

SUSTAINABLE WASTE MANAGEMENT IN MANGATTIDAM GRAMAPANCHAYATH, KERALA

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Abstract

This study investigated household waste management practices in Mangattidam Gramapanchayath, Kannur district, Kerala, surveying 50 residents aged 25-60 years. Findings reveal high rates of waste separation (78% always separate) and composting (72% regularly practice). However, challenges persist, primarily a lack of awareness cited by 56 percent of respondents, alongside infrastructure inadequacies noted by 22 percent. Organic material (50%) and plastics (44%) constitute the bulk of household waste, with plastics being the most recycled item (68%). While 94 percent reported health improvements following the implementation of waste management systems, 42 percent of the subjects still experienced waste-related illnesses, predominantly Dengue fever (44%) and Malaria (22%). Community engagement includes 68 percent receiving disease prevention training and 88 percent taking personal preventive measures, though participation in clean-ups remains moderate (42% participate sometimes). The study concludes that despite positive practices, enhancing specific public awareness campaigns and improving collection/disposal infrastructure are crucial for mitigating health risks and achieving sustainable rural waste management in the region.

Key words: *Community Participation, Health Impacts, Rural Waste Management, Sustainable Practices and Waste Segregation*

INTRODUCTION

Waste management is a critical global issue affecting human health and environmental sustainability. Waste generation, an inevitable outcome of human activities such as household, agricultural, industrial, and healthcare processes, poses significant environmental challenges due to its increasing volume and diversity. International efforts and technological advancements aim to tackle these issues (Omidi et al., 2020). Waste management involves handling waste from creation to disposal. Factors like geography, socioeconomic status, and culture influence waste quantity and types. Poor disposal contributes to climate change and serious health issues (Gour & Saraswat, 2022). Historically less concerning due to lower populations and abundant land, waste-related problems have intensified with population

growth, industrialization, and changing lifestyles, particularly in rural areas with limited resources.

India generates about 62 million tons of waste annually, facing major management challenges. Waste is categorized into hazardous, electronic, and solid types (Kurakalva et al., 2016). Improper disposal causes pollution and health hazards, particularly in rural areas lacking awareness and technology. Government initiatives like the Waste to Wealth Mission and Plastic Waste Management Rules (2016) aim to improve the situation by promoting community participation, technology, and reducing plastic use. The Swachh Bharat Mission also targets open dumping and better solid waste management. Despite progress, challenges like inconsistent collection and low public awareness remain. The urgent need for sustainable waste strategies in India is clear due to rising waste production and inefficient handling. Waste prevention, Recycling Composting, Landfilling, Mechanical-Biological Treatment and Waste-to-energy are the various methods are used in waste management: Combining these methods helps reduce environmental impact. Rural areas face unique challenges like poor infrastructure and dispersed populations, often leading to open dumping and burning (Bavani & Phon, 2009). Community efforts like composting and source separation are effective, with studies suggesting up to 95% of waste can be recycled or reused. However, success requires community engagement, government support, and technology (Ramesh & SivaRam, 2016).

Significance of the Study

This study addresses key waste management concerns, especially in rural areas. It evaluates current practices and identifies needed improvements in segregation, recycling, and disposal. A key focus is the lack of public awareness and structured systems in rural regions. It also assesses government initiatives and local recycling programs, noting challenges like irregular collection despite some successes. The research highlights health risks from improper disposal, such as respiratory issues from burning and waterborne diseases from contamination, stressing the need for better health education and sanitation. By offering insights, this study aims to aid the development of efficient rural waste solutions, emphasizing public participation, better infrastructure, and education. The findings are valuable for policymakers and communities in creating effective strategies.

Objectives of the Study

-To examine household waste management practices and their rural impact.

- To assess environmental awareness and recycling habits.
- To evaluate the effectiveness and challenges of existing waste systems.
- To investigate health impacts of improper waste disposal and prevention strategies.
- To identify community-level waste management efforts.

METHODOLOGY

This study employed a descriptive survey research design to investigate waste management practices among rural households. The research was specifically conducted within Mangattidam Gramapanchayath, situated in the Kannur district of Kerala, India. 50 households were selected at random consisting of residents in the age group of 25 and 60. This sample size and composition were deemed sufficient to provide indicative insights into the prevailing waste management behaviours and perceptions within the community. The primary tool for data collection was a self-designed questionnaire satisfying the objectives of the study. The purpose of the study was explained, and informed consent was obtained from each participant before data collection. The responses were compiled and analyzed quantitatively using percentage.

RESULTS AND DISCUSSION

The results and discussion pertaining to the study entitled “Sustainable Waste Management in Rural India: A Case Study of Mangattidam Gramapanchayath, Kerala” are discussed below,

Table 1
Household Waste Generation and Segregation

Particulars	Responses	n=50	%
Number of household	1-3	10	20
	4-6	38	76
	7-10	2	4
Age	25-40	30	60
	41-60	20	40
Generation of solid waste per month	Less than 10 kg	11	22
	11-20 kg	25	50
	21-30 kg	11	22
	31 or more kg	3	6
Separation of waste for recycling	Always	39	78
	Sometimes	8	16
	Rarely	1	2
	Never	2	4
Use of compost for organic waste	Yes, regularly	36	72
	occasionally	11	22
	No	3	6

The Table 1 presents data from 50 respondents, offering insights into household size, age distribution, and waste management practices. Most households (76%) consist of 4 to 6 members, indicating that medium-sized families are the most common in the surveyed area. 20 percentage have 1 to 3 members, while only 4% comprise 7 to 10 members. In terms of age distribution, the majority of respondents (60%) fall within the 25 to 40 age group, and 40% are between 41 and 60 years. Regarding the quantity of solid waste generated per month, half of the respondents (50%) produce 11 to 20 kg, while 22 percent generate less than 10 kg. Another 22 percentage produce 21 to 30 kg, and a small group (6%) report generating 31 kg or more. Waste separation practices show a positive trend, with 78% of respondents always separating their waste for recycling. Another 16% do so sometimes, while only 6% rarely or never engage in this practice. This indicates a high level of environmental awareness and responsible behavior among the community members.

Similarly, the use of compost for organic waste is common, with 72% reporting regular composting and 22% doing it occasionally. Only 6% do not compost at all, revealing that composting is well integrated into the waste management habits of most households.

Table 2
Current Waste Management System and Changes

Particulars	Responses	n=50	%
Introduced waste management system	Less than 6 months	17	34
	6 month- 1 years	8	16
	1-2 year	18	36
	3-5 year	7	14
	More than 5 years	0	0
Type of waste management system	Curb side	0	0
	Drop off Centre	0	0
	Recycling	13	26
	Compost	24	48
	Other methods	13	26

The Table 2 provides information on the duration and type of waste management systems introduced among 50 households. A significant portion of respondents (36%) reported that the waste management system in their household was introduced between 1 to 2 years ago. Another 34% had implemented it within the last 6 months, indicating a recent surge in adoption. About 16% introduced their system between 6 months to 1 year ago, while 14% have had it in place for 3 to 5 years. Notably, no respondents reported using a waste management system for more than 5 years.

Regarding the type of waste management system in use, composting is the most common method, practiced by 48% of the respondents. Recycling is used by 26%, and another 26% mentioned using other methods. Interestingly, none of the respondents reported using curbside collection or drop-off centers, which are common systems in more urbanized or formally organized settings.

Table 3
Sustainable Consumption Practices

Particulars	Responses	n=50	%
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Use of reusable bags during shopping	Always	20	40
	Sometimes	26	32
	Rarely	2	4
	Never	2	4
Avoidance of buying single use plastic products	Always	12	24
	Sometimes	24	48
	Rarely	7	14
	Never	7	14

The Table 3 presents the respondents' behavior regarding environmentally responsible consumer habits, specifically the use of reusable bags and the avoidance of single-use plastic products. When it comes to using reusable bags during shopping, 40% of respondents reported always using them, indicating a strong commitment to sustainable practices among a significant portion of the population. Another 52% use them either sometimes (32%) or rarely (4%), suggesting that while awareness exists, consistency is lacking. A small portion (4%) never uses reusable bags. In terms of avoiding single-use plastic products, only 24% always avoid them, while a larger percentage (48%) do so sometimes.

Table 4
Most generated Waste and Associated Diseases

Particulars	Responses	n=50	%
Measures taken to prevent diseases	yes	44	88
	No	6	12
Most generated waste	Plastics	22	44
	Organic waste	25	50
	Paper	2	4
	Others	1	2
Diseases associated with waste disposal	Jaundice	4	8
	Rat fever	5	10
	Malaria	11	22
	Dengue	22	44
	Others	8	16

The Table 4 outlines the health-related practices and concerns linked to waste management among the 50 respondents. A large majority (88%) reported that they take

preventive measures to avoid diseases, showing a high level of health awareness in the community. However, 12% do not take any such measures, which could increase their vulnerability to waste-related illnesses. In terms of the type of waste most commonly generated, organic waste (50%) slightly exceeds plastic waste (44%), suggesting that biodegradable materials form the bulk of household waste. Only a small percentage of respondents reported generating paper waste (4%) and other types (2%). Regarding diseases associated with improper waste disposal, dengue was the most commonly reported, affecting 44% of respondents. This is followed by malaria (22%), other unspecified diseases (16%), rat fever (10%), and jaundice (8%).

Table 5
Recycling and Community Participation

Particulars	Responses	n=50	%
Recycling item	Plastics	34	68
	Metal	2	4
	E-Waste	5	10
	Paper	9	18
	Glass	0	0
Participation in clean up events	Always	3	6
	Sometimes	21	42
	Rarely	13	26
	Never	13	26
Concerned about the impact of solid waste	Very concerned	35	70
	Somewhat concerned	14	28
	Not very concerned	1	2
	Not concerned at all	0	0

The Table 5 revealed that community practices and attitudes related to recycling, participation in clean-up events, and concern about the impact of solid waste. Among the recyclable items, plastics are the most commonly recycled material, reported by 68% of respondents. This is followed by paper (18%), e-waste (10%), and a very small portion recycling metals (4%). Notably, no respondents reported recycling glass, which may be due to lack of facilities, awareness, or perceived difficulty in handling glass waste. Participation

in clean-up events appears to be limited, with only 6% of respondents always taking part. A larger share (42%) participates sometimes, while 26% each rarely or never join such activities. When it comes to awareness and concern about the environmental impact of solid waste, the data is more encouraging. A strong majority (70%) of respondents are very concerned, and 28% are somewhat concerned. Only 2% are not very concerned, and none reported being completely unconcerned.

Table 6
Waste Disposal and Collection

Particulars	Responses	n=50	%
Disposal of hazardous waste	Special recycling Centre	3	6
	Garbage bin	5	10
	Local recycling Centre	38	76
	Other	4	8
Level of Satisfaction infrequency of waste collection	Very satisfied	28	56
	Somewhat satisfied	16	32
	Very dissatisfied	0	0
	Neutral	6	12
Effectiveness of waste management practices	Yes	47	94
	No	3	6

The data in Table 6 presents household practices related to hazardous waste disposal, satisfaction levels with waste collection frequency. A majority of respondents (76%) dispose of hazardous waste through local recycling centers, indicating good awareness and access to appropriate disposal methods. However, 10% still dispose of hazardous waste in regular garbage bins, which poses environmental and health risks. A smaller proportion (6%) use special recycling centers, and 8% rely on other, unspecified methods. In terms of satisfaction with the frequency of waste collection, 56% of respondents reported being very satisfied and 32% are somewhat satisfied. Only 12% remain neutral, and none expressed dissatisfaction. When asked about the overall effectiveness of current waste management practices, a strong 94% responded positively, while only 6% felt the system was ineffective.

Table 7
Challenges and Improvements

Particulars	Responses	n=50	%
Challenges during the management of waste	Lack of adequate collection	11	22
	Disposal infrastructure	11	22
	Lack of awareness	28	56
Improvements after implementation of waste management system	Yes	49	98
	No	1	2

It is evident from the above table that households face several challenges in managing waste, with the most significant being a lack of awareness (56%) inadequate waste collection infrastructure and disposal infrastructure (22%) each. However, the implementation of waste management system has yield positive results, with 98 percent of households reporting improvements after implementation of waste management system. Only 2 percent of household did not experience any improvements which is negligible.

Table 8
Health Concerns and Diseases

Particulars	Responses	n=50	%
Health improvements	Yes	47	94
	No	3	6
Reported case of diseases	Yes	21	42
	No	29	58
Specific symptoms due to waste disposal	Yes	8	16
	No	42	84

The above Table 8 shows that proper waste management practices greatly contribute to improved household health, with 94% of households experiencing better health outcomes. Only a small percentage (6%) of households reported no noticeable improvement. Despite the of the proper waste management system 42 percent of households reported instances of

disease. Highly commendable that more than half of the respondents (58%) are out of cases of diseases. Majority of the respondents (84%) did not show any symptoms of health problems due to waste disposal. Only 16 percent reported to have some health issues.

Table 9
Community Training and Health Initiatives

Particulars	Responses	n=50	%
Impart training for preventing diseases	Yes	34	68
	No	16	32
Community initiatives addressing waste - related diseases	Yes	30	60
	No	20	40

The above Table 9 shows that most of households (68%) have undergone training on disease prevention. 32 percent of the respondents showed non participation. Coming to community initiatives addressing waste related diseases 60 percent of the respondents showed positive responses compared to the negative responses of 40 percent.

CONCLUSION

This study of “*Household waste management in Mangattidam Gramapanchayath, Kerala*”, reveals both strengths and weaknesses in current practices. A significant portion of households demonstrate positive behaviours, with 78 percent consistently separating waste for recycling and 72 percent regularly compost organic waste. These actions are essential for reducing environmental impact. However, challenges persist, most notably a lack of awareness reported by 56 percent of respondents and infrastructure inadequacies cited by 22 percent. Furthermore, despite 94 percent of households reporting health improvements from waste management systems, 42 percent still experience waste-related illnesses. To achieve truly sustainable waste management and improve community health, targeted actions are crucial. Prioritizing enhanced public awareness campaigns to educate residents on proper waste disposal and its link to health is essential. Simultaneously, investments in improved waste collection and disposal infrastructure are necessary to ensure efficient service delivery. Strengthening community engagement in waste management initiatives can further promote collective responsibility and action. By addressing these key areas, Mangattidam Gramapanchayath can build upon its successes and create a healthier, more sustainable environment for its residents.

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