

# Solid Waste Management: A Step Towards Sustainability

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## ABSTRACT:

All human activities invariably produce waste; nevertheless management of waste is overlooked and occurs as an afterthought. So far, waste management had not been considered as an integral component of our planning. The waste generated by any individual or organization needs to be disposed of in a responsible manner in order to protect our environment from pollution. The pollution results in posing risk to our existence as individuals and as a planet. Carelessly disposing of the waste has threatening consequences for our health and community wellbeing. Proper management of solid waste will have positive economic, social and environmental consequences. Unscientific handling of the waste in the form of landfills or dumping it in open has a negative impact on the entire ecosystem disturbing the natural food chain. Therefore, effective solid waste management is the need of the hour; it ought to be a proactive, pro-planet, people-centric approach in order to attain sustainability.

## KEYWORDS:

Solid Waste, Waste Management Hierarchy, Circular Economy, 3R's, Swachh Bharat Mission

## INTRODUCTION

Nature is superordinate to human beings. Harmony between the Nature and life thereon especially human beings is fundamentally important for lasting subsistence and wellbeing of both. The material progress made by human civilizations has been undoubtedly necessary but it has somewhere created an unwarranted imbalance in the delicate ecological space. The much applauded industrial revolution had led to speedy urbanization, gradual exhaustion of natural endowments, deforestation, more incidences of natural disasters, heightened levels of air, water and soil pollution as well as humungous piling up of solid waste, and the situation continues to worsen.

Waste, particularly solid waste, is referred to as a discarded material that has no consumption value for the one who casts it away. In the literal sense, solid waste means any solid matter that is lying in the "wrong place" implying that it is no longer of any use to its possessor and therefore, it has been discarded. For instance, a cardboard package is probably of little use to the owner; all the same, it may be a raw input for a paper factory. According to Sasikumar and Krishna (2009), "Solid waste is the term used to describe non-liquid waste materials arising from domestic, trade, commercial, agricultural and industrial activities, and from public services" (See Figure 1).

Generation of urban solid waste (or municipal waste) has been a concomitant of the rapid economic growth. Management of solid waste cannot be seen in isolation. It has to be considered in the context of broader environmental concerns including preservation of natural endowments and human capital; as well as (control of) environmental pollution. The nature and kind of waste generated is dependent upon the product offering being purchased; the time duration for which it is being utilized; the way it is being disposed of when it is no longer useful. Sustainable management of waste calls for continual, concerted efforts of all generators of waste, no matter how much quantity of waste they generate. So, the onus of urban solid waste management ought not be on the local government bodies alone; rather households, local communities, private organizations and non-governmental organizations should also shoulder this big (social) responsibility. The aspect of sustainability must be incorporated by them in the way resource endowments are being utilized by them, the pattern of consumption adopted by them as well as the choices with regard to management of solid waste exercised by them.

## LINEAR ECONOMY AND CIRCULAR ECONOMY

It may be pertinent to mention that so far the management of waste was overlooked because policy-makers, businesses and other stakeholders were endorsing what is referred to as *linear economy* wherein humans extract raw inputs from the planet, manufacture want-satisfying objects from them, and finally discard them as waste. Herein, the process flows a linear pattern i.e. “*Source → Unsegregated Waste → Collection → Landfills*”.

On the other hand, in the case of a *circular economy*, primarily the generation of waste is tried to be stopped. Herein, materials ne’er turn waste and Nature gets regenerated. Objects and materials continue to remain in circulation by way of actions like refusing, reusing, repairing, recycling, renewing, re-purposing, re-manufacturing, composting and restoring; “*Source → Segregated Waste → Collection → Secondary Sorting: Energy from Non-Recyclable Waste; Compost from Bio-Degradable Waste; New Products from Recyclable Waste*”. By disconnecting economic activity from the usage of limited resource endowments, it addresses the global issue of climate change as well as other globally immanent concerns such as ruining of biodiversity, overwhelming levels of waste and contamination of air and water. The novel idea of circular economy is potent enough to tackle many of the sustainability concerns as well as create local and empowering means of living, enhance the answerability of the producers and consumers, besides strengthening social cohesiveness. The beauty of this mighty proposition lies in the fact that it explicates the manner in which Nature manages its endowments and operates the world where every *finish* circles back into yet another *beginning*; where every species assumes an equally significant role to play and where all living beings are mutually dependent (saahas.org).



[Source: Jebaranjitham et al., 2022]

Figure 2 demonstrates the enormous time duration during which decomposition of some common waste material happens. It is a clarion call for humanity to be mindful of its consumption choices.

**Figure 2: Common Waste Items Decomposition Time**

Waste Items	Decomposition Time
Cigarette butts	18 months to 10 years
Plastic bags	10 – 1000 years
Tires	2000 years
Plastic bottles	450 years
Synthetic fabric	More than 100 years
Disposable diapers	500 years
Batteries	100 years
Clothes	6 months
Leather	50 years
Sanitary pads and tampons	25 years

[Adapted from: Jebaranjitham et al., 2022]

### THREE R'S OF WASTE MANAGEMENT: REDUCE, REUSE, RECYCLE

#### **Reduce**

As consumers we need to be mindful of our purchases and consumption. We need to restrict our demands based on 'needs' rather than 'wants'. Each person can contribute to address the problem of solid waste management by simply reducing his/her share of waste generation. We can reduce solid waste by consuming durable, high quality and reusable products in place of disposable or single use products. Buying local products also reduces waste generation as it saves on packaging required for long distance transportation of goods. Use of single use plastic may be reduced by carrying cloth bags to marketplaces. We can carry our own cutlery to picnic spots to avoid the usage of disposable plastic cups, plates etc. Besides reduction in goods and services consumption, efforts should also be made to conserve resources like water, electricity, energy, natural resources and save it for the future generations.

#### **Reuse**

Whatever is brought in the consumption cycle should be reused as many times as possible. Before dumping the items we should consider reusing or re-purposing them. There are items like containers, packaging material, bottles etc. which can be reused; for example rechargeable batteries, refill packs and the like. We may outgrow our clothes; they may be donated to the poor and needy. We must strive to find new uses of the products which seem to be useless to us and would be just thrown away.

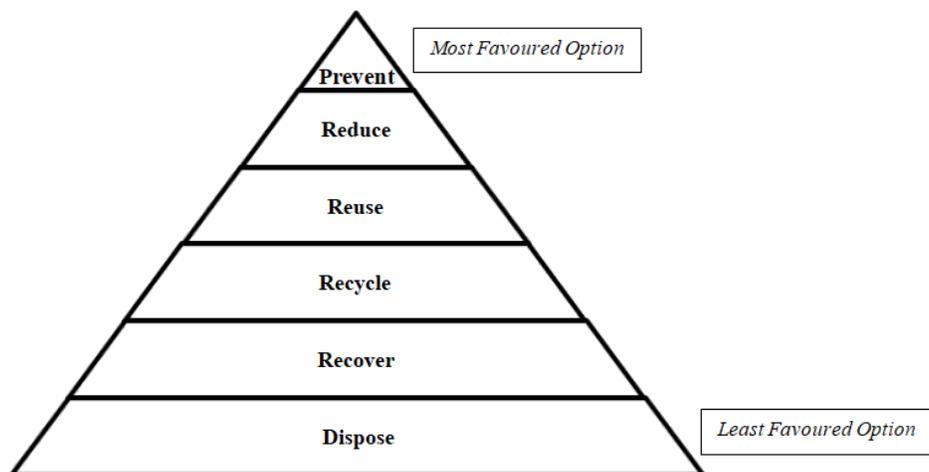
#### **Recycle**

It is a process of using the discarded products as raw material for other industries in their manufacturing process in place of virgin resources. This helps in making the product reach the manufacturing process thereby containing this waste from reaching the landfills. This not only reduces the load of the garbage but also saves the natural resources. Just as "penny saved is penny earned", likewise resources saved are like resource created. For instance, paper waste, cardboards, rubber, plastic waste, tin, iron, glass bottles and so on are collected by the scrap dealers and transferred to the recycling process. Even items like old clothes, furniture, and e-waste are collected by the scrap dealers. Recycling contributes to economic growth by generating industry which utilizes inputs in the form of recyclable material and corresponding employment opportunities are also created. It assists in preservation of natural resources and conservation of environment. We may have cleaner surroundings and environment as well as saving on energy among the main benefits of recycling. The collection of the material for recycling can be done in many ways. Companies have a buy back or exchange policy where they buy the old items from the customers when they buy new products. Drop-off centers are simple ways where containers are placed for households to leave the items not required in the respective containers at the collection centers. Municipality workers or NGOs also collect dry waste from the doorstep of households.

## THE WASTE MANAGEMENT HIERARCHY

“The Waste Management Hierarchy” is a conceptual model that grades the various methods of waste management from the most preferred to the least favoured, giving priority to prevention, reduction, reuse, recycling, and recovery over disposal of waste (See Figure 3). This strategy aids in mitigating the ecological effect of waste by promoting more sustainable actions.

Figure 3: The Waste Management Hierarchy



[Adapted from: Sasikumar and Krishna, 2009; Jebaranjitham et al., 2022]

The stages in this hierarchy are – *Prevent*: is the most favoured alternative that aims at altogether obviating the generation of waste by practising responsible, mindful consumption on the part of the consumers and manufacturing long-lasting products by embracing superior design practices, by the producers. *Reduce*: implies minimizing consumption so that the associated waste generation is also mitigated. *Reuse*: implies discovering newer ways of utilizing the products again in place of throwing them away; for instance, beverage and food containers, zip pouches, transportation packaging material may be used again. *Recycle*: or convert waste into new objects, minimize the requirement for virgin materials. *Recover*: implies obtaining resources or energy from waste matter through practices like composting organic waste or incinerating waste material for producing electricity. *Dispose*: is the least favoured alternative and the last resort after all other options have been explored; herein waste matter is transported to landfills or subjected to incineration sans energy recovery.

## SOLID WASTE MANAGEMENT TECHNIQUES

Some of the major solid waste management techniques practised in India, along with their relative merits and demerits (see Figure 4) are summarized below (Sharma et al., 2024):

- *Landfilling* implies disposing of solid waste in earmarked landfill locations.
- *Incineration of solid waste* is concerned with combusting solid waste at elevated levels of heat in presence of oxygen with the view to transforming it into ashes and gases.
- *Recycling of solid waste* is all about collecting, categorizing and processing waste matter into new objects.
- *Composting* implies breaking down organic solid waste matter into high-nutrient soil supplement that may be utilized to enrich the fertility of soil used for raising crops or vegetation.
- *Source reduction* implies preventing or minimizing generation of solid waste at source. It is implemented by creating better product design and environment-friendly packaging options that help reduce waste; urging consumer communities to repair and reutilize the objects; and encouraging them to adopt sustainable consumption practices.
- *Waste-To-Energy* implies utilizing heat produced by combusting solid waste to generate electricity.

Figure 4: Comparative Study of Waste Management Techniques Being Used in India

Waste Management Strategy	Merits	Demerits
Landfilling	Low cost; easy to implement; can accept a wide variety of waste	Takes up a large amount of space; can release pollutants and greenhouse gases into the air and water; can contaminate soil and groundwater
Incineration	Can generate energy and reduce the volume of waste; can destroy hazardous waste	Can release pollutants and greenhouse gases into the air and water; can be expensive to build and operate; can discourage waste reduction and recycling
Recycling	Can conserve natural resources; reduces energy use and greenhouse gas emissions; can generate economic benefits	Can be expensive to implement; can be difficult to separate and sort materials; requires a significant amount of energy and resources to transport and process materials
Composting	Can generate nutrient-rich soil; reduces volume of organic waste; can reduce greenhouse gas emissions	Can produce odours and attract pests; can be slow to break down certain materials; may require additional resources and equipment
Source Reduction	Can save resources and money; can reduce environmental impact of waste; can promote sustainability	May require behaviour changes and cultural shifts; may be difficult to implement on a large scale; may not be effective for all types of waste
Waste-To-Energy	Can generate energy and reduce the volume of waste; can help reduce reliance on fossil fuels	Can release pollutants and greenhouse gases into the air and water; can be expensive to build and operate; can discourage waste reduction and recycling; may not be consistent with waste reduction and recycling goals

[Source: Sharma et al., 2024]

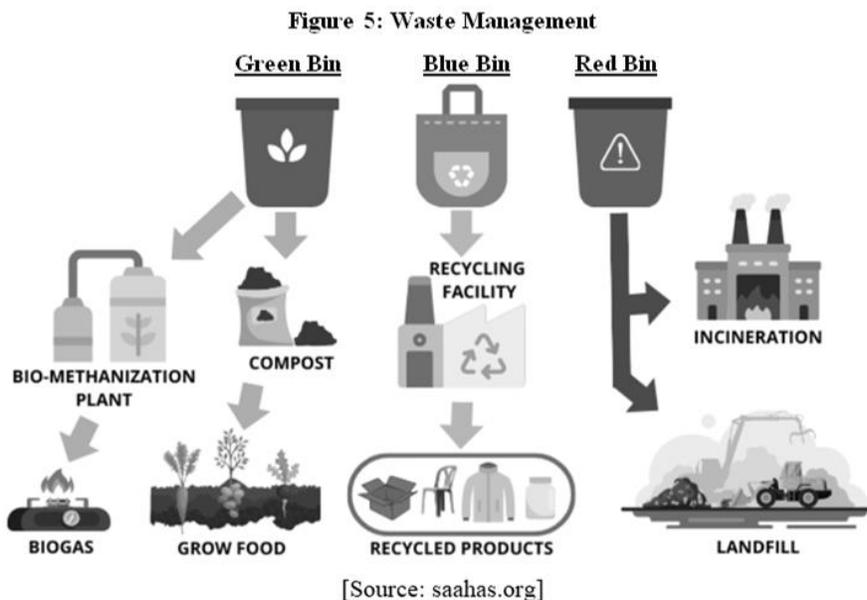
### KEY TO “ZERO-WASTE LIFESTYLE”

“Sustainable lifestyle” or “Zero-waste lifestyle” is attainable if we may imbibe some green lifestyle practices such as:

- Purchase upcycled products, for upcycling not only reduces the waste moving the landfills but also lowers the requirement of using virgin materials for production.
- Go in for repair of products wherever possible, for repair lengthens product life, lowers consumption and mitigates release of harmful carbon dioxide in the atmosphere.
- Purchase unpacked wherever convenient, for packaging normally constitutes sixty percent of total plastic used by weight.
- Re-utilize straws, for they are generally thrown away thus adding to the plastic litter that finally reaches lakes and rivers, hurting the aquatic beings.
- Segregate waste materials at the point of origin, for such practice may prevent up to ninety-five percent waste from landing up in landfill sites and dumping grounds.
- Carry one’s own water bottle when outdoor, for PET bottles exceedingly add to the existing plastic menace; moreover, one tree is axed to produce 2461 paper disposable containers/cups.
- Dine-in at restaurants rather than opting for takeaway, for eating hot eatables packaged in plastic boxes is extremely hazardous for one’s health, increasing vulnerabilities of indigestion, liver/kidney diseases and even life-threatening cancers.
- Choose environment-friendly gift-wrappers, for around fifty thousand trees are axed every year to produce gift wrapping paper that is utilized only once.
- Wet kitchen waste that is bio-degradable may be composted, for such practice may divert sixty percent of the total household waste from moving to landfills.
- Re-use decorative materials during festive times; for India is the fourth largest recycling economy globally; we may strive to emerge as the largest “reuser” of products.
- Borrow instead of purchasing fashion clothing to be worn on functions, for after automobile industry, it is the fashion business that creates maximum pollution (saahas.org).

## WASTE SEGREGATION AND MANAGEMENT

Each kind of solid waste matter has a distinct methodology of garbage disposal and management (See Figure 5). Hence, segregation of waste at source becomes necessary. Accordingly, households are urged to put their daily garbage in three distinct-coloured bins so that the waste matter may be appropriately treated. The *green bin* is meant for *bio-degradable (wet) waste* material (such as kitchen waste/garden waste) that may be composted; the *blue bin* is designed for *non-biodegradable (dry) waste* material (such as plastic, paper, metal, glass, wood, rubber) that may be recycled; while the *red bin* is intended for *domestic hazardous waste* material (such as sanitary pads, diapers, masks, bandages, syringes, old medicines, hair, cut nails, swept dust, sharp objects) that may be incinerated or sent to landfill.



Segregation of waste is imperative for it is far easier to separate the waste material at source; it provides a dignified living for ragpickers and waste workers; it is required by law; it minimizes dumping; it mitigates pollution markedly; it enhances the potential for recycling; it facilitates composting to help improve the fertile capacity of soil. By implementing the practice of segregating waste at source, as high as ninety percent of resources from the waste matter may be recovered; thus enabling a switching over from linear economy to circular economy (saahas.org).

## SPECIAL CATEGORIES OF SOLID WASTE

The categorization of solid waste (Jebaranjitham et al., 2022) has been depicted in Figure 1. Based on their nature, time taken for decomposition, and toxicity, these categories of waste may be further classified into “bio-degradable waste”, “non-biodegradable waste”, “hazardous waste” and “e-waste”. From amongst these, herein some of the major streams of solid waste are put forth:

“*Construction and demolition waste*”: refers to the materials (such as bricks, wood, metals, concrete, ceramic tiles, glass, plastic) discarded as unwanted or unusable from construction, repair, remodelling and demolition activities. Waste segregation at the point of origin enables seventy percent of the waste to be recycled while the remaining may be handled sans aggravating air and water contamination (saahas.org).

“*Bulky waste*”: includes solid waste discarded by households (such as books, furnishings, mattresses, carpets, toys, shoes) that may not be conveniently picked up by the daily garbage collection service providers of the municipality because of the weight, volume, size and shape of the waste.

“*Electronic waste*”: represents unwanted electronic gadgets (such as radio, television, computing devices, cell phones, refrigerators, washing machines, microwave ovens, electronic toys, electric kettles and electric toasters and so on); computing accessories such as CDs, pen drives; electrical wires/cables released during retrofitting; batteries, bulbs, watches, fluorescent lamps and so on. Globally, India has become 3<sup>rd</sup> largest generator of electronic waste after China and USA, contributing 3.8 MMT during the financial year 2024, with households generating seventy percent and businesses thirty percent (fortuneindia.com). Metal extraction for producing electronic items necessitates mining. Metal extraction and processing the same add to the menace of climate

change as mining results in large-scale deforestation, environmental pollution and emission of CO<sub>2</sub> in the air. If repairs and reuse becomes a part of consumption habits of households, the quantum of e-waste generation can be mitigated. If e-waste is handed over to authorized recyclers, then the proportion of e-waste being recycled can significantly improve from the present ten percent thereby ensuring recovery of metal that may be reutilized in making electronic products (saahas.org). Such practice shall cut down our carbon footprints as well as protect our planet from getting polluted.

*“Bio-medical waste”*: refers to any matter (such as sanitary napkins, diapers, cotton, bandages) that is fouled with blood or other bodily fluid.

*“Garden waste”*: such as dry leaves and twigs; small quantities may be added to biodegradable waste but if the quantity is considerable, then it may be separately delivered to the collection workers for utilizing the same in the composting unit.

### **STUBBLE: TROUBLE OR RESOURCE POTENTIAL**

Growing population and ensuing increase in demand for food consumption in developing countries has led to enormous rise in food production across the world. Uninterrupted rotational cultivation of paddy and wheat crop, intensive tillage, removal of crop residue, utilization of undue water as well as chemicals has led to environmental and ecological disequilibrium. Crop residue implies the crop remains left behind after the crop harvest. In earlier times, farmers used to cut the entire crop harvest with the reaping hook or sickle. After that the grains were segregated from the crop and the remaining stubble was used by them in their lives in various ways. In older days, when agriculture was the primary source of livelihood, then stubble was utilized in every house with careful consideration. First of all, it used to be the invaluable fodder for the cattle. The stubble was stored and given to cattle as fodder. Nowadays, it is put back in the farms as healthy manure to improve the fertility of soil.

Stubble was not only used as fodder for cattle but it was employed in the farmlands as well whereby the moisture of the soil was maintained. It used to work like natural organic manure for the crop. During winters, stubble was used in making pallet (mattress) to warm up cattle (cattle bedding) and rural homes. Stubble was also used in thatching the roof of rural houses. The handicraft items such as baskets, cots, ropes, coasters, mats (including table mats, foot mats) and so on made from weaving the stubble were a source of earnings for the farmers. At one point of time, stubble was considered as a precious resource. It was the symbol of prudence and self-reliance of our ancestors. Traditionally, we were not burning the stubble; therefore, we obtained clean environment. But today, what are we going to hand over to our future generations? It is nothing but polluted environment and new-found diseases.

Is stubble some problem? No, in fact, burning stubble is a grave problem. Stubble is a resource. One tonne (i.e. 1000 kilograms) of rice straw, is endowed with approximately 5.5 kilograms of nitrogen, 2.3 kilograms phosphorus pentoxide, 25 kilograms potassium oxide, 1.2 kilograms sulphur, 50% to 70% subtle nutrients absorbed by paddy and 400 kilograms of carbon (Meena et al., 2022); which is destroyed by burning the stubble generated from the rice crop. Besides this loss, some vital nutrients of the grains, some attributes of soil such as its temperature, pH, moisture, available phosphorus and carbonic elements are also considerably affected. By mixing the stubble back in soil, the fertile capacity of the soil improves. In addition, the expenditure on fertilizers is saved by Rupees 1500 to 2000 per hectare.

In the modern times, if we utilize the stubble in the right manner, then it can prove to be a boon for the environment as well as agriculture. Just as we derive benefit from the crop, likewise, we can also derive benefit from the stubble. The bales of hay made from machines can be transported to factories where a lot of products can be made out of it that are environment-friendly. There is a huge market for the stubble-based products. Today, through modern machines, organic disposable containers such as disposable bowls, plates etc are being manufactured. There is a huge demand for them in the market. Additionally, eco-friendly paper and thermocol is also prepared from stubble. This is bio-degradable, fire-resistant and decomposable. Stubble is also used as a packing material for packaging fresh fruits etc. Decorative objects used in homes are also made from stubble. In India, there is a huge market for handicraft items made from stubble. Bio-bricks are also built from stubble. The

temperature of houses made from such bio-bricks remains approximately 6 degrees lower than the outside temperature. Bio-brick also works as an insulator. Bio-gas is also generated from stubble. It can be used in rural areas for lighting and cooking. Organic fertilizers are also produced from it. Even mushrooms are grown on stubble which later on works as organic manure. Farmers can sell stubble and increase their income whereby their financial position may improve and no harm will be done to the environment. Now, the time has come that we select the right thing and convert stubble into a resource (Meena et al., 2022).

### **ECO-BRICK: A GREEN ANSWER TO THE PLASTIC MENACE**

There is a shift in the lifestyle of people because of excessive urbanization, industrialization and desire for material acquisitions. There is an increasing dependency on packaged foods that is generally purchased online. There is large amount of waste creation which ultimately gets shifted to landfills and water bodies. Its non-biodegradable characteristic eventually pollutes our surrounding air, water sources and soil.

An eco-brick is an initiative to save the environment and our beautiful planet Earth from the ill-effects of plastic waste. By creating eco-bricks, plastic is prevented from being thrown into the landfills or water bodies. Eco-bricks are made from single-use plastic bottles and non-recyclable plastic waste like single-use plastics (such as wrappers of biscuits and wafers, other grocery items) that are easily found in every household. These are made by manually compressing non-recyclable plastic into the plastic bottles. It is an effective solution to waste management that will reduce the plastic footprints of each individual.

Producing waste and garbage without understanding its ill effects and methods of disposing it of poses a threat to the health and safety of the humans, flora and fauna of the global economy. Eco-Bricks can be used creatively in decoration of our gardens and parks, for making furniture, for making boundaries of open areas, walls and even houses (See Figure 6).

**Figure 6: "Plastic waste becomes park furniture with eco-bricks"**



[Source: civilsocietyonline.com]

The consciousness and awareness are the starting point in the process of learning and adopting a concept. Eco-brick is a simple concept which if adopted can bring about a change in the behaviour of the people towards protecting the environment. There is a lot being done in the direction of sustainability and environment protection, but as an individual, be it a student, a homemaker, an office-going adult or a retired person, all can make eco-bricks and protect the environment.

### **SWACHH BHARAT MISSION**

“The evolution of sanitation in India is a rich tapestry woven with ancient wisdom and modern initiatives. From the Sindhu Valley civilization’s innovative toilet construction to contemporary nationwide movements, the journey reflects a commitment to improving public health and hygiene. Despite historical innovations, India grappled with sanitation challenges, particularly in rural areas, affecting millions. In 2014, only 39% sanitation coverage was achieved, impacting vulnerable demographics, notably women and children. Recognizing the urgency, various initiatives were launched to address this pressing issue” (swachhbharatmission.ddws.gov.in).

### Swachh Bharat Mission - Grameen (SBM): Phase I (2014 to 2019)

“Responding to the imperative for comprehensive sanitation coverage, the Swachh Bharat Mission was launched on October 2, 2014, with a focus on making India Open Defecation Free (ODF). This monumental endeavor mobilized millions, resulting in it becoming the largest mass movement and behavioral change programme in the world that led to the construction of over 100 million individual household toilets within five years, achieving 100% sanitation coverage by 2019. Over 6 lakh villages were declared as ODF by October 2019 marking a significant milestone, paying homage to Mahatma Gandhi on his 150th birth anniversary” (swachhbharatmission.ddws.gov.in).

### Swachh Bharat Mission - Grameen (SBM): Phase II (2020-21 to 2025-26)

“Having achieved the ODF status, SBM-G Phase II was launched with the objective of achieving *Sampoorn Swachhata*, i.e., sustaining the ODF status, managing solid and liquid waste, and visual cleanliness by 2024-25 and transforming all the villages from ODF to ODF Plus Model. The ODF Plus progress is being captured on SBM (G) MIS in following categories: *\*Aspiring*: The village which is sustaining its ODF status and has arrangements for Solid Waste Management *or* Liquid Waste Management. *\*Rising*: The village, which is sustaining its ODF status, and has arrangements for *both* Solid Waste Management *and* Liquid Waste Management. *\*Model*: The village which is sustaining its ODF status; has arrangements for both Solid Waste Management and Liquid Waste Management; observes visual cleanliness i.e. minimal litter, minimal stagnant wastewater and no plastic waste dump in public places and displays ODF Plus IEC messages” (swachhbharatmission.ddws.gov.in).

### Swachh Bharat Mission - Urban

“The Swachh Bharat Mission - Urban (SBM-U), was launched on 2nd October 2014 aimed at making urban India free from open defecation and achieving 100% scientific management of municipal solid waste in 4,041 statutory towns in the country. The second phase of SBM-U was launched on 1st October 2021, for a period of 5 years (till October 2026). The vision for SBM-U 2.0 is to achieve “Garbage Free” status for all cities by 2026 and institutionalizing ‘Swachh’ behavior amongst the citizens” (sbmurban.org). Figure 7 depicts the progress made by Swachh Bharat Mission - Urban till the end of 2024.

Figure 7: Swachh Bharat Mission-Urban Progress (till the end of 2024)



[Source: sbmurban.org]

### CONCLUSION

Solid waste is created by community, industry and government institutions; its sound management is the urgent need of the time. Solid waste management has assumed considerable significance because it has turned out to be a matter of global ecological and community health concern in the wake of industrialization, fast-paced urbanization and exponential population rise. Conventional techniques like dumping in landfills and open incinerations cause emission of harmful greenhouse gases, life-threatening pollution and fatal health risks. During the recent years, sound and effective solid waste management has been evolving with the emergence of modern techniques aligned with the tenets of sustainability. The simple and workable formula is to *reduce* the consumption of the product(s) what one can; if one cannot reduce, then *reuse* what one can; if one cannot reuse, then *recycle and compost* what one can; if one cannot recycle and compost, then *create energy* for generation of

electricity; if energy cannot be created, then the last option is to *dispose of* the solid waste in landfill sites. Solid waste management has become an imperative as it weaves the various facets of sustainability viz. clean and safe environment, health and wellbeing, resource conservation, responsible production and consumption, among others. Government initiatives, businesses' responsible practices as well as self-driven individual behavioural choices together can help combat the garbage ghost that has gripped our planet and its inhabitants. It is high time we all wake up and clean the mess created by us, for we have only "one earth", and we owe to the future generations a transfer of legacy of earth's vitality and vibrancy.

## BIBLIOGRAPHY

Jebaranjitham, J. N., Christyraj, J. D. S., Prasannan, A., Rajagopalan, K., Chelladurai, K. S., & Gnanaraja, J. K. J. S. (2022). Current scenario of solid waste management techniques and challenges in Covid-19–A review. *Heliyon*, 8(7).

Meena, H.N.; Singh, S.K.; Meena, M.S.; Narayan R. and Bheem Sen. (2022). Crop Residue: Waste or Wealth? Technical Bulletin 2022, published by ICAR- Agricultural Technology Application Research Institute, Zone-II, Jodhpur, Page No. 1 - 30.

Puri, V., Kumar, S., Grover, K., & Sharma, M. (2022, July). Development of Eco-Friendly Bricks for Sustainable Construction. In *IOP Conference Series: Materials Science and Engineering* (Vol. 1248, No. 1, p. 012109). IOP Publishing.

Sasikumar, K., & Krishna, S. G. (2009). *Solid waste management*. PHI Learning Pvt. Ltd.

Sharma, S. N., Dehalwar, K., & Singh, J. (2024). Emerging techniques of solid waste management for sustainable and safe living environment. In *Solid Waste Management: Advances and Trends to Tackle the SDGs* (pp. 29-51). Cham: Springer Nature Switzerland.

<https://www.civilsocietyonline.com/cities/plastic-waste-becomes-park-furniture-with-eco-bricks/> retrieved on 29/5/2025.

<https://www.fortuneindia.com/business-news/india-becomes-third-largest-e-waste-generator-as-tech-boom-fuels-surge/121182#:~:text=Formal%20E%2DWaste%20Recycling%20to,e%2Dwaste%20recyclers%20in%20India> retrieved on 29/5/2025.

<https://saahas.org/> retrieved on 22/4/2025.

[https://swachhbharatmission.ddws.gov.in/about\\_sbm](https://swachhbharatmission.ddws.gov.in/about_sbm) retrieved on 28/5/2025.

JNRID