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Organic Waste Management Practices In The Households Of Delhi

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Abstract: The study was undertaken to look into organic waste management in the households of Delhi by interviewing 70 households, 10 maids and 10 waste collectors and consulting 2 NGOs. It was found that people mostly saw organic waste as food scraps, with vegetable peels being the most common type. Pre-cooked waste exceeded 400g in many households. Waste was often stored in garbage bags and disposed off mixed. Odour was a major issue for maids and collectors. Both the NGOs focused on composting, using different methods and spreading awareness regarding the same.

Index Terms –Organic waste, Waste segregation, Recycling.

I. INTRODUCTION

Waste is created every day, everywhere - from a scrap of paper to construction waste, both biodegradable and non-biodegradable. The waste generated from different areas of work such as industries, commercial waste, agricultural waste and household waste (domestic) make up a lot when accumulated at one place. It is not only too much for all the waste to go into landfills or dumps but also harmful to the environment. Organic wet waste is a natural refuse, biodegradable in nature, however serious damage is associated with its disposal in landfills. Due to the lack of oxygen, it undergoes anaerobic decomposition creating greenhouse gas which is 20 times more powerful than carbon dioxide. Some of the most common organic wet waste is usually found in cattle waste/agriculture waste, food waste/domestic waste and municipal solid waste (Hazardous waste experts, 2014; Sapokta, 2020).

India faces major environmental challenges and issues related to waste management due to the large amount of waste generation and inefficient ways of waste collection, transportation, disposal and treatment. With the growing population of mega cities, it is becoming much more difficult to keep track of what goes where. Though various policies are in place, yet the current system is unable to cope with the growing needs of waste management. Waste segregation does not take place in most of the households, neither does organic wet waste recycling such as composting. Eventually, the waste from the household that does not have a proper way of disposal goes unnoticed and then onto the streets, consumed by stray animals as well as becoming breeding ground for insects and infections; after all of this, it goes to the landfills and generates powerful greenhouse gas methane, which contribute to global warming (Cheeseman et al. 2017). The need for organic wet waste recycling has thus doubled in the course of time as waste management has become a growing issue in most metropolitan cities.

The study was conducted with the objectives of identifying the components of organic wet waste generated in selected households of Delhi, methods adopted for organic wet waste disposal by households in terms of segregation and recycling, the cycle of organic waste from households to final disposal site and the intervention by the selected NGOs for organic waste management.

II. METHODOLOGY

The study was conducted in Delhi the national capital of India, being a metropolitan city with a rapidly growing population.
Seventy households were selected from across Delhi to form part of the study. One member from each household were chosen as a respondent. Ten maids working in the selected areas were also included in the study. Ten waste collectors responsible for collection from households individually or operating waste collection vehicles were contacted to obtain information related to the research. Thus, the total sample size was 90.
Convenience sampling (non-probability sampling method) would be used to select the sample based on their readiness to cooperate in responding to the questions and interacting with the researcher.

Tools for data collection

Tools for data collection included a questionnaire comprising closed and open-ended questions was used for the respondents to gain insight into the methods adopted and problems faced by the households in management of organic wet waste, and three interview schedules with closed and open-ended questions – two for the maids and waste collectors to gain insight into the cycle of waste from the household to the final disposal, one for the NGOs to understand the work done by them in the field of organic wet waste management.

To identify the amount of precooked waste generated in a day, the selected households were requested to segregate their precooked kitchen waste generated (in a day), on the same day the amount of waste generated was weighed with the help of weighing scale and the amount was noted down**.**

The researcher as a part of the study also prepared bio enzyme (all-purpose cleaner) out of 300grams of citrus peels (organic waste), 100 grams of jaggery and water and obtained 1 liters of bio enzyme which can be used for floor cleaning, glass cleaning, tiles cleaning and can even be used as a pet's cleaner without the fear of any harmful chemicals. The bio enzyme was made from natural ingredients without the use of any chemicals due to which the final product was human, environment and animal friendly.

Data obtained from selected stakeholders was analyzed and interpreted both qualitatively and quantitatively followed by discussion keeping in mind the objectives of the study. Information gathered was tabulated and analyzed (in excel format) to understand the practices of waste management followed by the respondents at the household level, the amount of precooked waste a household generates which can be recycled, and to provide sustainable solutions for the management of organic waste, which will help in adopting alternative methods of recycling organic waste (precooked kitchen waste).

III. RESULTS AND DISCUSSION

Effective waste management is vital as it impacts the environment, economy, and citizens' quality of life. Raising awareness and understanding of waste management practices is key to achieving sustainable development and ensuring the well-being of both people and the planet. Table 1 shows the respondents' perceptions of waste management.

Table 1: Awareness regarding waste management

S.NO.	Information	Frequency (N=70)	Percentage %
Perception vis-à-vis waste management			
1.	Recycling/Re-use	25	35.71
2.	Waste segregation	17	24.28
3.	Proper disposal	10	14.28
4.	Giving it to the waste collector	11	15.71
5.	Just throwing away the waste	2	2.85
6.	Getting rid of the waste from the house	5	7.14
Source of information			
1.	School	27	38.57
2.	College	15	21.42
3.	Workshop/ webinar	7	10.00
4.	Family/ friends/ acquaintances	4	5.71
5.	Media (Broadcast/Print/Social)	17	24.28
Webinars/workshops attended by the respondents			
1.	Webinars/workshops attended	34	48.57
2.	Webinars/workshops not attended	36	51.42
Campaigns held on waste management in the selected areas			
1.	Government campaigns	40	57.14
2.	Not aware	30	42.85

More than one third of the subjects (35.7%) perceived waste management as recycling or re-using the waste while about one fourth (24.3%) mentioned waste segregation in this context. Managing waste was also perceived as proper disposal (14.3%) or simply giving it to the waste collector (15.7%). A few felt that just getting rid of the waste from the house was waste management. Sources of information for the respondents regarding waste management was either school (38.6%), college (21.4%) or the media including broadcast and print media (24.3%). It was interesting to note that a good 48.5% of the respondents had also attended webinars and workshops on waste management while 57.4% reported government campaigns held in their area indicating that information dissemination regarding the same was conducted from time to time and people were aware of methods and techniques of waste management.

Table 2: Awareness regarding organic waste management

S.NO.	Information	Frequency (N=70)	Percentage %
Perception regarding organic waste			
1.	Only food waste	47	67.14
2.	Plant/Animal-based	12	17.14
3.	Paper waste	9	12.86
4.	Plastic waste	1	1.43
5.	E-waste	1	1.43

While there is a growing awareness of the benefits of managing organic waste, public perception of organic waste varied widely as observed in Table 2. Two-third of the respondents (67.1%) perceived organic waste as only food waste, 17.1% as plant or animal based, 12.9% considered it as paper waste. One respondent also mentioned plastic and e-waste as organic waste indicating either a lack of awareness or indifference.

Proper waste disposal is crucial for maintaining a clean and sustainable environment. Improper disposal and mismanagement lead to environmental and health hazards, such as overflowing landfills, groundwater pollution, and air pollution from waste burning. In Table 3, the waste disposal practices of residents is depicted.

Table 3: Kitchen waste storage and disposal

S.NO.	Information	Frequency N=70	Percentage %
Wet kitchen waste storage			
1.	Polythene bag	17	24.28
2.	Dustbin lined with a garbage bag	50	71.42
3.	Dustbin/Bucket without a garbage bag	3	4.28
Organic waste disposal			
1.	In the garbage bag it is stored in	39	71.42
2.	In the plastic bag it is stored in	22	24.28
3.	Directly from the dustbin	6	4.28
Waste disposal site			
1.	Waste collector's vehicle	20	28.57
2.	Waste collector collecting from home	31	44.28
3.	Dropped by self/maid in the society bin/nearby bin	13	18.57
4.	Dropped by self/maid in open spaces	3	4.28
5.	Composted at home	3	4.28
Frequency of disposing kitchen wet waste			
1.	Everyday	58	83.85
2.	Every second day	12	17.14
Availability of common bin for disposing organic waste in the area			
1.	Yes	28	40.00
2.	No	42	60.00

Majority of the respondents (71.4%) reported storing their kitchen waste in a dustbin lined with a garbage bag while about one-fourth (24.3%) stored it in polythene bags without a dustbin or bucket. The subjects either disposed off the organic waste in the same garbage bag (71.4%) or polythene bag (24.2%) that the waste was stored in; a few disposed the waste directly from the dustbin into the community bin or the waste cart. Nearly 44% of the households' waste was collected from home by the waste collectors while 28.6% disposed off the waste in the waste collector's vehicle (tipper); 18.6% dropped the waste either themselves or got it dropped by the maid in the nearby or society bin. Very few used the waste to prepare compost. Most of the households (83.9%) disposed off their waste everyday while the rest disposed it every second day. Forty percent of the households reported having a large bin for organic waste in the society they lived in.

Delhi faces significant challenges with waste management. The city generates massive amount of waste daily, including household, commercial, and industrial waste. Table 4 depicts the destination of waste after collection from households.

Table 4: Waste disposal after collection from households

S.NO.	Information	Frequency (N=10)
Treatment of mixed waste after collection		
1.	Segregated and disposed off	2
2.	Disposed off without segregation	5
3.	Segregated waste received and disposed off	3
Method of waste disposal by waste collectors		
1.	In an open space	7
2.	To the waste tipper	3
Final destination of waste after collection and disposal by waste collectors		
1.	Landfill	4
2.	Open space	5
3.	For segregation by municipality	1
Challenges faced while handling waste		
1.	Bad odor/stink	6
2.	Health issues due to infection	2
3.	Difficulty in waste segregation	2

Five waste collectors reported disposing off the waste in non-segregated form after collection from households while 2 reported segregating waste before disposal; the remaining 3 received segregated waste from the households which they disposed off as such. Four waste collectors reported landfills as the final disposal site of waste, while disposal in open space was reported by the remaining 5. Bad odor/stink from the waste generated was reported as a major challenge faced by 6 waste collectors, few other challenges that were reported consisted of health issues (infections) and difficulty in segregating mixed waste received from the households. The suggestions by the waste collectors included organic waste to be segregated at source before handing over of the waste as mixed waste creates difficulty in segregation and odor issues. Waste

segregation and regular disposal of organic waste was also recorded as a suggestion.

CONCLUSION

India faces major environmental challenges and issues related to waste management due to large amount of waste generation and inefficient ways of waste collection, transportation, disposal and treatment. Non-segregated waste goes into the landfills in a mixed form. However, with the growing population of megacities, it is becoming more and more difficult to keep track of what goes where. The data generated shows lack of waste management awareness and practices. The waste generated does not get segregated at source which results in improper final disposal of the waste. Non-segregated waste, including organic (uncooked/kitchen) waste, not only makes it harmful to the environment but also hazardous to the health of waste handlers. Information campaign is very important regarding proper ways of waste storage and disposal to ensure effective organic waste management throughout the system of waste collection and disposal. Techniques and technologies for proper waste management, particularly in urban areas should not only be installed but also monitored on a regular basis. Funds should be allocated for the same for smooth facilitation and monitoring of waste management. More and more awareness programs regarding organic waste management should be in place so that people become more mindful about the impact of improperly disposed off organic waste on human health and environment.

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