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## GREEN REVOLUTION IN WASTE MANAGEMENT: KERALA'S HARITHA KARMA SENA AND PATH TO ZERO WASTE HOME

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### ABSTRACT

The Haritha Karma Sena, a community-driven project that encourages decentralized waste collection and sustainable household waste practices, has made a substantial contribution to Kerala's Green Revolution in waste management. This study examines the role of Haritha Karma Sena (HKS) in advancing sustainable household waste management in Valanchery Municipality, Kerala. The municipality, with 43,522 residents and 8,472 households, generates nearly 24 tons of solid waste daily, highlighting the urgent need for community-based solutions. Using a descriptive research design, primary data were collected from 100 households through a structured questionnaire addressing waste collection, segregation practices, interactions with HKS workers, and perceptions of effectiveness. Respondents were chosen through convenience sampling method, while secondary data were obtained from municipal records and prior studies. Descriptive statistics and one-way ANOVA were employed for analysis, supported by charts and tables. Although there are still gaps in awareness and regular household involvement, the results show that Haritha Karma Sena has increased trash segregation, collection frequency, and community participation. In addition to positioning HKS as a scalable model for sustainable waste management in Kerala and abroad, the study highlights the importance of household-level observations.

**KEYWORDS:** Haritha Karma Sena, Household Waste Management, Sustainable Practices, Community Participation

### 1. Introduction of the Study

An environmentally friendly and public health-protective waste management system is essential. Due to a lack of awareness and insufficient infrastructure, home waste management has become a major problem in many communities (Srivastava & Gupta, 2019; Datta, 2022). A sustainable waste management system is vital for safeguarding the environment and ensuring public health. Across many communities, inadequate infrastructure and limited awareness make household waste

management a persistent challenge. Municipal Solid Waste Management is a critical concern for urban planners and policymakers in India, particularly in Kerala, where decentralized practices like source-level segregation and community composting have gained prominence” (Jayanthi & Ambat, 2023). In Kerala, this issue is particularly significant due to rising urbanization and consumption patterns that generate large volumes of solid waste, including plastics and packaging materials. Improper disposal contributes to air pollution, soil degradation, and water contamination, while also accelerating climate change and public health hazards. Addressing these concerns requires a comprehensive approach covering the entire waste cycle—from generation to disposal—while promoting recycling, composting, and responsible consumption. Against this backdrop, the Haritha Karma Sena (HKS), or “Green Action Force,” has emerged as a community-driven initiative under the state’s decentralized waste management strategy. Comprising primarily trained Kudumbashree women volunteers, HKS systematically collects, sorts, and manages non-biodegradable and organic waste at the household level, creating a localized and participatory model of sustainability.

Studies show that socio-economic and demographic factors such as education, income, and housing conditions strongly shape household waste management behaviors” (Handayani et al., 2018). The development of Kerala's HKS is indicative of a larger movement away from centralized garbage disposal systems and toward community-based alternatives that include social empowerment and environmental preservation. Through direct home engagement, the Sena promotes awareness and behavioral change in communities while also improving garbage segregation and recycling. In addition to creating livelihood options for women, this grassroots model tackles urgent issues like inadequate infrastructure, low awareness, and opposition to sustainable practices. So Effective waste management requires participatory models where local actors such as households and women collectives play a crucial role in reducing, reusing, and recycling waste” (Guerrero et al., 2013). The current study assesses how household behaviors, attitudes, and involvement in sustainable waste management are impacted by HKS efforts. It draws attention to both successes and shortcomings, providing information that local organizations and legislators may use to advance Kerala's transition to greener, cleaner, and more resilient communities.

This study is significant as it provides insights into sustainable household waste management practices and the role of Haritha Karma Sena (HKS) in promoting them. Focused on Valanchery Municipality in Malappuram district, the research examines household-level practices, barriers to effective waste management, and the contribution of HKS as a community-driven initiative. Despite existing awareness efforts, gaps remain in understanding current practices, challenges, and the effectiveness of HKS, limiting the formulation of effective strategies. The central problem, therefore, is the lack of detailed insights into household practices and HKS’s role, which hinders the development of targeted interventions.

This study focuses on understanding sustainable waste management at the household level in Kerala with special reference to the role of Haritha Karma Sena. It seeks to identify the range of sustainable practices currently adopted by households, such as segregation, recycling, and responsible disposal of waste. Further, it examines the various social, economic, and environmental factors that influence households in adopting or neglecting such practices. A key component of the study is to assess the role of Haritha Karma Sena as a community-based initiative, analyzing its effectiveness in promoting sustainable waste management and the challenges it faces in implementation. Through this multi-dimensional approach, the study aims to provide insights into both household-level behavior and institutional support systems for sustainable waste management.

## **2. Research Objectives**

The objective framed are:

1. To identify the sustainable waste management practises implemented by households
2. To analyse the factors influencing Households' sustainable waste management practices.
3. To assess the role, effectiveness, and challenges of Haritha Karma Sena in implementing sustainable waste management initiatives.

## **3. HYPOTHESES**

**Hypothesis 1:** There is a significant difference in the attitude towards sustainable waste management across different age groups.

**Hypothesis 2:** There is a significant difference in the attitude towards sustainable waste management across different occupational groups.

## **4. RESEARCH METHODOLOGY**

The present study adopted a descriptive research design to examine the role of Haritha Karma Sena (HKS) in promoting sustainable household waste management in Valanchery Municipality, Malappuram district. Descriptive research is particularly suitable for fact-finding inquiries, enabling the collection of both qualitative and quantitative data for analytical interpretation (Guerrero et al., 2013). Valanchery Municipality, with a population of 43,522 across 8,472 households, generates nearly 24 tons of solid waste daily, of which biodegradable waste constitutes the largest share. This alarming volume underscores the need for effective community-based waste management models. Primary data were collected from 100 households using a structured questionnaire, which included items on frequency of waste collection, segregation practices, interaction with HKS workers, and perceived effectiveness of the initiative.

Respondents were selected through convenience sampling, a widely used non-probability technique

in waste management research (Handayani et al., 2018). Secondary data were obtained from municipal records, government reports, and previous studies on sustainable waste practices in Kerala (Jayanthi & Ambat, 2023). Data analysis employed descriptive statistics to summarize household responses and one-way ANOVA to test variations in attitudes and practices across demographic groups. Tables, bar charts, pie charts, and column charts were used to present results effectively. The methodological approach, combining structured surveys with statistical tools, aligns with earlier research emphasizing the importance of household-level data in understanding waste management behavior and the role of community-driven initiatives like HKS (Srivastava & Gupta, 2019; Prodyanatasari & Feranda, 2023).

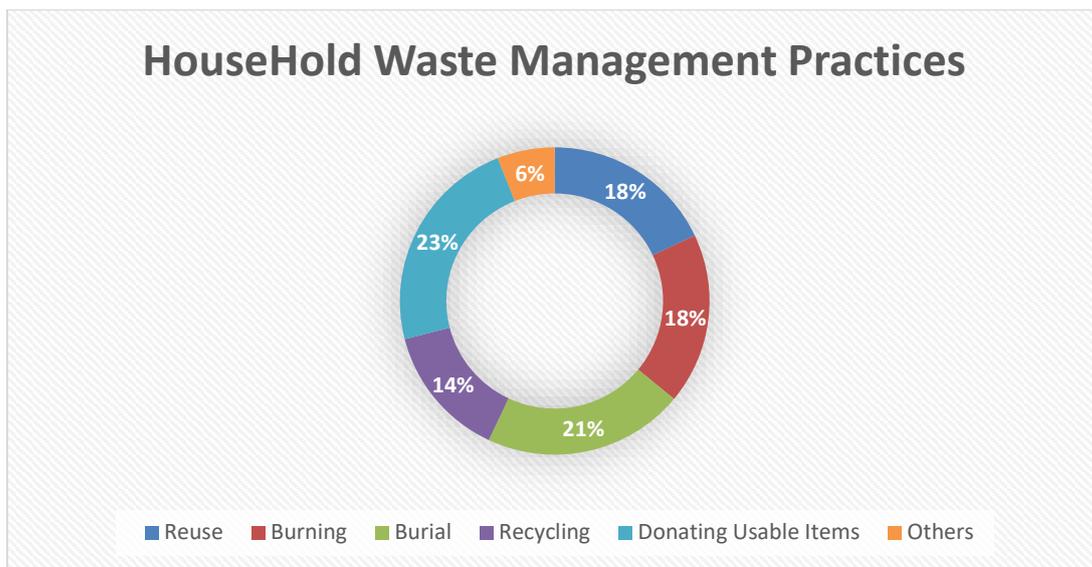
## 5. RESULTS AND DISCUSSION

### 5.1 Demographic profiles

Variable	Categories	Frequency (N=100)	Percentage (%)
Age	18–25 years	60	60
	26–35 years	22	22
	36–45 years	09	09
	Above 45 years	09	09
Gender	Male	41	41.0
	Female	59	59.0
Family Members	1–4	33	33
	5–8	62	62
	Above 8	05	05
Occupation	Agriculture	09	09
	Business	38	38
	Government Service	11	11
	Others	42	42

Monthly Income (₹)	10,000 – 20,000	24	24
	20,000 – 30,000	17	17
	30,000 – 40,000	23	23
	40,000 – 50,000	10	10
	Above 50,000	26	26

### 5.2 Sustainable Waste Management Practices Implemented by Households



According to the statistics, the most prevalent home waste management strategies are donating useful things and burial, with burning and reuse following closely behind. Recycling is significantly less popular, and only a small minority of homes use other ways. Although donation and reuse are sustainable, the persistent reliance on burial and burning demonstrates the limited adoption of environmentally beneficial trash techniques. Raising awareness and enhancing recycling and composting facilities may encourage families to adopt more sustainable waste management strategies

### 5.3 Factors Influencing Sustainable Waste Management Practices

#### *Hypothesis I*

H0: There is no significant difference in the attitude towards sustainable waste management across

different age groups.

H1:- There is a significant difference in the attitude towards sustainable waste management across different age groups.

<i>ANOVA Result 1</i>					
<i>Attitude_SWMP</i>					
	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
<i>Between Groups</i>	2.090	4	.522	1.524	.202
<i>Within Groups</i>	32.572	95	.343		
<i>Total</i>	34.662	99			

### **Hypothesis 2**

H0: There is no significant difference in the attitude towards sustainable waste management across different occupational groups.

H1: There is a significant difference in the attitude towards sustainable waste management across different occupational groups.

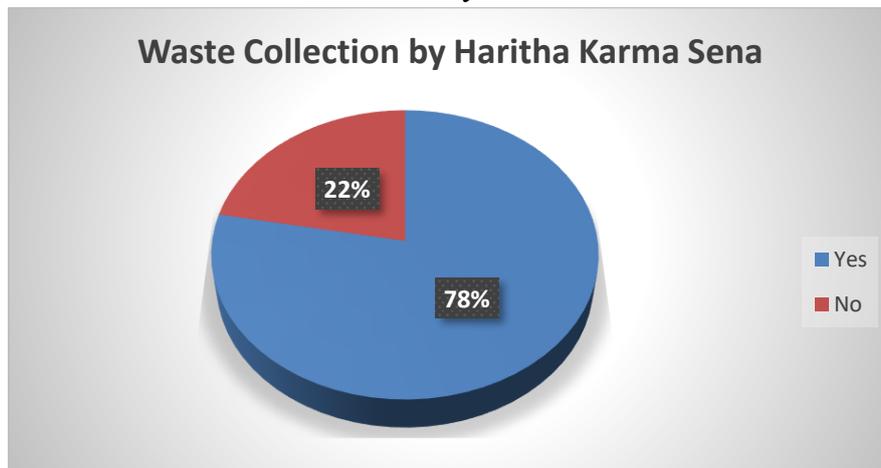
<i>ANOVA Result 2</i>					
<i>Attitude_SWMP</i>					
	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
<i>Between Groups</i>	.075	3	.025	.070	.976
<i>Within Groups</i>	34.587	96	.360		
<i>Total</i>	34.662	99			

To assess whether socio-demographic factors influence respondents' attitudes towards sustainable waste management, one-way ANOVA tests were conducted using age and occupation as independent variables. The results for age groups yielded an **F-value of 1.524 with a significance level of 0.202**, indicating that differences across age categories were not statistically significant. Similarly, the analysis for occupational groups produced an **F-value of 0.070 with a significance level of 0.976**,

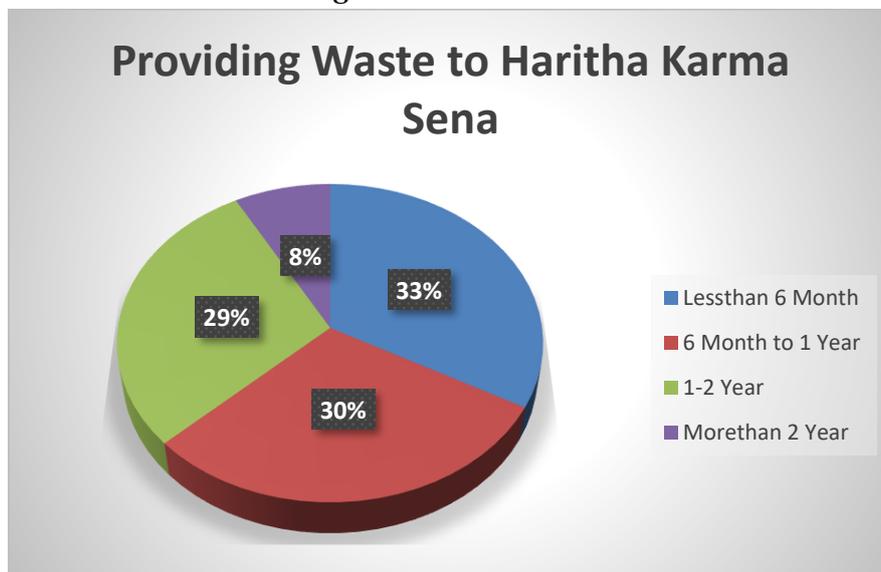
which was also not significant. Since both p-values are greater than the 0.05 threshold, the null hypotheses could not be rejected in either case.

#### 5.4 Role of Haritha-Karma Sena in SWPs of Households

##### 5.4.1 Waste collection by Haritha Karma Sena



##### 5.4.2 Providing waste to Haritha Karma Sena

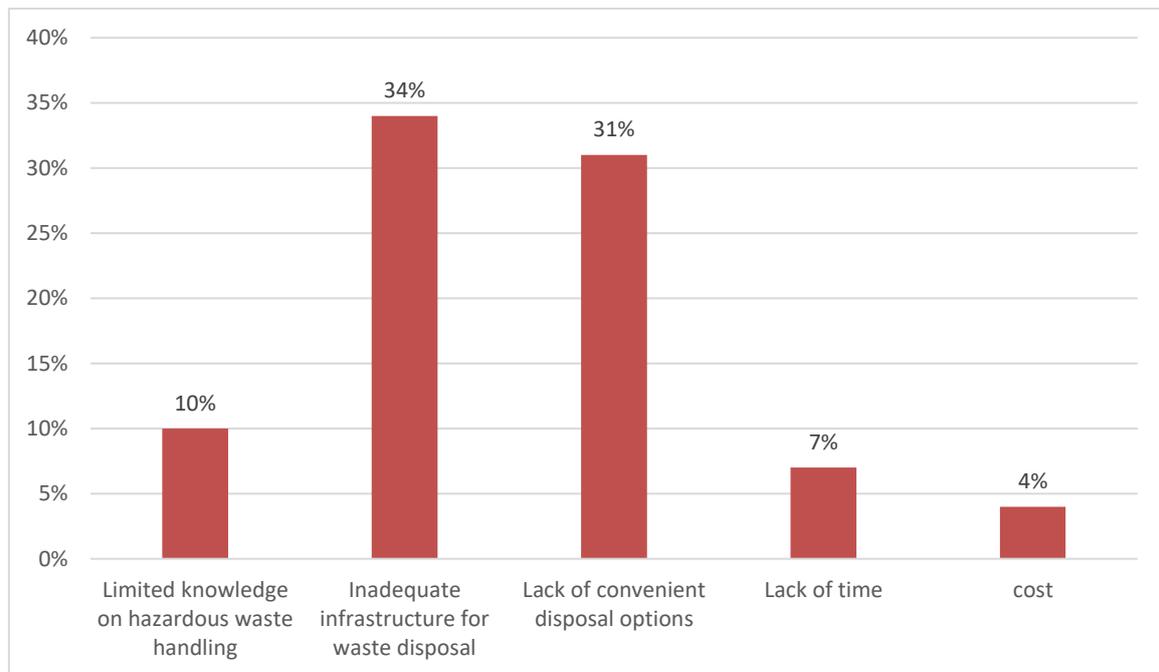


The study emphasizes the importance of Haritha Karma Sena (HKS) in promoting sustainable waste management at the household level. The majority of respondents (75%) said they were aware of HKS's guidelines, showing that the group has been effective at disseminating information and developing community awareness. In terms of participation, the majority of homes (78%) showed their

involvement in collection operations, displaying excellent community engagement and collaborative efforts with the program.

Furthermore, data on the time of providing garbage to HKS suggest that a significant amount of respondents (33%) joined during the last six months, with another 30% contributing for six months to a year. This shows an increase in recent engagement, as well as consistent contributions from those active over extended periods of time. Together, these data demonstrate Haritha Karma Sena's success in rallying households, assuring community engagement, and encouraging environmental stewardship

### 5.5 Challenges of Sustainable Waste Management Practices among Households



The most significant obstacles to appropriate waste disposal are poor infrastructure and a lack of convenient disposal options, accounting for 65% of all respondents. In comparison, just 10% of respondents mentioned a lack of awareness about hazardous waste treatment. The least significant factors are a lack of time and cost, with 7% and 4%, respectively. This data clearly shows that systemic issues, rather than individual ones, are the fundamental barriers. As a result, strengthening waste management systems and infrastructure would be the most effective approach to addressing the issue. These findings show the need of investing in public amenities to promote environmentally responsible behavior.

## **6. FINDINGS AND SUGGESTIONS**

The study revealed that households employ a range of waste management practices, with donation of reusable items and burial emerging as the most common methods, followed by burning and reuse. Recycling was found to be the least preferred option, indicating limited adoption of environmentally friendly techniques. Food waste handling practices included composting (48%) and biogas generation (22%), reflecting a growing inclination toward sustainable options. Awareness of Haritha Karma Sena (HKS) guidelines was relatively high, with 75% of respondents acknowledging familiarity, and 78% actively participating in collection initiatives, showing strong community engagement. However, inadequate infrastructure (34%) and lack of convenient disposal options (31%) were identified as the primary challenges, whereas knowledge gaps, lack of time, and cost played comparatively minor roles. Importantly, statistical analysis showed that age and occupation did not significantly influence attitudes toward sustainable waste management, suggesting that these concerns are uniformly shared across socio-demographic categories.

Based on the findings, there is a need to enhance awareness and education through targeted interventions such as door-to-door campaigns, workshops, and distribution of information materials. Strengthening the role and capacity of Haritha Karma Sena is also critical, particularly by providing training, adequate resources, and infrastructure support to improve community-based waste management initiatives. Special attention should be given to addressing plastic pollution through bans, fees, or promotion of eco-friendly alternatives such as reusable bags. Furthermore, households require continuous support and monitoring to identify gaps, refine existing programs, and promote environmentally friendly practices such as composting and recycling. By integrating feedback mechanisms and tailoring solutions to household needs, waste management efforts can become more effective and sustainable.

## **7. CONCLUSION**

The study comes to the conclusion that, with the help of programs like Haritha Karma Sena, sustainable waste management is both a home duty and a community endeavor. Eco-friendly measures like composting and garbage segregation have positive data, but systemic problems like poor infrastructure still prevent wider adoption. There are still obstacles in guaranteeing long-term compliance and fair access to disposal facilities, even with high levels of knowledge and involvement. Households, community organizations, and government organizations must work together to enhance services, build new infrastructure, and promote behavioral change in order to remove these obstacles. Achieving cleaner and healthier communities and promoting long-term environmental sustainability will require strengthened collaborations and continuous awareness-raising initiatives.

## **8. SCOPE FOR FURTHER STUDY**

Even though this study offers insightful information about how households manage their garbage and the function of Haritha Karma Sena, some topics still need more research. Future studies could look at the efficacy of certain solutions like recycling incentives, composting subsidies, or plastic reduction programs. Studies comparing homes in rural and urban areas may also reveal contextual variations in infrastructure accessibility and waste management techniques. In order to evaluate the long-term effects of awareness campaigns and legislative initiatives, longitudinal studies could also monitor changes in household behavior over time. The understanding of systemic issues and potential for sustainable waste management could be further enhanced by broadening the focus to include the viewpoints of private waste management companies and local government entities.

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