



## Research Article

### SUSTAINABLE WASTE MANAGEMENT

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#### ABSTRACT

Waste management is viewed as part of a generation, collection and disposal system. A systems approach that reveals its relationship to other parts of the system is examined in the light of producing more sustainable practice. The move to a more sustainable society requires greater sophistication to manage waste. A traditional reductionist approach is unsustainable as it lacks flexibility and long term thinking. A sustainable waste management system incorporates feedback loops, is focused on processes, embodies adaptability and diverts wastes from disposal. Transitioning to a sustainable waste management system requires identification and application of leverage points which effect change.

**Keywords:** Sustainable, Waste management, Environmental conservation.

#### INTRODUCTION

Human activities create waste, and these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health. Rapid urbanization and industrialization in India have resulted in overstressing of urban infrastructure services, including municipal waste services. Civic bodies are facing considerable difficulties in providing adequate services, such as supply of water, electricity, roads, education and public sanitation, including MWM. The management of MSW is going through a critical phase due to the non availability of suitable facilities to treat and dispose of the increasingly large amount of MSW generated daily in metropolitan cities. The MSW amount is expected to increase significantly in the near future as the country strives to attain industrialized nation status by the year 2020. Major portion of the problem of solid waste management arises from urban areas of India. Unscientific disposal causes an adverse impact on all components of the environment and human health. To ensure better human health and safety, there is a need for effective SWM systems which should be both environmentally and economically sustainable. The present paper segregation, treatment, transportation and final disposal. Recommendations for achieving sustainable waste management are provided. Augmentation of SWM facilities and their operation and maintenance in a sustainable manner by the urban local bodies would not only require huge capital investment, but also introduction of latest and cost-effective technologies. These approaches can all be integrated in the four aspects covered in this paper. These aspects are technological, institutional and financial. Further, it has been mentioned in the present work that incorporation of GIS technologies can highly upgrade the technological aspects of sustainable SWM by using GIS as an effective tool for data storage and handling. Three waste management case scenarios were studied for year 2001-2051 by keeping weight age of sustainable development goals 2030 of India. Case I depicts Indian present scenario of waste management where 164-735 tonnes/year of wastes would be generated for year 2001-2051. Further, 60% of waste can be treated in case II that help in reducing the land requirement up to 40% from estimated conditions of 2031 i.e.,  $83.8 \times 10^7 \text{ m}^3$ .

The case III is most ideal waste management condition for year 2031 to reduce 80% waste hence landfill requirement would minimize up to  $16.76 \times 10^7 \text{ m}^3$  where population is at controlled conditions. This article concludes the formal handling and treatment of ISWM would minimize the land filling, where LCA can be an antidote to achieve sustainable development goals. Yash Pujara (2019).

#### REVIEW OF LITERATURE

2015 Namita Gupta and Rajiv Gupta undergone a study on Solid waste management and sustainable cities in India, evaluated that Urban India generates about 42 million tonnes of municipal solid waste per annum. By 2050, 50 per cent of the country's population is projected to be urban, and the amount of waste will increase substantially. The 12th Schedule of the Constitution of India makes it obligatory for municipal authorities to keep cities and towns clean. Given their wide range of responsibilities, however, dealing with waste in both practical and environmentally sound ways is one of their most significant challenges, and innovative solutions are called for. This paper presents research on solid waste management in the city of Chandigarh, well known in India for its achievements in this regard. It provides an overview of the situation, discussing the strategies adopted and the continued and emerging challenges in waste management, as well as suggesting measures for possible solutions. SWACHH Bharat Mission One of the important declaration in the development agenda of NDA government is that of Open Defecation Free India by 2019. The "Swachh Bharat Mission" (SBM) is a major initiative of the Ministry of Urban Development (MoUD), Government of India. It is launched on the occasion of the birth anniversary of Mahatma Gandhi on 2nd October, 2014. The Mission is a national campaign covering 4041 statutory towns to clean the streets, roads and infrastructure of the country. Solid waste management is one of the important components of the Mission. The national government has allocated of Rs.14,623 crore for the SBM for urban areas, of which Rs.7,366 crore is given for the SWM for five years i.e. 2014-2019. While addressing the components of SBM for urban areas, state governments and ULBs are expected to focus on a set of social priorities and outcomes that define the scope and complexity of the Mission. Sustainable Municipal Solid Waste Management in India: A Policy Agenda Shyamala Mani a., Satpal

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Singh b a Professor, (2016). Kumar and goel analysed waste management practice in kharagpur a small city in west Bengal and proposed integrated waste management plan. 45mt/d solid waste is collect by Municipal Corporation out of 95mt/d Most of this waste is dumped on open land and in natural and engineered drains, thus blocking the flow of storm water and contaminating groundwater. Other major problems include inappropriate bin locations and poorly designed community bins, collection vehicles that are in poor condition, inadequate labour for collection and transport of waste, and lack of waste treatment and disposal facilities. 12 samples are collect and tested and various parameters such as moisture content, total solids, fixed solids, organic carbon, volatile solids and calorific value are analyzed and revealed that Kharagpur has high moisture content and low calorific value, making aerobic composting the best treatment strategy. Composting can help to divert more than 80% of the total waste and will lead to enormous savings in costs of waste collection, transport and disposal. The remaining waste can be disposed off in an engineered landfill. Augmentation in labor and vehicle inventory has been proposed along with better treatment and disposal facilities.

## OBJECTIVES OF THE STUDY

- To find out the various sustainable waste management problems in several places.
- To achieve the effective waste management plan.

In December 2019, India has built 21,000 miles of roads using plastic waste. Till now, the country has almost 33,700 km of plastic roadways that means every 1 km road uses 1 million plastic bags.

It involves: a) collecting waste plastics, including plastic carry bags, cups, soft and hard foams, and laminated plastics; b) cleaning it by washing; c) shredding it to a uniform size; d) melting the waste plastics at 165 °C, and blending it with hot aggregates and bitumen and using this mixture to lay the road.

These roads are made from recycled plastics, and the first step in constructing them is to collect and manage the plastic material. The plastics involved in building these roads consist mainly of common post-consumer products such as product packaging. Some of the most common plastics used in packaging are polyethylene terephthalate (PET or PETE), polypropylene (PP), and high- and low-density polyethylene (HDPE and LDPE).<sup>[3][9]</sup> These materials are first sorted from plastic waste. After sorting, the material is cleaned, dried, and shredded. The shredded plastic is mixed and melted at around 170 °C.<sup>[10]</sup> Hot bitumen is then added and mixed with the melted plastic. After mixing the mixture is laid as one would with regular asphalt concrete. Chennai was among the first cities globally to adapt the technology in a big way when the municipality commissioned 1000 km of plastic roads in 2004



## Sustainable waste management

**Definition:** Sustainable management takes the concepts from sustainability and synthesizes them with the concepts of management. Sustainability has three branches: the environment, the needs of present and future generations, and the economy. Using these branches, it creates the ability of a system to thrive by maintaining economic viability and also nourishing the needs of the present and future generations by limiting resource depletion. From this definition, sustainable management has been created to be defined as the application of sustainable practices in the categories of businesses, agriculture, society, environment, and personal life by managing them in a way that will benefit current generations and future generations. Sustainable management is needed because it is an important part of the ability to successfully maintain the quality of life on our planet. Sustainable management can be applied to all aspects of our lives. For example, the practices of a business should be sustainable if they wish to stay in businesses, because if the business is unsustainable, then by the definition of sustainability they will cease to be able to be in competition. Communities are in a need of sustainable management, because if the community is to prosper, then the management must be sustainable. Forest and natural resources need to have sustainable management if they are to be able to be continually used by our generation and future generations. Our personal lives also need to be managed sustainably. This can be by making decisions that will help sustain our immediate surroundings and environment, or it can be by managing our emotional and physical well-being. Sustainable management can be applied to many things, as it can be applied as a literal and an abstract concept. Meaning, depending on what they are applied to the meaning of what it is can change.



## Principle of sustainable waste management

1. **Prevention of waste:** Prevention occurs at the product design and manufacturing phase, but it also aims to encourage consumers keep products for longer time and re-use them. This is a critical point as it strives to minimize waste before it is even generated by improving product design and packaging. Environmental NGOs across the globe believe this is a critical aspect of sustainable resource and waste management. Promoting waste prevention by using targets or other means could for example help reduce over packaging in supermarket goods, since household packaging waste makes up a substantial amount of overall household and municipal waste.
2. **Preparing for re-use:** This means different processes of checking, cleaning, repairing, refurbishing of whole items or spare

parts that have become waste but are made in a way that they can be re-used. According to recent estimates one third of all material arriving at recycling centers can still be re-used. For example, at least 25 percent of electronic waste still has significant re-use value. A lot more can be done to take advantage of the potential of re-use. For example, Spain is the only country that has a separate preparation for re-use target to incentivize operators to extract materials that have been collected as waste but are useful and do not need to undergo further treatment processes, such as recycling or energy recovery.

3. **Recycling:** This well-known waste management process involves turning waste into a new substance or product. Recycling can also include composting if it meets quality protocols. Despite that most of us have easy access to recycling, the sobering truth is that over 60 percent of waste that ends up in the trash could be recycled. One UK study also found that almost 40 percent of the packaging found in a typical shopping basket cannot be easily recycled.
4. **Material or energy recovery** Recovery includes processes of waste management such as anaerobic digestion, incineration with energy recovery, gasification or pyrolysis which produce energy (fuels, heat and power) and other materials from waste. When recycling is not possible, other types of recovery need to be looked into so that the material does not end up in landfill.
5. **Disposal:** The bottom tier of the EU's waste hierarchy for sustainable waste management, involves landfill and incineration without energy recovery. This is the least favorable option and our waste management systems need to move away from such practice. To achieve this, some environmental NGOs are arguing for a zero landfill target to be implemented as early as 2020. It is important to note that Europe has achieved a substantial progress in diverting waste from landfill in recent years: between 2004 and 2010, the EU Member States as well as Iceland and Norway reduced the amount of total waste deposited in landfills by 23 percent.

Traditional practices for dealing with waste management fall short in a number of ways:

- A. Effort is spent collecting and analysing immaterial data. For example, conducting annual surveys of household waste composition when waste management practices do not change.
- B. Interventions may be irreversible, rather than providing for mechanisms to deal with emerging correctable side effects. For example, when Auckland City (New Zealand) increased waste collection containers from 40 L to 240 L they did not anticipate the resultant increase in waste quantities and did not plan for it (Seadon and Boyle, 1999).
- C. Solutions are based around short-term goals rather than longer-term sustainability thinking. For example, reporting container recycling quantities while ignoring packaging reduction (e.g. the New Zealand Packaging Accord (Pack NZ, 2004)).
- D. Time lags between intervention and effects are underestimated, thus misinterpreting the perceived lack of response as a need to invoke stronger interventions resulting in overcorrection that then needs to be fixed. For example, the New Zealand Waste Strategy was reviewed for progress in 2004 (one year after it was instituted) and again in 2006 (MfE, 2009).
- E. Disregard or undervaluing the side effects of intervention. An example is the Auckland City waste collection containers mentioned above (Seadon and Boyle, 1999).

## CONCLUSION

Since India is developing country and have large resources of techniques and facilities but due to lack of awareness, political issues, lack of attention toward the duties which assign to the govt. officers, etc are some of the hurdles due to which India is not able to cope up in waste management as compared to other countries. If some effective measure can taken lots of things should be done for the growth and development of the society such as proper recycling of waste, making goods from waste by proper treatment, which rises employment for unemployed peoples. A part from these stringent laws should be passed in this regard for proper disposal and treatment of waste. No new plan of any residential, commercial area should be passed until and unless it has proper place for disposal and treatment of its waste. In India there is a strong case of private sector participation in this area and private sector can come with its expertise, technology, and capital, improved and efficiently managed service. Public participation is of paramount importance and can provide big results if seek properly.

## Recommendations

The idea of door-to-door (D2D) collection of garbage was not new for our Municipal Corporation. In the urban areas there are different types of residential areas like skyscrapers, slums, independent houses, bungalows, government colonies, etc. These categories have been grouped and suitable volunteers have been deployed for garbage collection. The volunteers should train and has to be orient about waste disposal. Every volunteer i.e. 'Swachata Doot', cover about 200 – 300 households everyday depending upon the category. All the volunteers should be provided with uniforms and safety kit, which includes hand gloves, face mask, cap, etc. To monitor the project implementation, one supervisor and coordinator has been appointed for every zone. Monitoring indicators have been set in consultation with the NGO, which have further ensured prompt implementation of the project, e.g. households covered, timely complainant redressal, regular and surprise filed visits, community feedback, etc. are monitored regularly. Regular D2D collection of garbage and active participation in the zero garbage drive will be the better and prompt service at minimum costs. The citizens should contribute to the scheme by whole-heartedly adopting the idea of waste disposal to volunteers only and making voluntary token monetary contribution towards the welfare of the volunteers.

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