

MENSTRUATION DIALOGUE

*Re-centering
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Research, Policy &
Collective Action*

SPECIAL ISSUE-I
2026



CENTRE FOR
DEVELOPMENT
POLICY AND
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Published in India in 2026
by Centre for Development Policy and Practice

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ISBN: 978-81-993666-0-2

Designed by: Mohammed Ahmed

Printed at Hyderabad

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Sustainable Menstruation at the Ward Level in Navi Mumbai: A Case Study of Belapur Communities

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Abstract

Proper menstrual management is vital for all women, but it is particularly important for those living in informal settlements, where they often lack basic infrastructure and mostly rely on the public or common facility for sanitation and managing their menstruation. This case study describes how Shelter Associates (SA), a Pune-based civil society organisation, implemented a ward-level menstrual hygiene intervention across four informal settlements in Belapur ward, Navi Mumbai. The intervention did not begin as a standalone menstrual health initiative; rather, it emerged from an ongoing sanitation project. During these efforts, recurring instances of menstrual waste blocking drains, toilets, and sewer lines indicated a broader challenge around menstrual waste management.

Shelter Associates (SA) is a non-profit organisation established in 1994 in Pune with the aim of improving living conditions among urban low-income communities (Shelter Associates, n.d.). Over the past three decades, the organisation has worked across areas such as sanitation, menstrual social housing, and recently started to work around menstrual hygiene management, reaching more than 550,000 individuals in the Indian state of Maharashtra. Its initiatives align with the United Nations' Sustainable Development Goals (SDGs), particularly Goal 6 (Clean Water and Sanitation) and Goal 11 (Sustainable Cities and Communities).

One of SA's flagship programmes, One Home One Toilet, adopts a data-driven approach to facilitate the construction of household toilets in informal settlements. The implementation process typically begins with the available infrastructure assessment and a comprehensive household survey. The household survey data is then integrated into a Geographic Information System (GIS) platform, enabling spatial analysis of service gaps. Based on these insights, SA collaborates with the relevant Urban Local Bodies (ULBs) to improve access to essential infrastructure, including drainage, water supply, and sewerage systems. In several cities, this approach has supported ULBs in extending drainage infrastructure into previously informal settlements, thereby enabling

the construction of individual household toilets in areas that had relied primarily on community sanitation facilities or defecating in the open.

Within this broader sanitation framework, SA identified menstrual waste management as a persistent challenge. Field observations across multiple settlements revealed that used sanitary products were frequently disposed of in open gutters, mixed with household waste, or left in community toilet blocks. In response, SA introduced a menstrual hygiene component within its broader sanitation programme. This initiative includes education on reproductive health, awareness of the environmental and health implications of disposable sanitary products, and guidance on the use of sustainable alternatives such as menstrual cups.

Building on the household-level GIS data collected through SA's sanitation programme, the team identified 642 actively menstruating women across the four settlements. Through volunteer-led outreach, workshops, and structured follow-up, 500 women (78%) chose to shift from disposable pads to menstrual cups as their primary menstrual product. Based on current usage estimates, this change is expected to prevent approximately 3,00,000 disposable pads from entering local waste streams over five years, in addition to contributing to modest reductions in carbon emissions.

The paper traces the implementation of the intervention, including stages such as spatial mapping and volunteer training to product distribution and post adoption support. This case study draws directly from Shelter Associates' field implementation in Belapur ward, Navi Mumbai, offering insights into how data-driven sanitation programmes can be leveraged to address interconnected challenges in menstrual health and environmental sustainability.

Keywords: Menstrual Health Management (MHM), sustainable menstruation, menstrual cups, informal settlements, Geographic Information Systems (GIS), urban sanitation, community-based intervention, menstrual waste management.

Introduction

Menstruation is a routine biological process; however, for many women and girls in India, it continues to be treated as something private and seldom spoken about openly. Information is often passed informally, wrapped in restrictions rather than explanation. As a result, many girls enter puberty with little understanding of what menstruation is or how to manage it safely (Dasgupta & Sarkar, 2008).

In informal urban settlements, these challenges are compounded by living conditions. Access to private household toilets is limited due to inadequate support, and community toilet facilities are often treated as the only solution, overlooking the need for private and safe space for defecation and menstrual management. In some areas, water supply is often irregular, and waste management systems are already under strain. Under these circumstances, managing menstruation becomes closely tied to infrastructure. The type of product a woman uses, when she changes it, and how it is discarded are all shaped by what services are available around her.

Shelter Associates (SA), a Pune-based civil society organisation founded in 1994, has spent over three decades working on housing and sanitation with urban poor communities. Through its One Home One Toilet programme, SA combines door-to-door household surveys with GIS-based spatial mapping to identify gaps in drainage, sewerage, and water supply. While working in Belapur ward, Navi Mumbai, menstrual waste began to surface as a recurring issue. Used sanitary pads were found mixed with household garbage, dumped in toilet blocks, and flushed into sewer lines that had only recently been laid.

Conversations with women revealed that this was not simply a waste management problem. Most relied exclusively on disposable pads, had limited information about menstrual health, and were hesitant to discuss menstruation openly. While sanitation improvements had increased the availability of toilets in these communities, they had also made menstrual waste more visible. Addressing that gap became the starting point for the intervention described in this paper.

Objective of the Study

This case study documents the transformation that took place at the ward level, where 78% women switched to use eco-friendly menstrual products, developed an understanding of reproductive anatomy and tried to break the taboo around it while celebrating World Menstrual Day in the public area. It also outlines the methodology of implementation across all informal settlements in the Belapur ward. The intention is not only to report adoption figures, but to trace how the work unfolded on the ground, from identifying households through GIS mapping to training volunteers, conducting workshops, and following up after product distribution.

(a) To describe how GIS-based spatial data and household surveys were used to identify the target population and guide

outreach, distinguishing this work from more conventional awareness-led menstrual health programmes.

(b) To present the community engagement process (volunteer training, participatory workshops, culturally sensitive communication) that enabled a shift from disposable pads to menstrual cups in a low-income urban context.

(c) To report adoption outcomes, including the 78% cup uptake rate, and to present the environmental and behavioural changes observed, such as estimated waste reduction and shifting community attitudes towards menstruation.

(d) To consider what makes this ward-level model scalable and where its limitations lie, for ULBs and organisations seeking to embed sustainable menstrual practices within municipal sanitation programmes.

Contribution to Existing Literature

Research on menstrual hygiene management (MHM) in India has grown in recent years, covering awareness levels, product access, school-based interventions, and state policy schemes. However, much of this work tends to focus either on adolescents in schools or on national and state-level policy analysis. The settlement or ward level where sanitation infrastructure, waste management, and menstrual product use intersect in everyday life receives comparatively less attention in published studies.

This case study grows out of practice rather than an attempt to fill a theoretical gap. The ward-level focus emerged because that was the scale at which sanitation challenges were being addressed on the ground. By building on existing GIS-based household mapping, the intervention was able to identify and reach menstruating women with unusual precision. This spatial anchoring shaped outreach, follow-up, and monitoring in ways that typical awareness campaigns cannot easily replicate.

The study also documents a large-scale shift from disposable pads to menstrual cups in an informal settlement context, achieved not through subsidy alone but through phased education, volunteer engagement, and repeated follow-up. The adoption of eco-friendly menstruation across four settlements suggests that sustainable

menstrual products are not limited to middle-class or highly educated users when adequate support systems are in place.

Finally, the paper connects menstrual health to urban waste and climate considerations, situating product choice within broader municipal sanitation systems. For practitioners and urban local bodies, the value of this account lies in detailing how menstrual health can be integrated into existing WASH programmes rather than treated as a separate vertical initiative.

Background and Rationale

Organisational Background

Shelter Associates began its work in Pune in 1994 to improve living conditions for urban communities dwelling in informal settlements. Over 32 years, it has operated across the areas of sanitation, menstrual hygiene & management, and social housing, reaching more than 5.5 lakh individuals in Maharashtra and Uttar Pradesh. The organisation aligns its work with Sustainable Development Goals 6 (Clean Water and Sanitation) and 11 (Sustainable Cities and Communities).

SA's flagship programme, One Home One Toilet, follows a data-driven model for facilitating household toilet construction in informal settlements. The sequence is consistent. An infrastructure study and door-to-door household survey come first; findings are integrated on a GIS platform, and SA then collaborates with the concerned ULB to address gaps in infrastructures like drainage, water supply, and sewerage that the spatial analysis has identified. In numerous cities, this process has enabled ULBs to extend trunk infrastructure into settlements previously written off as unserviceable, opening the door to individual home toilets in places where only community toilet blocks existed.

This unique principle of the programme is a data-driven approach, involving multiple stakeholders in the processes and a cost-sharing model where each stakeholder is contributing to improving the situation in informal settlements.

The programme has reached more than 28,400 families with a home toilet. Through this sanitation work, SA kept encountering the issue of menstrual waste. In settlement after settlement, field teams found used sanitary pads in open drains, mixed into household garbage, and dumped in community toilet blocks. SA's response was to develop a menstrual hygiene component alongside its sanitation programme, covering female reproductive health, the environmental and health

costs of disposable pads, and practical instruction on reusable products such as menstrual cups. Close to 4,000 women responded actively to make a switch to use an eco-friendly menstrual product. Belapur ward is a unique case as the impact is achieved at the ward level rather than just at the community level. Women have collectively transformed this area.

Rationale: Why Belapur Ward

Belapur is one of eight administrative wards under the Navi Mumbai Municipal Corporation (NMMC). Five informal settlements fall within it, together making up about 2% of the ward's population. When SA began working with these communities in 2016, none of the five had a sewerage connection. Families who had built toilets were relying on holding tanks under their houses or, in a few cases, had connected outflows to closed gutters. Untreated sewage was a constant hazard. More than 65% of families depended on public water standposts situated near gutter lines, which made water collection difficult and exposed them to waterborne disease.

GIS-based infrastructure mapping revealed that municipal drainage lines ran adjacent to these settlements. These spatial maps helped NMMC to extend the drainage network into the settlements and link it to the main sewer line. This resulted in significant improvement and increased home toilet coverage from 15% to 77%, and the toilet seat to family ratio fell from 37:1 to 2:1. One service of drainage access provided by NMMC led to home toilets, and also those families received household water connections under the Jal Jeevan Mission.

Household toilets reduced the burden on existing community toilet blocks, which were supposed to improve the cleanliness status, but they remained uncleaned as they became dumping points for menstrual waste. Households routinely mixed used sanitary pads with kitchen refuse, causing trouble for waste collectors and contaminating waste streams. The scale of disposable pad waste in India is enormous. An estimated 12.1 crore women use sanitary napkins, producing around 1,230 crore napkins and 1,13,000 tonnes of waste annually (Economic Times, 2023). Health risks from chemical exposure in disposable pads compound the environmental burden of their non-biodegradable plastic content (Times Now, 2024). As a result, it is impacting the environment around and has become a main reason for the waste crisis.

When SA's field staff spoke with women in Belapur, the picture was consistent. Most had limited awareness of menstruation and reproductive health, no prior exposure to reusable menstrual

products, and no understanding of the environmental harm caused by disposable pads. These conversations led SA to design a dedicated menstrual hygiene intervention addressing health, waste, and stigma within a unified framework. Research from the Observer Research Foundation has pointed to a threefold payoff from sustainable menstrual practices, namely fewer infections and better well-being, reduced waste volumes and carbon footprints, and stronger economic participation once menstrual health barriers are lowered (ORF, 2024).

Intervention Approach

Figure 1: SA's Intervention Approach Framework



Source: Developed by the author.

Three decades in urban slum contexts taught SA a lesson that has shaped every subsequent project. Housing, sanitation, and development programmes designed for slum dwellers routinely fail when they are conceived without a proper reading of ground conditions. The physical layout of a settlement, the infrastructure around it, residents' economic activities, and cultural habits, all of this matters, and programmes built on incomplete data miss critical details that undermine acceptance and longevity. SA's intervention philosophy rests on three pillars that grew out of this experience.

(a) Data and Technology: Every intervention starts with an infrastructure study of the target area and a house-to-house survey in which community members take part as active participants. Beyond physical conditions, the survey captures residents' aspirations, their knowledge and attitudes around housing, sanitation, and menstrual hygiene, and their existing practices. All data goes into a GIS-based platform that produces spatial maps for location-specific analysis.

These maps guide planning, allow real-time monitoring, and provide a baseline against which outcomes can be measured.

(b) Multi-Stakeholder Engagement: SA requires that both slum communities and ULBs share in planning, design, and financial decisions. Community members join data collection, help interpret local realities, and later serve as trained volunteers who sustain knowledge transfer and behavioural change in their neighbourhoods. ULBs validate data, review existing infrastructure, and commit to extending services where analysis shows gaps. No single stakeholder controls the process.

(c) Cost-Sharing: Every intervention is financed jointly by the ULB, participating families, and CSR partners. SA avoids the conventional beneficiary-benefactor setup; each party puts in resources or effort, which strengthens ownership. The ULB provides trunk infrastructure (drainage, water supply, sewerage), families invest in their own toilet construction, and external funding covers facilitation, training, and product distribution.

SA has also partnered with Google to bring Plus Codes (unique locational digital addresses) to slum communities, improving access to public services and online platforms that require a verifiable address.

Intervention Process

Step 1: Baseline Survey to Identify the Target Population Using a Geographical Information System

SA's earlier sanitation work had already brought it into contact with most households in Belapur's five settlements. To scope the menstrual hygiene intervention, SA collected member-level demographic data from these families, broken down by gender and age. The gender composition of the four target settlements is set out below.

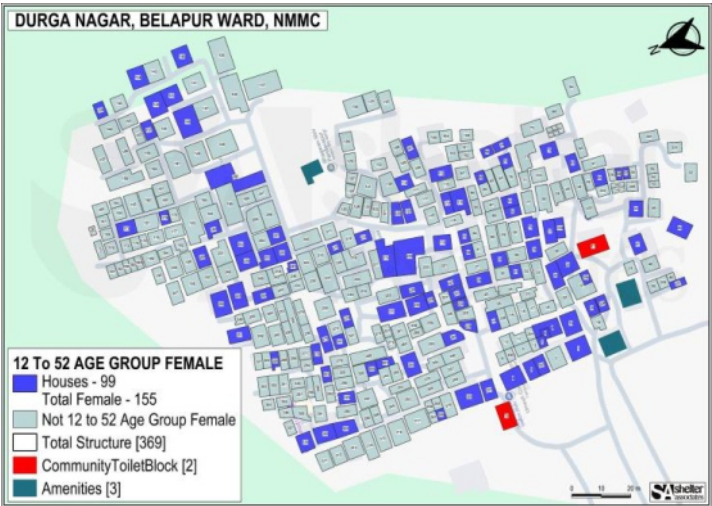
Table 1: Gender-Wise Population of Intervention Communities, Belapur Ward`

Community Name	Female	Male	Other	Total
Durga Nagar, Belapur	629	690	1	1,320
Rahul Nagar	155	138	—	293
Ramabai Nagar, Belapur	818	761	1	1,580
Sambhaji Nagar, Belapur	499	516	1	1,016
Total	2,101	2,105	3	4,209

Source: Baseline household survey conducted by Shelter Associates.

Out of a total female population of 2,101, the data identified 680 women in the menstruating age bracket (12–52 years). A further question established that 642 of them (78%) were actively menstruating at the time of the survey. That number, 642, became the operational target. The spatial map pinpointed individual households where these women lived, turning outreach from a blanket exercise into a targeted one. In Durga Nagar, for example, 99 households covering 155 menstruating women were mapped for direct engagement.

Figure 2: GIS Map of Durga Nagar Showing Households with Menstruating Women



Source: Baseline household survey conducted & spatial map created by Shelter Associates.

Step 2: Identifying and Training Community Volunteers

SA's experience across cities has reinforced a straightforward point. Without community ownership, even well-resourced programmes lose steam once the implementing agency steps away. In Belapur, the task was to find women willing to speak openly about menstruation, a subject that most families kept strictly private. There was initial doubt about whether anyone would volunteer. As it turned out, women from three of the four settlements agreed to take on the role.

GIS mapping was used to divide each settlement into geographic pockets, and each volunteer was assigned a cluster of roughly 250–300 households along with a map and a household register.

Table 2: Community-Wise Distribution of Volunteers

Community Name	Number of Volunteers
Durga Nagar	1
Rahul Nagar	1
Ramabai Nagar	2
Sambhaji Nagar*	0

*Sambhaji Nagar is adjacent to Ramabai Nagar; volunteers from Ramabai Nagar covered most of Sambhaji Nagar. The local ASHA worker also played an active role.

Source: Based on the on ground intervention of Shelter Associates.

Figure 3: Training Process for Community Volunteers



Source: Based on the on-leadership model of Shelter Associates.

Sambhaji Nagar had no designated volunteer of its own, but because it sits next to Ramabai Nagar, volunteers from the latter covered most of its households. The local ASHA worker filled in the remaining gaps.

Training covered female anatomy, the biology of menstruation, health and environmental drawbacks of disposable napkins, and the practical use and upkeep of menstrual cups. The aim was both immediate and long-term. Volunteers needed to become credible sources of information within their communities, and they needed to ensure that women and girls would keep receiving guidance on menstrual hygiene after SA's formal project timeline had ended.

Step 3: Community Engagement

With the spatial outreach plan and trained volunteers in place, SA's field team began house-to-house visits to invite women and girls to structured workshops. These were organised in two parts.

Part one dealt with understanding menstruation itself. Participants explored the everyday language they use to refer to their periods, then moved into an explanation of the biology involved. The emphasis fell on self-awareness, on knowing one's own body through participatory exercises rather than top-down lectures. Part two covered menstrual products and their consequences. Women learned about the materials in disposable pads, the health concerns they raise, and the environmental damage caused by non-biodegradable waste. Both sessions were designed to equip participants to make informed product choices and to challenge myths (restrictions on cooking, entering temples, touching certain objects during menstruation) with clear scientific reasoning.

Figure 4: Community Engagement Workshop



Figures 5 & 6: Corner Meetings and Participatory Activities



Alongside the formal workshops, SA’s team and the community volunteers ran corner meetings at the settlement level, using snakes-and-ladders boards and maze puzzles themed around menstruation to communicate key messages in an accessible way.

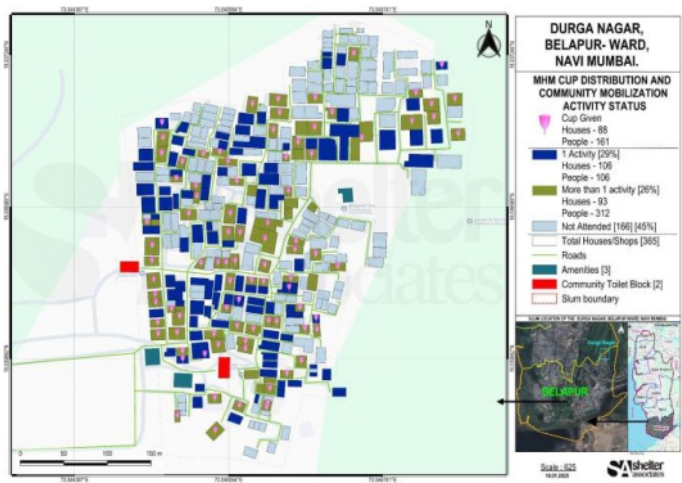
Table 3: Summary of Activities Conducted Across Four Settlements

Activity	No. of Activities	No. of Participants
Corner meetings	76	518
Workshops on MHM	52	563
Games (puzzle and others)	14	70
Menstrual cup distribution	63	500
Maasika Mahotsav Programme	1	150
Independence Day – Freedom from Sanitary Napkin Mahotsav	1	65
MHM awareness during Ganesh Festival	1	80
Total	208	1,946

Source: Based on reporting of community mobilisation activities conducted by Shelter Associates.

Across all four settlements, 208 activities reached 1,946 women and girls. Broader community events, such as a menstrual-awareness stall at the Ganesh festival, brought in participants of all ages and genders, creating public conversations about a subject that had previously been confined to whispers.

Figure 7: Community Event During Ganesh Festival



Source: Based on intervention reach of Shelter Associates.

Step 4: Distribution of Menstrual Cups and Follow-Up

The sustained engagement led to the distribution of menstrual cups. Of the 642 menstruating women identified during the mapping exercise, 500 chose to switch, giving a ward-wide adoption rate of 78%. The settlement-wise figures are set out below.

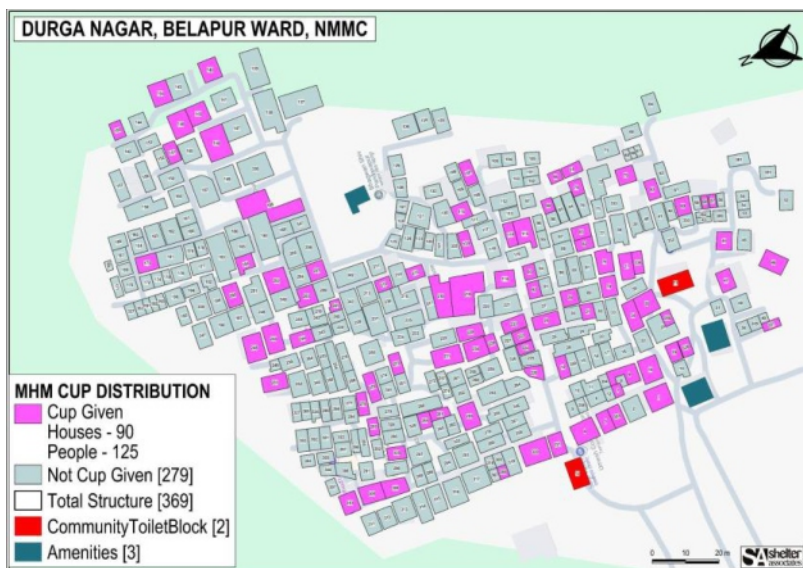
Table 4: Menstrual Cup Distribution Across Four Communities

Community	Women Aged 12–52	Menstruating Women	Cups Distributed	Coverage (%)
Durga Nagar	161	155	125	81%
Rahul Nagar	77	70	62	88%
Ramabai Nagar	319	296	207	70%
Sambhaji Nagar	123	121	106	88%
Total	680	642	500	78%

Source: Based on daily reporting of interventions of Shelter Associates.

Sambhaji Nagar and Rahul Nagar recorded the highest adoption (88% each), followed by Durga Nagar (81%) and Ramabai Nagar (70%). The lower figure in Ramabai Nagar, the largest of the four settlements, likely reflects the greater logistical difficulty of covering a bigger and more dispersed population, something worth noting for future scale-up.

Figure 8: GIS Map Showing Households Where Women Switched to Menstrual Cups, Durga Nagar



Source: Map prepared based on daily reporting of interventions of Shelter Associates.

Cup distribution was not treated as the finish line. The SA team and community volunteers conducted three rounds of structured follow-up visits with every recipient to address early discomfort, troubleshoot concerns about insertion and cleaning, and reinforce correct usage. This follow-up mattered because experience from other menstrual cup programmes indicates that without sustained post distribution support, many early adopters revert to familiar products within the first few cycles.

Outcomes and Impact

By the time the intervention closed, a visible change had taken hold in how menstruation was talked about within the four settlements. SA organised a public event on World Menstruation Day in an open community space. Women spoke freely about their experiences, played menstruation-themed games, and shared stories of switching to cups. The message was intentional. Menstruation could be discussed out in the open, and choosing a sustainable product was something to own, not conceal.

Figure 9, 10, 11 and 12: Maasika Mahotsav and Community Celebration Events



Transformational Impact in the Intervention Communities

(a) Among the 500 women who adopted cups, 45% are working women, mostly in domestic employment, while about 23% are students and the remainder homemakers. All three groups reported greater comfort, particularly during working hours and commutes. Several said they could now get through a full workday without worrying about leakage or needing a private space to change pads.

(b) A 78% adoption rate for cups as the primary menstrual product across four slum settlements is, as far as the authors can determine, among the highest recorded in any community-level MHM intervention in an Indian urban context.

(c) Follow-up surveys showed community acceptance between 70% and 88%, depending on the settlement.

(d) Cup users said they now understood menstruation as a biological process rather than a cause for shame, and many had started discussing menstrual health with friends and relatives outside the project area.

(e) If the 500 women continue using cups over the next 5 years, an estimated 3,00,000 disposable pads will be kept out of municipal waste streams. Additionally, they are expected to save more than 20 lakhs that otherwise would be spent on the disposable pads during the same period.

(f) Women reported stronger self-confidence, less embarrassment, and a willingness to talk about menstruation that they had not felt before.

(g) The NMMC adopted the model and invited SA's trained volunteers to share their field knowledge with the corporation's own female staff, a mark of institutional buy-in.

Asha Waghela, a 37-year-old sanitation worker from one of the Belapur settlements, says “those 5 days used to be the hardest.” Without a toilet at her workplace and facing an hour-long commute each way, menstruation made difficult days worse. Since receiving a home toilet through SA's programme and switching to a menstrual cup, she puts it simply: “Now, I don't even feel like I'm on my period.” A private toilet and a dependable product, together, have changed her experience at work and at home.

Environmental Impact: Climate and Menstrual Product Choice

A comparative life-cycle assessment published in 2025 found that disposable pads, both organic and non-organic, carried the heaviest environmental load across nearly all assessed categories. Non-organic pads scored worst on global warming potential and resource depletion, with close to half the climate impact traceable to polyethylene production. One unexpected finding was that organic cotton pads fared even worse on certain measures because of the resource demands of organic cotton farming (BBC Future, 2025).

Menstrual cups have a markedly smaller carbon footprint. A single cup lasts up to 5–8 years, and while it needs water for cleaning, its reusable nature cuts cumulative emissions steeply compared to a decade of disposable pad use. Based on established emission factors, the Belapur intervention has avoided an estimated 22.5 kg of CO₂ equivalent emissions, roughly the amount a passenger car produces over 100 km. That number is modest for one ward, but it becomes consequential once you consider the thousands of urban settlements across India where a similar programme could run.

Conclusion

From the holistic work in Belapur, we have seen what becomes possible when menstrual hygiene is approached as part of everyday sanitation work rather than as a standalone awareness exercise. Treating it this way changed both how the programme was designed and how it was received.

Using GIS-based household data to locate menstruating women gave the intervention a level of precision that broad campaigns rarely achieve. Knowing which households to visit and assigning trained volunteers to clearly defined geographic pockets made outreach manageable and follow-up consistent. Just as importantly, it reduced the sense of intrusion that often accompanies discussions around menstruation. Conversations happened in familiar settings, led by women from the same settlements.

Sequencing also played a role. Infrastructure improvements came first—drainage connections and home toilets—followed by menstrual health discussions, and only then product distribution and follow-up. Women who made this ecofriendly choice are followed up for three times to ensure its usage and to address any questions. Each stage built on trust created earlier. Women who had already worked with SA on toilet construction were more willing to engage in

menstruation, a subject they might otherwise have avoided with an external organisation.

The 78% adoption rate across four settlements challenges the assumption that menstrual cups are only suitable for middle-class or highly educated users. In Belapur, women weighed comfort, cost, convenience, and waste concerns against what they had always used. With time, information, and ongoing support, many chose to switch.

From a municipal perspective, the estimated prevention of 3,00,000 disposable pads from local waste streams and the associated reduction in carbon emissions may appear modest in isolation. Seen alongside the daily pressures on urban drainage and waste systems, however, they point to the cumulative value of addressing menstrual waste at source rather than downstream.

The Navi Mumbai Municipal Corporation's decision to adopt this approach and involve community volunteers in training its own staff suggests that ward-level interventions, when backed by credible data and visible results, can influence practice beyond a single project.

There are limitations. Adoption and satisfaction data rely on self-reported follow-up, and longer-term retention beyond the project period has not yet been measured. Environmental estimates depend on assumptions about product lifespan and usage that will vary between individuals. These gaps point to areas for future work, including longer tracking of product use and more detailed health outcome data.

Even with these constraints, the Belapur intervention demonstrates that sustainable menstruation at the ward level is not only feasible, but practical when it rests on accurate spatial data, community ownership, and an understanding of menstrual health as part of the wider architecture of urban sanitation.

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