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Sustainable Packaging

Status and Challenges

(Initiatives by FMCG Sector)

Message from Mr. Vineet Agarwal
President, ASSOCHAM

The Indian Packaging Market was valued at USD 50.5 billion in 2019, and it is expected to reach USD 204.81 billion by 2025, registering a CAGR of 26.7%. Packaging is among the high growth industries in India, well placed to become a preferred hub for the packaging industry. Currently the 5th largest sector of India's economy, the industry has reported steady growth over the past several years and shows high potential for expansion, particularly in the export market.

The packaging industry is an important sector driving technology and innovation growth in the country and adding value to the various manufacturing sectors, including agriculture and FMCG segments.

Packaging plays an essential role for FMCG businesses in meeting consumer needs and preventing waste by protecting products for proper consumption. With the advancement in technology and general awareness, the packaging sector in India is well poised. Still, the primary issue lies with the waste that is created on the consumption of the product.
Sustainable packaging is gaining importance among companies, as consumers are increasingly look for products that are 'green'. The reason is growing awareness around health and environmental issues on the use of plastic.

The Government of India is taking significant steps towards regulating plastic production and plastic waste in the country. The Indian government has banned single-use plastic, which creates an immense opportunity for new players to develop innovative packaging solutions. The Indian government has made this decision in consultation with industry experts. Industry must support this and collaborate to create a smoother transition.
With this background, I am pleased to present the White Paper on Sustainable Packaging: Status & Challenges (Initiatives by FMCG Sector), which ASSOCHAM and Resurgent India have prepared in association with EHS services.

I take this opportunity to congratulate all the experts associated with the report for their contribution and inputs.

Thank you.

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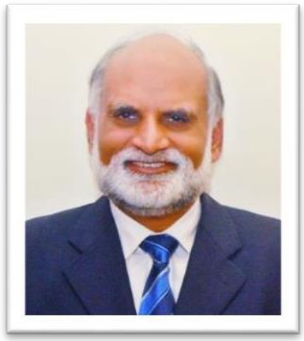

Message from Mr. Anil Rajput
Chairman, FMCG Council, ASSOCHAM

India currently ranks fifth among the world's worst plastic dumpers and accounts for 2% of the global mismanaged plastic waste. Although per-capita plastic consumption in India is relatively low, the amount of untreated plastic waste is huge and requires our undivided attention.

Waste generation in India has witnessed a steep rise, mainly as a result of three factors - a large and growing population, rapid and unplanned urbanisation along with a manifold increase in consumption levels. Our waste disposal and management infrastructure has lagged severely, creating a massive problem with heaps of waste being a common sight, a majority of which goes untreated into landfills causing serious public health risk, environmental hazard and an enormous waste of resources.

Growing concerns about environment protection and an imminent ban on plastic usage have set in motion a sustainability drive to eliminate single-use plastic and reduce the amount of plastic reaching the landfills. The government has launched several projects to increase awareness around plastic recycling and curb the negative environmental impact of plastic waste.

Aligned with the national agenda on plastic waste management, several FMCG companies are working aggressively towards using 100 percent biodegradable plastic for packaging, ready-to-eat and cosmetic products. Many FMCG companies in the value chain have joined forces and have pledged to become plastic-neutral by 2025. Some are focusing on plastic-free packaging while others are implementing measures to collect and recycle plastic into alternative products.

In view of the harmful effects of plastic on environmental sustainability, it is the need of the hour to develop various models to control the waste generation due to packaging in the sector. Although the recent trend of sustainable packaging has been largely triggered by the anticipation of a ban on plastic use, packaging companies and FMCG manufacturers are developing innovative solutions to eliminate single-use plastic from the value chain.

In this backdrop, it gives me immense pleasure to share that ASSOCHAM in association with EHS services and Resurgent India has developed this **White Paper on Sustainable Packaging: Status & Challenges; *Initiatives by FMCG Sector***
I'm confident that that this paper will provide valuable insights on the current scenario prevailing in the industry, bring about greater clarity on the challenges along with the possible remedies to effectively deal with this complicated and important subject.

Thank You

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Message from Mr. Deepak Sood
Secretary General, ASSOCHAM

The global packaging industry is developing and expanding day by day, and the Indian packaging industry is also proliferating. This growth is primarily driven by factors like growing pharmaceutical, food processing, manufacturing industry, FMCG and ancillary in the emerging economies like China, India, Brazil, Russia and few other East European countries.

In terms of packaging, the food packaging industry is one growth area that has seen the maximum number of innovations in terms of packaging and branding. Consumers want their food products to be hygienic, safe and, at the same time to look attractive.

Despite its use, the biggest problem with packaging is that it usually becomes waste as soon as consumers finish using a product. That's why experts in smart packaging have shifted their focus on creating designs optimized for recycling.

Sustainability - especially concerns around single-use packaging - is joining other disruptive forces to push significant transformations in the packaging domain. The emerging scenario will likely offer potential growth and collaboration opportunities to help companies revise their packaging portfolios with the appropriate focus and distinctive capabilities. Sensing the need and inclination, brands today choose to adopt responsible product packaging using recyclable and non-hazardous materials. The need of the hour is to rapidly scale up packaging innovations and infrastructure across the circular economy value chain, which is sustainable.

India is taking all the necessary steps to ensure that the country becomes free of single-use plastic by 2022. Our Hon'ble Prime Minister Shri Narendra Modi has pledged to make the country free of single-use plastic. The government is also providing support to states to develop adequate waste management infrastructure for solid and plastic waste management through the flagship Swachh Bharat Mission scheme.

I am happy to note that ASSOCHAM, in association with Resurgent India with the support of EHS Services, is coming out with a White Paper on Sustainable Packaging: Status & Challenges (Initiatives by FMCG Sector).

I hope that this paper offers valuable insights and recommendations for all stakeholders to strengthen this segment further.

Thank you

Message From EHS Services

Dr. Priyank Arya, Founder Director

Consumers' increasing demand for more sustainable products is reshaping the packaging industry and creating a powerful incentive for companies to lead through innovation.

Packaging plays a key role in our modern way of life. Without it, most products would expire or get damaged before arriving in a store. However, it's frequently pointed out as one of the main villains in our planet's battle for environmental sustainability because it turns into waste after its use.

EHS Services strongly believes that responsible packaging requires continuous innovation of products, waste management infrastructure and consumer participation. This approach will guide our investment in best-in-class research and development (R&D) capabilities; our partnerships to encourage the expansion of contemporary waste management infrastructure; and our work with brands to help inspire consumers to recycle more.

Through this collaborative initiative, we are trying to embrace leadership positions in the packaging industry to make solid progress on all three elements of responsible packaging. We together need to focus upon technological breakthrough to create the recyclable packaging within India and conduct our own research on consumer attitudes and behaviours towards sustainable packaging.

We are confident that through this first collaborative initiative, we will be to deliver the necessary approaches towards packaging innovation, improved waste management infrastructure so that society and the environment can realize the benefits. We know that wherever a sensible infrastructure is in place, the system works. We need infrastructure owners to learn from those countries and regions that are already succeeding. Expanding that example would radically reduce the problem of waste leakage.

As a growing advisory & consultancy firm in Environment, Health and Safety Services, we would like to support in the best possible way in sustainable packaging innovation and it's safe disposal/recycling and together move forward with urgency, confidence and optimism. We will continue making progress and reporting on it regularly.

I am happy to note that ASSOCHAM, in association with Resurgent India with the support of EHS Services, is coming out with a White Paper on Sustainable Packaging: Status & Challenges (Initiatives by FMCG Sector).
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Thank You

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Message from Jyoti Prakash Gadia
(M.D., Resurgent India Limited)

Globally, our environment faces acute challenges in all aspects, most significant being pollution and generation of waste. Plastic is the most widely used component in all industries across the globe. The chemical structure of plastics prevents them from natural processes of degradation. This allows large volume of plastic waste to persist in the ecosystem. Though plastic pollution, originated decades ago in remote central ocean gyres, we now know that plastic debris is ubiquitous across all ocean basins, ecosystems, habitats and food webs. According to Industry chamber, Indians consume 11 kg of plastic per year in comparison to 109 kg by an average American. But this figure is estimated to rise in the coming years. At about 34 lakh tonnes generated in 2019-20, India has a staggering annual volume of plastic waste, of which only about 60% is recycled. Considerable amounts of plastic waste cannot be recycled because of lack of segregation, leading to incineration, while mixing newer types of compostable plastic will confound the problem. Patchy regulation has led to prohibited plastic moving across State borders. Now that the Centre has adopted a broad ban, further pollution must end. Microplastic is already found in the food chain, and governments must act responsibly to stop the scourge.

In the report we analyze the various sources of plastic, its applications in our industries and how its management. We highlight non-recyclable plastic use across sectors and how our rules can help us stop the menace. Our report also showcases some exemplary players who have adopted unique and sustainable ways to recycle plastic as well as discard single-use plastic products. In conclusion, we look at how some of the developed countries like Sweden, Netherlands, Japan, Wales and Canada manage their plastic waste challenges. In order to switch toward green packaging, it is imperative that both governmental bodies, as well as the private sector, collaborate toward boasting initiatives which will not only solve the urgent issues around plastic waste but will also reiterate India's firm position in upholding United Nation's Sustainable Development Goals 2030.

Thank you.

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1. Executive Summary

Globally, plastic waste has been a significant menace to the environment. The manufacture of plastics as well as its destruction by incineration pollutes air, land and water and exposes workers to toxic chemicals which are carcinogenic in nature. Plastic-packaging especially the ubiquitous plastic bag is a significant source of landfill waste and is regularly eaten by numerous marine and land animals leading to fatal consequences. Most plastics are made from petroleum or natural gas; non-renewable resources extracted and processed using energy-intensive techniques that destroy fragile ecosystems. Ever since the production of plastic in 1950, it is estimated that 86 million tons of plastic waste has found its way to the oceans. Researchers suggest that by 2050 there could be more plastic than fishes in the oceans by weight.

India too has been contributing significantly to the plastic waste. It is estimated that India generates 9.46 million tonnes of plastic waste annually out of which 40% remains uncollected. Most cities and towns are unable to efficiently implement plastic waste management rules. In 2018-19, Central Pollution Control Board report put the plastic waste generated as 3,360,043 Mt per annum (roughly 9,200 Mt per day). Given that the total municipal solid waste generation is 55-65 million Mt, this would mean that plastic waste is roughly 5-6% of the total solid waste generated in the country. Top plastic users in India are packaging (43%), infrastructure (21%) and autos (16%). India generates 26 kilograms of plastic waste every day, of which 16.5 kilograms is just bags. Just 15% of urban plastic is processed, while rest is dumped in landfills or reaches the ocean. Around 0.6 million tonnes of plastic waste end up in the ocean. To avert a crisis would require vision, political will and the nerve to pull off a balancing act. The solution to India's problems with plastic waste can be addressed through targeted investments in recycling and ensuring sustained effort to cut down consumption.

The plastic industry is now engaged in innovations like plastic roads; eco-bricks, plastic made of wood, and cost savings because of growing consumerism and demand for value-for-money products. Massive growth potential lies in this industry in India due to its low level per capita plastics consumption which is expected to be doubled in 5 years time because India is now positioned in the World's first top ten plastic packaging consumers as per industrial association reports. There have been several rules to curb the menace of plastic usage. The most recent rule addresses single use plastic products in a three stage ban. In view of the current proportions of the challenge that India is faced with, it makes sense to suggest that MSMEs need to engage with regulatory agencies through a time-bound and outcome-based framework.

During the pandemic, brands like Diageo and Dettol launched limited edition eco-friendly packaging to test the waters indicating that more brands in India have started reevaluating their packaging strategy to put the environment first. HUL also brought Unilever's 'Love Beauty and Planet' range of skincare products to India after observing an increasing demand for sustainable products. With more goods being distributed directly to customers, e-commerce pack recyclability and reuse has become more important. RePack's recycled plastic mailer, for example, can withstand 20 online customer deliveries and is suited for return shipments. A vast amount of packaging material is necessary to package Amazon's five billion items sent worldwide each year. As a result, Amazon developed the Frustration Free Packaging initiative to lessen its environmental impact while also meeting customer needs for less over packing. According to media reports, companies such as

Marico, Bacardi, ASICS, HUL, Nestle India, Future Consumer, Coca-Cola, Pepsi-co, and Parle Agro will move to 100% recyclable packaging by 2025 helping towards a sustainable future.

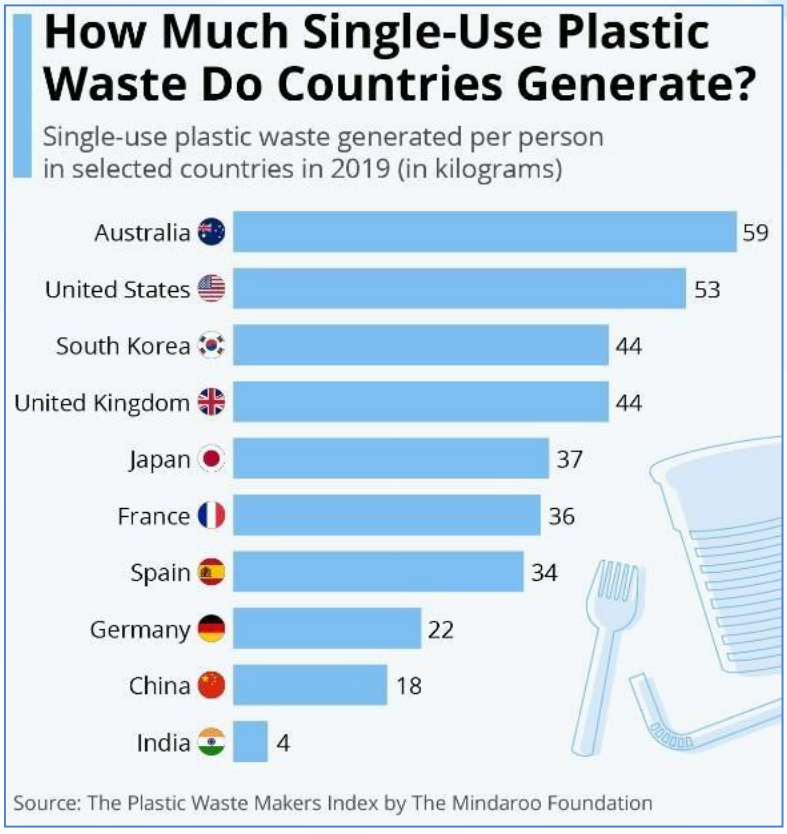
Government has to look into it with a very holistic perspective while forming policies to take all aspects into consideration and ensure strict implementation of regulations. Economically affordable and ecologically viable alternatives which will not burden the resources are needed and their prices will also come down with time and increase in demand. Citizens have to bring behavioural change and contribute by not littering and helping in waste segregation and waste management. Everybody, by doing their bit, can ensure elimination of single use plastic.

2. Overview of Current Plastic Usage

Our world faces the deadliest threat of extinction due to pollution reaching unprecedented levels. Among the various kinds of pollutants, plastics adversely affect wildlife, habitat, and humans. Plastic is the most widely used component in all industries across the globe. The chemical structure of plastics prevents them from natural processes of degradation. This allows large volume of plastic waste to persist in the ecosystem. Though plastic pollution, originated decades ago in remote central ocean gyres, we now know that plastic debris is ubiquitous across all ocean basins, ecosystems, habitats and food webs. In addition to understanding contamination, researchers have expanded their breadth of study towards the sources, life-cycle, transformations and effects of plastic pollution. In depth research has revealed the many ways in which plastic debris interacts with planetary cycles and affects physical and biological processes. The exploratory scientific field has opened up a growing policy movement across multiple levels of government from municipal to international.

A tributary of the Wouri River in Douala, Cameroon, completely clogged with plastic

Plastic waste not only threatens the livelihoods of those who depend on marine resources for work, it can lead to health issues for people who consume seafood infested with toxic micro- and nano-plastics. The challenge of plastic waste – which has intensified due to the COVID-19 pandemic – is a major part of the global pollution crisis. Along with biodiversity loss and climate change, plastic pollution poses a triple planetary emergency that must be addressed by massive shifts in the way humanity utilizes the earth's resources. Plastic pollution afflicts land, waterways and oceans. It is estimated that 1.1 to 8.8 million tons of plastic waste enters the ocean from coastal communities each year.[1] Ever since the production of plastic in 1950, it is estimated that 86 million tons of plastic waste has found its way to the oceans. Researchers suggest that by 2050 there could be more plastic than fish in the oceans by weight.[2] Living organisms, particularly marine animals, can be harmed either by mechanical effects, such as entanglement in plastic objects, ingestion of plastic waste, or through exposure to chemicals within plastics as a result of ingestion. Degraded plastic waste can directly affect humans through direct consumption (i.e. in tap water) as well as indirect consumption (through seafood). World's largest 10 rivers alone carry more than 90% of the plastic waste that ends up in the oceans. China's Chang Jiang (Yangtze) River, which flows past Shanghai, dumps nearly 1.5 million tons of plastic waste into the Yellow Sea.[3]



Source: Statista 2019

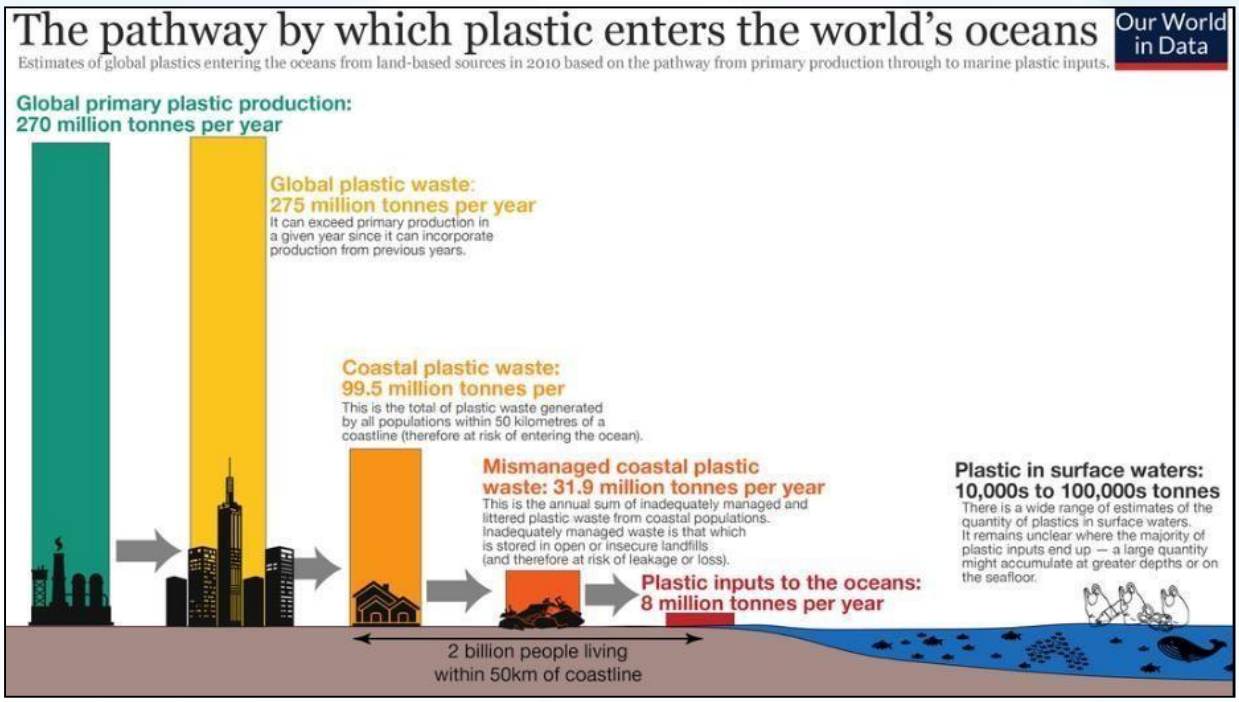
[1] Chinaza Godswill Awuchi, "Impacts of Plastic Pollution on the Sustainability of Seafood Value Chain and Human Health", www.researchgate.net, November 2019

[2] "Banning single-use plastic: lessons and experiences from countries", www.unep.org, UN Environment report (2018)

[3] "Banning single-use plastic: lessons and experiences from countries", www.unep.org, UN Environment report (2018)

From the 1950s up to 2018, an estimated 6.3 billion tonnes of plastic has been produced worldwide, of which an estimated 9% has been recycled and another 12% has been incinerated. This huge amount of plastic waste enters the environment, with studies suggesting that the bodies of 90% of seabirds contain plastic debris. As of 2020, the global mass of produced plastic exceeds the biomass of all land and marine animals combined. Around 275 million tonnes of plastic waste is generated each year around the world; between 4.8 million and 12.7 million tonnes is dumped into the sea. About 60% of the plastic waste in the ocean comes from the top 5 countries.

Plastic has multiple uses; the physical and chemical properties lead to commercial success. However, the indiscriminate disposal of plastic has become a major threat to the environment. In particular, the plastic carry bags are the biggest contributors of littered waste. Every year, millions of plastic bags end up in to the environment - soil, water bodies, water courses, etc and it takes an average of one thousand years to decompose completely. It is estimated that India generates 9.46 million tonnes of plastic waste annually[4] out of which 40% remains uncollected[5]. Most cities and towns are unable to efficiently implement plastic waste management rules. This waste piles up in landfills, chokes drains and rivers and flows into the sea where it is ingested by marine animals. The consequences of mismanaged waste, including plastics, to human health have become a silent and toxic crisis, killing between 400,000 and 1 million people each year in low- and middle-income countries.[6]



Source: Our World in Data

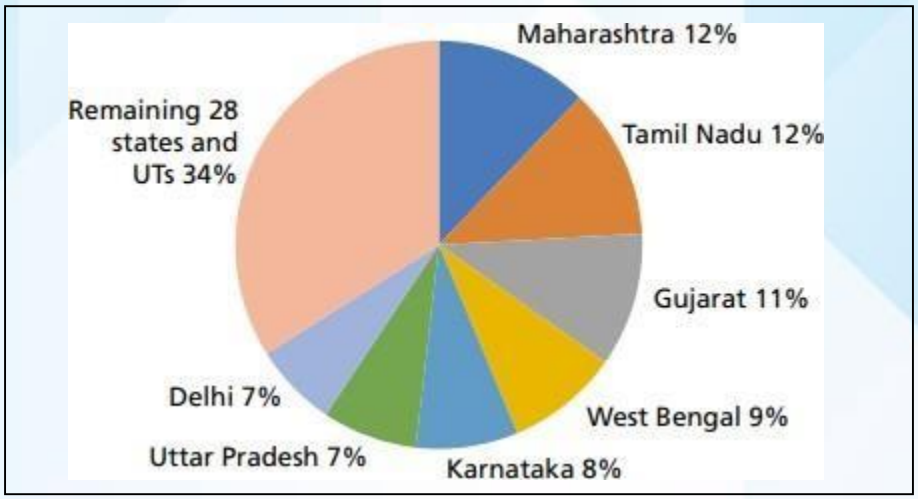
One of the biggest reasons for India's plastic crisis is that the country's plastic industry uses different tactics to distract, delay, dilute and derail progressive legislations on plastic control that are

[4] Jonathon Gatehouse, "Will there be more plastic than fish in the ocean by 2050?", www.cbc.ca, Jul 27, 2019 [5] PTI, "Nearly 40% of plastic waste generated daily remains uncollected," www.thehindubusinessline.com, November 22, 2019

[6] Bhasker Tripathi, "India Wants Manufacturers To Manage Plastic Waste. Here's How Proposed Rules Fall Short", www.indiaspend.com, Oct 5, 2020

unfavourable to them. In 2018-19, Central Pollution Control Board report put the plastic waste generated as 3,360,043 Mt per annum (roughly 9,200 Mt per day)[7]. Given that the total municipal solid waste generation is 55-65 million Mt, this would mean that plastic waste is roughly 5-6% of the total solid waste generated in the country[8]. Goa leads India in the per capita production of plastic waste in India at 61.2 gm per day. Just seven States — Maharashtra, Karnataka, Tamil Nadu, Delhi, Gujarat, West Bengal and Uttar Pradesh — generate two thirds of the country's plastic waste.[9] India's national per capita plastic waste generation is 7.6 gm per day and the country, it is estimated, produces 3.3 trillion grams of plastic waste per year.[10]

Top seven contributor states to total plastic waste generation in India — as of 2018-19



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

It was found that almost 66%[11] of plastic waste comprised of mixed waste — polybags, multilayer pouches used for packing food items sourced mainly from households and residential localities. These were plastic waste which could not be recycled. In India, around 43% of manufactured plastics are used for packaging purpose and most are of single use. Plastics are categorized under either recyclable, energy recoverable or with some other alternate use, but their recycling is an expensive process. According to research by an apex industrial body, Indians consume 11 kg of plastic per year in comparison to 109 kg by an average American. But this figure is estimated to rise in the coming years.[12] An estimate by the ministry of petroleum and natural gas suggested that the annual per capita consumption in India would be 20 kilograms by 2022. Top plastic users in India

[7] Annual Report 2019-20 on Implementation of Plastic Waste Management Rules, 2016, Central Pollution Control Board Delhi

[8] Siddharth Ghanshyam Singh, "Draft Plastic Waste Management Rules, 2021: Addressing the bigger problem", www.downtoearth.org.in, March 15, 2021

[9] "Goa, Delhi lead India's per capita production of plastic waste: CSE report", www.thehindu.com, September 25, 2020

[10] "Goa, Delhi lead India's per capita production of plastic waste: CSE report", www.thehindu.com, September 25, 2020

[11] "Goa, Delhi lead India's per capita production of plastic waste: CSE report", www.thehindu.com, September 25, 2020

[12] Shreeshan Venkatesh, Ishan Kukreti, "An Indian consumes 11kg plastic every year and an average American 109kg", www.downtoearth.org.in, June 04, 2018

are packaging (43%), infrastructure (21%) and autos (16%). India generates 26 kilograms of plastic waste every day, of which 16.5 kilograms is just bags.[13]

Just 15%[14] of urban plastic is processed, while rest is dumped in landfills or reaches the ocean. Around 0.6 million tonnes of plastic waste ends up in the ocean. To avert a crisis would require vision, political will and the nerve to pull off a balancing act. The solution to India's problems with plastic waste can be addressed through targeted investments in recycling and ensuring sustained effort to cut down consumption.

Piles of plastic waste on the "garbage island" of Thilafushi

3. Types of packaging used by MSMEs

Globally, Packaging stands as one of the fastest growing industries with a turnover of USD 700 billion. Interestingly for India though its global contribution is only 4%, its per capita packaging consumption is 4.3 kgs[15] which is only a fraction of the developing countries. Packaging is now the 5th largest sector of its economy, [16] its growth being 25% in Flexible and 15% in Rigid sector respectively. Packaging Industry Association of India expects India as a potential destination for global investment especially for export market as processing and packaging cost for food can be lowered up to 40% with availability of cheap skilled labour.

Packaging in general is classified into two significant types i.e. Rigid Packaging and Flexible Packaging, with rigid packaging accounting for 64% market share. In terms of packaging materials,

[13] Sonal Bhutra, "As India stares at single-use plastic ban, country's per capita consumption far behind world average", www.cnbctv18.com, Sep 24, 2019
[14] Sonal Bhutra, "As India stares at single-use plastic ban, country's per capita consumption far behind world average", www.cnbctv18.com, Sep 24, 2019
[15] Milind Bhole, "Flexible Packaging in Modern India", www.nichrome.com, 2020
[16] "India: the world's fifth-largest packaging industry", www.wedc.org, November 1, 2017

55% of the sector is dominated by plastics, followed by paper & cardboard (20%) and glass (10%)[17]. As compared to rigid packaging, flexible packaging is one of the most dynamic and fastest growing markets in India. Flexible packaging anticipates a strong growth in the future. There has been increasing shift from traditional rigid packaging to flexible packaging due to numerous advantages offered by flexible packaging such as convenience in handling and disposal, savings in transportation costs etc.

Flexible Packaging

Rigid Packaging

The packaging segment in India is an amalgamation of both organized and unorganized players ranging from very small players with limited presence to big players with large market share. The industry comprises a large number of manufacturers of basic materials, converted packages, machinery and ancillary materials, converted packages, machinery and ancillary materials. Indian packaging industry is expected to grow at 18% p.a. wherein, the flexible packaging is expected to grow at 25 % p.a. and rigid packaging to grow at 15 % p.a[18]. Recognizing this trend, the industry is

[17] India's Exciting Packaging Story, www.papermart.in, 2020

gearing itself to adopt scientific and functional packaging. Demand for this segment is anticipated to grow rapidly across all the players. Also there is an increasing focus on innovative and cost effective packaging materials. Thus, the industry players are keeping in track with the changing trends in packaging and making efforts to capture the market with higher technology orientation. Further with a viewpoint of health and environment friendliness, the growth is packaging industry has been leading to greater specialization and sophistication amongst the market players.

Packaging Materials, Types & Segments:

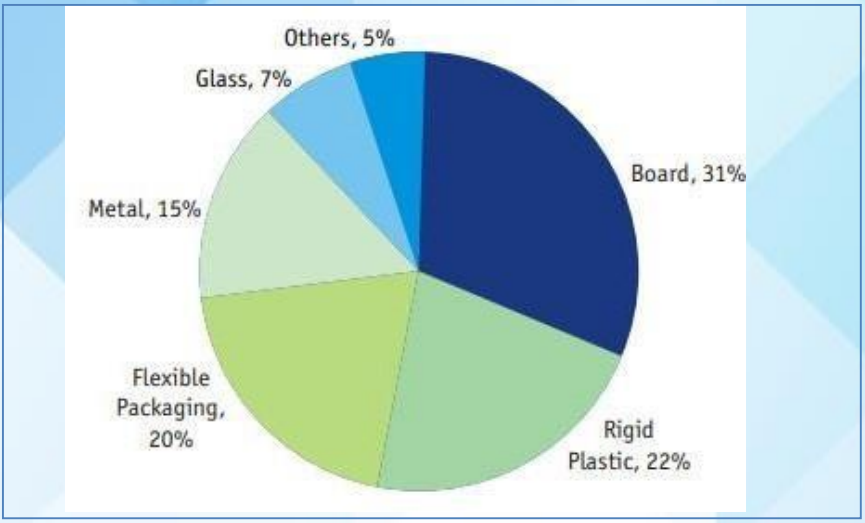
Manufacturers of packaging machinery and materials in India find demand for their products mostly in the food processing and pharmaceuticals sectors. About 45% of the packaging machinery and materials produced is absorbed by the food processing sector alone, 25% by the pharmaceuticals sector, and 10% each by the personal products, tea and coffee, and industrial products industries.[19] India's imports of packaging equipment currently stand at over $130 million a year. India's imports of packaging equipment for food processing are mainly automated machines and systems. There are between 600 and 700 packaging machinery manufacturers in India, of which 85% to 90%[20] are from small and midsize companies. Due to growing demand for packaging, the industry is gearing itself to adopt scientific and functional packaging. Three specific segments can be identified for opportunities in the packaging equipment market in India:

- First, the unorganized sector, which represents the largest opportunity, given increasing quality consciousness among consumers. The cost of equipment and upgrades hold the key to success in this segment.
- Second, large companies, primarily multinational corporations, which are guided in the choice of such equipment by the global policies and standardization of their parent companies.
- Third, the organized segment, which caters to the major food and pharmaceutical companies, and is conscious of quality and the ability to produce various packaging products, thereby, enabling them to tap a larger market.

Due to increasing domestic consumption and high potential, India is emerging as one of the prime destinations for plastics companies and downstream players worldwide. Huge investments in the Indian food processing, personal care and pharmaceuticals industries create significant scope for expansion and development of the Indian packaging industry.

Plastic Packaging amongst host of other packaging materials e.g. Paper Board, Wood, Glass and others, is now the fastest emerging trend due to former's Cost to Performance Ratio. Combination of Rigid and Flexible plastics is now an ideal packaging material in Industrial and Commercial sectors.

[19] Dibyajyoti Sarma, "PackPlus 2019 opens its doors", www.printweek.in, Aug 28, 2019
[20] "India: the world's fifth-largest packaging industry", www.wedc.org, November 1, 2017



Source: Industry Reports, Analysis by Tata Strategic

Applications like Pharmaceuticals, Food & Beverages widely use Plastics because of their versatility. Various applications of different plastics with their benefits across different industrial segments have been shown in the table below. Demand of flexible plastic packaging in India is thriving due to growing numbers of joint ventures and partnership between Indian and foreign companies. Its low cost and flexibility suiting different shapes and sizes, convenience and low carbon foot print is propelling its growth compared to Rigid Plastic Packaging.

The plastic industry is now engaged in innovations like plastic roads; eco-bricks, plastic made of wood, and cost savings because of growing consumerism and demand for value-for-money products. Massive growth potential lies in this industry in India due to its low level per capita plastics consumption which is expected to be doubled in 5 years time because India is now positioned in the World's first top ten plastic packaging consumers as per reports.[21]

All these sectors have huge potential for expansion due to increasing demand the end-user segments. While Pandemic has given exponential rise for packaging for groceries, healthcare products and e-commerce transportation but there has been a decline in demand for industrial, luxury and sections of B2B-transport packaging. So there will be a mix of growth and dip depending on the sub-segments.

Industry	Growth Trend	Dip Trend
Food and beverages packaging	Spike in demand for essential and shelf-stable foods is seeing an upsurge in the packaged food and beverages segment The demand for vacuum packaging, trays and protective films including PVC film and shelf life-extending modified atmospheric packaging and others have increased because of	Closure or partial operation of offline food chains including cafes and restaurants is negatively impacting the market.

	increased demand from grocery and dairy product segments.	
Transit and omnichannel packaging	Spike in demand from other end-user segments—such as disposable takeaway packaging for food and pharmaceuticals, and corrugated packaging for e-commerce and grocery deliveries	Reduced industrial activity has severely impacted demand
Consumer packaging	Sharp increase in home deliveries for grocery purchases and other home care products	The stores remaining closed or consumer cut backs on spending have impacted negatively the demand for non-food, premium/luxury and non-essential purchases
Healthcare packaging	Essential supplies needed by consumers in the pandemic situation has given rise to spiraling demand for packaging used in dietary supplements such as vitamins. Similarly demands have soared for all types of healthcare packaging and related substrates, including flexible blister foils, pumps, closures and rigid plastics.	

The different types of packaging materials used in packaging in India:

1. **Paperboard boxes** - Storing foods and beverage products, transporting heavy goods, etc. still use this packaging, it being tenable, viable and recyclable. Additionally, two derivatives of Paperboard Boxes are Solid Bleached Sulfate (SBS) which is used for cosmetics, pharmaceutical, frozen food, and Coated Unbleached Kraft (CUK) paperboard is used for eco-friendly paper that contains less moisture-resistant products.

2. Corrugated Boxes

Types of corrugated boxes are single–wall, double-wall and triple-wall corrugated box which handle both ordinary and premium products. These are used for movement of products from manufacturing to end users via Distribution and Sales.

3. Plastic Packaging

Plastic being flimsy and durable is used material in packaging for quite a vast range of products from paper clips to space shuttle. It is also easy and cheaper to transport. It allows storage, protect, conserve and transport products in various manner.

4. Rigid Boxes

Being four times thicker than an average folding paperboard it is used as universal packaging for luxury products like Cell Phone, other commonly uses being for shoeboxes, board games, jewellery, cosmetics, etc.

5. Chipboard Packaging

Chipboard also referred as the paperboard is generally made from reclaimed paper stock. Another form of chipboard packaging is used for consumer products that need clean, entrancing packaging inside a box.

7. Foil sealed bags

These bags which are made of malleable, flexible and easily recyclable material, extends the shelf-life of the product retaining its flavor. As such these have wide usage in the food, medical, tea and coffee industries due to their excellent seal abilities, good chemical and water resistance. Out of all such materials, Aluminum is best to seal the heat and retain the freshness inside the package and as such in wrapping fresh foods and snacks like burgers, sandwiches, these have wide daily usage.

8. Metal packaging

This packaging is superb for protection against any external impact during heat treatment, storage and information pack. The packaging industry went through a revolution with origination of metal can which made the product eye catching classic look with an extremely high response from consumers. Major players Coca Cola and Pepsi reduced the usage of plastic and glass bottles to a large extent.

9. Glass packaging

Glass is one of the oldest packing materials as its impermeable and non-poisonous surface with a high water-resistant rate as opposed to plastic containers. Glass materials though always costly compared to plastic and metal, make the packaging a premium look because of its overall finishing.

10. Flexible packaging

Flexible packaging bags are consummate for packaging products in various markets such as food, beverage, pharmaceutical, personal care and household products consume flexible packaging. As it is less expensive, it has got wide usage in packing most dairy products.

11. Biodegradable packaging

Biodegradable packaging is produced using polyelectrolyte, molecules found in living organisms, like fiber and protein, etc. Biodegradable packaging being non-taxable and allergy-free though have tremendous growth potential, it is still in somewhat limited use. It also has the capability to reduce water usage, electricity and emissions.

4. Evolution of Indian Law on Plastic Consumption and Disposal

Let us look at our laws drafted to curb plastic waste pollution over the years. The Ministry had initially notified the Recycled Plastic Manufacture and Usage Rules in 1999, which was mainly on manufacturing and usage of Plastic carry bags. It is specified that the minimum thickness of plastic bags should be of 20 microns. To address the issue of scientific plastic waste management, the Plastic Waste (Management and Handling) Rules, 2011 were drafted.

The Plastic Waste (Management and Handling) Rules, 2011 laid down certain conditions for manufacturing, stocking, sale and use of plastic carry bags and sachets, which were required to be monitored and implemented by the State Pollution Control Boards/ Municipal Authorities. It specified that the minimum thickness of plastic bags should be of 40 microns. This was to facilitate its collection and recycle. However, the implementation of these rules was not so effective because the ambit of these rules was limited to notified municipal areas whereas today, the plastic has reached to our rural areas also. There were no provisions on responsibility of waste generators. The rules did not address the promotion of conversion of waste to useful resources.

To implement these rules more effectively and to give thrust on plastic waste minimization, source segregation, recycling, involving waste pickers, recyclers and waste processors in collection of plastic waste and adopt polluter pays principle for the sustainability of the waste management system, the Central Government reviewed the existing rules and drafted revised rules. Based on the recommendations, the Plastic Waste Management Rules, 2016 had come into force aiming to:

- Increase minimum thickness of plastic carry bags from 40 to 50 microns
- Expand the jurisdiction of applicability from the municipal area to rural areas,
- To bring in the responsibilities of producers and generators, both in plastic waste management system and to introduce collect back system of plastic waste by the producers/brand owners, as per extended producers responsibility;
- To introduce collection of plastic waste management fee through pre-registration of the producers, importers of plastic carry bags/multilayered packaging and vendors
- To promote use of plastic waste for road construction
- To improve plastic waste management systems.

In 2017, the Central Pollution Control Board (CPCB) estimated that around 25,940 tonnes of plastic waste was generated in India per day[22]. However, according to Plastic Infrastructure Report, 2017, India consumes close to 12.8 million tonnes of plastic per annum, of which, close to 5 million tonnes is rendered as waste every year.[23] 70% of the plastic waste industry is informal in nature and no action plan for formalising the industry has been pushed in the last two years. On the other hand, under the Good and Service Tax (GST), plastic waste was put under a 5% bracket, hurting the informal sector, which already lacks a concrete action plan. The status of plastic waste management in the country is grim even after the rules gave emphasis on banning plastics below 50 microns, phasing out use of multilayered packaging and introducing Extended Producer Responsibility (EPR) for producers, importers and brand owners to ensure environmentally sound

[22] Ananda Banerjee, "India Is Generating Much More Plastic Waste Than It Reports. Here's Why", www.indiaspend.com, April 2, 2019

[23] Richa Agarwal, "Centre amends Plastic Waste Rules, but misses out on strengthening implementation", www.downtoearth.org.in, April 2, 2018

management of plastic products until the end of their lives. Implementation of the rules has been poor in all aspects.
The Ministry of Environment and Forest & Climate Change (MoEF & CC) amended the rules and released **Plastic Waste Management (Amendment) Rules 2018**.

1. Explicit pricing of carrying bags has been omitted in the amendment.
2. The term 'non-recyclable multilayered plastic if any' has been substituted by 'multi-layered plastic which is non-recyclable or non-energy recoverable or with no alternate use'.
3. All brand owners and producers are required to register or renew registration with the concerned State Pollution Control Board (SPCB) or Pollution Control Committee if operational only in one or two states or union territories.

State governments have felt no compulsion to replace municipal contracts, where companies are paid for haulage of mixed waste, with terms that require segregation and accounting of materials. Considerable amounts of plastic waste cannot be recycled because of lack of segregation, leading to incineration, while mixing newer types of compostable plastic will confound the problem. Patchy regulation has led to prohibited plastic moving across State borders.

During the 4th United Nations Environment Assembly held in 2019, India moved a resolution on addressing single-use plastic products pollution by 2022.[24]

1. A central government committee has identified the single-use plastic items to be banned based on an index of their utility and environmental impact. It will be a three-stage ban. The manufacture, import, stocking, distribution, sale, and use of some single-use plastic products including polystyrene and expanded polystyrene shall be prohibited from July 1, 2022.

   The first category of single-use plastic items proposed to be phased out are plastic sticks used in balloons, flags, candy, ice cream and earbuds, and thermocol that is used in decorations. Plates, cups, glasses, forks, spoons, knives, straws, trays, wrapping and packing films used in sweet boxes, invitation cards, cigarette packets, stirrers and plastic banners that are less than 100 microns in thickness will be removed in the second phase. The third category of prohibition is for non-woven bags below 240 microns in thickness which are widely used as shopping bags and will be removed in the third phase.

2. From September 30, 2021, the thickness of plastic carry bags will be increased from 50 microns to 75 microns and 120 microns. This will also allow the reuse of plastic carry bags due to an increase in thickness. The items that had a low score on utility scale and high score on environmental-impact scale were recommended for prohibition.

Now that the Centre has adopted a broad ban, further pollution must end. Microplastic is already found in the food chain, and governments must act responsibly to stop the scourge.

[24] HT Correspondent, "Several single use plastic products to be prohibited from July 1, 2022", www.hindustantimes.com, Aug 13, 2021

5. Challenges of MSMEs in Implementing the Plastic Ban Rules

With the recent imposition of ban on single-use plastics, there comes a host of challenges in the implementation of the rule. One part of the problem of previous attempts, that of differing rules across states, is taken care of with such exact items specified for the ban. The draft has, for the first time, defined non-woven plastic bags - widely used as shopping bags--and brought brand owners as well as plastic waste processors under its ambit. It has also defined thermoset plastic, which is irreversibly rigid and cannot be remoulded, as well as thermoplastics, which soften on heating. Thermoset plastics are used in electrical fittings and tableware whereas thermoplastics are used in items such as toys, combs and mugs. However, a big challenge for MSMEs is to look for alternatives, assessing how these alternatives will play out in terms of costs and how much of the added cost can be passed on to the consumer.

The move to ban plastic bags under 120-micron thickness will certainly help contain plastic waste, by encouraging better collection and recycling. Against the backdrop of the pandemic's effect on businesses, especially MSMEs, the government has to carefully consider the ramification of its decision on vulnerable businesses and come out with support packages to facilitate the transition to alternatives. It is recommended that MSMEs engage with regulatory agencies through a time-bound and outcome-based framework. Given that India has a consumption-driven economy; it shall be great to opt for a gradualist approach to enable MSMEs a cushion to absorb the economic impacts. A corporate income tax holiday to businesses offering sustainable packaging solutions can enable holistic ecosystem-wide reform by reducing the cost burden and further allowing such businesses to pass-on the benefit downstream.

The All India Plastic Manufacturers' Association (AIPMA), one of the largest trade bodies representing the plastics industry, has requested the government to push the deadline for phasing out SUP products by a period of one year to 2023 owing to economic distress faced by manufacturing units due to the Covid-19 pandemic. The industry body has pointed out broad issues such as the need for a uniform policy across the country, a life-cycle analysis of the products that are proposed to be banned and the need to include larger companies. These companies are the large petrochemical sector companies that produce polymers. It has also asked the government to revise the thickness of carry bags proposed in the draft from 120 to 75 microns and also specify that the increase in thickness is only applicable to carry bags and not plastic packaging. Increasing the thickness to 120 microns will force manufacturers to incur major expenses on changing production machinery. Besides manufacturers, the government's proposed ban on SUP will also affect e-commerce giants such as Amazon India and Flipkart which not only sell plastic items but also use them in packaging.

According to a fact sheet released by The Energy and Resources Institute and environment ministry in 2018, around 43% of manufactured plastics are used for packaging purpose and most are of single-use[25]. Central Pollution Control Board (CPCB) estimated that each person in India consumes about 9.7 kgs of plastics annually, most of which is packaging related. India generates about 9.46

[25] "Fact Sheet on plastic waste in India ", www.teriin.org, 2018

million tonnes of plastic waste per annum, of which about 40% remains uncollected[26], according to Un-plastic Collective (UPC), a voluntary initiative launched by United Nations Environment Programme, Confederation of Indian Industry and World Wildlife Fund India. Big cities generate at least 4,000 tonnes of plastic waste every day.

Just banning and phasing out will not work, it has to be complemented with a thorough plan for introduction of sustainable alternatives and focus on behaviour change. After battling the dip in revenues due to the economic slowdown post lockdown, plastic packaging manufacturers are staring at yet another roadblock: the draft plastic waste management (amendment) rules 2021. Gujarat is home to some 5,000 plastic manufacturing units, of which 5% units will stare at a total shutdown[27], and many others will have to suspend operations, if the new rules are implemented, according to industry estimates. According to plastic manufacturers, a manufacturing unit of plastic packaging requires a minimum capital of Rs 20-25 lakh[28], as machinery will need to be replaced. Existing equipment have to be scrapped, which is a waste of prior investment. At a time when industries are facing a shortfall in revenue, absorbing additional infrastructure costs will not be possible. In fact, most MSMEs would not be able to afford upgrades unless necessary.

6. MSME Operating Models Around Sustainable Plastic and Alternate Solutions

The Ministry of Environment, Forest and Climate Change released the draft Uniform Framework for Extended Producer Responsibility (Under Plastic Waste Management Rules 2016) on June 26, 2020. EPR puts the financial as well as physical onus on manufacturers-- plastic producers, importers and brand-owners--for the treatment, recycling, reuse or disposal of products after a consumer has used and disposed of them. The draft rules offer three options to producers: pay a fee into a central corpus that would be spent towards managing the waste; buy credits from a system that would be established to offset the plastic waste they generate; or participate in and pay for establishing producer responsibility organisations (PROs) to collect and manage post-consumer plastic waste.

At the centre of EPR lies a closed-loop approach to managing products, whereby waste generated from a product is used to produce another product. This approach ensures the price of the product includes the cost of its safe disposal. Therefore, this approach significantly reduces the environmental impact of the waste as well as leads to lower cost of production for the new product. Product manufacturers can reduce the environmental impact of waste by ensuring they use source materials and packaging strategies that reduce waste generation. Since EPR has shifted the burden of waste disposal from governments to these product manufacturers, it has driven the adoption of innovative product and packaging strategies leading to a reduction in plastic waste.

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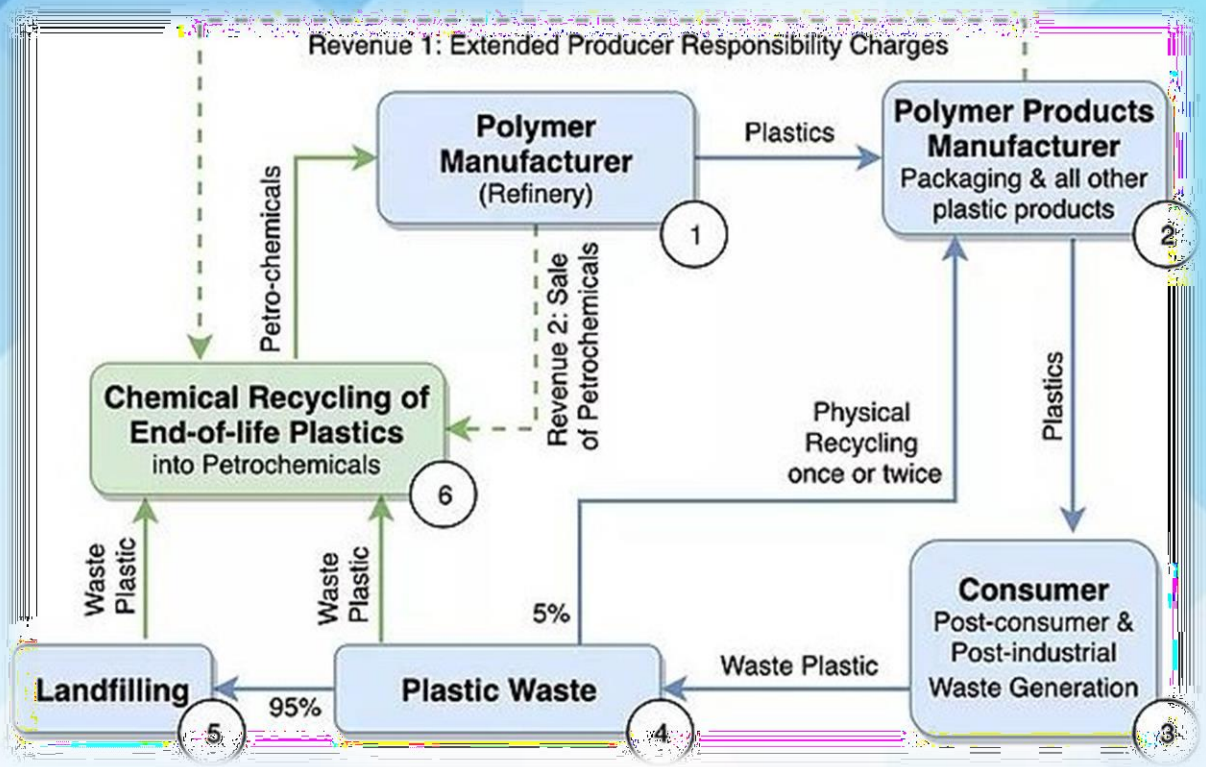
[26] PTI, "India generates 9.46 mn tonnes of plastic waste annually", www.thehindubusinessline.com, August 30, 2019

[27] Niyati Parikh, "Proposed plastic waste rules rattle packaging manufacturers", timesofindia.indiatimes.com, Aug 1, 2021

[28] Niyati Parikh, "Proposed plastic waste rules rattle packaging manufacturers", timesofindia.indiatimes.com, Aug 1, 2021



The new EPR rules will impact the entire plastic industry, estimated to comprise more than 40,000 processing units, 85-90% of which are small and medium-sized enterprises; the industry employs about four million people. Acknowledging that there cannot be a single EPR solution suitable for implementation across all regions of the country, the draft EPR rules provide plastic manufacturers with three options:

Fee-based mechanism: Under this model, plastic manufacturers need not get directly involved in the processing of post-consumer plastic waste. Instead, they would contribute money to an EPR corpus fund at the central level. This may be an escrow account managed by a special purpose vehicle (SPV), an independent entity wherein private and other stakeholders can become members. The corpus is proposed to be used to provide funding to three entities in order to manage plastic waste: firstly, to urban local bodies (ULBs) that are primarily responsible for managing waste in the cites; secondly, to waste collectors/assemblers/recyclers; and thirdly for spending on information, education and communication (IEC) activities to create public awareness about segregating and managing waste.

The draft EPR rules are unclear about which plastic producer can opt for this fee-based option. It states that producers/importers/brand owners “who are using less quantity of plastic for packaging” would work with this model. The fee-based model has a downside as deciding the appropriate fee amount would be tricky since it depends on multiple factors such as type of plastic, geographical regions, type of end processing, the state of ULB.

PRO model: Under this model too, plastic manufacturers need not take on the complete operational responsibility of collecting and processing plastic waste. Instead, they can form a producer responsibility organization (PRO) or contract service to an existing one. The PRO

operational model would have to be flexible; they can work with informal systems and ULBs with the objective to collect and segregate plastic waste from the source and channelize it to authorized recyclers and co-processors.

Plastic credits: Under this model, a plastic manufacturer is not required to recycle its own plastic waste. Instead, the model proposes that the manufacturer purchase plastic credits from properly accredited processors or exporters to ensure that an equivalent amount of packaging waste has been recovered and recycled to meet their waste management obligation. Manufacturers are mandated to acquire evidence of recycling or recovery from properly accredited processors. Offset credits could typically be awarded for activities such as removing plastic from natural ecosystems such as oceans and forests or for increasing plastic recycling. These credits will then be sold to companies that wish to spruce up their image. For example, a company would be able to claim that its bottles are made of "50% recycled plastic" if it buys credits representing increased plastic recycling even if none of the recycled plastic actually makes it into the company's bottles. Alternatively, a company could claim to "collect 100% of the plastic we use" because it buys offset credits representing plastic collection equivalent to its plastic footprint. Plastic offset credits will offer companies a way to outsource the responsibility of the plastic they produce or use.

With uncertain chances of passage, it's still up to companies to take voluntary measures to address their role in waste streams. Faced with increasing consumer consciousness and dismal predictions for the future, more companies are stepping up and announcing initiatives to curb their environmental impact, from reducing carbon emissions to tackling waste.

- **Coca-Cola** produces 3 million metric tons of plastic packaging per year — the most of any company that revealed such information in 2019's New Plastics Economy Global Commitment report. The beverage giant has charted out goals such as:

    - Having 50% recycled material in all its packaging by 2030
    - Collecting and recycling a bottle or can for each one that it sells by 2030
    - Making 60% of packaging either refilled or collected for recycling

In February 2021, the company launched new bottles made out of 100% recycled materials, rolling out the new 13.2-ounce packaging at convenience stores in the U.S. Northeast, Florida and California. It is also testing paper bottles, which now use recycled plastic liners. Ultimately the goal is to remove the plastic completely to achieve a bottle made completely from recyclable paper.

- **PepsiCo** is committed to eliminate all virgin plastic from its Pepsi brand beverage bottles sold in nine European Union markets by 2022. The company says it will package the entire range of beverages under that brand with plastics recycled from post- consumer packaging. PepsiCo will also continue its progress towards growing reuse and refill systems such as SodaStream. The company estimates that the move to 100% rPET for these beverage bottles will eliminate more than 70,000 tonnes of virgin, fossil-fuel based plastic per year, and will lower carbon emissions per bottle by approximately 40%. In 2018, the company had announced that it would achieve 50% rPET usage across the EU by 2030; it has already reached 30%. Technological innovations in the use of recycled plastics in carbonated drink bottles, improvements in the appearance of recycled plastic and greater availability of recycled materials on the market have made it possible for PepsiCo to accelerate its progress.

- **Estee Lauder** has targeted virgin plastics in its waste reduction strategy, with a goal that 75%-100% of its packaging will be recyclable, refillable, reusable, recycled or recoverable by 2025. According to the company's internal plastic guidelines, its pledge includes:

    - Replacing plastic applicators in retail stores with paper or wood versions
    - Reducing plastic water bottles and cutlery in office spaces
    - Reducing with weight/size of packaging and using bioplastics as applicable

Plus, its manufacturing and distribution facilities have sent zero waste to landfills since 2003. Any waste it can't recycle is incinerated and converted to energy.

- **Microsoft** has pledged some of the most ambitious environmental sustainability goals of any big tech company, announcing last year that it planned to go carbon negative by 2030, and by 2050, remove all the carbon it has ever emitted since the company's founding in 1975. The plan includes:

    - Diverting at least 90% of its solid waste headed to landfills and incineration
    - Building its own recycling 'Circular Centers' to reuse and repurpose servers and hardware for its datacenters
    - Manufacturing 100% recyclable Surface devices and use 100% recyclable packaging
    - Diverting at least 75% of its construction and demolition waste

- Another company topping multiple lists of worst polluters, **Unilever** has signed the New Plastics Economy Global Commitment. The massive health and beauty product manufacturer with some 400 brands under its umbrella has pledged to:

    - Eliminate problematic or unnecessary plastic packaging by 2025
    - Move from single-use toward reuse models where relevant by 2025
    - Make 100% of its plastic packaging reusable, recyclable or compostable by 2025

- Targeting its packaging as its greatest opportunity for improvement, **McDonald**, operating in more than 100 countries has set goals to source 100% of its guest packaging from renewable, recycled or certified sources, and to recycle its guest packaging in all of its restaurants by 2025. Among its many waste reduction initiatives, the company's measures include:

    - Help drive demand for plastic recycling by using recycled plastic in trays, Happy Meal toys and restaurant interior design. McDonald's France recently removed all plastic toys from its Happy Meal menu and offers the choice of a new book instead.
    - Innovate packaging design, such as partnering in the NextGen Cup Challenge to design beverage cups to be more easily recoverable
    - Recycling kitchen waste materials such as cooking oils, organic waste, and corrugated cardboard packaging from suppliers

Let us look at some Indian companies and their pledges around plastic waste:

- **Cigarettes-to-biscuits conglomerate, ITC,** which has been solid waste recycling positive for over 13 years. The company is set to collect more than 30,000 tonnes of plastic waste this fiscal year (2021) from 24 States, which is more than double that of last year's collections. ITC has adopted a multi-pronged approach to reduce plastic in the company's operations spanning FMCG, hotels, paperboards and packaging, agri-business and IT. This includes creating robust

next-generation environment friendly packaging solutions, mega-scale waste collection program 'WOW – Well-Being Out of Waste' as well as focused interventions in rural areas. It has also instilled a culture of plastic-free operations, in line with its philosophy of 'Responsible Luxury' to eliminate single-use plastic usage in ITC Hotels.

- On world environment day in 2021, **DS group** introduced PET Jar using recycled - PET for its popular Pulse candy packaging. Recycled PET, also known as R-PET is environmentally friendly and has a much lower Carbon Footprint compared to using Virgin PET. The PET Jar is made from a combination of virgin and recycled PET granules, which means that the waste from eco system is being reused into packaging and minimizes burden on the planet. The company is also targeting Industrial ecology and blue economy by working towards reducing resource depletion and environmental pollution.

- Dabur had rolled out its plastic waste collection and it's recycling/reuse processing initiative in Punjab in the 2018-19 financial year to meet the Plastic Waste Management Rules. Under this initiative, Dabur has collected a total of **7,00,000 Kg** of different types of plastic waste (Recyclable and Non-Recyclable) direct from the end-users with the help of around **700 local ragpickers** in Chandigarh, Mohali, Derabassi, Patiala & Amritsar cities by the end of March 2019.

7. Emergence of Sustainable Packaging

For Fast Moving Consumer Goods (FMCG) companies and beauty brands, packaging is the final point of contact with customers. Having an unforgettable packaging design and eco-friendly packaging in today's environment can help in communicating a disruptive image and stand out in the cluttered, competitive shelves. In the last few years, we have seen many brands become more environment-friendly and increase their focus on sustainability. Due to the lockdown and increased in-home consumption, consumers became more environmentally-conscious. Consumers, especially Millennials and GenZ, want companies to take sustainability and greater purpose more seriously and take action towards the betterment of our country. They are even willing to shell out more money or switch to a smaller brand. Brand owners have continued to prioritize sustainability in their packaging selections.

According to Capgemini's latest research study on sustainability and changing consumer behaviour, 79% of consumers are changing their purchase preferences based on social responsibility, inclusiveness, or environmental impact. 53% of consumers and 57% in the 18-24 age group have switched to lesser known brands because they were sustainable. More than half of the consumers (52%) say that they share an emotional connection with products or organizations that they perceive as sustainable.[29]

This reinforces the need for big companies to increase their commitments towards responsible business practices and migrate to sustainable solutions to contribute to a circular economy. As a result, during the pandemic, brands like Diageo and Dettol launched limited edition eco-friendly packaging to test the waters indicating that more brands in India have started reevaluating their packaging strategy to put the environment first. HUL also brought Unilever's 'Love Beauty and Planet' range of skincare products to India after observing an increasing demand for sustainable

[29] Karuna Sharma, "How ready is India to launch permanent eco-friendly packaging and become a plastic free country?", www.businessinsider.in, Nov 11, 2020

products. With more goods being distributed directly to customers, e-commerce pack recyclability and reuse has become more important. RePack's recycled plastic mailer, for example, can withstand 20 online customer deliveries and is suited for return shipments. A vast amount of packaging material is necessary to package Amazon's five billion items sent worldwide each year. As a result, Amazon developed the Frustration Free Packaging initiative to lessen its environmental impact while also meeting customer needs for less over packing. Companies such as Marico, Bacardi, ASICS, HUL, Nestle India, Future Consumer, Coca-Cola, Pepsi-co, Parle Agro will move to 100% recyclable packaging by 2025 helping towards a sustainable future.

Designers are constantly in search of materials that provide long-term hygiene efficacy, materials or processes that do least harm to the ecology. The topic of sustainability has also become a part of boardroom conversations between agency and client. Marketers, designers, print converters, logistics partners, retailers, consumers, and recycling agencies must come together to form the policy and develop practices to reach the common goals. It is a challenge now because all these stakeholders are not on the same platform yet. While consumers are willing to shell out more money for eco-friendly products, the audience is still very small and sustainable market is still at its nascent stage in India. While giants struggle to find eco-friendly alternatives, several smaller companies across the country are doing their bit to protect the environment.

- **Treewear**, selling organic deodorants and hand sanitisers - Their products are shipped in cardboard boxes tied with jute rope, and packed in with newspaper shreds. The T-shirts are packaged in recycled plastic water bottles, which are otherwise destined for the landfill. Customers can use these bottles as planters later, with their seed-embedded business cards.
- Helping the food industry to make greener choices is Visakhapatnam-based **House of Folium**, selling eco-friendly cutlery. Run by SV Vijay Lakshmi, a former software engineer, the company sells plates, bowls, forks and spoons made from sugarcane pulp.
- When Diwia Thomas started **PaperTrail** in Kochi in 2008, it was to provide underprivileged women a source of income. For the initial few years, the company just made newspaper bags of various sizes. Today, with a team of over 30 women, the company ships its eco-friendly packaging products like boxes, trays and bags across India, some regions of USA, and the Gulf countries.
- Rennee Saradha, who runs **Pidi** in Chennai, serves steam-cooked gluten-free kozhukkattais (rice dumplings) in charming boxes made of palm leaves. When she launched her venture early 2021, she decided that if the food is native, the packaging should follow suit. The wide variety of sweet and savoury dumplings she serves are wrapped and steamed in the leaves of native trees like peepal, banana and vilva.

Role of recycling:

The huge volumes of leakages in plastic wastes demand a clarion call for a recycling revolution in the country. India's recycling rates are low with respect to the volumes of waste it generates. As per Material Recycling Association (MRAI), India's recycling rates stands at 30% [30] . The data associated with this recycling rate is largely dominated by highly recyclable materials such as ferrous & non-ferrous scrap, paper, rubber, and tyre etc. Recycling of materials such as plastics is not very well documented. The litter that we see around and India's policy focus on plastic waste are indicators of the fact that this resource is at the bottom of the chart in recycling rates.

[30] Vaibhav Rathi, "Why India Needs A Plastic Recycling Revolution", www.outlookindia.com, 03 Jul 2021

Workers construct a fish sculpture made of plastic waste, under the Swachh Survekshan 2020 (cleanliness survey) in Karad.

Recycling of plastics is largely informal. The Number of plastic recyclers is small in the country and not very well documented. India's apex authority on pollution control, Central Pollution Control Board (CPCB) in its annual report of 2018-19 estimated that India generated about 13 Lakh tonnes of plastics annually. The country has about 5000 registered plastics manufacturing/recycling units and about 1000 unregistered units. Many states did not report number of recyclers available and none of the states reported what is the installed capacity of these plastic recycling units.

8. Examples from Developed Countries

Let us look at how some countries around the globe are tackling the problem of plastic waste management. These are some of the countries that have successfully managed to get their citizens and governments to cooperate to attain high levels of recycling, and some examples of the successful policies.

- **Sweden**: From Waste To Energy

The Scandinavian country is one of the European territories with the greatest culture of environmental protection, and has one of the most successful recycling rates. The success of the Swedish waste management system lies in raising citizens' awareness to do the first step: separation. The Swedes separate their waste into different colored bags, depending on the type of waste, and the recycling plants separate it into recyclable and non-recyclable elements. The waste that cannot be recycled is burned in plants that transform their combustion into energy to provide electricity for 250,000 homes in the country. Recyclable elements follow the normal process that converts them into new materials. The process has been so successful that the trash Swedes generate is not sufficient to supply all of the plants. The country has to import trash from neighboring countries like Germany or the U.K. to keep them fully operational and generate energy in a more sustainable way than the combustion of fossil fuels.

- **Japan**: The Path To Zero Waste

Along with Sweden, Japan is also serious about its recycling policies. In addition to the environmental commitment, the technical need to manage the large volumes of waste generated by millions of people is important. The Japanese have proven to be extremely efficient at reusing and recycling their waste. The country's government promotes and encourages the separation of water and citizens rigorously manage their own waste through a system of classification and pick-up schedules that they fulfill flawlessly. One of the examples of the Japanese model's success is the town of Kamikatsu, a small town in the mountains with difficult access to the system available in large cities. That's why the families are the ones in charge of separating the waste into 34 categories, which they subsequently transfer to recycling centers. In 2020, the town recycled 90% aims of its waste. In addition, Japan has a high metal recycling rate. The medals for the Tokyo Olympic Games were made of recycled metals.

- **The Netherlands**: Reutilization And Sustainability

The Netherlands have successfully applied sustainability models to mobility, construction and consumption. A clear example of recycling materials in this country is the 2018 construction of two sections of a bike path made entirely of recycled plastic in the cities of Zwolle and Giethoorn. The use of plastic to build roads has also been done in other places around the world, but this was the first time they were made entirely of plastic. In addition to a clear commitment to reuse all types of materials, the Netherlands also has a strong commitment to renewable energy and investment in developing initiatives that lead the country to reach a circular, sustainable economy.

- **Canada**: Tires And Cigarette Butts

The North American country does not have one of the highest recycling rates in the world, but it does have a deeply rooted circular economy culture that leads Canadians to sell, give or donate products they are no longer using instead of discarding them. They are also experts in recycling tires, as they use the material to mix with asphalt and build roads or playground surfacing. Furthermore, Canada has also distributed containers across numerous cities to recycle cigarette butts, as they are one of most polluting, discarded objects in the world.

- **Wales**: A Success Story

In just 20 years, the country has gone from recycling 5% of household waste to 64%. These figures are the result of an ambitious package of measures launched by the government, which aims to promote the circular economy among its citizens. The goal is to not have any waste in dumps or incinerators by 2050. Some of the measures include the reduction of single-use products, the requirement to separate household waste and the involvement of industrial manufacturers through a responsibility scheme. The country has also proposed developing recycling plants capable of processing products that are not normally recyclable, such as mattresses and diapers.

9. Way Forward

It requires a deep level of collaboration across all sectors in order to truly reach a sustainable packaging value chain. Currently the market for sustainable packaging is being driven individually by FMCG companies within their own production network. It is difficult to achieve sustainability projects without working closely with many retailers and manufacturers; it is even tougher to do so in the FMCG market with numerous players and low margins.

Actions stakeholders can engage in to promote a holistic packaging value chain

Stakeholder	Opportunity
• FMCG companies	• Implement more renewable/ recycled material in their product • Implement recycling and reusing initiatives in order to increase the rates of recycling for their products.
• Consumers	• Follow proper waste disposal practices • Demand that their products encompass a holistic value chain
• Policy makers	• Propose legislation to propel bio-plastics to a larger scale. • Promote the informal sector to collect low value waste material.
• Local municipalities	• Develop controlled waste streams they own in order to ensure all waste is collected and not just those with high market value.
• Investors	• Direct investment to expand bio-plastic market, formal waste management.
• Packaging supplier	• Demonstrate commitment to sustainable packaging in order to increase company value to large FMCG corporations.

Although, in the FMCG market branding of products is constantly changing to match consumer preference and it becomes difficult to coordinate long-term. Nevertheless, there are bright stars in the FMCG market in terms of collaboration. For example, Coca Cola has licensed their Plant Bottle technology to Heinz, Procter and Gamble and Ford for use in their products in order to expand the penetration of their bio-plastic in the market. As India's demand for more packaged goods rises over the coming years, all stakeholders have to work together in order for the recycling rate to out match the production rate of packaging material. Large FMCG brands have the greatest power to direct sustainable initiatives but need to understand the holistic nature of packaging in order to truly achieve the goals of sustainable packaging. Overall, it is the collective responsibility of government, policy makers, FMCG corporations, suppliers and consumers to reduce the amount of packaging waste headed to landfills and achieve a zero-waste approach to packaging.

Today, globally green packaging and sustainable solutions have become a rule rather than a norm for CPGs and end-users. Although, cost-effective solutions that provide positive environmental impact seem far and few in between, increasingly brands are consciously veering towards manufacturers that provide these solutions as part of their sustainability roadmap. Green packaging is based on the 3R policy: reduce, reuse, recycle (and additionally re-consume and re-circulate). The industry believe that to contain the New Plastics Economy, companies, manufacturers,

government and stakeholders must work towards adopting imaginative solutions like biodegradable packaging and recyclable packaging, making us move towards a circular economy that propagates a new way to design, make, and use things within planetary boundaries. The system involves everyone and everything: businesses, governments, and individuals; our cities, our products, and our jobs. By designing out waste and pollution, keeping products and materials in use, and regenerating natural systems we can reinvent everything. This cannot be achieved in isolation; consumers, as well as manufacturers collectively, have to lead the charge towards this system. The packaging industry is constantly evolving their in-house capabilities towards sustainable innovation. A fine example of this is the progress made towards manufacturing special films that contain a minimum of 90 percent post-consumer recycled PET content. This means creating green packaging using these films, in the form of pouches, sachets, labels, etc. that gets collected after use for recycling, thereby creating a circular economy for these products and lowering the carbon footprint.

In India, with the recent announcement made by the Ministry of Environment, Forest and Climate Change regarding the final date for the ban on plastic scrap imports, there has been a sudden rise in demand. However, once the ban comes into force later in 2021, it is inevitable that the industry will have to look inwards in order to meet the demand. This perhaps poses as a significant opportunity for the packaging industry to step up to the challenge and once and for all, decide the fate of recyclables in India.

In order to switch toward green packaging, it is imperative that both governmental bodies, as well as the private sector, collaborate toward boasting initiatives which will not only solve the urgent issues around plastic waste but will also reiterate India's firm position in upholding United Nation's Sustainable Development Goals 2030.

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Abbreviations

1. FMCG - Fast-Moving Consumer Goods
2. MSME - Micro, small & Medium Enterprises
3. CPCB - Central Pollution Control Board
4. HUL – Hindustan UniLever
5. TSMG – TATA Strategic Management Group
6. B2B – Business to Business
7. SBS - Solid Bleached Sulfate
8. CUK - Coated Unbleached Kraft
9. GST - Good and Service Tax
10. EPR - Extended Producer Responsibility
11. MoEF & CC - Ministry of Environment and Forest & Climate Change
12. SPCB - State Pollution Control Board
13. AIPMA - All India Plastic Manufacturers' Association
14. UPC - Un-plastic Collective
15. PRO - Producer Responsibility Organisations
16. IEC - Information, Education and Communication
17. SPV- Special Purpose Vehicle
18. ULB - Urban Local Bodies
19. MRAI - Material Recycling Association
20. RPET - Recycled Polyethylene Terephthalate

EHS Environment Health & Safety Services

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