

Solid Waste Management Practices of Households: A Comparative Study in Two Urban Settings of Kerala

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ABSTRACT

Solid waste is usually the one service that falls completely within the local government's purview. Solid waste is the most visible and pernicious by-product of a resource-intensive, consumer-based economic lifestyle. An urban local body that cannot effectively manage its waste is rarely able to manage more complex services and therefore improving MSW is one of the most effective ways to strengthen overall municipal management and is usually a prerequisite for other, more complicated, municipal services such as health, education, or transportation. In addition, the Municipal Solid Waste (Management and handling) Rules, 2000 entrust the municipal authorities with the responsibility for collection, segregation, storage, transportation, processing and disposal of municipal solid waste. Though the government of India has initiated a series of urban governance reforms to strengthen local –level government yet desired or minimum results are still illusive due lack of community participation.

Keywords

Municipal Solid Waste, urban local body, Municipal Solid Waste Rules, 2000

1. INTRODUCTION

The development experience of Kerala is quite striking and is widely discussed in economic literature. With high Human Development (education & health) and demographic attainment, fairly good standard of living relatively at low per capita SDP, favorable sex ratio, progressive politics, the economy is characterized by a fragile base and low commodity production, stagnant industrial production, high unemployment levels and falling ecological health [1]. The State of Kerala has a continuing problem with waste management with its high population density and land constraints in its pursuit to promote economic development [2]. The experiences of people living around Laloor in Thrissur, Vadavathur in

Kottayam, Kurrepuzha in Kollam and Vilappilsala in Thiruvananthapuram deeply stained the waste management legacy of the state. The experiment in decentralized solid waste management, several best practices have emerged in rural & urban areas of the state. Mention a few gold spots, 'The Thumpoomuzhi model' at Alappuzha, the Attingal Model, and Suchitwa Sundara Muthooli etc. stand distinct and received acclaim.

2. STATEMENT OF THE PROBLEM

Though, Solid Waste Management is one of the important obligatory functions of urban local bodies, this essential service is not efficiently and properly performed by the local bodies of Kerala due to lack of financial resources, institutional weakness, improper selection of technology, public's apathy towards environmental cleanliness and sanitation resulting in many health and sanitation problems [3]. The intervention of urban local bodies shows wide disparities across municipalities and this clearly shows that other than finances, management of solid waste is something to do with the organizational aspect? In other words, ULBs involvement in Solid Waste Management acts as a catalyst in delivery of the waste services

3. REVIEW OF LITERATURE AND RESEARCH GAP

Solid Waste Management is a major sustainable development challenge and requires transformative change at all local, national and global levels. In India, the per capita waste generation has increased from 0.44 kg/day in 2001 to 0.5 kg/day in 2011, decadal per capita waste generation growth rate of 13.6% fuelled by life style changes and consumerism of urban India[4]. A review of literature indicates that urban solid waste disposal is a multi-dimensional issue and to be approached holistically. The debates concerning waste material reduction focuses on main three angles namely manufacturer responsibility, consumer responsibility and recycling[5]. People recognize trash as an issue in developing countries [6]. But recognizing trash as an issue does not prevent littering or

other negative behavior concerning waste management [7]. This attitude-behavioral gap emerges due to variety factors including social norms, lack of awareness and education of effective waste management technique, lack of participation, convenience [8]. Litter is recognized as a street pollution and several factors contribute to increase public littering rates such as lack of social pressure, absence of realistic penalties, lack of enforcement laws, and lack of knowledge on environmental effects of littering, poor packaging designs of commercial products [9]. Living with waste is purely associated with habits and custom [10]. In developing countries, the common man's perception about solid waste management suffer "not in my backyard" syndrome and leave waste to be taken care by urban local municipal bodies only. Awareness towards safe disposal of waste, public-private partnership, and selection of appropriate technology according to waste characteristics is important [11]. Srinivasan Krithika [12] explores the effectiveness of public, private and civil society participation in SWM in Chennai city. Ambat Babu [13] gives an overview of the social and management problems encountered on community based solid waste management projects. Experiences revealed that problems encountered with waste management are due to low community participation, financial constraints, managerial problems attributed to low accountability. Thus, it is important to investigate how far policies of two municipalities influence waste management initiatives of households.

4. RESEARCH QUESTIONS

1. What are the factors that influence efficiency levels of waste management of the two municipalities?
2. How far policies of two municipalities influence waste management initiatives?

5. OBJECTIVES OF THE STUDY

1. To compare the Municipal Solid Waste Mechanisms of Attingal and Changanacherry municipalities.
2. To analyze the socio-economic dynamics of waste management of households in both municipalities.

6. METHODOLOGY

The study is analytical in nature based on inductive method and used both quantitative and qualitative methodologies to research. Secondary sources include accessing several documents like annual reports, survey

reports, and other relevant documents. The study has taken two important institutions for analysis. Information was collected from municipalities and also from the people (Households) about their concept and approach towards solid waste issue. The sample size of 350 is adequate to represent the finite number of 3500 households from selected wards of both municipalities. 10% of the sampled households randomly selected from the wards representing 220 and 130 households were taken from Changanacherry and Attingal respectively. To serve the purpose of the study, in depth dialogues have been conducted using discussions with various stakeholders like NGOs, CBO, Merchants Associations, scrap dealers etc.

7. STUDY AREAS

Of the 60 municipalities in Kerala, two were chosen to represent the current status of Solid Waste Management services provided in the state. The first municipality Attingal has a population of about 37,382 [14] and is spread over an area of 16.87 km², covering 31 wards. This municipality generates 20 tonnes solid waste every day and Attingal has been adjudged the best and won several awards from state Government for putting in place a mechanism for collection and disposal of waste, had drawn up an action plan to encourage people to dispose of waste at source itself [15, 16]. The second municipality is Changanacherry with population of 51,960. This municipality is spread over a total area of 13.5 km², covering 37 wards. About 12 tons of solid waste is generated daily, even though there is a solid waste collection service provided by the municipality, the collection coverage is limited to cleaning streets and public places and 50% of the household waste generated ends up being discarded in public areas and roadsides.

8. RESULTS AND FINDINGS

8.1 Empirical Verification of the Management of wastes in study areas

The researcher has made an empirical verification of the study on managing the wastes by the households in both Attingal and Changanacherry Municipalities. This is to ascertain if there is any significant difference in municipalities and the level of awareness and practices of solid waste management in both urban settings. The Pearsonian Chi-square test has been used to test whether there is relationship between the attributes concerned. A cross tabulation of the important variables has been made.

Measurement of level of efficiency

The overall waste management efficiency of a household is determined by various factors. Efficient and systematic disposal and management of solid waste finds expression based on following factors.

1. Use of environmental packaging
2. Purchasing long lasting products while shopping
3. Training on systematic solid waste management
4. Awareness on waste reduction

5. Taking waste disposal issues before Municipalities.
6. Following waste reduction practices.

The above mentioned parameters are often perceived as qualitative variables were sufficiently scaled for facilitating analysis of household’s efficiency in solid waste management. The responses for the above parameters were categorized in to four categories such as (a) never (b) sometimes (c) often (d) always .The following table.1 gives the relation between the use of environmental packaging of two municipalities. Environmental packaging refers to the use of carry bags made of paper and cloth instead of polythene covers which harm both humans and environment.

Table 1. Cross Analysis of the use of environmental friendly packaging of Attingal and Changanacherry Municipalities

Do you insist on particular (reusable or environment friendly) packing		Municipality		Total
		Attingal	Changanassery	
Never	No. of Households	16	92	108
	% within Municipality	12.3%	41.8%	30.9%
Sometimes	No. of Households	38	48	86
	% within Municipality	29.2%	21.8%	24.6%
Often	No. of Households	64	18	82
	% within Municipality	49.2%	8.2%	23.4%
Always	No. of Households	12	62	74
	% within Municipality	9.2%	28.2%	21.1%
Total	No. of Households	130	220	350
	% within Municipality	100.0%	100.0%	100.0%

Source: Primary Survey

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	97.540	3	<0.001
Significant			

From the above table, around 49.2% of the households often insist on environmental packaging in Attingal Municipality while it is only 8.2% in Changanacherry. The percentage of households that never insists on environmental packaging in Attingal is only 12.3% compared to 41.8% in Changanacherry. This clearly shows that people in Attingal resort to good practice of carrying big shoppers while shopping and they reduce the use of

plastic carry bags .This practice has come about through Information Education and Communication (IEC) imparted by the Attingal Municipality for societal change. In Changanacherry the percent of people always insisting on reusable packaging is higher, about28.2% compared to 9.2% in Attingal. This is because since there are no waste management facilities provided by municipality for households in Changanacherry, a portion of the households regularly adopts certain healthy practices. We cannot appreciate, as a small proportion only regularly adopts good practices in Changanacherry. The sustainability depends on the extensiveness or the spread of good practices in waste management as seen in Attingal. This requires an intervention of machinery in waste management by stakeholder’s participation.

Table 2. Cross Analysis of insisting on purchasing long lasting products while shopping of two urban settings

			Municipality		Total
			Attingal	Changanassery	
Do you insist on purchasing long lasting products or recyclable products while shopping	Never	No. of Households	16	81	97
		% within Municipality	12.3%	36.8%	27.7%
	Sometimes	No. of Households	30	32	62
		% within Municipality	23.1%	14.5%	17.7%
	Often	No. of Households	38	31	69
		% within Municipality	29.2%	14.1%	19.7%
	Always	No. of Households	46	76	122
		% within Municipality	35.4%	34.5%	34.9%
	Total	No. of Households	130	220	350
		% within Municipality	100.0%	100.0%	100.0%

Source: Primary Survey

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	30.588	3	<0.001
Significant			

is only to 12.3% while in Changanacherry it is 36.8%. This clearly depicts that through various IEC programme initiated by the Attingal municipality, people have more awareness and have a concern for the environment. Nearly 35% households of both municipalities purchase long lasting products to eliminate waste.

From the above table, in Attingal those people that never insist on purchasing long lasting products while shopping

Table 3. Cross Analysis of the participation in training programme on systematic solid waste management in two urban settings

Have you been associated with any awareness/training programme on systematic SWM			Municipality		Total
			Attingal	Changanassery	
No	No. of Households	86	131	217	
	% within Municipality	66.2%	59.5%	62.0%	
To some extend	No. of Households	42	71	113	
	% within Municipality	32.3%	32.3%	32.3%	
To great extend	No. of Households	2	18	20	
	% within Municipality	1.5%	8.2%	5.7%	
Total	No. of Households	130	220	350	
	% within Municipality	100.0%	100.0%	100.0%	

Source: Primary Survey

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.887	2	.032
Significant			

% and 60% never participated in any such programme in AttingalandChanganacherry Municipalities respectively. Differences are noticed in both municipalities and in Changanacherry municipality, the initiatives of residents associations and community based organizations in waste management are significant on providing training programme /awareness classes on systematic waste management.

From the above table we can infer that households did not get systematic training on solid waste management as 66

Table 4. A cross tabulation of awareness /knowledge on the importance on waste minimization of two urban settings

Are you aware on the importance of waste reduction/minimization?		Municipality		Total
		Attingal	Changanassery	
No	No. of Households	66	30	96
	% within Municipality	50.8%	13.6%	27.4%
To some extend	No. of Households	41	112	153
	% within Municipality	31.5%	50.9%	43.7%
To great extend	No. of Households	23	78	101
	% within Municipality	17.7%	35.5%	28.9%
Total	No. of Households	130	220	350
	% within Municipality	100.0%	100.0%	100.0%

Source: Primary Survey

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	57.026	2	<0.001
Significant			

involvement of Kudumbasree in waste collection. In Changanacherry more households have awareness/knowledge on the importance of waste minimization. Since there is no alternate arrangement for waste collection, people try to reduce waste by their own methods.

The table clearly depicts that knowledge on waste minimization is less in Attingal (50.8%) due to

Table 5. A cross Analysis of waste reduction practices in Attingal and Changanacherry Municipalities

Are you following any waste reduction practices		Municipality		Total
		Attingal	Changanassery	
Never practiced recycling	No. of Households	20	88	108
	% within Municipality	15.4%	40.0%	30.9%
Seldom did	No. of Households	81	76	157
	% within Municipality	62.3%	34.5%	44.9%
Regularly practiced it	No. of Households	29	56	85
	% within Municipality	22.3%	25.5%	24.3%
Total	No. of Households	130	220	350
	% within Municipality	100.0%	100.0%	100.0%

Source: Primary Survey

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	30.419	2	<0.001
Significant			

In Attingal Municipality , nearly 51%the households (Table 4) have no awareness on waste minimization but those never follows waste reduction practices is very less to the extent of 15.4% (Table 5). This is because of the high involvement of kudumbasree in waste collection through users' fee, people try to control wastes as user fee

is dependent on quantum generated. About 66% (Table 3) of households did not get systematic training or participated in programme on solid waste management as in Attingal, an environment is created in through the intervention of municipality through Self Help Groups. A societal consciousness in favor of waste management has developed through the intervention of Kudumbasree, knowledge spread through their activities has been internalized by the public. Moreover significant differences are noted in between the municipalities in following waste reduction practices.

In Changanacherry municipality 40% (Table 5) households never practice waste reduction practices, though 86% (Table 4) of the households have awareness on waste minimization. This shows that awareness does not prevent littering or other negative behavior concerning waste management. This attitude-behavioral gap emerges due to the absence of certain machinery. Based on the

information the most important determinant is that some kind of an intervention or stakeholders involvement is very important to tackle the issue of solid waste. Comparing both municipalities, awareness is not a sufficient condition, may be a sufficient condition. In between the awareness and practice there should be an external agency to make waste management work.

Table 6. A cross analysis on taking up of waste disposal issues with authorities two urban settings

Any time taken up waste disposal issues with authorities		Municipality		Total
		Attingal	Changanassery	
Always	No. of Households	64	46	110
	% within Municipality	49.2%	20.9%	31.4%
Often	No. of Households	46	20	66
	% within Municipality	35.4%	9.1%	18.9%
Sometimes	No. of Households	16	58	74
	% within Municipality	12.3%	26.4%	21.1%
Never	No. of Households	4	96	100
	% within Municipality	3.1%	43.6%	28.6%
Total	No. of Households	130	220	350
	% within Municipality	100.0%	100.0%	100.0%

Source: Primary Survey

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	105.499	3	<0.001
Significant			

From the above table, it is seen that 49.2% of the households always take up the waste disposal issues before the municipal authorities and only 3% have never addressed waste issues in Attingal. This is because a culture of environmental consciousness is created in Attingal through municipal intervention and consider municipality as a responsible partner in creating healthy living atmosphere. In Changanacherry 43.6% of the households has never taken up waste disposal issues before municipality. This is because they feel institutional mechanism as weak and non-supportive in delivering the civic responsibility of managing waste.

9. RECOMMENDATIONS BASED ON THE STUDY

1. The intervention of government with a political will and suitable policy framework are to be adopted in waste management

2. Bio-degradable waste should be collected by Kudumbasree from different sources. This Bio-degradable waste should be made manure and to be sold directly by the Government or through Government agencies in the local markets. This will help the government to find a source for financing the processing cost associated with waste management.
3. Government should promote managing the waste at the source itself. For this, awareness on different decentralized composting technologies should be made open to the public at subsidized rates.

10. CONCLUDING REMARKS

Waste management practices improperly managed can impede the provision of basic necessities for public health such as clean water, clean air and safe food and can lead to the spread of vector-borne diseases. Hazardous waste indiscriminately mixed with other wastes and disposed can be extremely harmful for workers in the waste sector, adjacent communities, and the environment. Effective SWM depends upon the co-operation of the population, and local government should take measures to enhance public awareness of the importance of MSWM, and promote active participation of users, community groups

and private groups in local waste management. This includes public participation from Gramasabha, Kudumbasree intervention, Residents Association, Merchants Association, education and awareness through schools/Institutions and through various media and club activities.

REFERENCES

- [1] Subrahmanian K.K. "Development Paradox of Kerala .Analysis of Industrial Stagnation". Economic and Political Weekly. Sep.15,2053-2055.1990.
- [2] Nair K.N and Sridhar R. "Cleaning up Kerala" submitted to Kerala Research Programme on Local Level Development by Centre for Environment and Development December 2005.
- [3] Sukanya Das, Ekin Birol and Rabindra N. Bhattacharya. "Informing Efficient and Effective Solid Waste Management to Improve Local Environmental Quality and Public Health: Application of the Choice Experiment Method in West Bengal, India". Discussion Paper Series Environmental Economy and Policy Research University of Cambridge .2008
- [4] 4. Annepu Kharvel Ranjith. "Sustainable Solid Waste Management in India" Sponsored by Waste-to-Energy Research and Technology Council (WTERT) Colombia University & Earth Engineering Centre. 2012
- [5] Beukman C P and Harfield Toby. "Sustainable development: Three innovative models of public management". The innovative Journal Rutgers-Newark School of Public Affairs and Administration. ISSN:1715 – 3816.1998
- [6] McAllister, Jessica. "Factors influencing Solid-Waste Management in the Developing World" .All Graduate Plan B and other Reports. Paper 528.2015
- [7] Moore, S. A. "Garbage matters: Concepts in new geographies of waste". Progress in Human Geography, 36(6), 780-799.2012.
- [8] Milea, A. "Waste as a social dilemma: Issues of social and environmental justice and the role of residents in municipal solid waste management, Delhi, India". Master's thesis, Lund University. Lund, Sweden.2009.
- [9] 9. Al-Khatib, I. A., Arafat, H. A., Daoud, R., and Shwahneh, H. "Enhanced solid waste management by understanding the effects of gender, income, marital status, and religious convictions on attitudes and practices related to street littering in Nablus – Palestinian territory". Waste Management, 29(1), 449-455.2009
- [10] Yousif, D. F., and Scott, S. "Governing solid waste management in Mazatenango, Guatemala". International Development Planning Review. 29(4), 433-450.2007
- [11] 11. Joshi, Rajkumar and Ahmed Sirajuddin. "Status and Challenges of Municipal Solid Waste Management in India. A review". Cogent Environmental Science Vol 2, Issue 1. 2016.
- [12] Krithika Srinivasan. "Public Private and voluntary Agencies in Solid Waste Management. A study in Chennai city". Economic and Political Weekly Vol. XLI No. 22 June 3-9, 2006.
- [13] Ambat, Babu. "Study of the attitude and perception of community towards solid waste management-A case study of Thiruvananthapuram District-Phase-II". Project report by Kerala Research Programme on Local Level Development, Centre for Environment and Development, Thiruvananthapuram. Centre for Environment and Development, December, 2003.
- [14] Census of India website: Office of the Registrar General and Census Commissioner of India. 2011.
- [15] Audit Report (LSGIs) 2010 Chapter 111 Performance Report, Solid Waste Management in Urban Local Bodies.
- [16] 'Attingal municipality wins PCB Awards', The Hindu, June 3, 2014.