

Survey of Household Solid Waste Management in Rohtak: Awareness, Issues and Practices

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ABSTRACT: Effective solid waste management (SWM) is pivotal for every nation as it determines the sustainability of the environment and ensures the health of the society. This study was designed to assess the level of awareness and knowledge of local residents concerning solid waste management in Rohtak. This study examines households' awareness and opinion of residents about household solid waste management in the city. A survey on 200 respondents among households finds that the awareness on SWM is acceptable and majority of them are ignorant about the disposal method, treatment technologies and frequency of waste collection. However, the respondents' knowledge on waste and their understanding on the health consequences of waste are relatively good. The main problem expressed by respondents with respect to waste is lack of awareness, knowledge and enforcement. As far as waste minimization is concerned, respondents feel that the facilities and services provided are not adequate. Other than using the waste collection service, the households rarely practice other means of waste minimization such as to reuse, recycle, and compost. Educating the community is crucial so that the latter can play their role effectively. Disorderly disposal of rubbish is also perceived to be a problem. As far as waste minimization is concerned, respondents feel that the facilities and services provided are not adequate. Other than using the waste collection service, the households rarely practice other means of waste minimization such as to reuse, recycle, and compost. According to the results of the surveys; where it is important to note that most of the participants reported that 57.57% participant are dissatisfied or very dissatisfied with waste management. 25.26 % of respondent don't know about segregation of wet & dry waste at household level. 17.68% respondent don't know about the harm waste can cause when it enters in water bodies.

Keywords— solid waste management, waste minimization, awareness.

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I. INTRODUCTION

Indian cities and towns are found littered with garbage and creating unpleasant look at many places within the city/town. In most of the towns/cities, only important locations-maintained cleanliness leaving other places piled up with uncollected waste. Drawing of time-targeted action plan for management of Municipal Solid waste (MSW) by each city and town is essential with the increasing quantity of waste that leads to unhealthy environmental conditions.

The World Bank's What a Waste 2.0 report states that around 2.01 billion tonnes of municipal solid waste is generated every year, out of which 33% is not disposed in an environment friendly method (Kaza et al., 2018). As 377 million urban people of India living in 7935 towns and cities are generating 85 million tonnes of municipal solid waste per year. Out of 85 million tonnes (MT) 43 collected, 11.9 treated and 31 dumped in landfill sites (Lahiry Samar, 2018). Increase in urban population and rapid economic growth lead to the increase in solid waste generation (Tarmiji, Usman & Hassan, 2011). Similarly, the characteristics of solid waste have changed in the country due to the rapid industrialization and urbanization (Manaf, Samah & Zukki, 2009). It has also been noted globally that developing Asia are among the largest solid waste generators (UNCRD, 2011). Hence, there is a need for an effective practice of solid waste management to control the current waste generation in the region. This is because in any economy, the solid waste management is an important aspect of citizens' lifestyle and country's economic status (Baud, 2001). According to the United Nations Development Programme in 2008, waste management is a crucial aspect of sustaining the national development.

This study was designed to assess the level of awareness and knowledge of local residents concerning household waste management in Rohtak. Rapid urbanization along with increases in population has led to the deterioration of physical environment in Rohtak. Effective Solid Waste Management (SWM) is one of the

major challenges faced by the local authorities. High volumes of waste generation, inefficient collection and transportation system and limited disposal options are continuously impacting the environment and quality of life in the area.

Rohtak is divided in 20 wards which are covered under Door-to-Door collection in Municipal corporation Rohtak, 100% Door to Door collection is placed. All the waste collected from the Municipal corporation Rohtak area is centrally segregated and processed scientifically (waste to compost). 42 Garbage tipper and 37 tractor trollies are placed for collection of waste. For proper management Rohtak city is divided into six zones. The present service area covered by the bins are less than 50 percent (municipal corporation Rohtak). A critical component in any waste management program is public awareness and participation, in addition to appropriate legislation, strong technical support, and adequate funding. Waste is the result of human activities and everyone needs to have a proper understanding of waste management issues, without which the success of even the best conceived waste management plan becomes questionable.

Solid waste management in Rohtak is aimed to solve the challenges faced by local authorities in managing solid waste, lack of expertise and advanced technology, illegal dumping and management skills on disposal and landfill system. Solid waste management in city needs, recommendation and implementation of policies and strategies pertaining to solid waste management services, as well as promoting participation and awareness among the public.

In order to achieve the above-mentioned goal, there is a need for enhancement in solid waste management practices especially through public awareness and highlighting key factors for reducing the solid waste. There have also been complaints from general public about the services provided, including that the household waste are not been collected as scheduled and was also not properly managed. The uncollected household wastes, resulted in a disgusting sight with nauseating smell, along with flies, insects and worms. This sight can always be seen during long public holidays, school holidays or during festive seasons. The potential reasons for such phenomena are due to limited number of vehicles, limited number of contractors, improper collection schedules and solid waste disposal dump that are situated too far.

This study focuses on household awareness and their perception on household solid waste management practices in Rohtak. Objective of this study is to examine household awareness on solid waste management, waste issues and concerns, Next, we examine household satisfaction on waste collection and customer service, and finally we examine household perception and practice on waste minimization. Primary data were collected from local residents through questionnaire and personal interview. A self-administered questionnaire was used to assess residents' knowledge, attitudes, awareness and practices towards the Solid Waste (SW) problem. The questionnaire consisted of 08 items distributed into four dimensions: attitude, awareness, knowledge of SWM and behavior or practices towards solid waste problem.

II. LITERATURE REVIEW

The increasing & changing lifestyles of people are the main reasons for continuous growth of Municipal Solid Waste (MSW) generation in urban bodies of the country. The annual waste generation has been observed to increase in proportion to the rise in population and urbanization, and issues related to disposal have become challenging as more land is needed for the ultimate disposal of these solid wastes (Idris et al., 2004). Solid wastes are those organic and inorganic waste materials produced by various activities of the society, which have lost their value to the first user. (Toolkit SWM, JNNURM, 2012). Involvement of stakeholders in the waste management practice, there are factors that influence effectiveness of solid waste management. For instance, Sujauddin et al. (2008) argued that waste generation is influenced by the size of the family, their income and their level of education. Similarly, the location of household, land size, peer influence, gender and separation behavior are also the factors affecting the effective management of solid waste (Ekere, Mugisha, & Drake, 2009).

The result revealed that methods of collecting the waste and easy access to waste facilities are the key factors which prevent the segregation of waste among households. Similar findings were reported by Tadesse, Ruijs & Hagos (2008) in the context of India. They found that the household decision on waste disposal is significantly influenced by facilities. Inadequate supply and long distance of waste increase likelihood of dumping the waste in the roadside and other open area. Approach of solid waste management is highly unprofessional and unscientific because of the improper collection, treatment and disposal of solid waste. Most of the waste dropped in an open area leads to air, water and land pollution.

In order to ensure a healthy and clean nation, Behzad et al. (2011) argued that solid waste management practice needs to be improved to achieve environmental quality and socio- economic development of the nation. Similarly, Jereme et al. (2015) observed that an effective service of solid waste management is an essential device for ensuring environmental protection, both urban and rural communities' health, employment and revenue generation.

Majority of the respondents believed the cause of the issues is due to lack of enforcement. Although

80% were satisfied with the collection service, 90% agreed that the federal or local government should enforce strict laws on waste management. A majority of the respondents agreed that there is a need for involvement of private sector and NGOs in waste management. For a sustainable solid waste management, there is a need for transformation in the environmental governance, specifically in solid waste management. This is because transformation is one of the main aspects that would ensure the sustainability of solid waste management in Rohtak.

Trend and management of household solid waste in India is like in other parts of the world, i.e. it depends mostly on changes in the pattern of consumption, seasonal variation and climate. Consequently, the management of solid waste must be improved to ensure the suitability of the technology used with the current development of solid waste. Visvanathan (2006), in their study of management of solid waste in Asia, argued that appropriate management of solid waste is a crucial aspect of reducing the environmental pollution. Awareness on the impacts and problems of generating solid waste must be promoted among the public through enlightenment campaigns and education. (Zarifah Abdullah, Salniza Md Salleh, Ku Nor Izah Ku Ismail, 2017)

III. RESEARCH METHODS

This research used primary data like observations and questionnaire data to determine household awareness and satisfaction with the Rohtak Municipality's Solid Waste Management services. The main reasons are a lack of awareness and poor solid waste management.

This research used data from questionnaire reports to determine household awareness and satisfaction with municipal solid waste management services. Questionnaires and interviews were used to acquire primary data from local individuals. Residents' wisdom, "attitudes, awareness, and practices about the SWM problem were evaluated using a self-administered questionnaire". The survey had four dimensions: attitude, awareness, knowledge of SWM, and behaviour or practices about solid waste. The first section provides the respondents' background information, such as gender, race, tenancy, job opportunity, and education are all factors to consider. The second component of the survey asks about respondents' knowledge of solid waste management, their perceptions of significant waste challenges, and their worries and solutions to the problems. The final component examines household satisfaction with SWM in the city, garbage collection, and perceptions of waste management and waste minimization alternatives. This study's sampling frame includes families in five colonies in the city under examination. RC (Shivaji colony), RC2 (Old Housing Board), (Model Town) RC3, (DLF) RC4 and RC5 are the city regions (Gohana Adda). In the end, 200 houses were sampled; 60 numbers of questionnaire sets were delivered in each RC1 and RC4, 20 in each RC2 and RC5, and 40 in each RC3. Because of the disparity in population density, the distribution was unequal.

The set of questionnaires were distributed by hand of four enumerators to ensure a high response rate. Only 198 of the 200 questionnaires issued were returned. This indicates that nearly all of the sampled respondents (99.5%) responded. The respondents, who were chosen at random from five suburban regions in Rohtak city, completed 198 questionnaires. The results of a descriptive cross-sectional analysis among local communities were studied. Given the importance of solid waste disposal, the goal of this study is to determine the people of Rohtak's knowledge, attitudes, awareness status, behaviour, and practice about SWM. There are three sections to the questionnaire. The first section asks about the respondents' backgrounds, such as gender, race, tenancy, employment status, and education level. The second component of the survey asks about respondents' SWM awareness, perceptions of significant waste issues and concerns, and solutions to those issues and problems. The household's satisfaction with customer service and garbage collection and their perspectives of waste management and waste minimization methods are discussed in the last part.

3.1 Qualitative and quantitative approach

Rohtak has a Municipal Corporation which has engaged a private company for SWM in the city. As this study focused on SWM in Rohtak the municipal Councils of 5 colonies, were selected for the purpose. Discussions and interviews were held with selected officers in order to identify implementation issues of SWM. 200 questionnaires were prepared for interviewing household from RC1, RC2, RC3, RC4, RC5. The data was obtained and presented using descriptive methods. Five officials from waste management department were interviewed for informal interviews and discussions.

IV. RESULTS AND FINDINGS

4.1 Respondent's Profile

The distribution of respondents is shown in Table 1 by district, gender, race, the greatest level of education, employment position, and tenancy. Residents of RC1 and RC4 account for 29.79 percent of the respondents, while each RC3 accounts for 20.20 percent. Male respondents (53.53 percent) outnumber female respondents by a small margin (46.47 percent). Males make up the majority of respondents (53.53 percent), followed by Females (46.47 percent). In terms of educational attainment, most respondents had at least a

secondary school diploma (32.83 percent). Only 1.01 percent of those polled had received no formal education, and 12.12 percent had only attended primary school. The majority of those surveyed are employed or self-employed (55.05 percent). Students make up 22.72 percent of the sample, while housewives make up 19.20 percent. The house owned by 73.24 percent of the tenants, while the remaining 26.76 percent rented it.

TABLE 1: DEMOGRAPHIC BACKGROUND OF RESPONDENTS, ROHTAK CITY (Selected five colonies)

		Frequency	Percentage (%)
Colony	Shivaji Colony (RC1)	59	29.79
	Old Housing Board (RC2)	20	10.11
	Model Town (RC3)	40	20.20
	Gohana Adda (RC4)	59	29.79
	DLF (RC5)	20	10.11
	Total	198	100.0
Gender	Male	106	53.53
	Female	92	46.47
	Total	198	100.0
Education	No formal education	2	1.01
	Primary	24	12.12
	Secondary/ Certificate	65	32.83
	Diploma/ Degree	50	25.25
	Postgraduate	57	28.79
	Total	198	100.0
Employment status	Employed	65	32.83
	Self-employed	44	22.22
	Student	45	22.72
	Housewife	38	19.20
	Unemployed	6	03.03
	Total	198	100
Tenancy	Self-owned	145	73.24
	Rented	53	26.76
	Total	198	100.0

4.2 Rohtak Residents' Household Awareness, Knowledge and Understanding of Waste

Table 2 indicates the respondents' level of knowledge to manage domestic waste. It has been discovered that the majority of respondents (81.81 percent) believe that rubbish is collected on a daily basis.

However, fewer than half of those polled (2.02%) are aware that waste is collected three times in a week. The remaining respondents said three times or four times per week. Approximately 6.07 percent of homes were unable to predict the frequency of waste pickup. The statistics could be interpreted in two ways. Most families are aware of the weekly waste pickup schedule. The respondents unaware of the frequency of garbage collection were either students or were not at home at the time of garbage collection. Second, it could signal that garbage collection are not timely.

The table demonstrates that the majority of respondents are aware of how their garbage should be disposed of, with 82.32 percent believing that rubbish should not be dumped anywhere, such as near river side. Some people (17.68 percent) still have a negative attitude about the garbage disposal, believing it can be poured into water bodies.

This poll also found that only 12.63 percent of respondents believe trash may be used for other purposes, while 87.37 percent disagree. Furthermore, many respondents are aware of the health implications of inadequate garbage collection; 65.66 percent feel that bad waste collection can harm residents' health, whereas 34.34 percent disagree.

Respondents were also asked what they could do with waste. Respondents were given the option of selecting multiple answers. According to Table 15, most families believe waste cannot be recycled. Many people also believe that garbage can be composted (2.02 percent). waste can be utilized as animal feed (6.06 percent) and that no one knows that waste may be used to generate energy.

TABLE 2: ROHTAK RESIDENTS' HOUSEHOLD AWARENESS, KNOWLEDGE AND UNDERSTANDING OF WASTE

		Frequency	Percentage (%)
Frequency of collection	Once a week	11	5.56
	Daily	162	81.81
	Three times a week	4	02.02
	Four times a week	9	4.54
	Don't know	12	06.07
	Total	198	100.0
Awareness on segregation of wet waste & dry waste	Children (below 14)	07	03.54
	Youth (15-24)	40	20.20
	Adults (25-64)	79	39.89
	Seniors (65 & above)	22	11.11
	Don't know	50	25.26
	Total	198	100.0
Rubbish can be thrown in or near water body	Yes	35	17.68
	No	163	82.32
	Total	198	100.0
Rubbish can be useful	Yes	25	12.63
	No	173	87.37
	Total	198	100.0
Poor collection affects our health	Yes	130	65.66
	No	68	34.34
	Total	198	100
What we do with waste	Recycle	0	0
	Compost	4	2.02
	Reuse	5	2.52
	Animal feed	12	6.06
	Energy product	0	0
	Don't Know	177	89.39

4.3 Waste Disposal and Collection Problems, Rohtak City

Respondents had conflicting feelings about trash disposal issues, expressing varying levels of responsiveness to the numerous issues listed. In general, respondents voiced grave concerns about all of the topics. The most important problem is that collectors do not stick to collection schedules, and garbage pickup is sporadic. Another difficulty is that there aren't enough bins to handle the amount of rubbish that needs to be disposed of. When this happens, garbage is disposed of in an unorganized manner. Respondents also have a problem with a lack of specialized garbage disposal locations.

Respondents were also questioned about the causes of garbage disposal chaos. According to the majority of respondents, the problem is mostly caused by a lack of awareness and understanding (table 3) (33.83 percent). Another factor is that the government does not enforce the law (55.05 percent). Furthermore, a significant percentage of respondents (11.12%) feel that non-human causes such as cats, dogs, and monkeys may be contributing to the problem. This demonstrates that trash management companies invest more time and effort in educating and training their employees about their jobs and dealing with the public. Deterring animals from rummaging in trash and digging into dumpsters should also be prioritized

TABLE 3: SERIOUSNESS OF WASTE DISPOSAL AND COLLECTION PROBLEMS (n = 198), ROHTAK CITY

			No problem(1)	Slight problem (2)	Serious problem(3)	Very serious problem (4)	Extremelyserious problem (5)
1. No specific rubbish disposal spot (n=198)	Freq.	22	35	73	42	26	
	%	(11.11)	(17.68)	(36.87)	(21.21)	(13.13)	
2. Number of bins not enough (n=198)	Freq.	22	43	69	40	25	

		%	(11.11)	(21.71)	(34.84)	(20.20)	(12.62)	
5.	Disorderly disposal of rubbish (n=198)	Freq.	20	40	67	45	26	
		%	(10.10)	(20.20)	(33.83)	(22.73)	(13.14)	
						Freq.	%	
	Causes of disorderly disposal		Lack awareness/ knowledge			67		33.83
			Lack of enforcement			109		55.05
			Other than human factors			22		11.12

4.4 Household Satisfaction - Waste Collectors, Rohtak City

This survey also looks into household satisfaction with waste collectors' behavior. Table 4 shows the results of the survey. Overall, respondents are somewhat satisfied with rubbish collection in their neighbourhood. In general, respondents think the curbside and alley collection service is good.

When it comes to safe driving, respondents are more satisfied with garbage truck drivers. The responses are divided on whether the staff are friendly and helpful to the household. Their views on whether the service areas are kept clean are mixed as well; nevertheless, more respondents say they are satisfied. Respondents were also questioned regarding service satisfaction rate (17.17+11.61= 28.78) percent. The service is unsatisfactory to the remaining (27.77+29.79=57.56) percent. However, the causes for their unhappiness were not investigated further in this study.

TABLE 4: HOUSEHOLD SATISFACTION - WASTE COLLECTORS, ROHTAK CITY

		Excellent(1)	Good(2)	Average(3)	Poor(4)	
Collection service at curbs and alleys (n=198)	Freq.	12	60	72	54	
	%	(6.06)	(30.30)	(36.36)	(27.28)	
Customer Satisfaction -Waste Collection		Not at all satisfied (1)	Not satisfied (2)	Undecided(3)	Satisfied(4)	Extremely satisfied (5)
		55	59	17	34	23
		(27.77)	(29.79)	(8.58)	(17.17)	(11.61)
Service area left clean(n=198)	Freq.	21	25	62	84	4
	%	(10.60)	(12.62)	(31.31)	(42.42)	(2.02)
Satisfied with service performed in collecting large items (n=198)					Freq.	%
	Yes				100	50.50
	No				98	49.49

4.5 Rohtak Residents' - Waste Management and Waste Minimization Solutions

Aside from a series of questions about SWM, the level of awareness and practice of households about waste minimization or lowering the amount of garbage sent to landfills, was also assessed. Table 5 summarizes the findings. Overall, most respondents (59.59 percent) felt that the waste management company's facilities and services for trash management are inadequate. Regular collection (32.82 percent), enforcement and strict standards (20.20+20.20=40.40 percent), sanitary dumping, and raising awareness, in that order, are among the facilities and services that might improve waste management (27.27 percent).40.40 % agreed that waste minimization services and facilities are adequate.

TABLE 5: ROHTAK RESIDENTS' HOUSEHOLD AWARENESS –WASTE MINIMIZATION

		Frequency	Percentage (%)
Facilities and services are adequate	Yes	80	40.40
	No	118	59.59
Facilities and services to improve	Regular collection	65	32.82
	Enforcement	40	20.20
	Awareness	22	11.11
	Sanitary dumping	32	16.16
	Strict standards	40	20.20
How dispose-off household waste	Collection service	40	20.20

	Reuse/ recycle	2	1.01
	Compost	4	2.02
	Animal food	65	32.82
	Burn/bury/dump backyard	53	26.76
	Dump on river side	4	2.02
Make compost at home	Yes	04	2.02
	No	194	97.97
Agree if compost demonstrated	Yes	4	2.02
	No	194	97.97
Support centralized composting	Yes	155	78.28
	No	43	21.71

The methods through which families dispose of their waste outside of regular pickups are sought. Respondents are permitted to provide multiple responses. The respondents also frequently burn, bury, or dump garbage in their backyards. Depending on the home area and population density, the activity may not be appropriate. It is an unhealthy and unacceptable practice in housing zones with limited vacant land where houses are linked or adjacent.

According to present study, just 1.01 percent of respondents reuse or recycle rubbish in order to reduce waste disposal in landfills. It appears that a majority of respondents (78.28 percent) support centralized composting and embrace the notion of showing composting (21.71 percent). This demonstrates that many people are interested in composting but lack the necessary information. Waste disposal can be reduced if good and ongoing composting demonstrations are provided.

IV. DISCUSSION AND CONCLUSION

This survey shows that families have a reasonable understanding of garbage, including the health repercussions and how waste may help society and the environment if disposed of appropriately and scientifically. On the other hand, households are unaware of the waste pickup schedule. Knowing the correct schedule is critical since it aids the household in planning their trash disposal in the bin. Ignorance on the public side and irregular garbage collection by the service provider can have major implications, such as overflowing bins, waste that has been left uncollected for an extended period of time, and an odorous atmosphere that attracts flies and other insects and animals. As a result, it is the municipality's responsibility to ensure that waste is collected on time and that householders are aware of the schedule. As a result, the environment will be cleaner and healthier. The respondents also agree that disorderly garbage disposal is caused by a lack of awareness, understanding, and enforcement. Knowing the correct schedule is critical since it aids the household in planning their trash disposal in the bin. Unawareness on public side and irregular waste collection by the service provider can have major implications, such as overflowing bins, trash that has been left uncollected for an extended period of time, and an odorous atmosphere that attracts flies and other insects and animals. As a result, it is the obligation of the municipality to ensure that waste is collected on time and that householders are aware of the schedule. As a result, the environment will be cleaner and healthier. The respondents also agree that disorderly garbage disposal is caused by a lack of awareness, understanding, and enforcement. In general, respondents are satisfied with waste collectors' attitude during rubbish collection. Safe driving, friendliness, cleanliness of service locations, and correct placement of garbage carts and bins after collection are all suggested improvements.

The people should be educated about the necessity of recycling through social media, mass media, schools and universities, and places of worship. Composting is another method of waste reduction that could be used. Although few respondents compost their household garbage, the majority are interested in doing so if it is demonstrated, and they are enthusiastic about the idea of centralized composting. Again, educating the public on composting techniques is crucial for trash reduction. Although this research was limited to one of Rohtak's regions, it might be used and generalized to other parts of the country. Continuous public awareness efforts, greater in-depth knowledge exchange, motivation, and training would be among the first steps required. Only way for community to prosper is for all parties to work together on technical and behavioural issues.

Campaigns on household waste separation, another method of waste management, were not widespread when this poll was done. The separation of recyclable waste, residual garbage, and bulky garden debris is part of the solid waste segregation process.

Barriers in People's participation in SWM

Following the survey, group discussions, a series of meetings, and crucial informal interviews were held to identify the barriers to bridging the gap between the municipality and the people in order to provide better SWM services. The respondents revealed the following main roadblocks to such a collaboration:

- Municipal leaders' inability to comprehend and form partnerships with the public.
- People's lack of understanding and uncaring attitudes toward their obligations
- Women and the impoverished are afraid to participate in SWM activities because they believe they are inexperienced.

Officials from the municipality stated that they were having problems enabling the participation process because they lacked the essential skills and had no opportunity to reach out to public.

Women are critical stakeholders in SWM since they are the ones who are in charge of family hygiene and waste management on a daily basis. In this context, a special focus on women is essential for long-term household garbage management. Every individual must make efforts to comprehend the solid waste issue, to have this understanding reach their consciousness, and to be aware of their roles and obligations.

Because children are powerful communicators and the ultimate beneficiaries of a brighter tomorrow, it is critical to focus on educating them about the necessity of maintaining a clean environment and proper trash disposal. As a result, it is vital to hold educational sessions for school-aged youngsters. In order to attract students' attention and build a thorough understanding, posters, images, and written articles should be shown in classrooms. The school lecture should contain solid waste management awareness among students, which enhanced parents' understanding of solid waste concerns indirectly since children carried the information home and discussed it with their parents. The success of SWM is heavily reliant on people's actions. People are more likely to engage in responsible conduct or make adjustments in trash disposal procedures if they are aware of the problem.

Most citizens are uninformed of the unfavorable effects of SW and hence do not make any attempt to reduce garbage, according to studies. Citizens do not separate waste into organic, non-biodegradable, glass, metal, and other categories, owing to a lack of awareness. As a result, ongoing public awareness programme are required. It is possible to employ electronic media, print advertisements, posters, pamphlets, and signage. Public awareness programme should be conducted to encourage people to reduce waste at the source, segregate waste, and be aware of their responsibilities in terms of environmental protection and public health and hygiene. Composting procedures at home should be made available, together with information and technology. Segregation and collection of garbage should be made a top priority for the commercial sector. Waste management should be made a mandatory subject in environmental science curricula so that students are informed of sustainable solid waste management, new solutions, and methodologies in the future.

V. CONCLUSION

The study found that there were insufficient human and financial resources, a lack of an Integrated Sustainable Waste Management Plan, public ignorance, inadequate land for final waste disposal, a lack of modern technology, and poor enforcement of the Solid Waste Management Rule. For effective and successful waste management in Rohtak, adequate resources, motivating workers, establishing a positive policy, incorporating technological innovations, providing economic rewards for recyclable materials, political leadership support, encouraging the reduction of waste, composting, and recycling methodologies are all recommended. Other allied areas that have an impact on SWM in the city and have not been studied include waste management financing and revenue mobilization from local sources, urban housing development and land use, configurational analysis of changing waste mix in the city, bio-medical waste and liquid waste disposal, and suitable logistics and advanced techniques for solid waste management. This research will help develop a sustainable waste management plan for the city of Rohtak. As a result, this research study aids in determining the level of awareness and waste management difficulties in Rohtak, which will aid in determining measures to improve environmental sanitation and sustainable development in the city.

This study found that raising public knowledge is crucial, but raising awareness alone is not enough to encourage individuals in Rohtak to participate in SWM. Building the municipality's capability is essential for encouraging public engagement and fostering long-term viability. Similarly, a plan that involves teaching people, creating knowledge, and developing self-reliability required for individuals to contribute to the complete SWM process actively should be implemented. Public communication and motivational measures that are effective are worthwhile.

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