MANAGING PLASTIC WASTE IN INDIA

CHALLENGES AND AGENDA

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This report has been researched on and published under the auspices of the School of Circular Economy, Anil Agarwal Environment Training Institute (AAETI), CSE.

Norwegian Embassy

We are grateful to the Norwegian Ministry of Foreign Affairs for its support.

Published by
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Foreword

Plastic is back on the agenda — and I am not talking about the garbage problems of countries like India. For us, plastic perhaps had never been out of the agenda: it has always stayed with us, and been in our collective faces, literally. Our governments lack the money or the humanpower to take back the increasing amounts of waste we generate and get rid of it somehow. Growing mountains of non-biodegradable garbage — mainly plastic — is our nightmare. It is choking our drains, our rivers and our streets.

No, this time, after almost 30 years, plastic is back on the global agenda. It was in the 1970s that the now developed world had struggled with its massive waste problem. But then, cities cleaned up their act — there is no litter now. There is no visible plastic waste on the streets or in the rivers. The problem of garbage has been managed.

This does not mean that plastic has gone away. In fact, its use has increased. It is today perhaps the most ubiquitous and necessary material that humankind has created for itself. The biggest increase in the use of plastic has come in the packaging industry — from water bottles to plastic layers in tea bags to plastic straws, glasses, plates and just about anything and everything that we package for our consumption. We wear it, we sleep on it, we build our homes with it, and we pipe out water and oil through it.

But plastic waste, it was believed, was a problem that had been tackled. As long as people did not use carry-bags to do their shopping, and as long as they segregated waste, it was ok. We could use and somebody would recycle. Or it would be taken to an incinerator and burnt. All in all, it was handled.

But now the balloon has burst. The first shock has come from studies that show that plastic generated on land is filling up our oceans — literally. But it is not just polluting oceans. Fish are eating this plastic, and we are then eating the same fish. So, the cycle has closed. Plastic that we used, even segregated, and which then somebody took away for recycling or disposal, has come back into our bodies. It is almost as if it never went away.

Then came the other shocker — micro-plastics or tiny fragments have been found in tap water and even in the air we breathe. This is because plastic is a wonder substance: it does not get destroyed. But with exposure to sunlight or water it does break up. Or it can be crushed. When this happens, tiny particles — fragments of plastic — contaminate our environment and bodies.

A fascinating study by academics from the University of California and Santa Barbara and others has put together the world's first material balance of plastics. It should really worry us. They estimate that the world has produced some 8.3 billion metric tonnes (bmt) of plastic from 1950 — when large-scale production began — to 2015. Of this 6.3 bmt, or 80 per cent, is plastic waste.

Of the 6.3 bmt of plastic waste generated in the world, as little as 9 per cent has been recycled. Of the 9 per cent that is recycled, only 10 per cent has been recycled more than once; 12 per cent of the waste has been incinerated. The rest, as much as 79 per cent of the plastic manufactured in the world, is in landfills or in the environment — our oceans and waterbodies.

The question we need to ask then — every time we use something made of plastic — is what will happen to it. There are currently two primary options. One, it can be recycled or reprocessed into secondary material. In most cases, this 'secondary' material is of lower quality or economical value. So, it does not displace the primary product. In fact, in this way, recycling delays the final disposal, say authors of the plastic balance study.

Two, plastic can be destroyed using thermal heat — incinerating it. But burning plastic in incinerators produces emissions. So, unless there is expensive pollution control equipment installed and functioning, this option is not so benign.

What, then, are the choices that we have? Will the anti-plastic movement succeed? Or will it once again succumb to a new set of technology 'fix-its'? For instance, there is the much needed and much welcome deposit scheme that has been initiated in some countries: people can return plastic goods like water bottles and get back their deposit. There is also the extended producer responsibility scheme in which producers have to take back a proportion of the materials they generate. But again, this begs the question — what will happen when the waste is collected? What do we really mean by recycling?

We need more drastic solutions. Solutions that have to be plastic-free. Remember also that plastic is nothing more than fossil fuel. Roughly, 6 per cent of the world's oil consumption goes into making this wonder substance. But how will we find those solutions when our lives are so enjoined with plastic?

In Hinduism, the god of destruction — Shiva — is more important than the god of creation — Vishnu. Maybe the next time we celebrate an invention that is so convenient because it is so indestructible, we should remember this. Plastic, for us, is a sign of the Anthropocene. This, clearly, is not the way we want future generations to remember us.

This background paper from Centre for Science and Environment is the first building block of our programme on plastic waste management. We believe it will help us understand the status of the waste problem and identify the gaps on what needs to be first learnt, and then done.

Sunita Narain

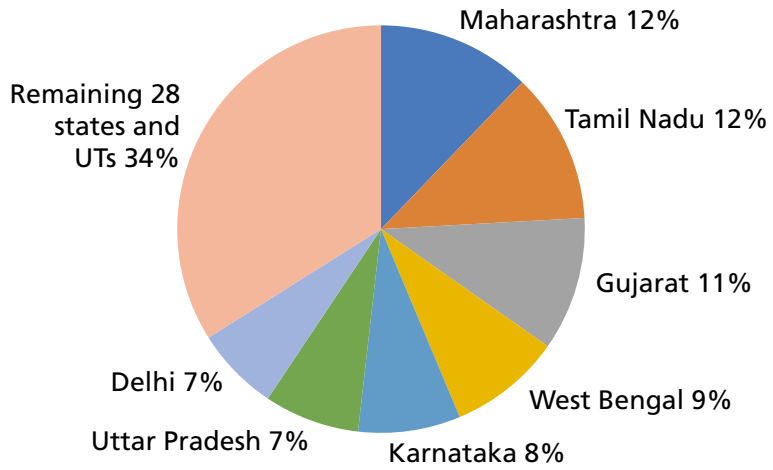
Plastic waste: How much does India generate?

The *Annual Report* on implementation of the Plastic Waste Rules, 2016, which is compiled by the Central Pollution Control Board (CPCB), is the only regular estimation of the quantity of plastic waste that is generated in India.[1] In 2018-19, this report put the plastic waste generated as 3,360,043 metric tonnes per annum (roughly 9,200 metric tonnes per day). Given that the total municipal solid waste generation is 55-65 million metric tonnes, this would mean that plastic waste is roughly 5-6 per cent of the total solid waste generated in the country.

Wealth and affluence contributes to the generation of plastic. Goa, India's richest state, has the highest per capita plastic waste generation — some 60 grams/per capita/day, which is nearly double of what Delhi generates (37 grams/per capita/day) and way above the national average of 8 grams/per capita/day (*see Graph 1 and Table 1)*

The *Annual Report* is compiled on the basis of submissions from state pollution control boards. For the first time, in 2018-19, all the states have provided data — though, it is unclear what is the source of this data, as no

Graph 1: Top seven contributor states to total plastic waste generation in India — as of 2018-19, the country was producing 3.3 million metric tonnes a year



Source: Central Pollution Control Board, Annual Report (2018-19) on Implementation of Plastic Waste Management Rules, 2016

survey has ever been conducted. Despite this, this *Report* remains the only source of national data on plastic waste generation.

But the *Annual Report*'s estimations are substantially lower than those in the 2015 CPCB report on *Assessment and Quantification of Plastic Waste Generation in Major Cities*,[2] which extrapolated data based on findings from 60 cities in India: it said that some 15,342 tonnes was generated per day — 5 million tonnes per year. This, the CPCB extrapolated to the rest of the country to estimate that some 25,940 tpd of plastic waste is generated (roughly 5.5 MT per annum). It also found that 70 per cent of plastic packaging of products was converted into waste in a short span.

The 2015 study methodology was to estimate plastic waste from the municipal waste dumping sites. It collected (from 60 cities) one tonne of waste from municipal/other dump sites to check the quantum of plastic waste that is ending up in them. It found that on an average in these cities, some 7 per cent of the waste in dumpsites was plastic waste. In some cities like Delhi, Kolkata, Surat, Raipur etc, over 10 per cent of the total solid waste in dumpsites was plastic. This would be an underestimate as it is well known that a lot of the more 'valuable' plastic is taken out of the waste stream much before it reaches the landfill.

As per the study, it was found that almost 66 per cent of plastic waste comprised of mixed waste — polybags, multilayer pouches used for packing food items etc (belonging to HPPE/LDPE or PP materials), sourced mainly from households and residential localities. These, according to the study, were plastic waste which could not be recycled.

An IIT Kharagpur study in July 2018 found more than one-fifth of the silt that clogs Delhi's drains during the monsoon months to be made up of empty *gutkha* and *pan masala* packets. The researchers who surveyed drains in the national capital found that 22 per cent of the silt in drains was *gutkha* and *pan masala* packets; another 27 per cent of it constituted of plastic bags and plastic film.[3]

3.3 million metric tonnes/ year

Total plastic waste generated in India in 2018-19, as per the CPCB

Table 1: States — per capita plastic waste generation

State	Population as per Census 2011	Plastic waste generated in tonnes (FY 2018-19)
Tripura	3,673,917	26
Sikkim	610,577	6
Mizoram	1,097,206	13
Nagaland	1,978,502	268
Chhattisgarh	25,545,198	6,000
Meghalaya	2,966,889	1,263
Himachal Pradesh	6,864,602	3,672
Bihar	104,099,452	68,903
Madhya Pradesh	72,626,809	72,327
Assam	31,205,576	32,278
Uttar Pradesh	199,812,341	254,402
Andhra Pradesh	49,576,777	66,314
Rajasthan	68,548,437	104,704
Jharkhand	32,988,134	51,455
Odisha	41,974,218	90,139
Lakshadweep	64,473	148
Haryana	25,351,462	68,735
Arunachal Pradesh	1,383,727	3,787
Jammu and Kashmir	12,541,302	34,367
National Average	1,210,854,977	3,360,043
Uttarakhand	10,086,292	31,093
West Bengal	91,276,115	300,236
Dadra and Nagar Haveli, Daman and Diu	586,956	1,948
Maharashtra	112,374,333	409,630
Kerala	33,406,061	133,316
Punjab	27,743,338	119,415
Manipur	2,855,794	12,454
Karnataka	61,095,297	272,776
Andaman and Nicobar Islands	380,581	1,850
Telangana	35,004,000	183,015
Tamil Nadu	72,147,030	401,091
Gujarat	60,439,692	356,873
Puducherry	1,247,953	8,433
Chandigarh	1,055,450	11,715
Delhi	16,787,941	224,810
Goa	1,458,545	32,581

Source: Central Pollution Control Board, Annual Report (2018-19) on Implementation of Plastic Waste Management Rules, 2016

	Plastic waste generation (in grams)	Annual per capita plastic waste generation (in grams) as per annual report 2018-19	Per capita plastic waste generation (in grams per day)
	26,200,000	7.131	0.02
	5,660,000	9.270	0.03
	13,306,000	12.127	0.03
	268,180,000	135.547	0.4
	6,000,000,000	234.878	0.6
	1,263,000,000	425.698	1.2
	3,672,000,000	534.918	1.5
	68,903,328,000	661.899	1.8
	72,327,390,000	995.877	2.7
	32,277,870,000	1,034.362	2.8
	254,401,800,000	1,273.204	3.5
	66,314,000,000	1,337.602	3.7
	104,704,383,000	1,527.451	4.2
	51,454,530,000	1,559.789	4.3
	90,138,980,000	2,147.484	5.9
	148,000,000	2,295.535	6.3
	68,735,260,000	2,711.294	7.4
	3,787,370,000	2,737.079	7.5
	34,367,370,000	2,740.335	7.5
	3,360,043,457,000	2,774.935	7.6
	31,093,000,000	3,082.699	8.4
	300,236,120,000	3,289.317	9.0
	1,947,700,000	3,318.307	9.1
	409,630,000,000	3,645.227	10.0
	133,316.000.000	3,990.773	10.9
	119,414,640,000	4,304.264	11.8
	12,453,800,000	4,360.889	11.9
	272,776,000,000	4,464.763	12.2
	1,850,000,000	4,860.989	13.3
	183,014,650,000	5,228.392	14.3
	401,091,000,000	5,559.356	15.2
	356,873,000,000	5,904.613	16.2
	8,433,000,000	6,757.466	18.5
	11,715,400,000	11,099.910	30.4
	224,810,000,000	13,391.160	36.7
	32,580,520,000	22,337.686	61.2

Types of plastic waste and what can be recycled

Thermoplastic is a generic category and within this, different types of plastic materials are manufactured for different uses. It is important to understand which of the plastic material, used for what, can be recycled. It is also important to understand what does this recycling entail and what is the recycled product used for. Unfortunately, there is little information available on these aspects — most of the recycling happens in the informal and small-scale industrial segment, which works 'invisibly'.

What is generally understood is that polystyrene (PP and PS) and low-density polystyrene (LDPE) are only partially recyclable; most of the times, they are not recycled due to their economic unviability. The 2015 CPCB study had noted that 94 per cent of the total plastic waste was thermoplastics, which — it said — would be recyclable; only 6 per cent was thermoset plastic which could not be recycled (*see Table 2*). However, what is not clear is if this study, which was based on the waste characteristics derived from landfill sites, can be the best way to establish the recyclability of plastic waste in the country.

Table 2: Categories of plastic and their recycling potential

Name of plastic	Code	Recyclable or not	Few applications	Type of recycling
Polyethylene Terephthalate (PET)	1	YES	Water bottles, soft drink bottles, food jars, films, sheets, furniture, carpets, paneling	Converted back to polymer and used for making apparel
High-density Polyethylene (HDPE)	2	YES	Milk pouches, bottles, carry bags, recycling bins, base cups	Converted to pellets and used to produce new HDPE
Polyvinyl Chloride (PVC)	3	YES	Pipes, hoses, sheets, wire cable insulations, multilayer tubes, window profile, fencing, lawn chairs	Pyrolysis, hydrolysis and heating are used to convert PVC waste into calcium chloride, hydrocarbon products and heavy metals. These are used to produce new PVC or as feed for other manufacturing processes or as fuel for energy recovery
Low-density Polyethylene (LDPE)	4	YES	Plastic bags, various containers, dispensing bottles, wash bottles	Converted to pellets and used to produce new LDPE
Polypropylene (PP)	5	YES	Disposable cups, bottle caps, straws, auto parts, industrial fibres	Converted to pellets and used to produce new PP
Polystyrene (PS)	6	NO	Disposable cups, glasses, plates, spoons, trays, CD covers, cassette boxes, foams	Not recyclable
Others (O)	7	NO	Thermoset plastics, multilayer and laminates, nylon SMC, FRP, CD, melamine plates, helmets, shoe soles	Not recyclable — however, multilayer packaging could be crushed and turned into sheets and boards for roofing, using adhesives

Sources: Columns 1 to 4 is sourced from the CPCB report titled Consolidated Guidelines for Segregation, Collection and Disposal of Plastic Waste; column 5 are based on data on recycling done in India (collated by CSE from various sources)

Bio-mining tells us about plastic waste in waste

Cities have now awarded contracts for bio-mining of existing landfills — what this essentially means is that the landfill is taken apart to see if there is any material that can be recovered; the rest of the waste is either put back or sent as a filler for roads. It is by no means an easy task. What it does tell us is the quantum and nature of plastic waste that is part of the total waste of our cities. This needs to be done so that it can help us understand what is waste and what is recycled.

Till now, most of the 'recovered' plastic has been sent for energy recovery — for incineration as fuel where some power is also generated. In Delhi's Bhalswa landfill, plastic waste 'recovered' was first sent for incineration to the Jabalpur waste-to-energy plant owned by Essel Infra; the city corporation paid a handsome Rs 3,240 for burning this waste. As of April 2020, the 'recovered' plastic waste is being transported to the Narela-Bawana waste-to-energy plant and the corporation pays about Rs 1,800 per tonne for burning the waste. According to bio-mining project experts, while there has been no study done to characterise the waste, a higher volume of multi-layered packaging and polybags have been found.

According to the 2016 Plastic Waste Management Rules, each plastic bag/ multi-layered packaging must label the type of plastic used in making it.

The nub of the plastic problem lies in the politics of recycling. According to industry, plastic is not a problem because it has a huge recycling potential. Industry says India recycles 60 per cent of its plastic waste — 70 per cent of which is recycled in registered facilities, 20 per cent by the unorganised sector, and 10 per cent at homes. It goes on to claim that, therefore, India recycles much more than the global average, which stands at 20 per cent.[4] The source of this data is unclear but it is bandied about to justify that there is no need to ban/minimise the product.

The fact is that if recycling was indeed so pervasive, then the plastic waste that is visible and found in cities and villages across the country should not have been a problem. Therefore, while it is clear that plastic is recycled in the country, it would be difficult to justify that nothing needs to be done to minimise its use or to ban the use of certain products because it litters our cities and makes its way into waters — both rivers and seas.

Multi-layered plastic: A key concern

The Plastic Waste Management Rules, 2016 define multi-layered plastic packaging as follows:

> *"Means any material used or to be used for packaging and having at least one layer of plastic as the main ingredient in combination with one or more layers of materials such as paper, paperboard, polymeric materials, metalised layers or aluminium foil, either in the form of a laminate or co-extruded structure."*

For the management of multi-layered plastic, the Rules stipulate the following:

- Section 4(f) of the Plastic Waste Management (Amendment) Rules, 2016[5] says *"Sachets using plastic materials shall not be used for storing, packing or selling gutkha, tobacco and pan masala".*
- Section 4(i) says: "*Plastic material in any form including Vinyl Acetate-Maleic Acid-Vinyl Chloride Copolymer, shall not be used in the package for packaging gutkha, pan masala and tobacco in all forms*".
- Section 9(2) says: "*Primary responsibility for collection of used multi-layered plastic sachet or pouches or packaging is of Producers, Importers and Brand Owners who introduce the products in the market. They need to establish a system for collecting back the plastic waste generated due to their products. This plan of collection has to be submitted to PCBs, while applying for consent to establish or operate or renewal".*
- Section 9(3) says: *"Manufacture and use of multi-layered plastic which is non-recyclable or non-energy recoverable or with no alternative use, if any, should be phased out in 2 years-time"* (as amended in March 2018).

2018

The year when the 2016 Plastic Rules were amended and diluted

Therefore, firstly, the Rules ban the use of pouches; secondly, they ask for a phase-out of multi-layered packaging that cannot be recycled. But the 2018 amendment dilutes this by replacing the provisions and weakening them to say that if any of this is non-recyclable, then only will it be banned. As there is no information about what can be recycled, these products continue to be used.

Carry-bags: The status

Over the past several years, Central and state governments have tried to manage plastic waste by focusing on carry-bags and stipulating the thickness of the bags that are permitted.

The 2016 Rules differentiate between carry-bags and packaging as follows:

- 4(a): *"Carry bags and plastic packaging shall be in natural shade, which is without added pigments or made using only those pigments and colourants allowed in BIS for foodstuffs, pharma and drinking water."*
- 4(b): *"Carry bags made of recycled plastic shall not be used for storing, carrying... ready to eat or drink food stuff."*
- 4(c): *"Carry bags made of virgin or recycled plastic shall not be less than 50 microns in thickness."*

Carry-bags are a particular problem because they are difficult to recycle. The Plastic Rules have already directed that states should not allow bags of less than 50 microns. Many states have enacted this ban, but many others (and their number is growing) have taken steps to ban all carry-bags irrespective of their thickness (*see Table 3*).

Recently, the Coimbatore City Municipal Corporation began a drive under the Smart City Initiative to introduce bio-bags that could serve as an alternative. The bags are known to be soluble in water and decompose within three-four months. As a part of the first phase of the plan, the Corporation sold 2.30 lakh bags that it procured for Rs 5.48 lakh through shops established for the sale of bags within the city.

The municipality has also tried to rope in bulk generators such as restaurants, hotels and commercial establishments to switch over to these alternative bags, and would explore a commercial model in discussion with big merchants, plastic manufacturers and distributors. This initiative marks a very unique approach towards introducing alternatives to plastic bags. **But it has its problems, as it becomes difficult to distinguish between bio-bags and ordinary bags — compliance, therefore, is impossible.**

Carry-bags

Are problematic because they are difficult to recycle, and it is almost impossible to regulate their thickness

The problem of carry-bags, therefore, has been as follows: firstly, it is almost impossible to regulate their thickness. Secondly, the problem is not about carry-bags but about packaging of food and other items — particularly in multi-layered bags, which are difficult to collect and have limited recycling options. Therefore, any serious effort to regulate plastic must go beyond this.

Table 3: Status of ban on carry-bags with thickness less than 50 microns

State	Status
Andaman and Nicobar Islands	Complete ban on all plastic bags
Andhra Pradesh	Partial ban in Tadipatri, Vijayawada, Tirupati and Bobbili (irrespective of thickness)
Arunachal Pradesh	Partial ban; use banned in East Siang, Tawang, Leparada Changlang, Kameng and Tirap districts
Assam	Ban irrespective of thickness.
Bihar	Complete ban irrespective of thickness
Chandigarh	Complete ban. Compostable carry-bags are allowed. Further, there is prohibition on use of plastic/non-woven plastic carry-bags
Chhattisgarh	Complete ban
Dadra & Nagar Haveli, Daman and Diu	Complete ban on all kinds
Delhi	Information not provided. However, Delhi has banned plastic bags since 2012
Goa	Ban on plastic bags below 50 microns
Gujarat	Ban on plastic bags below 50 microns
Haryana	Complete ban on use
Himachal Pradesh	Complete ban on use
Jammu and Kashmir	Ban on plastic bags below 50 microns
Jharkhand	Complete ban
Karnataka	Complete ban on manufacture, use and sale
Kerala	Ban on carry-bags below 50 microns; complete ban in Sabarimala, Pamba and pilgrim areas
Lakshadweep	Complete ban on import and use of polythene and plastic material for packing or carrying of consumer goods
Madhya Pradesh	Complete ban irrespective of thickness
Maharashtra	Complete ban irrespective of thickness
Manipur	Ban on plastic bags below 50 microns
Meghalaya	Ban on plastic bags below 50 microns
Mizoram	Ban on plastic carry-bags only in Aizwal Municipal Corporation limits
Nagaland	Complete ban irrespective of thickness
Odisha	Ban on plastic bags below 50 microns; five municipal corporations have banned plastic carry-bags irrespective of thickness
Puducherry	Complete ban

State	Status
Punjab	Complete ban on manufacture, sale, usage and recycling irrespective of thickness
Rajasthan	Complete ban on manufacture, sale, usage and recycling
Sikkim	Complete ban
Tamil Nadu	Complete ban on manufacture, store, supply, transport, sale or usage of plastic carry-bags of all thicknesses
Telangana	Ban on plastic bags below 50 microns
Tripura	Complete ban
Uttar Pradesh	Complete ban on manufacture, store, supply, transport, sale or usage of plastic carry-bags of all thicknesses
Uttarakhand	Complete ban on sale, use and storage
West Bengal	Partial ban: restriction on use and sale of plastic carry-bags in ecologically fragile areas, heritage and tourist spots

Source: https://cpcb.nic.in/uploads/plasticwaste/Annual_Report_2018-19_PWM.pdf

Single-use plastic: Ban, definitions and what is being done

On August 15, 2019, prime minister Narendra Modi had asked the people of India to "free the country from single-use plastics"; he also said a significant announcement on this would be made on October 2 that year, the 150th birth anniversary of Mahatma Gandhi.

In his speech on October 2, Modi said the phasing out of single-use plastic was necessary not just for the welfare of the environment but also for aquatic life which was being affected by the consumption of these plastics. He said the plastic blocked drains and roads, creating civic problems. In his words: "We have to build an *andolan* (revolution) to induce behavioural change which was at the heart of Mahatma Gandhi's philosophy."

2022

The deadline in India for phasing out single-use plastics — but in the absence of strict measures like a blanket ban, it is unclear how the country would meet the deadline

The statement that India would phase out single-use plastics by 2022 was a reiteration of the commitment that the Indian government had made in 2018. On World Environment Day (June 5), 2018, the then environment minister Harsh Vardhan had announced that single-use plastics would be phased out in the country by 2020; the deadline was later revised to 2022.

However, the government has now decided that a blanket ban was not in order as it would be too disruptive for industry and the economy; instead, it has urged states to implement the Plastic Waste Management Rules and to encourage 'behaviour change' and recycling.

Therefore, it is not clear how India intends to meet its objective to "free" the country from single-use plastics. And of course, the pandemic of 2020 has only made matters worse: the use of plastic — particularly single-use and disposable — has increased manifold as a protection against the infection.

No definition

However, the major bone of contention remains the fact that there is no clear definition of what comprises single-use plastics; this can adversely affect any effort to ban these products.

The prime minister has defined them as plastics which are used only once and then discarded (he said this in his address on October 2, 2019). At times, it is misunderstood to mean only polythene bags. For any ban to be successful, we need a clear definition of single-use.

As per an UN[6] definition, any plastic that is made from polymers of HDPE, LDPE, PET, PS, PP or EPS is single-use plastics. The definition of the government of Australia[7] says that single-use plastic includes shopping bags, cups, straws and packaging — basically anything that is intended only to be used once and then discarded. The IEEP (Institute for European Environment Policy) and the European Commission definition[8] says single-use plastics can include any disposable plastic item which is designed to be used only once (*see Table 4*).

The CPCB's Consolidated Guidelines for Disposal of Plastic Waste, 2017 has a classification for plastics (*see Table 5*).

Table 4: Classification of single-use plastics as per the EU

Type of plastic	Usage in percentage	Applications
PS, PSE	6.70%	PS: Eyeglasses, frames, plastic cups, egg trays PSE: packaging, building insulation
PET	7.40%	Water bottles, soft drink bottles, containers for juices, cleaners
PUR	7.50%	Building insulation, pillows and mattresses, insulating foams for fridges
PVC	10%	Window frames, profiles, floor and wall covering, pipes, cable insulation, garden hose, inflatable pools
HDPE	12.30%	Toys, milk bottles, shampoo bottles, pipes, houseware
LDPE, LLDPE	17.50%	LDPE: Reusable bags, trays and containers, agricultural film LLDPE: food packaging film
PP	19.30%	Food packaging, sweet and snack wrappers, hinged caps, microwave proof container, pipes, automotive parts, bank notes
Others	19.30%	Hub caps, optical fibres, eyeglasses lenses, roofing sheets, touch screens, cable coating in telecommunications, medical implants, surgical devices

Source: Plastics Europe Market Research Group and Conversion Market & Strategy GmbH

Table 5: Classification of plastics as per the CPCB

Name of plastic	Applications
HDPE	Milk pouches, bottles, carry bags, recycling bins, base cups
LDPE	Plastic bags, various containers, dispensing bottles, wash bottles
PET	Water bottles, soft drink bottles, food jars, plastic films, sheets, furniture, carpets, panelling
PVC	Pipes, hoses, sheets, wire cable insulations, multilayer tubes, window profile, fencing, lawn chairs
PP	Disposable cups, bottle caps, straws, auto parts, industrial fibres
PS	Disposable cups, glasses, plates, spoons, trays, CD covers, cassette boxes, foams
Others	Thermoset plastics, multilayer and laminates, nylon SMC, FRP, CD, melamine plates, helmets, shoe soles

Source: CPCB's Consolidated Guidelines for Disposal of Plastic Waste, September 2017
http://cpcb.nic.in/uploads/plasticwaste/Consolidate_Guidelines_for_disposal_of_PW.pdf

Table 6: Ban on single-use plastics

State	Plastic carry bags below 50 microns	Complete ban on plastic carry bags irrespective of thickness	Non-woven plastic carry bags	Compos-table bags	Plastic cutlery/ thermocol/ polystyrene cutlery	Plastic coated paper plates, paper bags and tea cups
Andaman and Nicobar Islands	√	√	√			
Andhra Pradesh	√	√ (in few ULBs)				
Arunachal Pradesh	√	√ (in few ULBs)				
Assam	√	√				
Bihar	√	√				
Chandigarh	√	√	√		√	
Chhattisgarh	√	√				
Dadra and Nagar Haveli, Daman and Diu	√	√				
Delhi	√	√				
Goa	√					
Gujarat	√					
Haryana	√	√				
Himachal Pradesh		√			√	
Jammu and Kashmir	√				√	
Jharkhand	√	√				
Karnataka	√	√			√	
Kerala	√	√ (sabarimala, pamba and pilgrim areas)	√		√ (cutlery made of PP is also banned)	
Lakshadweep	√	√				
Madhya Pradesh	√	√				
Maharashtra	√	√	√	√	√	
Manipur	√					
Meghalaya	√					
Mizoram	√ (only in Imphal)					
Nagaland	√	√				
Odisha	√	√ (in 5 ULBs)			√	
Puducherry	√	√				
Punjab	√	√				
Rajasthan	√	√				
Sikkim	√	√			√	
Tamil Nadu	√	√			√	√
Telangana	√	√				
Tripura	√	√				
Uttar Pradesh	√	√			√	
Uttarakhand	√	√				
West Bengal	√	√ (in ecologically fragile areas)				

Source: https://cpcb.nic.in/uploads/plasticwaste/Annual_Report_2018-19_PWM.pdf and compilation from all the state ban notifications

Food processing and packaging plates used in hotels	Water packets	Plastic straw	Plastic banners/ flex	Decoration material made of thermocol or plastic	Plastic flags	Plastic packaging material (integral to product)	Packaged dringking water bottles	Plastic tumblers in commercial use	Plastic sheets
						√ (below 50 microns)			√
			√		√				√
			√	√	√				√
		√		√			√ (PET and PETE bottles of less than 200ml)		
							√ (in government meetings)		
				√			√ (bottles of less than 200ml)		
							√ (in government offices and meetings)		
√	√	√			√	√		√	√

Bans

Have been announced on single-use plastics by many state governments, but are these bans being effectively implemented? Has any alternative material been found to replace plastics?

How Indian states/agencies are defining single-use plastics

Several state governments — such as Maharashtra, Telangana, Himachal Pradesh and Tamil Nadu — have announced a complete ban on single-use plastics, covering plastic and tetra-pack water bottles, single-use straws, and plastic and styrofoam tea cups and containers. Following the August 15 announcement, several public and private organisations and state and Central government departments have initiated moves to ban single-use plastics.

In Odisha, the ban came into effect from October 2. According to a notification issued by the Odisha government on September 29, 2018[9], the manufacture, sale, trade, import, storage, transportation, use or distribution of any of these items — polythene carry-bags, polyethylene terephthalate drinking bottles of less than 200 ml capacity, single disposable cutleries such as plates, dishes, spoons, cups, glasses, forks or bowls, pouches for selling liquid products (except milk), and decorative materials like flowers — are banned.

Vendors shall not be allowed to use polythene sheets of less than 50 microns thickness for storing or transporting any commodity excluding garbage and cups for milk products like ice-cream and curd, the notification says. Polythene packing for materials used in plant nurseries, medicines, blood transfusion bags and other healthcare sector items have been exempted.

Besides the Odisha government, the governments of Goa and Andhra Pradesh too have announced bans on single-use plastics. The Assam administration banned their usage on the premises of the state secretariat. The Kolkata Municipal Corporation's ban came into effect from October 2, 2019. The Airports Authority of India has declared 55 out 134 airports as single-use plastics free. The University Grants Commission has also written to all universities to initiate a bid to make their premises free of them.

Some Central government ministries like food and consumers affairs have announced that single-use plastics would not be used on their premises. The ITC group of hotels and the Rajasthan High Court have made similar announcements.

Table 6 provides information on which state has banned what in their single-use plastic notification. As is clear, the states of Tamil Nadu, Kerala, Maharashtra, Odisha, Sikkim and Mizoram have the most comprehensive listing of these products.

The question, now, is this: how is the ban being implemented in these states and what, if any, has been the alternative material found to replace plastic use in these products?

Extended Producer Responsibility (EPR)

The global recycling rates for plastic remain 5 to 9 per cent of the total plastics manufactured — over a billion metric tonnes of plastics have been manufactured in the last 50 years. Low household segregation and weak collection and transportation systems that support source segregation inhibit the recycling of plastics. Nearly 267 different types of plastic polymers further add to the recycling complication.[10]

This is why the world is looking at the system of Extended Producer Responsibility — where the producer of plastic would be responsible to take the product back and recycle it. But this is easier said than done.

The Plastic Waste Management Rules, 2016 included the Extended Producer Responsibility (EPR) as part of the plastic management system. In 2020, the government issued **guidelines** on how this will be implemented. The Rules define EPR as the responsibility of a producer for environmentally sound management till the end of life of the product. The 'producer' is defined in such a way that it covers all manufacturers, importers and users (brand owners). Under these Rules:

- **Section 9(1)**, *the producers, within six months of the notification of the Rules, shall work out modalities (either individually or collectively) for a waste collection system based on EPR through their own distribution channel or through the local body concerned and by involving the state urban development departments.*
- **Section 9(2)**, *the primary responsibility for collection of used multi-layered plastic sachets or pouches or packaging is of producers, importers and brand owners who introduce the products in the market. They need to establish a system for collecting back the plastic waste generated by their products.*

The Rules (Section 13) also require producers and brand owners to register themselves with the state pollution control board or the CPCB (if operating in more than two states).

However, the March 27, 2018 amendment to the Rules, which substituted "non-recyclable multi-layered plastic" with "multi-layered plastic which is non-recyclable or non-energy recoverable or with no alternate use" has further weakened the Rules. This gave producers a loophole to claim that packaging material, if not recycled, can be put to some other use. This registration is to be renewed each year.

1 billion metric tonnes

Amount of plastics manufactured globally in the last 50 years

PRO: An agent to manage and take responsibility of plastic?

In the business of waste management, there has been the emergence of Producer Responsibility Organisations (PROs) — a third party that facilitates the responsibility of producers to take back waste from the open market, recycle or process, and file compliance. So, brand owners and other producers of plastic now hire an agent — PRO — to do the work; they pay for both the cost of collection and the cost of ensuring compliance.

PROs mostly work through the informal sector. Earlier, a ragpicker used to sell all recyclable waste to a scrap dealer, which used to fetch her/him some value; the remaining non-recyclables were either burnt or disposed of in drains and dumpsites. With PROs in place, backed by collection targets of producers, the non-recyclable waste is purchased from a ragpicker.

The PRO does not find a mention in the Plastic Waste Management Rules, 2016, nor in the amendment of 2018. However, in 2017, the CPCB started registering PROs[9] for plastic waste management. The Indian Pollution Control Association (IPCA), a Delhi-based PRO, was the first to register. The CPCB has authorised 21 companies as PROs: these companies must have a minimum of three years of experience in handling plastic waste. These companies were recognised for a period of three years and authorised to work with plastic producers and/or a brand owner to collect back the plastic waste and process it — either by recycling/incineration or any other approved methods as per the guidelines[10] of the Board.

However, on May 24, 2019, the CPCB — through a notice[11] — withdrew the PRO scheme and cancelled the registration of all the 21 PROs; the Board advised producers and other stakeholders to plan their EPR implementation as per the requirements of the Plastic Rules of 2016, as amended in 2018, and engage agencies at their discretion.

Non-compliance with EPR

On April 24, 2019, the CPCB asked 52 companies and nine industries to submit their EPR plans according to the Plastic Waste Management (PWM) Rules, 2016. The defaulters were made liable for action under the Environment Protection Act (EPA), 1986/National Green Tribunal (NGT) Act, 2010. This was the first time that the CPCB held companies accountable for not complying with the PWM Rules, 2016.

The undertaking submitted by these companies takes responsibility to collect back and dispose of 20 per cent of the used multi-layered plastic (MLP) and other plastics produced/used by their brands. This was proposed to be eventually escalated to 100 per cent in three years.

On June 25, 2019, the CPCB issued directions for producers/importers/brand owners (called PIBO). The directive[12] provides an outline for framing the action plan under EPR for plastic waste management:

1. **Through own distribution channel**: Waste collected through own distribution channel, in its area of operation, should be equivalent to the estimated quantity of plastic waste generated. The PIBO must have a contract with a recycler or can send the waste for disposal to cement plants etc. A documentary proof is to be submitted to the CPCB.
2. **Through Urban Local Bodies**: In this case, the PIBO can work through a contract with a ULB for collection, segregation and recycling the equivalent of the quantity of plastic waste generated. The ULB would make the contract with the recycler or with a cement plant etc. To ensure pan-India coverage, one ULB each from the North, South, Central, East and West regions of the country would have to be contracted with.
3. **Through an agency**, which, in turn, would either contract with a ULB or a recycler or a cement plant for plastic waste management. In this case, the quantity of waste managed would be equivalent to the quantity generated.

An action plan based on the above options would be submitted to the state/Central pollution boards, which would then clear this and monitor its implementation. The PIBO is required to file quarterly reports on the progress made in waste collection and processing.

As of mid-2020, some 89 brand owners and four producers of plastics have registered under the EPR scheme with the CPCB. Now, companies are working to launch programmes for collection of their waste — they could hire an agent to do the work, but the agent is no longer responsible for compliance. One such pilot is 'We Care', funded by PepsiCo India Holdings Pvt Ltd, Nestle India Ltd, Perfetti Van Melle India Pvt Ltd, Dabur India Ltd, and Dharmpal Satyapal Ltd. According to We Care, it has processed 10,000 tonnes of plastic waste, which has been sent for co-processing in 2018.[13]

2020: guidelines for EPR

In June 2020, the Ministry of Environment, Forest and Climate Change (MoEF&CC) issued a uniform framework for EPR to implement the provisions under the Plastic Rules of 2016. According to this document, the Rules are "silent on allocating any responsibility to the producer/importer/brand-owner for establishing other parts of the waste management system like transportation, material recovery, recycling or final disposal." The Rules leave this to the local body. Therefore, for EPR to work, the 'producer' must be involved in the overall waste management projects and not just in the collection of the waste.[14]

2020

Environment ministry unveils EPR guidelines, which say producers must be responsible for overall waste management

93

Brand owners and plastic manufacturers who have registered under the EPR scheme till mid-2020

Under the 2020 guidelines:

1. The MoEF&CC will set up an online portal for registration for the benefit of producers and recyclers — this will provide information on the quantity of plastic waste as well as recycling.

2. Different models are suggested for implementing EPR:
   a. Fee-based model — where the producer can pay to the EPR corpus at the central level, which will then be used to fund the ULB and the recycler and pay for awareness creation. The fee will be decided based on a normative cost.
   b. PRO-based model and plastic credit model — under this, companies can form PROs to handle collection, arrange for recycling and ensure targets are met either by themselves or by engaging waste management agencies. They can also do a tradable recycling credit scheme, or a voluntary product take-back scheme.

3. Manufacturers and PIBOs will share the details about the type of plastic used in packaging and the quantity consumed. They will submit a quarterly report on collection and disposal of all packaging plastics, including multi-layered plastics, online against their targets.

4. The CPCB will create a national-level association called the PRO Association — all registered producers will be its members and share information.

5. Targets for EPR compliance shall be based on the model selected by each producer, importer or brand owner — these will be graded starting with 30 per cent and moving to 90 per cent in a period of five years.

The guidelines recognise that in the current best practice system, where cities ensure source-level segregation, the recyclables are sorted and sold for recycling. The proceeds benefit the city and the collectors of the waste. The guidelines also create a rather convoluted system that will allow for companies to choose models, set targets, and pay fees to central funds. But this may well lead to lower compliance as enforcement will be difficult.

Recycling

As per the 2016 Rules, all persons recycling or processing waste or proposing to recycle or process plastic waste are required to apply to the state pollution control board (SPCB) for grant of registration. However, the PCB cannot grant a registration unless the unit has a valid consent under the Water/Air Act and a certificate of registration issued by the district industries centre/ or a government agency.

But the flow of plastic waste in the country has many different pathways — the recyclers get the waste through door-to-door collection from ULBs, as well as through ragpickers and others who pick up the recyclable waste from roads or landfills. Industrial plastic waste is also sent to recyclers.

It is also clear that 'recycling' is not quite as benign as it sounds. A study by researchers from the University of California and Santa Barbara and others[15] has put together the world's first material balance of plastics. It estimates that the world has produced some 8.3 billion metric tonnes of plastic from 1950 — when large-scale production began — to 2015. Of this, 6.3 billion metric tonnes or 80 per cent is plastic waste. Of this plastic waste, as little as 9 per cent has been recycled. Of the 9 per cent that is recycled, only 10 per cent has been recycled more than once. A mere 12 per cent of the waste has been incinerated. The rest, as much as 79 per cent of the plastic manufactured in the world, has ended up in landfills or in the environment — oceans and waterbodies.

There are currently three options of what can happen to something that is made of plastic. It can be recycled or reprocessed into a secondary material. In most cases, this 'secondary' material is of lower quality or economic value. So, it does not displace the primary product. In this way, recycling delays the final disposal, say authors of the plastic balance study. Secondly, plastic can be destroyed using thermal heat — by incineration. But burning plastic in incinerators also produces emissions. So, unless there is expensive pollution control equipment installed and functioning, this option adds to the pollution load. Thirdly, there is the option of sending it to landfills, or as in India, disposal of plastics in making of roads and burning it in cement plants.

9%

The percentage of plastic waste that has been recycled globally, out of the total plastic waste produced between 1950 and 2015

According to the CPCB's 2015 report, recycling of plastics can be done as follows:

1. **Primary recycling** (conversion of waste plastics into products having a performance level comparable to that of original products made from virgin plastics)

2. **Secondary recycling** (conversion of waste plastics into products having less demanding performance requirements than the original material)
3. **Tertiary recycling** (process for producing chemicals/fuels/similar products from waste plastics)
4. **Quaternary recycling** (process for recovering energy from waste plastics by incineration)

In most cities where plastic is segregated, it is primarily secondary recycling that is done to the waste — it is sorted, cleaned, melted and then made into pellets for further use in products. These products, in most cases, have less demanding performance requirements than the original material.

In its study, which examined the waste in landfills, the CPCB had found that 94 per cent of the waste in landfills was thermoplastics, which is recyclable. The question that arises, therefore, is why has this waste ended up in landfills? Was it because it was not segregated and so could not be sent for recycling and processing? Or was it because while in theory the waste could be recycled, it was not cost-effective because the quality of the waste was poor (67 per cent of the waste was HDPE/LPDE category)?

The report goes on to explain that most of this waste was mixed plastic waste like polybags and multi-layered pouches used for packing food and *paan masala/guthka*. "It is also observed that these multilayer/metalised pouches are not lifted by the ragpickers because collecting them is not profitable and they are non-recyclable and hence thrown/dumped in the dumpsite," notes the report.

Therefore, what is clear is that the waste that ends up in landfill is of the first category of products that should be banned/restricted.

What cannot be recycled, if it is sorted and segregated, can be sent to the cement industry, where it is used as a substitute for fuel. According to the CPCB, as plastic waste has a high calorific value, it can substitute fossil fuels like coal or pet coke in cement kilns, which incinerate at very high temperatures — which implies that there is less emissions of toxins.

Plastic waste is also used for road construction; but for that as well, it has to be segregated plastic waste, which is shredded and then added to the stone aggregate and mixed with the hot bitumen. This use of polymers in road construction is said to improve the life of the roads as it reduces porosity of the material — prevents water from damaging the surface (*see Table 7*).

Table 7: Status of plastic recycling and disposal methods

State	Status
Andaman and Nicobar Islands	Segregated plastic waste used in recycling and road construction
Andhra Pradesh	i. Recyclable plastic channelised to recyclers ii. Non-recyclable plastic sent to cement plants and used in road construction
Arunachal Pradesh	No information
Assam	Non-recyclable plastic waste utilised in road construction and co-processing in cement industry (proposal underway)
Bihar	No information
Chandigarh	Non-recyclable plastic used in RDF processing plant
Chhattisgarh	i. Recyclable plastic sent for recycling to registered recyclers ii. Non-recyclable plastic used in co-processing in cement industry and as alternate fuel
Dadra and Nagar Haveli, Daman and Diu	No information
Delhi	Plastic waste processed through waste-to-energy units
Goa	i. 26,279.38 tonnes baled RDF sent for co-processing in cement kilns ii. 6057.62 tonnes waste recycled iii. 243.52 tonnes of inert waste disposed in sanitary landfills
Gujarat	86,553.62 tonnes of plastic waste used for co-processing in cement plants
Haryana	Plastic waste proposed to be used in construction of roads
Himachal Pradesh	Plastic waste processed through waste-to-energy unit, co-processing in cement plants and in road construction
Jammu and Kashmir (FY 2018-19)	No information
Jharkhand	i. Plastic waste used in road construction and co-processing in cement plants ii. Reverse vending machines used to collect back the plastic waste
Karnataka	i. 25,500 tonnes processed through co-processing in cement industry ii. 47,500 t recycled
Kerala	Recyclable plastic waste collected through 117 resource recovery facilities and 513 material collection facilities
Lakshadweep	Recyclable plastic waste sent to Kochi for recycling
Madhya Pradesh	i. 52,559 MT recycled ii. 18,283 MT co-processed iii. 1,222.5 t of non-recyclable plastic waste used in road construction

State	Status
Maharashtra	No information
Manipur	No information
Meghalaya	Non-recyclable waste used in construction of roads (1 km road built in Nongkynjeng village in West Khasi Hills)
Mizoram	Recyclable plastic sent for recycling (through plastic waste collection centres)
Nagaland	i. Recyclable plastic sent for recycling (through material recovery facilities) ii. Non-recyclable plastic used in road construction
Odisha	Non-recyclable plastic waste sent to ACC Ltd at Bargarh for co-processing in cement kiln
Puducherry	i. Amcor India Pvt Ltd built a 100-metre road using plastic waste ii. 272 MT MLP waste collected by Hindustan Unilever Ltd and sent for co-processing
Punjab	Recyclable plastic waste sent for recycling; collection done through ragpickers
Rajasthan	No information
Sikkim	No information
Tamil Nadu	i. Recyclable plastic waste sent for recycling ii. Non-recyclable plastic waste used in road construction and co-processing in cement kilns
Telengana	i. 6.34 MT used in road construction ii. 494 tonnes recycled iii. Warangal Municipal Corporation using 4-5 tonnes of waste per day in cement industries for co-processing
Tripura	No information
Uttar Pradesh	i. 21.37 MT used in cement Industries for co- processing ii. Uflex Ltd using non-recyclable plastic waste (6 tonnes per day) for the production of fuel, carbon black and gas iii. Waste-to-oil generation plant (3 TPD) installed in Jhansi iv. GPL Polyfills recycled 78,625.7 MT of PET bottles for production of fibres in 2018-19 v. Reliance Industries Ltd recycled 14,941 MT of PET bottles for the production of raw material in 2018-19 vi. Plastic waste used in road construction
Uttarakhand	Collected segregated plastic recycled through 25 recyclers
West Bengal	Polymer bitumen roads constructed by Kalyani, Chandernagore, Ashokenagar and Kalyangarh ULBs and the New Kolkata development Authority

Note: Figures are for FY 2018-19
Source: https://cpcb.nic.in/uploads/plasticwaste/Annual_Report_2018-19_PWM.pdf

Circular economy is by the poor

Sunita Narain

I am looking at massive mounds of garbage — but with a difference. This garbage — from your and my house and countless others — has been sorted, segregated and made into almost neat piles of different stuff. I am at what can be called Asia's largest wholesale market of junk — located in Delhi's Tikri Kalan — obviously at the outskirts of the city, because our waste must be out of sight and out of our minds. We then go to the Haryana side of the market; located in Bahadurgarh district, adjoining Delhi. Here again, there are mounds and mounds of sorted and unsorted garbage. While the Delhi market is formal in some ways; the land has been provided by the Delhi Development Authority (DDA); the Haryana side is located on agricultural land.

I ask farmers why they have leased away their land for this waste trade. They point their fingers at development, ironically called Modern Industrial estate, located near their fields. Here industry they say has pumped industrial discharge into the ground through reverse boring. As a result, our groundwater is contaminated and full of chemicals. Now agriculture is not possible. We could see chimneys and smoke from this "Modern" ground. The pollution control board officials who were with us said, give us proof and we will close down industry that does reverse boring. It was a rhetorical question — they did not really want the answer. Because just near the farms and coming from the factories we could smell and see the massive drain full of stink and dirt. The same Haryana government has stipulated that its pollution board officials can only 'inspect' an industry once in five years. Really rhetorical.

So, the cycle has closed. This could well be called the perverse circular economy of our times — we produce waste and destroy land and livelihoods and then provide no option to the very poor but to make a business out of the same waste we have created and dumped.

I was there with the chairman of the Environment Pollution (prevention and Control) Authority (EPCA) as we want to understand the steps taken to ensure that waste is not burnt in the open. The last time the chairman, Bhurelal had visited the area, he had found massive (this is an understatement) quantities of discarded waste in the Mundka plastic factory area as well as in Tikri. He directed for this waste to be lifted and to be taken the waste to energy plant for controlled burning. It made a huge difference in the last winter season.

This time, there was much less 'waste' in the open. The fact is waste is a resource as the traders informed us. They cannot afford to let it be burnt. But it is also a fact that there is waste that cannot be recycled — for all of us who need and like to buy shoes, one green tip is that 'uppers' cannot be recycled. They have to be burnt. There are other items like this, including multi-layered plastic; what we consume and throw every time we eat processed food packed in shiny and indestructible plastic.

But it is also undisputable that these markets, in Tikri and in Bahadurgarh, which employ the

poorest of the poor, are the reasons why we are not (yet) drowning in our own waste. These markets are built on the labour of the poor, who rummage through our waste, pick up the pieces of any value and then sell it to the first collector, who then sells it on to the next and the next. It is an informal trade but extremely well organized. I was told that the market sorts out some 2000 different products from the waste and value of each ranges between Rs 5-50 per kg. The trade pays GST — earlier the government has imposed a ridiculous 18 per cent, but has now corrected it to 5 per cent. So, the government earns from this trade, which should by all logic be supported, as it provides a waste to resource business and saves us from building landfill sites that take valuable land. We know nothing about this business, but we believe it is considered dirty. The municipal corporations will provide land for dumping waste but nothing for its recycling. Where are the spaces for junk shops in our city plans?

But there is an issue that niggles and eats away at my thoughts. What should be the right model for this waste business? Should we accept the fact that this trade provides livelihoods for the poor so it is good. This would mean that we should use more and reject more. Is this the way ahead? I ask this, not just in the context of Tikri but the world around us. Once China closed its borders on 'foreign garbage' recyclers are looking for new countries to sell this waste. Is this the answer to our waste problem? Surely not.

Part II: Next visit to the recycling plant

Now I am inside a dark and dingy "factory" looking at plastic waste being recycled. This was after I went to see how plastic waste—from our homes—was being separated and traded by the poor in our city. "Where does this plastic go?" I had asked in Tikri, located on the outskirts of Delhi. To Bawana and Narela, industrial areas also in Delhi, I was told. So, here I was standing inside one of the many factories that buy this waste and recycle it. Recycling is a big word, but what does it actually mean?

It goes broadly like this. This waste has to be segregated carefully as each industry can only "process" one type of plastic. It is first cleaned in vats, then boiled, heated and made to run through coils until it becomes like wire. This plastic wire is shredded into granules of plastic that is used again to make new products. The people doing this work are poor and the working conditions are pathetic. But they do it for their livelihoods—a trade, which is made of making resource of our waste. Let's not undermine their effort. If this waste was not so-called processed, it would have been burnt in the open or in poorly-constructed landfills. Bawana is why we are not 'yet' totally wasted. It is our savior.

But economics of this trade work only when the health and environment of the poor are de-valued. It was in 1991 when the then chief economist of the World Bank, Larry Summers, had advocated that toxic waste and polluting factories should be moved to least developed countries. Summers, who then went on to become the president of Harvard University, was pilloried for this idea by all—but he has the last laugh on all of us. This is the business order of the globalised world. It moves polluting factories and mountains of waste into the lands

and hands of the poor, all in the name of commerce and livelihoods.

When China finally stopped the import of plastic waste in 2018, new markets had to be found. Many countries, including Malaysia and Indonesia, became the willing dumpyards, till they decided enough was enough. But plastic waste is finding new ports where costs of recycling would be cheaper and would benefit local business and provide employment. All good. This is the modern world's notion of a circular economy. Summers' version has come true.

It is another matter that these receiving countries are already drowning in their own waste. The fact is that if the rich could pay the real costs of recycling, they would not ship it to poorer countries (I mean rich of the first world and rich of our world). The business is about cutting costs. And it is growing. At the May 2019 meeting of the Basel Convention—an international agreement that binds countries to be responsible in their trade of hazardous substances—plastic waste was included for the first time. But not without a fight. The amendment by Norway to regulate certain plastic trade was contested strongly by the US; and finally, after much dilution, it was agreed to distinguish between contaminated plastic waste and the so-called clean plastic waste, that is destined for recycling in an "environmentally sound manner". So, some control has been brought in, but trade will continue and it will supposedly work for all. The Summers Doctrine again!

The question is whether this is the way ahead? Waste can be a resource. There is no doubt about this. It is also clear that we must recycle and re-use as many times and as much as possible. The Basel Convention may try to stop illegal trade in hazardous substances, but it allows waste to be traded, recycled and processed in a "green" and sustainable way. Given the economics of recycling, that would only mean that this will be done where costs are cheap and health and environment are discounted.

It is not just plastic and it is not just the interests of the rich. While the European Union took a strong stand on plastic waste, it also sought permission to export electronic waste. Then we have second-hand clothes or second-hand cars, swamping African nations, all in the name of global charity as the poor can now afford better clothes. This is leading to new forms of local trade interests, which then want to trade in trash. It is their business.

It is time we re-thought this commodity business of waste. It is time we re-work the "Not-in-my-Backyard" to "In-my-Backyard". Every city must handle its own waste, including its processing. It is only then that it will become more responsible in its production and recycling. We need to close the circle of this circular economy to make it work. Not Summers-style. But really sustainable-style.

Conclusion and recommendations

The politics of plastic rests in the rather benign word 'recycling'. Globally, the industry has successfully argued that it can continue to use this highly durable substance because once we throw it, it will be recycled. Never mind that nobody knows what this means — it is a black box of mindlessness. But it lulls us into 'use and throw'.

When China came up with its 2018 National Sword policy to stop its import of plastic waste for 're-processing', the rich world woke up to some harsh realities. Soon after this, ships of plastic waste cargo were turned away from many other countries, such as Malaysia and Indonesia; nobody wanted this waste. They had enough of their own to deal with.

It is reported that prior to the 2018 ban, 95 per cent of the European Union's (EU) and 70 per cent of the US's plastic waste collected for recycling was sold and shipped to China.[13] The dependence on China meant that recycling standards had become slack — food waste was mixed with plastic and industry had excelled in creating new products, designs and colours of the waste. All this meant that waste was more contaminated; recycling difficult. So much so that even China — which seems to be able to generate business from nothing — found it unprofitable to reprocess it.

India's plastic waste problem is not as huge as that of the rich world — but it is growing. The latest annual report of the CPCB on plastic waste tells it all — while rich states like Goa produce as much as 60 grams per capita per day, Delhi is catching up with 37 grams per capita per day and the national average is around 8 grams per capita per day. In other words, as societies become more affluent, they will become more wasteful. This is the ladder of wealth we must not aspire to climb.

8 grams

The per capita per day production of plastic waste in India. The country's plastic problem, while not as huge as that of the rich world, is growing

However, given the huge litter of plastic we can already see in our cities, it is clear we cannot get sanguine about the fact that we will catch up — collect more; recycle more. This will not work, unless we think different and act decisively: something that is sorely missing today.

Prime minister Narendra Modi made a powerful statement at the Independence Day celebrations in 2019, calling on us to give up the habit of using plastic, promising that his government would announce significant plans for reduction. The Union government then decided that it would not let states take the lead and ask for the implementation of the existing Plastic Rules of 2016.

And again, the politics is about recycling. Industry has, once again, managed to convince policymakers that plastic waste is not a problem as we recycle virtually everything. It is a bit like tobacco — if we stop smoking, farmers will be affected; if we stop throwing plastic the recycling industry — run by small industry, working often in the informal sector, using the poorest people who work in the most abysmal conditions — will collapse. Jobs will be lost.

5%

The tax slab in which the recycling business falls in India, which is high for the sector. The recycling business needs to be supported and incentivised

All studies (limited as they are) show that the plastic waste in drains or in landfills comprises of the least recyclable material — this is multi-layered packaging (used to pack foodstuff of all kinds), sachets (*guthka* or shampoo etc) and plastic bags. The 2016 Plastic Management Rules recognised this and said that sachets would be banned and all multi-layered plastic use would be phased out in two years. In 2018, this was 'fatally amended' to say that only that waste that was non-recyclable — and if there was any of it at all — needed to be phased out.

This is not to say that, theoretically, multi-layered plastic or sachets cannot be recycled — they can be sent to cement plants for energy recovery or used in road construction. But it is nearly impossible to first segregate; collect and then transport these empty, soiled packages. A solution to this is needed.

The second issue is what do we really mean by recycling? The fact is that recycling of plastic needs careful segregation at the household level; this puts the onus on us and the local bodies. So, it is time we dismembered and took apart the word recycling.

State governments are recognising the fact that recycling alone will not work, unless there is a minimising of or ban on plastic items that are low-value and difficult to recycle and unless there are effective programmes for source-level segregation. This is why more and more states are beginning to ban single-use plastic — not just carry-bags and other bags, but also items of daily use, from plastic forks and spoons to plastic drinking water bottles below a certain size. Therefore, the issue clearly is to identify what cannot be recycled — what is unfeasible in cost or in management — and then to ban this.

The third issue is to promote the business of recycling. Currently, we do nothing to incentivise this 'business' which works in the informal and, mostly, in the illegal and dark underbellies of our cities. Today, this recycling business is taxed — it is under GST — and though corrected from the earlier higher slab to today's 5 per cent slab, it is still high. Given that it is in the business of material recovery, it needs to be supported and incentivised.

The fact is that this business is vital to our plastic management system. It is time we involved it in our policy; provided it land as part of the city land

use by-laws; gave it financial support; and most importantly, accorded it the respect it deserves.

The fourth issue is about the 'producer' of plastic — rightly defined to include all businesses that manufacture or sell products that are packaged in plastic of all varieties. The Plastic Rules of 2016 provide that these producers should be held responsible: they must be asked to take back the waste that is produced by them. But as yet, these systems of Extended Producer Responsibility (EPR) have never really been implemented. The 2020 guidelines for EPR make matters worse, because they offer so many options for plastic producers that they end up making implementation difficult, if not impossible. We, therefore, need better and smarter systems to hold producers accountable.

In all this, therefore, the agenda should be as follows:

- **Inventorise plastic waste** — not just in terms of how much we produce, but what happens to the waste after it is used and thrown. Data needs to be collected on the current waste lying in waste sites (landfills); on the current production by big players; and on the systems of recycling that exist in the country.

- **Ban/restrict multi-layered plastic and sachets that cannot be recycled** — we need to take a tough view on this, as the current system provides for industry to continue to manufacture and use plastic that is unfeasible to recycle. This ban needs to be enforced at the national level so that industry — largely the big food and fast-moving consumer goods (FMCG) industry — finds alternatives quickly.

- **Minimise, reduce and then work to recycle**. Many states in India have come up with bans on what they have categorised as single-use plastic. This is important and needs to be taken to the next level so that these restrictions on what is single-use can be put in place across the country.

Ban

All multi-layered plastics and sachets that cannot be recycled, recommends CSE. The ban must be enforced nationally, and the industry forced to find alternatives quickly

- **Include the business of plastic waste recycling in policy** and provide it incentives. Learn what cannot be recycled; and provide it financial support to improve labour and environmental conditions.

- **Start implementing the EPR system as provided in Plastic Waste Management Rules, 2016** — start with collating all data provided by companies to state pollution control boards on how much waste they produce and their plans for taking it back and processing it. This is a mandatory provision of the Rules. Make EPR simple and effective so that it can hold producers responsible. They need to work with the small and or informal recycling business — but this will only happen when they know they have to comply with the Rules.

- **De-code recycling** so that we can ensure that plastic products and packaging can be re-processed; and are designed for easy recycling — for instance, product and packaging cannot have toxic additives; must not be multi-coloured; and labels should be water-soluble. We need packaging rules that are designed for recycling, and these must be made mandatory.

- **Ensure enforcement of segregation at source by local governments**. It is clear that re-processing, recycling or any kind of material recovery — from making a new product or for energy recovery — is only possible if plastic waste is not contaminated and is segregated. This can best (and possibly only) be done at the household/institutional level. There is also the question of the cost of this waste collection and management business: we need a model that will tax the producer and the consumer and will pay the collector and the recycler.

Annexures

Annexure 1: State action on plastics

	Major provisions
Maharashtra	Passed a notification on 23rd March 2018 to ban plastic bags irrespective of the size, cutlery, packaging waste for food and thermocol products with exemption on few service sectors under the Maharashtra Plastic and Thermocol Products (manufacture, usage, sale, transport, handling, and storage) Act from June 2018 onwards. Under this provision, the dairy industry was asked to introduce a deposit refund scheme while the beverage industry was asked not to produce bottles of capacity lesser than 200 litres. Non-compliance of these guidelines would incur various degrees of penalties wherein a first time offender will have to pay INR 5,000 fine; second time offender will incur a penalty to the tune of INR 10,000 and INR 25,000 along with an imprisonment of three months for third time offence. Additionally, bringing plastic items from other states to Maharashtra would also lead to jail term for three months. Besides, all online companies were also asked to put take back price of plastic packaging waste on their wastes. Further to elaborate, following are the articles banned by Maharashtra state: • Plastic mineral pouch (exemptions: Bottles above 200 ml [implement DPR and EPR]); • Bottles below 200 ml; • Plastic bags including non-woven (exemptions: Export purposes); • Disposable crockery — plates, spoons, cups etc.; • Disposable dishes and straws used in food packaging; • Any compostable bags (exemptions: nurseries, agriculture purposes or for handling solid waste), and • Use of decorations made up of thermocol and plastics Maharashtra Pollution Control Board (MPCB) along with district and local administration was authorized to implement the ban whereas Maharashtra Tourism Development Corporation was made responsible for regulating this law at tourist locations. Interestingly, the ban was received differently by different stakeholders; while on one hand local and civil bodies welcomed it, and on the other the industry (formal and informal) was furious and challenged the ban in the Maharashtra High Court. However, it is imperative to note as per the information furnished that the ban was successfully implemented for few weeks but soon after the vigilance became lax, the implementation of the ban also rebounded. Available at: https://www.mpcb.gov.in/sites/default/files/plastic-waste/rules/Maharashtra_Plastic_and_Thermocol_Products_28062019.pdf

	Major provisions
Tamil Nadu	Chief Minister of the state passed a notification on 25th June 2018 to prohibit the use of 'use and throwaway plastics'/single-use plastics, from 1st January 2019. The State government is all geared to 'seal, seize and stop' all those who does not follow the rule and has banned the following 14 kinds of plastics including carry bags: • Food processing and packing plastic used in hotels; • Plastic coated paper plates; • One-time usable plastic coffee and tea cups used in shops and homes; • Thermocol tumblers and cups; • Plastic printed flags in sale in shops; • Water packets sold by small vendors around Tamil Nadu; • Plastic bags used for gift purposes; • Plastic carry bags used for everyday usage by people; • Plastic sheets used for table mats and tablecloths; • Normal plastic made tumblers in commercial use; • Plastic coated paper bags used in shops for packing products for the buyers; • Plastic straws used in shops, theatres and hotels; • Plastic coated tumblers, and • Thermocol plates Additionally, it stated in absolute terms that no industry or person shall manufacture, store, supply, transport, sale, or distribute, 'use and throwaway plastics'; and no person (shopkeeper, retailer, trader, wholesaler, hawker, vendor, salesmen) should use such plastics. It has also made a provision for levying fine of INR 25,000 (for the 1st time offence); INR 50,000 (for the 2nd time offence) and INR 1 lakh (for multiple time offences), respectively, for storage, supply, transport, sale and distribution of single-use plastics in the state. However, string of exemptions are also followed viz., plastic carry bags exclusively manufactured for export purposes; plastics used for packing of milk and milk products (dairy products); oil; medicine and medical equipments; carry bags made from compostable plastics bearing a label compostable and conforming to the Indian Standards; plastic bags used in packaging and sealing of goods which, are used prior in manufacturing/processing units, and plastic bags or sheets used in forestry and horticulture nurseries against the order from the government departments. Inspired by the state decision, Thoothukudi (port and industrial city in the state) Corporation banned the single-use plastics, of below 50 microns, in their district from 15 August 2018 onwards, and has made a provision for issuing fine of INR. 500 on being caught. Besides, the state guidelines mentioned that the Municipal Commissioners and the District Collectors of the area will ensure prevention of storage, supply, transport, sale, distribution and use of different kind of plastics. It further also indicated the responsibility of the District Environmental Engineers to monitor and cease the manufacturing of different kinds of plastics (as indicated above) in their regions. For state dwellers, Environment Secretary of the state were recommended to carry their own cloth/jute bags or baskets for shopping since even reusing plastic carry bags could be questioned. Available at: https://www.tnpcb.gov.in/pdf_2018/G.O_84_BanPlastic3718.pdf

	Major provisions
Bihar	Environment and Forest Department of the Government of Bihar imposed a complete ban and directed through notification (No. Parya Van-25/2018.../E.F., Patna-15) that no person (including a shopkeeper, vendor, wholesaler, retailer, trader, hawker, feriwala or sabjiwala) shall manufacture, import, storage, distribution, transportation, sale and use of plastic carry bags (irrespective of their size and thickness), in the urban areas of the state from 25th October, 2018 and in rural areas from 25th November, 2018 onwards. The contravention of any of the directions mentioned above would attract penal action and imprisonment upto 5 years or with fine which may extend to INR 1 lakh or with both. However, the guidelines in the notification stipulates the following exceptions to its application: • Plastic carry bags (>50 microns thickness) for the purpose of collection or storage of bio-medical waste for its disposal as specified under the Bio-Medical Waste Management (BMWM) Rules, 2016; • Plastic used for packaging of food materials, milk and milk products; • Plastic containers used for raising plants in the nurseries. The nodal persons authorized to regulate the aforesaid directions are the Chairman of Bihar State Pollution Control Board, the Principal Secretary of Urban Development and Housing Department, The District Magistrate, Superintendents of Police and the Regional Officers/AEEs/ Scientists of Bihar State Pollution Control Board, etc. Available at: https://bit.ly/2U21yhV
Himachal Pradesh (H.P.)	The state government has enacted 'H.P. Non-Biodegradable Garbage (Control) Act and H.P. Non-Biodegradable Garbage (Control) Rules', way back in the year 1995 and 1996, respectively, to deal with the menace of plastic and other non-biodegradable materials. Following to that series of amendments were made - stating ban on plastic carry bags of thickness <70 microns and size < 12" * 18" by the stocklists, traders, retailers, and vendors (in 2004); complete ban on littering and use of polythene/plastic carry-bags (irrespective of their sizes and thickness) and non-biodegradable material (in 2009); complete prohibition on the use of plastic cups, plates and glasses (2011) and complete eradication of thermocol cutleries (cups, plates, glasses, spoons etc.) or any other non-biodegradable product(s) (2018) in the state. Different regulatory authorities (District Magistrate, Police Superintendents, Block Medical Officers, Station House Officers, Food Inspectors were allowed to impose fine based on the following criteria: • INR 500 — 25,000 for carry bags; polythene; plastic items and thermocol cutleries, upto 100gms to 10kg and above, and • INR 5,000 and 1,000 for littering of such non-degradable materials by any institution/commercial establishments and by individuals in any premises & elsewhere, respectively, Keeping all the inevitable environmental consequences into considerations which are caused by plastics in this hilly and eco-sensitive terrain, the Environment, Science and Technology Department of the state has issued latest notification on 8th March 2019 which further elaborates on strategies for the management of non-biodegradable waste/plastic waste in the region. Interestingly, the document stated few facts which were observed while formulating & implementing bans on single-use plastics and their disposal i.e., over the period of time, plastic manufacturing and marketing has steeped-down in the state due to lack of coordination among various plastics franchise. Currently, the department is attempting to collaborate with Central Road Research Institute (CRRI), New Delhi to disseminate necessary technologies to the state which can help them in managing plastic waste in road construction. Available at: https://bit.ly/2JMA8b4

	Major provisions
Sikkim	Forest, Environment and Wildlife Management Department, Government of Sikkim has notified rules controlling the manufacture, sale and usage of plastics and/or any non-biodegradable products since 1997. Notably, it is the first state in the country which took these drastic initiatives on the grounds, and targeted the ban on single-use plastic bottles since then. The rules further got amended in 2016, wherein the government restricted the use of packaged drinking water in government offices and meetings, and Styrofoam/thermocol disposable products in the entire state. The guidelines issued recently are considered more robust, as they extend responsibilities of both, producers and generators of plastic; and imposing responsibilities on industry, consumers and civic bodies (up to and including the village level) for segregating, managing, recycling and reducing plastic usage. In order to make the ban successful, combination of other strategies were also applied and monitored yearly by the regulators viz., non-renewal of shopkeepers' license if they were found using and selling plastic bags. Besides, in Gangtok (capital of Sikkim) members of the Lachung Dzumsa (traditional system of governance in Lachen and Lachung villages which, is protected under the Sikkim Panchayat Act 1995) impose fine of minimum INR 1,000 if visitor(s) were caught throwing plastic waste in the tourist hotspots. Available at: http://udhdsikkim.org/183_State%20policy.pdf
Karnataka	On 11th March, 2016, the State Government passed a state-wide plastic ban order stated that no person (shopkeeper, vendor, wholesaler, retailer, trader, hawker, or salesman, etc.,) shall use plastic carry bags, banners, buntings, flex, plastic flags, plastic plates, plastic cups and plastic sheets (for spreading on dining table) used in functions for serving food items, irrespective of thickness. Further, the circular mentioned that manufacture of the banned items shall attract levy of INR 2 lakh (1st offence), INR 5 lakh (2nd and subsequent offence); storage INR 1 lakh (1st offence), INR 2 lakh (2nd and subsequent offence); trading and retailing INR 50,000 (1st offence), INR 1 lakh (2nd and subsequent offence); usage by domestic entities INR 500 (1st offence), INR 1000 (2nd and subsequent offence) and commercial users INR 25,000(1st offence), INR 50,000(2nd and subsequent offence). However, the plastics which are necessary for the following purposes were exempted: Plastics used for export orders located in Special Economic Zone (SEZ) and Export Oriented Units (EOUs); • Plastics used for packaging goods which are used as a raw material in manufacturing/processing units; • Plastics used in horticulture and forestry nurseries, and • Plastics used for packing dairy products • Interestingly, the state is currently using modern-age technology, which is similar to the ticket-vending machines, having additional features such as a camera and a screen enabled with a Global Positioning System (GPS) interface to robustly implement the ban in the state. Available at: https://kspcb.gov.in/Notification_28102015.pdf

	Major provisions
Jammu and Kashmir (J&K)	Department of Forest, Environment & Ecology of J&K, issued a notification on 3rd February 2017 to enforce ban on the manufacture, stocking, distribution, sale; and use of polythene carry bags, plastic sheets, multilayered plastic containing packaging materials of <50 microns thickness within its jurisdiction. The contravention of it would otherwise attract levy of INR 5000 (1st offence), INR 10,000 (2nd and subsequent offence); and one or two (2nd and subsequent offence) months imprisonment; or both. However, use of polythene carry bags in BMWM were relieved to its application. Keeping an aim to make the state plastic free, government recently published another notification on 26th March 2019, to prohibit the use of disposable articles viz., plastic tableware, plates, bowls, cups, knives and forks in the region. The regulative authorities are specifically instructed to ensure the implementation of the rule so that the ecological sensitivity of the region is conserved. Additionally, government is also planning to conduct awareness drive to promoting use of reusable alternatives of plastic products in the state. Available at: https://jkspcb.nic.in/WriteReadData/userfiles/file/Act%20and%20Rules/SRO%20450001.pdf

Annexure 2: Salient features of the Plastic Waste Management Rules, 2016

Producer means persons engaged in manufacture or import of carry bags or multi-layered packaging or plastic sheets or like, and includes industries or individuals using plastic sheets or like or covers made of plastic sheets or multi-layered packaging for packaging or wrapping the commodity

Manufacturer means and include a person or unit or agency engaged in production of plastic raw material to be used as raw material by the producer

Brand owner means a person or company who sells any commodity under a registered brand label

1. **Every local body is responsible for development and setting up of infrastructure for segregation, collection, storage, transportation, processing and disposal of the plastic waste either on its own or by engaging agencies or producers.**

   The local body is be responsible for setting up, operationalisation and coordination of the waste management system and for performing the associated functions:
   a. Ensuring segregation, collection, storage, transportation, processing and disposal of plastic waste
   b. Ensuring that no damage is caused to the environment during this process
   c. Ensuring channelization of recyclable plastic waste fraction to recyclers
   d. Ensuring processing and disposal on non-recyclable fraction of plastic waste in accordance with the guidelines issued by the Central Pollution Control Board
   e. Creating awareness among all stakeholders about their responsibilities
   f. Engaging civil societies or groups working with waste pickers
   g. Ensuring that open burning of plastic waste does not take place.

2. **The local body for setting up of system for plastic waste management can seek assistance of producers**

3. **The local body needs to frame bye-laws incorporating the provisions of these rules.**

4. **Responsibilities of Producer, Manufacturer and Brand Owners regarding EPR**

   a. Primary responsibility for collection of used multi-layered plastic sachet or pouches or packaging is of Producers, Importers and Brand Owners who introduce the products in the market. They need to establish a system for collecting back the plastic waste generated due to their products. This plan of collection to be submitted to the State Pollution Control Boards while applying for Consent to Establish or Operate or Renewal or new producers.

   b. The producers, are to work out modalities for waste collection system based on Extended Producers Responsibility and involving State Urban Development Departments, either individually or collectively, through their own distribution channel or through the local body concerned.

   c. The Brand Owners whose consent has been renewed before the notification of these rules shall submit such plan within one year from the date of notification of these rules and implement with two years thereafter.

State-level Monitoring Committee	**Additions as per PWM Rules, 2016**
a. Secretary UDD- Chairman	a. Municipal Commissioner
b. Representative from:	b. Commissioner, Value Added Tax or his nominee
c. Environment Dept	c. Sales Tax Commissioner or Officer, representative of Plastic Association
d. PCB	d. Drug Manufacturers Association
e. ULB	e. Chemical Manufacturers Association
f. NGO	f. Director, Municipal Administration
g. Industry and academic Institution	

Responsibilities of SPCB

1. **No person shall manufacture carry bags or recycle plastic bags or multilayered packaging without registration from SPCB/PCC**. shall not renew registration of producer unless the producer possesses an action plan endorsed by the Secretary in charge of Urban Development for setting of plastic waste management system

2. **SPCB shall submit annual report on the use and management of plastic waste to the CPCB before the 31st July every year**

3. **CPCB shall prepare a consolidated annual report on the use and management of plastic waste and forward it to the Central Government along with its recommendations before the 31st August every year**.

Annexure 3: EPR — international case studies

Slovakia: Natur-Pack

NATUR-PACK is a Producer Responsibility Organization (PRO) for packaging waste, with an authorization granted to ensures fulfilment of obligations of the Waste Act for the producers of packaging and non-packaging products. The municipality is obliged to ensure collection of segregated municipal waste through contractual partners. Each municipality in Slovakia has delegated a PRO and NATUR-PACK acts as a contractual partner of more than 1000 municipalities, including the three biggest cities i.e. Bratislava, Kosice and Presov. The PRO operates in conjunction with Producer of packaging and non-packaging products, Municipalities and the Collection Company (third party employed by PRO to collect segregated waste).

The collection and the transaction cost for collection of segregated waste and processing is funded by the producers or group of producers. A formal agreement is made between:

a. Producer and PRO (to facilitate collection and processing of specific type of waste to ensure waste act compliance)
b. PRO and Municipality (to collect segregated waste through a collection company)
c. PRO and Collection Company (to collect segregated waste from municipality on behalf of PRO)
d. Municipality and Collection Company (to collect segregated waste in the municipal jurisdiction)

Japan: PRO in packaging

The Producer Responsibility Organization (PRO) in Japan is a public interest incorporated foundation under the supervision of national government. The Japan Container and Packaging Recycling Association is responsible for recycling operations under the packaging recycling act. The packaging recycling emphasize on shared responsibility of stakeholder.

The framework is as follows:

a. Producers have the financial responsibility for recycling
b. Consumers have the physical responsibility for source segregation
c. Municipalities have both financial and physical responsibility for collection of segregated waste and further sorting
d. PRO is responsible for recycling the waste by registered recyclers.

A producer has three options to fulfil the recycling obligations:

a. Sign a recycling contract with the designated PRO and pay commissions to the PRO
b. Reuse or recycle on its own by creating infrastructure for collection (self-collection route)
c. Collect waste packaging form the municipalities and recycle or outsource the collection and recycle on own (own recycling route)

UK: Credit exchange system

The UK regulations divide the producer responsibility into four categories- Manufacturer, Converter, Packer/filler and seller and then apportion the recycling obligations to reach group.

a. Manufacturer- A person who manufactures raw material
b. Converter- A person who uses or modifies packaging material in the production or formation of packaging
c. Packer/Filler- A person who puts goods into packaging
d. Seller- A person who supplies packaging to user or a consumer of that packaging, whether or not the filling has taken place at the time of supply

The companies (under the four categories above) can either meet the recycling obligation themselves through reprocessor or can do it through compliance scheme (the other name for PROs). The Compliance scheme charges a fee to the companies and handles all the requirements including recovery, recycling and data submission. 23 registered compliance schemes are operational and represent 9200 businesses.

UK has the only tradable credit scheme in operation in packaging waste. The Reprocessors recycle the packaging waste and generate Packaging Waste Recovery Notes (PRNs). One PRN is generated on recycling One tonne. PRN is specific to material (paper, plastic, wood). The companies, reprocessors and PROs trade these PRNs among themselves. The Environment Exchange handles the trade of the PRNs. The only disadvantage with PRNs is even though an industry-wide recycling target would be met, some producers would do better compared to the target and others worse.

The functionality of PRNs is as below:

a. Accredited reprocessors submit quarterly reports to the government with details of waste processed (in tonnes)
b. Blank notes are issued by the government equivalent to quantity processed by reprocessors (One Blank note PRN for One Tonne of waste processed)
c. Reprocessor issue the PRN to the obligated companies or compliance scheme (PROs)

d. Packaging Export Recovery Note (PERN) are generated for packaging waste exported for recycling (with an evidence of compliance)

The PRNs and PERNs are generated by recyclers and not producers and are not brand specific.
There has been a concern of fraud in PRN markets. The number of PRNs issued for plastic grew substantially in 2002, with no apparent increase in collection of plastics. This led to fall in plastic PRN price.

Our Waste Our Responsibility14 is one such for United Kingdom formulated with great emphasis on circular economy.

Annexure 4: Cases in NGT and High Courts

A selection of court orders and reports on plastic in the court between 2019 — 2020 (June)

Subject	Title	About the Case	Date
Use of Plastic (Pens/Plastic Bags/Hoardings/ Banners)	CPCB report on use of plastic pens filed in NGT	The National Framework for Extended Producers Responsibility (EPR) under Plastic Waste Management Rules (PWM), 2018 was under consideration at the Ministry of Environment, Forest and Climate Change (MoEF&CC). The Central Pollution Control Board (CPCB) had communicated to the ministry to clearly enumerate the items to be covered under EPR. This was stated in a report filed by the CPCB before the National Green Tribunal (NGT) on the unchecked use of plastic pens having adverse impact on the environment. It was observed that 1600 to 2400 million pieces are brought to the market every year and 91% of plastic waste so generated was not recycled and the EPR not fully enforced. The items covered under EPR in PWM Rules, 2018 were multi-layered plastic sachet. pouches and packaging, thus, items such as plastic pens and other plastic products were not covered under EPR.	June 11, 2020
	Order of the National Green Tribunal regarding use of PVC and chlorinated plastics for banners and hoardings during election	A report was filed by the CPCB which mentioned that the Election Commission issued letters to all political parties and Chief Electoral Officers of all the states and union territories (UTs) on the subject. The Tribunal was appraised of the fact that the Ministry of Environment, Forest and Climate Change (MoEF&CC) had written a letter in January 2019 to Chief Secretaries of all the States/UTs and Chief Electoral Officers of all the States/UTs to use alternative options in election campaigning material such as compostable plastics, natural fabrics and recycled paper material. Similar advisories have also been issued since 1999. In view of the fact that MoEF&CC as well as the Chief Election Commission "have taken the view that use of plastic during elections particularly banner/ hoardings needs to be avoided, it will be appropriate that compliance of advisories/directions mentioned above is appropriately monitored by the Election Commission of India, Chief Electoral Officers of all the States/UTs and the CPCB," the order said.	November 08, 2019

Subject	Title	About the Case	Date
	Order of the National Green Tribunal regarding use of plastic packaging by Amazon and Flipkart	The matter relates to excessive use of plastic packaging materials by Amazon.in and Flipkart.com in the course of e-marketing in violation of 'Extended Producer Responsibility' Plastic Waste Management Rules, 2016. The NGT directed the Central Pollution Control Board to submit a status report within two months.	October 22, 2019
	Order of the National Green Tribunal regarding restriction on use of plastic bottles and multi layered plastic packages	An Expert Committee was constituted by an NGT order of May 31, 2019 comprising of the representatives of Food Safety and Standards Authority of India FSSAI, Bureau of Indian Standards (BIS), Central Pollution Control Board (CPCB) and Directorate General Of Health Services (DGHS) to consider whether any further regulatory provisions are required on the subject of restrictions on the packaging by use of plastic material and if so to what extent. The Committee submitted its report in August 2019. Some of the areas of concern listed included the continued use of multi polymer plastic (MPP) or multi layered plastic (MLP) and increasing use of small packages such as bottles used for beverages, sachets, pouches which are not viable to collect and recycle. The Committee also proposed a systematic action plan which included institution of the concept of 'plastic footprint', discouraging small pack sizes and reducing plastic content in multi-layered plastic (MLP). The Committee further noted that these are not only environmental issues but also public health issues and noted that FSSAI has established a seprate "'Scientific Panel on Packaging and Food Contact Materials". Taking into consideration the report submitted by the Expert Committee, the NGT directed the FSSAI, BIS, CPCB, DGHS and MoEF&CC to take further follow up action based on the report within three months and furnish an action taken report.	October 14, 2019
	Order of the National Green Tribunal regarding plastic polythene bags being used by shopkeepers in Delhi	NGT directed the Delhi Pollution Control Committee (DPCC) to look into the matter and take appropriate action.	January 02, 2019

Subject	Title	About the Case	Date
Plastic Industries and Pollution	MPCB report on Malegaon pollution	The Maharashtra Pollution Control Board filed its report on pollution by industries involved in plastic lumps (gitti), plastic granules, plastic recycling, yarn dyeing, power loom and others in Malegaon. This was in pursuance to the NGT order of January 21, 2020. To ensure effective implementation of directions of closure, Malegaon Municipal Corporation, Additional District Collector, Additional Superintendent of Police, Sub-Regional Officer, MPCB, Nashik and MSEDCL had initiated joint action and ensured permanent disconnection of water and electricity supply and sealing of sizing and plastic industries in the non-conforming zone as per City Development Plan and not complying with the Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981 and Plastic Waste Management Rules 2016.	June 10, 2020
	Order of the National Green Tribunal on unregulated handling of plastic, Delhi	Unregulated handling of plastic in Delhi including burning was continuing even after Supreme Court directions on the matter 14 years back imperiling the health of the citizens and the environment, read the order of the NGT dated July 18, 2019. The Tribunal in December 3, 2018 had directed the Government of Delhi to deposit a sum of Rs. 25 Crores towards cost of damage to the environment and furnish performance guarantee in the like amount with the CPCB. It was further directed that if the failure continues, the Delhi Government will be liable to pay a further amount of Rs, 10 Crore per month as a coercive measure for compliance of the order of this Tribunal. But CPCB has informed the Tribunal that the Delhi Government has not deposited the amount. NGT while expressing its dissatisfaction with the action taken report said the "action hardly meets the magnitude of violation" and gave last opportunity to the Delhi Government to deposit the amount.	July 18, 2019
	Order of the National Green Tribunal regarding violation of environmental norms by plastic industries in Narela and Bawana, Delhi	Report submitted by a committee found open dumping of waste and open burning of plastic waste, drains fully chocked by waste in absence of collection of waste generated by industries and untreated waste water from industries being directly discharged into the drains in Narela as well as Bawana industrial areas. Industries were asked to pay compensation ranging from Rs. 10 lakhs to Rs. 50,000 for environmental offences such as air pollution and dumping of garbage. SDM has been asked to recover the damages as arrears of the land revenue. A policy has been framed for recovery of compensation. In a surprise inspection, no open burning was seen.	May 24, 2019

Subject	Title	About the Case	Date
Use of plastic as fuel (brick kilns)	DPCC report on units using bhatties in Sainik Enclave, Uttam Nagar, Delhi	The National Green Tribunal had directed the Delhi Pollution Control Committee (DPCC) to furnish a factual and action taken report in respect of the pollution being caused due to wood dust, plastic bags and tyres/tubes being used as a fuel at Sainik Enclave, Vikas Nagar, Uttar Nagar, New Delhi. DPCC filed an exhaustive list of units in the said locality/non conforming area which were using bhatties. A total of 321 potteries were discovered in Sainik Enclave, of which 166 potteries were found to be using bhatties, whereas the remaining 155 potteries were found with dismantled bhatties.	March 12, 2020
	Order of the National Green Tribunal regarding brick kilns using plastic, village Makimpur Gadi, District Ghaziabad, Uttar Pradesh	The NGT directed the Uttar Pradesh Pollution Control Board (UPPCB) to look into the matter and take appropriate action and file a report	October 17, 2019
	Order of the National Green Tribunal regarding import of plastic waste for firing brick kilns	The matter related to cheap waste paper and the road sweep waste import for firing of brick kilns. According to the applicant, 900,000 tons of waste is imported which is hazardous. The CPCB had suggested restriction on import of plastic waste and proper management of hazardous waste. It was further suggested that local bodies should use plastic waste for road construction and energy recovery. The Tribunal directed CPCB to take further action for implementation of its recommendations on the issues of plastic waste management as well as restriction on import of plastic waste and furnish a further action taken report.	September 06, 2019
Solid Waste Management includes Plastic Waste	Order of the National Green Tribunal regarding waste management at Brahmapuram Solid Waste Processing Plant, Kochi, Kerala	Report filed by Justice A.V Ramakrishna Pillai, former Judge, Kerala High Court on February 22, 2020 points to continuing violation of law. Another report filed on June 16, 2020 by the Kerala State Pollution Control Board (KSPCB) said that e-tender floated for legacy waste by the municipal corporation was cancelled. Further, the entire quantity of non biodegradable waste was collected and transported from Kochi Corporation and disposed in the two sheds and nearby open yard of Brahmapuram plant and only 1% of plastic waste was segregated from the above and given to recyclers. The NGT called the steps taken on the matter as inadequate and said that unscientific handling of waste management could lead to serious adverse consequences.	July 03, 2020

Subject	Title	About the Case	Date
	Order of the National Green Tribunal regarding water body restoration, Kadaura, Jalaun district, Uttar Pradesh	Direction was sought to stop continuous burning of solid plastic waste, garbage cans, electronics waste, glass inside the residential area of town Kadaura that emits poisonous gases causing severe air pollution. The NGT directed that immediate remedial action be take and asked the UPPCB to prepare appropriate guideline for restoration of such water bodies and also involve the village community for the purpose.	June 23, 2020
	Order of the National Green Tribunal regarding encroachment of the East Kolkata Wetlands, Kolkata, West Bengal	The case was first taken up on May 19, 2016 and since then various directions had been passed for removal of illegal plastic manufacturing units and action against other bigger units which have been operating illegally without obtaining the statutory clearances from the concerned authorities. The NGT directed an updated report to be filed within 30 days from the following respondents: The West Bengal Pollution Control Board, The Directorate Of Industries, Government Of West Bengal, The Kolkata Municipal Corporation And The Deputy Commissioner, South East Division And The Kolkata Police.	June 05, 2020
	Order of the National Green Tribunal regarding Santragachi Jheel, Howrah, West Bengal	The case was instituted on the allegation that the water body was being polluted due to dumping of municipal and plastic wastes and building waste materials. The NGT noted that even after the passage of 2½ years and orders to settle the issue, nothing had been done. The railways had to provide for the land for setting up the sewage treatment plant for treatment of the sewage diverted away from the waterbody and the cost was to be shared between the Howrah Municipal Corporation (HMC) and the railways in the "ratio of the contribution of sewage".	June 01, 2020
	Report on solid waste management in Pithoragarh, Uttarakhand	The Tribunal had directed the secretary, Urban Development, Uttarakhand to look into the matter and taken remedial action. The report mentions that plastic was being segregated from municipal solid waste by Nagar Palika Parishad, Pithoragarh and being compacted using plastic compactor and about 9 ton of compacted plastic has been disposed. Further, segregated vegetables, fruit waste, organic waste was being disposed using organic waste converter of 1 ton per day capacity and the rest was being disposed on the disposal site. Compost prepared was used by the Nagar Palika Parishad in their own parks and grounds. As soon as tenders are processed for the solid waste management plant at Pithoragarh, it would be functional and operational by March 31, 2021.	March 05, 2020

Subject	Title	About the Case	Date
	Order of the National Green Tribunal regarding land encroachment and waste dumping on government land, Hastsal, Delhi	Regular burning of garbage was taking place including plastic and toxic waste material. Report filed by the DPCC shows that remedial action has been taken in the matter. In view of above, the NGT disposed of the case.	May 20, 2020
	Order of the National Green Tribunal regarding plastic waste management in Madhya Pradesh	The NGT disposed of the application with the direction that the state of Madhya Pradesh should abide by and comply with the directions given in the NGT order of December 6, 2019. The 2019 order had given detailed and elaborate directions which included the following: a) National Framework for extended producers liability be finalized and enforced as far as possible within three months b) CPCB to submit report on the compensation regime c) The state to submit time targeted action plans d) An institutional framework to ensure that no unregistered plastic manufacturing/ recycling units are in operation and the units are not running in non-conforming/residential areas and plastic carry bags less than 50 microns thickness should not be manufactured.	February 11, 2020
	Report on containing pollution in Delhi	The report among other things dealt with air pollution due to storage, handling and burning of plastic waste in agricultural field In Jahangir Puri. Around 10766 tonnes of plastic waste had been cleared and sent to waste to energy plant. Also, PWD drains in Jahangir Puri was freed from encroachment and 800 tonnes of plastic waste removed.	January 15, 2020
	Order of the National Green Tribunal regarding pollution of river Ashwani Khud in Himachal Pradesh	The river was found to be full of plastic. There was accumulation of solid waste in the drains joining the river. The Tribunal in its previous order had called for regular removal and cleaning and installation of trap nets on major rivulets and drains connected to Ashwani Khud. A report filed by the Municipal Corporation, Shimla and another by the Municipal Council, Solan listed the steps for collection of plastic. The NGT called the reports unsatisfactory, as the report did not mention where such plastic was taken and what was done of it and thus directed a revised report to be submitted. The new report has to mention the quantum of plastic waste and its use in construction and by the cement klins within a period of one month.	October 10, 2019

Subject	Title	About the Case	Date
	Order of the National Green Tribunal regarding environmental management of railway stations in India	The NGT directed that observations of the Central Pollution Control Board (CPCB) be taken into account in the process of implementation of action plans of the railways for all the major stations. Further, the team comprising of CPCB and concerned State Pollution Contrl Board (SPCB)/ Pollution Control Committee (PCCs) will evaluate the performance of major railway stations both in terms of implementation of action plans and compliance to the provisions of the Water Act, Air Act and Environmental Protection Act and Rules framed thereunder especially Solid Waste Management Rules 2016, Plastic Waste Management Rules 2016, Hazardous and other Waste Rules 2016, Bio-Medical Waste Rules 2016, Construction and Demolition Waste Management Rules 2016.	December 12, 2019
	Order of the National Green Tribunal regarding implementation of Plastic Waste Management Rules 2016	As per report of the CPCB filed on 30.05.2019, annual reports have not been submitted by States of Haryana, Jharkhand, Lakshadweep and Mizoram till 30.04.2019. CPCB in its report made further observations and recommendations which included SPCBs/PCCs to ensure that Annual Report on implementation of PWM Rules, 2016, as amended in 2018 is complete in all respect and submitted timely to CPCB i.e. on 31st July each year along with Action plan. After going through the CPCB report, the Tribunal has given directions to the States and UTs to take further action meeting the gaps pointed out as per the timeline laid down under the PWM Rules.	July 22, 2019
	Order of the National Green Tribunal regarding discharge of municipal solid waste in and around Tarapith area, Birbhum district, West Bengal	The matter related to discharge of municipal solid waste and plastic bags in and around Tarapith area, Rampurhat subdivision of Birbhum district in West Bengal. Report submitted by the District Magistrate and Collector, Birbhum informed the Tribunal that a garbage clearance agency has been appointed for collection of waste material from the periphery of Maa-Tara Temple and both the sides of river Dwarka where hotels, guest houses and shops are situated. Tarapith area would be declared as a plastic free zone within two months and land acquired for setting up STP. Justice S. P. Wangdi and Expert Member Satyawan Singh Garbyal expressed their concern at the delay in constructing the STP as it was the primary requirement for river Dwarka to be made pollution free.	July 29, 2019

Subject	Title	About the Case	Date
	Order of the National Green Tribunal regarding solid waste management and allied issues, Manipur	The compliance report submitted by Manipur indicated some of the steps taken for solid waste management like banning of plastic carry bags made of recycled plastic by Imphal Municipal Corporation. The NGT directed that steps for compliance of Rule 22 and 24 of SWM Rules should be taken within six weeks. Similar steps be taken with regard to Bio-Medical Waste Management Rules and Plastic Waste Management Rules.	May 03, 2019
	Order of the National Green Tribunal regarding solid waste management issues in Lakshadweep	NGT said the steps taken for plastic waste management and bio-medical waste management are inadequate. Taking note of the articles published in the media, the Court said that until 2016 Lakshadweep had no Sewage Treatment Plant and discarded plastic was affecting the coral reefs while on land they hindered the root growth of coconut trees and rainwater circulation.	May 14, 2019

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A recent study estimates that the world has produced about 8.3 billion metric tonnes of plastics between 1950 and 2015 — 80 per cent of this is plastic waste. A meagre 9 per cent of this waste has been recycled. As much as 79 per cent of the plastic manufactured in the world ends up in landfills or in the environment — in our oceans and waterbodies.

This comprehensive background paper on plastic waste management in India is our first attempt to help us understand the status of this problem, and identify the gaps on what needs to be first learnt, and then done.

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