Corporate Waste Management Policies in India and SDG 12 Achievement

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Abstract

India faces a major challenge in balancing industrial growth with the Sustainable Development Goals (SDGs). This research evaluates how corporate waste management policies in India align with SDG-12 targets. The study specifically focuses on the private sector's role in promoting conscientious consumption and production practices across various industries.

The research uses a qualitative design. It analyses sustainability reports from the industrial, consumer goods, and technology sectors and evaluates key strategies such as the circular economy and Extended Producer Responsibility. It also reviews official data from the NITI Aayog SDG India Index Reports.

The findings show that India has significantly improved its waste treatment capabilities. Bio-medical waste treatment reached 91.52% by 2024. Hazardous waste recycling also increased to 54.99%. However, total waste generation and fossil fuel use continue to rise. Large companies use advanced tools, such as artificial intelligence, for resource recovery. But small companies struggle with high costs and technical barriers. This creates a big gap in national sustainability performance.

The originality of this paper lies in its comparison of corporate reports with official national indicators. It identifies a disconnect between policy goals and real-world outcomes.

A primary limitation of this research is its focus on large corporations. These companies have greater resources than small enterprises. Additionally, gaps in national reporting systems make it difficult to track chemical waste accurately.

The findings imply that future regulations must provide more support to smaller businesses. The policymakers should strengthen reporting systems and the administration of waste regulations. These changes are necessary to safeguard the environment and improve public health. According to the analysis, India needs to shift from managing waste to preventing it at the source to meet the SDG 2030 targets.

Keywords: Sustainable Development Goals, Corporate waste management policy, Circular economy, Extended Producer Responsibility, Waste-to-energy, Sustainable packaging

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Introduction

The whole world is trying to balance economic prosperity with ecological safety. Most of the countries had

been following a linear economic model based on a "take-make-dispose" pattern (Virmani et al., 2022). This model supported rapid industrialisation along with massive consumption of natural resources and a huge increase in waste (Mangla et al., 2018; Rajayya et al., 2025). This has resulted in global issues like natural resource scarcity and environmental degradation (Ram & Bracci, 2024; Virmani et al., 2022). In 2015, the UN created the 17 SDGs as a framework to tackle those challenges. Among these, SDG 12: 'Responsible Consumption and Production' is a very important one, which focuses on better use of resources and moving towards a circular economy (CE) where materials are reused instead of discarded (Arora & Mishra, 2023; Rajayya et al., 2025).

The fast pace of urbanisation has resulted in generation of waste at a faster rate in India. The plastic waste generation (WG) has grown from 2.5 tonnes per annum in 2019 to 3.04 tonnes in 2024. It has resulted in accumulation of E-waste and plastic wastes throughout the country. There have been numerous amendments to current environmental legislation as well as the introduction of new ones in India to manage the increasing burden of waste. India's Solid Waste Management Rules 2016 and Plastic Waste Management Rules in 2016 are a few of such rules which focus on resource recovery and not just waste collection (Ajwani-Ramchandani et al., 2020). The Extended Producer Responsibility (EPR) rule is another component which was introduced initially for plastic and electronics in 2011 but later on, a lot more things were added (Nandini, 2025). Under the EPR policy, manufacturers are accountable for the full lifetime of their products, including what users do with them at the end.

The execution of these policies has proven to be equally difficult. Micro, small and medium enterprises (MSMEs) are often financially constrained and lack the technical know-how to manage their waste properly (Mangla et al., 2018; Virmani et al., 2022). Another challenge is the inability to separate garbage at the source in India. If biodegradable waste is mixed with plastics and other dry waste, it becomes difficult for producers to recycle (Ahluwalia & Patel, 2018). We need better technology and innovation to deal with these problems. For example, new recycling technologies help companies to extract quality resources from waste (Jiang & Bateer, 2025). The waste-to-energy projects help in converting waste to a source of energy which is environment friendly also (Hamdan et al., 2025). AI enhances the routing of waste collection and may even assist in forecasting WG (Singh et al., 2024).

Even after these initiatives in WM, there is a huge gap between policy objectives and results. For example, as per NITI Aayog report for the year 2023-24, only 54.99 % of hazardous waste is being recycled against a target of 100% recycling. Many companies have formal corporate waste management policies (CWMP) in place, but how effective these are in achieving SDG 12 is not clear. New challenges like increasing use of single-use plastics and medical WG from the COVID-19 pandemic underscore the need for more research to assess the real impact of corporate WM strategies on waste reduction and resource recovery in the country.

Our study is important because it examines how the private sector can lead India's transition to a sustainable economy. We can ascertain which policies are successful and which obstacles still exist by analysing CWMP. Our research will offer managers useful information and suggest ways for regulators to strengthen the implementation of CWMP.

The primary goal of this research is to analyse the function of CWMP in India in achieving SDG 12 targets. The study has the following four specific objectives:

- To review the current state of CWMP and EPR implementation in India.
- To evaluate how well these CWMP align with the specific targets of SDG 12.
- To identify the economic, technical, and regulatory barriers that prevent effective WM in Indian firms.
- To suggest measures to facilitate the process of WM

The paper is arranged as review of previous research on CE models and WM in second chapter, research methodology and data collection is third chapter, results in fourth chapter, discussion in fifth chapter followed by conclusion in the last chapter.

Literature Review

The transition from a linear to a CE is a central theme in global sustainability research. Globally, researchers contend that shifting away from the "take-make-dispose" model is necessary for achieving SDG 12 (Arora & Mishra, 2023; Rajayya et al., 2025). A systematic literature review conducted by Ram & Bracci (2024) highlights that using specific waste indicators is the only way to accurately track progress toward sustainable consumption and production. Global research on innovative energy technologies shows that these advancements support SDG 12 targets by optimum utilisation of resources in industrial processes (Kunskaja et al., 2023). Swami & Sharma (2025) shows that when cement and car companies openly share their environmental data, it helps improve their financial performance, reputation, and appeal to global investors.

In the context of emerging economies, studies on large multinational corporations show that adopting new technologies for packaging waste is the key to the CE (Ajwani-Ramchandani et al., 2020). Research pertaining to the Asia-Pacific region emphasises that e-WM requires regional collaboration and robust corporate policies to prevent environmental damage (Herat, 2021). Globally, advancements in plastic recycling—including mechanical and chemical methods—are recognised as essential for reducing the environmental damage caused by the modern manufacturing system (Jiang & Bateer, 2025).

According to Rajayya et al. (2025), with reference to India, the CE plays a central role in achieving the targets of the 2030 Agenda. Singh (2010) argues that, to conserve and protect the ecosystem for next generations, firms need to integrate manufacturing and recycling processes that are less wasteful and more eco-friendly. Mishra & Bhakay (2021) elaborate on the advantages of green supply chain management for chemical companies and describe how companies can create system that are less wasteful and more eco-friendly by implementing improved recycling procedures in collaboration with their suppliers. Research on the Indian smart cities indicates that emerging waste-to-energy programs are vital in order to manage the growing quantity of urban solid waste (Hamdan et al., 2025). Additionally, research has increased on effective WM processes involving EPR in India. One such case study on WM practices in Hyderabad provides proof that EPR is an effective mechanism for closing the gap that exists between WG and the recovery of resources (Bhadra and Mishra, 2021). Nandini (2025) argues that, among other policies, EPR is the most influential policy framework that has obliged Indian manufacturers to internalize the externalities associated with the product life cycle. Shobhwani and Prakash (2025) examine the Nifty-200 companies and found that there has been a marked improvement in environmental disclosures in India since 2019, especially with respect to energy and emissions, in line with ESG reporting. Shweta et al. (2025) focus on

consumers' attitudes and behaviors with respect to purchasing eco-friendly cosmetics, and determine that although consumers prefer cosmetics that are less expensive, do not contain synthetic ingredients, and are packaged in less wasteful and more eco-friendly packaging, the biggest barriers are the costs and lack of knowledge.

Also, the high costs and absence of technical know-how hinder effective WM for MSMEs in India (Virmani et al., 2022). Similar problems are faced in the circular supply chains of other developing countries. These issues are becoming worse by poor infrastructure and regulatory enforcement (Mangla et al., 2018). The monitoring of chemical and hazardous waste is a global issue in connection with achieving SDG 12 (Berthiaume, 2024). Innovation is a must to face these challenges, and AI is an important tool to achieve SDGs in India. The AI may help in e-WM and waste collection (Gupta et al., 2024). Singh et al. (2024), argue that the effectiveness of WM systems in Indian cities can be increased by utilising advanced technologies and risk assessment tools.

CWMP have a significant role in achieving SDG 12. However, the success of such policies depends on addressing financial issues and incorporating new technologies into present business models. While earlier research has addressed the benefits of CE models and EPR in India, they mainly focus on a few selected cities or specific technologies like AI (Bhadra & Mishra, 2021; Gupta et al., 2024). This research seeks to fill this gap in the assessment of the direct impact of CWMP on specific SDG 12 targets in India

Research methodology and data collection

A qualitative research method has been used in this study to assess how CWMP in India align with SDG 12. We gathered data also from government regulations, such as the 2016 WM rules etc. The corporate sustainability reports of big companies in the industrial, FMCG, and technology sectors in India have been systematically reviewed (Ajwani-Ramchandani et al., 2020; Rajayya et al., 2025).

Our research focuses on identifying solutions for reducing wastes, such as EPR and CE models. The direct contribution of these corporate initiatives to SDG 12 targets, like waste minimisation, resource recovery, hazardous waste recovery etc., has also been evaluated (Berthiaume, 2024; Kunskaja et al., 2023) to get a clear picture of their contribution to India's 2030 SDG.

Results

Some of the CWMP and their impact on SDG 12 in our country have been described in depth in the following sections.

Industrial resource recovery and waste minimisation

Ahluwalia and Patel (2018) highlight Tata Steel and JSW Steel for their recycling policies as they have implemented procedures to reuse their waste. For example, wastes like fly ash and blast furnace slag are delivered to the construction and cement sectors for reuse. Such policies directly support target 12.5, which aims at a substantial reduction in waste through recycling and reuse.

Additionally, "co-processing" methods have been employed by the cement industry in India. UltraTech Cement uses non-recyclable solid waste in its kilns as an alternative fuel in partnership with municipal corporations (Singh et al., 2024). This process achieves two goals: it reduces company's dependency on fossil fuels and offers an environmentally responsible way to dispose of municipal wastes (Hamdan et al., 2025). This strategy aligns with target 12.4 (Kunskaja et al., 2023).

CE in Textiles and Plastics

The transition to a CE is highly visible in the plastic and textile sectors. For example, the 'Green Gold' project by Reliance Industries and the 'Anokha Dhaaga' project by Tata Power convert plastic wastes into polyester fibres. These programs are notable as they integrate community development with environment protection (Gupta et al., 2024). These projects demonstrate how companies might meet target 12.2, which focuses on the effective use of natural resources.

Sustainable Packaging in the FMCG sector

Firms like ITC Limited, HUL, Nestle India, PepsiCo India etc. have also committed to sustainable packaging. These companies ensure that a high portion of their packaging are collected back with the help of authorised recyclers. They also rely on EPR framework to improve plastic waste collection (Bhadra & Mishra, 2021; Nandini, 2025). These practices highlight the importance of corporate-led collection system in WM in developing countries like India (Ajwani-Ramchandani et al., 2020; Plastic Packaging, 2008).

Waste-to-Energy projects

Innovation helps companies manage waste that was previously difficult to handle. For example, NTPC Ltd. has started biomass co-firing by combining coal with agricultural waste, such as paddy straw pellets, in its thermal power plants (Singh et al., 2024). This reduces the burning of crop residues in open fields, a major source of air pollution in India.

Digital technology also helps in better waste monitoring. For example, Infosys and Tata Communications have implemented integrated WM systems at their campuses.to track waste segregation, recycling, and composting rates. According to Beier et al. (2021) and Kunskaja et al. (2023), such initiatives support target 12.6, which encourages companies to implement sustainability reporting.

Transparency and Sustainability Reporting

The study finds that reporting is becoming a standard practice for large Indian firms. Companies such as ITC Limited, Mahindra & Mahindra, and Tata Steel regularly disclose WM indicators in their annual sustainability and ESG reports (Arora & Mishra, 2023; Rajayya et al., 2025). These disclosures include data on total WG, recycling percentages, and resource efficiency targets.

For example, Mahindra & Mahindra's "Rise for Good" strategy is helping its manufacturing facilities to be certified as "zero-waste to landfill" (Rajayya et al., 2025). Such reporting gives businesses a competitive edge in addition to increasing openness as investors increasingly look for environmentally responsible

companies (Arora & Mishra, 2023; Gupta & Gupta, 2025).

Summary of Corporate Contributions to SDG 12

Table 1 below summarises the key initiatives identified and their alignment with specific SDG 12 targets.

Company	Key Initiative	Waste Type	SDG 12 Target	Contribution
Tata Steel	By-product recycling (Slag/Ash)	Industrial	12.5	Reduces landfilling; promotes industrial reuse
JSW Steel	Steel slag reuse and waste heat recovery	Industrial	12.2, 12.5	Improves resource efficiency
UltraTech Cement	Waste co-processing in kilns	Municipal/ Industrial	12.4	Provides safe disposal and energy recovery
Reliance Industries	PET to Polyester fibre recycling	Plastic	12.5	Creates a circular textile value chain
ITC Limited	"WOW" Program	Municipal	12.5, 12.8	Improves collection and community awareness
HUL / Nestle	Sustainable packaging goals	Plastic packaging	12.6	Promotes sustainable corporate practices
PepsiCo India	Recycling partnerships and packaging innovation	Plastic	12.5	Improves plastic waste recovery
NTPC Limited	Biomass co-firing	Agricultural	12.2	Efficiently uses organic waste for energy
Tata Power	Plastic recycling and circular textile initiatives	Plastic	12.5	Promotes circular economy
Mahindra & Mahindra	Zero-waste manufacturing plants	Industrial	12.6	Sustainable corporate operations
Infosys	Integrated campus management	Institutional	12.5	Ensures high recycling and composting rates

Source: Websites of respective companies

These findings show that corporate WM in India has grown from mere disposal to sophisticated resource recovery. The embracing of EPR and CE models has allowed companies to contribute significantly to the 2030 Agenda. While barriers such as high costs and infrastructure gaps still exist, the use of technological innovations and collaborative partnerships provides a viable path for achieving SDG 12 targets in India (Rajayya et al., 2025; Singh et al., 2024).

SDG-12 targets achievement by India for the year 2019-20, 2020-21 and 2023-24

Table 2: Selected targets from SDG 12 and achievement by India for the year 2019-20, 2020-21 and 2023-24

SDG	Area	Target	Achievement		
			2019-20	2020-21	2023-24
12.2	Fossil fuel use per person (in kg)	55.6	164.71	157.3	166.43
12.4	Percentage use of nitrogenous fertiliser out of total NPK (Nitrogen Phosphorus Potassium)	57	64.49	64.39	65.24
12.4	Hazardous WG/1,000 person (MTs/ Annum)	4.04	7.4	8.09	9.6
12.4	%age of hazardous waste recycled/utilised	100	37.14	44.89	54.99
12.5	% of Bio Medical Waste (BMW) treated to total BMW generated	100	73.5	86.91	91.52
12.5	Plastic WG (tonnes)/1000 person p.a.	0.62	2.5	2.54	3.04

Source: NITI Aayog

India's progress against its SDG 12 targets between 2019–20 and 2023–2024 is displayed in Table 2. It can be observed from the table that the %age of hazardous waste being recycled has gone up from 37.14% in 2019 to 54.99% in 2024. More than 91% of bio-medical waste is being treated in 2023-24 as compared to 73.5% in 2019.

But the plastic WG has increased from 2.5 tonnes per annum in 2019 to 3.04 tonnes in 2024 and the hazardous WG per 1000 people increased from 7.4 metric tonnes to 9.6 metric tonnes. Fossil fuels consumption has also increased to 166.43 kg from 164.71 kg per capita. Also, our farmers are overusing nitrogen fertilizers, using around 65 % out of total NPK consumption against target of 57%. It means, while our country has shown improvement in treating and recycling wastes, we still need to find ways to generate lesser waste and use fewer resources to meet SDG 2030 targets.

Discussion

Our research reveals that while our nation's recycling capabilities have enhanced, the amount of WG overall has increased. Table 2 shows sound improvement in the treatment of biomedical waste, which reached 91.52% in 2023-24. This improvement is in line with earlier studies indicating that stricter regulatory frameworks and improved infrastructure lead to better compliance by industries (Rajayya et al., 2025).

Also, there is a clear gap between large and smaller companies with regards to WM. While big businesses employ cutting-edge technology like AI to optimise WM systems, MSME struggle with high cost and technical barriers (Mangla et al., 2018; Virmani et al., 2022). Moreover, use of fossil fuels per person in our country has increased to 166.43 Kg in 2023-2024, highlighting the challenges of distinguishing economic growth from environmental damage. Our study shows that current policies, such as EPR, need to be more inclusive to support all industrial players, as also concluded by Nandani (2025). India must change its

emphasis from merely managing waste to preventing it at the source through wider technological adoption in order to meet SDG 12 targets by 2030.

Conclusion

India's journey towards SDG 12 is characterized by both good progress in waste treatment and growing consumption concerns. Our country has successfully increased bio-medical waste treatment to 91.52 % and improved hazardous waste recycling to 54.99%, but absolute waste levels is also growing. Big companies in India have successfully used CE models and digital tools like AI to improve resource recovery, but MSMEs still face high costs and technical barriers to implementing these policies.

The increasing generation of plastic and hazardous wastes in our country indicates that many industrial strategies are still reactive. The failure to segregate wastes at the source leads to difficulty in recycling. India needs to integrate AI and expand its WM infrastructure to achieve its SDG 12 targets.

Our policymakers should design more inclusive frameworks that offer financial and technical support to smaller companies. Regulations like EPR must be strengthened to address the rising levels of plastics and hazardous waste in our country. The national reporting systems should also be improved to fix the gaps in chemical WM. Finally, integrating digital tools like AI can improve wate monitoring, optimise resource recovery, and my help industries transition effectively to a CE.

The main limitation of our study is its focus on large companies who have more resources than smaller firms towards WM. Also, the tracking of chemical waste in our country remains difficult due to gaps in national reporting systems. Future research may gather empirical data from a larger range of industries for a comprehensive understanding of India's SDG 12 performance. Future research may also examine how easier access to digital technologies may enable smaller companies in our country achieve SDG 12 targets.

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