

Plastic Recycling in India

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Plastic Consumption Trends



Photo Credit: All India Plastic Manufacturer's Assoc.

•	Plastic consumption CAGR	10%
•	Consumption growth by packaging industry	15%
•	Per capita plastic consumption in India	11 kgs
•	Global average per capita plastic consumption	28 kgs
•	India's plastic consumption estimate by 2020	22 mn MT
•	Use of recycled plastics by 2020	8.0 mn MT



Plastic Usage by Industry



- 50% of total packaging demand comes from the food sector
- Plastic flexibles, PET bottles fastest growing segments
- Organised food sector generally uses high quality plastic complying with Govt. norms
- Large informal sector in the food industry uses low quality plastics which is a concern
- Various states in India now allow single use plastics of only 55 microns and above



Plastic Sub-Categories and applications in India

S. No.	Symbol	Short Name	Scientific Name	Uses
1	£	PET	Polyethylene terephthalate	Soft drink bottles, furniture, carpet, paneling etc.
2	ŝ	HDPE	High-density polyethylene	Bottles, carry bags, milk pouches, recycling bins, agricultural pipe, base cups, playground equipment etc.
3	ß	PVC	Polyvinyl chloride	Pipe, Window profile, fencing, flooring, shower curtains, lawn chairs, non-food bottles and children's toys etc.
4	٤Ð	LDPE	Low-density polyethylene	Plastic bags, various containers, dispensing bottles, wash bottles, tubing etc.
5	3	PP	Polypropylen e	Auto parts, industrial fibers, food containers, dishware etc.
6	ئ	PS	Polystyrene	Cafeteria trays, plastic utensils, toys, video cassettes and cases, clamshell containers, insulation board etc.
7	<u>ر</u> ک	0	Other	Thermoset Plastics, Multilayer and Laminates, Bakelite, Polycarbonate, Nylon SMC, FRP etc.

Different Types of Plastics &its Uses

Source: Central Pollution Control Board, 2017



Plastic Waste Generation

Source	Estimated amount of plastic waste
CPCB Annual Report, 2015—16	1,589,418 tonnes
CPCB, Annual Report, 2017—18	660,787.85 tonnes
Media Reportage, 2017—2018	9,468,100 tonnes

High data variation exists between different sources

- India generates 25,940 tonnes of plastic waste every day (*data variation)
- Discarded plastics end up in landfills, drains polluting rivers and seas
- Non- recycled plastics are mostly multilayer packaging material
- Non-recycled plastic (carry bags, multi-layer packs, films) have low prices in recycling market
- Waste pickers derive only INR 4 / kg on plastic bags and multi layer packaging
- 80% plastic waste is thermoplastics; 66% is HDPE/LDPE materials



Plastic Waste Generation



Tonnes per day



Plastic Processing Industry

Snapshot of the Indian Plastics Processing Industry				
Estimated size of plastic processing in value (FY15)	~INR 1 lakh crore			
Market size in volume (FY15)	13.4 MMTPA			
Processing Units	> 30,000			
Technical manpower (as per CIPET)	11 lakh employees			
Growth Rate	10-11%			
Per Capita Plastic Consumption	11 kg (World: 28kg)			

Source: FICCI, 2017



Plastic Recycling Trends



- India has one of the highest plastics recycling rates in the world at about 50% (British Plastic Federation)
- Demand for commodity plastics such as PP, PET, PS, LDPE and HDPE is very high and achieves almost 90% recycling by the informal sector
- The reported recycling rates from the formal sector is 4 mn tn annually
- Recycling industry has surplus capacity but shortage of segregated plastic waste
- Indian recycling firms are importing plastic waste from China, Italy, Japan
- Imports rose from 12000 tn in FY 2016-17 to 48,000 tn in FY 2017-18
- Imports are permitted for firms situated in 'Special Economic Zones'



THE LEGAL SCENARIO

Plastic Waste Management (PWM) Rules 2011

- minimum thickness of plastic bags at 40 microns; later changed to 55 microns in 2016
- State Pollution Control Boards (SPCBs) or municipal authorities as implementing agencies

Plastic Waste Management (PWM) Rules, 2016

- source segregation, recycling, including waste pickers, recyclers and waste processors in plastic waste collection chain
- Adopted a 'polluter pays' approach to sustain the waste management system

In 2018, Ministry of Environment, Forests and Climate Change notified the phasing out of Multi Layer Plastics



Maharashtra: Complete ban on production, use, storage, sale, distribution, import and transportation of single use plastic.

- Drinking water PET/ PETE bottles, having liquid holding capacity less than 200ml
- Plastic mineral water pouch
- Plastic bags
- Non-woven bags
- Single-use and disposable items made up of thermocol (polystyrene) / plastic straws, cutlery, cups, dish, plates, glasses, bowls and containers
- Disposable bowls used for packaging food in hospitality sector
- Any compostable plastic bags except for plant nurseries, horticulture, agriculture and handling of solid waste.
- Use of plastic and thermocol for decoration purpose.



Guidelines for Segregation, Collection and Disposal of Plastic Waste



Figure 1. Flow Diagram for Plastic Waste Management



Extended Producer's Responsibility (EPR)

Introduced under *Plastic Waste Management, Rules 2016,* as a key policy initiative

Main Challenges:

Failed to take off in India due to broad, vague guidelines Absence of formal recycling industry makes EPR implementation difficult EPR obligations for brand owners are met under their CSR efforts Producer Responsibility Organisations (PRO) are becoming implementation agencies









Sustainable EPR Model





Plastics recycling and recovery option

Waste to Roads	Waste to Fuel	Waste to Energy
33,700 kilometres have been built using plastic waste	Paterson Energy runs a plant with capacity of 7.5 MT per day.	Multiple WTE plants operate in India. This has been mostly unviable due to product pricing and inefficient sussidies.
Net savings with plastic roads are about Rs 30,000 per kilometre	The oil generated is sold at an average cost of Rs 40 per litre. The plant produces 500 ltrs of oil / MT of plastic waste	



The Informal Sector – waste collection, segregation



Informal sector recycles as much as 66% of solid waste in cities

India's 15 lakh waste pickers collect, segregate, and trade in waste

Each waste picker picks at least 60 recyclable kg waste in a day to earn INR 8,000—10,000 a month

Other players in the sector are the waste segregators, large- and smallscale waste dealers and recyclers



Marine Plastics



India dumps over 600,000 tonnes of plastic waste into the seas and oceans each year

Indian states produce about 4,800 bn tonnes of domestic waste and 65 mn tn of solid waste annually, which is later dumped into the sea

It is estimated that 95% of the debris in the oceans comes from just ten rivers and two of them are located in India, namely Ganga and Indus.

There is no policy on marine plastic waste in India.

'Coastal Regulatory Zone' norms mention the prohibition of plastic disposal in coastal waters



Marine litter status along Indian beaches during October 2013-





Tech Applications in Waste Sector

TECHNOLOGY APPLICATIONS TO BUILD TRACEABILITY, CAPACITY BUILDING ALONG THE WASTE VALUE CHAIN

