

Women in Green: Gender-Responsive Participatory Waste Management and Community Health in Kerala's Haritha Karma Sena

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Abstract

Haritha Karma Sena (HKS) is a women-led network of enterprises in Kerala's decentralized solid waste management, across over 1000 local bodies and involving tens of thousands of members of Kudumbashree (SHG) groups. Although HKS is well known for its work in changing the way waste is managed in cities – including door-to-door collection, resource recovery, and digital monitoring – the implications for gender equity and community health have garnered comparatively less systematic attention. This review aims to consolidate the government documents and mission reports, along with the latest empirical studies to understand the nature of HKS as a gender responsive participatory waste management model and how it influences the environmental and health situation in Kerala. The paper first makes the case for the importance of understanding the context of the sanitation and decentralization reforms in Kerala and then presents the following theoretical perspectives on participatory governance, gender and environment justice, and social determinants of health. It then follows the development of the “green army” of HKS, an institutionalized force for waste services and green entrepreneurship, born from the campaigns. Later chapters examine evidence of socio-economic empowerment of female workers, behaviour change and environmental improvement in communities, and the rise of digital innovations like Harithamithram that will enable real-time tracking of waste flows. The risks to the health of the HKS workers, for example to mixed waste, to physical strain and social stigma, and the lack of health metrics in waste planning and evaluation are given particular attention. The review finds that the work of HKS on environmental hygiene and livelihoods has been significant, and has great potential to catalyse community health transformation, though gaps exist in epidemiological data, studies on occupational health and cross-sectoral collaboration between waste and health. It ends by outlining a research agenda and policy options that conceptualize women-led participatory waste management as a key element of a preventive public health and genderjust urban and rural governance in Kerala.

Keywords: Participatory Waste Management, Women's Empowerment, Gender-responsive Governance, Community Health, Kerala, Kudumbashree, Circular Economy, Occupational Health, Digital Waste Monitoring, Haritha Karma Sena.

Introduction

The Haritha Karma Sena has become a key pillar in the waste governance framework of the Kerala Government, and the State has become a national model for decentralized sanitation and solid waste management. HKS is comprised of women-led squads that gather segregated waste from

households and institutions, and manage material collection facilities (MCFs) and resource recovery facilities (RRFs), and increasingly do so in relation to composting and produce eco-friendly alternatives to single use plastics. They are aided by a galaxy of institutions like the Haritha Keralam Mission, Suchitwa Mission, Kudumbashree, Clean Kerala Company and local self-governments.

Although the environmental and economic successes of the HKS -- including the removal of over 50,000 tonnes of non-biodegradable waste in less than a year, as well as significant income from user fees and recycling -- are documented, there is increasing interest in understanding the contribution of this women-led, participatory model to broader community health outcomes. The community health in this context refers to the physical health benefits of cleaner environments, reduced exposure to pollutants and disease vectors and mental and social health which relates to environmental justice, gender equity and livelihood security.

This review aims at extending the current scholarship and practice by exploring HKS as a participatory waste management model that attends to the gender dynamics of waste management and conceptualizing its contribution to a community health transformation. It provides an alternative framework to previous analyses which considers gender and health as primary themes in waste governance, rather than as a secondary benefit.

Conceptual and Theoretical Framework

- **Participatory Governance in Waste Management. Participatory Governance in Waste Management.**

Participatory governance means a way of creating public services and a way that citizens and community groups share responsibility for results, with a way of influencing decision-making. Participation in waste management can vary from household segregation, fee payment, to participation in planning, monitoring and advocacy. Kerala's reforms make a point of participatory methods; waste services are integrated into community relationships and local governance structures through the concept of a "green task force" which is how they are known as in Kerala and are designated by HKS.

This framework helps to explain the reason why HKS is more than a service provider, but an institutional actor that intervenes between households, local government and private recyclers, and can influence norms of cleanliness, environmental responsibility and health aware living. Participatory governance also poses the issue of accountability to and recognition of and equitable sharing of risks and benefits of the different social groups.

- **Gender, Environmental Justice and Health**

A gender and environmental justice perspective reveals that women and marginalised groups are more likely to suffer from environmental degradation, and also lack power and resources in decision-making. In HKS, women from Kudumbashree's neighbourhood groups are placed at the heart of the governance of waste, with the potential to transform power dynamics and break down stigmas around waste work.

Meanwhile, these women face work hazards like exposure to mixed waste, biomedical waste, heavy lifting and handling, as well as social stigma, which can have detrimental consequences on their health and dignity. From an environmental justice point of view it is thus necessary to address empowerment as well as exposure, so that improvements in livelihoods and leadership do not lead to increased vulnerability.

In this paper health is considered a social and environmental consequence of waste management, yet of gendered labour arrangements and institutional support systems. This encompasses lowered disease risk due to enhanced environment-based hygiene, as well as psychological and social benefits because of recognition, collective identity and secure income.

- **Circular Economy and Social determinants of health**

The social determinants of health approach (SDOH) highlights that the places people live and work—including their income levels, housing quality, and their social and environmental environment— influence health outcomes. HKS impacts several determinants at once, in the sense that it gives regular income, formalizes waste work and helps to create cleaner surroundings.

HKS takes a circular economy approach to waste, too, shredding plastics for road construction, composting organics for agricultural use and producing "upcycled" products to decrease the use of

single-use plastics. Indirect health benefits from circular economy strategies include less pollution, more sustainable food systems and creation of green jobs.

The development of Haritha Karma Sena

- **Genesis and Institutionalization**

The concept of HKS was introduced as part of a strategic shift towards a community-based enterprise-oriented waste management approach with the participation of Kudumbashree's SHG network instead of a contractor-driven and fragmented waste management model in Kerala during 2015–2017. HKS were identified as trained teams of women entrepreneurs delivering technical services and solutions to waste management projects at the ward and local body level as per the government orders/mission documents.

The initiative spread quickly: by mid-2020s more than 1,034 local bodies were reported as working with 4,438 HKS units and more than 33,000 women members. Incorporation of HKS in door-to-door collection, management of MCFs and RRFs and enforcement of green protocols for events and institutions. This was because of the high literacy rates, political strong local governments and social capital in the state, which allowed women-led squads to be accepted as legitimate service providers.

- **Thinking beyond Campaigns to Ecosystem**

Initially launched as a sanitation campaign as part of Haritha Keralam, HKS now has become a complex system involving waste services, entrepreneurship and digital monitoring. Clean Kerala company offers forward linkage of the dry waste, which is collected by the HKS, to industries for co-processing with cement factories. An IT based Smart Garbage monitoring system (Harithamithram) facilitates the monitoring of garbage quantity and flow from households to MCFs and RRFs and aids in strengthening planning and accountability.

It marks a shift from a reactive approach towards clean-up to a system-driven approach towards the management of waste as a resource, positioned in the centre of this development: HKS. It also opens opportunities for incorporation of health-related modules like odour complaints, vector prevalence and contamination of water into digital systems.

The Model and Technologies are in place to support the operations

- **Service Models and Daily Operations. Service Models and Daily Operations.**

HKS services are distinct in urban and rural areas, but have common key features: door to door collection of segregated waste, local processing at MCF and RRF, selling recyclables and eco-friendly products, and assisting organic waste. The HKS members are assigned at least two per ward, and carried out visits to at least 250 households per ward to collect non-biodegradable waste and keep service registers.

All the collected waste is carefully sorted into plastics, metals, glass, e-waste and so on. RRFs operated by Clean Kerala Company or any other institution, shred the recyclable plastics and use it in road taring projects. Non recyclable combustible waste is sent to the cement factories for co-processing as refuse derived fuel, which decreases landfill dependency.

Apart from waste collection, the HKS members also organize clean up activities in disaster affected areas and relief camps and in one such campaign, more than 81 tonnes of mixed waste was removed. They also rent eco-friendly equipment, promote organic cultivation and produce cloth and paper bags, thus diversifying their green services.

- **Digital Monitoring & Citizen Interfaces**

Kerala's Smart Garbage monitoring application, called Harithamithram, provides an interface of real-time data on door-to-door collection, storage and transportation of garbage. It aids in quantitative assessment of waste at state, district and local body level, it helps in addressing unorganized waste collection and it helps in coordination among stakeholders.

From the community health point of view, these digital platforms can become key tools to identify environmental hotspots, for complaints management and planning interventions. Citizen interfaces help households engage in cleanliness and quality monitoring and authorities get information about trends and allocate resources accordingly. Current documentation, however, emphasizes largely on waste volumes and performance of the operation, and there is not much explicit reference to health indicators.

Socio-Economic Empowerment and Gender Outcomes

• **Livelihoods and Economic Security (SES)**

HKS has made waste management a professional, income-generating service, and user fees and scrap sales are two revenue streams. During the financial year 2023-24, the waste collection service user fees were about Rs. 22.43 crore and there was also a profit from products made from waste. In some local bodies, the average monthly income of HKS members is reported to be around ₹22,000 with the wages stabilized by the Viability **Gap Funding provided by the Government**.

These incomes constitute important economic gains for women in the poor and middle income households, increase their bargaining power within the family and the community and are linked to better nutrition, access to health and education services. These impacts are mitigated by the broader empowerment programme of Kudumbashree that involves microfinance and capacity building.

• **Recognition, Leadership and Social Capital**

HKS reclaims and challenges existing gender norms and stigmas related to waste work by recruiting women as green technicians, supervisors and entrepreneurs. In the media and government reports, members of the HKS are characterized as “green warriors” and “women in green,” who are leading in the field of environmental protection.

Social capital is enhanced through HKS, as it fosters trust and reciprocity among households and waste workers and helps foster collective actions on cleanliness campaigns and environmental issues. Women's presence in public spaces can also help to encourage younger generations to see environmental work as a job that is respected and has dignity.

CHEO (Community Health and Environmental Outcomes)

• **Environmental Hygiene and Disease Risk Reduction**

The amount of non-biodegradable waste dumped in water bodies and public areas has been significantly reduced through HKS activities, with more than 50,190 tonnes of such waste documented from April 2024 to February 2025. Cleaned up neighbourhoods and managed waste streams decrease mosquito and rodent breeding habitat, decrease exposure to smoke from burning mixed waste, and enhance the neighbourhood aesthetic.

The focus on source-level treatment of biodegradable waste (via bio-bins, compost pits, ring composts and the setting up of community biogas plants) further mitigates the release of pathogens from decomposing organic waste in open areas in Kerala. Together with waste collection by HKS, these may help to limit the occurrence of respiratory and gastrointestinal diseases, but there is not much systematic epidemiological evidence.

• **Behaviour change and health Literacy**

It provides opportunities for continuous learning on segregation, eco-friendly practices and hygiene by regular presence of HKS members in households. There are indications of higher awareness and compliance of households with waste segregation after they were provided with the service by HKS, which should have an impact on daily life and means health.

HKS also extends the health messages to the vectors and water safety through participation in pre-monsoon cleaning drives and sanitation campaigns. While challenging to measure, behavioural and cultural change is essential to community health transformation.

Occupational Health and Justice Dimensions

• **Risks and Vulnerabilities of HKS Workers**

Although the empowerment story is being told, the occupation of HKS workers puts their health at risk. Some case studies of specific panchayats bring to the fore challenges of the lack of PPE, exposure to biomedical and sanitary waste, musculoskeletal fatigue during load lifting, stigma and stress due to conflict with households.

Women workers could also face double burden of paid and unpaid labour, having to balance their time between HKS and domestic and caring duties and this may cause fatigue and lack of time for self-care. These vulnerabilities highlight the need for an environmental justice lens, which includes a consideration of inequitable distribution of risks, to view HKS.

- **Safe and dignified work in waste management**

There is a need to strengthen capacity building, provide uniforms and basic facilities and promote HKS to technology empowered areas as stated in government documents and best-practices reports. But explicit programmes for occupational health, including health insurance, regular medical examination, ergonomic training and psychosocial support, are still developing.

Safe and dignifying working conditions is a key to protect the health of the members of HKS as well as to maintain the legitimacy and effectiveness of the model. Interventions designed for the occupational health sector can involve workers in co-design, drawing on their experience and priorities in designing policies and programmes.

Policy and Programmatic Implications

- **Health-related aspects in Waste Governance.**

Although these policy documents acknowledge the linkages between sanitation, waste management and health in Kerala, institutional setups are still treating these areas as separate issues. These could be the areas where health departments could be brought on-board in the planning of Haritha Keralam Mission and HKS and come up with joint audits of waste and health, joint targets on reduction of disease and coordinated response to health crises in the environment.

A digital tool like Harithamithram could be scaled up to incorporate other indicators relevant to health like complaints of odour, prevalence of vectors, reported clusters of illness could help authorities identify and respond to environmental health hotspots more effectively. Such integration can contribute to a move for HKS from a sanitation service to a public health frontline actor.

- **Scaling and Replication – Example with Justice Considerations**

HKS is gaining recognition as a best practice in national sanitation platforms and could be used as a model for replication in other states and countries. However, it is important to bear in mind that scaling should be sensitive to the gender dynamics in the context, existing waste worker networks, and capacities of local government when scaling to prevent vulnerable groups being displaced and marginalized.

Policy makers need to make sure replication models integrate robust occupational health protection, participatory systems and recognition of various waste worker identities, thus linking environmental and health objectives to social justice.

- **Research Gaps and Future Directions**

The necessity to carry out empirical health studies. The need to conduct empirical study of health.

Much of the literature available on HKS concentrates on operational efficiency, public perception and socio-economic impacts, and few empirical studies have been conducted to measure health impacts. Future studies should use a mixed methods design incorporating both environmental monitoring (air and water quality, vector indices) and health data (disease incidence, healthcare utilization) and qualitative narratives to determine the impacts on the health of the community.

Longitudinal studies that compare areas with high and low densities of HKS with areas that have areas with weak or no participatory waste management would help to identify causal pathways and quantify the benefits over time. There may be a need for participatory epidemiology (involving HKS members and communities in data collection and interpretation) to improve relevance and accuracy.

- **Gendered Analysis of Occupational Health**

Detailed occupational health studies should be conducted to capture the range of physical, mental and social health problems in the hands of HKS workers, broken down by age, caste, marital status and other cross-cutting identities. This should be used to design specific interventions such as ergonomic tools, safe waste handling procedures and supportive supervisions.

Gendered analysis can then further investigate the changes in intra-household dynamics, time use, decision-making power, and how these changes contribute to health and well-being as a result of participation in HKS. Focusing on men's roles as household members or as local leaders or co-workers may also help to understand the overall impact of gender relations on participatory waste management.

Conclusion

Haritha Karma Sena is a perfect example of participatory governance, women's empowerment and waste management with a circular economy in Kerala. Through the introduction of formalised, women-led waste services at the grassroots, HKS has helped improve environmental conditions, livelihoods and the social norms of environmental responsibility.

These are all upstream interventions in the social determinants of health as well as the environment, and have potential for reducing disease risks and increasing well-being at the community level. Nevertheless, the health effects are not sufficiently supported by documentation and the occupational risks of HKS workers are a pressing concern.

This review calls for a paradigm shift of the HKS and similar projects as key components of prevention and gender-just governance in public health. That means embedding health indicators in waste management planning, improving up to date occupational health and safety standards and conducting more participatory research that reflects the experiences of women in green. The journey of Haritha Karma Sena provides insights into the potential of gender-responsive and community-driven waste management for environmental and health transformation as Kerala moves towards achieving sustainable sanitation.

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