

# Study on the Importance of Waste Management to Environment

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## ABSTRACT

*Waste management includes the activities and actions required to manage waste from its inception to its final disposal. This includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process. Waste can be solid, liquid, or gas and each type has different methods of disposal and management. It deals with all types of waste, including industrial, biological and household. It is intended to reduce adverse effects of waste on human health and the environment.*

*Proper management of waste is important for building sustainable and livable cities, but it remains a challenge for many developing countries and cities. Effective waste management is quite expensive, usually comprising 20%–50% of municipal budgets. Operating this essential municipal service requires integrated systems that are efficient, sustainable, and socially supported. In view of this, the World Bank finances and advises on solid waste management projects using a diverse suite of products and services, including traditional loans, results-based financing, development policy financing, and technical advisory. World Bank-financed waste management projects usually address the entire lifecycle of waste right from the point of generation to collection and transportation, and finally treatment and disposal. A large portion of waste management practices deal with municipal solid waste (MSW) which is the bulk of the waste that is created by household, industrial, and commercial activity. It is an important element of environmental protection. Its purpose is to provide hygienic, efficient and economic solid waste storage, collection, transportation and treatment or disposal of waste without polluting the atmosphere, soil or water system.*

**KEYWORD-** waste, environment, health issues, waste disposal, recycle, reuse.

## INTRODUCTION

Waste management is defined as the regular collection, transportation as well as processing and disposal or recycling and monitoring of different types of waste materials. Human activities create waste, and it is the way these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health.

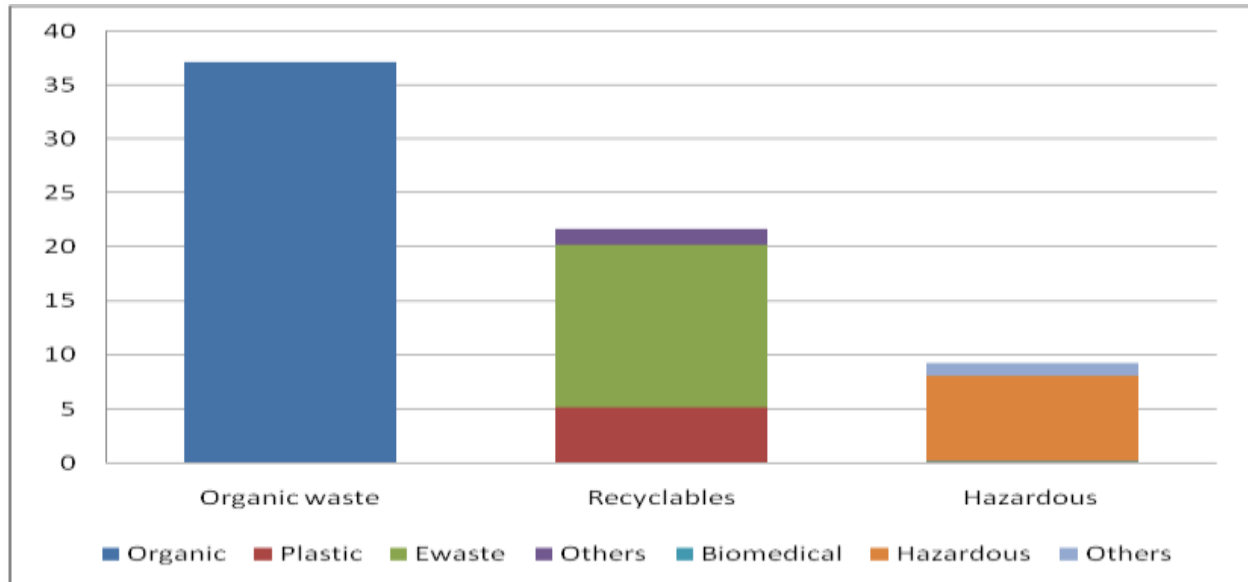
It is distinct practice from resource recovery which focus on delaying the rate of consumption of natural resources. All waste material, whether they are solid, liquid, gaseous or radioactive fall within the remit of waste management. waste management practices can differ for developed and developing nations ,for urban and rural areas, and for residential and institutional waste in metropolitan areas is usually the responsibility of local government authorities, while management for non -hazardous commercial and industrial waste is usually the responsibility of the generator subject to local, national or international controls.

There are eight major categories of waste management, and each of them can be divided into numerous sub-categories. The categories include source reduction and reuse, animal feeding, recycling, composting, fermentation, landfills, incineration, and land application.

### Types of waste

**Liquid Waste:** Liquid waste is commonly found both in households as well as in industries. This waste includes dirty water, organic liquids, wash water, waste detergents and even rainwater. Liquid waste can be classified into point

and non-point source waste. All manufactured liquid waste is classified as point source waste. On the other hand, natural liquid waste is classified as non-point source waste.



**Solid Rubbish:** Solid rubbish can include a variety of items found in household along with commercial and industrial locations.

Solid rubbish is commonly broken down into the following types:

- Plastic waste – This consists of bags, containers, jars, bottles and many other products that can be found in household. Plastic is not biodegradable, but many types of plastic can be recycled. Plastic should not be mix in with regular waste, it should be sorted and placed in recycling bin.
- Paper/card waste – This includes packaging materials, newspapers, cardboards and other products. Paper can easily be recycled and reused so make sure to place them in recycling bin.
- Tins and metals – This can be found in various forms throughout at home. Most metals can be recycled.
- Ceramics and glass – These items can easily be recycled.

**Organic Waste:** Organic waste is another common household. All food waste, garden waste, manure and rotten meat are classified as organic waste. Over time, organic waste is turned into manure by microorganisms. This in landfills causes the production of methane, so it must never be simply discarded with general waste.

**Recyclable Rubbish:** Recyclable rubbish includes all waste items that can be converted into products that can be used again. Solid items such as paper, metals, furniture and organic waste can all be recycled.

**Hazardous Waste:** Hazardous waste includes all types of rubbish that are flammable, toxic, corrosive and reactive.

### Various Methods of Waste Disposal

Although there are many methods of disposing of waste some of the most used methods about waste management are:

Landfill

In this process, the waste that cannot be reused or recycled are separated out and spread as a thin layer in low-lying areas across a city. A layer of soil is added after each layer of garbage. However, once this process is complete, the area is declared unfit for construction of buildings for the next 20 years. Instead, it can only be used as a playground or a park.



#### Incineration

Incineration is the process of controlled combustion of garbage to reduce it to incombustible matter such as ash and waste gas. The exhaust gases from this process may be toxic, hence it is treated before being released into the environment. This process reduces the volume of waste by 90 per cent and is considered as one of the most hygienic methods of waste disposal. In some cases, the heat generated is used to produce electricity. However, some consider this process, not quite environmentally friendly due to the generation of greenhouse gases such as carbon dioxide and carbon monoxide.

#### Waste Compaction

The waste materials such as cans and plastic bottles are compacted into blocks and sent for recycling. This process prevents the oxidation of metals and reduces airspace need, thus making transportation and positioning easy.

#### Biogas Generation

Biodegradable waste, such as food items, animal waste or organic industrial waste from food packaging industries are sent to bio-degradation plants. In bio-degradation plants, they are converted to biogas by degradation with the help of bacteria, fungi, or other microbes. Here, the organic matter serves as food for the micro-organisms. The degradation can happen aerobically (with oxygen) or anaerobically (without oxygen). Biogas is generated as a result of this process, which is used as fuel, and the residue is used as manure.

#### Composting

All organic materials decompose with time. Food scraps, yard waste, etc., make up for one of the major organic wastes we throw every day. The process of composting starts with these organic wastes being buried under layers of soil and then, are left to decay under the action of microorganisms such as bacteria and fungi.

This results in the formation of nutrient-rich manure. Also, this process ensures that the nutrients are replenished in the soil. Besides enriching the soil, composting also increases the water retention capacity. In agriculture, it is the best alternative to chemical fertilizers.

#### Vermicomposting

Vermicomposting is the process of using worms for the degradation of organic matter into nutrient-rich manure. Worms consume and digest the organic matter. The by-products of digestion which are excreted out by the worms make the soil nutrient-rich, thus enhancing the growth of bacteria and fungi. It is also far more effective than traditional composting.

### OBJECTIVES

To study the importance of waste management to the environment.

To protect the health and wellbeing of people by providing an affordable waste collection service.

To ensure the protection of the environment through effective waste management measures.

### ADVANTAGES OF WASTE MANAGEMENT

**This practice is highly lucrative:** There are only a few people who sincerely consider this as an industry into various facets of waste management like recycling and reusing and reap the benefits. Now many companies are looking forward to associating themselves with this industry and are ready for a long-term investment.

**Keeps the environment clean and fresh:** The greatest advantage of waste management is keeping the environment fresh and neat. These waste disposal units also make the people go disease-free as all the resultant wastes are properly disposed and taken care of.

**Saves the Earth and conserves energy:** This characteristic of waste management includes specifically the recycling aspect. As recycling of waste helps in reducing the cutting down of trees. This cutting of trees is mainly done to produce paper. Though the paperless office is the new trend that is practiced widely but with the help of recycling we can conserve energy and lower the consumption of earthly resources.

**Reduces environmental pollution:** Waste management if done in a proper manner not only eliminates the surrounding waste but also will reduce the intensity of the greenhouse gases like methane, carbon monoxide which is emitted from the wastes accumulated. The depth of the existing landfills and incineration will be curbed, thereby cutting down the harmful factors that affect the environment.

**Waste management help in earning money:** There are many companies which pay for waste. Right from old and used bottles to tin cans and e-wastes, all kinds of wastes are collected and paid. These wastes are then segregated according to the extent of pollution they cause to the environment and these wastes are recycled accordingly for various purposes.

**Creates employment:** In all the facets of waste management, a huge amount of labor is needed. Right from the collection to the final step of segregation, every phase needs manpower and ultimately a large number of employment opportunities get opened up.

## THE 5 R'S: REFUSE, REDUCE, REUSE, REPURPOSE, RECYCLE



Applying the 5 R's to business' waste management and recycling strategies can positively impact the outcome of program by significantly reducing the amount of waste the business generates. In the 5 R's hierarchy, recycling is treated as a last resort after attempting to refuse, reduce, reuse, or repurpose. Before disposing of waste, walk through each of these steps in the following order:

### STEP ONE: REFUSE

Refuse: the first element of the 5 R's hierarchy. Learn to refuse waste can take some practice, but incorporating this step into the business' strategy is the most effective way to minimize waste by talking to procurement team about refusing to buy wasteful or non-recyclable products. When working with vendors, refuse unnecessary product packaging and request reusable or returnable containers. Making smarter purchasing decisions and setting standards and expectations early in the process makes it easier for organizations to “refuse” waste in the first place.

### STEP TWO: REDUCE

Reduce the use of harmful, wasteful, and non-recyclable products. Reducing dependency on these kinds of products results in less waste materials ending up in landfill and the associated negative environmental impacts. We recommend always using the minimum amount required to avoid unnecessary waste. For example, when printing a document, print double-sided to cut your waste output in half.

### STEP THREE: REUSE

Single-use plastics have created a "throw-away" culture by normalizing consumer behavior of using materials once and then throwing them away. The rate at which we consume plastics has become unimaginable, and the plastic crisis has become one of the world's greatest environmental

challenges. In an effort to reduce waste, reuse items throughout the workplace instead of buying new ones. Begin by focusing on one area of business at a time, like the break room. Replace all of the single use eating utensils, Styrofoam cups, water bottles, and paper plates with compostable or reusable alternatives. Once you master one area, prioritize reuse for other products in the facility like packaging peanuts, printer cartridges, cardboard boxes, food containers, and rechargeable batteries.

#### **STEP FOUR: REPURPOSE**

For every item that cannot be refused, reduced, or reused, try repurposing it. Many people in the green community refer to this method as upcycling. We will surprise to learn how many common office products serve more than one purpose. Sometimes it requires using some creativity, but the possibilities are endless. For example, try using wasted printer paper for scrap paper, cardboard boxes for storing supplies, binder clips to hold power cords and chargers in place, and even mason jars, coffee mugs, and tin cans for holding pens and pencils.

#### **STEP FIVE: RECYCLE**

Last but definitely not least: recycle. Once gone through all the other R's, recycling is the most environmentally friendly waste disposal method. Most companies are surprised by the amount of waste they reduce by establishing an effective recycling program.

### **Challenges of waste Management in India**

Waste management rules in India are based on the principles of "sustainable development", "precaution" and "polluter pays". The increase in waste generation as a by-product of economic development has led to various subordinate legislations for regulating the manner of disposal and dealing with generated waste are made under the umbrella law of Environment Protection Act, 1986 (EPA). Specific forms of waste are the subject matter of separate rules and require separate compliances, mostly in the nature of authorizations, maintenance of records and adequate disposal mechanisms.

With rapid urbanization, the country is facing massive waste management challenge. Over 377 million urban people live in 7,935 towns and cities and generate 62 million tonnes of municipal solid waste per annum. Only 43 million tonnes (MT) of the waste is collected, 11.9 MT is treated, and 31 MT is dumped in landfill sites. Solid Waste Management (SWM) is one among the basic essential services provided by municipal authorities in the country to keep urban centers clean. However, almost all municipal authorities deposit solid waste at a dump yard within or outside the city haphazardly. Experts believe that India is following a flawed system of waste disposal and management.

A report by IIT Kanpur (2006) found the potential of recovering at least 15 per cent or 15,000 MT of waste generated every day in the country. This, the report said, could also provide employment opportunities to about 500,000 rag-pickers. The report added that despite immense potential in big cities in this area, participation from non-profits or community is limited. In some urban centres, people working in the informal sector collect solid waste for each doorstep to get a collection fee and derive additional income from sale of recyclables. The informal recycling industry plays a major role in waste management. It also ensures that less waste reaches landfills.

Iswar Ahluwalia, in an article, points out that more than three-fourth of solid waste management budget is allotted to collection and transportation, leaving leaves very little for processing or resource recovery and disposal. There has been technological advancement for processing, treatment and disposal of solid waste. Energy-from-waste is a crucial element of SWM because it reduces the volume of waste from disposal also helps in converting the waste

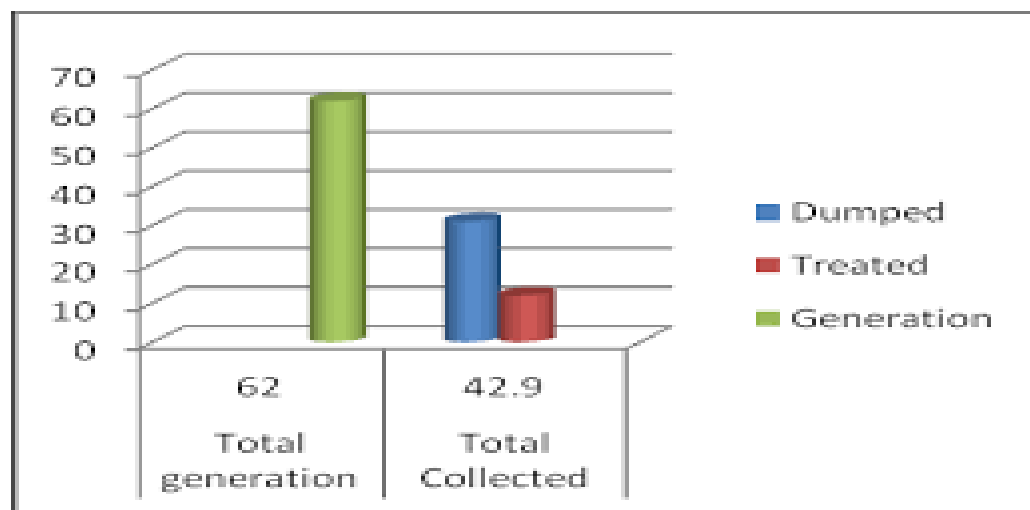
into renewable energy and organic manure. Ideally, it falls in the flow chart after segregation, collection, recycling and before getting to the land fill. But many wastes to energy plants in India are not operating to their full potential.

Installation of waste-to-compost and bio-methanation plants would reduce the load of landfill sites. The biodegradable component of India's solid waste is currently estimated at a little over 50 per cent. Bio-methanation is a solution for processing biodegradable waste which is also remains underexploited. It is believed that if we segregate biodegradable waste from the rest, it could reduce the challenges by half. E-waste components contain toxic materials and are non-biodegradable which present both occupational and environmental health threats including toxic smoke from recycling processes and leaching from e-waste in landfill into local water tables.

## FINDINGS

At present, around 62 million tonnes of solid waste is generated annually out of which 5.6 million tonnes is plastic waste, 0.17 million tonnes is biomedical waste, hazardous waste generation is 7.90 million tonnes per annum and 15 lakh tonne is e-waste. The per capita waste generation in Indian cities ranges from 200 grams to 600 grams per day. Shri Javadekar underlined the fact that 43 million TPA is collected, 11.9 million is treated and 31 million is dumped in landfill sites, which means that only about 75-80% of the municipal waste gets collected and only 22-28 % of this waste is processed and treated. "Waste generation will increase from 62 million tonnes to about 165 million tonnes in 2030", Shri Javadekar said.

The responsibility of generators has been introduced to segregate waste into three categories – Wet, Dry and Hazardous Waste. The generator will have to pay 'User Fee' to the waste collector and a 'Spot Fine' for littering and non-segregation, the quantum of which will be decided by the local bodies. The government is keen on the integration of ragpickers from the informal sector to the formal sector. The Environment Minister highlighted that in case of hilly areas, land for construction of sanitary landfills in the hilly areas will be identified in the plain areas, within 25 kilometers.



The waste processing facilities will have to be set up by all local bodies having 1 million or more population within two years. In case of census towns below 1 million population, setting up common, or stand-alone sanitary landfills by, or for all local bodies having 0.5 million or more population and for setting up common, or regional sanitary landfills by all local bodies and census towns under 0.5 million population will have to be completed in three years.

The Government has also constituted a Central Monitoring Committee under the chairmanship of Secretary, Ministry of Environment, Forest and Climate Change to monitor the overall implementation of the Rules.



The concept of common waste treatment facility (ENVIS Newsletter, December 2010) is being widely promoted and accepted as it uses waste as a resource by either using it as a co-fuel or co-raw material in manufacturing processes. This has led to rise of Public Private Partnership (PPP) models in waste management which has open doors for doing business in waste management. Bio-medical waste (management and handling) rules, 1998 prescribe that there should be a Common Biomedical Waste Treatment Facility (CBWTF) at every 150 kms in the country. CBWTFs have been set up and are functioning in cities and towns. However, establishment of functional CBWTF throughout the country must be ensured. Integrated common hazardous waste management facilities combine secured landfill facility, solidification/stabilization and incineration to treat hazardous wastes generated by various industrial units. They contribute about 97.8 per cent of total landfill waste and 88 per cent of total incinerable hazardous waste generated in the country, as per an environment ministry report.

### WASTE MANAGEMENT MARKET IN INDIA

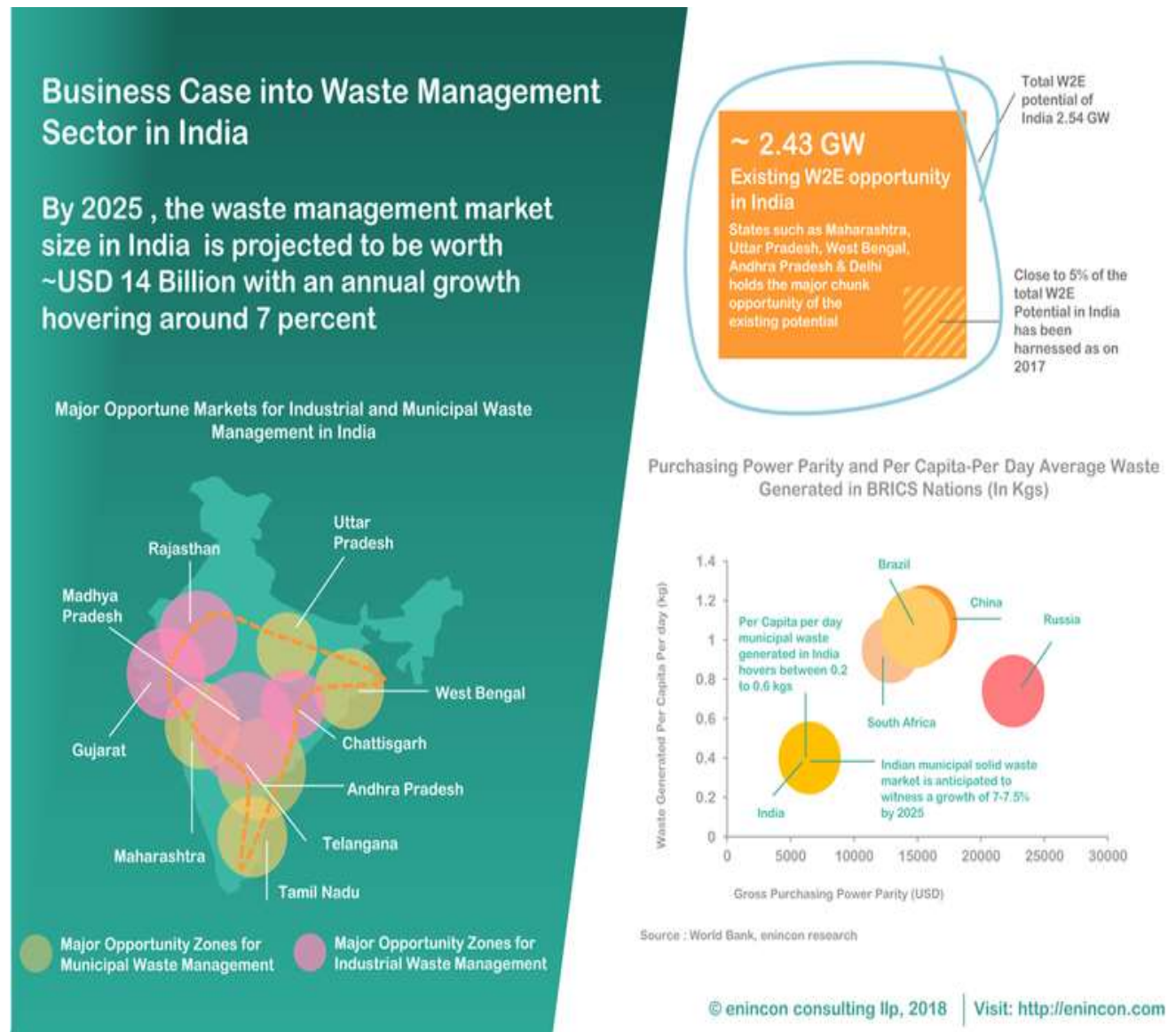
Waste management in India falls under the purview of the Union Ministry of Environment, Forests and Climate Change (MoEF&CC). In 2016, this ministry released the Solid Waste Management (SWM) Rules, these rules replaced the Municipal Solid Waste (Management and Handling) Rules, 2000 which had been in place for 16 years. This national policy is notable in that it has acknowledged and included the informal sector (waste pickers) into the waste management process for the first time.

Urban India (about 377 million people) generates 62 million tonnes of municipal solid waste (MSW) each year. Of this about 43 million tonnes (70%) is collected and 11.9 million tonnes (20%) is treated. About 31 million tonnes (50%) is dumped in landfill sites.

By 2025, the waste management market size in India is projected to be worth ~USD 15 Billion with annual growth around 7 percent. A growing economy, soaring urban population, rising living standards and increasing consumption



levels are common trends in emerging economies across the globe. With India flourishing on the same grounds, an increase in the purchasing power parity has led to more affordability, accessibility to resource use and a rapid surge in the waste volumes as well. Considering the current trend toward urbanization in India, the MSW quantum is expected to double the existing volumes within ten years. At approximately 80-85 MTs by 2030, this represents a business opportunity estimated at US\$20 Billion.



**CONCLUSION**

India, a country of 1.2 billion, is running the risk of drowning in all the waste it generates daily. India is among the top 10 countries in the world generating the highest amount of municipal solid waste, and the bigger problem is that approximately 70-75% of this waste remains untreated. This untreated waste of 31 million is mostly dumped into

landfills.

Major Indian metros like Mumbai, Delhi, Bengaluru, Kolkata and Chennai generate about 10 million tonnes of garbage every day. Mumbai and Delhi have 3 major landfills each and their biggest/main landfills, Deonar in Mumbai (90 years old) and Ghazipur in Delhi (33 years old) are functioning way beyond their lifespan. To deal with this crisis, the Swachh Bharat Abhiyan launched by Prime Minister in 2014, has set specific targets. For instance, all waste generators should segregate their waste at source, municipal bodies should provide solutions for dealing with segregated waste and create effective Solid Waste Management plants. In 2016, the Union Ministry of Environment, Forests and Climate Change came up with the new Solid Waste Management Rules (SWM). These rules are the sixth category of waste management rules and do not include plastic, e-waste, biomedical, hazardous and construction and demolition waste. These were last updated 16 years ago by the ministry.

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