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Solid Waste Management – A Case Study in Puducherry

T. Dhivya[1], Dr. A. Royal Edward Williams[2]

[1]Research Scholar, P.G. & Research, Department of Economics, Sacred Heart College (Autonomous), Affiliated by Thiruvalluvar University, Tirupattur Dt. – 635 601. Tamil Nadu.
[2]Assistant Professor, P.G. & Research Department of Economics, Sacred Heart College (Autonomous), Affiliated by Thiruvalluvar University, Tirupattur Dt. – 635 601. Tamil Nadu.

In modern era the technological improvement, urbanization, migration and huge population have increased the waste generation. Increasing population will leads to lack of infrastructure facility like water sanitation, sewage and solid waste management. People are not properly disposing their waste into the common waste bin as well as bins are not sufficient with the increasing population level. Due to improper disposal of solid waste, it ultimately reached into sewage channels and ends with blockage of sewage channels. It leads to cause more environmental and health issues. Improper waste management in the landfill of Puducherry district cause more heat in the landfill as well as increase in the leachate generation and it will leads to the contamination of soil and ground water quality. This paper focused on health and environmental issues owing to improper disposal solid waste and its management practised.

Keywords: Disposal, Solid Waste, Landfill, Health, Environmental Issues, Population.

1. Introduction

The term solid waste refers to the non-liquable waste and solid waste management means the entire process of collection, transportation, disposal and treatment of waste. In developing countries and underdeveloped countries are facing hilarious problem due to increase in accumulation of solid waste because population growth. The overall population of India in the year 2023, with the size of population 1,428,627,663 and 165 million tons of waste was generated. According to the district plan of Puducherry union territory (2021), with the population 12,47,953 and 480 tons of waste was generating per day. Puducherry union territory constitutes with four districts Mahi, Yanam, Karaikal and Puducherry. The overall population size of Puducherry district is 9,50,289 and 370 tons of solid waste generation per day (District

plan of Puducherry, 2021).

Increasing population leads to the increase in the economic growth, urbanization and increasing level of consumption resulting in the generation of municipal solid waste. According to the report of the energy and resources institute (TERI) India generated 62 million metric tons of waste in a year. There are 43 metric ton of waste was collected, among these only 12 metric ton of waste was treated before it disposal and rest of the 31 metric ton of waste was discard in the waste yards. Still most of the solid waste is untreated. There is also inadequate process of waste will leads to create the environmental issues as well as affect the public health (International Trade Administration 2023).

In the year December 2021 the journal of urban management states that there are 62 metric ton of wastes was generated annually such as 7.9 metric ton of hazardous waste, 5.6 metric ton of plastic waste, 1.5 metric ton of e-waste and 0.17 metric ton of biomedical waste was generated. According to the report of central pollution and control board projected that in the year 2030, India will generate 165 metric ton of waste like plastic waste, e-waste, bio-medical waste, hazardous waste (International Trade Administration, 2023).

In India according to CPCB 2019-20 the total quantum of waste generated was 1,50,761 TPD (Tones Per Day), the overall efficiency of collection of solid waste was 1,45,957 (96.8%) TPD, among these nearly 70,881 TPD (47 %) of waste was treated and 40,952 (27.16%) TPD waste was placed in the landfilled (CPCB, 2019-2020).

In Puducherry district consist of 79 wards, out of these 79 wards only 10 wards are doing segregation while collecting solid waste materials and rest of the wards are doing only primary and secondary level of waste collection (reference). In outgrowth areas the waste has been collected from two days ones so the people from the households disposing the waste near to empty place and buring the waste as well as the inadequate dustbins will leads to overflowing of waste and create the odour smell, blockages issues and wet bone diseases. In Puducherry continuous increase of waste generation, without proper segregating and without treatment of waste will leads to produce more methane gas as well as leachate that leachate will cause the soil and water pollution upto 5 kilometres from the landfill. The rag pickers are plays an important role in the solid waste management and they were taking waste from the landfill sold to the scrap dealers and earning minimum income to sustain their livelihood due to overflowing of waste and without proper treatment of waste will affect the health of the rag pickers.

2. STATEMNT OF THE PROBLEM

The study highlighted that Puducherry district having high density of population among in the Puducherry union territory. In this case, lack of inadequate dustbins and improper disposal methods are leading to the waste accumulation and this accumulation leads to the blockage in the sewage channels and it creates unhygienic ambience in the residential area as well as in other area, will create environmental issues and wet-bone diseases. Improper management in the landfill will leads to increase the leachate generation and contamination of soil, water and air quality. These contaminations will lead to decline in the quality of Human health as well as in the quality of natural resources in general

3. OBJECTIVES

- To analyse the percapita and quantity of waste generation at the households level in the Puducherry district.
- To examine the impacts of human health and environment of the Puducherry district.

4. RESEARCH METHODOLOGY

The study was carried out from Puducherry district. In Puducherry district consist of two municipalities such as Puducherry and Oulgaret municipality. In the Puducherry district consist of 79 wards, among these wards nearly 790 sampled households was chosen as a sample size. The random sampling method was adopted, simple tools was used such as percentage and correlation was adopted for analyse purpose.

5. ANALYSIS

Table - 1: Correlations Family Size and Quantity of Waste Generation

Particulars		Family size of the respondent	Quantity of waste generation
Family size of the respondent	Pearson Correlation Sig. (2-tailed) N	1 790	.375** .000 790
Quantity of waste generation	Pearson Correlation Sig. (2-tailed) N	.375** .000 790	1 790

**. Correlation is significant at the 0.01 level (2-tailed).

In Table–1, represents the Pearson correlation coefficient between the family size and quantity of waste generation by the households. The Pearson Correlation coefficient indicates the positive correlation between family size and quantity of waste generation. The coefficient of correlation is 0.375, it has positive linear relationship between family size and the quantity of waste generation and it is statistically significant with means, increase in the family size will leads to the increase the waste generation. The quantity of waste generation depends on the income and family size of the respondent.

Table 2: Per day percapita waste generation

Sl. No.	Percapita Waste	Frequency	Percent
1	Below 50 gm.	186	23.5
2	51 gm.-100 gm.	150	19.0
3	101 gm. -500 gm.	238	30.1
4	501 gm. - 1 kg	216	27.3
	Total	790	100.0

In Table-2, represents that per day percapita waste generated by the respondents. There are 23.5 percent of the respondents are generated below 50 gm./day, 19 percent of the respondents are generated 51 gm./day to 100 gm./day, 30.1 percent of the respondents are generated 101 gm./day to 500 gm./day, 27.3 percent of the respondents are generated 501 gm./day to 1 kg./day and the waste are kitchen waste, plastic covers and waste, food waste, flower waste,

sand.

Table - 3 Correlations of Health Issues, Consequence of Open Dumping, Problem Faced by Household's Due to Solid Waste

Particulars		Health issues	Consequence of open dumping	Problem faced by household's due to solid waste
Health issues	Pearson Correlation	1	-.061	.077*
	Sig. (2-tailed)		.088	.031
	N	790	790	790
Consequence of open dumping	Pearson Correlation	-.061	1	-.144**
	Sig. (2-tailed)	.088		.000
	N	790	790	790
Problem faced by household's due to solid waste	Pearson Correlation	.077*	-.144**	1
	Sig. (2-tailed)	.031	.000	
	N	790	790	790

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

In Table–3, represents the Pearson correlation coefficient between the health issues, consequence of open dumping and solid waste problem faced by the households. The Pearson Correlation coefficient indicates the positive correlation between health issues, consequence of open dumping and problem faced by households due to solid waste. The correlation coefficient of problem faced by households due to solid waste and health issues is .077 this infers a positive relationship between problem faced by households due to solid waste and health issues and it is statistically significant, which means when the problem of solid waste increase and it leads to blockages in the sewage channels, which ultimately leads to health impact like skin allergy & infection, malaria, dengue, elephantiasis. The correlation coefficient of problem faced by households due to solid waste and consequence of open dumping is -.144 suggest that due to open dumping will create the odour smell, domestic animals will eat the waste, rag pickers and peoples from the households burn the waste it will leads to create the health impact.

6. FINDINGS

❖ In Puducherry district has Puducherry & Oulgaret municipality, which consist of 79 wards, among these ward only 10 wards are doing segregation in solid waste.

❖ Only two common dustbins area available for more than 50 – 100 households. This is insufficient for the maintaince clean or zero waste area/wards.

❖ In every household there are below 0.15 grams of waste to 3.5 Kg of waste was generated in the urban areas.

❖ In the outer part of these two municipalities limit are still facing with the problem of collection and disposal of waste. Once in two day in a week the garbage collectors are collecting waste.

❖ Improper waste collection management and buring the waste is creating unhygienic environment in the residential and its surrounding areas.

❖ Overflowing of waste in the landfill and without proper treatment of waste have damaged more environmental issues like water and soil pollutant due to the landfill with the radius of upto 5 km of distance from landfill.

❖ The dustbins are overflowing of waste has caused the blockages in the sewage channels. The households located nearest to the dustbins have experiencing with the water bone diseases like skin allergy, fever, chest irritation, dengue, and cholera infections.

❖ In households they were spending Rs. 200 to Rs. 300 to clean the sewage channels blockages per week.

❖ In every year and every household are spending Rs. 1000 to Rs. 3000 as waste collection tax towards their municipality.

❖ There are 79 households are buring their garden waste and utilized the ash for cleaning their utensils and using the ash in their garden in the substitute form of pesticide. Along with the ash and cow dung liquid, they utilized in the form of manure purpose.

7. CONCLUSION

In developing countries, solid waste management is an important dimension for the discussion, in the realm of policy making. Proper collection of waste, disposal of waste in both primary and secondary method should take place in systematic manner in all the wards will help to control this solid waste issue. In landfill will provide proper segregation and sold waste to the recycling industry, will help to generate revenue for the government as well as treatment process will help to control of the environmental issues and keep the society away from the illness, by keeping clean and green.

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