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Assessment of Solid Waste Management: A Case Study of Rourkela

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Abstract: ***Solid waste, which is a consequence of day to day activity of human kind, needs to be managed properly. Rourkela city, like any other cities also face problem. This study concerns about analysis of the city current municipal solid waste management problem, collection and existing method. The information was collected through survey and secondary sources. The study discovered that there is low performance of solid waste management in the city mainly due to lack of knowledge about waste separation and awareness, community participation, ill dumping manner (often around residence and any open space) and lack of community bins. Finally, the study forwarded some important recommendations towards improving the waste management practices.***

Keywords: Solid waste management, collection, Disposal, Transportation, Development

I. INTRODUCTION

1) Since the dawn of the civilization humans are generating solid waste. During the earlier period solid waste were generated conveniently and dumped randomly due to lack of knowledge about the impact it has on environment and also due to availability of large open land.
2) However, in this modern time due to rapid urbanization, growth in population the necessity for the Solid Waste Management (SWM) is the need of the hour. Not only the SWM but also the assessment of SWM is equally or even it is of more significance.
3) Assessment of Solid Waste Management involves evaluating the entire Waste Management System to ensure its efficiency, sustainability and environmental impact.
4) This assessment focus primarily on various aspects of solid waste generation including waste generation, collection, transportation, disposal and recycling. It also helps us to identify areas for improvement, implement effective strategies and work towards a more environment friendly waste management system.

Need of the study: With the Rapid growth in city due to increased chance of employment along with the increase in population has been a concerning factor for the waste materials being generated. Due to change in lifestyle in addition to the exposure to outside world has become so easy that it has not only lead to increase of solid waste but also the growing of solid waste had negative impact on environment (human, water, land, air and many more). The study and assessment of solid waste management are essential for several reasons, as they contribute to the development and implementation of effective waste management strategies. So the assessments provide a foundation layer for informed decision making and also will be helpful in the development of effective waste management policies and practices.

Benefits: Identify possible waste and forecast their quantities, so that the governing bodies can properly plan for the future years. Knowing what are the selected treatment, storage or disposal facility. Determining how waste should be handled, packed, labelled and transport by selected criteria.

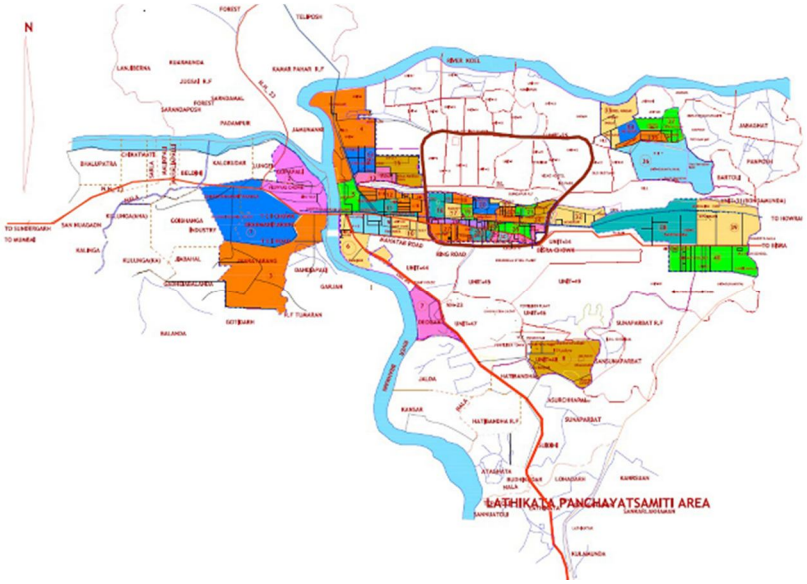
II. LITERATURE REVIEW

Solid Waste Management may be defined as the discipline associated with the control of generation, collection, storage, transfer and transport, processing and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics and other environmental considerations. Solid waste management can be transformed into opportunity by proper segregation of waste, and maximizing resource recovery and recycling as amply demonstrated by many cities, industries and other stakeholders concerned with the management of waste.

1) Sources and types of municipal solid waste: In order to categorize what exactly municipal solid waste constitutes, there have been different attempts of categorization based on numerous classification criteria are source from which solid waste emanates and nature of solid waste components. On the basis of the nature of the nature of items that constitute solid waste, it can be classified into organic or inorganic, combustible or non-combustible.

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2) Study Area: Rourkela is a city located at 84.54E longitude and 22.12N latitude in the Sundergarh district of Odisha at an elevation of about 219 meters above mean sea level. The area of Rourkela is 200 square kilometres approximately.



Map 1.1 Location map of study area

- The current estimate population of Rourkela city in 2024 is 3,85,000.
- The last census was conducted in 2011 and the schedule census for Rourkela city in 2021 was postponed due to Covid. The current estimates of Rourkela city are based on past growth rate.
- As per provisional reports of Census India, population of Rourkela in 2011 is 272,721.
- Population projection is one of the most efficient ways by which the future population can be determined and the services which would be required to cater the needs of the future population can be estimated.

III. METHODOLOGY

The aim of the study is to comprehensively assess the current state of solid waste management process in Rourkela along with its core aspects.

According to the aim the objectives were:

1) To study the current practice of solid waste management on various aspects including generation, collection, transportation, disposal and recycling

2) To identify major source of solid waste in the municipality and their approaches of management

3) To Assess the current problems faced by the waste management system and their impact on the surrounding

4) Studying the best practice of municipal solid waste management system and to suggest the framework for the management.

5) The study is based on both quantitative and qualitative data from primary and secondary sources. To understand the solid waste characteristics, collection system, treatment processes, disposal and other management issues. The profiling was based on the primary information collected during survey and interviews with Rourkela municipal corporation office staff, wealth centre and person who are involved directly or indirectly in solid waste management to get information about waste. The information was supplemented with observation visits to the ward and other site to understand the various issue regarding collection, transportation and disposal of municipal waste.

IV. RESULT AND DISCUSSION

Present scenario of solid waste management at Rourkela. Total Area of Rourkela is 200 sq.km with 40 wards. Solid waste generation from household, commercial, hospital etc. Are been collected by the collector then transport to the wealth centre after the separation and processing of solid waste. RMC (Rourkela municipal corporation) to provide directly or through contract for public cleaning services of acceptable quality, disposal of all waste collected in a proper manner.

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However Local authority are facing several problems due to improper waste collection and transport.

Rourkela Municipal Corporation has introduced QR code enabled waste management system under its ambit, as it will monitor door-to-door segregation of garbage across the city. It will also strengthen our initiatives being taken for Swachh Survekshan too. Rourkela Municipal Corporation is fully focusing on 100% collection of segregated household waste in order to process the same at its' Micro Composting Centres and Material Recovery Facilities.

Door to Door collection of MSW is to be carried out in both residential and commercial areas on regular basis (including holidays and Sundays) at pre informed time & schedule by utilizing bell or musical alert as per the recommendation of schedule-ii of municipal solid Waste management & Handling Rules-2016.The waste is to be collected in segregated manner or it has to be segregated at the primary station by the agency(Separate Colour coded Bins for bio-degradable(Green), Non-biodegradable(Blue), hazardous waste(Red) are to be used for collection). The segregated waste is to be transferred directly to the transfer station/ compost plant/recyclable collection centre.

YEAR	POPULATION	TOTAL WASTE GENERATION PER DAY(IN TONNES)
2011	272721	136
2024	385000	192
2034	508000	254

Table 1.1 Total waste generation.

Source: Primary Data Collection

WASTE COLLECTION AND ISSUES REALTED TO SOLID WASTE MANAGEMENT: Many people still mix dry and wet waste in the same bin, which makes it difficult to separate and process the waste. One of the primary challenges of solid waste management in Rourkela is the lack of awareness among the general public about the importance of waste segregation and proper disposal. The city administration has launched various awareness campaigns to educate people about the 7 R's of solid waste management: Rethink, Reduce, Refuse, Repurpose, Reuse, Recycle, and Rot. People through garbage to open drain, which causes water logging. If they miss the waste collector vehicles they throw the waste on open field or on road side.

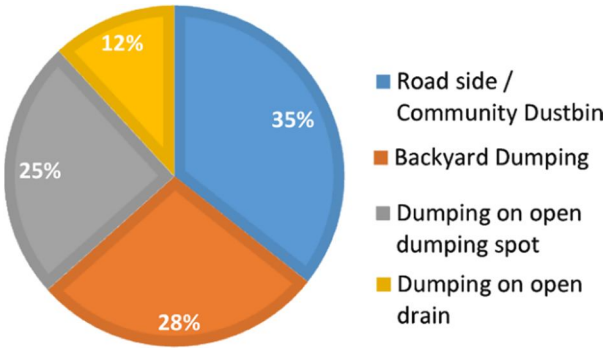


Chart 1.1 Disposal of solid waste from sources.

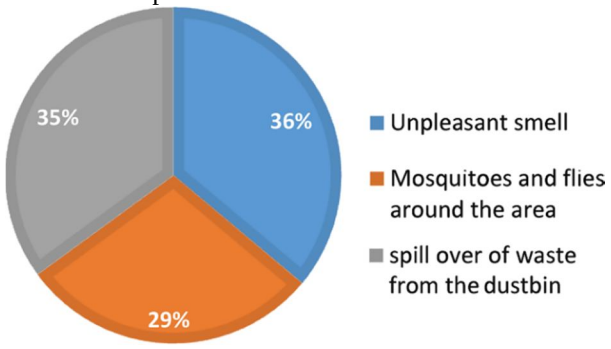


Chart 1.2 Condition of area around dustbin or open Dumping Site.

Source: Primary Data Collection



Fig 1.1 showing spill over of waste from dustbins.



Fig 1.2 showing dumping of waste on open spots

Source: Primary Data Collection

Disposal of waste from household shows the most practiced method of waste disposal from the waste. Maximum percentage of the population is disposing wastes on road side or community but still considerable percentages of population uses open dumping spots, dumping of waste in open drains which is not beneficial for the environment nor the health of the people. The major issues relating with the disposal areas is spill over of waste from the dustbins which can be due to inadequate capacity of the bins or due to poor condition.

V. RECOMMENDATION

1) To achieve better compliance of municipal solid waste rules by the people, power need to be given to the corporation to levy spot fines on the polluters.
2) Increase awareness among the people about ill-effect of mismanagement of solid waste can also lead to better environment.
3) Awareness programs: through different medium such as prints, encompassing magazines, posters and newspapers, audio-visual, TV ads as well as internet.
4) To ensure effective waste management: campaign should extend its reach beyond households, shops and commercial premises. a diverse range of mediums exists like interaction on community levels or individually and door to door visits.

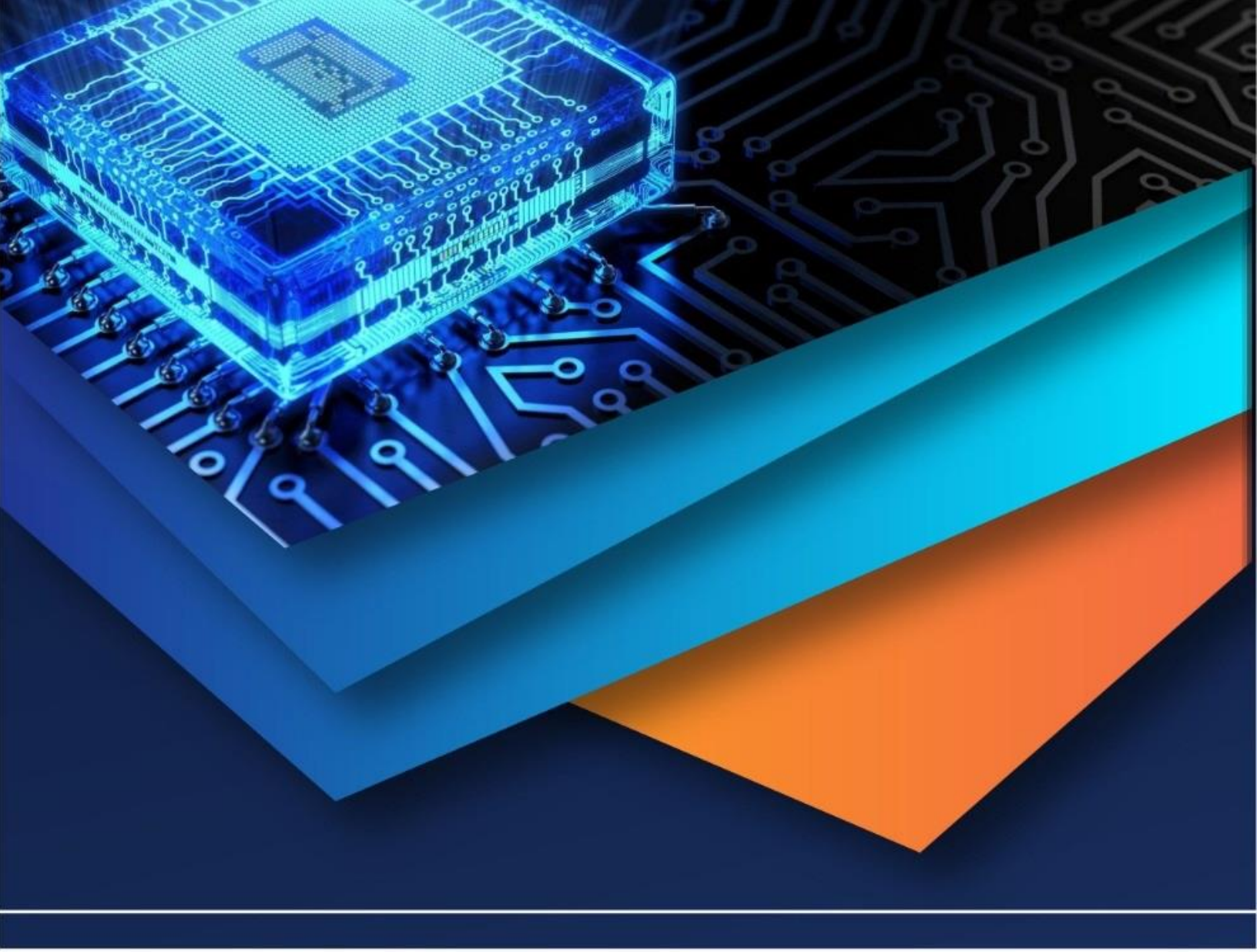
VI. CONCLUSION

Rapid urbanization and population growth is bound an increase in the overall waste generation in the coming years. In the city, solid waste management falls short of the desired level as the system adopted are out-dated and inefficient. The city is facing these deficiencies in varying degrees and there is a need to make substantial improvement in the municipal solid waste practices prevailing in the city to raise the standard of healthy and urban environment keeping pace with the rapid urbanization and growing population. There is therefore, an urgent need to improvise the situation to stop further decay and deterioration of the city. Concerning the hierarchy of the principles and the methods for MSW management. Rourkela Has a long way to go and therefore, there is a considerable amount of effort to be done in order to obtain real and significant positive evolution in municipal solid waste prevention, reduction and recovery.

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