

# Analysing the public responsiveness towards the Haritha Karma Sena program in Kerala

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**Abstract** - The Haritha Karma Sena initiative under the Haritha Kerala Mission is a community-led waste management program implemented in the state of Kerala, India. This study analyses public responsiveness towards the Haritha Karma Sena scheme with a focus on behavioral attitudes, willingness to pay, and perceptions of Kudumbashree members engaged in waste collection. Data was collected from approximately 100 respondents through online questionnaires and interviews. The findings reveal that while many households are supportive of the initiative, reluctance persists due to monthly charges, irregular collection, and differences in rural and urban waste practices. The study also highlights the importance of strengthening accountability mechanisms and enhancing awareness to improve participation. This research contributes to understanding community participation in decentralized waste management and provides policy recommendations for sustainable waste management models in India

**Index Terms** - Environmental awareness, Haritha Karma Sena, Kerala, Kudumbashree, Public responsiveness, Waste management

## I. INTRODUCTION

Waste management has become one of the most immediate challenges in India, especially with the issue of rapid urbanization, industrialization, and an increasing population. Millions of tonnes of solid waste are annually produced in the country, and in most cases, unscientific disposal results in severe environmental and public health implications. Landfills full to capacity, water body pollution, and the ever-increasing problem of plastic waste indicate the need for sustainable measures. In this larger context, Kerala has been a state with progressive governance models, mostly due to its robust decentralized system of local self-government. The state has always valued public involvement in developmental schemes, and waste management is no exception.

One of the pioneering ventures in this context is the Haritha Karma Sena, created under the Haritha

Kerala Mission. The scheme is planned to facilitate decentralized, community-based waste collection and management, lessening the reliance on centralized dumping sites. What sets the project apart is its use of Kudumbashree, Kerala's renowned women's self-help group network, whose members constitute the operational strength of the Haritha Karma Sena. These ladies have been tasked with door-to-door collection of waste, segregation, and coordination with area facilities and recycling plants. This strategy not only solves the environmental problem but also offers employment opportunities to women, supporting Kerala's overall model of inclusive development.

The scheme has achieved success at many levels, especially in advocating source segregation and encouraging domestic and commercial units to adopt responsible waste management practices. However, the degree of public response to the scheme is highly divergent across places and socio-economic communities. Some residents have fully accepted the program, appreciating its social and environmental value, while others are slow to adopt because of considerations like the financial burden of monthly user charges, frustration with collection frequency, or simply the conviction that biodegradable waste can be composted at home without the need for outside help. These mixed reactions indicate that though the program has caught on, there are still strong behavioural and structural barriers to overcome.

This research thus endeavours to present a systematic examination of the public reaction to the Haritha Karma Sena in Kerala. It is directed towards three important dimensions: the magnitude and character of the public involvement, the readiness of the households to pay for the service, and the perceptions of Kudumbashree members who implement the scheme at the grassroots level. Through analysis of these determinants, the study aims to help establish a general understanding of

decentralized waste management and community participation in promoting sustainable waste management.

## II. LITERATURE REVIEW

A study of current literature shows that community engagement is the key to the success of waste management projects in developing nations. The Solid Waste Management Rules, 2016, published by the Ministry of Environment, Forest and Climate Change emphasize the role of source segregation, user charges, and decentralized collection arrangements for ensuring responsibility and effectiveness [1]. Such rules act as a policy base for initiatives at the state level like Kerala's Haritha Karma Sena, which are consonant with national goals of sustainable solid waste management.

Researchers have underscored public behaviour as a determinant for the success of waste management programs. Joseph [2] stressed that even with greater awareness, several households are still averse to adopting sustainable methods owing to socio-cultural routines, inconvenience, and cost factors. In the same vein, Kumar and Sharma [3] examined behavioural resistance in the urban setting and noted that despite residents' awareness of proper waste disposal, their intention to segregate and pay user charges is not consistent. The findings are significant in the characterization of public responsiveness in the case of Kerala where there is promotion of community-based models.

The Kudumbashree program in Kerala has been highly acclaimed for women's empowerment and community development [4]. Members of Kudumbashree have been successfully mainstreamed into waste management operations, giving them livelihoods while increasing grassroots engagement. According to Suchitwa Mission [5], Kudumbashree has considerably improved the efficiency of waste collection for many local bodies. Alappat [6], however, noted that while all this is being achieved, structural issues persist in terms of service delivery on a regular basis and in achieving equitable participation from economically weaker sections.

On a larger level, research on Indian city municipal solid waste management indicates systemic issues. Sharholly et al. [7] illustrated the inefficiencies of centralized waste management systems and promoted decentralized, community-based

solutions. Shekdar [8] also emphasized the significance of minimizing landfill reliance through source segregation and localized treatment. These views reflect the applicability of Haritha Karma Sena as a decentralized system that can attend to both environmental and social issues.

International experiences also offer valuable lessons. The World Bank's What a Waste 2.0 report [9] highlighted the need for both financial sustainability and behavioural incentives to achieve success in the long run. Recycling community models in nations like Japan and Germany have shown how thorough regulatory enforcement paired with steady awareness efforts can enhance high levels of civic compliance. These foreign models offer useful lessons to reinforce Kerala's strategy.

Despite this vast literature, studies directly targeting Haritha Karma Sena are few in number. Although available studies address broad waste management practices in India and the contribution of Kudumbashree towards community development, very few have researched the socio-economic determinants and behavioural factors influencing participation in the program. Specifically lacking are the rural-urban differences in households, affordability of user fees, and Kudumbashree member perspectives as frontline implementers. Filling this gap is the attempt of this study, through a systematic assessment of public responsiveness to the Haritha Karma Sena, that aims to enrich both scholarly deliberation and policymaking.

## III. WHAT IS HARITHA KARMA SENA

Haritha Karma Sena is a path-breaking initiative introduced as part of the Haritha Kerala Mission by the Government of Kerala for ensuring the scientific and sustainable management of solid waste generated from households, commercial institutions, and institutions. Kerala, a state with a robust model of decentralized administration, has always placed greater focus on decentralized interventions in public service delivery, and Haritha Karma Sena is one such example. The program was designed to meet the piling up of waste management issues, such as unscientific dumping, environmental pollution, and increasing plastic waste menace.

The program operates at the level of local self-governments (LSG) through a collaborative model with the Kudumbashree Mission, the Suchitwa Mission, and the Clean Kerala Company. The

manpower for the Haritha Karma Sena comes from Kudumbashree, a women-focused poverty elimination and empowerment program. Kudumbashree members are enrolled and trained and is called the Haritha Karma Sena, tasked with door-to-door picking up non-biodegradable and in some places some biodegradable waste. After being collected, the waste is sent to specific Material Collection Facilities (MCFs) or Resource Recovery Facilities (RRFs) at the local self-government level, where it is sorted into various categories. Recyclables are routed to the Clean Kerala Company, which is the nodal agency for directing waste into recycling industry channels, thus establishing a circular economy. In places where biodegradable waste is collected it is composted locally and the compost is sold.

A distinct feature of the scheme is its model of financial sustainability. Every home, shop, or business unit subscribed to the program pays a small user fee for the collection service. The income generated by these contributions is used to offer wages to Haritha Karma Sena members, thus making it a people-supported initiative. This model minimizes reliance on government subsidies and promotes citizens taking direct responsibility for the waste they produce. For members of Kudumbashree, involvement in the Haritha Karma Sena also provides an opportunity for livelihood, with social empowerment and environmental protection.

Besides waste collection, the Haritha Karma Sena has a robust awareness-raising component. Through frequent interaction with families and neighbourhood communities, Kudumbashree members serve as environmental educators, creating awareness regarding segregation, plastic pollution, and the need for sustainable consumption. This bottom-up approach can potentially lead to behavioural change at the community level, beyond mere service delivery, to create a culture of sustainability.

In spite of these strengths, the Haritha Karma Sena implementation has faced setbacks. Some families are unwilling to pay user charges, especially in rural districts where families have long coped with biodegradable waste by home composting. Others complain about non-uniform collection timings or no advance communication. These problems underscore the importance of more robust accountability systems, better monitoring, and

enhanced sensitivity towards the socio-economic heterogeneity of communities. However, questionnaires and opinion have shown that the large majority of the beneficiaries are content with the project, appreciating its contribution towards waste reduction and environmental conservation.

The Haritha Karma Sena is, overall, a decentralized, community-based, and women-centric approach to waste management. With a combination of collection, segregation, recycling, and sensitization, the scheme has established an all-encompassing mechanism that accounts for both environmental and social goals. Its strength is the capacity to integrate policy commands with local involvement, showing how people's movements can help achieve overall goals of sustainability. This paper thus attempts to examine people's response to the Haritha Karma Sena, paying special attention to its effect on environmental consciousness and behaviour change among the populace of Kerala.

#### IV. RESEARCH METHODOLOGY

This study took a primary data collection strategy to analyze the public responsiveness toward the Haritha Karma Sena initiative in Kerala. The study intended to reflect both the perceptions at the household level and the experiences of Kudumbashree members who were directly engaged with the program's operations.

The main instrument for data collection was an online survey designed and disseminated using Google Forms. The survey was distributed among households in Kerala, with the aim of achieving a representative sample of both urban and rural settings. To cover respondents without internet connectivity or digital competence, telephonic interviews were undertaken. The interviews were done to ensure that the voice of resource-poor households was also heard, thus increasing the scope of the sample inclusivity.

A total of around 100 participants were involved in the study. Though the majority were from households, enterprises and business units were also included in small numbers. Beneficiaries apart, the study also included views of Kudumbashree members involved in the collection of waste. The members were interviewed to establish their perceptions about issues like irregular payments, hesitancy of households, and limitations in segregation practices of waste.

The study employed a qualitative approach, complemented with descriptive statistics where appropriate. The use of a qualitative approach was intentional, given the research objective to examine behavioural dimensions such as sensitivity to the environment, how much people are willing to pay, and satisfaction in service delivery. Focusing on stories and perceptions, the approach allowed for richness and perspective that might not be appreciated if quantitative methods alone were used.

While random sampling would have added representativeness, the research was based on convenience sampling as there were limited funds. The respondents were accessed mostly through social contacts, limiting generalizability but allowing for achievable data collection.

The questionnaire predominantly featured closed-ended questions, along with one open-ended item that allowed participants to elaborate freely. Closed-ended questions offered clarity and facilitated analysis of key variables, while the open-ended responses enriched the study with qualitative insights. This mixed format ensured that the research addressed both measurable trends and subjective perceptions of the Haritha Karma Sena scheme.

## V. FINDINGS AND ANALYSIS

The data analysis of survey responses from around one hundred respondents offers worthwhile insights regarding the public receptiveness to the Haritha Karma Sena program in Kerala. Although the sample population is small in relation to the state's population, the results are indicative of significant trends in household action, waste management attitudes, and community-based environmental action attitudes. Analysis is organized along a number of dimensions: household response, willingness to pay, rural–urban variations, satisfaction with the scheme's operating functions, perceptions of Kudumbashree members, enterprise response, and policy implications.

### A. Household Responsiveness

Most of the sample respondents came from households instead of business establishments or institutions. This is quite natural, since households are the largest group of stakeholders in the Haritha Karma Sena activity due to the fact that this activity is mainly addressed to residential areas through door-to-door waste collection. Household data

analysis will thus reflect a more representative image of public responsiveness compared to the few

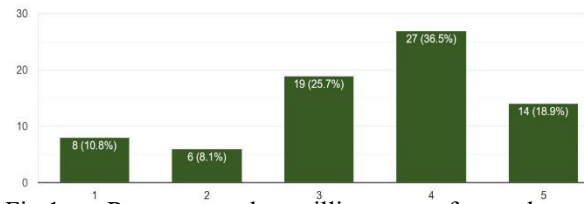


Fig.1 - Represents the willingness of people to participate in the scheme on a scale of 1-5 where 1 represents least willing and 5 represents high willingness.

obtained responses from business organizations.

When the participants were asked to give their willingness to participate in the scheme on a scale of 1-5 where 5 is most willing and 1 is least willing, 54 per cent of them gave a 4 or a 5 indicating more than half of the respondents were more comfortable participating in the scheme.

Of the households surveyed, almost 54.2% indicated that they had already segregated waste into various categories prior to passing it on to the Haritha Karma Sena. This is a positive observation since segregation at source is one of the basic requirements of successful waste management. It shows that over half of the households have imbibed environmentally friendly habits either through prior exposure to awareness programs or peer influence.

Nonetheless, the information at the same time presents that a considerable number of households fail to observe consistent segregation. This indicates behavioral change lapses and implies further intensive awareness drives. Additionally, segregation practice oscillated in terms of consistency, whereby certain households confirmed that although they tried to segregate biodegradable from non-biodegradable waste, they failed to clean or prepare the waste for collection. This disparity put extra load on the members of Kudumbashree, who were required to deal with poorly segregated or contaminated goods.

### B. Willingness to Pay

Perhaps the strongest public responsiveness indicator is the number of households willing to pay a nominal charge of 50 rupees per month for the collection of waste. The survey found that 55% of those surveyed concurred that people are responsible

for their own waste and should pay the cost of its disposal. The finding is noteworthy, as it shows that most households acknowledge the "polluter pays" principle, which is enshrined in India's Solid Waste Management Rules (2016).



Fig.2 - Willingness of people to pay for the scheme

Interestingly, approximately 50% of the households who reported segregating waste at source were also those who expressed a willingness to pay for collection services. This overlap suggests that environmental sensitivity is closely linked with financial willingness to contribute toward sustainable practices. Those households that were already engaged in responsible behaviour appeared more prepared to extend that responsibility by contributing monetarily.

However, this also means that almost half of the beneficiaries did not want to pay. Qualitative response indicated two key reasons for this unwillingness. To begin with, the majority of respondents from poorer households complained that charging money for garbage collection was unjust, as they had been using household compost pits for disposing of biodegradable trash free of charge in the past. For them, charging money was an extra expenditure. Second, a few respondents doubted the effectiveness of the collection system, claiming that irregular services did not merit systematic payments.

One of the participants suggested that if the government was in a position to offer waste collection for free or exempt low-income households from payment, at least levels of participation would improve hugely. This remark identifies a socio-economic divide in responsiveness, where willingness to pay mirrors affordability alongside subjective considerations of fairness of the system.

#### C. Rural vs. Urban Differences

The study found evident differences between rural and urban families. Half of the interviewees lived in rural settings, which made for an even comparison.

Amongst rural populations, a greater share of respondents were found to be opposed to the collection of biodegradable waste by the Haritha Karma Sena. Exactly 42.2% of respondents were opposed to the collection of biodegradable waste. The majority of these respondents claimed to have home composting facilities or agricultural land where organic waste could be handled effectively. For them, the collection of biodegradable waste was unnecessary, and the payment of a fee for the same was seen as unwarranted.

In urban homes, however, the respondents welcomed biodegradable waste collection more. While having less space for composting and having more population density, urban dwellers perceived the Haritha Karma Sena as a relief from the burden of dealing with organic waste within limited living spaces. For them, the convenience of outsourcing the disposal of waste was more important than the expense.

The second difference was in frequency expectations. Urban households complained more over monthly collection. 36.8% of all respondents complained about waste being collected only once a month, yet the dissatisfaction was disproportionately higher in urban areas where waste must be dumped so quickly due congested living and more consumption. Rural households tended to deal with biodegradable waste themselves and so had less need to want frequent collection. These rural-urban differences underscore the importance of context-sensitivity in adapting the Haritha Karma Sena's initiatives. A uniform strategy may alienate parts of the community, while adaptability in service delivery may enhance satisfaction and engagement.

#### D. Perceptions of Kudumbashree Members

Another such critical aspect of responsiveness pertains to the interaction between households and Kudumbashree members as Haritha Karma Sena workers. The survey gave a mixed result: 25.7% of the respondents rated Kudumbashree members as highly cooperative, 50% rate them as moderately cooperative, and 6.8% rate them as uncooperative.

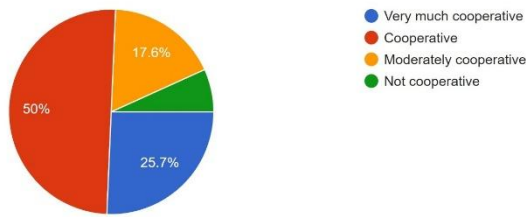


Fig.3 - Cooperation of Kudumbashree members who collect waste

As a matter of fact from the point of view of the Kudumbashree members, however, the hurdles were real. Interviews of three members indicated high levels of discontent with the attitudes they got from households. Most households were said to have refused to clean plastic materials before passing them on, consequently adding more work for collectors. In certain instances, members encountered hostility upon requesting the payment of agreed fees from households. The process of constant reminding or negotiating with families for unpaid payment not only frustrated but also disrespected the dignity of their work.

Further, members were dissatisfied with a lack of accountability in local institutions. Families often reported delayed collection of waste and failure to communicate schedules beforehand. This variability in schedules led to mistrust and frustration among the beneficiaries. From a policy point of view, these issues identify the need to consolidate monitoring mechanisms, instill accountability at the local level, and provide greater training and support for Kudumbashree members.

#### E. Responses of Enterprises and Businesses

Although most data were collected from households, two businesses, a boutique and a small retail shop, were also included in the responses. Although few in number, these were informative contrasts to household views. Both the boutique and the small retail shop expressed high levels of satisfaction with the Haritha Karma Sena's service.

For the boutique owner, the scheme brought relief in handling textile and packaging waste in an urban area where the municipal disposal system was either unreliable or overloaded. She stressed that the Haritha Karma Sena played a crucial role in stopping waste from being dumped in neighbouring water bodies, a frequent issue in most towns. These corporate responses show that firms, particularly in the urban sector, understand the environmental and

operational benefits of the scheme. Yet, the under-representation of firms in the sample points towards the necessity of a larger sample of commercial firms to obtain a broader insight into their views in future studies.

#### F. Policy Implications and Interpretation

This study's outcomes are in line with wider literature on Indian waste management. The coincidence of willingness to pay and segregation practices reflects findings by Kumar and Sharma [3], where authors suggested that behavioural resistance would mostly be due to cost factors. Likewise, the lack of satisfaction with frequency of collection is supported by Joseph's [2] findings regarding the necessity of regular service provision in maintaining people's participation.

The aversion of rural homes to biodegradable waste collection is an indication of age-old traditions of self-sustenance via composting, a practice also noted in earlier reports by the Suchitwa Mission [5]. The aversion, at first sight, might seem to be resistance, but it could also be a chance to incorporate household-level composting into the Haritha Karma Sena structure, thus saving on operational costs and enhancing community ownership.

The contradictory perceptions of Kudumbashree members only serve to bring into sharper focus their dual role: as service providers and change agents. Their payment collection and recalcitrant household problems point to the need for interventions through policy, including subsidized charges for poor households, stricter enforcement of payment norms for others, and the institutionalization of digital payment systems for facilitation of payments.

Lastly, enterprises' expressed satisfaction hints at the scheme's possibilities in reaching more businesses, particularly in urban areas where commercial waste tends to be a major factor in environmental deterioration. Greater emphasis on enterprises might also broaden revenue sources and improve the scheme's financial viability.

#### G. Summary of Key Findings

Participation by households: Over half sort out the waste, though regularity is a problem.

**Willingness to Pay:** 55% offered to pay, although affordability remains an issue among low-income families.

**Rural–Urban Divide:** Rural families are more inclined towards self-management of biodegradable waste, while urban families need regular collection.

**Kudumbashree Member Perceptions:** Divergent reactions indicate both cooperation and difficulties, calling for improved accountability.

**Enterprise Satisfaction:** Restricted but positive feedback from enterprises indicate the scope for coverage of commercial establishments.

**Policy Implications:** Requirement for context-specific service models, financial inclusion, increased accountability, and increased enterprise engagement

## VI. POLICY RECOMMEDATIONS

The conclusions of this research highlight the imperative to intervene at the policy level to increase the effectiveness, inclusivity, and longevity of the Haritha Karma Sena initiative. Although the program has been able to bring together communities and enhance waste management practices, various gaps need to be addressed at the policy level. The policy implications based on the findings of this research are provided below.

### 1. Differential Pricing and Financial Inclusion

One of the main participation barriers found in this research is low-income households' aversion to paying user charges on a monthly basis. Policy action could involve a differential pricing approach wherein economically weaker sections are exempted from paying or subsidized, while affluent segments of the population and businesses pay proportionately more. A cross-subsidization model would make the undertaking financially sustainable without depriving vulnerable sections. Moreover, incorporating government support or contributions by corporations under corporate social responsibility (CSR) could also alleviate the pressure on families.

### 2. Enhanced Monitoring and Accountability Mechanisms

Households complained about inconsistent waste collection timings and absence of advance communication. To overcome this, local self-government institutions (LSGs) must evolve

effective monitoring systems to monitor punctuality and performance of waste collection. Incorporation of mobile apps or SMS alerts to inform households about collection timings could make the process more transparent and trustworthy. Periodic audits and performance assessment of Kudumbashree members would also enhance accountability.

### 3. Enhanced Role of Kudumbashree Workers

The members of Kudumbashree are the pillars of the program but are regularly exposed to hardships such as late payment, poor training etc. Government policies need to focus on the benefit of these workers through timely compensation, capacity development programs, and workplace safety. Skill development and training in skills like waste segregation, composting technology, and digital literacy might help to improve efficiency and dignity of work. The Kudumbashree members must also be incorporated into decision-making at the local government level.

### 4. Customized Rural and Urban Strategies

The research sheds significant light on rural–urban variations in waste management behaviour. Rural residents, who are themselves often composting biodegradable waste already, could be supported by policies that bring home-based composting into the larger scheme of the Haritha Karma Sena. Subsidies for compost bins and encouraging community compost centres could supplement the system. In cities, since space is scarce, policies must focus on enhancing the frequency of waste collection and providing infrastructure for segregation and recycling at community levels.

### 5. Enterprise and Institution Integration

Since enterprises produce high volumes of non-biodegradable waste, policies will need to promote more enterprise engagement in the scheme. This can be done through compulsory registration of enterprises with the Haritha Karma Sena, accompanied by user charges based on their wastage. Incentives in the form of tax rebates or reward awards may be provided to business enterprises that show outstanding compliance with waste recycling and segregation. Schools and colleges may also be incorporated into the system to make future generations accustomed to sustainable practices of waste management.

### 6. Awareness and Behavioural Change Campaigns



Sustainable waste management needs infrastructure but also behaviour change. Policy makers must invest in sustained public campaigns using many platforms community meetings, social media, schools, and mass media to support the segregation, recycling, and timely payment messages. Campaigns must be culturally responsive and context specific, highlighting both environmental and community well-being benefits.

## 7. Long-Term Policy Vision

For long-term viability, the Haritha Karma Sena must be mainstreamed into Kerala's overall climate resilience and circular economy policy. Alliance with recycling sectors, research organizations, and non-governmental agencies can support innovation in waste-to-energy initiatives, plastic substitutes, and sustainable livelihood options. Such mainstreaming would place the Haritha Karma Sena as not just a waste collection campaign but as a central support to Kerala's sustainable growth agenda.

In conclusion, deepening financial inclusivity, fostering accountability, empowering Kudumbashree members, adapting strategies to rural and urban contexts, broadening enterprise engagement, and investing in behavioural change campaigns are key policy directions. Acting on these suggestions has the potential to reshape the Haritha Karma Sena as a more effective, equitable, and replicable decentralized model of waste management for Kerala and India at large.

## VI. Conclusion

The results of this research show that the Haritha Karma Sena initiative has largely been accepted by members of the public, and most families have recognized its significance in upholding sustainable approaches to waste management. There is a high level of respondents who indicated readiness to take an active role in the scheme, and the data also supports increased environmental consciousness among Kerala's populace. The Haritha Karma Sena has therefore made a significant contribution towards creating more awareness regarding appropriate waste disposal and the risks posed by plastic pollution.

Nonetheless, the analysis also identified some of the issues that militate against full participation. One of the key reasons for reluctance is the monthly user

charge. For many families, particularly those in rural areas and low-income communities, the cost of waste disposal is a new and unfamiliar expense. In the past, these households have depended on domestic composting or unstructured disposal that did not have any direct cost in money. Therefore, the imposition of user charges is seen as an additional cost burden. Nevertheless, there are very positive indications that opposition to payment is slowly falling away as individuals start to appreciate the importance of guaranteed, organized waste management provision.

Experiences with Kudumbashree members, who constitute the working core of the Haritha Karma Sena, also reveal the changing mindset of people. Although Kudumbashree workers at first encountered hesitation and even resistance from households mainly in making payments and segregating waste appropriately the workers evidenced improvement over a period of time. Households are gradually getting used to washing, storing, and segregating waste prior to its delivery. This signals a favourable change in behavioural norms, indicating that the scheme is slowly accomplishing one of its overarching goals: transforming day-to-day practices towards ecologically sustainable behaviours.

The research also highlights the imperative for policy adjustments to further advance the scheme. Differential price models, subsidies for low-income families, and tougher accountability measures for on-time waste collection would greatly improve public satisfaction. Additionally, more needs to be done to close the rural–urban participation gap. Rural families, who already compost much of their biodegradable waste, might need engagement that is specifically targeted to highlight the advantages of working with Haritha Karma Sena, while city residents might appreciate enhanced frequency of collection and improved notice of schedules.

Overall, the Haritha Karma Sena is a pioneering model that integrates environmental management and social empowerment. Through the deployment of Kudumbashree women as collectors of waste, the scheme not only solves ecological issues but also offers livelihoods, thus promoting gender-inclusive development. This blend of social and environmental goals makes the program a special and reproducible model for other Indian states.



On a personal front, carrying out this research and being a recipient of the scheme has given first-hand experience of its positives and negatives. The program has been able to start the conversation regarding environmental responsibility at the grassroots level, which in itself is a commendable feat. Ahead, more research and constant assessment are needed to streamline the working processes of the scheme. With appropriate improvements and ongoing awareness campaigns, the Haritha Karma Sena can spread to other states outside Kerala and be a model for decentralized community-based waste management at a national level.

#### V. Limitations of the Research and Scope for Further Study

While this study has provided important insights into the public responsiveness towards the Haritha Karma Sena program, several limitations must be acknowledged. Recognizing these constraints not only helps place the findings in perspective but also creates opportunities for future research to build upon and strengthen the understanding of decentralized waste management initiatives in Kerala and beyond.

The first significant constraint pertains to sample size. At around one hundred respondents, the sample is relatively small in relation to the vast state of Kerala. A bigger sample would have given more statistical power and enabled more precise subgroup analyses. For example, it would have been feasible to analyze variations by districts, age group, or income brackets with more precision. The limited sample size further restricts generalizability of the results to the broader population of Kerala.

Another limitation relates to the sampling method. Given the limited availability of resources, convenience sampling using personal connections was followed as opposed to selecting through a random or stratified random method. This facilitated easy data collection within a given time frame but may have led to selection bias. Respondents who took part may have been more aware of or involved with the Haritha Karma Sena than the general populace, possibly distorting the results in favour of a more positive evaluation. Future studies should try to use random or stratified procedures to provide more representativeness.

The scope of the respondents also posed some limitations. Most of the respondents were

households, and relatively little data were gathered from enterprises and firms. This imbalance signifies that the study shows mostly domestic views while providing a mere idea of what commercial organizations think and react to the program. Because enterprises create enormous volumes of non-biodegradable waste, it is imperative to know their interaction with Haritha Karma Sena in order to accurately judge the entire effectiveness of the scheme. Future research thus needs to ensure more incorporation of small, medium, and large businesses.

The second limitation is the cross-sectional nature of the study. The data was gathered at one point in time and therefore gives only a snapshot view of public responsiveness. Waste management attitudes and practices, however, change over time, particularly as households learn new routines or as policy interventions alter. A longitudinal study following the same group of households and Kudumbashree participants over a number of years would be better suited to identifying trends in behavioural change, willingness to pay, and satisfaction with the scheme.

Additionally, the research did not fully evaluate the financial viability of the program. Although willingness to pay was examined, more questions lie ahead for whether the user-fee model can adequately meet operational expenses, provide equitable compensation to Kudumbashree members, and fund service expansion. Investigations of alternative financial models, such as government subsidies, corporate sponsorships, or cross-subsidization programs, could provide valuable information.

Lastly, the research underlines the necessity of extending further inquiry into the effects of participation in Kudumbashree on empowering women. Though this study made passing remarks on the role of Kudumbashree members being troublesome, it did not explore seriously how taking part in Haritha Karma Sena influences their economic autonomy, social standing, or decision-making within homes and communities. In-depth qualitative research stressing gender dynamics can add depth of understanding in this regard.

In summary, although the constraints of this research limit its generalizability, they also identify some promising areas for future research. Increasing sample sizes, using strict sampling procedures, carrying out longitudinal measures, drawing from enterprise viewpoints, and examining financial and

gender aspects in more detail would all combine to reinforce the evidence base for Haritha Karma Sena. Working on these fields may be a contribution to academic scholarship as well as policy design, making sure that the program will be a strong model of community-based, decentralized waste management.

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