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Investigating the Perception of Solid Waste Management among Local Communities in Central India

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Abstract: Since many decades, waste management has been one of the most severe issues. Regional government bodies are working hard in the area under their jurisdiction, but the problem still requires the help of residents in eastern Maharashtra. As a result, the study seeks to comprehend people's perceptions, opinions, and attitudes concerning the issue in the current pandemic condition. Tools used are one-sample T tests, and mean analyses. People are positive towards the natural environment and waste management mechanisms, according to the survey, but they become hostile when it comes to contributing individually and shouldering responsibilities. New measures such waste inventory, Data availability about waste and tie up with corporate are some of the interesting findings of the manuscript. The clean environment can only be achieved when all the sections of society joint their hand for lofty objective and greater cause.

Keywords: Waste Management, Perception, Community, Environment, Natural Resource.

I. INTRODUCTION

As per government data total, solid waste generated every day in India is increasing. Nearly all of the waste is dumped in an open land area and only a few are composited. India is ranked third regarding garbage generators in the world. However, some cities have done commendable work concerning waste management Alleppey in Kerala, Mysore of Karnataka, Panji and Pune are doing a fabulous job when it comes to waste management. Some of the cities are zero landfill cities. Nowadays cleanliness is a buzzword, however the ground reality differs. We can't deny that landfills in many parts of the country have passed their saturation period and are accountable for air pollution due to the burning of improperly handling garbage. It also leads to polluting groundwater. Hence a concrete system to manage the waste based on segregation and recycling is the need of the hour. The underlined principle is to stop considering waste as a waste rather than as a resource to produce energy. Even though waste recycling and reuse remain a big challenge. In many cases, residents have complained the authority to dump City waste in their backyard which further spread everywhere in the town and cause a huge crisis. The solution to such problems is biogas plants both fixed and portable, consciousness about the environment, biogas and pipe composting and aerobic composting. Some cities are doing good and have been awarded by the Government of India based on the parameters such as open defecation, solid waste management, sewerage system and drainage system. Educating people and distributing color-coded dustbins are some of the prominent steps that can be taken by the Municipality. At present, it is of paramount importance to realize that non-biodegradable wastage can be sold at varying rates via scrap merchant to recyclers to Industries who reuse the material. Hence, nothing goes to waste as the price is associated with everything even a plastic bottle cap. So far as eastern Maharashtra is concerned nearly 479.8 metrics per day waste is generated. Industrialization and urbanization are about to spread its wing in this area as it is the centre of the country. Hence, the researcher has selected this region for the study.

Objectives

1. To study the waste management concern of residents.
2. To examine the willingness of people to contribute for neat environment.

II. LITERATURE REVIEW

The 21st century of growth and expansion has also brought bane with it in form of wastages being generated at various levels –domestic and industries. Lying garbage improperly handled wastages and public ignorance is continuously leading to vulnerability of public health (Yoada, Chirawurah and Adongo, 2014). Public health depends on waste management as if it is poorly managed consequences would be unfavourable risks such as infection and other diseases. The prominent waste among all is solid waste which needs to be handled appropriately (Kaoje et al., 2017). Increasing population, setting up of new industries, increased tourism, increased in prosperity, changing lifestyle all these are making it difficult to manage the region wastages (Song, Wang and Li, 2016). The government is implementing various environmental protection laws however people's attitude and their participation matter improper handling of wastes (S and J, 2021). Attitudes and actions in the society are also related to these personal beliefs (Buenrostro, Marquez and Ojeda, 2014). To evaluate the perception and attitude in relation to waste management cross-sectional studies had been conducted to reach all levels of residents (Kaoje et al., 2017). The people in the city at times feel the municipality should keep the city and area around clean which becomes a big hindrance for garbage disposal methods. Primarily the Solid waste management also depends on the attitude of people to pay for arranging the private service providers. When the public is not willing to pay, it leads to unlawful dumping and burning of garbage (Kumar, M. and Nandini, N., 2013) and (Abdullah, Z et al, 2017) . The inclination of people towards reduces, reprocess and refuse wherein they are discouraging the use of plastic can play a significant role. Individuals take their shopping bags to reduce the excessive usage of plastic bags (Buenrostro, Marquez and Ojeda, 2014) and (Talyan, Dahiya and Sreekrishnan, 2008). Most of the waste coming from houses consist of extra food, debris, papers and plastics which are disposed of without parting into dry-wet or degradable-non degradable. Even though maximum people put waste in allotted disposal community box however some people throw garbage in open space, holes, bushes and streets (Yoada, Chirawurah and Adongo, 2014) and (Song, Wang and Li, 2016) . People if are educated about environmental concerns reduces the excessive burden of local municipalities (Dlamini, Rampedi and Ifegbesan, 2017). Private sector participation, timely collection of waste by the local municipality and increased awareness are important issues for the concrete waste management system. Introduction of awareness camp, social surveys in schools, colleges and universities can bring a participative approach in society to join hand for a clean environment (Gumau, Harir and Mohammed, 2020) and (Ferronato et al., 2017). In days to come, waste must be considered as a resource as it can generate energy if handled and processed properly (Powell, Chertow and Esty, 2018) and (Sharholy, Ahmad, Mahmood and Trivedi, 2008. Studies conducted in Malaysia aimed to find the consciousness and satisfaction level of 400 residents regarding waste management. The respondents approved that they lacked a waste sorting concept. The study discovered that people are satisfied with the waste management services available in their area but more effective ways are expected by them (Choon, Tan and Chong, 2016). A survey study conducted at Kazakhstan showed that people are aware of waste management concern and there was no laws or penalty for violators if the waste is not handled properly (Karaca et al., 2019). In China, a study conducted to explore the knowledge of people about the natural environment and waste management showed a rise in education and income influence the decision of people to contribute to a healthy environment (Han et al., 2018). In the latest study carried out in the capital of India, it has been revealed that people feel that its government responsibility to maintain clean and hygienic surroundings. Moreover, there are misconceptions such as segregating the waste is time-consuming and needs technical skills. The conclusion suggests that proper education via newspaper, campaign, direct mail can help to get participation from the masses for keeping the atmosphere clean (Kala, Bolia and Sushil, 2020). The polluted environment also causes various diseases in human beings and worsen the situation (Vrijheid, 2000).

III. RESEARCH METHODS

The study has been conducted by collecting the data through a well-designed questionnaire to find out the viewpoint, perception, and attitude of residents of eastern Maharashtra. A pilot study was conducted before forwarding the questionnaire to the target individuals. The population is 2.3 crore (GOI, Population census 2011) is eastern Maharashtra, and the respondents are residents varying from age 25 to 50. The total sample size (respondents) taken was **388** by using purposive sampling technique. The researcher has also interviewed 50 employees of Municipal corporation to find out new measures undertaken to control the wastages of their respective cities. The statistical tools used here are descriptive analysis, T test and Mean- Standard deviation analysis.

IV. NOVELTY OF THE RESEARCH

The author has selected this title as no other paper has covered the specified region and employees of Municipal corporation were also involved in the study alongwith residents of the population.

H0: The respondents have no waste management concern.

i.e H0: $\mu < 3.5$

H1: H0: $\mu > 3.5$

H02: People are willing to contribute positively for clean environment

i.e H02: $\mu < 3.5$

H1: H2: $\mu > 3.5$

Table 1. Perception of **388** Respondents

Waste Disposal/ Management Concern	SA5	A4	N3	D2	SD1
I am concerned regarding burning of waste that leads to health risks	16%	70%	14%	0%	0%
I am concerned regarding unlawful dumping of wastage harming water sources	38%	43%	2%	17%	0%
I am concerned about diseases caused by improper storage wastages	41%	40%	12%	7%	0%
I am concerned about flooding caused by blockages of wastages.	52%	29%	11%	3%	5%
I am concerned regarding loss of Natural resources used in products we buy (Plastic)	0%	64%	12%	24%	0%
Local Area Wastage Concern					
I am concerned about provision of garbage vehicle of my area	56%	28%	9%	2%	5%
I am concerned about littering in my area	38%	43%	2%	14%	3%
I am concerned about unlawful waste dumping in my area	49%	32%	11%	3%	5%
I am concerned about Municipal waste management	39%	42%	12%	5%	2%
Willingness to contribute					
I will throw on my own garbage to wastage collection tank	35%	24%	11%	26%	4%
I am willing to purchase products made up of recyclable raw materials.	27%	25%	12%	21%	15%
I am ready to participate in program for compost eatables.	43%	38%	6%	7%	6%
I will segregate paper, metal and plastic in different containers to support recycling program	20%	32%	12%	17%	19%
I will support law to fine people who improperly handle wastages	22%	29%	13%	25%	11%
I take enough measures to reduce the generation of wastes	27%	24%	12%	22%	15%
I segregate waste into dry/wet and degradable-non degradable	17%	32%	12%	30%	9%
Waste Management attitude					
I do contribute in wastage management of my locality	37%	44%	11%	6%	2%

Appropriate waste management must be taught at schools	35%	46%	6%	8%	5%
We all must strive for garbage free community	39%	42%	7%	7%	5%
Regular garbage collection by local government body and individual both are important	16%	50%	14%	15%	5%

Graph 1- Perception of 388 Respondent

The above questionnaire consists of 4 sections, being sub-parts of waste management concerns. Here the author has used descriptive analysis to check the mean score. If the value of mean is more than 3.5, the null hypothesis would be rejected else accepted.

4.1 Hypothesis Testing 01

Table 2.

Descriptive Analysis	
Mean	3.93
Standard Error	0.09
Median	4.1
Mode	3.4
Standard Deviation	0.392
Sample Variance	0.15
Kurtosis	-1.10
Skewness	-0.87
Range	1.08
Minimum	3.23
Maximum	4.31
Sum	66.85
Confidence Level(95.0%)	0.20

From table 1, it is apparent that the value of mean is higher than 3.5 and the standard deviation 0.392 with variance 0.15 at 95% confidence level no scope other than to reject the null hypothesis. Hence it is apparent that residents of eastern Maharashtra are conscious and concerned about waste disposal.

Table 3. T test one sample

T-Test: One Sample for Means	
Mean	3.93
Known Variance	0.39
Hypothesized Mean Difference	3.5
T	2.85
P(T<=T) one-tail	0.002
T Critical one-tail	1.64

The above test has been conducted to verify whether the calculated mean is by chance, or it exists. The above table shows P value is much less than 0.015 i.e., 0.002. Hence, we cannot accept the null hypothesis. Further, the T value (2.85) is greater than the T critical value (1.64) it further provides conclusive evidence to reject the null hypothesis.

The interview of municipal corporation employees reveals some interesting steps undertaken to check the problem of increasing waste. Municipal corporation have taken sufficient measures to ascertain the data regarding dry and wet wastages. A new concept of waste inventory has been introduced for each district. These two steps are very helpful to sell the wastes to industries.

4.2 HYPOTHESIS TESTING 02**Table 4.** Mean and Standard deviation analysis

Sr No	Willingness to contribute	Mean	Std. Dev
1	I will throw on my own garbage to wastage collection tank	3.2	1.42
2	I am willing to purchase products made up of recyclable raw materials.	2.8	1.33
3	I am ready to participate in program for compost eatables.	3.2	1.48
4	I will segregate paper, metal and plastic in different containers to support recycling program	2.8	1.09
5	I will support law to fine people who improperly handle wastages	2.2	0.89
6	I take enough measures to reduce the generation of wastes	3.1	0.93
7	I segregate waste into dry/wet and degradable-non degradable	2.7	0.91
	Total Mean	2.85	0.35

The above table present total mean and standard deviation which is 2.85 and 0.355 respectively. Moreover, the individual mean score supported by standard deviation also proves that people are reluctant when it comes to contribute individually. Excluding one parameter where they agree to throw garbage to wastage collection tank other areas lacks their support. However, they are convinced to be present in awareness program but segregation of waste, imposing fines on defaulters, purchasing recyclable products scores are not very appreciable.

During the interview of Municipal corporation's employees, it has been found out that waste inventory has been introduced at every district. The municipal corporation have developed a information system, to keep track of wet and dry waste separately and have collaboration with industries which directly purchase it from them.

V. CONCLUSION AND POLICY PRESCRIPTION

The study clearly finds out that people in eastern Maharashtra very much concern about waste management and issues arising due to it when handled improperly. Hence it can be concluded that community perception is very positive towards waste management. However, when it comes to delivering the same on individual level, the calculated Mean figures shows contradiction in their approach. People must accept that unless we don't change and contribute even local municipality and other bodies will be ineffective.

During an interview with workers of the Municipal Corporation, it was discovered that trash inventory has been implemented in each district. The municipal corporation has created an information system to track wet and dry garbage separately, as well as collaborate with businesses that buy it directly from them. The three new steps undertaken by Municipal corporation can be an example to other states to implement for checking the ever-increasing issue of waste.

To achieve clean environment awareness environment sessions at schools, effective campaigning, TV-Radio advertisement, direct mail, online content the installation of more communal garbage cans, and the disposal of waste by allotting private contractors would be effective strategy. Municipalities and other governing bodies need to ensure implementation of plans in terms of Standard technology, Manpower, Timeliness, and decomposing methods. Lastly, residents are integral part of any society, and they must execute their obligation and responsibility to ensure clean environment for their coming generation and sustainable development.

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