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# A Systematic Approach Towards Public Health and Sanitation for a Suburban Area – A Case Study of Dhayari, Pune

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***Abstract:*** **The total quantity of solid waste generated in the Pune city (Pune Municipal Corporation) is estimated to be around 1500 Tonnes Per Day (TPD) in which Dhayari contributes to 25 TPD excluding the area under Dhayari Gram Panchayat. In absence of appropriate systems, inadequate institutional arrangement and poor financial health of urban local bodies, suburbs are following rudimentary methods of waste disposal creating problem to the public health and environmental sanitation. In present study, a comprehensive review of the characteristics, generation, collection, transportation, treatment and disposal of Municipal Solid Waste (MSW) practiced in Dhayari is reviewed. The urban agglomeration is also one of the concerns that should be considered in MSW management capacity of the respective city. In the present case study, the solid waste management system for Dhayari is mainly concentrated in the study which eventually affects the public health and sanitation of the area.**

***Key words: MSW, PMC, MSWM system, Dhayari, TPD, etc.***

## I. INTRODUCTION:

### 1.1 Present scenario of solid waste management in Pune:

The Pune city generates the waste at a rate of 0.12 kg/c/day. The last 5 years' waste generation and expenditure for solid waste management is as shown in fig.1.1.

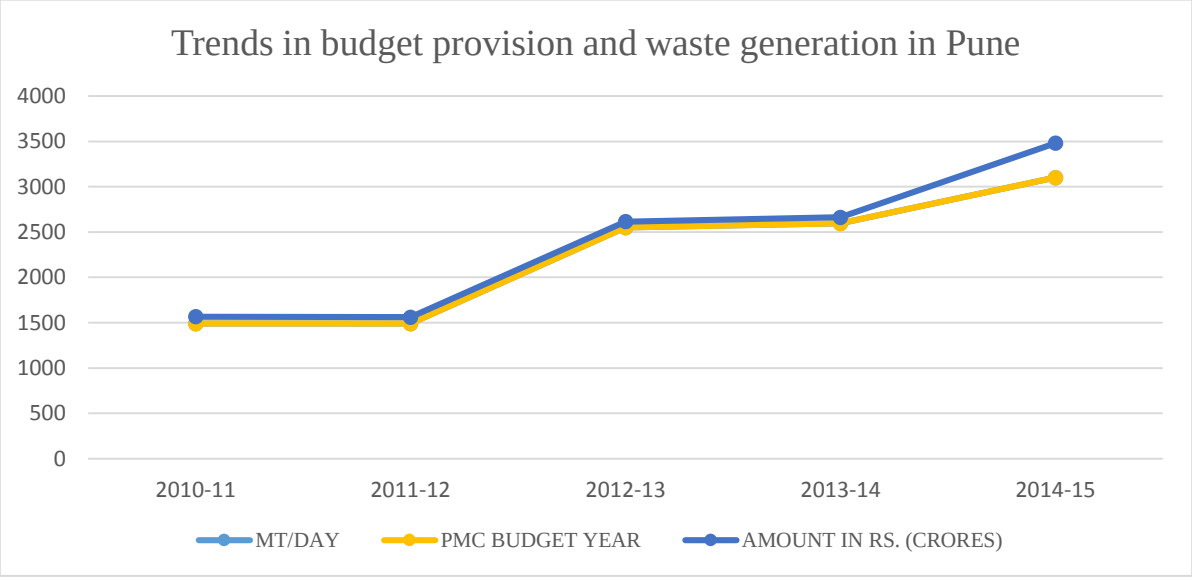


Fig.1.1: Trends in budget provision and waste generation in Pune.

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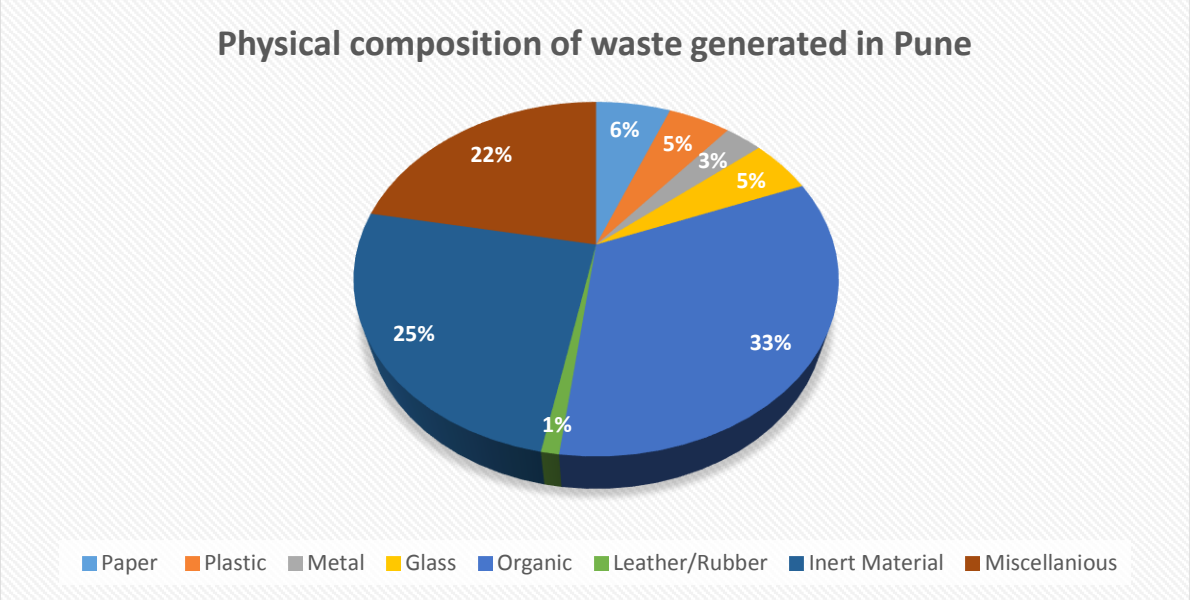


Fig.1.2: Physical composition of waste generated in Pune.

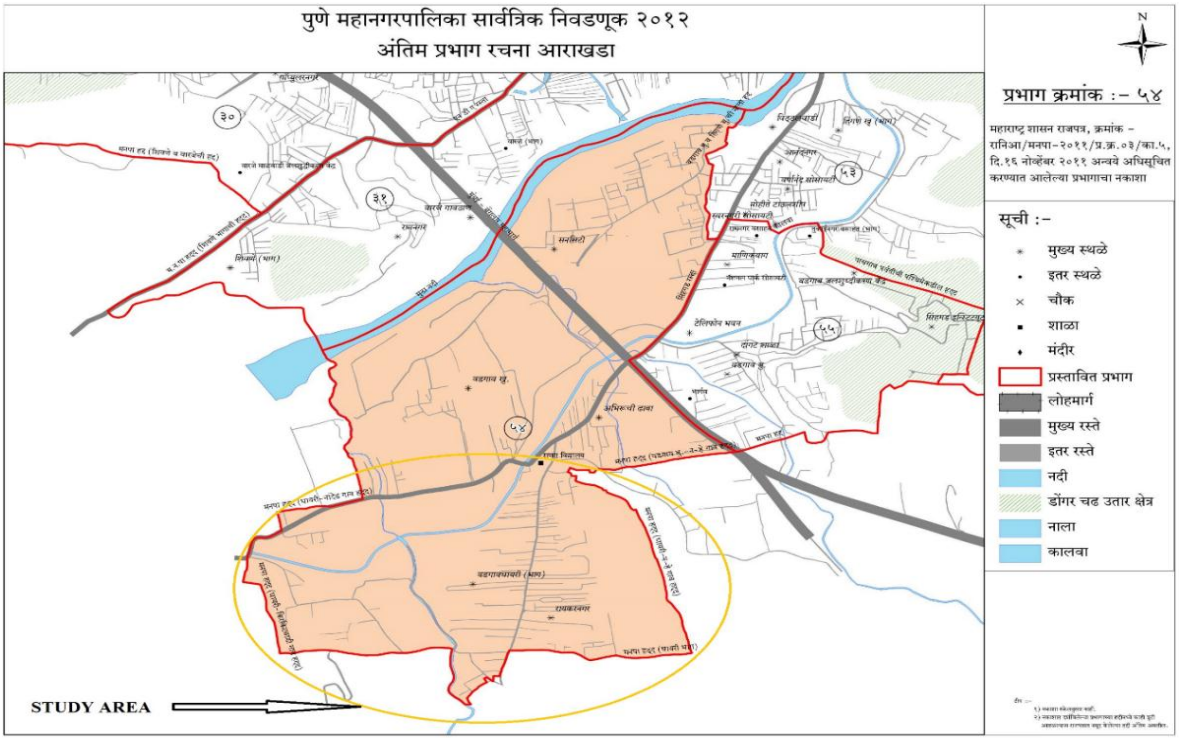


Fig 1.3: Study Area- Dhayari, Pune.

The fig.1.1 illustrates that the expenditure allocated for solid waste management of the city increase with respect to time; whereas it should decrease. The physical composition is as shown in fig.1.2.

*1.2 Study area:*

Dhayari is a suburb of Pune, Maharashtra, India. It is approximately 13 kilometers from Pune. It is a part of ward no. 54, PMC. The fig. given below shows the study area, i.e. Dhayari.

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Table 1.1: The collected data about the study area

| Sr. No. | Particulars | Details |
|---|---|---|
| 1. | Name of Village | Dhayari |
| 2. | Area (hectare) | 1241 |
| 3. | Census population (2011) | 44,678 |
| 4. | Projected population (2021) | 56,936 |
| 5. | Geographical features | Altitude- 560 m above MSL<br>Latitude-18˚26'44"N<br>Longitude- 73˚48'38"E |
| 6. | Climatic features | Annual average rainfall - 722 mm |

The suitability of the study area is discussed as follows:
1)The economic development of Dhayari is faster than Pune city.
2)It is connected to Sinhgad road, Sinhgad fort, DSK Vishwa (residential society), Bangalore-Pune expressway.
3)The Khadakwasala canal passes by the village.
4)It is a naturally self-sufficient village and its industrial growth rate is higher.

## II. METHODOLOGY:

*2.1 Waste generation:*

The generation and classification of waste is as shown in tables below:

Table no. 2.1: Generation of biodegradable waste.

| BIODEGRADABLE WASTE | | |
|---|---|---|
| | | |
| VEHICLE NO. | 28 | 89 |
| DAY | QUANTITY | |
| Thursday | 2910 | 3015 |
| Friday | 3460 | 3625 |
| Saturday | 3360 | 3875 |
| Monday | 4575 | 5010 |
| Tuesday | 4055 | 4995 |
| Wednesday | 3300 | 4100 |
| Thursday | 3700 | 3895 |
| Total | 25360 | 28515 |
| Average | 3625 | 4075 |
| Total average generation | 7700 kg/day | |

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Table no. 2.2: Generation of dry waste.

| DRY WASTE | |
|---|---|
| VEHICLE NO. 587 | |
| DAY | QUANTITY |
| Thursday | 4010 |
| Friday | 8375 |
| Saturday | 4945 |
| Monday | 5735 |
| Tuesday | 7200 |
| Wednesday | 4945 |
| Thursday | 4450 |
| Total | 39660 |
| Average | 5666 |
| Total average generation | 5666 kg/day |

Table no. 2.3: Generation of mixed waste.

| MIXED WASTE | |
|---|---|
| VEHICLE NO. | 216 |
| LOCATION | QUANTITY |
| S.T.D. | 1460 |
| S.T.D. | 1800 |
| S.T.D. | 1870 |
| Savitri Garden (DSK road) | 1550 |
| Mandai | 2120 |
| Mandai | 2230 |
| Total | 39660 |
| Average | 5666 |
| Total average generation | 11030kg/day |

Thus, total per day generation is calculated as follows:
Total waste = (Biodegradable + Dry +Mixed)
= (5666 + 7700 + 11030)
= 24396 ≈ 24400 kg/ day
= 20-25 tonnes / day (collected by corporation only)
Per capita generation of waste can be calculated as:
Per capita generation = (25000/44678) *1000
= 0.56 kg/capita/day

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*2.2 Waste collection:*

Table no. 2.4 Details of collection timings of vehicles

| VEHICLE | TIMING | FREQUENCY |
|---|---|---|
| 28(PMC) | 8:00 am-10:00 am | Once a day |
| 89(PMC) | 9:00 am-11:00 am | Once a day |
| 587(PMC) | 9.00 am-1.00 pm | Once a day |
| TATA 407 dumper placer(PMC) | 10.00am-4.00 pm | Thrice a day |
| Tractor(DGP) | - | - |
| TATA Ace hopper (DGP) | - | - |

*2.3 Waste treatment & Disposal:*

The total waste generated in the Pune city goes under the various treatments at various places. The table given below illustrates the processing techniques used for the treatment of the waste which is estimated to be around 2000 TPD.

Table no.2.5: Waste processing plants used for the disposal of waste in Pune.

| Name of Operator | Capacity | Output |
|---|---|---|
| Hanjer Biotech-Urali Devachi | 1000 TPD | Composting, RDF |
| Disha Waste Management | 100 TPD | Vermi-composting |
| Ajinkya Biofert | 200 TPD | Vermi-composting |
| Rochem | 700 TPD | Electricity (10 MW) |
| Biogas and compost | 100 TPD | Electricity and Compost |

## III. RESULTS AND DISCUSSION:

The overall scenario of the solid waste management of the case study can be shown in a tabular form as follows:

Table no.3.1: Overall scenario of solid waste management in Dhayari, Pune.

| Areas of Waste Management | Responsible Agency |
|---|---|
| Door to door collection | Private |
| Street sweeping | PMC |
| Drain cleaning | PMC |
| Primary collection | Private |
| Secondary collection | PMC |
| Waste transportation | PMC |
| Waste treatment | PMC+Private |
| Waste disposal | Private |

The above table shows the participation of private sector in the solid waste management for the study area – Dhayari. The overall coverage of the service of waste collection is not 100 percent. The status of solid waste management needs to be improved considerably in the area under Gram Panchayat.

## IV. CONCLUSION:

One of the areas that need immediate and urgent attention is the disposal of waste. The waste collected by Dhayari Gram Panchayat being dumped crudely, the quality of environment is deteriorating rapidly. Landfill sites need to be identified and developed on a priority basis and waste treatment facilities (e.g. composting) need to be developed on scientific lines. Decentralization of waste management, wherever possible, should be resorted to in order to reduce the quantity of waste that needs to be transported and also the land requirement for waste treatment. Waste segregation at source and recycling of waste should be encouraged. Waste reduction and recycling should be promoted at the household and neighborhood level.

Since there is no separate account maintained for solid waste management, it is difficult to assess the financial condition of the service and suggest improvements. At the same time, new sources of revenue in solid waste management such as fine for littering, user charges for bulk waste generators and other commercial establishments, user charges for domestic

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waste collection (door-to-door) and levying of tipping fees should be considered by local governments for improving revenue from this service. The following recommendations can be considered for the improvement of the waste management system:

[1] Three 'R's of solid waste management i.e. reduce, reuse and recycle must be adopted by all urban centers. This will help in reducing the quantum of solid waste that the local governments have to deal with.

[2] Crude/open dumping of waste must be completely discouraged by engaging in controlled tipping.

[3] Landfill sites should be identified that are usable. In order to reduce the quantity of waste that goes to landfill sites, waste treatment such as neighborhood composting and recycling of waste must be encouraged.

[4] Plans to improve cost recovery from this service must be made by every local government. New sources of revenue generation must be thought of.

[5] People's participation must be encouraged to keep cities clean and Non-Government Organizations must be used to do information, education and communication work in communities.

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