

Waste Management Recommendations for Gadhinglaj Municipal council

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Abstract— Waste management is been a crucial environmental issue since the starting of 20th century. It has been seen that the generation increases with increasing population, industrialization & urbanization etc. The cities like Mumbai, Delhi, Bangalore, & Kolkata are facing problems in managing their waste, these examples tell us the need of solid waste in growing cities, therefore by keeping approach of prevention from future threats this work is executed. The growth ratio of city is very high; the present work evaluates all aspects of waste management & elaborates the situation & also highlights the deficiencies in the system. This paper contains some useful suggestions & recommendations for Gadhinglaj city which improves the waste management system in the city. The current waste management system is studied & some difficulties & problems are observed, such problems can be overcome if the suggestions are implemented well. As scope of work is very wide & available resources are less, there may be some limitations of work the depth of investigation can be increased in upcoming studies; there is good scope for betterment in the waste management system of the city.

Keywords— Waste Management, Gadhinglaj city, Recommendations, Segregation at source, SWM, Solid waste, Waste separation.

INTRODUCTION

Waste management is worldwide phenomenon, rising population, industrialization & urbanization are responsible to produce tremendous amount of waste. Today, the urban areas of Asia generate about 760,000 tons of municipal solid waste per day, which is equal to about 2.7 million m³ per day. In 2025, this amount will raise to 1.8 million tons of waste per day, which becomes 5.2 million M.cu per day. These estimates are conservative; the real values are probably double of this amount.^[2]

Local governments in Asia at present spend about US \$25 billion per year on waste management of urban area. This amount is used to collect more than 90 percent of the waste in high income countries & it is about 50 to 80 % in middle income countries, and only 30 to 60 percent for low income countries in 2025, Asian governments should look forward to spend at least double this amount on solid waste management activities.^[2]

Calculated value of solid waste generation by 300 million people from urban India is 38 million tons per year. The collection & disposal of municipal solid waste is one of the vital problems of urban life, which has assumed great significance in the recent past. With the rising urbanization as a result of intended economic growth and industrialization, problems are becoming delicate and there is need for immediate and rigorous action. The proper disposal of urban waste is not only totally necessary for the preservation and development of public health but it has a huge potential for resource recovery. It has estimated that around 1, 00,000 MT of Municipal Solid Waste is generated daily in the nation. The Per capita generation of waste from major cities is ranges from 0.20 Kg to 0.6 Kg. usually the efficiency of collection ranges between 70 to 90% in metropolitan cities while in several smaller cities it is below 50%. It is too estimated that the ULB's spend around Rs.500 to Rs.1500 per ton on solid management activities like storage, collection, disposal etc. About 60-70% of this amount is utilize for street sweeping of waste, 20 to 30% for transportation of waste and nearly less than 5% on final disposal of waste, which clearly shows us that there is very less attention is given to systematic and safe disposal of waste. The Landfill sites are not yet been recognized by many municipalities and in several municipalities, the landfill sites have been worn out and the respective local bodies don't have resources to acquire new land for land filling. Due to less availability of disposal sites, the collection efficiency also gets affected.^[8]

Though national data is not available, many urban areas have been studied by CPCB. If we consider some of major cities like Mumbai, Chennai, Bangalore, and Kolkata that producing 5320, 3036, 1669, 2653 Tonnes per day respectively.

Gadhinglaj is a city in the Kolhapur district in the south-west corner of Maharashtra, India. City is located on the banks of the river Hiranyakeshi. It is the Taluka (Tehsil) headquarters of Gadhinglaj Taluka and a subdivision headquarters of the Gadhinglaj Subdivision of the Kolhapur District. Gadhinglaj is governed by a municipal council. The main languages spoken are Marathi & Kannada, and a majority of its people in this area are Hindu. The rapidly growing city is the third largest in the Kolhapur District.

As Gadhinglaj is growing city from Kolhapur district, the waste generated from the city has specific character; the waste from the city is moreover organic one but it has contained some amount of recyclable inorganic part. The city generates about 5 MT of waste per day, which is significant amount. Presently the waste is dumped in to an open dump yard; the processes over there are not up to the

mark. So there is scope for betterment of waste management system. This paper provides some useful recommendations about the SWM system through the investigations. Hopefully this will be the guideline for the improvisation of waste management system in the city.

STUDY AREA

Gadhinglaj lies at (16° 10' N, 74° 20' E; p. 8,546) southwest corner of Maharashtra. It is a well known taluka place from Kolhapur district which is governed by municipal council over there. The total area is about 17.97 km². Because of availability of good education & medical facilities, the population of the city is constantly increasing; In addition to this Gadhinglaj serves as a good market place for surrounding villages in three taluka places i.e. Ajara, Chandgad, & Gadhinglaj



Fig No 01: Image showing location of study area in India.

MATERIAL & METHODS:

Methodology adopted for to get acquainted the existing scenario of waste generation and its management includes the following points;

- (1) Primary Data collection is done by field survey & lab testing's & secondary data is to be collected from appropriate sources like Municipal council & Web resources of government websites.
- (2) Identification of major sources of waste generation, based on the field survey and discussion with various stake holders.
- (3) Define characteristics of waste generated in the prime identified source as well as at the final disposal site.
- (4) Analysis of findings of the quantification and characterization of waste
- (5) Study of handling and management of waste from the generation point to the disposal.
- (6) Providing appropriate recommendations & technological solutions to the system.

After studying all aspect of waste management some simplified & easily applicable recommendations are provided in the paper to achieve betterment in the system.

RESULT & DISCUSSIONS:

Present S.W.M. Scenario in the city:

As Gadhinglaj is growing city from Kolhapur district, the waste generated from the city has specific character; the waste from the city is moreover organic one but it has contained some amount of recyclable inorganic part. The city generates about 5 MT of waste per day which is significant amount. All the waste management work carry out in city is done as per solid waste management and handling rules 2000. For the purpose of waste management the city has been divided in five zones and work is also divided accordingly.

Workers can do daily 3000sq, m cleaning of roads gutters. But as considering growth of the city this manpower is not enough. Therefore private contractors invited by bidding and nearly 268000 sq. m of area are cleaned by private contractors. House to house collection system is adopted for collection of waste. Presently there are few refuse vehicles & push carts are utilize for collection. Presently all the waste is stored at Gadhinglaj compost yard, Neharu nagar, the total area for storage is 2 acres, For Pedestrians 72 No of cement Dustbins are provided at certain places and 40 small dustbins are also placed at some places. The waste from these bins is

collected frequently. For disposal of solid waste the facility of land filling is provided at 1km distance from the city. Also the composting plant is situated at the same place, there is need to inspect working and efficiency of the plant.

Measures To Improve the System :

1. Segregation at source:

Enhancement measures should include effective strategies so as to organize the community and citizens towards synchronizing their system of waste storage at source with the primary collection of the wastes by the corporation and cooperate with the authority to preserve clean streets and neighborhood in particular and city in general. The local population shall be advised to keep two separate bins for the purposes of segregation of wastes at source and adopt appropriate mode of disposal of such wastes from the source.

Gadhinglaj council shall direct all the waste producers (households, institutions commercial establishments and floating population) not to throw any solid waste in their neighborhood, on the street, open spaces, or into drains by organizing public awareness program and addressing through leading local news papers. There shall be adequate provision made in public health rules to punish the violation at least to some extent like imposing fines in order to decrease the violations. Presently the process of segregation and storage of waste at source is generally absent. As a result of this, the main collection system has become adhoc and unsystematic. It is essential to promote the practice of segregation and storage of waste at source so as to facilitate an organized and hierarchical system of waste collection and disposal that will not let waste to reach the ground in the primary and secondary collection stages. The measures for such a system are:

- All premises should keep two separate bins/containers for biodegradable waste (green color) and Non-biodegradable waste (red color).
- Storage bins should be HDPE/FRP/metallic, with lid for the biodegradable waste. The size should be enough to hold the waste of a day with spare capacity to meet contingencies.
- Segregation has to be done at source to ensure recyclable fraction, to get better price.

A guideline for source storage requirements is presented in following Table. It is imperative to mention that bins for households to store waste in a segregated manner shall be provided only during the first year. Subsequent replacements/renewals shall be performed by the local body at the cost of the public

Table: 01 Recommended source storage requirements:

| Sr. No. | Generation Source. | Storage Facility. | |
|---------|---------------------------|---|---|
| | | Biodegradable (Green color dustbin with lid) | Non Biodegradable (Red color dustbin) |
| 1 | Household | Plastic / Fiber bins 10 liter capacity. | Plastic / Fiber bins 10 liter capacity. |
| 2 | Market stalls | 30 liter bin of HDPE | 30 liter bin of HDPE |
| 3 | Shop/offices/institutions | 30 liter bin of HDPE | 30 liter bin of HDPE |
| 4 | Hotels & restaurants | 50 liter bin of HDPE | 50 liter bin of HDPE |
| 5 | Wedding / community halls | 25 to 50 liter container of HDPE/LDPE- (depending upon volume of waste generated) | 25 to 50 liter container of HDPE/LDPE- (depending upon volume of waste generated) |
| 6 | Health care institutions | 10 liter bin for domestic waste. | 10 liter bin for domestic waste. |
| 7 | Garden waste | Store within premises & utilized for composting process | Store within premises. & handover to Municipal crew. |

2. Individual Households:

- To keep the food waste/ biodegradable as and when generated, in any type of domestic waste container, preferably with a cover.
- To keep dry/recyclable wastes preferably in bags or sacks for the collection by the trained rag pickers.
- To keep domestic hazardous waste separately, for disposal as arranged by the council.
- Following are the suggestive specifications for storage of wet wastes (food and biodegradable) at household level.
 - Preferably, a metal or plastic container with lid,

- A container of 10-litre capacity (0.010 cu. M, which can accommodate 7-8 kg) for a family of 5 members would be adequate,
- Household may keep larger containers or more than one container to store the waste produced in 24 hours having a spare capacity of 100% to meet unforeseen delay in clearance or unforeseen extra loads and
- Plastic carry bags may be supplied regularly to all households and commercial establishments to hold the bio degradable waste within the container to prevent unhygienic conditions during the door-to-door collection

3. Community / Group Households:

- Provision of community bin facility for apartment residents for storage of domestic wastes and encourage residents to deposit their domestic waste into the community bins.
- To provide separate community bin optionally for the recyclable wastes to be collected by the trained rag pickers.
- The Gadhinglaj council to issue notices to the existing private society/, flats/multistoried buildings, etc. and provision of such facility to be made mandatory for sanctioning building construction permits and completion certificates.

4. Slums and Old Areas of the City

- To place community bins of suitable size ranging from 30 to 50 litre capacity with adequate numbers (to accommodate 30-50 kg) at suitable locations to enable the public to deposit the waste.
- The location to be fixed in discussion with the slum dwellers to facilitate their cooperation and the Local Body shall identify such locations, which may be suitable to the slum dwellers and suitable for the local body to collect such waste.

5. Shops / Offices / Institutions:

- To keep hazardous waste separately, for disposal to be arranged by the council.
- Following are the suggestive specifications for storage of wastes:
 - ✓ Preferably, a metal or plastic container with lid,
 - ✓ A container of 30-litre capacity (0.03 cu. m to accommodate 15 kg) would be adequate,
 - ✓ The shops, offices and institutions may keep larger containers or more than one container to store the waste produced in 24 hours having a spare capacity to meet unforeseen delay in clearance or unforeseen extra loads and
 - ✓ Preferably wet wastes should not be disposed of in plastic carry bags.
- To keep the dry/recyclable wastes preferably in bags or sacks for the doorstep collection by the trained rag pickers. Alternatively, their association may make their own arrangements for collecting these wastes on 'no payment on either side basis.

6. Vegetable / Fruit / Meat / Fish Markets

- To provide 50 liters PVC containers for each market /stall on full cost recovery basis, leaving open shops & road side shops.
- The container should have appropriate handle on the top or side and rim at the bottom for ease of emptying.

7. Marriage Halls / Community Halls:

- 50 liters capacity PVC bins with lid and handles of adequate number in dining halls and kitchen.
- Dumper bins of adequate numbers shall be hired from Gadhinglaj council.

8. Hospitals / Nursing Homes / Health Care Centers / Laboratories

- Strictly avoid from throwing any bio-medical waste on the streets or open spaces, as well as into the municipal bins or domestic waste collection sites.
- To keep color-coded bins or bags as per the directions of the Government of India, Ministry of Environment, dated 20th July 1998 Biomedical Waste (Management & Handling) Rules, 1998, and follow the directions of CPCB and HPCB from time to time for the storage of biomedical waste including amputated limbs, tissues, solid bandages, used injections, syringes, etc.
- The storage of biomedical waste shall be done strictly in conformity with directions contained in the Government of India's aforesaid notification.
- To provide 10 litres capacity bins of green and red in each ward canteen
- 50 liters capacity green container with lid and handles in canteen and kitchen. Construction and Demolition Wastes

9. Directions to house hold

- They shall not throw any solid waste in their neighborhood, on the street, open spaces, and vacant plots or into drains.
- They shall
 - (a) Keep the food waste / bio-degradable as and when generated, in any type of domestic waste container, preferably with a cover, and
 - (b) Keep dry / recyclables wastes preferably in bags or sacks as shown in Fig.
- Use of a non-corrosive container with lid is advised for the storage of food/biodegradable/wet waste. A container of 15 liter (0.015 cu.mtr) capacity for a family of 5 members would ordinarily be adequate. However, a household may keep larger containers or more than one container to store the waste produced in 24 hours having a spare capacity of 100% to meet

unforeseen delay in clearance or unforeseen extra loads. Wet wastes should preferably not be disposed of in plastic carry bags.

- A private society, association of flats/multistoried buildings etc. shall provide a community bin i.e. a bin large enough to hold the waste generated by the members of their society/association for storage of wet domestic wastes and instruct all residents to deposit their domestic waste in this community bin to facilitate collection of such waste by the local body from the designated spot.
- In case of Multi Storied buildings where it may be difficult for the waste collector to collect recyclable waste from the doorstep, the association of such buildings may optionally keep one more community bin for storage of recyclable material.

In slums, where because of lack of access or due to narrow lanes, it is not found convenient to introduce house-to-house collection system, community bins of suitable sizes ranging from 40 to 100 litre (0.04 to 0.1 cu.mtr.) capacity may be placed at suitable locations by the local body to facilitate the storage of waste generated by them. They may be directed to put their waste into community bins before the hour of clearance each day.

10. Directions for shops and establishments

- They shall refrain from throwing their solid waste/ sweepings etc. on the footpaths, streets, and open spaces.
- They shall keep their waste on-site as and when generated in suitable containers until the time of doorstep collection.
- The size of the container should be adequate to hold the waste, they normally generate in 24 hours with 100% spare capacity to meet unforeseen delay in clearance or unanticipated extra loads.
- They shall keep hazardous waste listed under Para 9.3.3 separately as and when produced and disposed of as per directions given by the local ULB.
- The association of private commercial complexes/multi-storey buildings shall provide suitable liftable community bins which match with the waste collection and transportation system of the local body for the storage of waste by their members and direct them to transfer their waste into the community bin before the prescribed time on a day-to-day basis.
- The association should consult the local body in this matter in advance and finalize the type of bin and the location where such community bins shall be placed to facilitate easy collection of such waste

11. Directions to hotels and restaurants

- They shall refrain from throwing their dry and wet solid waste/sweepings on the footpath, streets, open spaces or drains.
- They shall also refrain from disposal of their waste into municipal street bins or containers.
- They shall store their waste on-site in sturdy containers of not more than 100 Liter (0.1 cu.m) capacity. The container should have appropriate handle or handles on the top or side and rim at the bottom for ease of emptying.
- In case of large hotels and restaurants where it may not be convenient to store waste in 100 liter or smaller size containers, they may keep larger containers which match with the primary collection and transportation system that may be introduced in the city by the urban local body, to avoid double handling of waste.
- They may be directed to keep hazardous waste separately as and when produced and dispose it off as per the directions of the urban local body.

12. Directions for Storing Vegetable/Fruit Markets Waste

These markets produce large volumes of solid waste and local bodies may

- direct the association of the market to provide large size containers which match with the transportation system of the local body or,
- Depending on the size of the market, local body itself may provide large size containers with lid or skips as illustrated below for storage of market waste at suitable locations within markets on full cost/partial cost recovery as deemed appropriate.

Shopkeepers may be directed that they shall not dispose of waste in front of their shops/establishments or anywhere on the streets or in open spaces and instead shall deposit their waste as and when generated into the large size container that may be provided for storage of waste in the market

Meat and Fish Markets

- The shopkeepers shall not throw any waste in front of their shops or on the streets or open spaces.
- They shall keep within their premises sturdy containers (of size not exceeding 100 liters i.e. 0.1 cu.m) having lid, handle on the top or on the sides and rim at the bottom of the container with adequate spare capacity to handle expected loads. However, slaughter house wastes should be handled as per the guidelines given in the chapter 5 on slaughterhouse waste.

13. Marriage Halls & Community Halls

A lot of waste is generated when marriage or social functions are performed at these places and unhygienic conditions are created. Suitable containers with lids which may match with the primary collection or transportation system of local bodies should be provided by these establishments at their cost and the sites of their placement should be finalized in consultation with urban local bodies to facilitate easy collection of waste. On-site bio-digesters for food waste should be encouraged.

Hospitals/Nursing Homes/Pathological Laboratories/Health Care Centers etc.

These may be directed that,

- They shall desist from throwing any bio-medical waste on the streets or open spaces, as well as into municipal dust bins.
- They shall also prevent from throwing any ordinary solid waste on footpaths, streets or open spaces.
- They are obligatory to store waste in color-coded bins or bags as per the directions of the Govt. of India, Ministry of Environment Bio-medical

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CONCLUSION

Currently waste management is burning environmental issue over a world The urban centers producing huge amount of waste daily which ultimately dumped on open dumping yards if this is been continued & if proper measures are not taken with this then it will raise even more dangerous issues in upcoming days. With context to the case in Gadhinglaj, the city is at its growing stage & population is rising fast. So from the point of view of waste management we should provide firm & solid implementation for improvement. In this paper the attempt was made to provide some feasible recommendations which are quite suitable & applicable to the municipal council.

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