



Paryavaran Pathways

Paryavaran Sakhi Model: a sustainable community-led solution to manage solid waste in rural Himalayan region



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Foreword

The Jim Corbett Tiger Reserve holds a special place for Waste Warriors and me. When I joined Waste Warriors in December 2020, it was the only project we were running in a rural area. Owing to a dearth of funds to sustain the project, we were compelled to downsize our operations by reducing the number of villages under our purview. Up until that point, we had been employing waste workers on a daily wage basis, managing operations ourselves. Following the adage that necessity is the mother of invention, in October 2021, we pivoted to launch a community-led entrepreneurial model called the 'Paryavaran Sakhi Model'. This shift allowed us to attract more women to join our cause, breathing fresh life into our work on the ground.

Drawing on the lessons learned from our work in Corbett, today, we operate in over 200+ villages across 8 locations in two states of the Indian Himalayan Region, catalysing systemic change to address the waste crisis in eco-sensitive regions. Our strategy for sustaining these rural projects is simple: the 'operational costs'—covering waste collection, transportation, processing, consumables, etc.—should be borne by local entrepreneurs; they will be fairly compensated from local and institutional sources of income rather than relying on philanthropic support. These sources encompass user fees from households and businesses, revenue from the sale of recyclables, and service contracts with local governments.

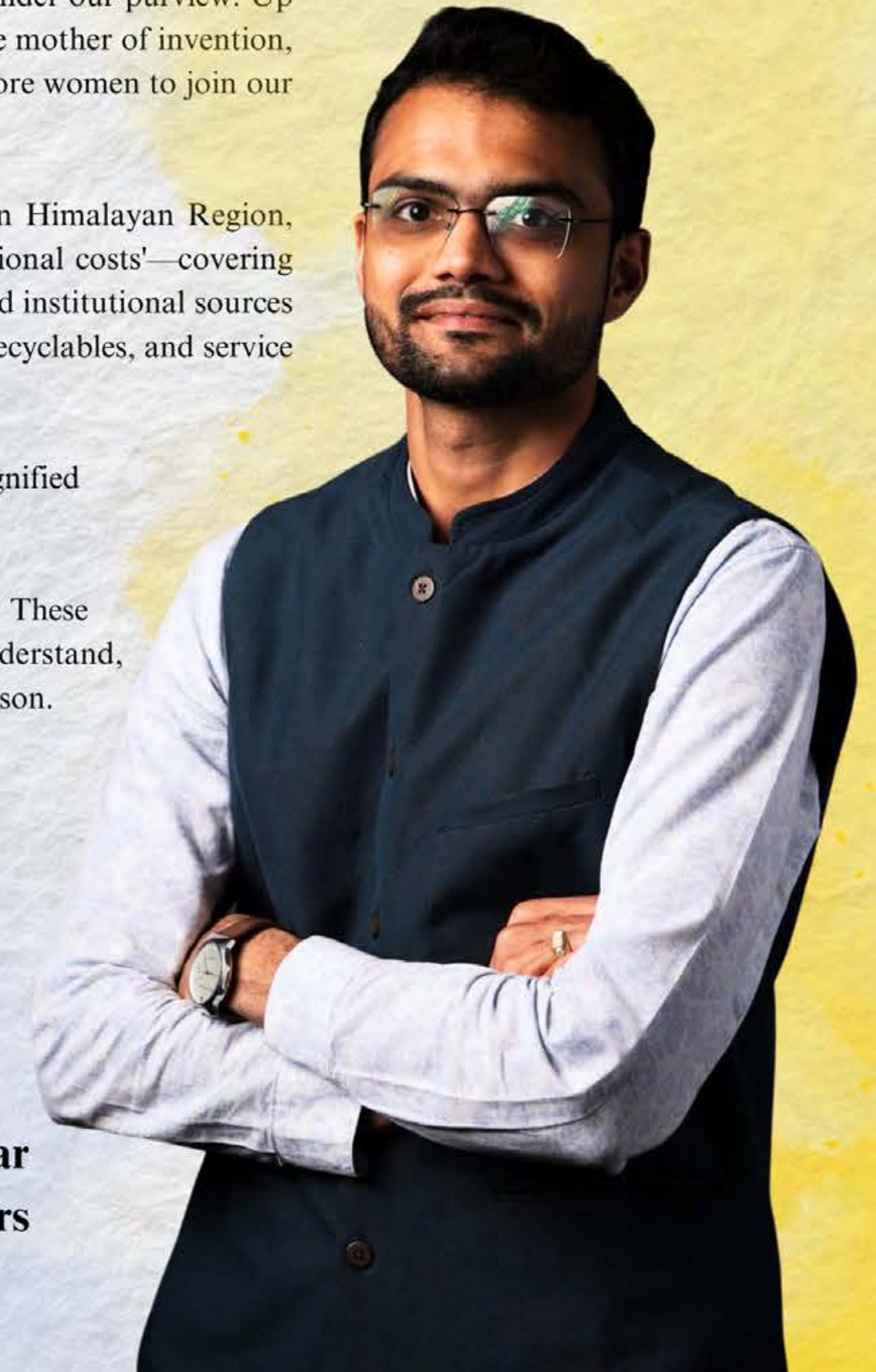
This model exemplifies intersectionality at its finest, operating at the crossroads of climate change mitigation, biodiversity habitat conservation, and dignified livelihood generation.

The *Sakhis* have overcome familial opposition and various social barriers of caste, gender, education and economic background to work harmoniously. These rural women now experience a sense of agency they've never felt before. It inspires me to see them enjoy their work, which can be counterintuitive to understand, especially because it involves segregating waste manually. This document is a testimony to their commitment and we invite you to experience this in person.

This case study serves as a Knowledge Tool, offering insights to replicate it elsewhere in the country. Please feel free to share it widely and reach out to us for any support.

I thank Minakshi Pandey and all former and current team members for keeping the spirit of the work alive for over a decade. Special thanks to all our supporters, including the SBI Foundation, ICICI Foundation, Sud-Chemie, Eicher Group Foundation, and countless individuals who have generously contributed to our work in the last decade. A heartfelt acknowledgement to Rohini Nilekani Philanthropies for making this document possible.

Vishal Kumar
CEO, Waste Warriors



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Executive Summary

Waste matters. Even more so, when we look at its far-reaching impact on everything else that matters — air, water, soil, agriculture, health, climate, and biodiversity. In the Indian Himalayan Region, the surge in waste generation, coupled with minimal waste processing systems, poses a serious threat to the pristine beauty of these majestic mountains. At the forefront of this combat are the indigenous communities and rural inhabitants who have traditional and cultural ties to these delicate ecosystems, flora, and fauna. Waste Warriors is addressing this problem, one step at a time. In Jim Corbett Tiger Reserve, Ramnagar, Uttarakhand, a community-based entrepreneurial initiative called Paryavaran Sakhi Model (translates to Female Friends of the Environment) is not only a means of dignified livelihoods for local women but also of tackling climate change by promoting end-to-end solid waste management, aiding in lowering carbon emissions. In terms of climate action, research indicates that waste prevention is the best management option, with recycling being the next best. Through the Paryavaran Sakhi Model, Waste Warriors is at the forefront of both approaches by bringing change at the grassroots. In 19 months (April 2022 to October 2023), the *sakhis* have collected over 148 metric tonnes (MT) of solid waste, and 53MT was dispatched for recycling from seven panchayats (village councils) alone in Ramnagar block of Nainital district. This bulk waste translates to the conservation of 1.4 hectares of land area, and the reduction of 10.4MT of Carbon dioxide emissions and 4.1MT of Methane emissions— two major greenhouse gases and protection of 135 trees from felling. Biodiversity and habitat conservation are at the core of the waste management systems designed by Waste Warriors, especially through a focus on enabling sustainable tourism practices.

Paryavaran Sakhi Model serves as a four-way solution, enabling — climate change mitigation, biodiversity habitat conservation, dignified livelihood generation and responsible tourism.

The *sakhis* are a part of self-help groups (SHGs) which are small community-based collectives offering financial security to its members. *Sakhis* carry out door-to-door dry waste collection, segregate it in the waste banks, sell recyclable waste to aggregators and earn through monthly user fees and the sale of recyclables (SOR). On average, a *sakhi* is currently earning Rs 4,560 for 12 woman-days per month. ‘Paryavaran Pathways’ is a compilation of our efforts under the Paryavaran Sakhi Model, which introduces 21 *sakhis* or women from seven panchayats in the region, some of whom have been associated with us for as long as ten years. These women have garnered recognition from their communities as well as panchayat and district administration. We intend to spark community conversations around waste and expand our operations to all 53 panchayats in Ramnagar block in Nainital district, Uttarakhand, in the next 12 to 18 months (November 2023 onwards). Despite initial hurdles, we have witnessed a growing interest in rural women to be associated with the Paryavaran Sakhi Model.

The *sakhis* have inscribed a success story of financial independence, breaking gender norms and are in the process of addressing the discriminatory waste-related responsibilities on marginalised communities. The model is shifting the onus on the community as a whole to tackle the waste crisis in their neighbourhood. We envision transforming this into a self-sustainable model, under which the *sakhis* will run it independently in association with local governance bodies.

Furthermore, Waste Warriors is a knowledge partner for *sakhis*, panchayat and block-level government bodies, Corbett Tiger Reserve officials, and the Forest Department in Corbett. We hold focused group discussions and training to equip them in disseminating awareness among tourists and locals to play a vigilant role in safeguarding the diverse Corbett Landscape. Waste Warriors’ assistance to panchayats in framing and passing by-laws pertaining to waste collection and disposal, has also helped formulate effective solid waste management regulations and hence, a system at local level.

About Waste Warriors

Waste Warriors Society, a non-profit organisation, operates as a catalyst for systemic change to address the pressing waste management crisis in the Indian Himalayan Region (IHR). Situated amid the stunning yet challenging landscapes of Uttarakhand and Himachal Pradesh, our team of 190+ Warriors is dedicated to developing effective waste management solutions in urban and rural areas, with a particular emphasis on eco-sensitive and tourist regions. Our mission spans climate change, biodiversity habitat conservation, and creation of dignified livelihoods.

The integrated approach involves collaborating with government bodies and encompasses a Zero Waste Program, Research and Advocacy, Community Activation, and Livelihood Development. Our project locations, including Kasauli, Dharamshala, Bir-Billing, Manali, Kempty, Dehradun, Sahastradhara, Muni ki Reti, Uttarkashi and Corbett Tiger Reserve, are strategically chosen to have a significant impact on the IHR's diverse ecosystem.

The IHR comprises snow-covered peaks and glaciers feeding perennial rivers which provide water to a third of India's population and hosts over 10,000 plants, 300 mammals, 977 birds, 281 herpetofauna, 269 fishes, several species of invertebrates and microorganisms, many of which have global conservation significance. The ecosystem faces exponential degradation due to improper waste disposal practices, impacting high-altitude wildlife food chain, soil health and rivers, thus reducing agricultural yield and water quality.

Waste Warriors actively combats this challenge by promoting source segregation, bridging infrastructure gaps, and raising awareness through Information, Education, and Communication (IEC) initiatives. Our work contributes to waste mitigation and aids in conserving vulnerable and endangered species, maintaining the delicate balance of the IHR ecosystems. Waste Warriors seeks to usher in a sustainable and harmonious coexistence between communities and the environment through these efforts. Additionally, we are committed to align our initiatives with the United Nations Sustainable Development Goals (SDGs). Through the Paryavaran Sakhi model, we are integrating the following SDGs to contribute not only to the local resilience but also to the broader global agenda of creating a more sustainable and equitable world.

5 GENDER
EQUALITY



8 DECENT WORK AND
ECONOMIC GROWTH



10 REDUCED
INEQUALITIES



11 SUSTAINABLE CITIES
AND COMMUNITIES



12 RESPONSIBLE
CONSUMPTION
AND PRODUCTION



13 CLIMATE
ACTION



15 LIFE
ON LAND





Introduction

Background and Context

India is grappling with a severe waste management crisis that demands urgent attention and action. This issue extends beyond being an environmental concern; it poses significant threats to climate change, public health, agriculture, food security, groundwater quality, and wildlife. The primary victims of these consequences are the local communities, who find themselves vulnerable to not only economic losses but also intangible cultural losses. The intricate connection between waste and these crucial aspects of life underscores the urgency to seek effective waste management solutions. The fragility of ecosystems makes it critical to look for viable solutions.

One of the most affected regions, the Himalayas, a biodiversity hotspot, faces a unique challenge due to mass tourism. This was expected to grow at an average annual rate of 7.9% from 2013-2023, and projected to witness a rise to 240 million by 2025. Uttarakhand ranked second with an inflow of ~25 million tourists between 2012-2016. Despite the region's popularity, there is a glaring lack of institutional capacity to handle the substantial waste generated by the tourism sector.

Currently, tourism-related activities in the Indian Himalayan Region produce an overwhelming 8.4 million metric tons of waste annually, a number that is poised to escalate rapidly in the coming years. Adding to this challenge is the sprawling urbanisation and consumerism encroaching upon these biodiversity hotspots. Missing initiatives on waste collection data and segregation have been acknowledged as a challenge for Uttarakhand.



Paryavaran Sakhi Model

The Paryavaran Sakhi Model is a beacon of sustainable change, addressing the waste crisis in the Indian Himalayan Region through community empowerment, gender equality, and inclusive livelihoods. Started formally in 2021, this initiative thrives in the eco-sensitive sub-Himalayan region around Jim Corbett Tiger Reserve in Uttarakhand, a haven for diverse wildlife, including tigers, elephants, and various bird species. This pioneering model engages women from diverse backgrounds, equipping them with entrepreneurial roles for effective waste management amid challenges like social barriers, gender norms and limited livelihood opportunities.

Operational in Kaniya, Ringora, Himmatpur Dotiyal, Dhikuli, Kyari, Sawal Deh East and Sawal Deh West, the model employs 21 dedicated *sakhis* (local women) across these seven panchayats, one of which is a Van Panchayat. These *sakhis*, in addition to their household responsibilities, farm work and taking care of cattle, perform door-to-door dry waste collection, segregation in designated waste banks, and sale of recyclable waste. Furthermore, the women handle awareness campaigns, record keeping, organising cleanup drives and focused group discussions, baling of waste, and on-boarding new community members.

Beyond monetary gains, this work grants them recognition in their communities and by government bodies. Initially met with scepticism, the model's success hinged on persistent conversations with the communities, educating them on the role of these women in improving habitats.

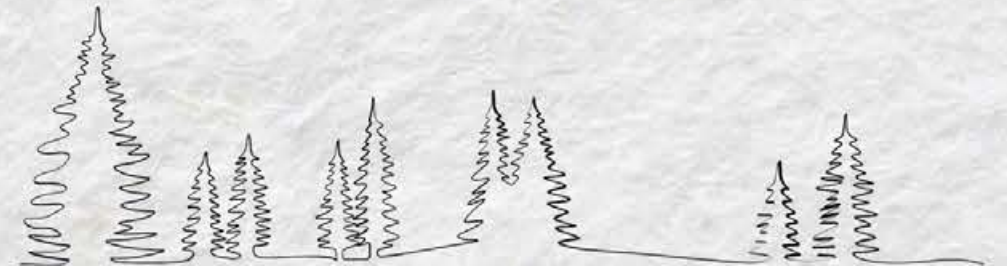
Initially, the *sakhis* received a compensation of Rs 350 per workday on a monthly basis. To enhance sustainability, the model underwent a transformation into an entrepreneurial framework.

The women now earn their wages from the user fee generated from door-to-door collection and sale of recyclable waste. The model not only promotes gender equity but also provides an alternative livelihood, particularly vital for women unable to participate in the demanding tourism industry (which thrives in Corbett).

Envisioned for independent operation in partnership with rural government institutions, the model aims to tackle the Himalayan waste challenge comprehensively. Adaptable and scalable, this initiative promises a brighter, cleaner future, emphasising on the vital intersection of waste management with rural development.



Mohini Devi, a sakhi from Sawal Deh village carries the collected waste to the waste bank.





02

Trash Troubles

Mapping the challenges of unchecked solid waste in CTR

Geography

Covering 16.2 per cent of India's land, the Indian Himalayan Region (IHR) hosts 50 million people and diverse flora and fauna. Despite its economic importance, unchecked tourism-driven activities result in 8.4 million tonnes of annual solid waste, impacting the fragile ecosystem, wildlife, agriculture, and local communities. Ramnagar, a gateway to Jim Corbett Tiger Reserve, faces waste woes due to inadequate waste management systems. The region's challenging geography, with remote settlements and limited infrastructure, complicates waste management efforts. Tourist-generated waste, left unchecked, highlights the urgent need for effective solutions in this ecologically sensitive area.

Local Unawareness

The rural population around Corbett Tiger Reserve remains unaware of the dry waste, including single-use and recyclable plastics, generated in their households. The crucial first step is to raise awareness about waste generation within the community. Rapid urbanisation and shifting consumption habits have introduced packaged foods into these villages, leading to open dumping and burning as a disposal method due to the lack of knowledge and infrastructure. Moreover, plastic waste is being discarded in canals, which supply water to villages for sanitation and cleaning purposes, further exacerbating the environmental challenge.

Agriculture

The influx of plastic wrappers into fields via irrigation canals poses a significant challenge for the farming community. Unawareness and absence of waste disposal infrastructure push farmers to resort to open-burning, leading to hazardous plastic fumes causing air pollution. The partially burned plastic residues in the form of micro-plastics enter the food chain, adversely affecting crop health, soil nutrition, livestock, and humans. Globally, micro-plastics have been found in human blood, placenta, and the faeces of newborn babies, but despite such revelations, related research is severely lagging. The unawareness of these aftermaths make communities continue the unscientific waste disposal practices.



Climate Change

Although the waste sector contributed 2.7 per cent to total GHG emissions in 2016, it witnessed the highest growth in GHG emissions (224 per cent) between 1994 and 2016, landfills being the third-largest source of methane emissions globally. In villages near Jim Corbett Tiger Reserve, waste segregation and understanding waste categories pose challenges, leading to mixed waste disposal.

Tourists' lack of responsibility compounds the issue, resulting in inefficient disposal. Mixed waste, where organic waste is covered and compacted by dry waste, accelerates Methane formation — a GHG 28 times more potent than Carbon Dioxide, adding to global warming.

Waste mismanagement, as per a World Bank report, could raise global temperatures by 1.5°C by 2100, worsening climate change impacts. In fragile mountain and forest habitats, this could intensify climate change-related disasters like glacial outbursts, snowcap melting, and flash floods. Indigenous communities are at the forefront of these ramifications.

Gender Equity

As much as half of the world's work is unpaid, most of it is done by women and not counted as part of economic activity. UNICEF estimates that women spend 200 million hours per day worldwide simply fetching water. This unpaid labour imbalance not only robs women of economic opportunities but takes away the financial decision making in a household. The tourism industry in the Ramnagar region, while providing livelihood opportunities, fails to accommodate women needing flexible hours due to family obligations.

Climate change wreaking havoc on agriculture —due to changing rainfall patterns and dry spells —limits crop yields and increases food expenses.

The unreliability of agriculture-generated income puts an additional burden on women who have to make do with the limited incomes of the

households, making it imperative for them to

step out of gender-defined roles and realise their full potential in the marketplace.



Unchecked Mass Tourism

In a decade(2005-2015), Jim Corbett Tiger Reserve(CTR) saw a whopping increase of 89% in the number of visitors in the region annually, which makes tourism a major economic contributor for the region. Unfortunately, it is a goose that not only lays a golden egg, but also fouls its own nest. The practice of 'leaving behind' self-generated wastes by the visitors and poor mechanisms to keep a check on this puts CTR in a concerning spot, causing irreparable damage to the natural resources, wildlife habitat and local communities. Collectively, in five major eco-tourism zones of CTR —Dhikala, Bijrani, Jhirna, Durgadevi, Sonanadi — ~53,000 kg per year amount of non-biodegradable waste was reported. This included plastic bags/ bottles — 56.1%, polythene bags — 14.8%, can-tins — 17.1% and wrappers/ sachets — 12%.

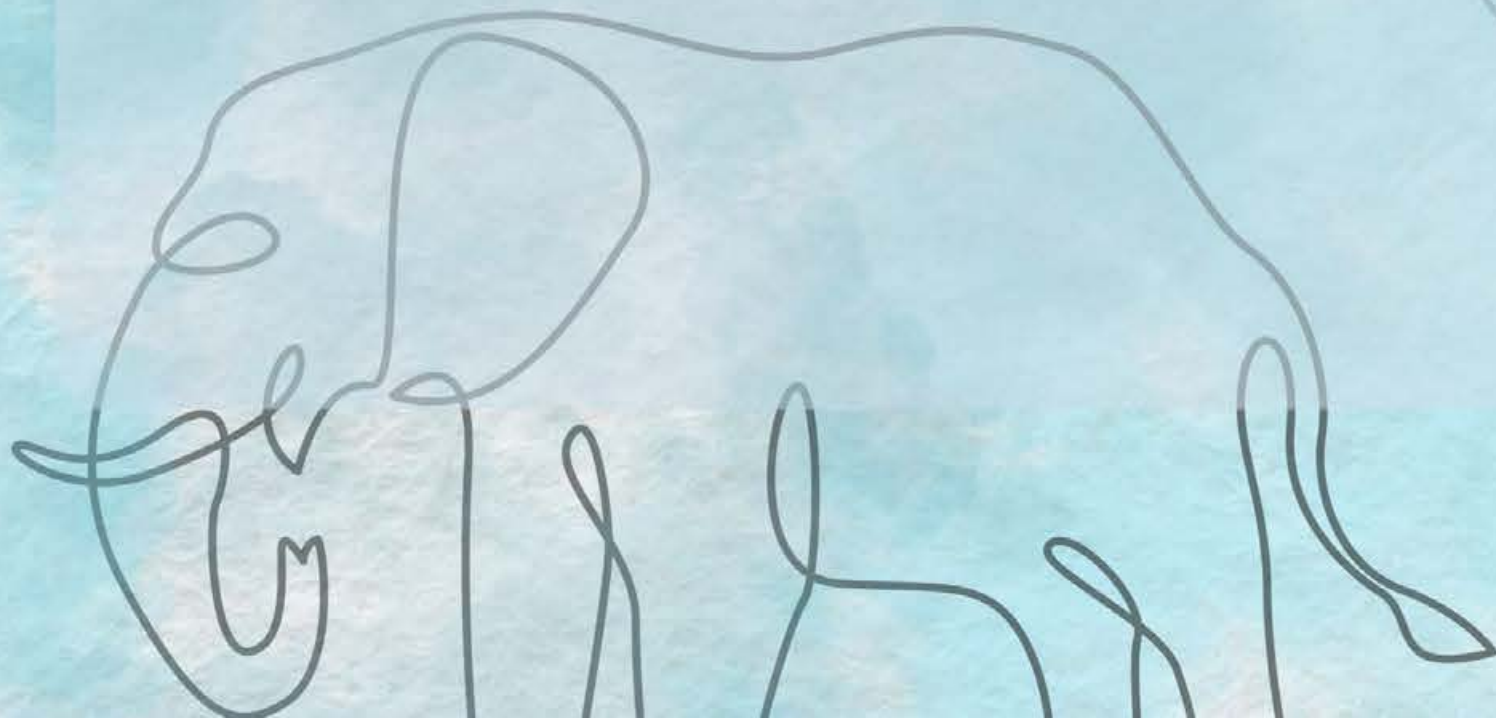
Institutional Capacity

Ramnagar block in Nainital district, Uttarakhand comprises 53 Gram Panchayats and 10 Van Panchayats, encompassing 135 villages. Each panchayat formulates its Gram Panchayat Development Plan (GPDP) tailored to village-specific needs. Despite waste management being a pressing concern, local governance institutions cite limited financial capacity for lacking waste infrastructures and community unawareness as a challenge. Rigorous Information, Education, and Communication (IEC) initiatives are the need of the hour to initiate conversations amid communities about waste. Presently, there is a lack of diligent monitoring regarding waste segregation and non-scientific disposal methods. The Gram Pradhan, the village head, possesses decision-making power to consult with the community in public meetings but faces limitations due to insufficient community support and inadequate funds allocated for waste management efforts.

Wildlife

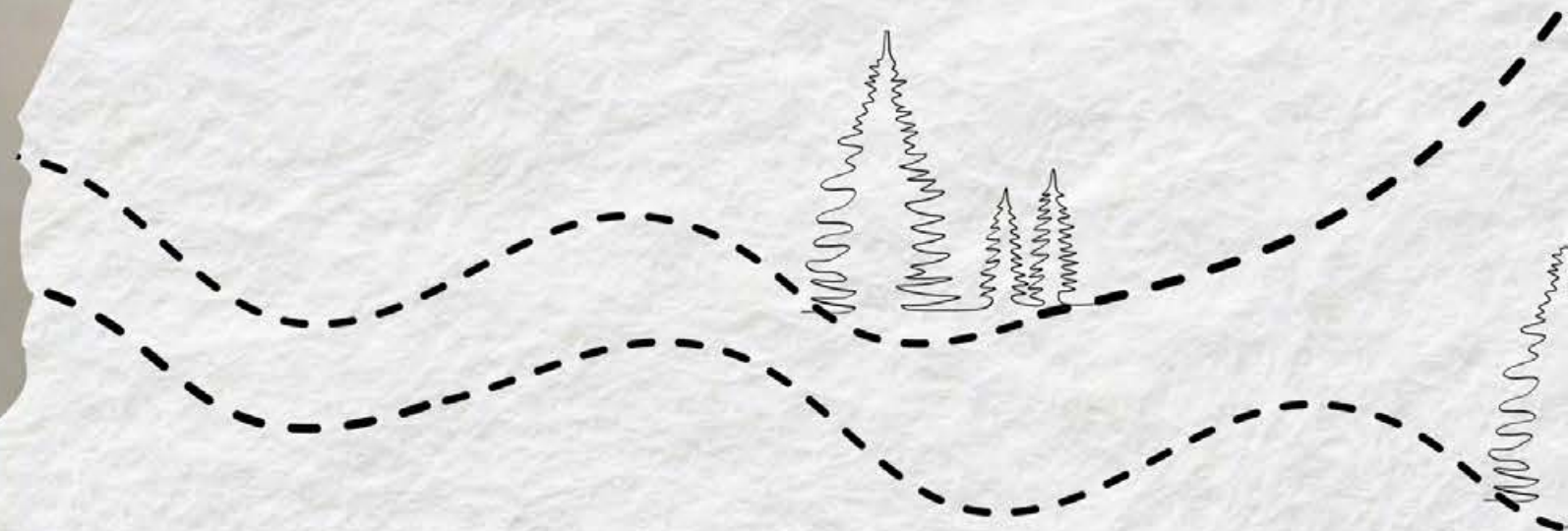
In July 2019, a forest department official shared a photograph online, depicting a leopard rummaging through leftovers in a polythene bag near CTR. Another image in February 2020 showed three tigers playing with a piece of plastic at CTR, shared by Indian Forest Services officer Parveen Kaswan. This occurred despite CTR being a plastic-free zone, prohibiting tourists from carrying plastic bottles. The responsibility lies on various sources that allow plastic pollution to infiltrate the eco-sensitive habitats, food chain, and wildlife. Forest officials suspected that locals might have dumped the waste into the river, highlighting the need to address human interference in habitats housing critically endangered flora and fauna. Another study published in The Journal for Nature Conservation reported the presence of plastic in elephant dung in the forests of Uttarakhand.

The rapid increase in solid waste in nearby villages and its mismanagement could have catastrophic consequences for these species, which lack the ability to relocate unlike humans.





03



Staring Right in the Eye

The Corbett Intervention with the Paryavaran Sakhi Model

Waste Warriors embarked on its mission in 2013, piloting initiatives in six villages within the Corbett Landscape (CL). Our multifaceted approach included surveys, capacity building workshops, data collection, and the entire waste management process—from door-to-door collection and segregation to recycling, composting, and disposal.

We aim to scale up our operations in collaboration with government bodies at the panchayat, block, and district levels.

Presently engaged in seven panchayats with 21 Paryavaran Sakhis, we have made substantial progress. Over the next 12 to 18 months (from November 2023 onwards), we plan on expanding operations to all 53 Gram Panchayats in Ramnagar.

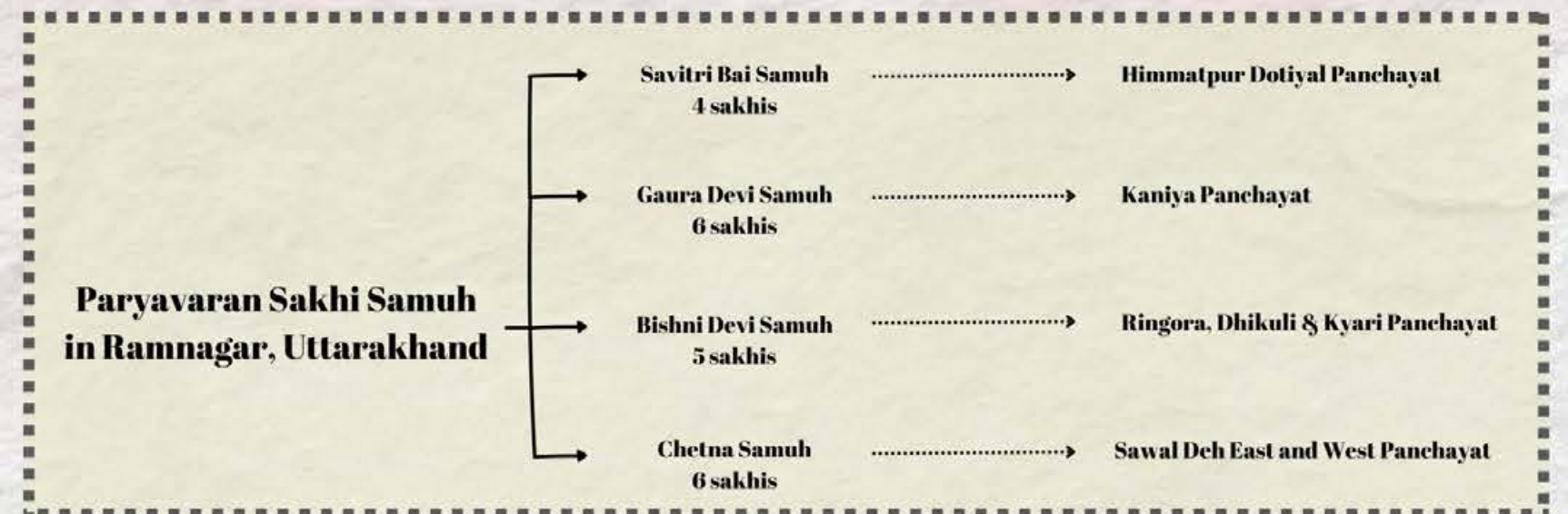
This also includes the active engagement of Paryavaran Sakhis in educating visitors in the Jim Corbett region about sustainable tourism practices and the waste management initiatives they undertake.

Drawing from the insights gained in the Corbett pilot project, our objective is to implement and replicate the successful Paryavaran Sakhi Model across Himalayan districts, offering a viable solution to the pressing human-induced waste issue.

We believe this approach is pivotal for preserving the pristine Himalayan ecosystems and helping indigenous communities cope with the grave consequences of this challenge.



Active units refers to households, commercial establishments (out of the total units in the area) who are currently availing waste management services of the *Sakhis*.



Our Approach

Awareness, survey, and capacity building

- The 'Chai pe Charcha' initiative has been introduced to convene communities in a village square, engaging in focused conversations to discern their hesitancy toward active participation in efficient waste disposal. This informal session serves as a medium for conducting Information, Education, and Communication (IEC) activities, thereby facilitating enhanced capacity building.
- Conducting surveys to comprehensively assess the waste landscape and implementing targeted capacity-building programs.
- Some other IEC tools employed to strengthen these operations are *swachhta* (cleanliness) rally, clean-up events, awareness sessions in schools, door-to-door beneficiary awareness programs, instituting a Young Warrior Club, putting up signboards, doing dark-spot transformations and art installations, among other things.

Providing a sustainable waste management system

Establishing an integrated waste management system encompassing effective collection, sorting, strategic storage, advanced processing, and environmentally conscious disposal methods.

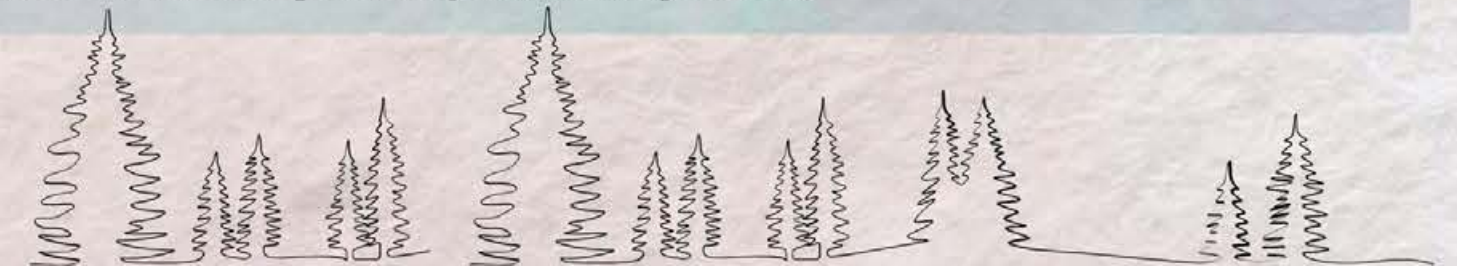
Introducing livelihood options

Facilitating avenues for livelihood improvement, with a particular emphasis on empowering self-help groups actively engaged in waste management.



Improving standard of life in villages

Enforcing initiatives to uplift the overall living standards of the village community by tackling challenges related to waste and promoting sustainable practices.





**Biodiversity
Habitat
Conservation**



Climate Change Mitigation



**Waste Management
through the
Paryavaran Sakhi Model**



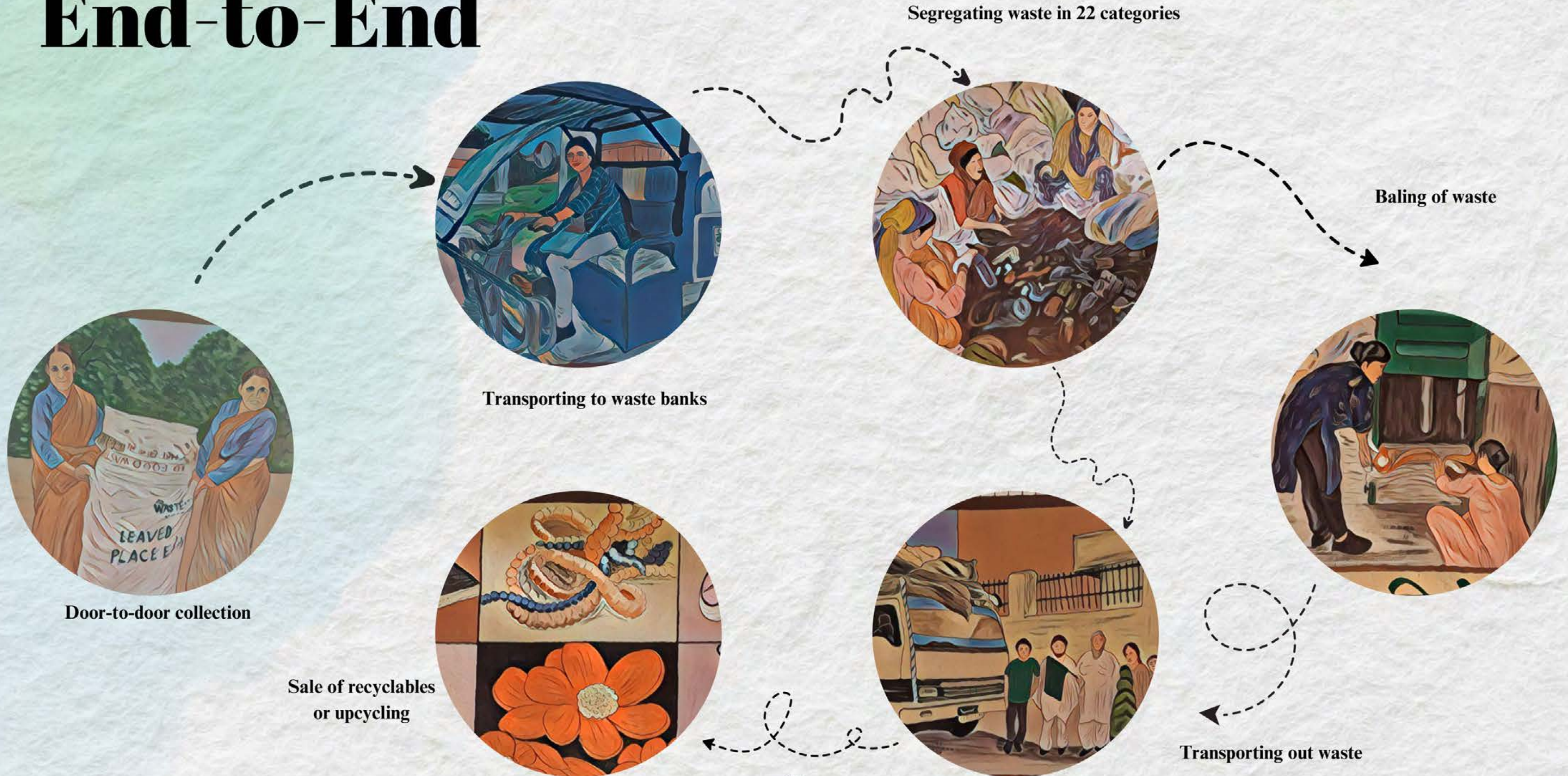
Responsible Tourism



**Dignified
Livelihood
Generation**



End-to-End





Who is a Paryavaran Sakhi?

A Paryavaran Sakhi is a local woman with an entrepreneurial spirit, leadership qualities, and strong communication skills, dedicated to waste management in her village.

She can be of any age, educational level, and socio-economic background.



Khimuli Devi(45)



Khasti Devi(36)



Hansi Devi(50)



Beena Gusain(34)



Prabha Devi(50)



Manju Bangari(39)



Hema Thapa(32)



Ganga Adhikari(39)



Pooja Upadhyay(29)



Karishma(23)



Janki Negi(38)



Tara Adhikari(30)



Mohani Devi(38)



Bhawana Adhikari(27)



Indra Devi(50)



Sunita Devi(50)



Indu Joshi(35)



Vimla Devi(46)



Hema Adhikari(27)



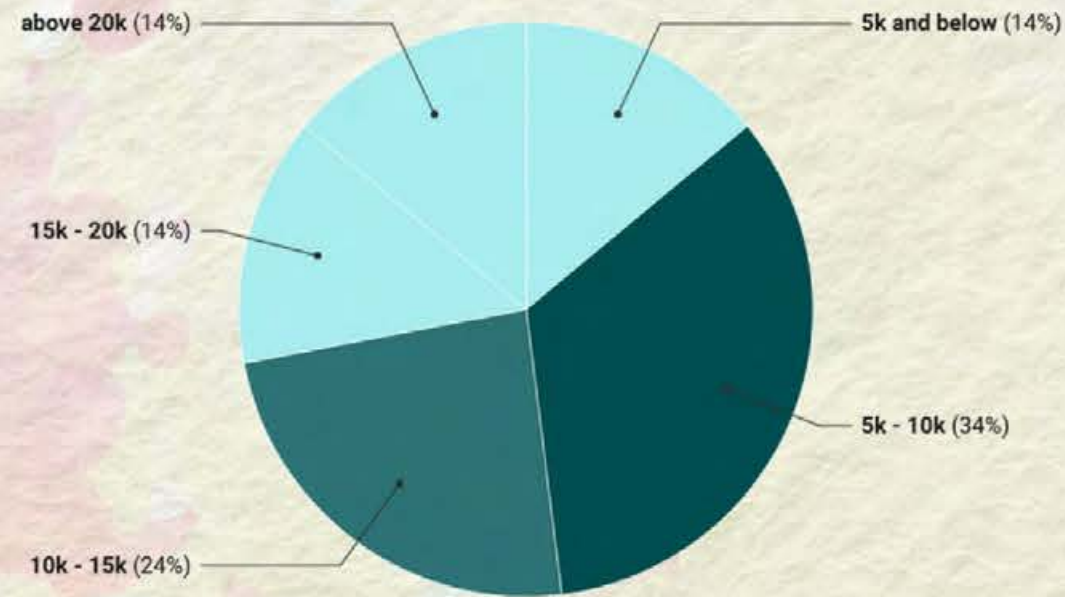
Kamlesh Tiwari(33)



Chandrakala Patwal(33)

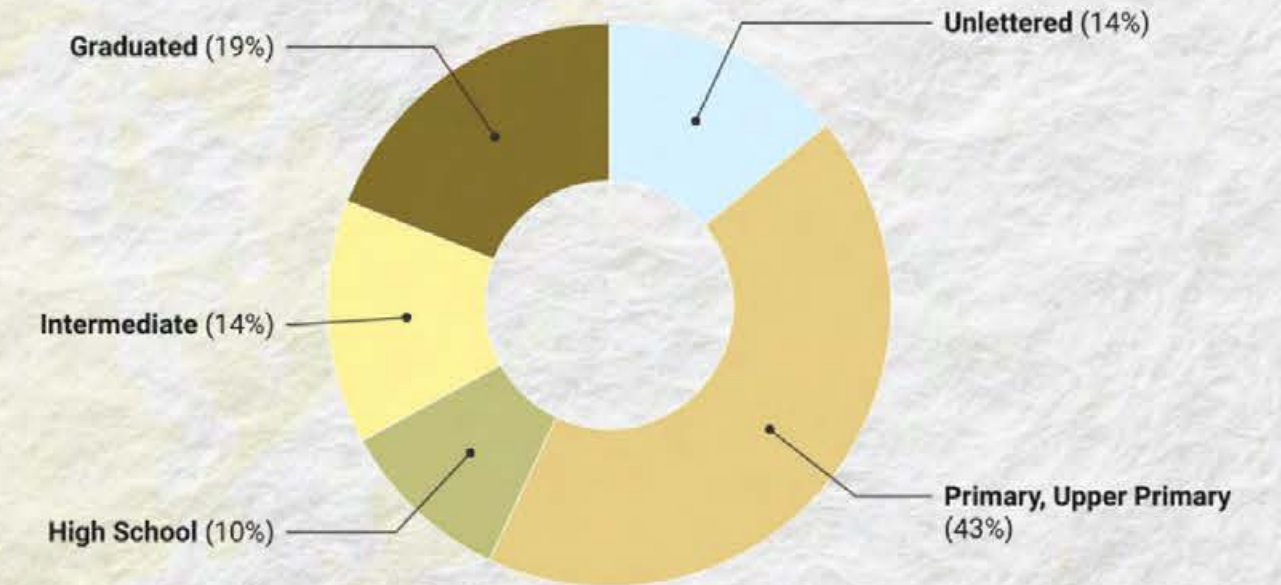
Demographic Profile

Household income (per month)

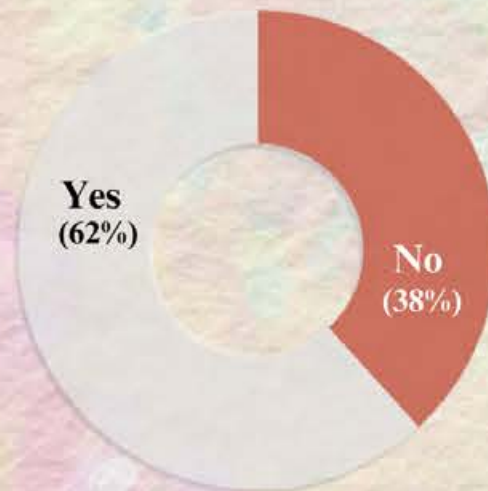


Women are engaging with this model irrespective of their educational qualification and economic backing.

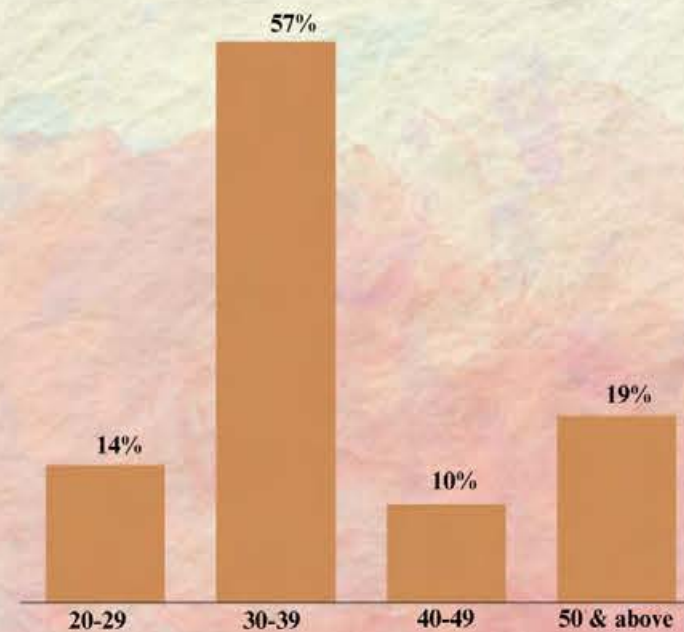
Education



BPL Category



Age



Caste Category



This illustrates that the responsibility for waste management, traditionally associated with specific caste categories, has evolved into a collective effort involving the entire community, aligning with a more **inclusive approach**.

What is a Waste Bank?

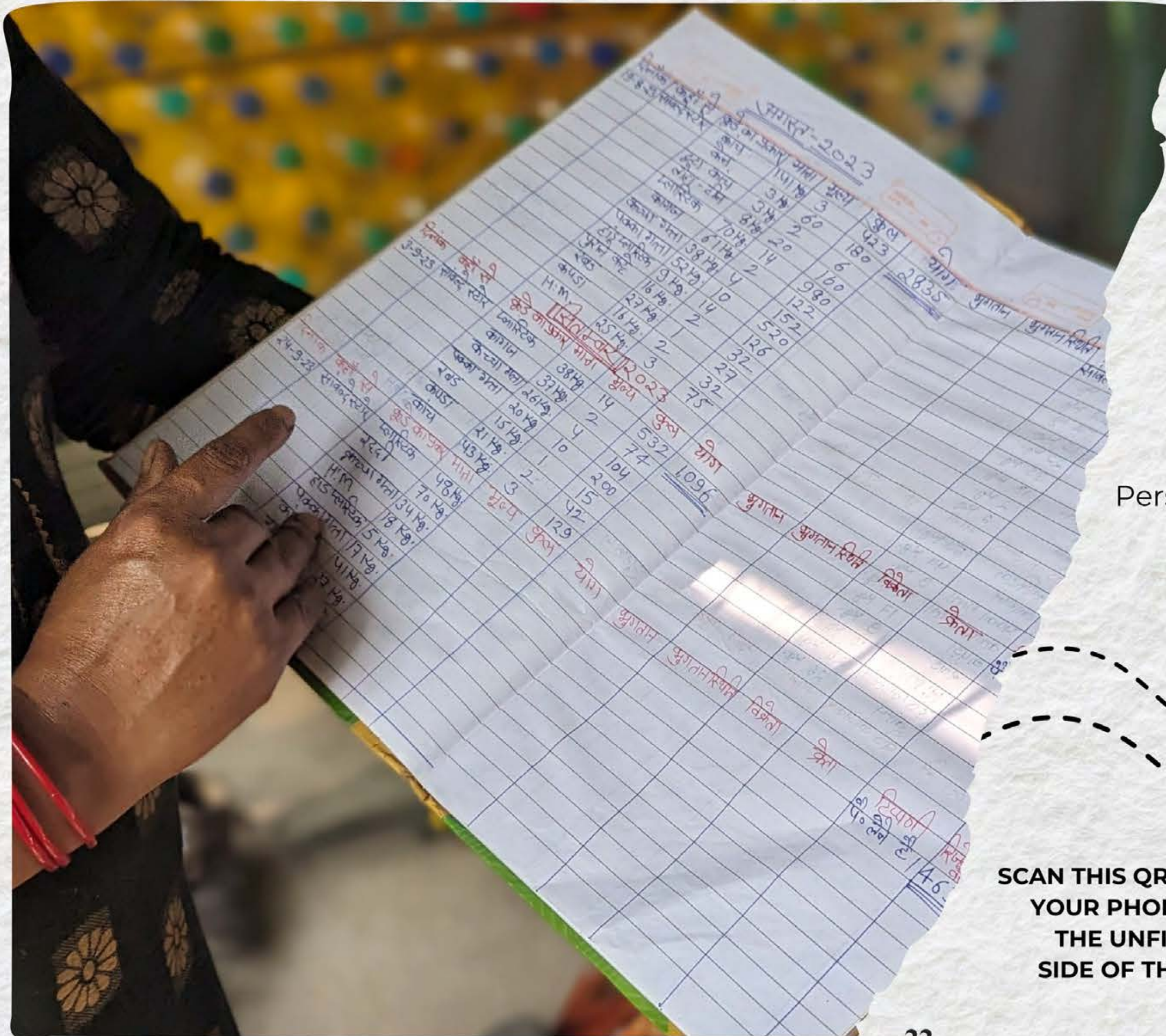
A waste bank is a designated working space for Paryavaran Sakhis in their village utilised to segregate, weigh and store collected dry waste. This is now evolving into an experiential centre which also allows general public to visit, engage and gain knowledge about their work and waste in depth.



Footprints of Change

Personal narratives of aspirations, achievements and friendships

SCAN THIS QR CODE WITH YOUR PHONE TO SEE THE UNFILTERED SIDE OF THE SAKHIS



Every Tuesday at 9:30 am Khasti Devi stands waiting for an auto to reach Dhikuli — one of the three villages she goes to collect dry waste. Equipped with sturdy shoes for walking through uneven roads and gloves for hygiene, she goes door to door. Each visit is met with a warm namaste and a record-keeping card in which she updates the monthly payment of Rs 30. It is hard to guess that Khasti is educated only till fifth grade, based on her quick on-the-finger calculations.

“I used to think of my education level as a measure of my knowledge but now I feel confident when I step out with information about waste management and its impact on our environment, health and agriculture. What is the point of education, if one doesn’t know their own good and bad?” she asked rhetorically.

The change in mindset was not an easy road though; initially, the sight and smell of waste made her nauseous.

“It was difficult to eat after work,” she recalled. After a five year-long commitment, Khasti now sees herself beyond a waste collector and recognises her leadership skills in educating her community about waste-related implications and its management.



Khasti Devi collects and enters user fee data into her record book in Dhikuli.

A decade ago, when Khimuli Devi received her first wage, it gave her a taste of financial empowerment. Sitting outside the waste bank in Ringora, she recalled her first purchase — a dozen colourful bangles that she had always desired but couldn't ask her husband for.

“Our income was strictly budgeted for essentials like flour, lentils, and oil,” she said. With her own money, Khimuli could finally afford small luxuries she had longed for like shampoo, conditioner, and scented soap. At 45, Khimuli jumps with excitement as she hears about a plan to visit Ramnagar town with other *sakhis*. “Oh! I will go and eat momos and chow mein,” she said excitedly. On the days of waste collection, she doesn't hesitate to take a pit stop at a roadside tea shop to refuel from walking on uneven roads.

“I have been able to do anything that pleases me with my own money and nobody can question me about it. That is the power your own money gives you,” Khimuli said while sipping on tea. After 20 years of carefully budgeting her family's income, Khimuli enjoys her moments of unaccounted spending.

Unlike Khimuli, for Vimla in Himmatpur Dotiyal, earning her own money is not just a financial relief but a necessity. Following the loss of her husband five years ago, she decided to not rely on her children for her expenses and turned to waste management to generate income for continued financial independence.

“Who can take care of someone forever? This work keeps my pride intact,” she said, taking off her gloves after the day's work.



Vimla Devi segregating dry waste.



Khimuli Devi on a waste collection drive.

The routine must be followed. Every morning Karishma dresses in a crisp, ironed *salwar-kameez*, puts on bright red lip colour, kajal, vermilion, and a small bindi. But the final touch is a mask and a pair of gloves, after she reaches her workspace — the Sawal Deh waste bank — to segregate dry waste into 22 categories.



It took some time for her to get used to wearing gloves and a mask, but now she understands its importance. At 23, she's taken on the responsibility of contributing to her village's cleanliness, and in the process, she's experienced empowerment beyond her roles as a wife, mother, and caregiver in a family of four.

“Despite having the flexibility of working hours, I can’t sit at home anymore. It feels as if something is missing. This place feels like home now,” she smiled as she lifted the heavy sack to empty on the waste segregation table. And it appears so, considering a small cupboard in the storeroom adjacent to the waste bank, occupied with essential utensils, her spare makeup items and a hand mirror, she found while segregating waste.

“People addressed me as *kooda-wali*. It was hurtful but soon after I could see the purpose behind my work,” she recalled the sarcastic jabs taken at her when she had started out.

However, she's become resilient, proudly calling herself a *‘safai sakhi’*. What began as a source of livelihood has transformed into a journey of personal aspirations, community recognition, and road to freedom — all of it enabled by a workspace she calls home now.



Karishma getting ready before starting work at the waste bank.

Pooja Upadhyay carries the collected dry waste from Dikuli on her head.



Eight-year-old Kunal and nine-year-old Sakshi have been the talk of their school in Ringora village, ever since they sparked conversations around waste management amongst their peers. Hearing them talk passionately about the subject, it is hard to imagine that until five years back they casually littered chocolate wrappers and tetra packs around.

The change has been driven by their mother, Pooja, a Paryavaran Sakhi. When started out, the 29-year-old found herself shocked knowing about 22 distinct categories of dry waste. "Who would know this? This was something completely new and difficult to wrap my head around. *Kooda* is *kooda* after all, I thought," she said wide-eyed.

Over the years, it started making sense. Not only did Pooja overcome her own inhibitions but began cultivating the habit of minimal plastic waste generation, segregation, and proper disposal methods, in her children too.

"Now when they go to the mountains to visit their nani [grandmother], they ensure not to litter; and carry back all the wrappers and tetra packs of the packaged food items they consume, in their bags," she said proudly.

Recognising the absence of waste management systems in the remote mountains, Pooja's children have developed a sense of disposing of their waste back at home, knowing their mother can handle it. With her knowledge transfer, Pooja is not only looping in the communities, but readying the next generation for a change too.

Outside the waste bank in Ringora village, the straw-made gazebo reverberates with the joyful sounds of children. The source of their delight is a repurposed *jhoola* or swing, from a ragged *saree*.

Indira, a vibrant force in waste management for five years, explained with a giggle, "We found it in perfectly good shape and wondered why to throw it away. We washed it and transformed it into a swing for the children. At times, we leisure on it too."

Indira's commitment as a Paryavaran Sakhi has made her embrace the idea of reuse. Discovering barely used plastic toys during waste collection, she diligently cleans and sun-dries them, creating a cherished collection for her grandchildren.

Much alike, in Kaniya panchayat, decorative items unearthed during waste segregation, like a portrait of Indira Gandhi and a scenic painting, adorn the waste bank. Within this community, a heartwarming tradition emerged among the *sakhis*: a tea treat whenever someone discovers money while sorting dry waste.

Meanwhile, in Himmatpur, Vimla Devi's Thursday evening waste-sorting routine takes an unexpected turn when she discovers a shiny object. Intrigued, she picks it up – a discarded toe ring.

"I wonder if people throw these away on purpose or by mistake," she said as she tossed the toe-ring towards a younger colleague Manju.



Tara Adhikari shows a scenery found during waste segregation in Kaniya waste bank.



The sakhis enjoying the repurposed swing in Ringora.



Vimla Devi finds a silver toe ring while segregating waste.



Hansi Devi stands in her agriculture field in Sawal Deh.

On a balmy November afternoon, Hansi Devi is helping out a fellow farmer in collecting stubble from the fields. She has been a farmer for as long as she remembers which explains her deep connection to her land.

Few years back, a disheartening sight gripped her soul when she witnessed her agricultural fields marred by plastic wrappers carried along plastic-polluted irrigation canal water.

"This land sustains us all. Do we not owe a responsibility to it? If our fields are full of plastic, consider the implications on the food we consume and the water we drink," she sighed sitting at the corner of a harvested field.

The influx of plastic not only hindered the soil's absorption capacity but also left a mark on crop yields. Over the years, the open-burning used as a disposal method has affected both the quality and quantity of Hansi's harvest.

Faced with this ecological crisis, the quinquagenarian took a bold step at 48, assuming the role of a Paryavaran Sakhi. Her involvement became a pledge for the well-being of her soil, water, and crops. Today, her plastic-free fields bring her some relief, a testament to her dedication to the earth and the soil that sustains life. However, she is well aware of this long fight against waste, she is to continue being part of.

After staying long-away, Mohini Devi's husband has come home for a short vacation. Unlike earlier, he is finding it hard to catch some time with his wife, whose routine starts at 9:30 in the morning. Unwavering in her commitment by her husband's visit, Mohini comes to the Sawal Deh waste bank everyday, for either a collection drive or the segregation of waste. Constructed on a panchayat land, the waste bank is surrounded by greenery, almost looking like a picnic spot.

"He tells me sometimes that my work has become more important than him," she confessed with a shy smile. "But what can I do? I can't stay home anymore. Whether there's work or not, I enjoy coming here every day to meet my fellow sakhis, sharing our joys and sorrows," she added. The friendships forged within the waste bank are Mohini's first of a lifetime.

For Mohini, the youthful energy and enthusiasm of 23-year-old Karishma adds a new spark in her otherwise mundane life. This is complemented by the mature wisdom and patient ears of the elder *sakhis*, Hansi and Parbha, in the time of need. It's this bond that is a driving factor for Mohini to continue as a Paryavaran Sakhi, despite her plateful of domestic chores. Occasionally, with the *sakhis*, Mohini go on a short stroll to the nearest tea shop, where laughter along with the aroma of chai fills the air.

On more exhilarating days, they unabashedly break into dance, embracing the joy of the moment, even if it means arriving home later than usual.



Hansi Devi(left) and Parbha Devi(right) dance on a folk song after attending a focus group discussion with the community.



Karishma(left) and Mohini Devi (right) spending time together post work.



Tara Adhikari sits in an e-loader, which she uses for waste collection drives in Kaniya panchayat.

“The elders said that driving wasn't for women,” reminisced Tara. However, this neither deterred her nor her sister-in-law Hema — another Paryavaran Sakhi — from seeking lessons at a local driving school to operate an e-loader for waste collection in their panchayat, Kaniya.

“I'm still figuring out how to reverse it properly, but I'm confident I'll master it soon,” Tara declared with determination as she revved the vehicle carefully checking the rear-view mirror. As she parked, the vehicle started moving on its own, that's when she quickly pulled the handbrake.

“I keep forgetting this,” she slapped her forehead. In their free time, Hema, who is slightly better at operating the e-loader, offers her guidance to Tara.

“We keep the keys at home, and our kids argue about whose mother owns the vehicle,” Hema chuckled. Yet, beyond the lighthearted banter, both Hema and Tara never imagined they could achieve this feat. Now that they have, it feels as if they've taken their first step to break societal shackles.

The Economic Model

05

Under the Paryavaran Sakhi Model, a community-based entrepreneurial initiative, a Sakhi makes **Rs 4,560** on an average for **12 woman-days** per month; remuneration structured by the women as a daily wage contingent upon the number of workdays a month, with the flexibility of working days and hours.

This financial compensation is derived from two primary sources: user fees levied on households and small commercial establishments, revenue generated through the sale of recyclable waste items, directly collected by the *sakhis*; gap funding remains an additional source to bridge the financial gaps for ongoing operations.

Households contribute to this revenue stream through a user fee of Rs 30 per month, while small commercial entities contribute Rs 50 per month. Larger commercial users incur varying fees, ranging from Rs 100 to Rs 250, based on the quantity of waste they dispose of.

The second avenue of income through Sale of Recyclables is facilitated by the segregation of recyclable waste items into distinct categories, subsequently sold by *sakhis* to an aggregator by directly negotiating a flat rate per kilogram.

In 15 months, between April 2022 to June 2023, out of the total revenue of **Rs 952,909** — **Rs 311,775** was obtained from user fee, **Rs 216,364** from Sale of Recyclable (SOR) and **Rs 424,770** (45%) from the gap funding. With the collaboration with local and block-level government bodies, Waste Warriors envisions to substitute gap funding being invested in the model with service fee from local government in the future.

The gap funding provided by Waste Warriors (through Corporate Social Responsibility interventions) is calculated according to the latest minimum wage of Rs 350/day. It is a characterisation of risk-taking and belief in the sustainability of this model as it scales with time.



Monthwise total waste collected by Paryavaran Sakhis (April 2022-October 2023) (in metric tonnes)

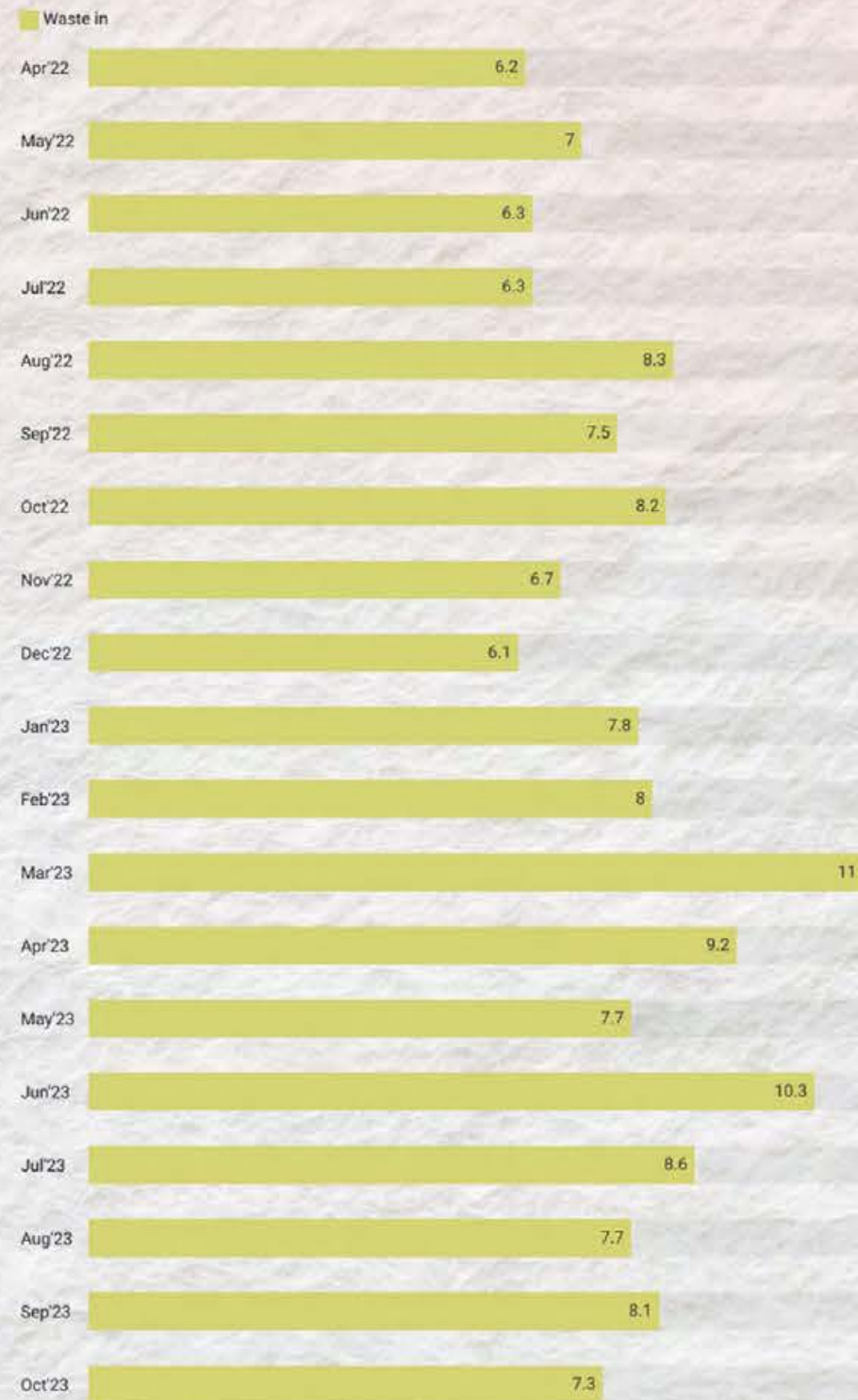


Chart 5.1

in 19 months

148.3 MT

of Solid Waste was collected under Paryavaran Sakhi Model



1363~51%

active units

80kg/day

waste segregated manually on an average by a *Sakhi*

Composition of total waste collected (April 2022-October 2023)

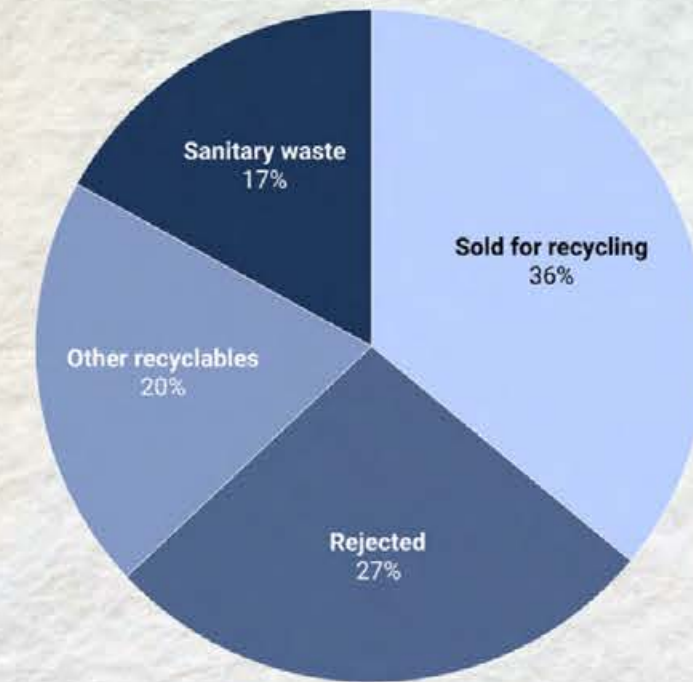


Chart 5.2 Under Paryavaran Sakhi Model, 36% of collected waste is sent for recycling, as **compared to a global 19%**.

Other recyclables are stored in the waste bank, till they bulk-up for economic transportation for other processing means like Refuse-Derived Fuel (RDF).

Segregated Waste Categorisation (April 2022-September 2023)

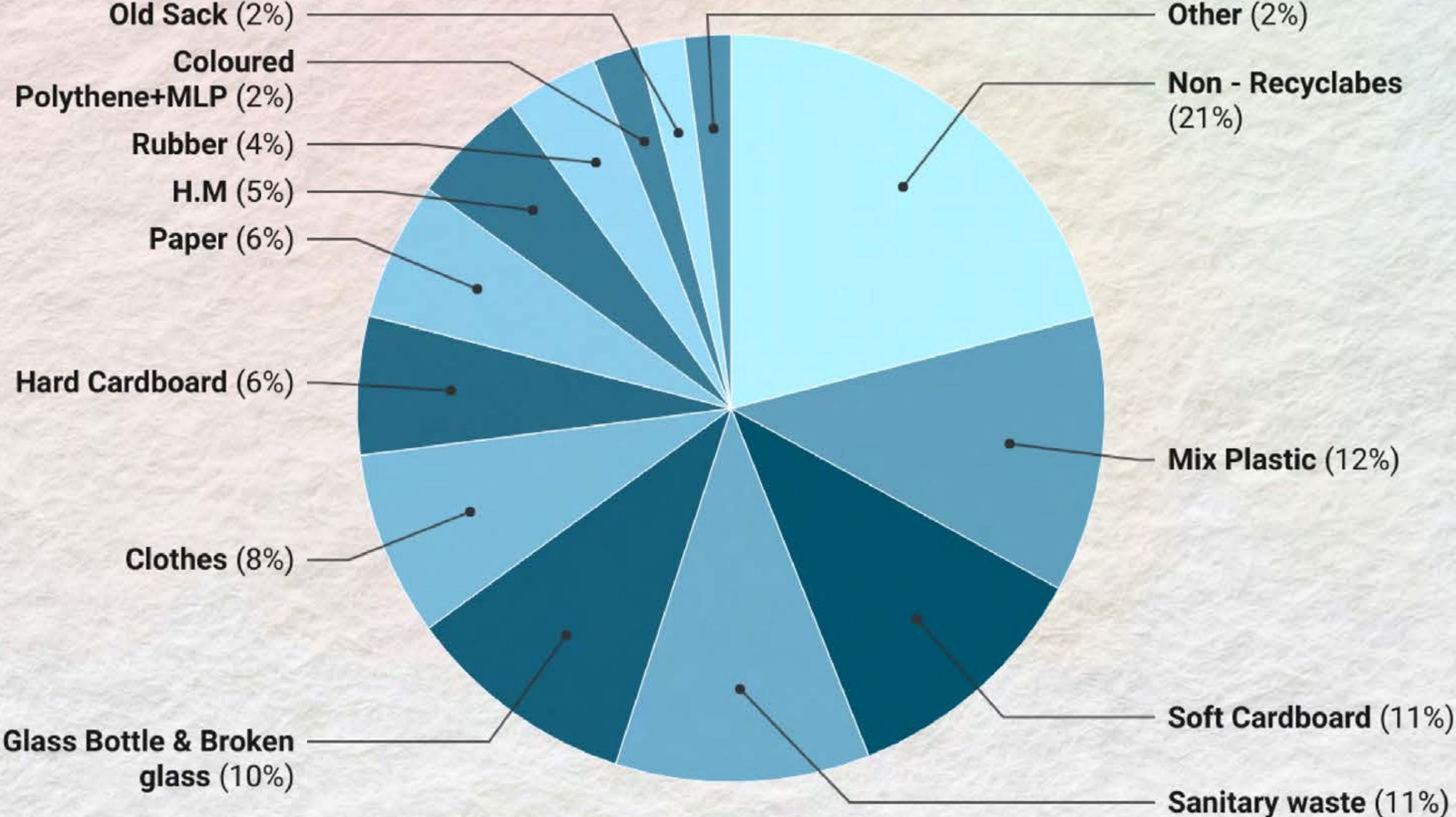


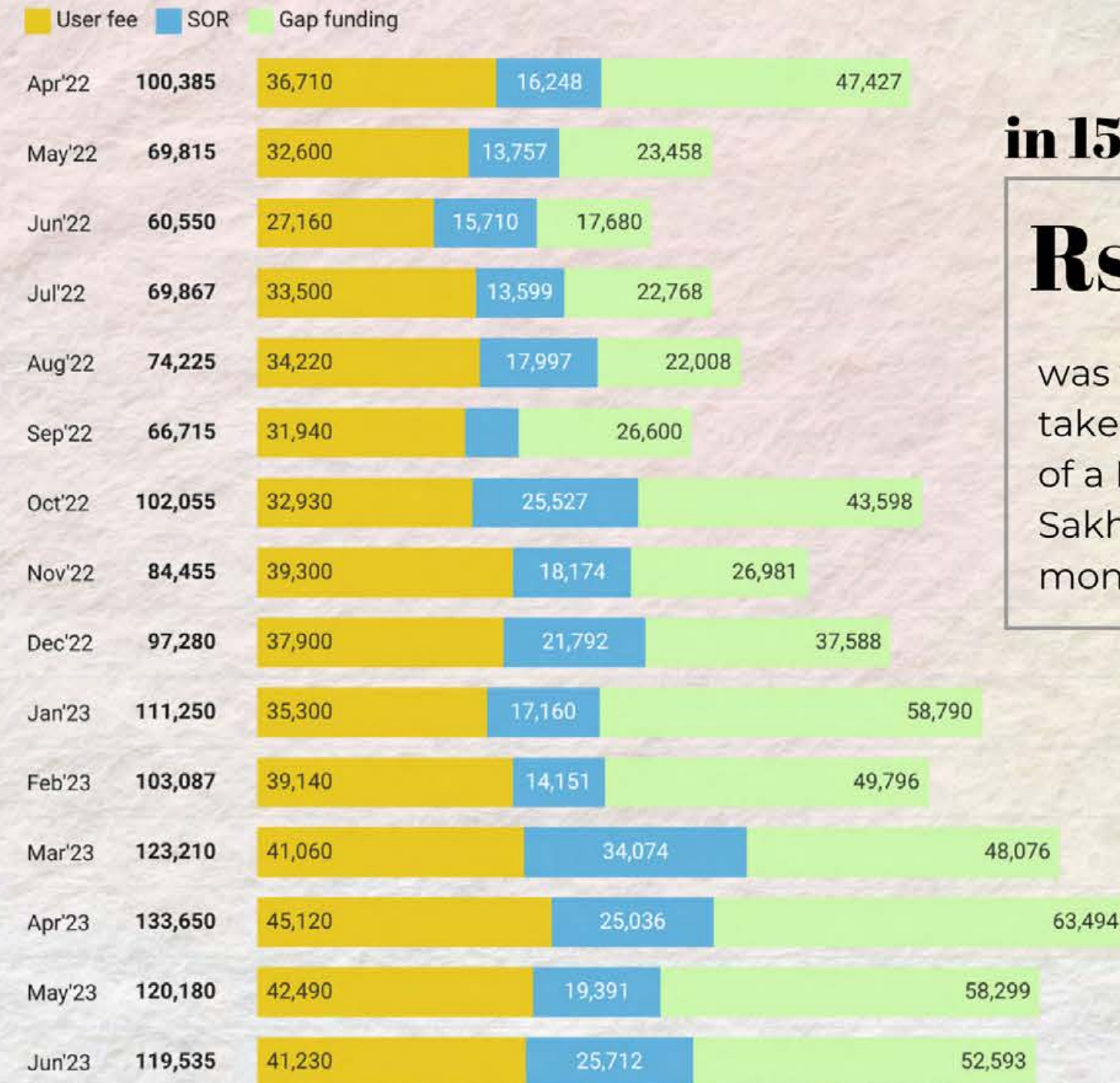
Chart 5.3: Out of the total processed 142.819 MT of waste, glass bottles, aluminium and metal is most reusable.

Sanitary waste is incinerated at the firm Global Environmental Solutions, Rudrapur. A sizeable cost is incurred at approx. Rs 200/kg for the same.

Disposables soiled in food leftovers make up for a sizeable chunk in the non-recyclable category.

While cardboard, paper glass and metal make for an easy sale, mixed plastic, MLP and clothes find limited vendors due to their low calorific value.

Monthwise Income under Paryavaran Sakhi Model (April 2022-June 2023)



in 15 months

Rs 4,560

was the average take home income of a Paryavaran Sakhi for 12 days in a month



Chart 5.4 A sakhi earns Rs 4,560 for an average of 12 workdays in a month

Income Composition under Paryavaran Sakhi Model

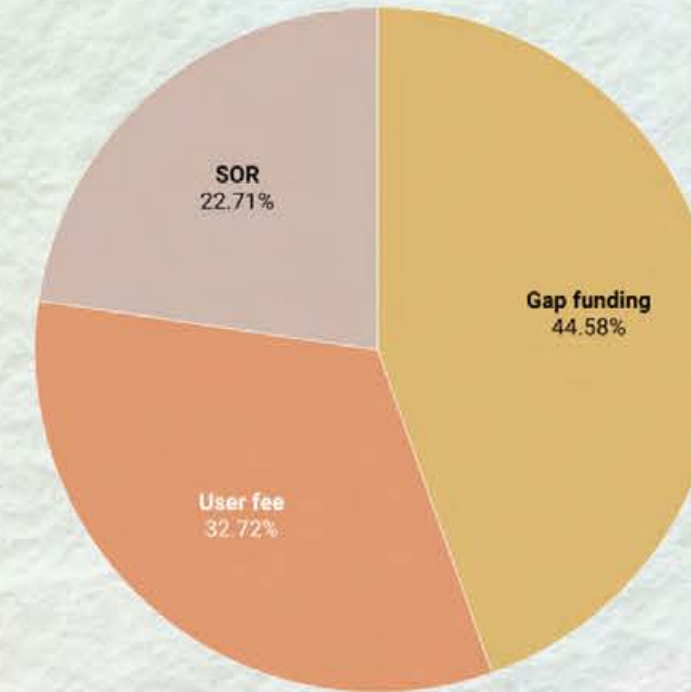


Chart 5.5 The service fee from the local government will substitute the gap-funding in the future

Income & Expenses under Paryavaran Sakhi Model (April 2022-June 2023)

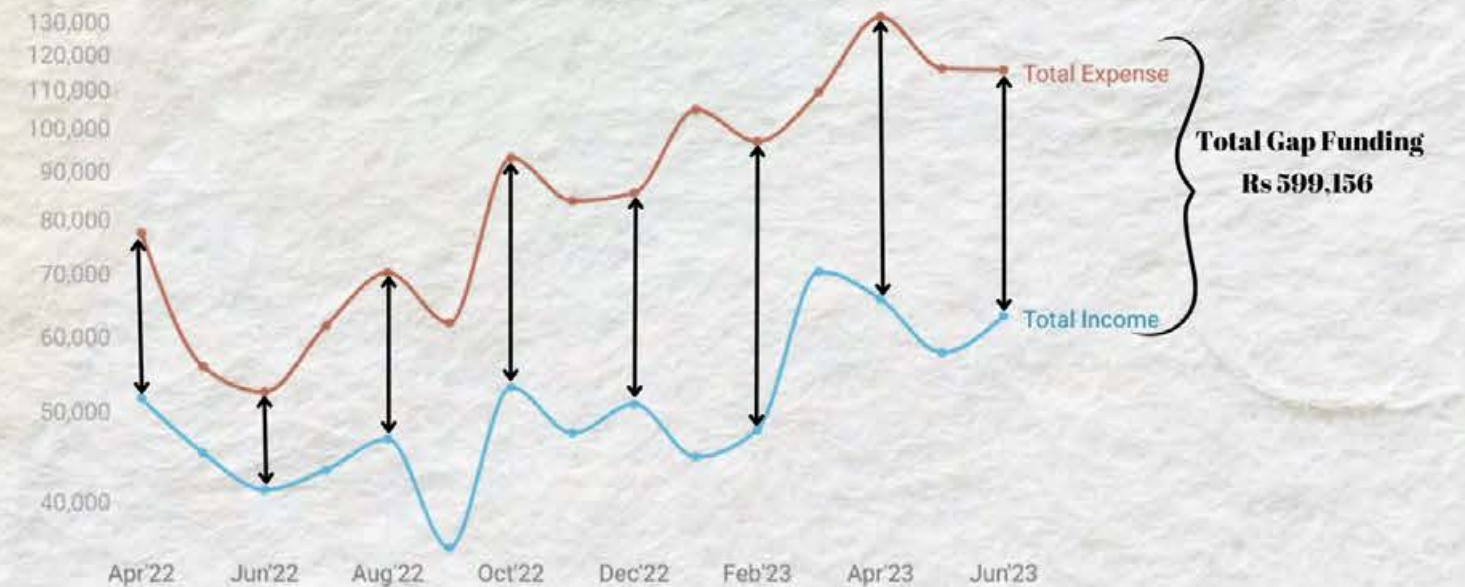


Chart 5.6 Presently, the income covers 55% of expenses including womanpower and transportation. The gap amount is funded to fill this difference.

Total Gap Funding
Rs 599,156



Roadblocks & Way Forward

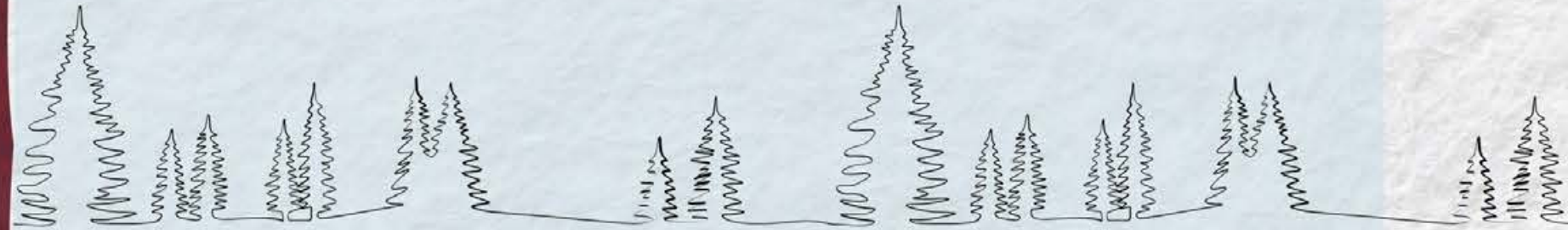


The **sustainability** of the model remains an area for improvement. Currently, with 47% of community participation, only 55% of the incurred cost is being substantiated by the user fee and SOR income. Full penetration will be able to cover daily wages, however additional support is needed to fulfil other operational costs like transportation, putting up informative signboards and running awareness campaigns.



The challenge lies in the community's acceptance and understanding of waste management, primarily due to **widespread unawareness**. This reflects in their unwillingness to avail the waste management services for a minimal cost and pay for the same. The Not In My Backyard (NIMBY) approach also poses as a constraint for decentralising waste management infrastructure.

- Access to well-equipped Material Recovery Facilities (MRFs).
- Implementation of Extended Producer Responsibility (EPR) for low value plastics.
- Operations and Maintenance (ONM) contracts from local government for *sakhis*.
- Need for active *Swachhta Samitis* (cleanliness committees) for monitoring operations.
- Allocation of tied-funds for Solid Waste Management in Gram Panchayats under Fifteenth Finance Commission (XV-FC).



- Effective Information, Education, and Communication (IEC) initiatives for reducing, reusing waste and better segregation at source.
- Improved userfee collection to be achieved by increasing the community's willingness to pay, and timely so.
- Instilling responsibility within tourists and the hospitality industry which serves them.

Stakeholders



“Waste Warriors leads in waste management, having addressed rural issues before it became a national hot topic. Expanding it to all Gram Panchayats could help solve this crisis in Ramnagar, helping control waste-related impact on agriculture and water as well.”

Umakant Pant
Block Development Officer
Ramnagar, Nainital



“Women play a crucial role in managing household waste, making Paryavaran Sakhis highly relevant. Waste Warriors' intervention effectively curbed open burning. I personally visited homes, spreading awareness about the vital role of Paryavaran Sakhis. It's their dedication that earned Kaniya recognition from Uttarakhand's Chief Minister for its cleanliness.”

Suneeta Gughtiyal
Gram Pradhan
Kaniya Panchayat



“Our village protested in the past as it turned into a dumping zone, a critical issue.

Community involvement led to adopting the Paryavaran Sakhi Model. Gram Panchayats are vital for sustaining this model, providing support by making common land available for waste banks and other infrastructure.”

Tara Dutt Belwal
Up-Gram Pradhan
Sawal Deh East Panchayat



“Societal norms challenge inclusive waste management systems. This is compounded by low awareness in the community. I advocate for this model, trusting women to lead intergenerational change. Crucial for Ramnagar's livelihoods, including tourism and agriculture, effective waste management is essential for sustainable community development.”

Devendra Singh Parihar
Gram Pradhan
Himmatpur Dotiyal Panchayat

Responsibilities



Paryavaran Sakhi

- Onboarding all the units in the village
- Providing waste collection bags to each unit with a unique identification code
- Spreading awareness on waste segregation, anti-littering and anti-burning
- Collection of monthly user fee from each unit
- Weekly dry waste collection from each household
- Segregation of all collected waste at waste banks
- Selling the recyclable waste obtained from the segregated waste at a reasonable price
- Documenting and tracking waste quantity, user fee, households data etc.

Gram Panchayats

- Legalising the solid waste management system at the Gram Panchayat level through the by-laws to overcome conflicts with the communities
- Ensuring healthy participation and discussion on solid waste management in open meetings or Gram Sabhas
- Utilisation of tied funds of waste management based on XV Finance Commission
- Commission funds for waste management systems in villages
- Provide storage and segregation centres to the *Sakhis*
- Support *Sakhis* with the operational expenses like freight, conveyance, equipment and collection contract.
- Set up wet waste composting

Waste Warriors

- Identification of local women from the communities who are inspired to become Paryavaran Sakhis
- Capacity building of Gram Panchayats for introducing by-laws pertaining to waste management system in the village
- Stakeholder coordination to provide infrastructure support to the *Sakhis*— waste banks, waste collection vehicles, and waste processing facility
- Supporting the *Sakhis* with IEC material to inform and induce a behavioural change in the communities
- Training and capacity building of Paryavaran Sakhis along with helping them overcome day-to-day challenges
- Ensuring the financial sustainability of the *Sakhis*

Block & District Administration

- Construction of MRF, including land identification and provision of the same
- Regular monitoring of Gram Panchayats to check their contribution towards village-level waste management systems
- Spot fines for not paying user fees or dumping and open-burning of waste
- Provide expertise and consultation for the legalisation process.
- Capital costs for setting-up the Material Recovery Facility
- Provide vehicles/e-loaders for transportation of the waste
- Set up an Integrated Command and Communication Centre (ICCC) at block level
- Set up incinerator to tackle sanitary waste
- Provide a scientific landfill within the block for the rejected waste

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कचरे की बालिका

“It isn’t just about money. It is the *maan-samman* [respect] our work garners that drives us everyday. This work has given us an identity in the society as well as our homes.”

Karishma, 23
Paryavaran Sakhi
Sawal Deh, Ramnagar, Uttarakhand

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REDUCE RE-USE RECYCLE

www.wastewarriors.org