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SOLID WASTE GENERATION AND DISPOSABLE PATTERN OF THE HOUSEHOLDS IN NAGERCOIL MUNICIPAL CORPORATION

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ABSTRACT

In recent years, the exponential population growth, high density of urban areas, diverse culture, changing food habits, and lifestyles have seen an unresolved problem in terms of Municipal Solid Waste Management in India. Consequently, the municipalities have been facing many other issues related to the collection, treatment, and management of solid waste. The main objective of the study is to identify the factors which determine the quantity of solid waste generations of the households. The total sample size was fixed at random 150.The important finding of the study is identified majority of the sample households generate 1-1.5kg of solid waste.

Key Words: Waste Generation, Solid Wastes and Solid Waste Management

1 INTRODUCTION

"Solid wastes" is the term now used internationally to describe non-liquid waste materials arising from domestic, trade, commercial, industrial, agriculture and mining activities and from the public services. Non-liquid is a relative term because solids of certain kinds fall within the scope of solid wastes management. These arise primarily from industrial sources and from sewage treatment plants. It includes all activities that seek to minimize the health, environmental and impacts of solid wastes. Solid waste can be defined as material that no longer has any value to the person who is responsible for it, and is not intended to be discharged through a pipe. It does not normally include human excreta. It is generated by domestic commercial, industrial, healthcare, agricultural and mineral extraction activities and accumulates in streets and public places.

2 PROBLEM OF THE STUDY

Modernization increases the extent and dimensions of the solid waste problem. As a broad categorization the different forms of waste generated in any centre would be households, commercial refuse, street sweepings, construction and demolition, debris, hospital waste and industrial waste. The differences in the composition and quantum of waste are likely to be considerable whereas slum settlements are likely to have higher degree of organic matter in households waste and street sweepings than higher or even middle income areas. Refuse generation in a function of consumption production and growth, which therefore affects not only quantum, but the nature of refuse generated. Clearly the quantum of waste generated varies across urban centres depending to some extent on the population the degree of industrialization and consumption patterns in the centre, for the country as a whole per capita waste generation varies between 0.1 kilograms and 0.6 kilograms per day with an average of 0.33 kilograms.

Although across different areas within an urban centre such as residential commercial market and industrial the waste composition is likely to vary significantly it is estimated that over all of the municipal waste generated in urban centers anywhere between 40 and 75 percent constitutes organic matter. It is also important to note that waste composition varies significantly across areas of different economic levels of residents. The solid waste management is a big problem in the Nagercoil Municipal Corporation. A little effort has been taken to assess and reuse of solid waste in the study area. It may create awareness among the public, households and government authorities. Hence, an attempt has been made to analyze the quantum of waste generation and factors determine solid waste management in Nagercoil Municipality Corporation.

3 OBJECTIVES

The important objectives of the study are,

- To analyze the quantum of solid waste generated by households in the study area.
- To find out the factors influencing the quantities of solid waste generations of the households in the study area.
- To review the major health problem faced by respondents towards solid waste in the study area.

4 SAMPLING PROCEDURE

Nagercoil municipality comprises 51 wards. For the analysis purpose, four wards are selected in the Nagercoil municipality. They are ward-9 ward-16, ward-25 and ward-36. The samples under different ward are given in table 1.

Table 1

The number of sample households at each wards in Nagercoil Municipality

Sl. No.	Wards	Households
1	Ward-9	43
2	Ward-16	34
3	Ward-25	34
4	Ward-36	39
	Total	150

The simple random sampling method was adopted to select 150 households in Nagercoil Municipality for the purpose of analysis.

5 COLLECTIONS OF DATA

Primary data have been used for the present study. The selected households were contacted in person and the objectives of the study were clearly explained and their co-operation was ensured. The details regarding the general characteristics of the households, their familial characteristics, income, solid waste generations and the like relating to the overall objectives of the study were collected through the direct personal interview method.

6. TOOLS OF ANALYSIS

In order to analyse the association between profile variables and quantum of solid waste generation through Chi-square test. The health problem faced by the respondents in the study area was analyzed through mean score ranking method.

.7. DATA ANALYSIS

An attempt has been made to analyse the quantum of solid waste generated by households in different zones of Nagercoil Municipality. Further, it attempts to analyse the factors which influence the solid waste generation in households. Table.2 clearly exhibits the quantum of solid waste generated by the sample household's respondents.

Table 2

Quantum of Solid waste generated by households

Sl. No.	Quantum of waste generated by households	Number of Households				
		Ward No 9	Ward No 16	Ward No 25	Ward No 36	Total
1	Below Rs. 0.5	7 (16.28)	5 (14.70)	6 (17.65)	6 (15.38)	24 (16.00)
2	0.5-1	9 (20.93)	7 (20.59)	7 (20.59)	9 (23.08)	32 (21.33)
3	1-1.5	17 (29.53)	11 (32.35)	9 (26.47)	13 (33.33)	50 (33.33)
4	1.5-2	6 (13.95)	6 (17.66)	7 (20.59)	9 (23.08)	28 (18.67)
5	2 and above	4 (9.31)	5 (14.70)	5 (14.70)	2 (5.13)	16 (10.67)
	Total	43 (100.00)	34 (100.00)	34 (100.00	39 (100.00)	150 (100.00)

Source: Primary Data
Note : Figures in brackets represent percentage to total

The table 2shows that out of 43 sample households respondents in ward No 9 majority of 17(39.53 per cent) of the households respondents generate between 1-1.5kg of solid waste per day, while only 4(9.31 per cent) of the households respondents generate 2 and above Kg of Solid Waste per day. Out of 34 sample households respondents in Ward No 16 majority of 11(32.35 per cent) of the households respondents generate between 1-1.5Kg of solid waste water per day. Each 5(14.70 per cent) of the households respondents generate below 0.5kg and 2kg and above of Solid Waste per day respectively.

In the case of Ward No 25, out of 34 sample households respondents, 9(26.47 per cent) of them generate between 1-1.5kg of Solid Waste per day, and 5(14.70 per cent) of them generate 2 kg and above.

Further it infers that out of 39 sample households in Ward No 36 majority of 13(13.33 per cent) households respondents generate between 1-1.5kg of Solid Waste per day and 2(5.13 per cent) of them generate 2kg and above of solid waste per day in the study area. Thus, it may be concluded that majority of the sample households generate1-1.5kg of solid waste.

7.1FACTORS DETERMINE THE SOLID WASTE GENERATION

The factors that determine the generation of quantum solid waste in the selected households, a multiple log linear regression model of the following form was used.

$$\text{Log } y = \beta_0 + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + U$$

The above model was estimated by the method of least squares. The computed results are presented in Table.3

Table 3

Estimated Regression results for households

Variables	Parameter Estimates			
	Ward 7	**Ward 16**	**Ward 25**	**Ward 36**
Intercept (β_0)	2.0172	2.9673	1.7841	2.0131
Log X_1 (β_1)	0.0671 (0.9421)	0.1021 (0.7021)	0.0094 (0.0012)	0.0431 (0.7231)
Log X_2 (β_2)	0.1201 (1.6214)	0.0921 (1.2141)	0.1124 (0.9721)	0.1036 (1.0147)
Log X_3 (β_3)	0.3814* (3.4712)	0.2916* (2.9411)	0.3017* (3.0117)	0.3218* (2.9842)
R_2	0.5371	0.5716	0.5471	0.5571
F-Value	31.63	29.16	37.87	30.16
Number of observations	12	27	11	25

Source: Computed data

*Indicates that the co-efficient is statistically significant at 5 per cent level.

Figure in brackets represent t-value

It is understood form Table.3 that in the ward-7, all the independent variables included in the model jointly accounted for 53.71 per cent variation in solid waste generated by the households. Among the variables, the number of outpatients per day alone was statistically significant at 5 per cent level. It indicates that as additional percentage in this variable could effect 0.3814 per cent variation in solid waste generation.

In the case of word-16, R^2 indicates 57.16 variation accounted for by all the explanatory variables on solid waste generation. Among the variables, only the variable namely the number of outpatients alone was found to be significant. It means that with one per cent increase in this variable, the quantum of solid waste could be increased by 0.2916 per cent.

It is inferred from table that the co-efficient of multiple determination (R^2) indicates 54.71 per cent variation on solid waste generation. The only variable namely number of outpatients was statistically significant indicating that one per cent increase in this variable may lead to increase of 0.3017 per cent in solid waste generations.

In the case of word-36, all the three variables included in the model jointly accounted for 55.71 per cent variation on solid waste generation. Out of three variables, number of outpatients alone was statistically significant at 5 per cent level. It means that one per cent increase in this variable may lead to increase of

0.3218 per cent in solid waste generation. The F-test shows that the fitted regression model was statistically significant at 5 per cent level in the entire four zones in Nagercoil Municipality.

7.2 HEALTH PROBLEM FACED BY RESPONDENTS

Table.4

Major health problem faced by the respondents in the study area

Sl.No	Health Problems	Mean Score	Rank
1	Skin Irritations	64.3	I
2	Blood Infections	51.7	IV
3	Respiratory Problems	56.0	III
4	Tuberculosis	42.2	V
5	Pneumonia	35.1	VII
6	Influenza	40.9	VI
7	Growth Problems	58.9	II

Source: Computed data

The table reveals that major health problem faced by respondents in the study, skin irritations with the mean score of 64.3 contributed 1st rank, growth problems with the mean score of 58.9 contributed 2st rank, 56.0 with the mean score of 56.0 contributed 3st rank, blood infections with the mean score of 51.7 contributed 4st rank, tuberculosis with the mean score of 42.2 contributed 5st rank, influenza with the mean score of 40.9 contributed 6st rank and pneumonia with mean score of 35.1 contributed least rank.

8. FINDINGS:

- The study shows that out of 43 sample households respondents in Zone No 9 majority of 17(39.53 per cent) of the households respondents generate between 1-1.5kg of solid waste per day.
- Out of 34 sample households respondents in Ward No 16 majority of 11(32.35 per cent) of the households respondents generate between 1-1.5Kg of solid waste water per day.
- In the case of Ward No 25, out of 34 sample households respondents, 9(26.47 per cent) of them generate between 1-1.5kg of Solid Waste per day
- The study further it infers that out of 39 sample households in Ward No 36 majority of 13(13.33 per cent) households respondents generate between 1-1.5kg of Solid Waste per day.
- The study reveals that in the ward-7, all the independent variables included in the model jointly accounted for 53.71 per cent variation in solid waste generated by the households. It indicates that as additional percentage in this variable could effect 0.3814 per cent variation in solid waste generation.
- In the case of ward-16, R^2 indicates 57.16 variations accounted for by all the explanatory variables on solid waste generation. It means that with one per cent increase in this variable, the quantum of solid waste could be increased by 0.2916 per cent.
- The study further reveals that the co-efficient of multiple determinations (R^2) indicates 54.71 per cent variation on solid waste generation. The only variable namely number of outpatients was statistically significant indicating that one per cent increase in this variable may lead to increase of 0.3017 per cent in solid waste generations.

- In the case of ward-36, all the three variables included in the model jointly accounted for 55.71 per cent variation on solid waste generation. It means that one per cent increase in this variable may lead to increase of 0.3218 per cent in solid waste generation.
- The F-test shows that the fitted regression model was statistically significant at 5 per cent level in the entire wards in Nagercoil Municipality.
- The study reveals that major health problem faced by respondents in the study, skin irritations with the mean score of 64.3 contributed 1st rank, growth problems with the mean score of 58.9 contributed 2st rank and pneumonia with mean score of 35.1 contributed seventh rank.

9. SUGGESTIONS

1. The most used and cheapest disposal of solid waste is the landfills techniques. So, the government and private concerns are strictly following this technique to reduce the soils waste.
2. The government should implement the waste management through waste reduction, reuse and recycling to cut down on the amount of waste we throw away.
3. The municipal corporation should provide training to the waste workers on how to collect, transport and dispose of waste.
4. Municipal corporation should provide awareness programs to inform the community the danger and the consequences of wastes, especially on illegal open dumping.
5. Community participation in Solid Waste Management can be elicited through comprehensive awareness programmes and by introducing economic incentives for segregation.
6. Evaluate and encourage new technologies that produce better packaging materials and yet are compatible with existing or future recycling technology.

10. CONCLUSION:

The study is helpful to the public authorities to arrange for the safe disposal of solid waste system and proper arrangement of disposing of solid waste in an environmentally friendly manner. Solid waste generated by households, commercial enterprises, offices, markets and its domestic waste and cleaning these wastes is the sole responsibility of the municipal corporation. The study concluded that majority of the sample households generate 1-1.5kg of solid waste per day in Kanyakumari district. The study further shows that major health problems faced by respondents in the study are skin irritations, growth problems and pneumonia.

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