

Barriers and Enablers in Scaling Decentralized Waste Management: Lessons from Haritha Karma Sena's Grassroots Experience

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ABSTRACT

In the Global South, where urban and rural waste challenges are becoming more pressing and centralized capital-intensive waste management has proven to be difficult to achieve environmental sustainability and social equity, decentralized solid waste management has become a key strategy to tackle these issues. Haritha Karma Sena (HKS), a women-led, community-based waste collection, segregation, and resource recovery network, is one of the most ambitious and ambitious initiatives in India to decentralise at scale in Kerala. This review paper collates literature and project studies and government documents on the topic of HKS and other similar decentralized waste management practices in Kerala, highlighting the challenges and opportunities in scaling up such systems beyond the pilot stage. The paper builds a conceptual framework that maps institutional, socio-cultural, economic, infrastructural and gender-differentiated factors influencing the expansion and consolidation of HKS, drawing from the empirical studies from Ernakulam and other districts, policy documents of the Haritha Keralam Mission, and recent analyses of gender equity, climate governance and participatory waste management. The review identifies that needs of the policy support, the user fee and the scrap-based revenue streams, the integration with women's SHGs of Kudumbashree as well as investments in material collection centres have facilitated the rapid scale up of the HKS units in over a thousand local governments, allowing for effective removal of non-biodegradable waste and improved segregation practices at the household level. Weak infrastructure in some regions, low and inconsistent remuneration, lack of adequate social recognition, occupational health risks, reliance on public collaboration and lack of equal institutional capacities are all factors limiting a long-term sustainable and equitable model. The presented conceptual approach focusing on scaling up decentralized waste management emphasises the need for good governance, equitable employment conditions, gender-responsive recognition, secure funding and flexible participatory approaches. The paper ends by summarizing implications for state and local governments and providing further research directions, such as comparative analyses between districts, longitudinal analyses of livelihoods and more in-depth intersectional analyses of gender and environmental justice in decentralized waste governance.

Keywords: Decentralized Waste Management, Haritha Karma Sena, Kerala, Gender Equity, Participatory Governance, Scaling Barriers, Enablers, Circular Economy, Local Self-Government.

Introduction

Solid waste management is broadly acknowledged as a key issue in environmental governance in LMICs, where waste generation is high and safe disposal is inadequate due to the rapid rate of urbanization, growing consumption patterns and poor investment in infrastructure. Centralised systems,

based on landfill and incineration, have frequently resulted in significant environmental degradation, public health risks and marginalisation of informal waste workers, as well as in the lack of source based waste reduction and resource recovery. In turn, an increasing volume of practice and scholarship has shown that a decentralized management system, focusing on segregation at source and community-based processing and governance, offers a potential avenue for sustainability and circular economy transitions.

Kerala is a leading example in this global debate, having formally embraced the concept of “My Waste, My Responsibility” and been gradually transforming towards decentralised, community based waste systems, with the active support of LSGIs. One of the key elements of this transformation is the network of women waste workers from Kudumbashree neighbourhood groups who collect segregated non biodegradable waste door-to-door and also provide support to the household-level organic waste management and facilitate resource recovery through Material Collection Facilities (MCFs) and Resource Recovery Facilities (RRFs). In the last ten years, HKS has gone from initial experiments to thousands of units throughout Kerala, and has been a flagship initiative of Haritha Keralam Mission and a major tool for achieving a ‘zero waste’ vision at grassroot level.

The growth of HKS shows how decentralized waste management can be achieved using gendered community labour and local governance, but it has been an uneven process with many tensions. The literature also reveals that there are enabling factors (e.g. good policy support, training, financing arrangements and social mobilization) as well as ongoing obstacles (e.g. insufficient infrastructure development, low income structure, limited policy recognition of women's environmental labour, institutional capacity limits and socio-political complexities in participatory governance). This review paper aims at stitching together these various strands and provide a coherent analysis of the drivers and barriers for scaling decentralized waste management in Kerala, with a focus on HKS.

Background: Haritha Karma Sena and Kerala's Decentralized Waste Policy

The Haritha Keralam Mission initiated by the Government of Kerala identifies waste management, soil and water conservation, and organic farming as its three strong pillars and also explicitly spells out a decentralized, public-informed approach to its operations, driven by LSGIs. Waste management sub-mission documents highlight the need for segregation at the household level, awareness creation at the community level, decentralized treatment system and coordination between different schemes and agencies such as the Suchitwa Mission, Kudumbashree, Clean Kerala Company and local governments at the local level under a single local project. In this framework, Haritha Karma Sena was established in 2017 as an organised network of Green Technicians/Green Supervisors, mostly women members of the Kudumbashree neighbourhood groups, for the collection, transport, processing and management of waste materials.

Government and mission reports state that HKS collects non-organic waste (and in some cases also organic waste) from households and institutions at the doorstep and charges user fees as fixed by the LSGIs and transports the waste to the MCFs and RRFs for recycling and upcycling. These facilities allow for additional value added, for example shredding plastics for road tarring and to create upcycled products that are increasingly being adopted in government procurement. The mission also calls for “viability gap funding” for those units that have insufficient income, biofertilizer branding and marketing of organic waste and green protocols for waste reduction during public functions.

The extent and effectiveness of these has been emphasised through recent reports: HKS: NIUA reports that 1,034 LSGIs are working with 4,485 Haritha Karma Sena groups and more than 33,000 SHG women, who are collectively visiting at least 250 households each for waste collection. From April 2024 to February 2025, HKS collected approximately 50,190 tonnes of non-biodegradable waste from various parts of Kerala, resulting in significant income from user fees and the sale of scrap metal, and inspiring thousands of women to participate. These aggregated data indicate that HKS has succeeded in developing the waste management system from a rather free-form sanitation service into a professional and revenue-generating environmental service at grassroots.

Meanwhile, government documents acknowledge that decentralized options for waste management are a part of more comprehensive policy changes, such as coordination between central, state and World Bank-assisted schemes, the creation of plastic recycling parks on the regional level, the introduction of Extended Producer Responsibility, and the improvement of enforcement and green audit systems at LSGI level. HKS therefore functions within a multi-scalar governance structure, that includes

local operations, state-level policy and infrastructure interventions, that all influence the possibilities and limitations of scaling decentralized waste systems.

Literature Review

- **Empirical studies related to the impacts of HKS**

In several empirical studies, the effect of Haritha Karma Sena on the practices of household and community waste management, focusing on environmental and behavioural aspects has been studied. The study has been conducted on the households in Ernakulam, using structured questionnaires which were filled by 100 respondents, followed by regression, correlation, mean comparison and ANOVA for assessing the role of HKS in enhancing waste management practices in households. The analysis showed that the reliability and validity of the study instrument was proven to be good and the impact of the HKS volunteers was positive in improving waste segregation, reducing the improper handling of waste and contributing to the quality of the environment.

Other case-based investigations and project reports have highlighted the role of HKS in supporting decentralized infrastructure, like MCFs and local composting plants and the positive impact of its presence on decreasing the amount of visible dumping sites and improving compliance to segregation norms at the household level. Together these studies place HKS in a key position between policy aims of zero waste and household habits, as both a service provider and an environmental educator.

- **Labour and Environmental Justice in HKS—Gender Issues**

Sasi and Singh have recently analysed the HKS in the context of gendered decentralised waste governance, highlighting the initiative and its impact in the wider discourse on women's environmental labour, community health and environmental justice. The chapter makes the case for not limiting the scope of HKS to a waste collection model, but instead viewing it as a form of labour for women, as a protective mechanism for the health of the community and as a local environmental governance system. It illustrates how HKS has helped women enter the paid environmental workforce, raise awareness on waste segregation, minimise unscientific waste disposal, and engage in strengthening waste governance institutions at the local level.

Meanwhile, the analysis reveals unsolved problems such as lack of infrastructure, low and irregular pay, lack of social recognition and occupational safety, and dependence on public cooperation, which all limit the potential for HKS as a “green justice with gender sensitivity”. It highlights that women waste workers need to be acknowledged as skilled environmental service providers, provided fair wages and protection, and provided good infrastructure, social dignity and a voice in decision-making processes. This is a gendered approach which foregrounds enablers and barriers in scaling HKS, contextualizing the initiative in the light of patriarchal norms and undervaluation of care and sanitation.

Complementary work refers to the way in which HKS is seen as an entrepreneurial opportunity for the local women, who are given economic incentives through user fees and profits from the waste-derived products, which also helps them to stabilize their wages, assisted by government funding in the form of viability gap funds. These narratives highlight the significance of HKS in women's livelihoods and economic empowerment, but also implicitly challenge the sufficiency, frequency and equity of livelihoods based on such income in relation to the physical and emotional strain of waste work.

- **Policy and Governance Analyses**

The decentralised waste management model in Kerala, in which HKS play a role, has been studied from the perspective of governance innovations and institutional capacities through policy oriented studies and working papers. PPRI's working papers and mission reports indicate that democratic decentralization reforms, along with campaigns and public involvement, facilitate the implementation of locally tailored waste management schemes, but also point to a lack of capacities in small towns and rural areas. These documents highlight that technical, financial and institutional gaps are important, and these gaps should be closed in order to continue supporting decentralized systems at scale.

A related study on participatory governance of solid waste in Alappuzha identifies how solutions with the citizens are co-created, focusing on knowledge-sharing platforms, community campaigns, and collaboration between academia, civil society and local government. Among the enabling conditions found in the study are knowledge co-production, incentives based on participants' motivations (including social recognition, skill-building opportunities), and adaptive frameworks that connect to local governance structures and community aspirations. It also indicates the need to overcome challenges including lack of

institutional capacity, socio-political dynamics and power relations, the limitations of voluntarism and the danger of participatory processes dragging on without concrete results. While the study is not specific to HKS, the findings are pertinent to a broader understanding of the governance space in which HKS operates and scales.

The case study focuses on a decentralized Waste Management system and challenges in the Global South.

There is a larger literature on solid waste management in the Global South, where decentralized solutions are framed in the context of systemic issues. Research indicates that socio-economic, infrastructural and cultural issues are limitations that hinder optimal collection, segregation and recycling in municipal waste management systems. Issue briefs and case analyses highlight that swift and uncontrolled urban growth can outpace management and disposal, and established habits of relying on centralized landfilling or incineration can make it difficult to implement source separation and community-based solutions.

Such obstacles can only be addressed through a mix of technological solutions and governance reforms, institutional capacity building, behavioural change and informal and community-based waste workers. The implementation of HKS and other forms of decentralized systems is often touted as a success story in Kerala, where it demonstrates that a combination of normative changes, such as the concept “My Waste, My Responsibility” and multi-level coordination, can help these systems take hold. But the literature also points to the need for ongoing efforts to overcome barriers to sustaining and scaling up these models which are structural in nature such as funding, infrastructure and entrenched social hierarchies.

Transition, Climate Governance and Localization

Recent studies on climate protection strategies in Kerala have started taking a look at waste management through the lens of local climate action and environmental governance, as waste management is closely linked to GHGs, resource use and resilience. These analyses also shed light on localization of climate protection policies, of which HKS is part, and how global environmental issues are condensed into local action, in the form of segregation, recycling and reduced pollution. They point out that decentralized waste systems, when scaled up, can also have a positive impact on achieving long-term climate goals, beyond the immediate aspects of public health and sanitation, if they are supported by solid institutions and participatory governance.

Research Gap

While a vast amount of literature has emerged on the topic of HKS and its relevance to decentralized waste management in Kerala, there are still gaps that need to be filled regarding challenges and possibilities of scaling the same. Much of the existing empirical research centers on local effects – such as improved household segregation rates, decreased dumping sites, or economic impact in a specific district – without fully theorizing the processes and conditions that enable HKS to migrate from pilot projects to statewide networks. Policy documents and mission reports typically describe infrastructure expansion, training systems and funding arrangements, but rarely systematically analyze the extent to which these factors interact to either support or hinder scaling over time.

Moreover, gender oriented analyses such as those of Sasi and Singh do identify barriers and enablers in important aspects of labour and justice, but these are largely as thematic issues rather than part of an integrated scaling framework. There is not enough comparative study among the different LSGIs and the different socio-economic settings in Kerala that reveals the differences in the performance of HKS and conditions of the workers and community relations and associates them with institutional and infrastructural arrangement. Likewise, studies on participatory governance in Alappuzha highlight some enabling and constraining aspects for co-creation; however, it is not explicitly linked with the functioning of the HKS units across the state.

The gaps indicate a need for a conceptual framework that integrates institutional, socio-cultural, economic, infrastructural and gender dimensions, in order to develop a comprehensive understanding of scaling decentralized waste management. This approach can make the leap from descriptive documentation and stand-alone case studies to a more analytical perspective that can help guide policy development, programmatic interventions and future research, especially for those interested in replicating or adapting HKS-like models.

Proposed Conceptual Framework/Model

Through analysis based on the literature reviewed, this paper proposes a conceptual framework for analysing barriers and enablers that can be used to consider scaling decentralized waste management that includes five inter-related dimensions: (1) Policy and institutional environment, (2) Infrastructure and technology, (3) Socio-cultural and behavioural factors, (4) Economic and livelihood arrangements, and (5) Gender and labour justice.

- **Policy and Institutional Environment:** This aspect reflects commitments, legislation, mission design, inter-agency coordination and local government capacities that underpin the institutional foundations of decentralized waste systems. Clear policy mandates for decentralised waste management, multiple schemes under LSGI led projects, training systems such as KILA and participatory campaign based implementation are enablers. Coordination fragmentation, lack of technical capacity, weak enforcement and the potential for participatory processes to stall due to institutional capacity and socio-political complexities are the barriers.
- **Infrastructure and Technology:** Proper physical infrastructure (mini-MCFs, MCFs, RRFs, plastic recycling parks) and technology (segregation, processing and resource recovery) are necessary for scaling up decentralized models. These enablers are investments by the state in mechanised RRFs, regional recycling parks, digital solutions such as smart garbage Apps and decentralised treatment facilities. Barriers include inequitable distribution and maintenance of facilities, absence of specialized equipment in some sectors and infrastructural weaknesses that contribute to increased workloads and decreased efficiency for workers in the HKS.
- **Socio-Cultural and Behavioural Factors:** Household and community attitudes and perceptions towards waste, norms of cleanliness and willingness to cooperate with waste segregation and user-fee systems have a significant influence on the viability of HKS. Enablers include intense IEC activities, community confidence in Kudumbashree networks, social validation of HKS and localised incentives like public recognition and capacity development. Issues that impede implementation are the lack of change in user habits regarding mixed waste disposal, non-willingness of waste users to pay user fees, stigmatization of people associated with waste and participation fatigue due to the lack of institutionalization and reward for voluntary participation.
- **Economic and Livelihood Arrangements:** HKS is based on a dual revenue system from user fees (households and institutions) and from selling of the products obtained through scraps and waste, and occasionally viability gap funds. Enablers include stable user-fee regimes agreed to by LSGIs, markets for recyclables and upcycled products, as well as making green businesses like cloth and paper bag units less plastic dependent. Barriers are associated with low and intermittent wages, volatility of the scrap markets, slow payment of wages, and lack of formal labour safeguards similar to other industries.
- **Gender and Labour Justice:** HKS is mostly women-run and gender norms and labour relations are at the heart of the scaling dynamics. Enablers are empowerment opportunities through paid work on the environment, more visibility of women as environmental stewards and connecting HKS to Kudumbashree's other women's livelihood initiatives. The barriers include undervaluation of sanitation labor, risks to occupational health and safety, absence of formal social protection, and women sanitation workers have limited voice in decision-making, which restrict recruitment and retention.

The framework does not see scaling as only a growth of the number of HKS units nor as an increase of collected waste, but as a progressive strengthening of these five dimensions so that decentralized waste management is socially just, environmentally effective and institutionally resilient. It offers a prism to understand certain barriers and enablers seen in Kerala and then leveraging to replicate in other places.

Discussion

• Enablers in Scaling HKS

There are several reasons, as mentioned in the literature, by which these HOKs have spread throughout Kerala and have created noticeable environmental impacts. First, there is strong policy support from the Hariitha Keralam Mission and LSGIs, which have given a clear mandate to decentralize

waste management, through door to door collection, source segregation etc. This policy environment has legitimized and institutionalized HKS as a part of official waste governance, rather than an informal or ad hoc effort, and provided it with resources.

Secondly, the linkage of HKS and Kudumbashree's women SHG's has provided a solid platform for recruiting, training and management of waste workers. Kudumbashree's long experience in community development and microfinance has helped to build trust with households, which helps to make the introduction of user fees and segregation behaviour change activities easier. This combination of decentralized waste management and women's collective organizations is a unique enabling condition driving HKS's coverage.

Thirdly, the decentralized infrastructure has been developed, which includes mini-MCFs at ward level, bigger MCFs and mechanized RRFs, and enables HKS to shift beyond collection to systematic segregation and recovery. Visible material benefits and economic incentives are available when shredded plastics are re-used in road tarring and waste-derived products marketed, reinforcing the idea of waste as a resource, not a liability.

Fourth, user fee and scrap sales, along with viability gap financing, have given a financial base to the operation of HKS and incomes of the workers. Since there are reports of significant income creation and average monthly income of the members of the HKS, it could be said that waste work is a viable livelihood in some places. These economic incentives, along with climate and sanitation campaigns, enable maintaining participation and encouraging ongoing engagement.

Lastly, participatory governance mechanisms like co-created solutions in Alappuzha, demonstration projects and community-led clean-up drives have increased visibility and acceptance of decentralized waste management. Knowledge co-production, public campaign and recognition of HKS members in government programme help to ensure institutional frameworks are aligned with community aspirations and that a sense of ownership and solidarity is built around waste governance.

• **Barriers and Tensions in Scaling**

However, the literature also uncovers consistent barriers and tensions to scaling that exist, and make scaling difficult. A key challenge is infrastructural inequity and lack of infrastructure – some areas have good functioning MCFs and RRFs, some areas lack adequate facilities, equipment and transport, which means that the physical workload of HKS members is increased and efficiency is reduced. Inadequate infrastructure can cause delays in processing, which can result in waste piling up at collection sites and a lack of confidence in the system by the community.

Another barrier is the precarious nature of women's environmental labour within HKS. It has been stressed that wages may be too low and too irregular to reflect the physical and health hazards of working with waste, particularly when there are no protective equipment or safety procedures. Social recognition is low and sanitation work continues to be stigmatized, which denies members of HKS dignity and status as environmental service providers. Such challenges may put retention and morale at risk, and may impede recruitment as the network grows.

Additionally, institutional capacity limits and socio-political issues also constrain scaling. Waste co-creation solutions can be delicate if sufficient technical and administrative capacity is not present in LSGs, and the process of knowledge sharing can be long without resulting in tangible and durable solutions. Power disparities and inequities can limit inclusive participation, and reduce the decision-making space and the power of HKS workers to shape the policies that affect their labour.

There are still behavioural and cultural barriers. Despite concerted efforts, some households still do not adopt the segregation norm or pay user fees for economic reasons or because of the resistance to adopting new habits. Waste work can lead to stigma and limited awareness of the environmental impacts of unscientific disposal activities can lead to less cooperation, making HKS operations more difficult and unpredictable. With less institutionalisation of incentives and over time, participation fatigue and disengagement could occur due to voluntary participation and intrinsic motivation.

Finally, decentralised waste systems are subject to further layers of risk in the form of volatility in recycling markets, limited implementation of Extended Producer Responsibility and macro-economic uncertainties. Markets failures could occur with recyclables, and policy changes that do not favour community based recycling could lead to negative impacts for the economic sustainability of HKS and the incomes of those working in the sector.

Intersections of Gender, Justice and Scaling

A key takeaway from the literature is that scaling decentralized waste management is not only a technical and institutional process, it is also a transformation process that is gendered and justice laced. Being based on women's labor and an entrepreneurial opportunity, compensation, health care, recognition and decision-making authority are at the heart of the sustainability of HKS. However, the issues that remain unresolved after analysis with gender perspectives – for example, lack of infrastructure and social recognition – are not side-effects but core issues, which determine whether or not HKS can be a model of green justice.

Such scaling up, which fails to consider these aspects of labor and justice, can simply perpetuate or exacerbate existing inequalities, while still having positive environmental effects. In contrast, gender- and labour justice-specific, legal protection, formal recognition, social security, and inclusive governance can make HKS a role model for environment and gender-related, socially just, and environmentally sustainable waste governance. As the conceptual framework posited in this paper suggests, this intersectional approach must go hand-in-hand with improving environmental performance and labour and community justice.

Practical Implications

This review has a number of practical policy implications for those looking to improve and scale decentralised waste management in Kerala and elsewhere.

Firstly, systematic strengthening of infrastructure in lagging areas in order to make all the HKS units have access to well-functioning mini-MCFs, MCFs, RRFs and protective equipment. This encompasses investments in maintenance, transport logistics and digital monitoring systems, which can improve efficiency and transparency and alleviate physical workload on workers.

Second, mainstreaming of labour and gender justice in the HKS policies must be ensured. This includes wage systems to be revisited and regular, fair wages to be paid; provision of occupational safety equipment, health insurance, formal recognition of HKS members as skilled environmental service providers, and mechanisms to be put in place to include HKS in decision-making forums at LSGI level. These interventions can lead to better retention, morale and recruitment and show the state's appreciation for women's environmental work.

Third, participatory governance processes need to be adaptive and inclusive to overcome capacity gaps and continue to include citizens. This might include targeted capacity building for LSGI officials, formal fora to facilitate discussion between communities, LSGI networks and technical expertise, and incentive mechanisms to encourage continued engagement (e.g., public recognition, certification and skills development). Research collaborations and processes of knowledge co-production can be integrated into these to further enhance learning and innovation.

Fourthly, economic and market considerations should focus on stabilizing revenues for HKS. Governments and agencies can promote green businesses that are able to diversify green businesses, such as cloth and paper bag units, that can be less dependent on volatile scrap markets, and enhance procurement policies that favour upcycled products and compost. Viability gap funding should be predictable, timely, with transparent criteria; in order to avoid income shocks for workers.

Lastly, ongoing behavioural initiatives and communication campaigns need to address household and community norms with regards to waste. With the "My Waste, My Responsibility" story, campaigns can promote the work of HKS members and the "environmental story" and "human story" can be included, which will increase social recognition and promote co-operative behaviour. For a culture of shared responsibility between generations, school-based programmes, youth involvement and digital tools can supplement traditional IEC programmes.

Limitations

The main limitations of this review are that it focused on secondary literature, government reports and project-based studies, and that there was no ethnographic engagement with HKS workers and communities and limited data collection of primary sources. There are published studies that provide insights into impacts and challenges, but these cannot necessarily reflect the complexities of labour relations, informal negotiations or emerging trends in particular localities.

Furthermore, the literature available on HKS is fairly new and emerging, and much of the analyses are limited to a particular district or a specific aspect of the themes (household practices,

gender equity or climate governance), and the findings may not be applicable to all parts of Kerala. There is limited comparative research between different socio-economic settings and LSGI capacities, thus there is little capacity to systematically map the variations in scaling outcomes.

Lastly, this paper's conceptual framework is based on patterns and on arguments from scholars but is heuristic and needs to be tested empirically. To validate and develop the framework, and to make it actionable and measurable with indicators for use in policy monitoring and evaluation, operationalizing its dimensions will be required in quantitative or mixed-methods studies.

Future Research

There are several potential lines of research to be pursued in the future in the area of HKS and decentralized waste management in Kerala. Firstly, longitudinal studies examining the HKS units over time across different LSGIs would shed light on the role of institutional, infrastructural and economic changes on scalability, sustainability and workers experience. This research could study the path of the successful units and unsuccessful units, and seek to find the 'tipping points' and policy interventions.

Second, cross-district analyses can help identify differences across districts with different socio-economic and urban-rural characteristics and governance capacities and may inform understanding of contextual factors that affect scaling success. These studies may utilize quantitative measurements (e.g., waste amounts, waste segregation rates, income levels) and qualitative community attitudes, political support and labour relations data.

Third, more in-depth intersectional analysis of gender and caste/ class in HKS is required to understand the intersectional effects and experiences of decentralized waste governance. Such studies can expand on existing gender work to delve deeper into intra-group dynamics within the female workforce, dynamics with male workers and officials and the implications of HKS for intra-household power dynamics and social mobility.

Fourth, transdisciplinary research (including partnerships between academic institutions, policy institutions, and HKS networks) can try out new governance formats, incentive regimes and technological innovations, and assess their effects using co-produced knowledge formats. This approach may help to connect the theory and practice and develop replicable models for other states and countries in the Global South.

Lastly, research with a climate focus can measure how decentralized waste systems with HKS can help achieve climate goals by reducing GHGs and by enabling resources efficiency and resilience at the local level. These studies can support the development of integrated climate and waste policies, and further highlight the role of HKS as a major player in local climate protection strategies.

Conclusion

Haritha Karma Sena is one of the most important women-led, community-based decentralized waste management initiatives in the Global South to show how waste governance in the Global South can change from a centralized, often ineffective system to a localized, participatory and resource-focused one. This scaling up of HKS in Kerala is facilitated by robust policy directives, engagement with Kudumbashree networks, investments in decentralized infrastructure, and innovative revenue strategies and participatory campaigns encouraging household-level segregation and environmental awareness.

Meanwhile, the literature shows that there are still challenges to overcome, such as infrastructure issues, uncertain employment conditions, lack of social recognition, institutional capacity constraints and socio-cultural resistance, that limit the potential of HKS as a model of green justice. This conceptual framework brings together these insights and combines five dimensions—policy and institutional environment, infrastructure and technology, socio-cultural and behavioural factors, economic and livelihood arrangements, and gender and labour justice—which provide a comprehensive way of looking at scaling dynamics.

The lessons from HKS highlight that for Kerala and other regions looking to scale decentralized waste, scaling is not just a matter of quantitative growth but one of a qualitative strengthening of governance, infrastructure, livelihoods and justice, which recognises and empowers the women and communities that are environmental labour. Speaking about barriers and consolidating enablers along these dimensions, can help to make HKS a globally relevant example of decentralized waste management and gender sensitive environmental governance.

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