

# A Comparative Study of the Potential Factors and Their Impacts on Waste Generation

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**Abstract**—Solid waste management has considered as a serious issue in India. In order to make effective management, it is essential to ensure accurate methods for estimating types of solid waste, its quantities and distribution effectively. The methodology of the waste management for any city depends on the quantity of the waste produced and all the further process of transportation to treatment and disposal depend on the estimated solid waste quantity. From the past studies it has been found that the estimation of solid waste quantity is dependent upon different factors such as socio-cultural, economic, environmental, political, technological etc. This paper mainly aims to identify specific social & spatial parameters which will facilitate the quantification of waste generation and also to make a comparative study of those factors in specific location of Cuttack city, India. The methodology adopted here is by primary survey of the selected factors in the study areas and comparative analysis of them.

**Keywords:** Solid waste, Management, Sustainable, Waste quantification, comparison

## INTRODUCTION

Solid waste are of different types such as municipal waste, commercial, agricultural waste, medical waste, construction and demolition waste etc. Among the other waste municipal waste is the highest in amount and managing the waste is a very challenging task for the urban planners and decision makers. As per the United Nations conference held in 1992 by considering the agenda 21 concerning the environment and development found that sound solid waste management is essential to make safe disposal of waste and also focused on reducing the waste by maximizing the recycling and reusing method of the waste (Chaves Gde L, 2014). To achieve this way, it is understood to know the generator of the Municipal waste so that it will help to provide a direction on the quantity and type of solid waste and its creation by analyzing the requirement of the capacity building.

Global waste generation is increasing at an alarming rate. The generation of solid waste is considered a major environmental and public health-related issue especially in developing countries (Ziraba, 2016). All these kinds of problems are highly related to generation of solid waste because it is an integrated part of waste management system. Household plays an important role in waste generation. Various studies have

been conducted concerning the generation of solid waste and also found that because of the societal change, demographic pattern, use of land, social status and wealth level, location of residents, and status of the community as well. Apart from this, various authors and scholars have also described the inter-relationship between household solid waste generation and various social-economic factors including its composition and relevance (Beigl P, 2004).

## LITERATURE REVIEW

In the past studies it was found that the factors such as the role of norms of influence and habits play an important role in adopting recycling behavior by an individual. If an individual possesses a habit of recycling, there is more probability of adopting sustainable behavior for recycling of solid waste management and vice versa (Whitmarsh, Haggard, & Thomas, 2018). There was a direct association between the income of the household and solid waste generation. It was analyzed that high-income households consumed more industrialized products. It increased the portion of garbage that can be recyclable in comparison to the lower-income class households. A major reason behind it was that most of the high-income group people used canned and packaged food which can be recycled. On the other hand, low-income group people mainly used local groceries and products because of which the shelf life of the products is less and cannot be reused or recycled (Adeniran, 2019). There is a lack of supportive waste management attitude among the less educated individuals that adversely impact the execution of solid waste management practices in the region (Khan D, 2016).

The use of land and its parameters to create solid waste is attempted for the residential use of land which is not considered only factor but also includes other factors like household size, income that also depend on the typology of housing, area of the floor of Residence and lifestyle of the people (Chithra, 2016).

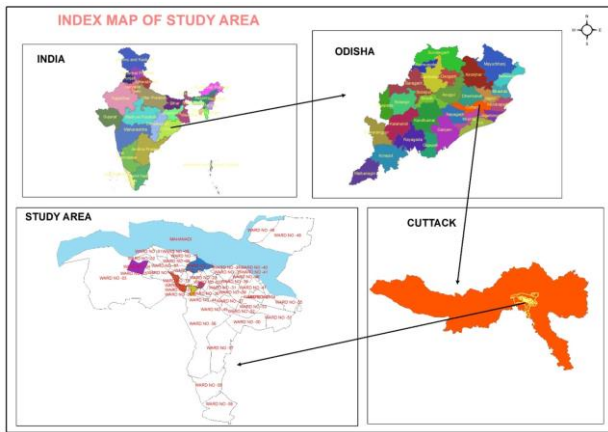
The quantity and composition of household solid waste is related between building type and spatial location. The past researchers also found that land use based system can be

developed to calculate the quantity of solid waste and generate a better waste management system for any city.

**METHODOLOGY**

In this research process, there is selection of the variables done for the identification of the research process. It helps in identifying the issues in the research by systematically describing the facts. In the present research which is related to solid waste assessment using socio-economic and land-use-based parameters, mixed data collection methods including both primary and secondary methods of data collection were included. The research methodology is a mixture of different approaches and techniques that are used to collect, analyze, and interpret facts related to the research topic.

**STUDY AREA**



The study area selected is the Cuttack Municipality which was established on 4th June 1876 . It was later accorded the status of Municipal Corporation. This corporation covers an area of 192.5 sqkm. With 59 wards and with a population above 5, 35,139.The city is having the old core town area with and the extended newer part of the old city which are planned areas of the city.

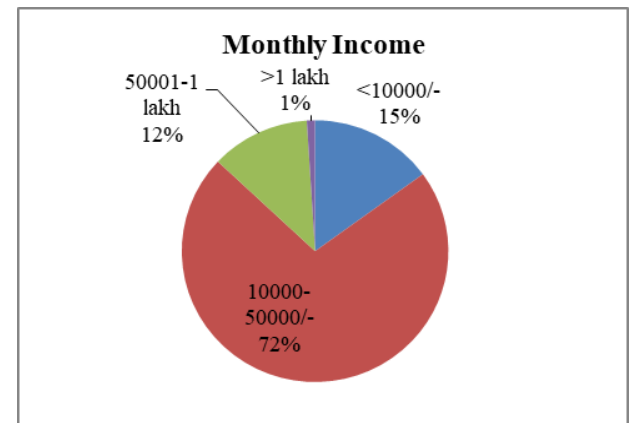
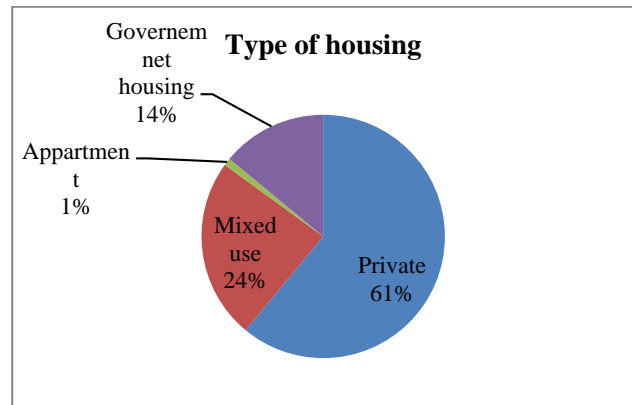
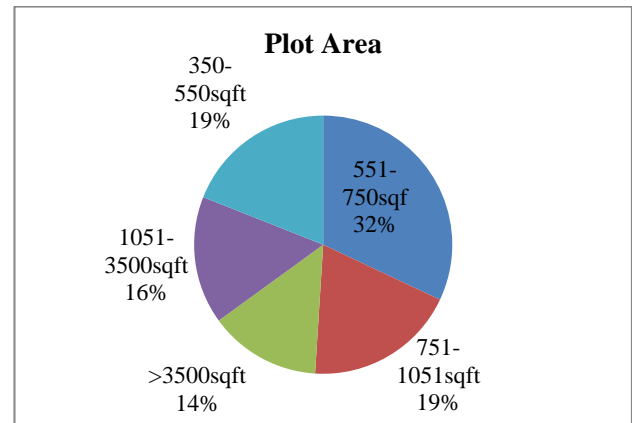
In Cuttack, solid waste is collected through both door to door collection and collection from secondary and community bins. Door to door waste collection is carried out through private a service provider i.e. M/s Ramky Enviro Engineers Ltd. Current Issues in waste management of Cuttack city that collection has not reached to 100 percent at city level. Segregation of waste is not done at source. So labor intensive procedure adopted for waste segregation method. Household Waste quantity is not measured and no specific ward wise data are available.

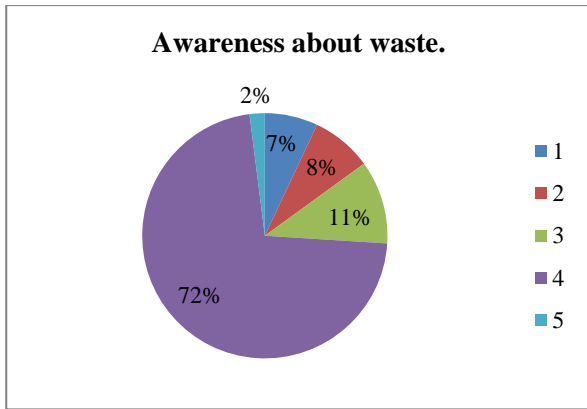
The major housing typology identified in Cuttack city are of two types residential and mixed use (residential + commercial).The mixed use residential development are very common in old city area where mostly ground floor is having commercial activity and upper floors for residential.

The major built typologies of housing in the city are Detached housing(low rise)

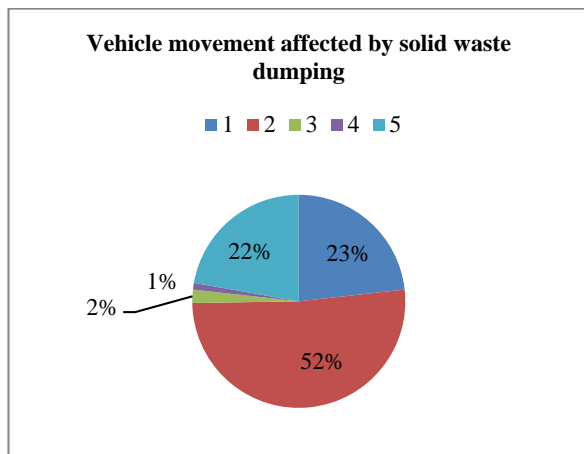
- Plotted development/row housing/semi detached housing
- Multifamily apartments
- Government housing
- Private plots(old/mixed use)
- Slums

A household survey is conducted in these areas of the city to 100 respondents in the selected clusters within the city and analysis was conducted on selected factors .The results were as shown in the table below:





1=strongly agree,2=agree,3=neutral, 4=disagree,5=strongly disagree



1=strongly agree,2=agree,3=neutral, 4=disagree,5=strongly disagree

Other variables such as gender, laws about waste management, recycling campaigns, blockage of drains, informal waste pickers, garbage disposal system, waste collection time and method, and age group have weak correlations with the amount of waste collection in the house per day.

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**RESULT AND DISCUSSION**

Based on the output, we can make the inferences that Plot area, type of housing, and monthly family income has a strong positive correlation with the amount of waste collection in the house per day. This suggests that households living in larger plots, better quality housing, and higher income levels tend to generate more waste.

People's awareness about waste management and their willingness to segregate waste at household level have a weak positive correlation with the amount of waste collection in the house per day. This suggests that these factors may play a minor role in waste generation. The frequency of waste collection by the municipal corporation has a very strong negative correlation with the amount of waste collection in the house per day. This suggests that households generate less waste when the municipal corporation collects waste frequently.