

Solid Waste Accounts

Municipal Solid Waste



Hazardous Waste



E-Waste



Bio medical Waste



Plastic Waste



Construction & Demolition Waste



Chapter 3

Solid Waste Accounts

"There is no such thing as 'away'. When we throw anything away, it must go somewhere.

- Annie Leonard

Introduction

3.1 The effect of human activity on the environment has emerged as one of the most significant policy issues in environmental sustainability- a fact that is known to all. As the countries grow and develop in terms of the economy, enormous pressure is created on the environment in terms of the residuals. There is a growing concern about the effect of economic activity upon the environment and increasing recognition that economic growth and human welfare are dependent upon benefits obtained from the environment.

3.2 India too is rapidly marching ahead towards the 'fastest growing economy'. The unprecedented levels of urbanization in India, growing consumerism and emergence of new mega-cities, along with growth in population has resulted in massive increase in the consumption and imports. As a consequence of huge annual material consumption, there is a significant pressure on the management of all forms of residuals in the country. If these residuals are not properly treated or are disposed of irresponsibly, irreversible environmental degradation is bound to happen. This will have far reaching consequences affecting the public health and well-being which will have a negative impact on all forms of life on earth. The long-term environmental strategy of the country, based on the principles of sustainable development, may not be feasible to achieve without adequate waste management. The importance of planning in residual management is reflected in the fact that the management plans need to integrate the most appropriate option for the environment, considering economic, technical, social and environmental factors.

3.3 It is thus utmost required to take stock of different types of residuals generated, collected, treated and disposed of. With the availability of integrated statistics on the flow of residuals from the economy to the environment, the analysis of various residual management options becomes viable. This allows for the decision makers to use different instruments in order to consider more acceptable options and make decisions about the optimal solutions to satisfy the specific needs. These also form the basis for initiating the decision-making process essentially depending

on the data on the waste generation and composition (qualitative & quantitative) in a given territory within a particular period of time. Effective waste management also presents an opportunity to recover resources and create employment while mitigating the negative environmental and social impacts.

Residuals and Residual Accounts

3.4 Residuals are flows of solid, liquid and gaseous materials and energy that are discarded, discharged or emitted to the environment by establishments and households through processes of production, consumption or accumulation¹. They may be generated at any stage of a supply chain from producer to consumer for instance during the extraction of raw materials, during the processing of raw materials into intermediate and final products, during the transportation of goods, during final use by consumers or at the point of disposal at the products' end of life. Residuals may be discarded, discharged or emitted directly to the environment or captured, collected, treated, recycled or reused by economic units. These various transformation processes may lead to the generation of new products that are of economic value to the unit undertaking the transformation even if the residual, when first discarded or emitted, had no economic value to the household or establishment discarding or emitting the residuals.

3.5 There are a wide variety of different types of residuals, which are not usually accounted for as a single type of flow using mutually exclusive classes. Some of the widely accepted groupings of residuals are as given below:

- (i) Solid Waste
- (ii) Waste Water
- (iii) Emissions
- (iv) Dissipative Uses of Products
- (v) Dissipative Losses
- (vi) Natural Resource Residuals

3.6 Residual Account is an organised information on the generation of residuals and its management. In the current publication, as an initial step, compilation of only the Solid Waste Accounts following the SEEA Framework has been considered.

¹ https://seea.un.org/sites/seea.un.org/files/documents/seea_glossary_terms_languages_v2.pdf

3.7 Solid waste covers all the discarded materials that are no longer required by the owner or user. Where the unit discarding the materials receives no payment for the materials then the flow is considered a residual flow of solid waste. Where the unit discarding the materials receives a payment but the actual residual value of the material is small, for example, in case of scrap metal sold to a recycling firm, this flow is considered a product flow of solid waste. Discarded material sold as second-hand products; for example, the sale of a second-hand car or furniture is treated as flows of products and is not treated as solid waste. In the determination of whether a material is a second-hand product, consideration may be given to the extent to which the receiving unit can use the product again for the same purpose for which it was conceived. In practice, in many countries, statistics on solid waste is based on legal and administrative lists of materials determined to be solid waste. However, the SEEA framework provides a basis for the measurement of solid waste in countries where legal or administrative processes concerning waste do not exist or are limited in scope.

3.8 Solid Waste Accounts organize the information on the generation of solid waste and the management of flows of solid waste to recycling facilities, to controlled landfills or directly to the environment. These accounts help to organize and connect statistics on solid waste by types, sources, suppliers, users and final disposal. They can help to answer questions viz how much solid waste is being generated, which industries are responsible for maximum generation of the solid wastes, how is the solid waste treated etc. In addition, some solid waste flows could also act as resources which can be converted into valuable products. Knowing the type of resources being generated by different industries can enable utilization of the solid waste as resources.

3.9 It is important to have proper solid waste management practices which includes collection, treatment and disposal of solid material that is discarded because it has served its purpose or is no longer useful. Improper disposal of solid wastes can create unsanitary conditions, and these conditions in turn lead to pollution of the environment and outbreaks of vector-borne diseases i.e., diseases spread by rodents and insects.

3.10 In the EnviStats India Vol-II 2022: Environment Accounts, solid waste accounts were published for the Union Territory of Delhi for the year 2020-21 using data from the Delhi Pollution Control Committee. In the current publication, solid waste accounts have been attempted for the States/UTs of Mizoram, Tamil Nadu,

Chandigarh, Jammu and Kashmir, Gujarat, Rajasthan and Maharashtra using the available information.

Linkages with Sustainable Development Goals (SDGs)

3.11 A major pillar of sustainability is the Environment and the strategies on Environment cannot be materialized without considering the problems of inadequate waste management. Decoupling economic growth from resource use and environmental degradation is one of the objectives of the 2030 Agenda for the Sustainable Development Goals. Compilation of the Solid Waste Accounts helps to measure progress in achieving targets for the SDG goals, especially Goal 11 (Make cities and human settlements inclusive, safe, resilient and sustainable) and Goal 12 (Ensure sustainable consumption and production patterns). The following Table 3.1 indicates the Global Targets and Indicators of SDG that are directly related to the Solid Waste Accounts.

Table 3.1 SDG Global Targets and Indicators related to the Solid Waste Accounts

Targets	Global SDG Indicators
Target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, which includes paying special attention to air quality and municipal and other waste management.	Indicator 11.6.1: Proportion of municipal solid waste collected and managed in controlled facilities out of total municipal waste generated, by cities
Target 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.	Indicator 12.4.1: Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement. Indicator 12.4.2: (a) Hazardous waste generated per capita; and (b) proportion of hazardous waste treated, by type of treatment.
Target 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	Indicator 12.5.1: National recycling rate, tons of material recycled.

3.12 In addition, there are certain SDG indicators in National Indicator Framework of SDGs which are based on generation and treatment of wastes such as Indicators 8.4.1 (Proportion of waste recycled vs. waste generated), 11.6.1 (Percentage of waste processed) and 12.4.2 (a) (Hazardous waste generated per capita (in MT/person); and (b) Proportion of hazardous waste treated, by type of treatment)). Components of these indicators involve generation of wastes by type and their treatment by type. These can be derived from Physical Supply and Use Tables (PSUT) of Solid Waste Accounts.

Linkages with Circular Economy

3.13 The Economy-Wide Material Flow Accounts (EW-MFA) provide a physical measurement of the relationship between the economy and the environment through an aggregate overview of the material inputs and outputs of an economy, including inputs from the environment, flows of materials back to the environment, and the physical amounts of imports and exports. One important component of the MFA's Physical Supply and Use Tables is the residuals. Thus, compilation of the solid waste accounts has close connections with the economy-wide material flow accounts. A reduction in the quantities of waste and an efficient and sustainable use of this waste are key elements in the efforts towards having a circular economy. In a circular economy, resource productivity is increased and materials as well as products are kept in the economic cycle for as long as possible, which benefits the environment as well as the economy. Circular Economy seeks to transform the way wastes are managed and handled. In a circular economy, waste is regarded as a valuable resource rather than something to be discarded. Therefore, a good utilization of waste is important for advancing towards the circular economy.

3.14 Solid Waste Accounts which follows the SEEA Framework is also consistent with the System of National Accounts since both the accounting frameworks are compatible with each other. As a result, the integrated information can be used to inform integrated policies. This indicator is also closely linked to other socio-economic and environmental indicators especially those related to income-level and economic growth such as rate of growth of urban population, Gross Domestic Product (GDP) per capita, Wastewater Treatment, and Waste Treatment and disposal.

Policy Relevance

3.15 While the economies derive useful inputs from the environment, the residuals are discarded back into the environment. The continuous and the rapid pace at which the residuals are flowing out from the economy has become a matter of concern. The flow of residuals into the environment has a horrendous impact on the nature. Having integrated statistics on the flow of residuals from the economy to the environment can help to improve the management of the residuals.

3.16 Measures of the amount of waste in aggregate or of quantities of specific waste materials may be important indicators for assessing the environmental pressures or identifying the issues for taking corrective measures. The compilation of solid waste accounts allows these indicators to be placed in a broader context with economic data in both physical and monetary terms. These accounts when fed into policies which are alligned with the principles of 'circular economy' plays a significant role in transitioning from a linear 'take-make-dispose' model to a more sustainable and resource-efficient system that aims to close material loops and reduce waste.

3.17 The main purpose of the compilation of the Solid Waste Accounts is to show the trend of waste generated due to various human activities. Waste generation per capita allows the comparisons of countries with similar economies, while waste generated per unit of value added will show if there has been any decoupling of waste generation from economic growth. For each industry or sector selected, the two -time series when presented together enables utilization of the full benefit of the indicator.

3.18 Sound and efficient use of natural resources is an important part of sustainable development. Waste represents a considerable loss of resources both in the form of materials and energy. The improper treatment and disposal of the generated waste may cause environmental pollution and expose humans to harmful substances and bacteria, and thereby impacting human health. Generation of waste is intimately linked to the level of economic activity in a country. It reflects society's production and consumption patterns. Wealthier economies tend to produce more waste as compared to the others. In many developed countries, a reduction in the volume of waste generated is an indication of development towards less material-intensive production and consumption patterns, particularly as the economy moves from a heavy industry base to a more service base.

Policies related to Solid Waste in India

3.19 The six Solid Waste Management Rules and guidelines by Central Pollution Control Board (CPCB), Central Public Health and Environmental Engineering Organisation (CPHEEO), and other related agencies, prescribe utilization of waste materials in some selected sectors. Apart from the Rules regarding the different categories of Solid Waste in India, Government of India has also implemented several other significant policy decisions² related to the solid waste management. Some of the milestone decisions taken are as follows:

- (i) Section 2.1 of the Municipal Solid Waste Management Manual, 2016³ by CPHEEO, Ministry of Urban Development, prescribes a stepwise waste minimisation approach that is closely linked to the 3Rs (Reduce, Reuse, and Recycle). The Manual mentions the need for policy interventions at the national, state and local levels, and envisages a pivotal role for Urban Local Bodies (ULBs) for effective management.
- (ii) In order to incentivise waste composting, Ministry of Chemicals & Fertilizers has notified the policy on promotion of City Compost providing Market Development Assistance of Rs. 1,500 per tonne to fertilizer companies, ULBs, and compost manufacturers⁴.
- (iii) Ministry of Power has revised the Tariff Policy 2006 under the Indian Electricity Act, 2003, making it mandatory for State DISCOMS to purchase power from Waste-to-Energy plants. In addition, Central Electricity Regulatory Commission (CERC) has notified generic tariff for Waste-to-Energy at Rs. 7.04 per unit and for RDF (Refuse Derived Fuel) at Rs. 7.90 per unit.
- (iv) For providing impetus to the use of waste in roads and construction activities, the Ministry of Road Transport and Highways has notified the use of plastic waste in bituminous mixes in construction of National highways⁵.
- (v) The Central Public Works Dept. has mandated the use of recycled portions of C&D Waste in construction activities, if the same is available within 100 kms of the construction site.

² <https://www.niti.gov.in/sites/default/files/2021-11/Promoting-Behaviour-Change-for-StrengtheningWasteSegregationatSource-PolicyGuidelines.pdf>

³ https://cpcb.nic.in/uploads/MSW/SWM_2016.pdf

⁴ <https://pib.gov.in/PressReleaselframePage.aspx?PRID=1654529>

⁵ <https://morth.nic.in/sites/default/files/File1850.pdf>

- (vi) Swachh Bharat Abhiyan (Clean India Mission) launched in 2014 is a national cleanliness campaign aimed at achieving universal sanitation and effective solid waste management across India. The mission emphasizes behavioural change, construction of household toilets, public awareness campaigns, and the promotion of proper solid waste management practices at the community level.
- (vii) The various green building norms provide for re-utilisation of C&D waste. MoHUA has issued a notification to local authorities to incentivize and provide 1% to 5% extra ground coverage and Floor Area Ratio (FAR) for projects of more than 3,000 sqm plot size on basis of GRIHA evaluation. Similarly, MoEFCC has provided for out-of-turn appraisal for environmental clearances of building and construction projects on the basis of GRIHA/IGBC/LEED evaluation.
- (viii) Recently, Government of India has taken another step towards the fulfilment of its commitment to the protection of environment by banning single-use plastics⁶ in India with effect from July 2022. The policy aims to reduce the plastic waste generation and promote the use of alternative eco-friendly materials.
- (ix) The Ministry of Road Transport and Highways has come out with National Auto Scrapage Policy in March 2021. It aims to achieve multiple goals like reduction in air pollution, the fulfilment of India's climate commitments, improving road and vehicle safety, better fuel efficiency, and boosting the availability of low-cost raw materials for auto, steel and electronics industries. The government expects recycling of metals like steel, copper and aluminium from the scrapped vehicles to help reduce their imports.
- (x) The Ministry of Environment Forest & Climate Change (MoEF&CC) unveiled the Plastic Waste Management (Amendment) Rules, 2021⁷ that propose to ban select categories of single-use plastic items. The proposed prohibition on their manufacture, use, sale, import, and handling is in keeping with the objective of phasing out single-use plastic by 2022. Further, a guideline document for "Uniform Framework for Extended Producers Responsibility (Under Plastic Waste Management Rules, 2016⁸)"

⁶ <https://pib.gov.in/PressReleasePage.aspx?PRID=1882855>

⁷ <https://cpcb.nic.in/uploads/plasticwaste/Notification-12-08-2021.pdf>

⁸ <https://cpcb.nic.in/uploads/plasticwaste/PWM-Amendment-Rules-2022.pdf>

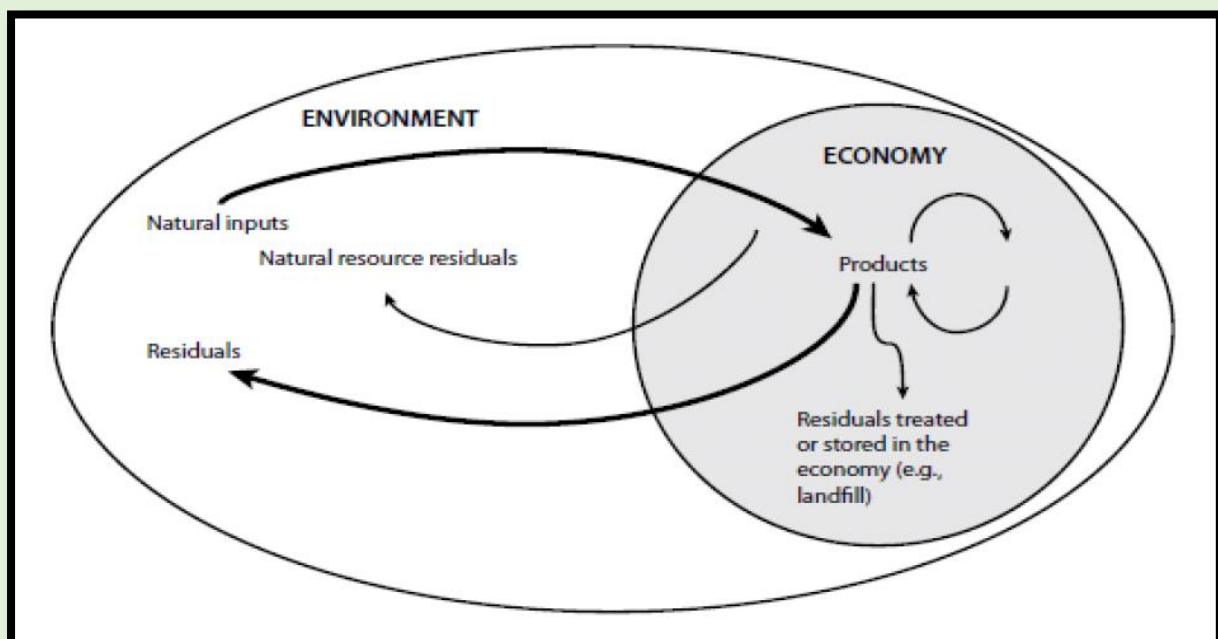
was also formulated by the ministry. The “Extended Producer Responsibility” may be defined as a policy principle to promote total life cycle environmental improvements of product systems by extending the responsibilities of the manufacturer of the product to various phases of the entire life cycle of the product, especially the take-back, recycling and final disposal of the product.

3.20 Apart from these, different Ministries and different state departments have been taking various initiatives towards the direction of minimising the solid wastes.

Solid Waste Accounts SEEA-Framework

3.21 Our economies are embedded within the environment. The economy derives useful inputs from the Environment in terms of natural inputs which includes mineral resources, timber resources, aquatic resources and water resources. These inputs are converted into useful products (goods/services) within the economy with the help of the institutional sectors for instance industries, households and government. This results in flow of residuals to the environment. Thus, there is a clear and strong linkage between the environment and the economy and the SEEA helps to better understand this linkage. Figure 3.1 given below helps to pin-point the relationships between inputs, products and residuals within the environment.

Figure 3.1: Physical flows of natural inputs, products and residuals



Source: SEEA-CF

3.22 The SEEA-Central Framework organizes and integrates the information on the various stocks and flows of the economy and the environment in a series of tables and accounts: (a) supply and use tables in physical and monetary terms showing flows of natural inputs, products and residuals; (b) asset accounts for individual environmental assets in physical and monetary terms showing the stock of environmental assets at the beginning and the end of each accounting period and the changes in the stock; (c) a sequence of economic accounts highlighting depletion-adjusted economic aggregates; and (d) functional accounts recording transactions and other information about economic activities undertaken for environmental purposes. The analysis of these data can also be extended by linking the tables and accounts to relevant employment, demographic and social information.

3.23 “Physical Flow Accounts” of System of Environmental Economic Accounting (SEEA) explains in detail the recording of different physical flows—Natural inputs, Products and Residuals and are placed within the structure of a physical supply and use table (PSUT). The flows from the environment to the economy are recorded as natural inputs (e.g., flows of minerals, timber, fish and water); flows within the economy are recorded as product flows (including additions to the stock of fixed assets) and flows from the economy to the environment are recorded as residuals.

3.24 In Physical supply and use tables (PSUT), physical flows are recorded by compiling supply and use tables in physical units of measurement. These PSUTs are used to assess how an economy supplies and uses energy, water and materials and also helps to examine changes in production and consumption patterns over time. In combination with data from monetary supply and use tables, changes in intensity in the use of natural inputs and the release of residuals can also be examined through the PSUTs.

3.25 The basic form of Physical supply and use table for solid waste accounts is given in **Figure 3.2** and **Figure 3.3**. In the current publication, an attempt has been made to compile the Physical Supply and Use Tables of the Solid Waste Accounts for selected states of India sourcing data primarily from the Central and State Pollution Control Boards/Committees.

Figure – 3.2: Basic Form of Supply Table for Solid Waste

Physical Supply Table for Solid Waste										
	Generation of Solid Waste							Rest of the world	Flows From the environment	Total supply
	Waste collection,treatment and disposal industry							Imports of Solid Waste	Recovered Residuals	
	Landfill	Incineration		Recycling and reuse	Other treatment	other industries	Households			
		Total	Of which: incineration to generate energy							
Generation of Solid Waste Residuals										
Waste 1										
Waste 2										
Waste 3										
.....										
.....										
Other Waste										
Generation of Solid Waste Products										
Waste 1										
Waste 2										
Waste 3										
.....										
.....										
Other Waste										

Dark Grey cells are null be definition

Source: SEEA-CF

Figure 3.3: Basic form of Use Table for Solid Waste Accounts

Physical Use Table for Solid Waste										
	Intermediate Consumption, collection of residuals						Final Consumption	Rest of the world	Flows to the Environment	Total supply
	Waste collection,treatment and disposal industry						Households	Exports of Solid Waste		
	Landfill	Incineration		Recycling and reuse	Other treatment	other industries				
		Total	Of which: incineration to generate energy							
Collection and disposal of solid waste residuals										
Waste 1										
Waste 2										
Waste 3										
.....										
.....										
Other Waste										
Use of Solid Waste Products										
Waste 1										
Waste 2										
Waste 3										
.....										
.....										
Other Waste										

Dark Grey cells are null be definition

Source: SEEA-CF

3.26 The first part of the supply table (Figure 3.2), “Generation of solid waste residuals”, shows the generation of solid waste by industries and households. It also

shows the supply of solid waste from the rest of the world (recorded as imports) and also solid waste recovered from the environment (for example, oil recovered following an off-shore oil spill, debris collected following a natural disaster, or the excavation of soil from locations at which hazardous chemicals were used).

3.27 Similarly, the first part of the use table (Figure 3.3), “Collection and disposal of solid waste residuals”, shows the collection and disposal of solid waste by various activities within the waste collection, treatment and disposal industry and by related activities in other industries. It also shows the flow of solid waste to the rest of the world as exports and the flow of solid waste directly to the environment. The columns of the table highlight the various activities of the waste collection, treatment and disposal industry such as landfill operation, incineration of solid waste (of which incineration of solid waste to produce energy is separately identified), recycling and reuse activities, and other treatment of solid waste. More industry details can be provided depending on analytical requirements and available information. It is to be noted that the accumulation of waste in landfill sites is not presented in a distinct accumulation column as in the general PSUT. This is done so that all information on the waste collection, treatment and disposal industry can be presented as a single group.

3.28 In the second part of the supply and use table, which talks about “Generation of solid waste products” and “Use of solid waste products” respectively, the flows of solid waste that are products rather than residuals are recorded, following the distinction described above. The flows recorded here relate to cases when a solid waste product is identified at the time of disposal by the discarding unit. The flow is recorded in the second part of the supply table matched by a use of solid waste products in the second part of the use table. Sales of scrap metal would be recorded in this way. Sales of products manufactured from solid waste, or simply obtained from waste collection, should not be included. For example, paper discarded by households that is collected by a charitable organisation and subsequently sold in bulk to a paper recycling firm, is only recorded in the solid waste account in respect of the initial flow of solid waste from households to the charitable organisation.

Classifications of Solid Waste Accounts in India

3.29 In India, Central Pollution Control Board (CPCB) is the nodal agency for developing standards and keeping a watch on residuals and their treatment. CPCB collects data related to all the three types of waste, i.e. solid waste, effluents and air

emissions. As far as the classification of the wastes is concerned, at present there is no comprehensive standard international classification for the Wastes. In India, Solid Wastes are classified into 6 components by Law, namely, (i) Municipal Solid Waste (ii) Hazardous Waste (iii) E-waste (iv) Bio-medical Waste (v) Plastic Waste and (vi) Construction and Demolition Waste.

A brief description of the different types of waste are provided in the subsequent paragraphs:

Municipal Solid Waste (MSW)

3.30 Municipal Solid Wastes includes solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non-residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical waste and e-waste, battery waste, radioactive waste generated in the area under the local authorities and other entities mentioned in Rule 2 of the Solid Waste Management Rules, 2016.⁹

3.31 In accordance with the Provision 24 (4) of the Solid Waste Management Rules, 2016, the Central Pollution Control Board (CPCB) is required to prepare a Consolidated Annual Report (CAR) based on the annual report submitted by SPCBs/PCCs in compliance of Solid Waste Management Rules, 2016. As per the Annual Report on Solid Waste Management¹⁰ (2020-21), the total quantity of Solid waste generated in the country is 1,60,038.9 TPD of which 1,52,749.5 TPD of waste is collected at a collection efficiency of 95.4%. 79,956.3 TPD (50 %) of waste is treated and 29,427.2 (18.4%) TPD is landfilled. 50,655.4 TPD which is 31.7 % of the total waste generated remains un-accounted.

Hazardous Wastes

3.32 Hazardous Wastes are any waste which by reason of characteristics such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or environment, whether alone or in contact with other wastes or substances.

3.33 The Government of India has notified Hazardous and other Wastes (Management and Transboundary Movement) Rules, 2016¹¹ under the Environment

⁹ https://cpcb.nic.in/uploads/MSW/SWM_2016.pdf

¹⁰ https://cpcb.nic.in/uploads/MSW/MSW_AnnualReport_2020-21.pdf

¹¹ <https://cpcb.nic.in/displaypdf.php?id=aHdtZC9IV01fUnVsZXNfMjAxNi5wZGY>

(Protection) Act, 1986 to ensure safe handling, generation, processing, treatment, packaging, storage, transportation, use processing, collection, conversion and offering for sale, destruction and disposal of hazardous wastes. The occupier handling hazardous waste and operator of the disposal facility are required to submit the annual return (about hazardous wastes generation, storage, recycling, utilization, disposal etc.) in the prescribed form to State Pollution Control Board (SPCB)/Pollution Control Committee (PCC) by 30th June of every financial year.

3.34 SPCBs/PCCs are required to prepare an annual inventory of the waste generated, recycled, utilized, disposed, etc. for the respective State/UT and submit the same to CPCB by 30th September of every financial year in accordance with the provisions stipulated under Rule 20(3) of the Hazardous Waste Management (HOWM) Rules, 2016. Thereafter, CPCB is required to prepare a consolidated report on management of hazardous and other wastes based on the annual inventory report submitted by SPCBs/PCCs and submit the same to the Ministry of Environment, Forest and Climate Change before 30th December every year, as per Rule 20(4) of the HOWM Rules, 2016.

3.35 As per the National Inventory on the Generation and Management of Hazardous and Other Wastes (2021-22)¹², in 2021-22, about 12.35 Million MT HW was generated (i.e. 26%) against the authorized capacity of about 46.89 Million MT.

E-Waste

3.36 E-wastes means electrical and electronic equipment, including solar photovoltaic modules or panels or cells, whole or in part discarded as waste, as well as rejects from manufacturing, refurbishment and repair processes.

3.37 E- Waste (Management & Handling) Rules, 2011¹³ were notified in 2011 and had come into force since 1st May, 2012. In order to ensure effective implementation of E-Waste Rules and to clearly delineate the role of producers in Extended Producer Responsibility (EPR), MoEFCC, Government of India in supersession of E-Waste (Management and Handling) Rules, 2011 has notified the E-Waste (Management) Rules, 2016¹⁴ vide G.S.R. 338(E) dated 23.03.2016 which has been effective since 01-10-2016. These rules are applicable to every manufacturer, producer, refurbisher, dismantler and recycler involved in manufacture, sale, transfer, purchase, refurbishing, dismantling, recycling and processing of e-waste or electrical and

¹² https://cpcb.nic.in/uploads/hwmd/Annual_Inventory2021-22.pdf

¹³ https://www.meity.gov.in/writereaddata/files/1035e_eng.pdf

¹⁴ <https://cpcb.nic.in/displaypdf.php?id=aHdtZC9HVUIERUxJTkVTX0VXQVNURV99SVUxFU18yMDE2LnBkZg==>

electronic equipment listed in Schedule I, including their components, consumables, parts and spares which make the product operational but shall not apply to: -

- i. waste batteries as covered under the Battery Waste Management Rules, 2022¹⁵;
- ii. packaging plastics as covered under the Plastic Waste Management Rules, 2016;
- iii. micro-enterprise as defined in the Micro, Small and Medium Enterprises Development Act, 2006¹⁶ (27 of 2006); and
- iv. radio-active wastes as covered under the provisions of the Atomic Energy Act, 1962¹⁷ (33 of 1962) and rules made there under.

3.38 The E-Waste (Management) Rules, 2016 mandates CPCB to prepare guidelines on implementation of E-Waste Rules, which includes specific guidelines for extended producer responsibility, channelization, collection centres, storage, transportation, environmentally sound dismantling and recycling, refurbishment, and random sampling of Electric and Electronic Equipments (EEE) for testing of RoHS parameters. In the document, all the above guidelines have been compiled except guidelines for random sampling of EEE for testing of RoHS parameters. These guidelines are given in separate sections of the document. The Central Pollution Control Board submits an annual report to the Ministry of Environment, Forest and Climate Change regarding status of implementation of the E-waste management rules with quantitative and qualitative analysis along with its recommendations, within one month of the end of the financial year. As per the National Inventory on the Generation and Management of E-waste Rules, 2016, in 2020-21, about 1.35 Million Tones E-waste has been generated and 0.35 Million Tones E-waste has been processed.

Bio-Medical Waste (BMW)

3.39 The term "biological" means any preparation made from organisms or micro-organisms or products of metabolism and biochemical reactions intended for use in the diagnosis, immunisation or treatment of human beings or animals or in research activities pertaining thereto. "Bio-medical Waste" means any waste, which is generated during the diagnosis, treatment or immunisation of human beings or animals or research activities pertaining thereto or in the production or testing of

¹⁵ <https://cpcb.nic.in/uploads/hwmd/Battery-WasteManagementRules-2022.pdf>

¹⁶ <https://www.dcsmse.gov.in/MSMED2006.pdf>

¹⁷ <https://www.aerb.gov.in/images/PDF/Atomic-Energy-Act-1962.pdf>

biological or in health camps, including the categories mentioned in Schedule I under Biomedical Waste Management Rules, 2016 (BMWM Rules, 2016).

3.40 Biomedical Waste is regulated under the Biomedical Waste Management Rules, 2016 (BMWM Rules, 2016)¹⁸ as notified under Environment (Protection) Act, 1986 by the Ministry of Environment Forest & Climate Change. These Rules were first notified in the year 1998 and then revamped in the year 2016 in order to implement these rules more effectively and to improve the collection, segregation, processing, treatment and disposal of bio-medical wastes in an environmentally sound management, thereby reducing the bio- medical waste generation and its impact on the environment.

3.41 These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose of, or handle bio-medical waste in any form including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories, blood banks, ayush hospitals, clinical establishments, research or educational institutions, health camps, medical or surgical camps, vaccination camps, blood donation camps, first aid rooms of schools, forensic laboratories and research labs. The BMWM Rules, 2016 stipulates the provisions for segregation of biomedical waste as per the colour-coded system (Yellow, Red, Blue and White) prescribed under said Rules.

3.42 These Rules have a mandate of preparation of Annual Inventory of biomedical waste generation, its collection, treatment and disposal under Rule 13. Every Occupier and Common Bio-medical Waste Treatment Facility Operator is required to prepare an annual inventory for biomedical waste management. Further, SPCBs/PCCs compile and submits the Annual Report to Central Pollution Control Board for the preceding year before 31st July of every year. Central Pollution Control Board compiles, reviews and analyses the annual data submitted by SPCBs / PCCs and submits the same to MoEFCC.

3.43 As per the Annual Report of the Bio-Medical Waste Management¹⁹ for the year 2021, as reported by SPCBs/PCCs, about 764 tonnes/day of BMW were generated during the year 2021 by 3,75,256 numbers of HCFs. Out of 764 tonnes/day of BMW, 721 tonnes/day of BMW is treated and disposed of by CBWTFs and captive treatment facilities (CTFs) installed by Healthcare Facilities.

¹⁸ https://cpcb.nic.in/uploads/Projects/Bio-Medical-Waste/Bio-medical_Waste_Management_Rules_2016.pdf

¹⁹ https://cpcb.nic.in/uploads/Projects/Bio-Medical-Waste/AR_BMWM_2021.pdf

Plastic Waste

3.44 The “plastic” means material which contains, as an essential ingredient a high polymer such as polyethylene terephthalate, high-density polyethylene, vinyl, low density polyethylene, polypropylene, polystyrene resins, multi-materials like acrylonitrile butadiene styrene, polyphenylene oxide, polycarbonate, polybutylene terephthalate. “Plastic waste” means any plastic discarded after use or after their intended use is over;

3.45 As per rule “17(3)” of Plastic Waste Management Rule, 2016²³ (as amended) each State Pollution Control Board or Pollution Control Committee shall prepare and submit the Annual Report to the Pollution Control Board on the implementation of these rules by the 31st July of each year. Also, as per provision “17(4)” of PWM Rules, 2016 (as amended), the Central Pollution Control Board shall prepare a consolidated report on the use and management of plastic waste and forward it to the Central Government along with its recommendation by 31st August of each year.

3.46 As per the Annual Report 2020-21²⁰ on Implementation of PWM Rules 2016 (As amended), according to the details provided by 35 States/UTs, the estimated plastic waste generation during the year 2020-21 is approximately 41,26,997 TPA. Out of which, 11,09,180 TPA has been processed in recycling, road making, co-processing, RDF, pyrolysis and others, during the same year.

Construction and Demolition Waste (C&D Waste)

3.47 As per Rule 3 (c) of Construction and Demolition (C & D) Waste Management Rules, 2016²¹ as notified under Environment (Protection) Act, 1986 (29 of 1986) by the Ministry of Environment Forest & Climate Change, the "construction and demolition waste" means waste comprising of building materials, debris and rubble resulting from construction, re-modeling, repair and demolition of any civil structure. The rules shall apply to every waste resulting from construction, re-modeling, repair and demolition of any civil structure of an individual or organization or authority who generates construction and demolition waste such as building materials, debris, rubble, etc. C&D Wastes also include surplus and damaged products and materials arising in the course of construction work or used temporarily during the course of on-site activities. Under Rule 3 of Construction and

²⁰ https://cpcb.nic.in/uploads/plasticwaste/Annual_Report_2020-21_PWM.pdf

²¹ <https://cpcb.nic.in/displaypdf.php?id=d2FzdGUvQyZEX3J1bGVzXzlwMTYucGRm>

Demolition (C & D) Waste Management Rules, 2016, the following definitions have been provided:

- Sub-rule (b) "construction" means the process of erecting of building or built facility or other structure, or building of infrastructure including alteration in these entities;
- Sub-rule (d) "de-construction" means a planned selective demolition in which salvage, re-use and recycling of the demolished structure is maximized;
- Sub-rule (e) "demolition" means breaking down or tearing down buildings and other structures either manually or using mechanical force (by various equipment) or by implosion using explosives.

Solid Waste Accounts- for the selected States/UTs of India

3.48 The basic deviation from SEEA-CF in preparation of PSUT for Solid Waste Accounts is on "products". As per SEEA if any residual fetches any value while discarding an item, it will no longer be treated as 'waste' but will be treated as 'product' in the PSUT which cannot be followed in the Indian case as data on many items like batteries, e-waste, plastic waste etc. has been given by the recycler who obtains these items by making nominal payments or at free of cost and no such segregated data is available.

3.49 It may also be noted that the data pertaining to different types of wastes are obtained by the authorised collectors of the same and so there may be an overlapping of data pertaining to a particular type of waste. For example, the data on plastic waste generated is obtained mainly from recyclers, which they might have received from ragpickers or segregators who did it from Municipal Solid Waste. Since no such segregated information is available, the data is placed as itself under the assumption that the volume of such waste may be negligible.

3.50 In the current publication, the solid waste accounts in terms of Physical Supply and Use Table (PSUT) have been attempted for the States/UTs of Chandigarh, Jammu and Kashmir, Mizoram, Gujarat, Rajasthan, Maharashtra and Tamil Nadu based on the information received from the respective State/UT Pollution Control Board/Committee and Central Pollution Control Board. Since the data on construction & demolition waste does not represent the C&D waste generated by the entire State, therefore C&D waste has not been considered while preparing the PSUT for the solid waste. The collection of solid waste generated in

the States/UTs is done by Urban Local Bodies/Municipalities/Cantonment Boards which does not include the solid waste generated in the rural areas of States/UTs.

3.51 In general, the following approach has been adopted while compiling the PSUT for the Solid Waste:

- (i) MSW: Total MSW generated has been taken from the CPCB Report and the same has been distributed in the ratio of the information provided by the respective States. On the use side of MSW, the total waste dumped or landfilled has been taken from the CPCB Report and the remaining has been computed as per the information provided by the State. The difference of generated and collected has been adjusted against the 'To the Environment' column.
- (ii) BMW: Total BMW generated has been taken from the CPCB Report. On the use side, the total waste treated is distributed in the proportion of the information provided by the State. The difference of waste generated and collected has been adjusted against the 'To the Environment' column.
- (iii) Hazardous waste information has been taken from CPCB Report.
- (iv) E-Waste information has been provided by the State
- (v) The information on the plastic waste generated has been taken from the CPCB Report and the use side information has been compiled utilizing the data received from the State. The difference of Plastic waste generated and collected has been adjusted against the 'To the Environment' column.

Chandigarh

3.52 In Chandigarh, 1 ULB is responsible for the implementation of the SWM Rules, 2016. The Municipal Corporation of Chandigarh (MCC) has facilitated door to door collection system in 24 out of 26 wards. The MCC has deputed 489 GPS installed compartmentalized vehicles (for dry, wet and domestic hazardous waste) for door-to-door collection and transportation of segregated waste from the city. The work of bio remediation for legacy waste has also started in Chandigarh and no fresh waste is being dumped at the legacy waste site. In addition, all the bulk waste generators are practising on-site composting of their wet waste.

3.53 As regards the Plastic Waste, Municipality staff collects solid waste from door to door and the segregated plastic waste is sent to Refused Derived Fuel (RDF) processing plant for final disposal. At present there are no registered and unregistered plastic manufacturing units in the UT, however, there are around 7 registered recycling units in the UT.

3.54 The Physical Supply and Use Table for the Solid Waste for the Union Territory of Chandigarh has been compiled using the data from the Chandigarh Pollution Control Committee and Central Pollution Control Board for the years 2018-19, 2019-20 and 2020-21 and is presented in the **Annexures 3.1 and 3.2**. The PSUT of solid waste accounts shows that the maximum solid waste generated in Chandigarh is Municipal solid waste followed by E-waste in all the 3 years under study. Against this, majority of the solid waste has been disposed of and treated in sanitary landfills. Remaining has been disposed of through recycling, waste to energy and composting in all the years. In 2020-21, around 82% of the solid waste has been generated by the households (municipal waste) followed by 11% by hotels/shops/restaurants (municipal waste) and the remaining 7% by industries (e-waste, hazardous and BMW). Similarly, in disposal and treatment of solid waste, around 80% of the solid wastes is disposed-off at sanitary landfills and a small proportion is treated in composting, waste to energy and recycling.

Gujarat

3.55 The Physical Supply and Use Table for the Solid Waste for the State of Gujarat has been compiled using the data from the Gujarat Pollution Control Board and Central Pollution Control Board for the years 2018-19, 2019-20 and 2020-21 and is presented in the **Annexures 3.3 and 3.4**. Gujarat Pollution Control Board²² plays its role not merely as a regulator but also as a facilitator. The Board adopted a novel approach of 'Environmental Clinic' & 'Open House' for efficient and better environment management in the State. In Gujarat, at present (according to 2020-21 CPCB Report) there are 164 dumpsites and the state reports 100% door to door collection of mixed MSW with 82% segregation at source.

3.56 The PSUT of solid waste accounts of Gujarat shows that the maximum solid waste generated in the state is Municipal solid waste followed by Hazardous waste and Plastics waste for the years 2018-19 and 2019-20. However, in 2020-21, the highest contributor of solid waste generation is Hazardous waste followed by Municipal solid waste and Plastic waste. Against this, the majority of solid waste has been disposed of and treated in sanitary landfills/dumpsites followed by recycling and composting. In 2020-21, around 42% of the solid waste has been supplied by the households/ hotels/shops/restaurants, followed by 40% generated through industries (BMW, Hazardous and E-waste) and the balance was the stock of previous year's untreated solid waste. Similarly, in disposal and treatment of solid waste, around

²² https://gpcb.gujarat.gov.in/uploads/AR_2021_22_ENGLISH.pdf

33% solid waste was disposed-off at sanitary landfills/dumpsites followed by 21% treated in recycling/reuse, 16% in composting and 10% through waste to energy.

Jammu and Kashmir

3.57 In the Jammu division of Jammu and Kashmir 100% collection of waste has been achieved by the 21 local bodies while partial collection is being done in the remaining local bodies. In Kashmir division, door to door collection of municipal solid waste is being undertaken in 80% of households in Srinagar city through Srinagar Municipal Corporation. In addition, the eco-fragile tourists' places like Pahalgam and Gulmarg have facilities with regard to the treatment and disposal of the solid waste generated in these areas. The segregated waste collected is processed in auto composters and magnetic disintegrators.

3.58 The Physical Supply and Use Table for the Solid Waste for the Union Territory of Jammu and Kashmir (J&K) has been compiled using the data from the J&K Pollution Control Board and Central Pollution Control Board for the years 2018-19, 2019-20 and 2020-21 and is presented in the **Annexures 3.5 and 3.6**. The PSUT of solid waste accounts shows that the majority of solid waste generated in J&K is Municipal solid waste followed by Plastic waste and hazardous waste in all the years. Against this, the majority of solid waste has been disposed and treated in sanitary landfills/dumpsites followed by recycling and composting in all the years. In 2020-21, around 81% of the solid waste has been generated by the households (municipal solid waste and plastic waste) followed by 13% by hotels/shops/restaurants (municipal solid waste) and 5% imports (hazardous waste). Similarly, in disposal and treatment of solid waste, around 75% of the solid waste was disposed-off at sanitary landfills/dumpsites followed by 12% treated in recycling and 9% in composting.

Maharashtra

3.59 In the State of Maharashtra, ULBs practice segregation of waste at source and adequate provisions are made in Solid Waste Management DPRs for achieving 100% segregation of waste at source. ULBs segregate waste into 3 categories-wet, dry and domestic hazardous waste. Dry waste collected from the city is further segregated into paper, plastic, glass, metal etc. through secondary segregation process at transfer stations or the designated material recovery facility (MRF) in the city or at solid waste treatment facility. Many ULBs²³ in the state have accumulated legacy

²³ https://mpcb.gov.in/sites/default/files/solid-waste/msw_annual_report_2021_12082022.pdf

waste at processing facility due to absence of treatment facilities in past. Biomining of legacy waste has been started and 141 sites have been either reclaimed or capped where legacy waste was accumulated.

3.60 The Physical Supply and Use Table for the Solid Waste for the State of Maharashtra has been compiled using the data from the Maharashtra Pollution Control Board and Central Pollution Control Board for the years 2018-19, 2019-20 and 2020-21 and is presented in the **Annexures 3.7 and 3.8**. The PSUT of solid waste accounts shows that the majority of solid waste generated in Maharashtra is Municipal solid waste followed by hazardous waste and plastic waste in all the years. Against this, the majority of solid waste has been disposed and treated in sanitary landfills/dumpsites and composting (including composting, vermi-composting, bio-methanation and waste to energy) in all the years. In 2020-21, around 66% of the solid waste has been generated by the households (municipal solid waste) followed by 22% through hotels/shops/restaurants (municipal solid waste) and 12% by industry (BMW, hazardous, e-waste and plastic). Similarly, in disposal and treatment of solid waste, around 58% of the solid waste has been treated in composting/vermi-composting/biomethanation/waste to energy followed by 33% disposed-off at sanitary landfills/dumpsites.

Mizoram

3.61 In Mizoram, 1 ULB is responsible for MSW management in the State. Solid Waste is being handled by Aizawl Municipal Corporation in Aizawl City and by Urban Development & Poverty Alleviation Department in 22 urban towns through PPP mode. The Physical Supply and Use Table for the Solid Waste for the State of Mizoram has been compiled using the data from the Mizoram Pollution Control Board and Central Pollution Control Board for the years 2018-19, 2019-20 and 2020-21 and is presented in the **Annexures 3.9 and 3.10**. The PSUT of solid waste accounts shows that the majority of solid waste generated in Mizoram is the municipal solid waste in all the years followed by Plastic waste in 2019-20 and 2020-21. Against this, the majority of solid waste had been disposed and treated in other mechanism (pig feed, reuse, composting, material recovery etc.) followed by dumpsites in all the years. In 2020-21, more than 98% of the solid waste generated is the municipal solid waste. Similarly, in disposal and treatment of solid waste, around 48% of the solid waste has been treated/reused through other mechanisms (pig feed, reuse, composting, material recovery etc.) followed by 28% treated in dumpsites and 2% in sanitary landfills. In addition, around 20% of municipal solid waste which has not

been collected by Mizoram Pollution Control Board is assumed to be discharged into the Environment.

Rajasthan

3.62 The Physical Supply and Use Table for the Solid Waste for the State of Rajasthan has been compiled using the data from the Rajasthan Pollution Control Board and Central Pollution Control Board for the years 2018-19, 2019-20 and 2020-21 and is presented in the **Annexures 3.11 and 3.12**. The PSUT of solid waste accounts shows that the majority of solid waste generated in Rajasthan is municipal solid waste followed by Hazardous waste in all the years. Against this, the majority of solid waste had been disposed and treated in sanitary landfills followed by recycling and waste to energy. In 2020-21, more than 51% of the solid waste has been generated by the households (municipal solid waste) followed by 18% through industries (hazardous, e-waste and BMW) and 17% by hotels/shops/restaurants (municipal solid waste). Similarly, in disposal and treatment of solid waste, more than 55% solid waste has been disposed-off at sanitary landfills followed by 16% in recycling and 15% treated in waste to energy. In addition, around 6% of municipal solid waste which has not been collected by Rajasthan Pollution Control Board is assumed to be discharged into the Environment.

Tamil Nadu

3.63 In the State of Tamil Nadu, urban local bodies at several places have organised collection of MSW by house-to-house collection, by using collection bins, compactor bins, lorries using dust bins etc. All the urban local bodies have partly started the source segregation of municipal solid wastes generated in their limits and are partly composting the biodegradable waste.

3.64 The Physical Supply and Use Table for the Solid Waste for the State of Tamil Nadu has been compiled using the data from the Tamil Nadu Pollution Control Board and Central Pollution Control Board for the years 2018-19, 2019-20 and 2020-21 and are presented in the **Annexures 3.13 and 3.14**. The PSUT of solid waste accounts shows that the majority of solid waste generated in Tamil Nadu is Municipal solid waste followed by Hazardous waste and Plastic waste in all the years. Against this, the majority of solid waste has been disposed and treated in composting followed by landfills/dumpsites in all the years. In 2020-21, around 62% of the solid waste is generated by households (municipal solid waste, plastics waste and e-waste) followed by 19% through hotels/shops/restaurants (municipal

solid waste) and 15% by industries (hazardous, plastic, e-waste and BMW). Similarly, in disposal and treatment of solid waste, around 48% of the solid waste has been treated in composting followed by 15% disposed-off in landfills/dumpsites, 9% in reuse and 6% in recycling. In addition, around 10% of municipal solid waste & plastic waste which has not been collected by Tamil Nadu Pollution Control Board is assumed to flow into the environment

3.65 Using the Physical Supply and Use Table of Solid Waste Accounts, the following Global SDG Indicators have been compiled for the years 2018-19, 2019-20 and 2020-21 and are given in **Annexures 3.15 and 3.16**. For 2020-21, the summary value of the following SDG Indicators is presented in **Tables 3.1 and 3.2**.

- **Global SDG Indicator 11.6.1:** Proportion of municipal solid waste collected and managed in controlled facilities out of total municipal waste generated.
- **Global SDG Indicator 12.4.2:** (a) Hazardous waste generated per capita; and (b) proportion of hazardous waste treated, by type of treatment.

Table 3.1: Proportion of municipal solid waste collected and managed in controlled facilities out of total municipal waste generated.

Year: 2020-21

S. No.	Name of States/UTs	Total Municipal Solid Waste Generated (Tonnes)	Total Municipal Solid Waste Collected (%)	Total Municipal Solid Waste Managed in Controlled Facilities (%)
1	Rajasthan	25,17,464	91.2	91.2
2	Gujarat	37,86,433	99.6	67.0
3	Maharashtra	82,60,939	99.8	72.5
4	Tamil Nadu	48,99,031	87.4	71.6
5	Chandigarh	1,87,245	100.0	100.0
6	Jammu & Kashmir	5,34,079	98.2	41.1
7	Mizoram	1,26,097	79.9	50.8

Table 3.2: (a) Hazardous waste (HW) generated per capita; and (b) proportion of hazardous waste treated, by type of treatment.

Year: 2020-21

S. No.	Name of States/UTs	Total HW Generated (Tonnes)	HW Generated Per Capita (Tonnes)	Total Hazardous Waste Treated by Type of Treatment (%)				
				Sanitary Landfill	Incineration	Recycling	Reuse	Waste to Energy
1	Rajasthan	11,32,287	1.436	16.1	0.2	11.1	18.2	47.7
2	Gujarat	39,10,007	5.634	30.5	3.6	5.0	5.6	20.5
3	Maharashtra	8,37,488	0.676	34.8	5.2	14.3	43.1	
4	Tamil Nadu	10,72,953	1.408	8.2	0.5	7.9	44.8	15.7
5	Chandigarh	1,279	0.106					
6	Jammu & Kashmir	34,406	0.257			93.4		
7	Mizoram	51	0.004	5.9		94.1		

3.66 It is evident from the Table 3.1 that almost 100% of the Municipal solid waste is collected in the States of Gujarat, Maharashtra & Union Territory of Chandigarh. Against the collected municipal solid waste in the States/UTs, the Union Territory of Chandigarh has managed 100% treatment in controlled facilities followed by Rajasthan (91.2%), Maharashtra (72.5%) and Tamil Nadu (71.6%). Table 3.2 shows that out of 7 States/UTs, the highest per capita hazardous waste generated in 2020-21 was Gujarat and the lowest in Mizoram. Further in respect of hazardous waste treated by type of treatment, more than 93% of the hazardous waste has been treated in recycling by the State of Mizoram and Union Territory of Jammu & Kashmir in 2020-21. Similarly, around 44.8% of the hazardous waste has been treated in reuse in 2020-21 by the State of Tamil Nadu followed by Maharashtra (43%). In Rajasthan, around 48% of the hazardous waste has been treated in waste to energy in 2020-21.

3.67 As per the metadata of Global SDG Indicator 12.5.1, National Recycling Rate is defined as the quantity of material recycled in the country plus quantities exported for recycling minus material imported intended for recycling out of total waste generated in the country. Recycling includes co-digestion /anaerobic digestion and composting/aerobic process but not controlled combustion (incineration) or land application. National recycling rate can be presented by type of waste including e-waste, plastic waste, municipal waste and others.

$$\text{Recycling Rate} = \frac{\left(\frac{\text{Material recycled} + \text{Material exported intended for recycling}}{\text{Material imported intended for recycling}} \right) \times 100}{\text{Total waste generated}}$$

where

Total waste generated = Waste from manufacturing (ISIC 10-33) + Waste from electricity, gas, steam and air conditioning supply (ISIC 35) + Waste from other economic activities (ISIC 38) + Municipal waste (excluding construction and mining).

3.68 Recycling Rate has not been compiled due to non-availability of data as per the International Standard Industrial Classification (ISIC).

Conclusions

3.69 Despite huge thrust on the principles of 3R (reduce, reuse, recycle) being implemented with active engagement of citizens, there still exists considerable scope to recover value from the waste. This is possible through the adoption of the circular economy approach which is central to achieving the vision of a clean India. Circular Economy solutions are embedded in the concept of generating zero waste through innovations that can utilize discarded materials to produce reusable and recyclable products.

3.70 Given the hazardous effects of the residuals, management of wastes has gained paramount importance in today's society. The tasks of solid waste management pose not only complex technical challenges but also a wide variety of administrative, economic and social problems. It is an undeniable fact that 'Better Data' will provide better information on waste generation which will lead the policy makers to take decisions on RRRR (Reduce, Reuse, Recycle and Recover).

3.71 Solid Waste Account is one of three accounts suggested by the SEEA for the residuals. The scope ahead is enormous. A time series accounts on Solid Waste will provide useful insights into the trend in 'generation & processing' of waste. This will enable further probing in estimating the generation of solid waste in different types of waste which in-turn will be helpful for the policy makers to take empirical decisions on the number and capacity of treatment plants to be set up. With the support of the Central and State Pollution Control Board, these accounts can be developed for other States as well. Also, the residual accounts can be extended for the Effluents and Air Emissions. The Material Flow Accounts (Core Accounts) together with the complete Residual Accounts will completely describe the Material Flow Accounts.
