PROMOTING SUSTAINABILITY: BEST PRACTICES IN WASTE MANAGEMENT BY HARITHA KERALA MISSION

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Abstract

The Haritha Kerala Mission, initiated by the State Government of Kerala, represents a significant shift towards sustainable waste management practices in the region. This mission is focused on the 3 Rs principle (Reduce, Reuse, and Recycle) and aims to address the increasing waste management challenges in Kerala, driven by rapid population growth and urbanization. The mission's multifaceted approach includes decentralized waste management systems, the establishment of Material Collection Facilities (MCFs), Resource Recovery Facilities (RRFs), and the mobilization of the Haritha Karma Sena, a women-led group trained in waste collection and resource recovery. This study examines the effectiveness of these strategies in contributing to Kerala's overall sustainable development goals, highlighting innovative practices such as waste-to-wealth initiatives and community engagement programs. The results demonstrate significant progress in managing municipal solid waste, reducing environmental impact, and promoting community involvement in waste management.

Keywords:- Sustainable Waste Management, Haritha Kerala Mission, Material Collection Facilities (MCFs), Resource Recovery Facilities (RRFs), Haritha Karma Sena (HKS).

Sustainable development requires efficient waste management, especially in highly populated areas like Kerala, India. With an emphasis on social and economic advancement and environmental care, the Haritha Kerala Mission is a prime example of a paradigm shift towards sustainable practices. This article examines how the mission's activities have changed the way waste management methods are implemented and how this has helped achieve the larger objectives of community empowerment and

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environmental sustainability. To address Kerala's growing garbage crisis, the Haritha Kerala Mission has put in place a number of sustainable waste management strategies.

Women-led and focused on ending poverty and empowering women, the Harithakarma Sena supports sustainable waste management at the local level (Parvathy Ravikumar, 2024). Kerala produces a large amount of municipal solid trash, and estimates suggest that this amount will rise significantly by 2036, requiring the use of alternate methods for management (Shettigondahalli Ekanthalu et al., 2023). The state must invest in cutting-edge technologies and efficient procedures to address the problems associated with managing plastic garbage (https://haritham.kerala.gov.in/submission-waste.php). While incineration and land filling present environmental difficulties, established treatment facilities like an aerobic digestion and composting have experienced operational problems (https://www.suchitwamission.org/public/). In order to attain environmental health and turn Kerala into a garbage-free state, the state government implemented the 3Rs principle (reduce, reuse, recycle) in its Solid Waste Management Policy (Shettigondahalli Ekanthalu et al., 2023).

Statement of the Problem

The core research problem of this study is to evaluate the effectiveness of the Haritha Kerala Mission's sustainable waste management strategies, particularly its implementation of the 3Rs principle (Reduce, Reuse, Recycle), decentralized systems like Material Collection Facilities (MCFs) and Resource Recovery Facilities (RRFs), and community engagement through the Haritha Karma Sena, in addressing Kerala's growing waste management challenges and contributing to the state's sustainable development goals.

Significance of the Study

The study on the Haritha Kerala Mission's waste management strategies is significant because it addresses Kerala's escalating waste management challenges due to rapid urbanization and population growth, offering insights to reduce environmental degradation and promote a healthier ecosystem. It evaluates the Mission's alignment with Kerala's sustainable development goals, highlighting improvements in public health, environmental cleanliness, and economic growth through job creation and waste-to-wealth initiatives. The research underscores community empowerment, particularly through the women-led Haritha Karma Sena, which fosters social inclusion and poverty reduction. Additionally, it provides valuable lessons for policymakers by analyzing decentralized systems like MCFs and RRFs, enhancing waste management frameworks locally and globally.

Scope of the Study

The study focuses on the Haritha Kerala Mission's waste management initiatives across Grama Panchayats, Municipalities, and Corporations in Kerala, India. It evaluates sustainable practices, including the 3Rs principle (Reduce, Reuse, Recycle), decentralized systems like Material Collection Facilities (MCFs) and Resource Recovery Facilities (RRFs), community engagement via the

Haritha Karma Sena, and innovative approaches like waste-to-wealth and public awareness campaigns. Methodologically, it is descriptive, using secondary data from official sources such as the Haritha Kerala Mission website, Kudumbashree Mission reports, and state publications, including quantitative data on MCFs, RRFs, and Haritha Karma Sena operations. The study aims to assess the Mission's contribution to Kerala's sustainable development goals and the effectiveness of its multifaceted approach, including infrastructure and community mobilization. It also identifies potential for future research on waste reduction, economic benefits, environmental impacts, and scaling the model to other regions, providing a comprehensive analysis with opportunities for improvement and broader application.

Objectives of the Study

1. To assess how well the Haritha Kerala Mission's tactics support Kerala's broader objectives for sustainable development.
2. To evaluate Haritha Kerala Mission's multifaceted approach, including decentralized waste management systems, Material Collection and Resource Recovery Facilities, and the mobilization of the Haritha Karma Sena.

Methodology

The present study is descriptive in nature and purely based on secondary data. Quantitative data were collected from official sources, including the Haritha Kerala Mission website, Kudumbashree Mission reports, and state government publications. This data included statistics on the number of Material Collection Facilities (MCFs), Resource Recovery Facilities (RRFs), and the operational status of Haritha Karma Sena units across different administrative levels.

Literature Review

In Kerala, sustainable management of Construction & Demolition (C&D) waste is a pivotal initiative aimed at achieving effective waste reduction and recycling through the 3R method: Reduce, Reuse, and Recycle (Salah, H., Abhijith, R. 2024). This approach is part of broader efforts to transform the state into a garbage-free environment (Shettigondahalli Ekanthalu et al., 2023). Key initiatives include collaboration across government, private sectors, and citizens, bolstered by initiatives such as the green army at the local government (LSGI) level (Neriamparampil, 2018). These efforts encompass establishing sorting and recycling facilities regionally, enhancing waste segregation practices, and promoting awareness among communities (Porathoor & Vincent, 2020). Despite challenges such as open dumping and limited adoption of modern treatment methods, there is a growing interest in innovative solutions like biogas production, reflecting a shift towards sustainable waste management practices in Kerala(Ajith, 2016).

Haritha Kerala Mission

The Haritha Kerala Mission, launched by State Government of Kerala on December 8, 2016, aims to achieve sustainable development while preserving the environment, guided by the motto "Water, Hygiene, and Harvest." It focuses

on cleanliness, water security, safe food production, and is divided into three sub-missions: agriculture, sanitation and waste management, and water conservation. The mission has implemented initiatives like the Green Law awareness program, achieving significant progress in waste management, sanitation, and intellectual growth. Its waste management objectives include public campaigns for environmental cleanliness, creating an economy around waste by transforming it into resources and jobs, implementing decentralized waste management plans, ensuring infrastructure development, raising sanitation awareness, managing liquid waste, and improving public sanitation through campaigns like 'Take A Break' and 'Litter Free Kerala.' It also promotes private sector involvement and proposes higher education reforms to develop waste management experts.

Haritha Karma Sena

The Haritha Karma Sena (HKS), established in 2017 under the Haritha Keralam Mission, is a key waste management and sanitation initiative in Kerala, operating under the Kudumbashree Mission. HKS collects organic and inorganic waste from households and businesses across 857 Grama Panchayats, 87 Municipalities, and 5 Corporations, with sorted waste sent to recovery facilities for recycling or repurposing, such as using shredded plastic for road tarring by Clean Kerala Company. Approximately 36,000 workers, supported by a Viability Gap Fund, are trained by the Kerala Institute of Local Administration (KILA) and Kudumbashree to perform door-to-door waste collection, source composting, green technician services, and small-scale enterprises like compost production and organic farming. HKS processes over 100 tons of dry discards daily, sorted at Material Collection Facilities for recycling industries. Despite temporary disruptions during the COVID-19 pandemic, HKS is working towards self-sufficiency, with many units now operating independently. The initiative collaborates with Clean Kerala Company, Kudumbashree, Shuchithwa Mission, Haritha Kerala Mission, and local governments, with each worker managing waste from at least 250 households on a user-fee basis, promoting recycling and innovative green initiatives.

Table 1 shows that, of the 1,035 local self-government institutions (LSGs) in Kerala, 767 have allocated funds for the Haritha Karma Sena (HKS). A substantial 29,520 HKS units have been identified, with 27,517 individuals trained. However, only 410 units are operational, and 324 consortia have been formed, indicating uneven progress. Implementation varies across districts, with some showing strong organizational structures and others lagging in operational execution.

Material Collection Facilities

MCFs are a storage facility for collecting and storing inorganic wastes collected by Haritha karma sena before they are sorted or classified. For facilitating secondary segregation of dry waste collected by Haritha karma sena through door-to-door collection, 994 Material collection facilities are established under various LSGIs in the state. This would be enough to cater the need of managing 80 per cent of the segregated dry-waste generated in the state.

Table 1

Haritha Karma Sena Project Status

No.	Districts	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Thiruvananthapuram	78	73	1706	71	1970	34	27
2	Kollam	73	73	2477	72	2634	18	4
3	Pathanamthitta	58	47	1528	54	1274	38	41
4	Alappuzha	78	71	3460	72	2290	20	8
5	Kottayam	77	44	2187	77	2031	33	26
6	Idukki	54	36	1736	48	1446	18	45
7	Ernakulam	96	47	2251	34	1469	16	12
8	Thrissur	94	20	2200	61	2646	20	11
9	Palakkad	95	72	2862	95	2862	35	9
10	Malappuram	106	96	2925	86	2876	25	61
11	Kozhikode	78	48	3004	79	1978	67	27
12	Wayanad	26	26	491	25	998	7	26
13	Kannur	81	81	1500	81	1837	59	19
14	Kasaragod	41	33	1193	33	1206	20	8
	Total	**1035**	**767**	**29520**	**888**	**27517**	**410**	**324**

Source: official website of kudumbashree

(1) No: of Total LSGs, (2) No: of LSGs kept fund for HKS, (3) No: of Haritha Karma Sena Identified, (4) No: of LSGs completed training of HKS, (5) No: of Haritha Karma Sena Trained, (6) No: of Haritha Karma Sena units started Operation, (7) No: of HKS consortium formed.

The summery of the table 2 shows that Grama Panchayats demonstrate high performance in waste management with an average of 90.01 per cent across districts. Municipalities have a moderate average performance of 77.64 per cent, with some districts like Alappuzha excelling and others needing improvement. Corporations, however, show a lower average performance of 36.7 per cent, indicating a need for increased attention and resources to enhance their waste management effectiveness.

Resource Recovery Facility

Material Collection Facilities (MCFs) serve as intermediary points for plastic waste, which is then transferred to Resource Recovery Facilities (RRFs) for further processing. These RRFs play a crucial role in the waste management process. They perform several key functions to prepare plastic waste for reuse or recycling:

1. Removing dust and contaminants.
2. Shredding the plastic into smaller, more manageable pieces.

Table 2

Material Collection Facility as on 31-05-2021

Sl. No.	District	Grama panchayaths				Municipalities				Corporations			
		(1)	(2)	(3)	%	(4)	(2)	(3)	%	(5)	(2)	(3)	%
1	TVM	73	73	69	94.52	4	8	5	62.5	1	10	6	60
2	Kollam	68	68	74	108.8	4	8	4	50	1	10	1	10
3	Pathanamthitta	53	53	54	101.9	4	8	5	62.5	0	0	0	0
4	Alappuzha	72	72	65	90.28	6	12	24	200	0	0	0	0
5	Kottayam	71	71	71	100	6	12	10	83.33	0	0	0	0
6	Idukki	52	52	52	100	2	4	3	75	0	0	0	0
7	Ernakulam	82	82	56	68.29	13	23	21	91.3	1	10	5	50
8	Thrissur	86	86	75	87.21	7	10	9	90	1	10	7	70
9	Palakkad	88	88	85	96.59	7	14	7	50	0	0	0	0
10	Malappuram	94	94	66	70.21	12	24	12	50	0	0	0	0
11	Kozhikode	70	70	51	72.86	7	12	7	58.33	1	10	1	10
12	Wayanad	23	23	24	104.4	3	6	3	50	0	0	0	0
13	Kannur	71	71	72	101.4	9	14	11	78.57	1	10	2	20
14	Kasargode	38	38	33	86.84	3	6	4	66.67	0	0	0	0
Total		**941**	**941**	**847**	**90.01**	**87**	**161**	**125**	**77.64**	**6**	**60**	**22**	**36.7**

Source: Annual Report of suchitwa mission 2020-2021

(1) Total no. of Grama panchayaths, (2) Total No. MCF's required, (3) Total No.of MCF's functional, (4) Total No.Muncipalities, (5) Total No.of Corporations

3. Compressing and baling the processed plastic.

After this treatment, the refined plastic materials are distributed to appropriate facilities for recycling or repurposing. This system helps to maximize the recovery of usable materials from plastic waste, contributing to a more circular economy and reduced environmental impact.

The summary of the table 3 shows that

- **Grama Panchayaths**: 941 total across all districts. Participation is complete across all districts.
- **Block Panchayaths**: 152 total, with full participation across all districts.
- **Municipalities**: 87 total, with an overall performance rate of 65.5 per cent. There is variation across districts, with some showing perfect or near-perfect performance and others much lower.
- **Corporations**: 6 total, with an overall performance rate of 38 per cent, indicating room for improvement.

This data suggests that while there is full participation in Grama Panchayaths and Block Panchayaths, the performance of Municipalities and Corporations varies significantly across districts, with some

Table 3

Resource Recovery Facility as on 31/05/2021

Sl no.	District	Grama panchayaths		Block panchayaths				Municipalities				Corporations			
		(1)	(3)	(4)	(2)	(3)	%	(5)	(2)	(3)	%	(6)	(2)	(3)	%
1	TVM	73	1	11	11	6	54.55	4	4	3	75	1	4	2	50
2	Kollam	68	9	11	11	2	18.18	4	4	4	100	1	4	1	25
3	Pathanamthitta	53	3	8	8	4	50	4	4	4	100	0	0	0	0
4	Alappuzha	72	4	12	12	3	25	6	6	5	83.33	0	0	0	0
5	Kottayam	71	3	11	11	7	63.64	6	6	6	100	0	0	0	0
6	Idukki	52	3	8	8	2	25	2	2	2	100	0	0	0	0
7	Ernakulam	82	6	14	14	1	7.14	13	13	7	53.85	1	4	2	50
8	Thrissur	86	12	16	16	8	50	7	7	7	100	1	4	2	50
9	palakkad	88	5	13	13	4	30.77	7	7	6	85.71	0	0	0	0
10	Malappuram	94	3	15	15	2	13.33	12	12	2	16.67	0	0	0	0
11	Kozhikode	70	1	12	12	4	33.33	7	7	1	14.29	1	4	1	25
12	Wayanad	23	4	4	4	0	0	3	3	0	0	0	0	0	0
13	Kannur	71	3	11	11	8	72.73	9	9	7	77.78	1	4	1	25
14	Kasargode	38	0	6	6	3	50	3	3	3	100	0	0	0	0
Total		**941**	**57**	**152**	**152**	**54**	**35.5**	**87**	**87**	**57**	**65.5**	**6**	**24**	**9**	**38**

Source: Annual Report of suchitwa mission 2020-2021

(1) Total no. of Grama panchayaths, (2) Total No. RRF's required, (3) Total No.of RRF's functional, (4) Total No. Block Panchayaths, (5) Total No.Muncipalities (6) Total No.of Corporations

areas performing exceptionally well and others needing improvement.

Major Findings

- The Haritha Karma Sena (HKS) effectively manages waste across 857 Grama Panchayats, 87 Municipalities, and 5 Corporations in Kerala, processing over 100 tonnes of dry discards daily. This decentralized system enhances waste segregation and resource recovery by channeling sorted waste to Material Collection Facilities (MCFs) and Resource Recovery Facilities (RRFs) for recycling or repurposing.
- The Haritha Kerala Mission has developed robust infrastructure with 994 Material Collection Facilities (MCFs) managing 80 per cent of Kerala's segregated dry waste and 195 Resource Recovery Facilities (RRFs) as of January 27, 2023, processing plastic waste through contaminant removal, shredding,

and baling to support a circular economy. Additionally, the Haritha Karma Sena (HKS), employing around 36,000 workers (mostly women), promotes community empowerment and poverty reduction through jobs in waste collection, composting, green technician services, and enterprises like organic farming, creating green jobs and fostering self-sufficient local economies.

- The Haritha Kerala Mission effectively implements the 3Rs principle (Reduce, Reuse, Recycle), aligning with Kerala's Solid Waste Management Policy to reduce waste disposal and environmental impact through innovations like using shredded plastic for road tarring. It fosters collaboration among stakeholders, including local self-government institutions, private sectors, Clean Kerala Company, Kudumbashree, and Shuchithwa Mission, for integrated waste management. However, challenges persist, with only 410 of 767 funded HKS units operational and 324 consortia formed, showing uneven progress across districts—Grama Panchayats perform strongly (90.01 per cent), Municipalities moderately (77.64 per cent), and Corporations poorly (36.7 per cent)—indicating a need for better coverage, especially in rural areas. The mission significantly enhances public health and environmental cleanliness by reducing waste and improving resource recovery, advancing Kerala's sustainable development goals.

Suggestions

- To enhance the Haritha Kerala Mission's impact, efforts should focus on achieving full operational coverage by activating the 625 non-operational HKS units among the 1035 LSGs, with targeted interventions in underperforming districts like Ernakulam and Thrissur. The mission's urban successes should be replicated in rural Grama Panchayats by providing more resources, training, and infrastructure to address operational challenges. Low-performing Corporations (36.7 per cent) need increased resources, infrastructure, and specialized training to boost urban waste management efficiency. Additionally, intensifying public campaigns like 'Take A Break' and 'Litter Free Kerala' will enhance community awareness and participation in waste segregation, recycling, and sanitation.

- To strengthen the Haritha Kerala Mission, expand the "Smart Garbage Application" for real-time monitoring and invest in advanced waste processing technologies like improved composting and biogas production to overcome operational challenges. Enhance HKS sustainability by bolstering the Viability Gap Fund and promoting income-generating activities, such as marketing "Harita Mithram" bio-fertilizers and upcycled products, to ensure financial independence. Additionally, implement higher education reforms to develop waste management experts and establish a

robust training system through the Kerala Institute of Local Administration (KILA) to build human resource capacity.

- To expand the Haritha Kerala Mission's impact, conduct further research to quantify its effects on waste reduction, economic benefits, and environmental outcomes, creating a scalable model for other states or countries. Boost private sector engagement through incentives and partnerships to support infrastructure and waste-to-wealth initiatives, increasing the mission's reach. Ensure accountability and continuous improvement by conducting biannual performance evaluations of local self-government institutions (LSGs) and establishing permanent Green Audit Committees for regular monitoring and evaluation.

Conclusion

The Haritha Kerala Mission employs a comprehensive, innovative approach to sustainable waste management in Kerala, integrating local governance, community participation, and technological solutions to address growing waste challenges. It significantly advances Kerala's sustainable development goals by improving public health, environmental cleanliness, and local economies through green jobs and waste-to-wealth initiatives. However, challenges persist in achieving full coverage and operational efficiency, particularly in rural areas, where urban successes need replication. Continued emphasis on public education, technological innovation, and infrastructure strengthening is essential. The mission serves as a replicable model for other regions, with future research recommended to quantify its impacts and explore scalability for global waste management practices.

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