National Reviews (VNR) provide a better understanding of a country's waste management situation by encompassing national policies and strategies. The following is an example of how Voluntary National Reviews provide data on solid waste management policy progress based on a selected number of countries that reported in recent years. The impact of the COVID-19 pandemic is reported as a driver for increased waste generation across countries, with the most common challenges being low resource recovery, as well as a lack of data, capacity, and integrated national governance on waste across these countries.

¹⁶

Kristanto GA, Kemala D, Nandhita PA. Challenges confronting waste pickers in Indonesia: An on-field analysis. *Waste Management & Research*. 2022;40(9):1381-1389. doi:10.1177/0734242X211029181

- i. Cambodia (Government of the Kingdom of Cambodia, 2019)
 - Management Status: A data platform was established to provide environmental knowledge information.
 - Challenges:
 - Limited awareness of environmental protection among stakeholders and citizens.
 - Lack of personnel to conduct research and weak enforcement level.
 - Inefficiencies due to different ministries responsible for the implementation, measurement, reporting, and verification of hazardous waste reduction plans.
 - Absence of governmental agency to treat hazardous substances.
 - Need for technical support to collect data on sources of pollution, including solid wastes and liquid wastes, and the management and monitoring of industrial wastes.
- ii. Indonesia (Government of the Republic of Indonesia, 2021)
 - Management status: Data is collected through a waste management information system by the Ministry of Environment and Industry.
 - Challenges:
 - Lack of integrated waste management infrastructure.
 - Lack of waste transportation and geographical accessibility issues.
 - Open system operation of existing landfills.
 - Decentralization and financing of waste management.
- iii. Philippines (Government of the Republic of the Philippines, 2022)
 - Management Status: National Implementation Plan for the Prevention, Reduction and Management of Marine Waste Generation was established with the goal of zero waste in Philippine waters by 2040.
 - Challenges: Damage to fishing, shipping, and marine industries due to waste plastics.
- iv. Uzbekistan (Government of the Republic of Uzbekistan, 2020)
 - Management Status: Piloting the Digital Platform Center for Regional Management in Tashkent is ongoing.
 - Challenges: Low rate of proper waste disposal and generation of hazardous-grade toxic waste products.
- v. Viet Nam (Government of the Socialist Republic of Viet Nam, 2018)
 - Management Status: Waste management has been improved through national initiatives such as establishing the National Strategy for Sustainable Development and the National Strategy for Green Growth.
 - Challenges: While SDG monitoring, evaluation roadmap, and indicator systems have been developed to manage data, data in the waste sector is still missing.
- vi. El Salvador (Government of the Republic of El Salvador, 2022)
 - Management Status: In 2020, the "Integrated Management of Waste and Recycling Promotion Act" was enacted, and 12.3 and 12.4 were selected as SDGs to be prioritized for achievement in 2022.
 - Challenges: Lack of demand for processed products and knowledge about environmental responsibility.

- vii. Morocco (Government of the Kingdom of Morocco, 2020)
 - Management Status: A national household waste program is implemented to improve waste collection rates and the percentage of controlled landfills.
 - Challenges: Unsanitary areas due to rapid urbanization and very low recycling rate
- viii. Ethiopia (Government of the Federal Democratic Republic of Ethiopia, 2022)
 - Management status: Coverage of solid waste collection and disposal improved from 30 per cent in 2019/20 to 40 per cent 2020/21. The government has developed strategies for inclusive socio-economic transformation towards low-carbon resource efficiency, including Solid Waste Management proclamation.
 - Challenges: Insufficient information to assess the progress of the implementation in waste and resource management strategies.
- ix. Ghana (Government of the Republic of Ghana, 2022)
 - Management Status: The National Plastic Management Policy in 2020 has been implemented. A recycling plant through public-private cooperation was established and commissioned.
 - Challenges: Urban-rural disparity in waste disposal methods, Public dumping, and low recycling levels
- x. Cabo Verde (Government of the Republic of Cabo Verde, 2021)
 - Management Status: Not only was the '2030 Goal Plan for Sustainable Waste Management' established, but the 'National Food Management System and Food Early Warning Integrated System' was institutionalized.
 - Challenges: Suspension of the solid waste management system due to movement restrictions under the influence of COVID-19
- xi. Egypt (Government of the Arab Republic of Egypt, 2021)
 - Management Status: National Solid Waste Management Program (NSWMP) is operated.
 - Challenges: Significantly lower recycling rate compared to the waste collection rate; Significant disparities in waste management between states; and 22 per cent of food lost in production, transportation, and consumption due to COVID-19

III. National Policy Progress from Integrated Solid Waste Management towards a Zero-Waste World

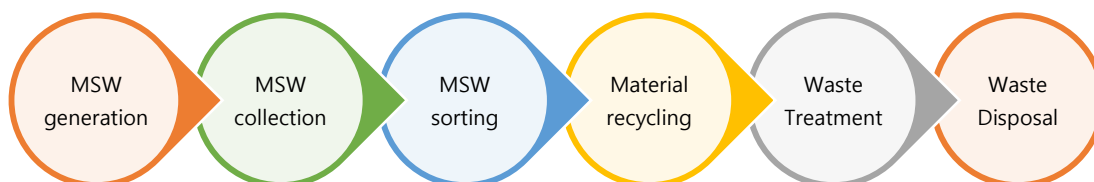
a. Key Considerations on Policy Progress

Zero waste policies are strategies and initiatives that aim to minimize waste generation and maximize resource efficiency through promoting waste prevention, recycling, composting, and other sustainable waste management practices. Policies may also focus on the producer as well as the consumer, for example, extended producer responsibility (EPR), which holds manufacturers accountable for the entire lifecycle of their products and provides incentives for them to design products that are recyclable, reusable, or easily repaired. *The ISWM approach* is fundamental to achieve zero waste as it encompasses an integrated and holistic approach for waste minimization (Seadon, 2006).

To ensure an ISWM approach, academic and policy circles have adopted the lifecycle approach into policy. The lifecycle approach to waste management is based on the concept of the lifecycle assessment of a product

or service which allows to deal with the waste stream 'from cradle to grave'. The main stages in the lifecycle of solid waste comprise generation, collection, sorting, material recycling, and treatment (biological treatment, thermal treatment) and disposal (landfill) (White, Franke and Hindie, 1995).

Figure 11. From 'Cradle to Grave' - Lifecycle approach for Solid Waste Management



Zero waste is a relatively new goal for the global community building on ISWM and circular economy principles, and therefore significant further policy efforts are needed. The following provides some of the key elements to consider when addressing the need and implementation of zero waste policies:

- *Terminology* used in the waste sector varies across countries. Defining which terms and classification systems are applied is necessary to strengthen policy, global comparability and standards adoption and enforcement (White, Franke and Hindie, 1995).
- *Technology* shifts are essential drive the full resource recovery from waste materials and composition, including for mixed material products. Key waste sorting and processing facilities and equipment will be needed to shift from landfill and incineration towards full resource recovery.
- *National priority areas* of waste management based on the national long-term strategy and waste composition.
- *Capacity* to enforce targeted legislation at both the central to local levels, and availability of the infrastructure and facilities required.
- *Community engagement* is key to successful zero waste policies. Public awareness campaigns, education and incentives can encourage behavioural change and a mindset shift in fully viewing waste as a resource as well as in closing last mile challenges to sort and process waste at source (e.g. within households, consumption and disposal points).
- *Private sector engagement* for designing out waste and incentivizing circular design principles that increase product life extension, reparability and recyclability through policy measures and public finance (removing harmful subsidies, EPR and PPP principles and public procurement).
- *International institutions'* resources, initiatives and publications should be assessed for potential support to zero waste policies and initiatives and to avoid duplication.
- *Consumer behaviour, prevention and reduction* should be central when addressing the need and implementation of waste reduction and zero waste policies, particularly better product design that enables separate collection and full material recovery. Consumer behaviour can most effectively be altered in terms of purchasing behaviours or the usage of non-recyclable or harmful products by regulatory practices such as choice editing and change the default option available in the market.¹⁷
- *Monitoring and evaluation* in line with SDG indicators and national priorities to assess the progress on zero waste policies and cross-country comparability on resource circularity.

¹⁷ https://wedocs.unep.org/bitstream/handle/20.500.11822/27236/Consuming_sustainably.pdf

b. National Policies for Waste Management and Resource Circularity in Countries

As countries shift from viewing waste as a resource, policy frameworks are also changing. In some countries it is no longer about solid waste management but instead zero-waste underpinned by resource circularity. Currently, countries advancing with zero-waste, circular economy, and waste minimization policies are mostly located within Europe with some developing countries initiating programs or projects at local level. These take the form of national acts, laws, policies and large-scale public programmes.

On 12 May 2021, the **European Commission** adopted the [EU Action Plan: "Towards a Zero Pollution for Air, Water and Soil" \(and annexes\)](#) - a key deliverable of the European Green Deal. You can get more information and get involved in the implementation of the Action Plan through the [Zero Pollution Stakeholder Platform](#).¹⁸

The **Republic of Korea** has increasingly developed a comprehensive national to local regulatory framework to reduce waste and target specific waste streams such as plastics. One key legal achievement is the Wastes Control Act, 5.7 Legal and regulatory framework.

Türkiye put forward the resolution establishing the International Day of Zero Waste alongside 105 other countries and aims to be a leader in the zero-waste movement. Since 2017, the government provides support for the establishment of zero-waste management systems across all 81 provinces. This [national government support](#) has helped recover 33 million tons of recyclable waste, including 20 million tons of paper and cardboard and 5 million tons of plastic, with gains in the neighbourhood of US\$3.3 billion and savings in energy and water use and storage space.

As part of its National Sustainable Development Strategy, **Morocco** has a National Waste Recovery Programme grounded in a recognition of natural resource constraints and increasing waste. This includes a law on Extender Producer Responsibility and planned legal, technical and financial reforms for a circular economy through waste reuse and recovery.

In **Brazil**, there is a National Policy on Solid Waste (Law No. 12305) that aims for shared responsibility for product's life cycle among manufacturers, importers, distributors and sellers, consumers, and providers of public urban cleaning and solid waste management services. Furthermore, in April 2022 Brazil adopted the [National Solid Waste Plan \(Decree No. 11043\)](#) aiming to increase the national recycling rate by 14% by 2024 and then to a total of 48% by 2040. However, cities like Bahia have instituted Zero-Waste projects and initiatives such as [Bahia Peninsula Zero-waste project](#).

Moreover, major cities in countries such as the **United States** are also taking the lead in establishing zero-waste legislation at local level such as [New York City](#) with a 'Zero Waste Act', [Washington, DC](#) and many other local efforts across the country, setting a framework for eventual national level legislation.

It is of special note that many communities, civil society organizations and more are driving policy advocacy for resource circularity and zero-waste across the globe. While this background paper cannot provide a summary of these actions and stakeholders globally, these stakeholders are fundamental in creating evidence-based and accountable policy actions for zero-waste from national to local level.

Many plans, policies and declarations have been made towards zero-waste in developed and developing countries, but more is needed in terms monitoring and accountability on the actual achievement of zero-waste actions.

¹⁸ https://environment.ec.europa.eu/strategy/zero-pollution-action-plan_en

Box 1. Climate financing in Brazil to mitigate GHG emissions and waste minimization.

"In Brazil, for example, waste production has increased by about a third since 2003 and communities collect over 216,000 tons of trash every day. Yet only about 59% of municipalities dispose of their waste in sanitary landfills designed to protect the surrounding soil and groundwater and properly collect and treat methane, a powerful greenhouse gas generated by decomposing trash. The rest deposit their waste in landfills with limited environmental controls or in open dumps... As a result, Brazil's solid waste is estimated to generate the equivalent of over 47 million tons of carbon dioxide every year, approximately the same as the greenhouse gas emissions from 10 million passenger cars driven for a year... The World Bank's Carbon Partnership Facility partnered with the Caixa Econômica Federal (CAIXA), the second largest public bank in Brazil, to blend multiple sources of financing and offer them as loans to companies that manage and operate landfills—but only under certain conditions. In order to qualify for funding, landfill operators had to agree to fulfill the rigorous requirements of the United Nations Framework Convention on Climate Change's (UNFCCC) Clean Development Mechanism and reduce their greenhouse gas emissions by a specific amount each year. As they met the pre-determined milestones, they would receive payment through CAIXA."

Source: World Bank, 2020. <https://www.worldbank.org/en/news/feature/2020/09/10/with-carbon-finance-brazil-landfills-reduce-methane-emissions-and-turn-trash-into-treasure>.

The rise of climate financing can serve as a driver for zero-waste and waste minimization policy actions that can also benefit climate goals on zero emissions, as country cases like the one on Brazil shows (Box 1). At COP27, bilateral agreements were launched, between Ghana and Switzerland for example, to reduce greenhouse gas emissions by using Internationally Transferrable Mitigation Outcomes (ITMOs) to accelerate the implementation of climate mitigation projects in the waste sector, whereby, strengthening the use of carbon finance for a transition to waste reduction.¹⁹

Zero waste systems reduce GHG emissions through multiple avenues: the separate collection and treatment of organic waste reduces landfill methane emissions; waste avoidance and recycling reduce "upstream" emissions caused by natural resource extraction, manufacturing, and transport associated with the production of new goods; ending waste incineration and open burning eliminates the direct emissions of fossil and biogenic CO₂; and the application of compost or digestate to land can enhance the carbon uptake of soils (GAIA, 2022).²⁰

Lastly, measurable progress on waste minimization is essential and multi-stakeholder engagement in the policy process will be fundamental to collecting greater evidence on zero-waste policy design and implementation.

¹⁹ <https://www.worldbank.org/en/news/feature/2020/09/10/with-carbon-finance-brazil-landfills-reduce-methane-emissions-and-turn-trash-into-treasure>

²⁰ Added at the request of the Global Alliance of Incinerator Alternatives (GAIA) during a review of this background paper in the *Expert Group Meeting on Resource Circularity and Solid Waste Management to Accelerate National to Local Progress on the Sustainable Development Goals*, 21-23 November 2023 – Incheon, Republic of Korea.

IV. Conclusion - A Roadmap for a Global Policy Support System on ISWM

Solid waste outputs from current production and consumptions systems will continue to grow as human population increases, unless accelerated progress is made towards a zero-waste approach and circular use of resources. Solid waste management policies at national to local levels can adopt a zero-waste goal to ensure accelerated progress on the SDGs by 2030.

Solid waste outputs are not uniform and vary according to household income. There is also variance in urban and rural waste outputs within countries. In addition, national level government entities and subnational authorities have differing public governance mandates, requiring an integrated national to local level approach to solid waste management. Countries have different levels of waste data management and classification systems depending on their capacity, policy, and regulations.

Compared to other SDG targets, there is limited progress on data reporting related to solid waste indicators. Countries are already making progress in this regard, but evidence-based policies require greater support to close data gaps. A policy support system led by the United Nations to support national governments aims to address these issues and guide countries in developing globally applicable zero-waste strategies, standards and policy models. Existing guidelines and tools provide results based on either i) the basic steps for handling waste or ii) the status assessment of specific areas of waste. Based on the research conducted for this background paper, there is no integrated decision support system for the waste sector that is able to offer information on waste management following the lifecycle of waste to achieve a zero-waste goal, as well as self-assess waste management status together as an “all-in-one tool”.

The United Nations, through continued research and partnership for policy support at national level aims to develop an integrated policy support platform containing learning modules, questionnaires, and tools to guide users (policymakers at country level) to achieve their waste reduction objectives in line with the policy cycle. To ensure the inter-agency perspective in the development of this system and policy support, the UN Office for Sustainable Development under UN DESA will develop partnerships with key UN agencies and stakeholders to inform this policy support system and process, to better assist member states in their waste management data and evidence-based policymaking. Key stakeholders and expert institutions may also be invited into the policy support process to ensure global and regional insights and knowledge into the roadmap process below.

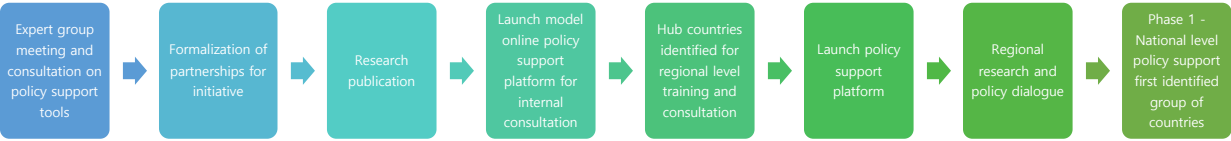
National governments are responsible for voluntarily reporting progress on the Sustainable Development Goals and equally setting national strategies and policies for waste minimization, therefore these are the main target audience for this policy support system, informed in its development through a multi-stakeholder process. While this system could support countries in their SDG target reporting, the primary vehicle for reporting would still remain through UN Statistics Division surveys, national statistics offices and the Voluntary National Reviews.

Through the user’s input to the online system, national policymakers can self-assess the implementation status of waste management in their region and set priorities for which enabling environments should be advanced further in the decision-making process.

While system users can be categorized according to each country, data collection and survey responses could also be conducted at the local government level. Considering the major role of local authorities in waste management, this is to improve the linkage between national policies and local government implementation plans. Further partnerships will be needed to strengthen these linkages with national to local authorities, as well as civil society stakeholders and academia that national governments deem can inform the data, policy formulation, and SDG reporting process.

As an initial Roadmap to guide this process, in the following figure, summarises key steps needed to develop the policy support system in partnership with expert institutions, potential beneficiary countries and more. While the process is by no means final, the roadmap below will be presented to an expert group of stakeholders for further consultation to initiate the research and policy support process in November 2023.

Figure 12. Roadmap for Consultation on Policy Support for Integrate Solid Waste Management towards Zero-Waste



Components of the system will aim to cover various enabling environments for waste management according to the policy cycle, which should be considered when making waste-related decisions and policies. Quantitative and qualitative questionnaires will be designed to assess and gather information at each stage of the waste management life cycle, as well as other areas that may be deemed useful for policymakers. Future consultation will allow for greater review of this policy support initiative in accordance with the Roadmap (Figure 12, above).

The current paper has benefited from comments received from the participants of the *Expert Group Meeting on Resource Circularity and Solid Waste Management to Accelerate National to Local Progress on the SDGs, Incheon, Republic of Korea, 21–23 November 2023*. Annex 2 includes further comments that will be incorporated directly into a research publication to be informed by both the current paper and the outcomes of the Expert Group Meeting. The publication will address policies for achieving resource circularity and solid waste management and accelerating national to local progress on the SDGs.

Annex 1: Recent United Nations Publications on Waste (2021–2022)

Key Publications from UNEP on waste (2021-22)

No	Title	Year
1	2022 Greening the Blue Report	2022
2	Study on how to engage industry in funding an integrated approach to sound management of chemicals and waste	2022
3	Utilizing green digital technologies to reduce consumer food waste	2022
4	Policy and Legislative Guidance for Integrated Waste Management During a Pandemic	2022
5	UNEP 2020 Needs Assessment Report Factsheet: Chemicals and Wastes that Pose Risks to Human Health and the Environment	2022
6	Bangkok, Thailand case study: Utilizing technology to reduce food waste	2022
7	Marine Waste, Plastics, and Human Rights	2021
8	Policy options to eliminate additional marine plastic waste by 2050 in line with the G20 Osaka Blue Ocean Vision	2021
9	The State of Food Waste in West Asia	2021
10	Blind Spots: How Marine Waste and Plastic Pollution Affect Environmental Justice	2021
11	UNEP 2021 Food Waste Index Report	2021

Source: Author's consolidation from UNEP Publications website: <https://wedocs.unep.org/handle/20.500.11822/40795>

Key Publications from UN-Habitat on waste (2021-22)

No	Title	Year
1	Leaving no one behind: How global organizations are enabling a fair transition for informal waste collection and recovery workers to end plastic pollution	2022
2	2022 Sustainable Development Goals Report	2022
3	2014-2020 EU funding for UN-Habitat	2022
4	Bakalian Waste Repository Sampling Methodology and Analysis Report	2021
5	Quarry rehabilitation - putting asbestos management technology to work	2021
6	Bakalian Disposal Site Asbestos Management Guidelines	2021
7	Waste Wise Cities Tool	2021
8	Innovative experiences of cities on environmental sustainability and climate action through South-South-Triangular Cooperation (SSTC)	2021
9	Cities and the pandemic: Towards a fairer, greener and healthier future	2021

Key Publications from FAO on waste (2021-22)

No	Title	Year
1	Preliminary report on pre- and post-harvest crop losses (2021–2022)	2023
2	Off-farm post-harvest loss assessment survey in Ethiopia	2023
3	Sustainable Food Cold Chain: Opportunities, Challenges, and the Way Forward	2022
4	Food Waste Management and Circular Economy in Mediterranean Cities	2022
5	Tracking progress on the 2022 Food and Agriculture SDG indicators	2022
6	Voluntary Code of Conduct to Reduce Food Loss and Waste	2022
7	A holistic approach to food loss reduction in Africa: food loss analysis, integrated capacity development and policy implications	2022
8	A Guide to Living Food Waste Free	2021
9	Fish Waste Management	2021
10	Dairy cooperatives' response strategies and loss and waste reduction during the COVID-19 pandemic: examples from India and Japan	2021
11	Supporting the development of a national strategy to reduce post-harvest losses	2021

Annex 2: Comments to be incorporated into research publication

The current paper, together with the outcomes of the *Expert Group Meeting on Resource Circularity and Solid Waste Management to Accelerate National to Local Progress on the SDGs, Incheon, Republic of Korea, 21–23 November 2023* will inform a research publication addressing policies for achieving resource circularity and solid waste management and accelerating national to local progress on the SDGs. The following comments were received from the Expert Group meeting participants and will be incorporated into the publication.

Comments
Regarding Zero Waste policies, a perspective of scaling circularity through SCP might be relevant? E.g. incentivising circular design principles that increase product life extension, reparability and recyclability through policy measures and public finance (removing harmful subsidies, EPR and PPP principles and public procurement).
To be added in a section covering Consumption and Consumer Behaviour Policies: <ul style="list-style-type: none"> • Suggesting to consider whether an example of banning plastic bags could be brought up as existing ZW policies. E.g. Rwanda (Guidelines on use of plastic bags English.pdf (rema.gov.rw)) or Kenya (National Environment Management Authority (NEMA) - Plastic Bags Ban PORTAL) • Chatham House has mapped existing CE policies (including waste management): Policies circulareconomy.earth Chatham House https://wedocs.unep.org/bitstream/handle/20.500.11822/27236/Consuming_sustainably.pdf
Integrate policy measures that address the reduction and prevention of waste, for example, redesigning materials to prevent them from becoming waste – waste isn't the problem, it's the symptom of a problem.
Stronger focus on the lifecycle perspective, and the biological and technological cycles.
Need to focus on how to decouple economic growth from environmental degradation: 90% biodiversity loss comes from natural resource consumption.
Need to address the externalities of consumption and waste trade – who pays for the waste that is being transported and how is it being managed.
Mismatch between local costs and global benefits. Local nuances need to be taken into account, how do we align the challenges of costs, financial sustainability, and mandates and responsibilities between national and local levels and between different ministries.
Include the Baseline of 11.6.1: Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities.
Include a chapter on the informal sector, how national policies should address the sector and the just transition supported by UNEP.

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