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Research Paper

Plastic Waste Management Policy

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Abstract
According to a report by India's Central Pollution Control Board, the total plastic waste generated in the country every year exceeds 3 million metric tonnes. The national capital region of Delhi (Delhi-NCR) is the 2nd biggest consumer of plastic per capita. Its significance as the national capital, an economic hub, and a city abundant in natural resources necessitates urgent solutions that improve the waste management system. This paper has examined the cause of plastic pollution in Delhi, which is rooted in the absence of resources with public work departments, the lack of awareness and oversight of waste segregation at the community and household level, and the absence of implementation of technologically advanced waste management systems. Existing technologies and successful policies that tackle plastic pollution across the world have been analyzed, with a focus on extended producer responsibility, recycling, and energy production. Lastly, this paper has sought to provide recommendations that could enable communities and local governments in Delhi to develop and implement plastic waste management systems that improve environmental conditions in a cost-effective way -- achieving the twin objectives of environmental and financial sustainability.

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I. INTRODUCTION: PLASTIC WASTE SCENARIO IN DELHI

One of the most important challenges faced by policymakers in India is the management of plastic waste, which India is producing at an alarming rate. India stands 12th in the global list of largest mismanaged plastic waste polluters (Jambeck, et. al., 2015). This is particularly concerning given that India drastically underrepresents the amount of plastic waste produced by it. This lack of transparency is deeply rooted in the public works departments of local and central governments in India. In the financial year 2017-18, only fourteen of India's thirty-five regional pollution boards filed information surrounding plastic waste generation to the Central Pollution Control Board (CPCB). This caused the estimation of plastic waste generation in India (which is calculated annually by the CPCB) to be highly inaccurate, given the absence of data from about 60% of India's states and union territories (Banerjee, 2019). India produces about 16.5 million tonnes of plastic every year. A significant amount of this plastic is not recycled, and according to research by the PlastIndia Foundation, 80% of the total plastic waste produced in India is discarded. The popularity of plastic is owed to its economic utility- it is an inexpensive product that serves several purposes in different sectors of the economy. Statistics from the Federation of Indian Chambers of Commerce & Industry suggested that the per capita consumption of plastic in India in 2015 was 11 Kg, and estimates from the Ministry of Petroleum and Natural Gas suggest that this figure could increase beyond 20Kg by 2022 (Bhagat, et. al., 2016). This increasing usage of plastic is owed to increasing rates of urbanization and the expansion of the middle class in India, both of which directly and indirectly contribute to the increase in demand for plastic. A vast percentage of the demand for plastic products comes from the biggest cities in India. Theoretically, the amount of plastic waste generated is related to the standard of living, the extent of industrialization and urbanization, and the nature of economic activities being carried out in society. Owing to rapid economic development over the past few decades, the per-capita plastic consumption in cities in India has increased eightfold since independence (Sharholy, et. al., 2018).

Delhi-NCR (a region that includes Delhi and surrounding cities such as Gurugram and Noida) has the second-highest rate of per capita plastic consumption in the country. Only Goa, a sparsely populated state supersedes Delhi in these rankings. The significance of Delhi as the national capital, its population and strategic importance justifies the need for a comprehensive and holistic plastic waste management policy (The Hindu, 2020). According to data from 2007, the residents of Delhi-NCR generate about 7000 tons of municipal solid waste every day, a number which is expected to increase to around 17,000 – 25,000 tons per day by 2021

(Talyan, et. al., 2007). Given the inefficiency of waste management systems in Delhi, the region can be described to be suffering from plastic pollution, which, generally defined, is the accumulation of plastic products in the environment to an extent that adversely affects the lives of human beings and other living organisms. 83% of the world's water is polluted by plastics, and India ranks third in the list of countries with highest levels of plastic contamination of water (after the United States and Lebanon) (Kosuk, et. al., 2017). Those without access to adequate purification facilities (the majority of the population of Delhi-NCR) could face negative consequences of pervasive contamination of drinking water, the health impacts of which continue to be researched. Moreover, the production of plastic was responsible for releasing 850 million tonnes of carbon dioxide into the atmosphere in 2019. If the current trends continue over the next few decades, plastic production will become a significant contributor to the process of global warming and climate change. Even though Delhi-NCR is not a marine economy, plastic pollution has been known to ravage marine ecosystems and impact the life cycles of phytoplankton (Banerjee, et. al., 2014). Further, plastic pollution has severely contaminated Yamuna (a river that flows through eastern Delhi). These are some of the many reasons which make the regulation and production of plastic waste very important in Delhi-NCR (Goswami, 2018).

In October 2019, the government of India implemented a number of measures to tackle the increasing rates of plastic pollution, which included a ban on single-use plastics (Liz, 2019). However, the ban has had a very limited impact. Plastic is especially important to the economy of India, given that the country is developing and economic entities prioritize cost-effectiveness over other parameters such as environmental impact. This calls for a nuanced exploration into this problem with the aim of developing sustainable and holistic solutions.

Background: Policy Review

Discourse around the negative implication of plastic waste pollution has prompted action at the local, national, and international levels. A wide range of initiatives and policies targeting different actors have been established. Some focus on cleaning the existing levels of plastic waste in the environment, while others focus on reducing the usage of plastic in the supply chain. These can be targeted towards individuals - to nudge them into more sustainable lifestyles and promote alternatives to plastics - or can be public mandates to corporations ordering them to reduce usage and production. Plastic waste management specifically pertains to the processes involved in ensuring that used plastics are not discarded or incinerated, but are scientifically treated to reduce environmental and public health harms (Thompson, et. al., 2009). Certain models advocate changing the chemical composition of plastics to make them biodegradable and environmentally sustainable. Bioplastics are composted in industrial composters because despite their different chemical compositions they continue to be non-biodegradable in domestic composters (Selke, et. al., 2015). A United Kingdom Parliamentary Committee explored the usage of biodegradable plastic as an alternative but the lack of infrastructure required to facilitate industrial composting prompted the Committee to decide against the implementation of this technique, and instead opt for policies that target plastic reduction altogether (Laville, 2019).

Waste management requires some level of regulation of commodities, which after usage constitute 'waste'. Governments regulate the production of different types of plastics through taxation and subsidy policies. Canada, Australia, and the European Union have implemented a landfill tax, which seeks to increase the cost of creating a landfill. Then, the cost of disposing of a plastic bottle in a landfill becomes much higher than the cost of recycling it. Hence this policy causes producers to opt into sustainable behavior and adopt recycling methods throughout their supply chain. Instead of introducing outright bans that could cripple certain vulnerable sections of the economy, a combination of regulation and incentive measures often leads to more beneficial outcomes when it comes to environmental policy (North & Halden, 2013). The European Union has also introduced stricter measures on composting with the European Norm EN 13432 (implemented by the European Committee for Standardization) listing standards that plastics are required to meet, in terms of compostability and biodegradability, to be officially labeled as compostable. This has led to a gradual phase-out of more harmful and less compostable plastics (Thompson, et. al., 2009). Whilst the most effective way to regulate the production of any commodity continues to be banning or capping its usage, corporations have successfully lobbied governments in many developed countries (especially in the United States) to reduce government oversight and have instead advocated for self-regulation on their parts. However, this policy has largely failed, as the world's largest plastic producing companies (which includes multinational conglomerates such as PepsiCo and the Coca-Cola Company) have successively failed to meet their self-defined minimum targets for virgin plastic use (Kaufman, 2020). Other government mandates seek to reduce plastic consumption at the consumer level, such as China's successful ban on single-use plastic bags and bottles (BBC, 2020). Certain states of India, especially those in the Himalayan and the north-eastern region have significantly reduced the per capita usage of single-use plastics. Other states such as Tamil Nadu and Kerala have achieved some success in this field as well. Unfortunately, the national ban introduced in 2019 continues to be virtually ineffective in environmentally vulnerable regions including Delhi-NCR, Uttar Pradesh, and Bihar.

Increasing access to recycling facilities and promotion of RRR (reduce, reuse and recycle practices) have proven to be marginally beneficial. The impact of these policies is limited by the fact that only 10% of plastics in the world have ever been recycled (despite the prevalent and pervasive use of misleading recycling symbols) (Sullivan, 2020). The low rate of recyclability is one of the many challenges associated with recycling plastics, especially in comparison to paper and metals. Japan has been particularly successful in promoting the recycling of plastic waste. This is primarily owed to the technological innovations made by the country's scientists in their recycling processes, such as thermal recycling wherein the plastic waste is used as fuel in incineration, hence reducing oil consumption (and environmental pollution). Technological solutions to the global plastic waste problem are being pioneered by other nations as well, with Israel developing methods to extract plastic film from municipal waste to create common household commodities like buckets and stands (McCurry, 2018).

International Scenario

The international response to plastic waste management is mixed: while some nations have developed efficient systems of recycling plastic waste, others have taken a less sustainable approach. Japan has made significant improvements in plastic waste utilization over the past 3 decades. The waste utilization rate was 39% in 1996 and has shown a gradual increase since then -- amounting to 86% in 2017, according to data from Japan's Plastic Waste Management Institute (McCurry, 2018). This can be attributed to Japan using a multi-pronged approach which includes different recycling and incineration processes. Other Asian countries however dump high volumes of plastic waste into the ocean. Specifically, China, Indonesia, the Philippines, Thailand, and Vietnam dump more plastic in the sea than all other countries combined according to data published by the Ocean Conservancy (Leung, 2018). The Scientific American reported that China dumps 30% of all plastics in the ocean, followed by Indonesia, the Philippines, Vietnam, Sri Lanka, Thailand, Egypt, Malaysia, Nigeria, and Bangladesh (Dunham, 2019). In the United States, corporate lobbying has deterred recycling in many states, which has contributed to the persistent concentration of plastic pollution. The usage of the 'recycling' symbol on commodities that are usually not accepted by recycling facilities (because of the complexity of their components) poses another problem. Despite novel innovations in particular states, overall plastic recycling in the United States continues to be poor despite its economic development (Brock, 2020).

The ability of a country to recycle plastic, to a significant extent, depends on its economic development. Developed countries possess resources to research, develop, and implement efficient recycling technologies. Moreover, they are more likely to pass legislation that bans or deters the usage of plastics that are unsustainable and cannot be recycled using presently available technology. Different tax reforms in Europe have been established in order to discourage certain ways of managing plastic waste, and Canada has listed plastic officially as a 'toxic' substance to limit production and consumption of the material (North & Halden, 2013).

National Scenario

The nationwide ban on single-use plastics in India has been revised and has failed in achieving desired outcomes (Liz, 2019). The government has instead sought to make improvements through optics, an example of which is the Ministry of Drinking Water and Sanitation's request to various governmental departments to avoid the use of plastic bottles during governmental meetings. Whilst this central directive has been followed by many states including Bihar, Uttar Pradesh, and Kerala, plastic pollution rates in most of these areas have not improved because of the lack of grassroots initiatives and action on part of the government. More than state governments, local authorities have challenged the consumption of single-use plastics. Yet, while they have achieved some degree of progress in reducing plastic usage, improvements have not trickled down to all sections of society (IANS, 2019). Sikkim and Himachal Pradesh, which banned single-use plastics, stand as exceptions as their success in combating rampant plastic usage has been commendable. Despite existing economic challenges, India piloted a resolution for a global phase-out of single-use plastics by 2025 at the UN Environment Assembly in 2019 (Shah, 2021). The Union Environment Ministry on March 11, announced legislation titled the Plastic Waste Management (Amendment) Rules 2021, which proposes a wide variety of changes that aim to reduce plastic pollution, including a blanket ban on the usage of a list of plastic items. Previous bans passed over the past few decades by subsequent governments across party lines (including the party that is presently in government) have failed because of faults in the existing implementation landscape, which have been discussed extensively in this report. Structural implementation changes are key to ensuring that the latest legislation yields better results.

Prevalent Practices:

Resource Recovery

Extended Producer Responsibility

Extended Producer Responsibility uses an interdisciplinary approach to promote waste management through the supply chain of modern economies. According to this strategy, all environmental costs incurred through the product's life cycle should be added to its market price so that it reflects its true cost of production. Extended producer responsibility directly contributes to the decline of demand and supply for a product (because of its increased prices). One of the most effective ways producers counter this price increase is by innovating manufacturing processes and commodity features with the aim of minimizing the environmental impact of the commodity and the waste produced by it (Johnson & McCarthy, 2012). Introducing legislation surrounding extended producer responsibility can be a rare opportunity to hold corporations accountable for the vast levels of environmental and plastic pollution caused by them, especially in light of the historic failures associated with self-regulation (discussed above). Corporate greed has been one of the biggest reasons behind the increasing rates of plastic usage in a developing economy like India, as the usage of plastics leads to cost-cutting and higher profits (given its low cost of production and durability). Threatening that profit motive is considered an effective method of forcing corporations to innovate their commodities to the end of making them more sustainable.

Extended Producer Responsibility Systems shift the responsibility of managing waste from the government to private companies (Hanisch, 2000). Facilitating this program can be a challenge, given India's informal economy and the lack of oversight over corporate practices in the same. Employing third-party producer responsibility organizations has proven to be a functional solution as observed by the impact of the Packaging Recovery Organisation and Green Dot in Europe, and can be actualized in Delhi through decentralized grassroots level networks. To counter problems associated with take-backs and product monitoring, companies often choose to reduce costs of production by making commodities more sustainable. For example, a commodity that is biodegradable and recyclable will be cheaper than one that is not biodegradable and/or recyclable because of the higher environmental costs associated with managing the latter. Then there would be an emphasis on producing more durable commodities, and ones that use organic materials, to reduce the potential costs associated with setting up take-back and recycling systems. Therefore, this approach also contributes to entrepreneurship and innovation within the free market in addition to achieving positive environmental outcomes (Lindhqvist & Lidgren, 1990)

Recycling

Recycling plastic waste involves processes that use plastic waste as raw materials in the production of new commodities. The discourse surrounding the harms of plastic usage has promoted lifestyle and policy changes. Consumers have a clear preference for recyclable commodities, primarily because it takes away from the individual guilt associated with pollution. However, this symbolism is often used by companies to improve sales, even though only 10% of plastics in usage presently are recycled (Sullivan, 2020). Mechanical Recycling uses primary and secondary physical processes to convert plastic waste into products that resemble the original product in chemical composition but might have different physical properties (Mantia, 2022). Even though this process reduces the aggregate demand for fresh plastic in an economy, it continues to be unpopular because of the high energy requirements associated with it. Chemical recycling is used to manufacture fuels and composite chemicals from plastic waste. Chemical processes are used on plastic waste polymers to break them down into their composite chemicals, which are used in many different types of industries. Quaternary Recycling recovers energy from the waste through incineration (aerobic combustion at high temperatures) hence reducing the burden of greenhouse gases on the environment. Technological and financial constraints have prevented this policy from being implemented on a broad scale in India (Panda, et. al., 2009). Research conducted by Bhagat et. al., in 2017 suggests that recycling (followed by incineration) is the most sustainable and comprehensive method of tackling the waste management crisis in Delhi (Bhagat, et. al., 2017), primarily because of reduced air pollution and the generation of economic surplus. Mechanical plastic recycling, which shows promise in improving the waste management of Delhi can be directed towards producing end commodities in two ways

- **Upcycling:** Upcycling refers to the recycling of a commodity with the end goal of creating a product that is of greater value than the original product. Plastic has been used to construct roads in Indian cities like Jamshedpur, the overall economic value of which far exceeds the economic value of primary plastic products used to construct it (Srivastava, 2018). Upcycling can have an aesthetic value in addition to a utilitarian one, and as plastic waste components are beautified, their economic value sees a rise as well.
- **Downcycling:** In downcycling, the final commodity at the end of the recycling process is of much lesser value than the original commodity. Plastic bottles can be downcycled to generate fleece fibers which can eventually be used as a carpeting material and in plastic lumber products (Spacey, 2016).

Energy Production

- **Refuse Derived Fuel (RDF):** Refuse Derived Fuel refers to the fuel that is derived from municipal solid waste, industrial waste, or commercial waste (all of which contain high levels of plastics) (Williams, 1998). Through processing and preprocessing stages, waste can be repurposed into different types of fuels, a few of which have been recently standardized in Europe (CEN/343 ANAS). The waste mixture is first separated through a combination of processes including screening, air classification, ballistic separation, magnetic separation, and air knives to remove all non-combustible materials- particularly glass, ferrous substances, and light metals (Veils, et. al., 2010). The plastic component of this waste can then be used as a fuel in industrial processes, particularly cement. The German Cement Industry replaced 62% of its fossil fuel energy usage with refuse-derived fuel over a period of 30 years. Beyond its usage in cement, RDF can be fed into plasma arc gasification modules & pyrolysis plants. Moreover, its production can yield economic benefits through exports (stemming from RDF's value as a raw material in the cement industry).
- **Incineration:** Incineration can be defined as the process of combustion of waste to convert it into ash residue and gases. The energy content and the calorific value of polyethylene are similar to that of conventional fuel oil, which suggests that the incineration of plastics can reduce the dependence on fossil fuels and counter increasing greenhouse gas levels. Incineration is considered to be especially beneficial to local governments as it allows them to generate economic value from waste ((Bhagat, et. al., 2017). The lack of segregation and conversion facilities and the high investment costs associated with the same have driven down the possibility of implementing incineration at a large scale in India. However, its ability to reduce carbon dioxide emissions and the economic value it attributes to waste can still prompt its implementation in Indian cities (Agnihotri, 2014).
- **Gasification:** Gasification is defined as the conversion of carbonaceous materials into gases (primarily nitrogen, carbon monoxide, hydrogen, and carbon dioxide) by heating the feedstock material (in this case, the waste) to high temperatures (typically >700 °C), without combustion, and by regulating the presence of other gases (Giddey, et. al., 2012). Its implementation has been scarce, primarily due to environmental concerns associated with the gasifying of potentially toxic waste (GAIA, 2006).

Unscientific Disposal of Plastic Waste: Greenhouse Gas Emissions

Air pollution in Delhi has been a crucial cause for concern for the state and national government, with the rates of concentrated matter reaching the highest global levels in the months of October and November (Rosane, 2021). The population of Delhi is increasing at a progressive rate, which has put an alarming level of pressure on the waste management system of the region. The major landfills of Delhi- located in Bhalswa, Ghazipur, Okhla are operating with waste which is way beyond their capacity, crossing their limited height ceilings and contributing increasingly to greenhouse gas emissions (Kumar, 2013). The emissions of methane are particularly concerning, with research suggesting the need for urgent mitigation measures for emissions from landfills (Singh, et. al., 2016). Air pollution in Delhi has many contributors ranging from the agricultural practices in the neighboring states of Punjab and Haryana to the concentration of vehicular traffic in the region. However, research suggests that the smog of Delhi is highly concentrated in chloride, which is associated with the burning of plastics. Therefore, the practice of burning plastics in non-governmental, non-regulated small and medium level waste dumps is also responsible for higher pollution rates (Rosane, 2021). Solving the problems associated with the unscientific disposal of plastic waste in New Delhi is intrinsically linked to the governing challenges associated with the city in general. The dynamic socio-cultural environment, combined with the turbulent political climate (marked by both large-scale protests for national issues as well as an ongoing power struggle between the Central and State governments) has made the implementation and oversight of public policies particularly challenging. In addition to threatening the public health of Delhi-NCR, greenhouse gas generation resulting from the unscientific disposal of plastic waste has consequences at the local and national level, given the urgency of climate change.

Waste Segregation

Waste segregation is one of the most important aspects of waste management and plastic reduction because it acts as a precursor to all processes discussed above -- recycling, incineration, and gasification. Non-plastic waste cannot be used to generate fuels, produce cement or be subject to the same recycling processes that plastic waste. One of the key problems associated with waste management in India is the absence of adequate systems facilitating waste segregation in major urban and commercial hubs, including New Delhi (Sachdeva, 2019). Despite the importance of dealing with the present levels of plastic pollutants in the environment of New Delhi, the government has failed to address it through policy, instead opting to put more onus on individual households (Ghosh & Ravi, 2019). According to the directions of municipal corporations in New Delhi which stem from the directives of the National Green Tribunal, households must segregate their waste before it is deposited to the collectors. Whilst other states including Tamil Nadu have introduced similar policies with some level of efficacy, awareness and compliance in Delhi continues to be low. This has caused Delhi's municipal

corporations to perform poorly in national-level surveys, which have called for the establishment of new rules surrounding waste management.

Research suggests that the lack of social awareness at the local and community level (where waste is collected) is responsible for these gaps. The lack of waste sorting by individual households forms the basis for other waste management processes, which are widely rendered ineffective in New Delhi. Municipal Corporations were also found to be understaffed, which deters awareness creation and compliance at the community level (Singh, 2020). The state and local level governments have failed to set up incentives or punishments for households (which can also be attributed to the lack of manpower, skills, and financial resources allocated to waste management). Since waste is not adequately addressed (segregated and treated) landfills in Delhi (Bhalswa, Ghazipur, and Okhla dumpsites) are prone to be overfilled, which creates environmental and public health concerns for the surrounding localities, mostly inhabited by migrant and daily wage laborers, families belonging to 'backward castes', and other socio-economically marginalized groups. Despite repeated reports, fines, and directives from central agencies, waste segregation and management systems in Delhi operate at a lower than ideal capacity, contributing to plastic pollution that severely impacts the underprivileged (IANS, 2019).

Challenges:

To summarise, the main reasons why a plastic policy may fail includes:

- Alarming rate of production of plastic waste.
- Lack of social awareness at the local and community level (where waste is collected).
- The lack of waste sorting by individual households.
- Municipal Corporations found to be understaffed, which deters awareness creation and compliance at the community level.
- The state and local governments have failed to set up incentive or punishment schemes for households which reduces the propensity of people to take the extra initiative of sorting waste.
- The dynamic socio-cultural environment, combined with the turbulent political climate (marked by both large-scale protests for national issues in Delhi as well as the ongoing power struggle between the Central and State governments) have made the implementation and oversight of public policies particularly challenging.
- Absence of adequate systems facilitating waste segregation in major urban and commercial hubs.
- Corporate greed has been one of the biggest reasons behind the increasing rates of plastic usage in a developing economy like India as the usage of plastics leads to cost-cutting and higher profits (given its low cost of production and durability).
- Instead of introducing outright bans that could cripple certain vulnerable sections of the economy, a combination of regulation and incentive measures often leads to more beneficial outcomes when it comes to environmental policy. Banning has also proven to be ineffective as corporations have successfully lobbied governments in many nations.
- Self regulation is also ineffective as the world's largest multinational conglomerates have failed to meet self defined minimum targets for virgin plastic use.
- Usage of biodegradable plastics as an alternative would most likely fail due to a lack of required infrastructure.
- The low rate of recyclability is one of the many challenges associated with recycling plastics, especially in comparison to paper and metals. Facilitating recycling programs can be a challenge, given India's informal economy and the lack of oversight over corporate practices in the same.
- **Recycling**: Technological and financial constraints have prevented this policy from being implemented on a broad scale in India (Panda, et. al., 2009).
- **Incineration:** The lack of segregation and conversion facilities and the high investment costs associated with the same have driven down the possibility of implementing incineration at a large scale in India

Moving Towards Sustainable Plastic Waste Management

Plastic waste management in India, and particularly in Delhi has been looked at through a very narrow lens, which is the root cause of the many gaps in India's waste management policies. The government has sought to eliminate plastic altogether instead of managing it. In 2019, the Indian government announced a national-level ban on single-use plastics (IANS, 2019). This naturally caused an uproar in the billion-dollar plastic industry, which employs thousands of individuals and contributes immensely to the economy of India. Opposition and protests forced the government to shelf this policy, instead giving states the option to introduce such bans. Different states have done so with varying degrees of success and efficacy, with Delhi being one of the poorest performers. This process of 'plastic elimination' is also flawed because it does not address the high quantities of plastic waste that already exist in the ecosystem of Indian cities. Even after the central government shelved its mandate to ban plastic, it failed to institute alternative policies at the national level aimed at

sustainability. While the Delhi Government has been proactive in dealing with issues such as healthcare and education, it has failed to deal with the problem of plastic waste holistically. The findings of this paper allude to the diverse and complex methods, the combination of which is required to limit and manage the level of plastic waste created by modern society. Thus, instead of attempting to eliminate the problem through one rule (which is unrealistic and expensive), the Delhi government should instead make a holistic policy which includes investment in waste management technology and research, the implementation of awareness programs aimed at improving segregation and managing waste at the household and community level, and the maintenance of stricter vigilance and oversight over landfills.

India's developing economy often presents a trade-off between economic growth and environmental protection to policymakers. Plastic pollution is one classic example -- the cheapness and durability of plastic make it important for the Indian economy and yet, its unregulated usage has created immense challenges in environmental and public health. A sustainable waste management system must be cognizant of both financial and environmental sustainability, which means that it should cater to improving existing environmental conditions around plastic pollution in a manner that does not put undue strain on the economy.

To summarise, solutions to the unsuccessful plastic policy in Delhi include:

- Governments should regulate the production of different types of plastics through taxation and subsidy policies. Introducing a high landfill tax, which seeks to increase the cost of creating a landfill, will increase the cost of disposing of a plastic bottle in a landfill rather than the cost of recycling it.
- Municipal corporations in New Delhi should ensure that households segregate their waste before it is deposited to waste collectors. This can be done by refusing to collect unsegregated garbage/waste.
- Employing third-party 'producer responsibility organizations' in Delhi specifically through the use of decentralized grassroots level networks.
- An emphasis on producing more durable commodities and ones that use organic materials, to avoid the potential costs associated with setting up take-back and recycling systems.
- Setting up mechanical plastic recycling, which shows promise in improving waste management in Delhi and can be directed towards producing end commodities in two ways: upcycling and downcycling.

Compliance and Oversight:

- Reward instead of just punishment: Due to the lack of oversight of the policies it would be highly unlikely that all defaulters will be punished hence it is easier to give rewards as people would then make an effort to do the correct thing in hope of getting rewarded.

How citizens can be better prepared:

- Education about SWM should be integrated into schools at all levels in Delhi. Students starting from primary level have positive attitudes towards the environment, and are willing to contribute to curbing environmental issues, but due to a lack of practical education of teachers themselves they are unable to guide students to put SWM into practice. Hence to put this into effect, education is key. Initiatives like A-PLUS (Anti plastic union of students) started by a group of high school students in Delhi which aims to teach younger children about segregating waste at both at home and institutional level are a good way to educate students from a young age.
- Government programs like "Mann ki baat" can be broadcasted to talk about the different kinds of waste, how to segregate them and the reward for doing so in order to both educate and better prepare adults.

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