Haritha Karma Sena: Transforming Waste Management

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Abstract— The Haritha Karma Sena, is an initiative launched by the Government of Kerala in India to promote waste management and environmental conservation. The study focuses on the solid waste management practices in Kerala, India. The research aims to analyze the waste management strategies implemented by Haritha Karma Sena, its impact, and the factors affecting waste management in the area. The study employs a descriptive and analytical research design to collect primary data through a structured questionnaire. The research highlights the challenges faced in waste management, including behavior change, limited participation, and funding constraints. Haritha Karma Sena's waste disposal process includes waste segregation, collection, transportation, recycling, composting, and disposal. However, inadequate infrastructure and funding hinder efficient waste management. The study suggests focusing on awareness and education campaigns to promote responsible waste management practices and encouraging community participation in waste management initiatives. Collaborating with local authorities and seeking financial support can enhance waste management efficiency. Implementing incentive programs and sustainable waste management policies will address challenges and promote a cleaner and greener environment. Overall, Haritha Karma Sena's efforts have made a positive impact on waste management in Kerala, serving as an inspiring example for other communities. Continuous monitoring and evaluation will help in further improvement and ensure a sustainable waste management system for a healthier and eco-friendly future.

Keywords— Impact,Waste, Disposal, Management

I. INTRODUCTION

The state has been a pioneer in adopting decentralized waste management practices, including source segregation, organic waste composting, and recycling. Haritha Karma Sena plays a significant role in waste management in Kerala State. The members of this organization are primarily volunteers who work closely with local authorities, educational institutions, and community groups to promote waste management practices. They are involved in various activities such as conducting awareness campaigns, organizing cleanliness drives, assisting in waste segregation and collection, and promoting the use of composting techniques.

1.1 NEED AND SIGNIFICANCE OF THE STUDY

Solid waste management refers to the process of collecting, treating, disposing, and recycling waste materials produced by human activities. It is an essential aspect of environmental conservation and public health, as improper waste management can lead to pollution, health hazards, and environmental degradation. The government of Kerala issued necessary directions to local self-government institutions (LSGIS) to constitute the support system for field level management. The field level waste management came to be known as 'Haritha karma Sana' and consisted trained team group of SHG women whose task was to be provide technical services and solutions on waste management pertaining to collection, transportation, processing and management of waste in collaboration with the respective LSGIs. When the disposal procedure are enforced by clean Kerala Company limited. The women were recruited from kudumasree by collection process. There for this study is essential to analyse that how efficiently Haritha karma sena as support system for the field level waste management in each Locality.

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In rural areas of Kerala, solid waste management can present unique challenges compared to urban areas. While many urban centers have established waste management systems, rural regions often face limited resources and infrastructure. The Haritha Karma Sana collects non-biodegradable waste from houses and establishments to shredding units for recycling. According to the mission, the shredded plastic is being given to the local bodies for road tarring by Clean Kerala Company.

1.2   STATEMENT OF THE PROBLEM

When the present study deals with the municipal solid waste management by Haritha karma sena. Based on the previous researches, Government of Kerala State put forward that, Waste management projects should be devised only after ensuring that they are scientific. Based on the Kerala waste management campaign "Malinya Mukta Nava Keralam", It is an important task that local government take to protect the human health and environment and to preserve natural resources to make this scheme of things functioning. Thus the government of Kerala, through Haritha Kerala mission issued necessary directions to LSGIs to constitute support system for field level waste management

1.3 OBJECTIVE OF THE STYDY

➢ To assess the association between demographic variables and public attitudes towards waste management.
➢ To identify critical factors influencing public attitudes towards waste management.
➢ To study strategies and interventions that can lead to more effective waste management practices based on the identified factors and demographic profiles of the respondents.
➢ To investigate the composition of waste in the local waste stream, with a specific focus on plastic waste, e-waste, and clinical waste.
➢ To study awareness and promote responsible waste management practices among the surveyed population and the wider community.

1.4 SCOPE OF THE STUDY

To analysis and evaluate the municipal solid Waste management by Haritha karma sena is the subject matter of the study. As this study is restricted to Kerala State in India. When data was collected from Kerala state in India and from those who maintain active participation with the Haritha Karma Sana in the State.

1.5   RESEARCH AND METHODOLOGY

The study is descriptive in nature. The viewpoints of residents in Kerala were determined and analyzed using statistical techniques.

(a)   Sample Size

The universe of the study was residents in Kerala State. The sample consisted of 48 respondents.

(b)   Tools for Data Collection

The tool employed for data collection was a questionnaire having three parts: the first part designed to determine the demographic profile of the respondents in relation to the various demographic factors, second part consist of analyzing satisfaction factors and third part consist of influencing factors.

(1)   Primary Data

The primary data were collected through questionnaire from 48 respondents. Questionnaires and interview schedules were used for this.

(2)   Secondary Data

The study also made use of various types of secondary data including studies, reports and data collected by government and non-governmental organizations.

C. Data Analysis - Tools

Statistical tools such as percentage, Mean score and Chi Square Test were used for analyzing the data.

II.   REVIEW OF LITERATURE

These initiatives, coupled with the efforts of Haritha Karma Sena, aim to reduce the burden on landfills, promote recycling, and create a cleaner and greener environment. The Kudumasree Mission will work with Haritha Kerala Mission, Suchithwa Mission and Clean Kerala Company for a garbage-free Kerala. The powers to select Haritha Kerala Sana are with the local bodies.

Zurbrugg (2002): The amount of waste generated per capita for both developed and developing countries may sometimes be more or less the same but the main difference is related to the waste management strategy and practice. In developed countries much emphasis is given to segregation, processing and resource and energy recovery while in developing countries like India and Thailand, virtually all of the generated waste is land filled.

Kalyani and Pandey (2014): presented the current status, major achievements and future aspects of waste to energy in India. The study reveals the main causes behind the failures of waste-to-energy process at various Indian cities, which is due to lack of financial and logistical planning and absence of a strong policy framework for waste to energy process. Also, the increasing development, education, prices of fuel and power has made such waste to energy projects much more viable. Thus, many

investments in the form pilot as well as large scale plants have been witnessed throughout the nation.

Hayami (2006): The rag pickers, itinerant waste buyers, sanitation workers, middlemen, and secondary buyers often will not keep a log book, and are so complicatedly interwoven in the system linking multiple levels that the actual quantification of materials recovered is difficult or incorrect. This will lead to potential biases, over representation or under representation of material fractions recycled and revenue earned through recycling in informal sector.

Colon and Fawcett (2006): In their emphasized on the need of public-community participation system in household solid waste management services and asserted that the operational efficiency can be achieved by large scale involvement of private sector and local community along with the provision for incentives/subsidies to them in exchange of services rendered. Also asserted in their study that public-private partnerships will not be effective and sustainable unless proper incentives for both sectors are built into the design.

Gupta and Kumar (2014): Different types of vehicles, varying from bullock carts to compactors, ordinary trucks, tractor and trailers, dumper placers, and tippers, are used for waste transportation depending upon the location, waste quantity and distance from the collection point. However, general-purpose open body trucks of 5–9 ton capacity open-body are in common use. In smaller towns, bullock carts, tractor-with-trailers, tricycles etc. are employed for MSW transport.

Kumar K. N., & Goel, S. (2009): At present basic source segregation into wet and dry wastes is available only in mega and metro cities where ULBs take up composting of wet wastes. In majority areas, there is no source segregation and waste is disposed in mixed manner. Usually households use 16 – 20 L plastic containers/ buckets; their size, shape and material vary according to economic status of the generator.

III.   SOLID WASTE MANAGEMENT SYSTEM IN KERALA - THEORETICAL BACKGROUND

The collection, treatment, and disposal of solid waste is known as solid waste management. Unsanitary circumstances result from improper municipal solid waste disposal. These circumstances will gradually cause the pollution of the environment. There are several health problems that might affect people because of the environment and its contamination. The duties involved in managing solid waste create several difficulties as well as economic and social issues that must be handled and fixed.

The success of solid waste management in rural Kerala relies on the active involvement of the local community, support from local authorities, and the willingness to explore innovative and sustainable waste management practices. Additionally, creating awareness about the environmental and economic benefits of effective waste management can lead to long-term behavior change and contribute to a cleaner and healthier environment for rural communities. However, with the right approach and community involvement, effective waste management can be achieved in rural Kerala. Here are some considerations and strategies for solid waste management in rural areas of Kerala:

- ➢ Awareness and Education: Initiating awareness campaigns and educational programs about the importance of proper waste management is crucial. Informing residents about the environmental and health impacts of improper waste disposal can encourage responsible waste practices.
- ➢ Community Participation: Engaging the local community in waste management efforts is essential. Encourage residents to actively participate in waste segregation at the source and the creation of community-based waste collection and disposal systems.
- ➢ Composting: Promote composting of organic waste at the household level. Composting not only reduces the amount of waste sent to landfills but also creates nutrient-rich compost that can be used in agriculture, promoting sustainable farming practices.
- ➢ Biogas Plants: Encourage the establishment of biogas plants in the community. These plants can convert organic waste into biogas, which can be used for cooking and other purposes, reducing dependence on fossil fuels.
- ➢ Recycling Centers: Set up small-scale recycling centers for common recyclable materials like paper, plastic, glass, and metal. These centers can serve as collection points for recyclables, which can then be sent to larger recycling facilities.
- ➢ Waste Collection and Transportation: Develop an efficient waste collection system using local resources. This may involve using tractors or other available vehicles to transport waste to a central collection point.
- ➢ Collaboration with Local Authorities: Work closely with local panchayats (village-level self-governing bodies) and government agencies to coordinate waste management efforts and seek

support for infrastructure development and funding.

➢ Waste-to-Energy Solutions: Explore appropriate waste-to-energy solutions for certain types of non-recyclable waste. For example, in some cases, small-scale incineration or gasification systems may be viable options for generating energy from waste.

➢ Encourage Reuse: Promote the concept of reusing items whenever possible. Encourage repairing and refurbishing goods instead of discarding them, thus extending their useful life.

➢ Integrated Approach: Adopt an integrated solid waste management approach that combines various waste management methods tailored to the specific needs and resources of the rural area.

3.1 HISTORY OF SOLID WASTE MANAGEMENT IN KERALA

On a normal tons of solid waste is being created in all over Kerala. Waste management is a fundamental administrations to be given by the metropolitan and neighbourhood government specialists. Inability to give it productively could be unfortunate. Confidential area support is one of the most incredible decision open to help the exhibition of public administrations like strong waste administration. There has been a critical expansion in squander age in India. In the quick couple of many years, generally because of fast populace development and monetary turn of events. According to certain appraisals, on a normal six thousand tons of solid waste is being created in the whole way across Kerala, in its nearby nine hundred Panchayats, districts and five corporations.

3.2 REASONS FOR GROWING WASTE

There are various reasons for growing solid waste generation. Following are some of them:-

- •Changing lifestyle
- • Food habits
- •Changes in standard of living.
- • Urbanization

3.3 IMPACT

Piling up of garbage and failure to adopt state of the art methods of waste management process has serious consequences as follows:-

➢ Environmental: - Pollution from poorly maintained landfill sites are prone to ground water contamination and facilitate breeding of mosquitoes, flies, rats and other pests.

➢ Public health: - Probability of incessant flare-ups of transferable illnesses.

➢ Labour productivity gets affected with frequent outbreak of communicable diseases.

➢ Economic effect: - can be negative impact.

3.4 HARITHA KARMA SANA (HKS)

Haritha karma sena is micro entrepreneurial initiative under kudumasree mission. Its operation is scheduled from 10th to 18th of every month.6 days for field collection and 2 days for segregation process, User fee for collection schedule at the rate of ₹ 50 from households and ₹100 from shops. Haritha Karma sena is always at the forefront when there is no manpower for any need of the State. The consortium account has a bank passbook as a president and a secretary, and the collected user fees are deposited in this account. 10% of consortium is charged in this account and balance amount is given to Haritha karma sena members. After taking the plastic CKC Company they give us an amount and that amount comes in consortium account.

3.5 HARITHA KARMA SENA WASTE DISPOSAL PROCEEDURE

Waste Segregation: The first step in effective waste management is waste segregation at the source. Haritha Karma Sena may encourage and educate residents about separating waste into different categories, such as organic (biodegradable) waste, recyclables (paper, plastic, glass, metal), and non-recyclables (e.g., sanitary waste).

➢ Collection: After waste segregation, the organization may arrange for waste collection from households and businesses. They may use designated collection points or door-to-door collection services to gather different types of waste separately.

➢ Transportation: Once collected, the waste is transported to the next stage of the process. Depending on the scale of operations, Haritha Karma Sena may use trucks or other suitable vehicles for transportation.

➢ Recycling: Recyclable materials are sent to recycling facilities, where they are processed and turned into raw materials that can be used to produce new products. Haritha Karma Sena may collaborate with recycling companies or set up small-scale recycling centers.

➢ Composting: Organic waste, such as food scraps and garden waste, can be converted into compost through composting. The compost can be used in agriculture to improve soil health and fertility.

➢ Waste Treatment: Non-recyclable and non-compostable waste may require treatment. Depending on available facilities and resources, this waste may be incinerated (in controlled

environments) or processed through other waste-to-energy methods.

➤ Disposal: Waste that cannot be recycled, composted, or treated is sent for disposal in landfills. Haritha Karma Sena may work towards minimizing the amount of waste sent to landfills by maximizing recycling and composting efforts.

➤ Awareness and Education: Throughout the waste management process, Haritha Karma Sena emphasizes the importance of waste reduction, responsible disposal, and environmental conservation through awareness campaigns and educational programs.

➤ Community Participation: The success of waste management largely depends on community participation. Haritha Karma Sena may actively involve local residents in waste segregation and other waste management activities.

➤ Monitoring and Evaluation: Haritha Karma Sena may continuously monitor and evaluate their waste management initiatives to assess their effectiveness, identify areas for improvement, and adapt strategies accordingly.

IV. DATA ANALYSIS AND INTERPRETATION

Data analysis and interpretation is the process of assigning meaning to the collected information and determining the conclusion, significant and implications of the finding. The steps involved in data analysis are a function of the type of information collected, however, returning to the purpose of the assessment and the assessment questions will provide a structure for the organization of the data and a focus for the analysis. The chapter presents in detail the analysis and interpretation of data along with the discussion and conclusion of the results of the present study. The investigator analysed, interpreted and concluded the obtained data in accordance. The focus of Haritha Karma Sena and waste management efforts in Thiruvananthapuram district is on source segregation, which involves separating waste into different categories such as biodegradable (organic) waste, recyclable waste (plastics, paper, metals), and non-recyclable waste.

4.1. Comparison of Category of Waste

Table 4.1

Comparison of Category of Waste	Percentage
Paper	21.00%
Plastic	44.00%
Wood, Glass and Metal	22.00%
E – Waste	8.00%
Clinical Waste	3.00%
Others	2.00%
Total	100.00%

Source of Data: Primary Data

Interpretation: Overall, the data highlights the dominance of plastic waste in the waste stream, followed by paper, wood, glass, and metal. The presence of a significant amount of e-waste and clinical waste indicates the need for proper management and disposal practices for these specialized types of waste.

4.2. Factors Affecting the Waste Management

Table – 4.2

Factors	SA	A	N	D	SDA	Total Score	Mean Score	Rank
Lack of Infrastructure	75	64	30	6	4	179	3.73	9
Funding Constraints	60	84	24	10	2	180	3.75	10
Limited Participation	55	60	36	12	4	167	3.48	3
Behaviour Change	40	68	39	14	3	164	3.42	1
Enforcement and Compliance	55	84	18	8	6	171	3.56	5
Integration with Authorities	75	36	33	18	4	166	3.46	2
Lack of Awareness	85	52	21	16	3	177	3.69	7
Handling Hazardous Waste	65	76	24	10	3	178	3.71	8
Seasonal Variation	60	72	30	8	4	174	3.63	6
Political Interference	50	56	51	8	3	168	3.50	4

Source of Data: Primary Data

Interpretation: Factors with higher mean scores are considered more critical in contributing to the challenges faced in waste management. Behaviour change, integration with authorities, and limited participation are perceived as the top three factors influencing waste management, while lack of infrastructure and funding constraints are perceived as relatively less critical factors.

4.3 Relationship between Profile Variables and Attitude of Customers towards Harithakarma Sena Waste Management

Table 4.3

Variable	Group	Positive Attitude	Negative Attitude	Total	Chi-Square Value	p-Value	Significant Level
Gender	Male	10	16	26	2.276	0.1310	Not Significant
	Female	13	9	22			
	Total	**23**	**25**	48			
Age	Less than 25 years	2	5	7	7.554	0.1090	Not Significant
	26 – 35 years	13	4	17			
	36 – 45 years	10	5	15			
	45 – 60 years	4	1	5			
	Above 60 years	2	2	4			
Total		**31**	**17**	48			
Marital status	Single	14	13	27	1.226	0.5420	Not Significant
	Married	8	13	21			
	Total	**22**	**26**	48			
Educational qualification	School	3	5	8	11.781	0.0670	Not Significant
	Intermediate	2	4	6			
	Higher secondary	6	5	11			
	Graduation	6	3	9			
	Post-graduation	7	0	7			
	Technically qualified	2	5	7			
	Total	**26**	**2**	4			
Income			2	8	5.402	0.2470	Not Significant
	Rs.60,000 – Rs.1,00,000	5	10	15			
	Rs.1,00,000 – Rs.3,00,000	4	5	9			
	Rs.3,00,000 – Rs.5,00,000	7	3	10			
	Rs.5,00,000 and above	12	2	14			
	Total	**28**	**20**	48			

Source of Data: Primary Data

Interpretation: For each chi-square test, we compare the p-value to a chosen significance level (commonly 0.05). If the p-value is less than the significance level, we reject the null hypothesis, indicating that there is a significant association between the "Variable" and "Attitude." Conversely, if the p-value is greater than the significance level, we fail to reject the null hypothesis, suggesting that there is no significant association between the "Variable" and "Attitude.". Based on the results from the chi-square tests, none of the p-values are less than 0.05. Therefore, we fail to reject the null hypothesis for all tests, and we conclude that there is no significant association between any of the "Variable" categories (Gender, Age, Marital Status, Educational Qualification, and Income) and "Attitude" (Positive Attitude and Negative Attitude) in the given data.

V.   FINDINGS, CONCLUSION AND SUGGESTIONS

5.1 FINDINGS

➢ Based on the study, it indicates that plastic waste is the most dominant component in the waste stream, which is concerning due to its persistence and harmful impact on the environment.

➢ Factors Affecting Waste Management: The data presented in a previous table shows the factors affecting waste management, ranked based on their mean scores. The top three critical factors are behaviour change, integration with authorities, and limited participation, while lack of

infrastructure and funding constraints are perceived as relatively less critical factors.

➢ Based on the results of the chi-square tests and the p-values, there is no significant association between any of the "Variable" categories (Gender, Age, Marital Status, Educational Qualification, and Income) and "Attitude" (Positive Attitude and Negative Attitude) in the provided data. This implies that the attitudes of the participants do not show a significant relationship with these demographic factors in the surveyed population.

5.2 CONCLUSION

Haritha Karma Sena, an innovative waste management initiative, has emerged as a beacon of hope in the pursuit of a greener and sustainable future. This remarkable initiative is making its mark in Kerala State in India, where it is transforming the way waste is managed and processed. The dedicated team of Haritha Karma Sena members has taken on the responsibility of educating the community about waste segregation, recycling, and composting. Through their relentless efforts, they have successfully instilled a sense of environmental consciousness among the residents of Kerala State. By actively engaging in waste collection, segregation, and disposal, Haritha Karma Sena is mitigating the adverse impact of improper waste disposal on the environment and public health. As they continue to expand their reach, this grassroots movement is not only revolutionizing waste management practices but also setting an inspiring example for other communities to follow. Through their collaborative approach and commitment to sustainable practices, Haritha Karma Sena stands as a testament to the power of collective action in creating a cleaner and greener tomorrow.

5.3 SUGGESTIONS

➢ Based on the study, it is essential to focus on awareness and education campaigns to promote responsible waste management practices. Targeted educational programs can help in fostering behaviour change and encourage waste segregation and recycling.

➢ Encouraging community members to actively participate in waste management initiatives, such as clean-up drives and recycling programs, can lead to more effective waste management.

➢ Establishing proper waste collection systems, recycling facilities, and waste treatment plants can improve overall waste management efficiency.

➢ Collaboration with Authorities: Given that integration with authorities is seen as critical,

collaborating with local municipalities and waste management agencies is important. Working together can lead to better coordination and support for waste management initiatives.

➢ Implementing incentive programs for waste reduction and recycling might be effective. Such programs can encourage waste reduction and sustainable practices among households and businesses.

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