

# RECYCLING SIGNIFICANCE OF WASTE MANAGEMENT

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**Abstract** - As a result of urbanization and rapid population growth solid waste generation is rising at a pace which makes it difficult to manage the waste produced. Risks of improper waste management has drawn great attention of public and policy makers and has forced them to come up with the new policies for dealing with accumulation of waste. Improper waste management has great impact on environment and public health hence one should follow proper measures and norms for waste disposal which has been suggested by the experts. Proper management of waste is important for building sustainable and livable environment, but it remains a challenge for many developing countries and cities. An appropriate technology that is environmentally friendly, socially acceptable, and economically accessible can fulfill the society demands of sustainable waste management.

This paper overviews the waste management along with the recycling of waste and the responses of the government to address various problems brought about by improper waste management. It also reviews the policies related to waste management including the latest the most comprehensive solid waste management policy in the country. It focuses on the implementation of these policies and the recent initiatives and activities to promote proper waste management and recycling. Using the experiences of some selected case studies, the potentials and benefits of recycling both has been addressed related to the waste management problems.

**Key Words:** Recycling, Urbanization, Sustainable Waste, Management, Policies, Environment Friendly

## 1. INTRODUCTION

Solid waste management (SWM) is a problem in both developed and developing nations around the world. People are consistently producing solid waste via their regular activities. As global population increases the generation of solid waste increases as well, particularly in cities. There were 2.9 billion urban residents in the world in 2000 and is anticipated to reach 5 billion 2030, that will cause a faster rate of solid waste production. Managing this enormous amount of waste effectively is very crucial. Poor solid waste management brings with it serious health and environmental problems. Piles of uncollected solid waste accumulated in open spaces and streets are major contributors to health problems and environmental degradation. These wastes generally add greatly to water pollution as when it rains, much of this waste ends up being

swept into water bodies with the surface runoff. According to the World Health Organization, more than five million deaths worldwide are caused each year by waterborne and water-related diseases (UN). In order to minimize risk to the environment and human health, solid waste must be properly managed, which includes proper storage, collection, transportation, treatment, and disposal. In industrialized nations, Workable regulations are now in place, and the justifications for waste collection and disposal are widely understood and accepted. The lack of land available for sanitary landfills is the other issue that developed nations must deal with. Since the landfill technique is very popular and widely used in developed countries to dispose of municipal solid waste, it requires a sizable operating area as well as the right technology to minimize environmental pollution. (kassim, 2012)

## 1.1 LITERATURE REVIEW

Sustainable waste management aims to reduce the amount of solid waste that is disposed of in the landfills or through incineration. Materials are kept in use for as long as possible. To help lessen the detrimental environmental, social, and economic effects of 21st-century consumption, a more thorough approach towards sustainable waste management must focus on the entire lifecycle of a product. This is because of the fact that in our current linear economy, waste production starts even before the products are manufactured. (Ariva Sugandi Permana a, 2015)

## 1.2 CONCEPT

Sustainable waste management aims to produce the least amount of waste while consuming fewer natural resources and reusing as many natural resources as possible. it is our responsibility to do sustainable waste management for the sake of both our environment and future generations. A successful sustainable waste management system should include feedback loops, put an emphasis on processes, demonstrate adaptability, and divert waste from disposal. The circular economy which involves sharing, leasing, reusing, refurbishing and recycling of existing material as long as possible is central idea of sustainable waste management which presents numerous opportunities and advantages for the economy, society, and environment. Collecting, classifying, treating, recycling, and, when properly facilitated, supplying an energy and resource source are all components of sustainable waste

management. As a result, it boosts waste management techniques, creates jobs, and reduces the negative effects of human activities on the environment, thereby enhancing the overall quality of the environment. Additionally, it lessens food wastage, avoids significant environmental costs, and shields people from some health issues, enhancing human life in general. (Kesri, 2021)

## 2 CASE STUDY OF INDORE

Indore is India's cleanest city and has been ranked one in swachh bharat mission. Approximately 2.17 million people called Indore City home as of the 2011 census, increasing roughly 47% from the previous year i.e. 2001 census data. Numerous thousands of tones' of municipal solid garbage is produced each day as a result of the city's rapid population increase, industrialization, urbanization, and economic expansion. The accumulation of Municipal solid waste in every nook and cranny is the result of poor collection and transportation. As more space is required for the final disposal of these solid wastes, disposal-related concerns have grown to be quite difficult. Due to the lack of facilities that can properly treat and dispose of the significant amount of MSW that is created every day, its management is currently in a critical phase. (etal, 2008) In Indore, MSW is typically disposed of in an open location without using enough precautions and quantifiable controls, which has made it the main contributor to environmental degradation and human health. (TASHMEER KHAN, 2016)

Municipal solid waste management activities involve the production, storage, collection, transfer, and disposal of solid waste. However, the MSWM system in Indore only includes the four tasks of waste production, collection, transportation, and disposal. For all actions involving the management of MSW, suitable infrastructure, upkeep, and upgrades are necessary. Planning, engineering, organization, administration, financial, and legal facets of activities related to production, storage, collection, transportation, processing, and disposal in an environmentally friendly manner are all included in MSW management, which also incorporates principles of economy, aesthetics, energy conservation, and opportunities. (Rajendrakumar kaushal) Landfills, incineration or combustion, recycling or recovery, gasification technology, composting, bioreactor landfills, and other techniques are utilized for solid waste management and can be used by municipal corporations for MSWM. A thorough analysis of the trend of the MSW components has been attempted in the current work. This study concludes with several recommendations like promoting 3R concept i.e. (reduce, reuse, recycle), composting organic waste, uses of gasification technology for the treatment of solid waste etc. that will help the MSWM authorities develop more effective and profitable approaches going forward. (PRATAP KUMAR SWAIN, 2017)

## 3 APPROACHES

There are six functional components can be used to categorise the practises involved in managing urban solid waste from the point of generation until its final disposal.

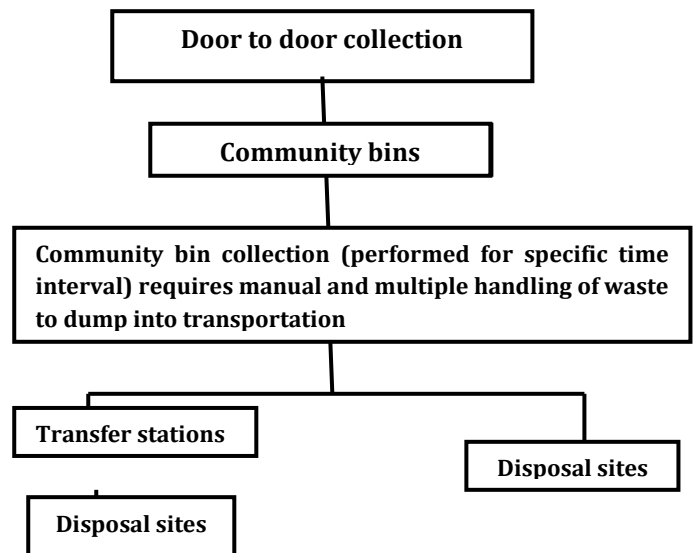


Chart-1: Waste collection

**Collection of waste:** Waste is collected from door to door using partitioned vans. Each tipper has three distinct collection bins for dry, moist, and home hazardous garbage. These tippers convey domestic rubbish to the transfer station, from which point hook loaders from the trenching site transport the waste. A GPS-enabled tracking system for routes is utilized to keep track of every vehicle employed in the collection and transportation system. (chaudhary, 2019)

**Process of Segregation:** In Indore, the waste is produced in a segregated structure. The waste generators are divided into three categories: household, semi-bulk, and bulk. Local generators are those who produce less than 25 kg of waste per day. Semi-bulk generators have been arranged for generators that produce 25-100 kg of waste per day. Bulk generators are waste generators that produce more than 50 kg of waste. Domestic generators produce waste in four separate structures: wet waste, dry waste, biomedical(diapers, sanitary pads, PPE kits, mask, hand gloves) and domestic hazardous waste. The waste is separated into wet and dry waste by the semi-bulk/bulk generators.

**Waste collection and transportation:** In a separate building just for household generators, partitioned tippers collect waste. These tippers have been split into proportions of 50:50, 60:40, or 85:15. These vehicles have separate chambers for collecting dry and wet garbage. Domestic hazardous garbage as well as biomedical waste are gathered in a separate bin that is attached to the tipper's back.

**Processing and Disposal:** Dry waste is offloaded at MRF locations, where it is further prepared and sorted, from both exchange stations and bulk collection vehicles. The bulk collection system and exchange stations' moist waste are trucked to the central composting facility for processing. The wet waste from the bulk generators is processed locally by individual generators. Residential hazardous garbage is handled in a different facility and delivered straight from the exchange station in biomedical vans. Hazardous trash is incinerated at the Central Biomedical Waste Treatment Facility.

**Treatment:** The method of treatment waste involves burning the organic material included in MSW. This process leaves behind ash and flue gases. Hazardous garbage, germs, poisons, and hospital waste products all benefit from incineration. Additionally, the waste is reduced by 80–85% in weight and 90–96% in volume. It's done in a piece of machinery called an incinerator. Per tonne of MSW, incineration may generate 2.3 MWh of electricity. It is a subpar alternative since the waste has a large proportion of organic material (40–60%) and a high proportion of inert material (30–50%), as well as low calorific value (800–1100 kcal/kg), high moisture content (40–60%) in MSW, and expensive setup and operating costs.

### Implementation of 3R Model in Indore City

When considering ways to save money, the three R's—reduce, reuse, and recycle come to mind. Waste avoidance, trash recovery, and recycling are the strategies of choice when it comes to waste management. The application of these methods will have numerous positive effects on the environment. They reduce or avoid greenhouse gas emissions, pollutant emissions, the need for waste management equipment and landfill capacity, as well as resource and energy conservation. It is advised that these methods be used and incorporated into the waste management strategy as a consequence.

The MoHUA is dedicated to promoting scientific SWM, particularly in households under quarantine. Sanitation personnel on the front lines are among the most vulnerable because of the nature of their employment. As a result, the MoHUA has published a number of recommendations and directives that states, local governments, and businesses that employ personnel for faecal waste management must follow. In the Central Advisory, there are three different sorts of boards.

- Standard Operating Procedure
- Specific measures for sanitation workers
- Availability of PPE kits/safety gears and disinfectants for sanitation workers

In addition to the broad categories, the MoHUA has issued advisories to help ULBs in the following areas:

- Special cleaning of public places
- Safe disposal of waste from quarantined households
- Safe disposal of masks and other related waste from quarantined households, and transportation without mixing with other household wastes.

No one method of managing solid waste is adequate for handling all types of materials and waste streams under all conditions. Local governments should work to develop a plan that takes into account the unique requirements and circumstances of their region. In response to this reality, the United States Environmental Protection Agency created a solid waste management hierarchy. This hierarchy places an emphasis on reducing, reusing, and recycling while providing a general ranking system for the different solid waste management strategies from most to least environmentally preferable. (Mata Jijabai girls P.G. College, 2021)

### 3. CONCLUSIONS

It goes without saying that sustainability cannot be treated as an afterthought in the process of managing solid waste. It must be integrated into the system's many parts and how they work together.

Encouraging the 3R idea can help achieve the same, which cuts back on consumption and gets rid of excessive GHG emissions.

Because it takes more energy to make a product with virgin resources than it does with recycled materials, recycling garbage helps reduce GHG emissions. Composting organic waste can help farmers replace chemical fertilizers by increasing the carbon content of the soil.

By restoring carbon to the soil, compost helps with carbon sequestration. Compost also has increased soil porosity, which decreases the need for tillage and increases soil's capacity to hold moisture. Maintaining timely waste collection, transportation, and disposal is crucial for zero waste.

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