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COMPENDIUM OF INITIATIVES, LEARNINGS & SCALABLE MODELS

under

Circular Economy Solutions Preventing Marine Litter in Ecosystems

As a federally owned enterprise, GIZ supports the German Government in achieving its objectives in the field of international cooperation for sustainable development.

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On behalf of the
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INTRODUCTION

Under ongoing Indo-German Bilateral Cooperation, the German Federal Ministry of Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) is collaborating with the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India to implement a Technical Cooperation project on "Circular Economy Solutions (CES) Preventing Marine Litter in Ecosystems". The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH implemented the project.

The 'compendium of initiatives, learning and scalable models' is developed under the Indo-German Development cooperation project "Circular Economy Solutions Preventing Marine Litter in Ecosystems" (CES Project). The compendium includes learning from the pilot demonstrations, knowledge products, campaigns and digital solutions for traceability.

The illustration below consists of an illustration of project initiatives/ activities.

Chapter 1

REDUCE- REUSE- REFILL ECONOMY

1. Reduce-Reuse-Refill Economy

1.1 CONTEXT

In the Second Meeting of the Intergovernmental Negotiating Committee (INC) to Develop an International Legally Binding Instrument on Plastic Pollution (29 May – 2 June 2023), reuse and refill economy has managed to become a key priority. In addition, at the 2021 UN Climate Change Conference (UNFCCC COP26), India put forward the concept of Lifestyle for Environment (LiFE) to accelerate the transition to a circular economy which will rethink priorities, redesign systems and reinforce environmentally friendly behaviours to be self-sustainable.

The project intervention "Refill Truck" promotes the 'Reuse-Refill' economy and provides a portable convenience store with a range of home care products in an eco-friendly and sustainable way. The start-up offers products that are designed in such a way that the packaging is reduced, and customers can use their own reusable or refillable packaging which can be refilled at selected locations.

The recent EPR notification by the Ministry of Environment, Forest and Climate Change (MoEFCC), Govt. of India is also key in promoting the 'Reuse' models among brand owners and targets have been established under the EPR rules. Thus, the regulatory framework has been well positioned to create an ecosystem for promoting models of 'Reuse-Refill' in the Indian economy.

1.2 OBJECTIVE

The project aims to promote the reduce-reuse-refill economy by providing eco-friendly and sustainable home care products through a portable convenience store, known as the "Refill Truck.".

1.3 STAKEHOLDERS & INSTITUTIONAL MECHANISM

Table 1 Stakeholders and Institutional Mechanism

State Nodal Department and State Level Agencies	• Department of Environment, Forest and Climate Change Department, Government of Uttar Pradesh • Department of Environment, Government of Tamil Nadu • Directorate of Environment & Climate Change, Government of Kerala • Kerala State Pollution Control Board (KSPCB) • Thiruvananthapuram Municipal Corporation (TMC) • Kudumbashree, Government of Kerala

	• Suchitwa Mission (Technical Support Group in waste management under Local Self Government Department), Government of Kerala
Technical Support	• Indo-German Development Corporation project "Circular Economy Solution (CES) Preventing Marine Litter in Ecosystems" by GIZ India. (BMUV and MoEFCC)
Implementing partners	• Refillable, India Wasted, Saahas, GreenWorms, Sanchi bags
External partner collaboration	• Partnering with brands for homecare liquids like Refillable, Liquids, Kleenex, Rossari, Unilever Professional, Born Good, Mitte se, Herbal Strategi, Kudumbashree liquids
Institutional Mechanism	• Working with industries coupled with the development of infrastructure such as refill stations and reverse logistics systems. Additionally, public-private partnerships are tried and implemented awareness programs to ensure scalability and continuous improvement.

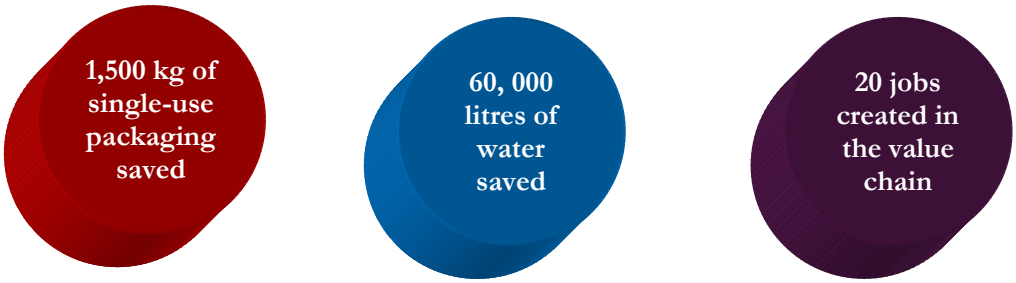
1.4 INTERVENTIONS

Business to Consumer Model (B2C)	Target retail customers purchasing home care cleaners directly. Orders can be placed via the website or WhatsApp bot, with delivery scheduling flexibility. • High demand for sustainable products, evidenced by online requests and social media engagements. • Increased internet usage, social media, and content delivery systems make innovative models like Refillable appealing and accessible to tech-savvy consumers.
Business to Business Model (B2B)	Collects and cleans large quantity cans like 5-liter cans of cleaning brands for reuse from large organisations and bulk consumers • Price-conscious B2B market benefits from reduced packaging costs, lowering the end cost for customers. • Corporates with sustainability obligations present opportunities. • Corporations can attract more customers by showcasing their commitment to green practices through services like Refillable.

Business and Community Interventions:

- Partnerships: Collaboration between refillable service providers and established brands to enhance market penetration.
- Marketing Campaigns: Awareness campaigns highlighting the environmental and economic benefits of refillable models to consumers.
- Innovation in Design: Developing user-friendly and durable packaging solutions that can withstand multiple refills.

1.5 IMPACTS



1.6 TIMELINE

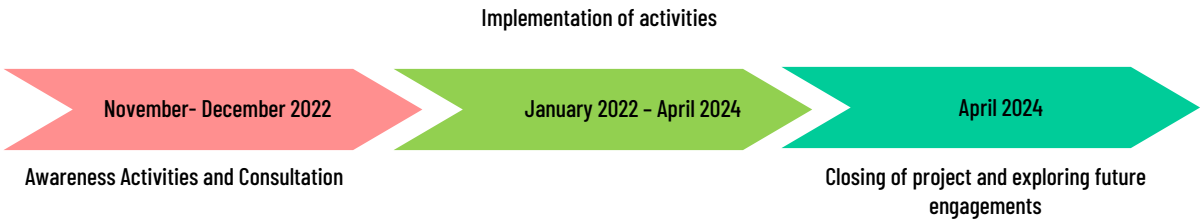


Figure 1 Timeline of the project

1.7 RESOURCES

- To effectively manage and scale the refillable model, a comprehensive budget covering both capital and operational aspects is essential.
- The capital costs include 3,900 Euros for the truck;1, 670 Euros for fabrication; 1, 670 Euros for an inverter and 5,570 Euros for a dispenser totalling 12, 810 Euros.
- Monthly operational costs comprise team costs, which includes on an average 1, 050 Euros for the sales team, operations manager, and support staff. Additionally, warehouse and rent costs averages upto 450 Euros, and maintenance costs are 335 Euros per month (on an average), leading to a total monthly recurring cost of 2,000 Euros (on an average)

1.8 SCALABILITY AND MECHANISM FOR REPLICATION

To achieve scalability, the project emphasizes a B2B model as compared to B2C (till the market gets acclimatised with the refill concept), enhancing both sustainability and expansion potential.

- Reduce-refill model is an entrepreneurship model where investment from private sector including producer and brand owners may invest.
- Reduce-refill model shall have business case where products shall be as per local demand. Special focus may be given to banned single use plastic product and available affordable alternatives.
- Necessary permissions from RTO and urban local bodies shall be obtained.
- The replication mechanism involves strategic partnerships with well-known brands to facilitate market entry and adoption. Businesses and consumers are incentivized to participate, driving engagement and adherence to reuse-refill practices.

- Comprehensive training and awareness programs must be implemented to educate stakeholders on the benefits and operational aspects of reuse-refill models.
- Pricing strategies are meticulously tailored to local market dynamics, ensuring competitiveness and appeal. This approach not only fosters scalability but also ensures the model's adaptability across diverse market environments.

The refillable model implemented in Chennai and Lucknow has been innovated with above scale up mechanism in up Trivandrum, the model ensure long-term sustainability and economic feasibility. The model features an eco-friendly options truck that

- Travels directly to consumers' doorsteps, offering the convenience of refilling household liquid products such as detergents, lotions etc. This minimizes plastic waste and encourages reuse while reducing the carbon footprint associated with traditional retail packaging.
- Alongside this, the truck provides a selection of eco-friendly alternatives (for example cloth bags, bamboo, jute products etc.) for everyday items, making sustainable products more accessible to the community.

1. Pricing Strategy: Post-discount sales in the project indicated a strong influence of price on product adoption. Continuous evaluation and market-tailored pricing strategies are essential to remain competitive.	**2. Cost-Effectiveness and Value:** Customers prefer cost-effective, value-driven products. Competitive pricing and high product performance are crucial for customer retention.	**3. Talent Acquisition:** Finding knowledgeable individuals in sustainability and reuse-refill models is challenging. Innovative approaches to talent acquisition and substantial investment in training and development are needed.
4. Customer Education and loyalty: With sustainability awareness still evolving, significant efforts are required to educate	**5. Delivery Efficiency:** Quick commerce and rapid delivery services pose a challenge. Adapting and innovating delivery strategies,	**6. Holistic Value Proposition**: Emphasizing product quality, affordability, and convenience, alongside sustainability, can attract consumers. Transparent

customers. Community engagement and awareness-building initiatives are vital.	such as implementing route optimization algorithms and real-time tracking systems, can enhance efficiency while maintaining sustainability.	communication about environmental impacts builds trust. Community engagement through local partnerships can deepen brand loyalty.

Chapter 2

MANAGEMENT OF DISCARDED FISHING NET

2. Management of Discarded Fishing Nets in Tamil Nadu

2.1 CONTEXT

Discarded fishing nets, are fishing nets that have been abandoned, lost, or discarded in the ocean. These nets continue to drift in marine environments, causing significant harm to aquatic life and ecosystems. They can trap marine animals such as fish, turtles, seabirds, and mammals, and can be fatal to these creatures.

2.2 DISCARDED FISHING NETS ENVIRONMENTAL THREATS

The need for initiative has been identified from the baseline study conducted in the year 2022. To address this growing concern, a demonstration project has been initiated at Pattinapakkam Beach in Chennai, Tamil Nadu. This intervention aims to manage discarded fishing nets through a community-driven approach. Pattinapakkam Beach is in the southern part of Chennai, close to Mylapore, along the East Coast Road (ECR) which runs parallel to the Bay of Bengal. Adjacent to Marina Beach is the Pattinapakkam fish market, which spans a 2 km stretch along the beach road. The community residing around Pattinapakkam Beach consists of more than 10,000 families spread across seven communities. Among these families, approximately 30% are engaged in fishing activities, either as fishermen or fisherwomen. The area is shaped by its bustling fish market and a large population involved in fishing activities.

2.3 OBJECTIVE

The objective of this intervention is to demonstrate a community-based model for the management of discarded fishing nets by involving women-based self-help groups (SHGs).

2.4 STAKEHOLDERS & INSTITUTIONAL MECHANISM

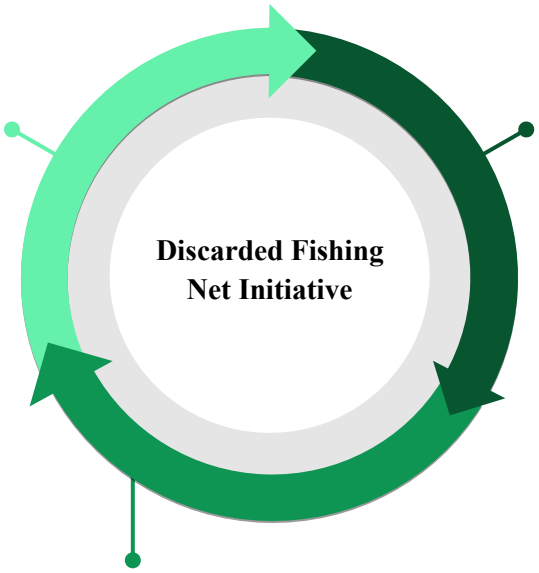
Table 1 Stakeholders and Institutional Mechanism

State Nodal Department and State Level Agencies	• Department of Environment Climate Change and Forest (DoECCF), Government of Tamil Nadu • Tamil Nadu Pollution Control Board (TNPCB) • Tamil Nadu Green Climate Company (TNGCC)
Technical Support	• Indo-German Development Corporation project "Circular Economy Solution

	(CES) Preventing Marine Litter in Ecosystems" by GIZ India. (BMUV and MoEFCC)
Implementing partners	• Hand in Hand (Development of community-based approach, awareness activities, identifying and capacity building of SHG) • National Centre for Sustainable Coastal Management (NCSCM) (Awareness activity, Support for Fishing Net Kiosks - 3R centre)
Private Sector collaboration	• Local aggregators (Training to SHG on sorting, and collection of fishing nets from the centre) • Aquafil (An Italian company working on a close loop - Visited Pattinapakkam to understand the Quality)
Institutional Mechanism	• Community-based process through self-help groups supported by an NGO

2.5 INTERVENTIONS

Supporting Women SHGs: Building the capacities of local organisations, women-based Self-Help Groups, and youth informal sector workers in relevant functions for collection, segregation, sorting of waste etc.



Creating Awareness on Plastic Waste Management: Working with communities to understand the issues and create awareness on Marine Litter and its impacts.

Promoting Upcycling and Recycling of Marine Litter (focus on discarded fishing nets): Involving community Channelisation of the waste towards upcycling, recycling and strengthening the value chain (incl informal

The intervention engages the local fishing community, including fishermen and fisherwomen, to develop circular economy measures for managing discarded fishing nets. The community-based approach targeted local ownership by the community to ensure sustainability.

2.6 IMPACTS

1. The intervention has successfully diverted over 703 kg of discarded fishing nets from October to February. The intervention has been affected due to floods in Chennai as well as restrictions on fishing.

2. By involving SHGs and local communities, the intervention has created economic opportunities aimed at creating alternate livelihoods. However, the scale of the demonstration model has been constrained by existing challenges and complexities at the coastal community and ongoing development work.

Stakeholder consultation with members of fishing community

Fishing net collection point operated and maintained by the members of self-help groups

2.7 TIMELINE

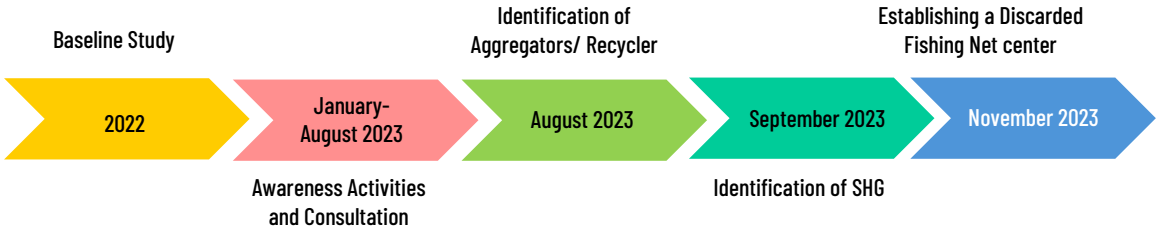


Figure 2 Timeline of the intervention

2.8 RESOURCES

1. Development of community approach, consultations, and awareness activities by deploying a team from an NGO consisting of two personnel for more than a year. The estimated expenditures were 23,000 Euros.
2. Set-up and deployment of small Discarded Fishing Net centres for SHGs. The estimated resource for one centre is 35,00 EUROs.

2.9 SCALABILITY AND MECHANISM FOR REPLICATION

The CES project has shared the learnings with the Tamil Nadu Fishing Net initiative, which was launched by the Department of Environment, Climate Change and Forest (DoECCF) and implemented by the Tamil Nadu Pollution Control Board (TNPCB). The CES project is actively involved in the TN fishing net initiative for showcasing best practices, providing capacity building and EPR framework assessment. The replication of the model may include the following steps:

1. Map the community fish landing sites and influence zones showing the discarded fishing nets of the site.

2. Facilitate consultations with community and community-based groups active in the fishing villages/ pockets/ communities in the influence zone on marine litter and discarded fishing nets.
3. Estimate the quality of discarded fishing nets generated monthly from the influence area and identify the type of fishing nets used.
4. Identify the interested group from the community – Self-help groups, Youth groups, etc.
5. Provide necessary training to the identified groups and include them to create awareness in the community.
6. Map the locations on the coast where the discarded fishing nets can be collected, stored, and sorted.
7. Link with centres established under TN Fishing Net initiative/ local aggregator/ recycler for collection of fishing nets and associated pricing of different types of nets.
8. Identify other local activities associated with the discarded fishing nets to create the scale of the economy. Such activities may include SHG-based cafés, youth-supported beach sports, shops of alternatives, Bartan Bank on the beach for small restaurants, etc.

Chapter 3

EPR LED LEGACY WASTE MANAGEMENT

3. Extended Producer Responsibility (EPR)-led Legacy Waste Management, Prayagraj- Uttar Pradesh

3.1 CONTEXT

Legacy waste typically refers to aged municipal solid waste in landfills or dumpsites. It is a cause of concern for the environment and health, as landfill fires and leakages contribute to GHG emissions, groundwater pollution as well as riverine and marine pollution. As per the United Nations Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), land-based sources account for 60 – 80% of the world's marine pollution. The legacy waste is not managed properly can contribute to:

According to the Swachh Bharat Mission Urban dashboard, 2,431 dumpsites (>=1000 tonnes) are reported with a total legacy waste quantity of 2,558 lakh tonnes[1]. As of May 2022, the Prayagraj Municipal Corporation (PMC) had a substantial 14 lac metric tonnes of legacy waste, requiring effective management before the upcoming Kumbh Mela in 2025. The city had engaged waste management agencies (2022) for dumpsite remediation, however, the recovery of waste particularly the Refuse Derived Fuel (RDF) remained a challenge.

3.2 OBJECTIVE

To recover material from legacy waste and demonstrate Extended Producer Responsibility (As per amendment of PWM Rules, February 2022) based business model for management of the landfill in Prayagraj city.

3.3 STAKEHOLDERS & INSTITUTIONAL MECHANISM

Table 1 Stakeholders and Institutional Mechanism

Nodal Department	• Department of Environment, Forest and Climate Change, Government of Uttar Pradesh
Technical Support	• Indo-German Development Corporation project "Circular Economy Solution (CES) Preventing Marine Litter in Ecosystems" by GIZ India. (BMUV and MoEFCC)

[1] Accessed on 12.06.2024

City Collaboration	• Prayagraj Municipal Corporation (PMC)
Implementing partners	• Geo-Stone (Quality of legacy waste and support to Urban local bodies and agencies engaged for legacy waste management)
Private Sector collaboration	• Dalmia Cement Limited (Bharat, Bihar) (tripartite agreement) • Circular Sustainability Solutions Private Limited (CSSPL) (EPR support), coordination with PIBOs and PWPs (tripartite agreement) • 5 Cement plants (Scaling up from initial tripartite agreement)
Institutional Mechanism	• A Tripartite Agreement was signed in October 2022 between Prayagraj Municipal Corporation, Dalmia Cement Limited (Bharat, Bihar) and Circular Sustainability Solutions Private Limited for the implementation of the model.

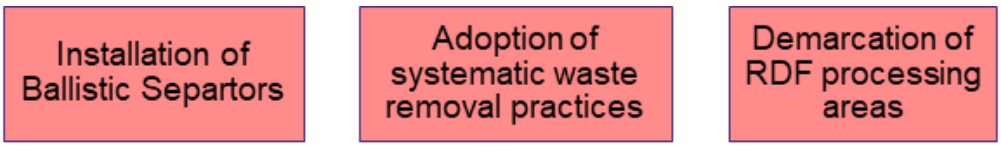
3.4 INTERVENTIONS

Under the umbrella of the signed tripartite agreement between PMC, CSSPL, Dalmia Cement, GIZ India and the Department of Environment, Forest and Climate Change; the Government of Uttar Pradesh has demonstrated collaboratively a solution to address the recovery of material from legacy waste and implement an EPR-based business model for management of the landfill site in Prayagraj. The following interventions have been implemented:

Figure 3 Key Issues and Interventions

1. Improvement in RDF Processing and Quality:

The technical interventions adopted in Prayagraj have a comprehensive approach to enhance the processing and quality of RDF at the legacy waste site. The caloric value has been increased from 2200 kCal/kg to 3800 kCal/kg.



2. EPR-led Business Model for transportation of RDF to cement factories:

The model demonstrates that, with a systematic structure, the cost of transporting the quality legacy waste (RDF) from PMC's dump site (Baswar) to the co-processing facility can be taken up by EPR through the transfer of certificates from Plastic Waste Processors (PWPs) to Producers, Importers and Brand Owners (PIBOs) (particularly BOs). The earnings from the EPR certificate have been used to offset the transportation cost. The implementation of EPR is supported by CSSPL, which takes care of logistics and facilitates EPR credits.

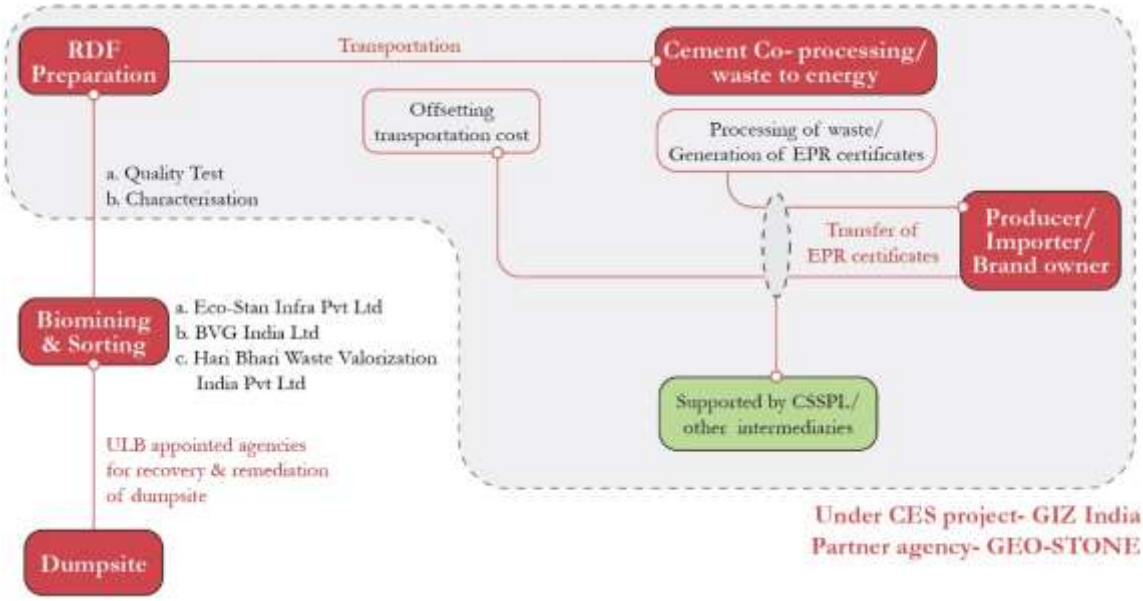


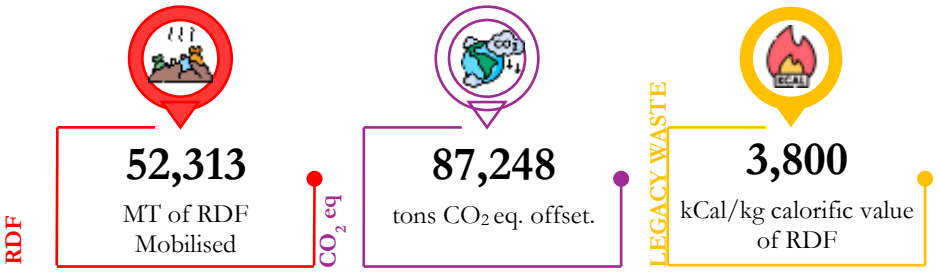
Figure 4 Prayagraj EPR-based business model

3. Scalability: RDF Quality under the Model and Market Acceptance:

a. The pivotal tripartite agreement with Dalmia Cement, facilitating the disposal of 2,452 metric tons of RDF, underscores the success and sustainability of this waste management initiative.

b. The interventions are scaled up to 5 cement factories recovering a total of 52,313 MT of total RDF from legacy waste till March 2024.

3.5 IMPACTS



3.6 TIMELINE

Figure 5 Timeline of the project

3.7 RESOURCES

The project has demonstrated the model by creating institutional mechanisms, deploying technical agencies for developing technical intervention, and through multiple iterations for quality control. Under the initiative, the engaged agency has deployed two human resources with legacy waste site for a period of one year. The resource is mainly required for working with legacy waste sites to identify ways of improving the RDF and coordination with cement factories.

1. Lab testing or setting up a lab at the site for quality parameters of RDF.
2. Regular characterization of RDF to identify the plastic category as per the EPR Rules.
3. Training to Nodal officer/ Engineering team of Urban Local Body and Bio-mining agency on the business model.
4. Support the ULB-hired agencies on the installation of ballistic separators as key machinery in the recovery of legacy waste.

The resources required for the above task are very minimal and can be part of the tenders for engaging bio-mining agencies for remediation and recovery of waste from legacy waste. Key considerations as per section 8 shall be included while planning for bio-mining.

3.8 SCALABILITY AND MECHANISM FOR REPLICABILITY

The model can be replicated across India on legacy waste sites (as per the SBM Portal 1,291 sites in India are under remediation). Key steps will include:

1. **Remediation of Dumpsites**
   a. The ULB to assign a Nodal officer for Plastic waste management and EPR implementation.
   b. ULB to engage agencies for biomining of legacy waste for waste recovery and remediation of the site. (In case of a new site)
   c. Include provisions such as
      i. Establishing the labs to measure key quality parameters provided by collaborated industry or engagement of NABL labs for delivering the quality aspects.
      ii. Regular Testing of RDF and sharing the test results with PWPs.
      iii. Implementing the technological solutions as per detailed technical interventions at the Legacy waste site.
   d. Fresh waste may also be included for recovery of waste particularly focussing on low-value components having good calorific value.

2. **Recovery of RDF and Collaboration with PWPs (cement factories and other PWPs)**
   a. Map nearby cement factories and other PWPs that can use RDF as an alternate fuel.
   b. Memorandum of Understanding (MoUs) with Cement factories or intermediaries working on behalf of PWPs/PIBOs for:
      i. Ensuring continuous supply of RDF.
      ii. Setting up quality parameters as per requirements of PWPs.
      iii. Establishment of monitoring mechanism.
      iv. Quantifying categories of plastics as per EPR notifications from CPCB.
      v. Agreement on Cost of RDF.
      vi. Earning/ offsetting option cost with EPR certificates/transfer of certificate to ULB

3. **Transfer of RDF to PWPs**
   a. Deploy a mechanism at the legacy waste site for recording the RDF disposal to different PWPs.
   b. Nodal official to collaborate with PWP or agency engaged by PWP for transportation cost, receiving of certificates etc.
   c. Transportation of RDF to cement factories.

4. **Generation of EPR Certificate**
   a. ULB to register on EPR certificate to gain the direct benefits for EPR certificates.
   b. PWPs to raise the EPR certificates on the centralized EPR portal of CPCB.

5. **Transfer of EPR certificate to PIBOs to fulfil their obligations.**
   a. PWPs either can transfer the EPR certificate to ULBs, which can further transfer to PIBOs.
   b. Alternatively, EPR certificates can be transferred from PWPs to PIBOs directly, limited role of the ULB.

6. **Offsetting of operational cost with EPR certificate**
   a. In case of the PWP transferring the EPR certificate to the ULB, which can further transfer to PIBOs by ULB. The EPR certificate will be reflected in the ULB wallet on the Centralized EPR portal. The price of the certificate will be negotiated between ULB and the respective PIBOs.
   b. EPR rules allowed a maximum time of two years to transfer this certificate to PIBOs. The price of EPR certificates is volatile depending on supply and demand, however, as of date (18.03.2024) the lowest and highest price set for certificates are 1.5 INR to 5 INR per certificate by CPCB.
   c. Alternatively, based on an MoU an offsetting mechanism for transportation/operation can be agreed with PWPs/ PIBOs or with the help of intermediaries engaged by them. In this case, the EPR certificate is transferred between PWPs and PIBOs directly, limited role of the Urban Local Body.

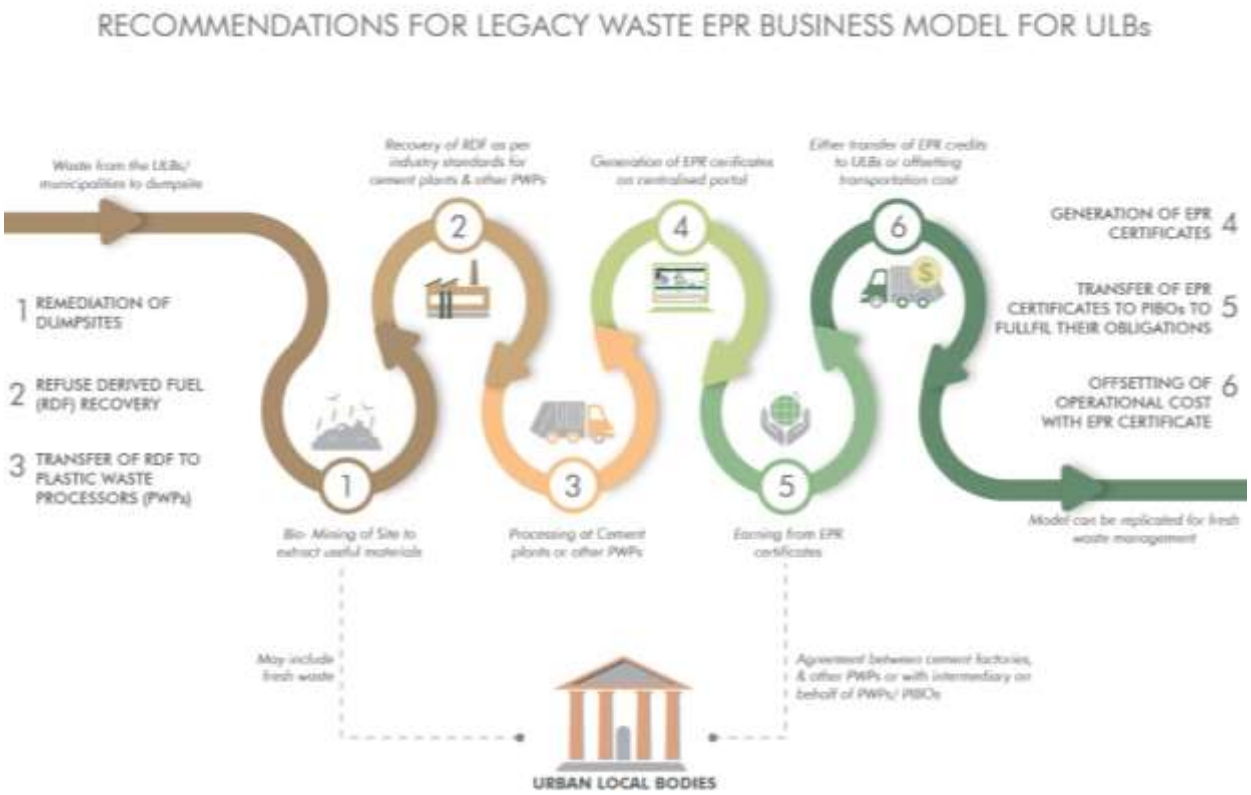


Figure 6 Replicable model for EPR-led legacy waste management

3.9 DETAILED TECHNICAL INTERVENTIONS

Table 2 Technical Interventions improving the quality of RDF

SN	Issue	Implemented Measure	Pictures/ Impacts
1	RDF quality produced by bio-mining agencies was assessed, failing which the process improvement was not considered for disposal in cement industries	Regular testing for RDF quality was done at all three bio-mining agencies (total 7 nos.), resulting in the basis for implementing a better process for RDF production	Improved RDF quality increased acceptability by cement industries and disposal of RDF was increased.
2	Manual removal of big stones and C&D material was done from the feeding conveyor, The length of the conveyor is very short and resulted in less time to pick manually all the big stones and bricks, resulting in carry over to trommel	The length of the conveyor is increased by 5 meters to give sufficient time to workers to remove stones and bricks and help in reduced carry over to trommel to improve separation efficiency	 Waste quality after trommel was improved and there was less carryover of stones and bricks to the ballistic separator, which further improved the efficiency of the ballistic separator.

3	Earlier all three bio-mining agencies have trommel to process the waste	Ballistic separators (Ecostan 2 nos., Hari Bhari 1 no. and BVG 1 no.) are installed	 RDF quality improved due to additional processing at ballistic separators (calorific value increased from an average of 2200 kCal/kg to more than 4400 kCal/kg)
4	The feeding rate of waste was 35 TPH on the ballistic separator and was not regulated as per the capacity of the ballistic separator	The feeding rate on the ballistic separator with an external conveyor was regulated as per capacity to 25 TPH	 This resulted in higher efficiency of the ballistic separator and improved RDF quality
5	The initial ballistic separator installed has design issues (material flow direction, blade movement). The efficiency of segregation was not as per requirement.	Further, High-efficiency ballistic separators (2 nos.) were installed by Ecostan, resulting in better efficiency and less contamination in RDF (Durochem make)	 
6	Earlier no demarcation between the RDF processing area and other separated constituents (C&D, bio soil etc.) of legacy waste. This resulted in the mixing of C&D waste with processed RDF during loading/ unloading	Proper demarcation/ partition improved RDF quality and reduced C&D transfer with RDF	 

			Reduced transportation volume of unwanted material in trucks – as most of C&D and other unwanted waste is now not getting transported but captured at the site
7	The external conveying system for waste feeding was not controlled and unregulated (35 TPH). This resulted in a higher feed rate compared to the designed capacity and less efficiency of the ballistic separator	Inbuilt conveying resulted in a regulated and controlled feeding rate and the use of an exhaust fan with high efficiency of the ballistic separator resulted in further improvement in RDF quality.	 
8	Earlier C&D waste was dumped on site and disposal was not continuous (mostly at the end of the month). This resulted in contamination and an increase in inert due to multiple handling, also space management was difficult	Now, daily removal of C&D waste to designated areas for temporary storage resulted in free space and reduced contamination and above all utilized for better application	 
9	Leno bag traps C&D and is inert with it, also moisture is retained with waste. Resulted in carry-over of C&D and inert in RDF /processed waste	Removal of these bags before loading waste on trommel resulted in better separation efficiency	
10	Initially, the stakeholders were working in silos and there is no engagement between these stakeholders	On-site, stakeholder engagement was established through onsite training to the staff on technical aspects as well as other stakeholders through training to address concerns and provide synergy to resolve issues	

11	There was no method established to measure the categories of plastic available in RDF to claim the EPR credits accordingly	A pilot study including 21 nos. sampling and characterisation exercise following ASTM Method (D5231-92) as the guiding principle was done to demonstrate the process of measuring category-wise plastics in RDF	 
12	The platform to discuss and share concerns was not available to stakeholders, resulting in individualised efforts to resolve the issue of disposal of RDF	There are focused group discussions (FGDs) organised amongst all stakeholders (Bio-mining agencies, PMC, Cement industries, transporters, Karo Sambhav, GIZ and Geostone), which were instrumental in generating new ideas and faster disposal of RDF	

Chapter 4

EPR LED PLASTIC WASTE MANAGEMENT

4. Extended Producer Responsibility (EPR)-led Business Model for Plastic Waste Management – Agra, Uttar Pradesh

4.1 CONTEXT

Pilot technological solutions have been implemented in Agra and emphasized the operationalization of Extended Producer Responsibility (EPR) for managing plastic waste generated in four pilot wards of the city. However, major waste is managed by small businesses or informal sector workers, resulting in fragmented and challenging-to-track material flows. Poor waste segregation, mixed streams of plastic & the absence of publicly available data on the EPR of producers, importers & brand owners (PIBOs)not registered on the portal obstruct both innovation and the monitoring of policy implementation.

Figure 7 Key Challenges

This initiative tries to enhance waste management practices, promote recycling, and foster Extended Producer Responsibility (EPR) engagement within Agra.

4.2 OBJECTIVE

To demonstrate technical measures to emphasise the operationalisation of Extended Producer Responsibility (EPR) for managing plastic waste generated in four pilot wards of the city (Ajit Nagar, Kamla Nagar, Jaipur House, Belanganj).

4.3 STAKEHOLDERS & INSTITUTIONAL MECHANISM

Table 1 Stakeholders and Institutional Mechanism

State Nodal Department	Department of Environment, Forest and Climate Change, Government of Uttar Pradesh (DoEFCC), Agra Nagar Nigam (ANN)
Technical Support	Indo-German Development Corporation project "Circular Economy Solution (CES) Preventing Marine Litter in Ecosystems" by GIZ India. (BMUV & MoEFCC)
Implementing partners	Rekart Innovations
Institutional Mechanism	The project partners with ReKart in collaboration with the Agra Nagar Nigam (ANN) for the EPR-led waste management and recycling initiatives in Agra.

4.4 INTERVENTIONS

The EPR model in Agra required multiple stakeholders to be Onboarded for its execution. The process flow diagram below shows a step-by-step process of building the EPR ecosystem for Agra, starting from identifying collection centres for ensuring plastic waste availability to EPR credit allotment to Brand Owners.

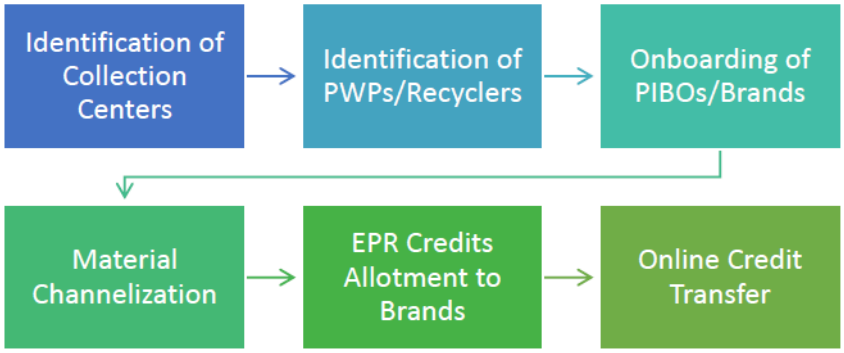


Figure 2 EPR Model Process Flow

The technical measures included channelling plastic waste generated in the wards to recyclers, coprocessing units, producers and/ or brand-owners, registered in the CPCB portal, facilitating the EPR credit mechanism.

1. Conducting a baseline survey on selected wards towards the identification of all the collection centres and L1, and L2 aggregators.
2. Onboarding PWPs for channelising plastic waste and boosting compliance towards EPR implementation including the plastic packaging categories (rigid and flexible) under the EPR regime with PWPs and end-of-life processing of such wastes with the cement plants.
3. Onboarding of brands engaging them towards implementation of EPR.
4. Door-to-door awareness & outreach sessions and activities such as Nukkad Natak.
5. Piloting customized indigenously developed a barrier to trap litter (piloted in Bhairo Nala) in the drains/ water bodies in the city.

4.5 IMPACTS

As a result of door-to-door awareness campaigns, a significant increase has been observed in the segregation rates from 10% to 56-60%. Also, an EPR of 1037.7 MT has been achieved in the project's timeline including the months from April 2023 to March 2024. The EPR targets of plastic waste have been achieved in three plastic waste categories as defined under EPR rules. The table shows the details of EPR category-wise.

Sr. No	Category	Type of Material	Type of Processor	Quantity (MT)
1	Rigid	PET	Recycling	910.79
2	Flexible	PP, LDPE	Recycling	69.70
3	Multi-Layered Packaging (MLP)	Low- value MLP	Co-processing	57.21
			Total Quantity of waste	**1037.7 MT**

4.6 TIMELINE

Figure 8 Timeline of the project

4.7 RESOURCES

62,456 Euros/ 1 Team Leader, 2 Waste Management Experts, 2 Field Associates

4.8 SCALABILITY AND MECHANISM FOR REPLICATION

Innovative and locally crafted solutions are economically viable and adaptable to local contexts and needs. Mechanism for replication:

1. Segregation rates may drop after the interventions have been removed. Urban local bodies could be supported for inclusion in the EPR ULB modality with waste management agencies to continue EPR and other practices.
2. Mapping the existing situation: Conduct surveys to identify waste types and quantities.
3. Mobilizing local support: Engage and educate the community to garner involvement.
4. Evaluating resources and technologies: Assess suitable technologies and available resources.
5. Collaborating with local partners: Form partnerships to ensure long-term project sustainability.

Chapter 5

LOW VALUE PLASTIC WASTE MANAGEMENT

5. Low-value Plastic Waste Management in Tambaram City, Tamil Nadu

5.1 CONTEXT

Low-Value Plastic (LVP) is mostly voluminous, lightweight, and very hard to recycle. They are one of the major causes of plastic pollution. The lack of informal-formal value chains results in leakages from waste management systems to environment, marine, and riverine ecosystems subsequently LVP forms one of the major components in legacy waste. The common reason for the limitations in the LVP value chain is that the cost of its collection, sorting, and recycling/ end of disposal outweighs the value of materials recovered. The key concerns associated with the management of LVP are:

The pilot measures at Tambaram focus on working with Tambaram Municipal Corporation with their waste management facilities and propose an effective waste management model for Low-value plastic through the engagement of the private sector by replying to business models such as international plastic credit and Extended Producer Responsibility (EPR).

5.2 OBJECTIVE

The EPR model in Tambaram aims to improve recyclable recovery from low-value plastics and safely dispose of the non-recyclable.

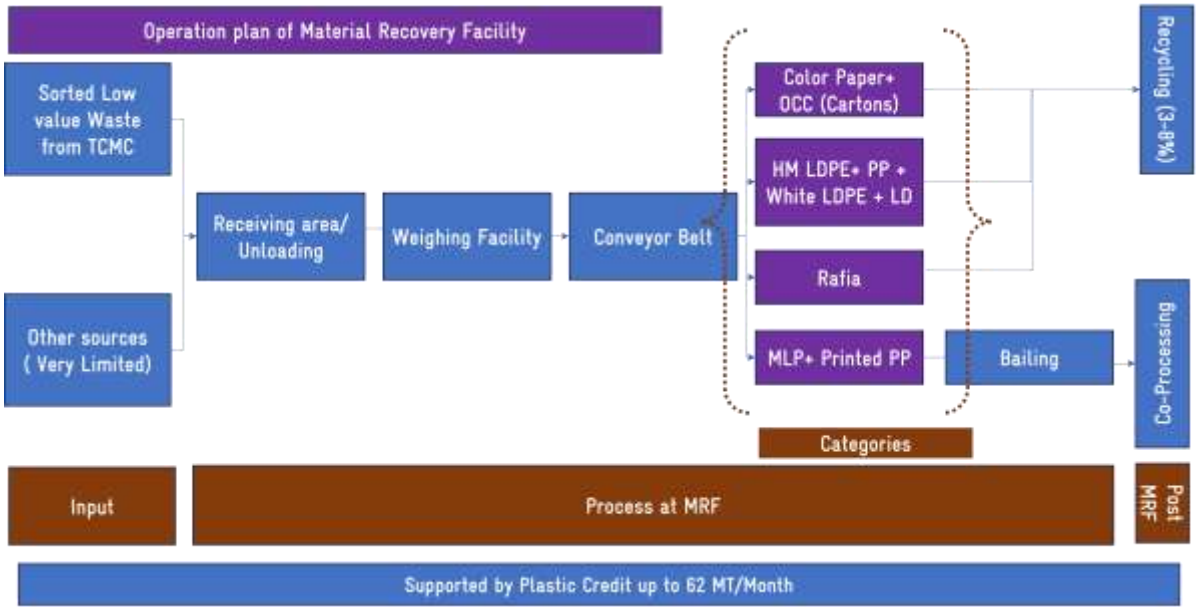
5.3 STAKEHOLDERS & INSTITUTIONAL MECHANISM

Table 1 Stakeholders and Institutional Mechanism

State Nodal Department and State Level Agencies	• Department of Environment Climate Change and Forest Government of Tamil Nadu • Tamil Nadu Pollution Control Board (TNPCB) • Tamil Nadu Green Climate Company (TNGCC) • Tambaram City Municipal Corporation (TCMC)
Technical Support	• Indo-German Development Corporation project "Circular Economy Solution (CES) Preventing Marine Litter in Ecosystems" by GIZ India. (BMUV and MoEFCC)
Implementing partners	• Repurpose Global (Support for leveraging the finance through Plastic Credit)
Private Sector collaboration	• GreenWorms (Partner of repurposing global establishing and operating the Private MRF facility)
Institutional Mechanism	• An agreement with TCMC for channelizing the low-value plastics from the municipal-owned facilities.

5.4 INTERVENTIONS

Tambaram Municipality is located near Chennai, having a population of more than 9,60,887 with an area of 87.64 sq. Km. These measures focus on working with the Material Recovery Facility (MRF) of TCMC to strengthen their existing functions. The project includes demonstrating tertiary recovery of low-value plastic, with a new facility supported under plastic credit international plastic credit. The learnings are to be implemented in government-owned MRF with the support of EPR, under PWM rules.



5.5 IMPACTS

1. The low-value plastic facility handles more than 62 MT/month of low-value plastic from the municipal corporation.
2. Showcase a sustainable model for low-value plastic with plastic credit. However, the international plastic credits and Indian EPR certificates have major gaps in their respective valuation.

5.6 TIMELINE

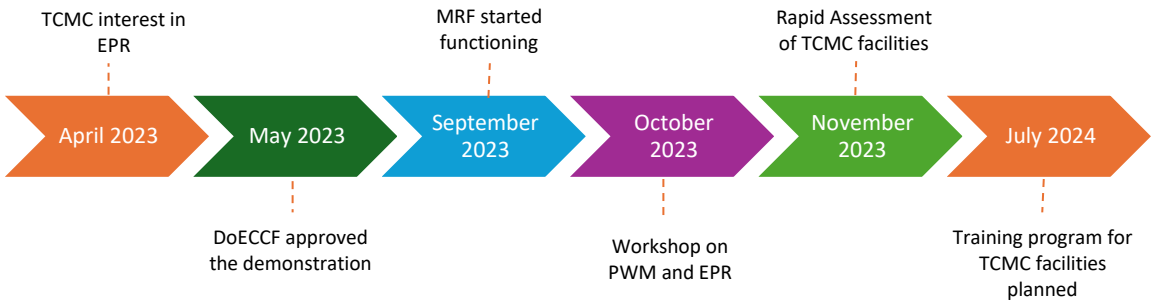


Figure 4 Timeline of the pilot intervention

5.7 RESOURCES

1. The intervention has mobilised finances through International Plastic Credits to enable the private sector to manage low-value plastics. There were no capital investments from the government or private sector involved.

2. Rapid Assessment, assessing feasibility and development of plastic credit models, training and capacity building, and workshops for municipal staff and stakeholders are organised to improve understanding and implementation of EPR and plastic waste management with a cost of approximately 16,000 EUROs.

5.8 SCALABILITY AND POTENTIAL FOR REPLICATION

1. The model may be implemented with government-owned MRF facilities where the revenue from the EPR can be focused on better management of low-value plastics. The steps may include:

    a. Assessment of plastic waste quantity and composition in the Urban Local Body (ULB).

    b. Identifying and integrating the EPR registered recyclers and other PWPs including cement plants for channelization of recovered waste. Cement plants, Waste to energy, and other entities identified may be crucial due to the limited recyclability (business case) of low-value plastic.

    c. ULBs may carry out consultations with existing recyclers for onboarding on the centralized EPR portal.

    d. Material recovery facility (RRC/ MCC) shall be equipped with slow-moving conveyor belts, bailing machines, and other related equipment. Basic facilities such as water, sanitation, and fire equipment shall be given special consideration along with necessary signages.

    e. ULBs shall be registered on the EPR portal for receiving the benefits of EPR. ULBs shall assign a nodal officer for EPR-related matters.

    f. Training and capacity-building workshops for municipal staff and stakeholders to be organised to improve understanding and implementation of EPR and plastic waste management.

2. The model may be implemented with the private sector having MRF facilities for low-value plastics. The steps may include:

    g. The private sector to approach agencies working on plastic credits such as Repurpose Global, Verra, and others.

    h. Memorandum of Understanding (MoU) by the private sector with ULBs having details on the type of plastics, quantity, transportation, and financial obligations.

    i. The private sector adopts the norms as per requirements of agencies facilitating the credits such as registration, fire safety, traceability of waste, etc.

Chapter 6

CIRCULAR ECONOMY & WASTE MANAGEMENT

6. Circular Economy And Waste Management Cell For Thiruvananthapuram Municipal Corporation (TMC) – Kerala

6.1 CONTEXT

The Circular Economy and Waste Management (CE & WM) Cell for Thiruvananthapuram Municipal Corporation (TMC) was constituted to promote the city's Circular Economy framework, with a focus on plastic waste management (PWM), enforcement of PWM rules, and facilitating the ban on single-use plastics (SUP) in the city.

6.2 OBJECTIVE

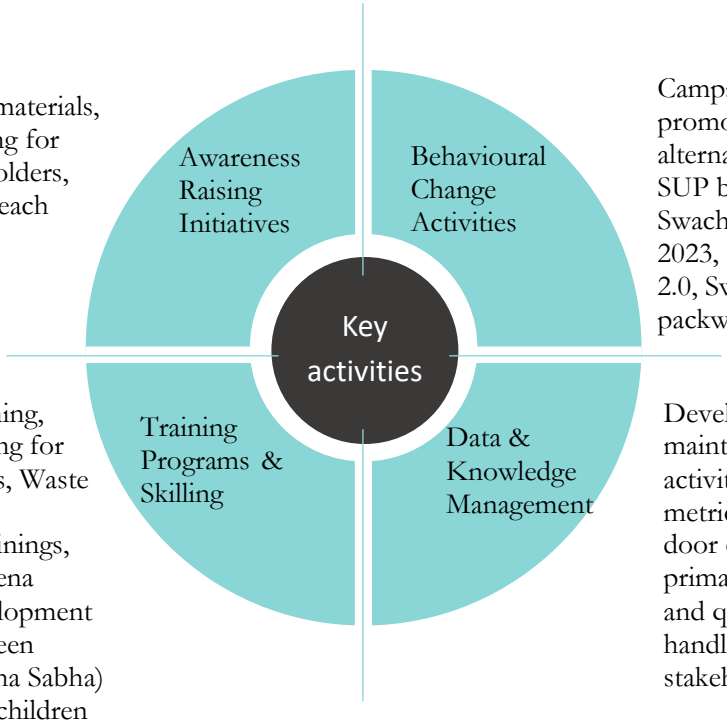
The primary objectives of the CE & WM Cell include the development and maintenance of data on plastic waste management activities, promoting sustainable waste management practices, and enhancing public awareness and capacity through various initiatives. The cell aims to ensure effective implementation and enforcement of PWM rules and SUP bans at the city level, thereby contributing to the broader Circular Economy framework of Thiruvananthapuram.

6.3 STAKEHOLDERS & INSTITUTIONAL MECHANISM

Table 1 Stakeholders and Institutional Mechanism

State Nodal Department and State Level Agencies	• Directorate of Environment & Climate Change (DoECC), Government of Kerala • Kerala State Pollution Control Board (KSPCB) • Thiruvananthapuram Municipal Corporation (TMC)
Technical Support	• Indo-German Development Corporation project "Circular Economy Solution (CES) Preventing Marine Litter in Ecosystems" by GIZ India. (BMUV and MoEFCC)
Implementing partners	• Centre for Environment and Development (Setting up of the operational aspects of the cell for sustainable plastic waste management, Awareness creation, capacity development and knowledge management) • Sustera (Conduct and coordinate beach clean-up drives and behavioural change activities)
External partner collaboration	• The project involves various stakeholders, including city officials, sanitation workers, Haritha karma sena (women self-help groups managing waste in the city), health inspectors, the informal waste sector, and the general public
Institutional Mechanism	• The CE & WM Cell serves as the central coordinating body, facilitating communication, coordination, and reporting among all stakeholders

6.4 INTERVENTIONS



6.5 IMPACTS

The CE & WM Cell has had a significant impact on the community:

3. Trained and built the capacity of 1800 people (sanitary inspectors, waste management workers) on PWM, identifying banned SUP materials, waste segregation, data management, bookkeeping practices etc.
4. Indirectly reached over 9 lakh citizens of the city on SUP ban and PWM through awareness drives and creative materials, including posters, banners, leaflets, and social media posts.
5. Enhanced social media presence, engaging with over 9,000 people through an Instagram page developed for outreach and awareness.
6. On 1 June 2023, a "No More Beach Cleanups" campaign was launched along the coastal line of city of Thiruvananthapuram to demonstrate behavioural change focused on awareness and action, beach clean-ups, youth mobilization and community engagement.

Between June 2023- June 2024, 50 beach clean-ups were organized across 8 beach locations

Approximately, 3,000 volunteers, 100 stakeholder institutions participated

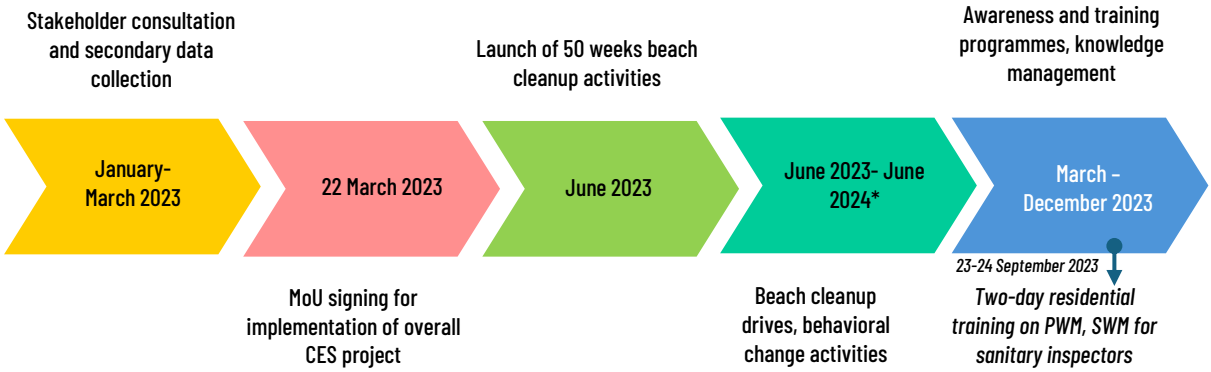
Total Waste Removed = 12,027 kg

Two-day residential training -for Health inspectors of TMC

Support to Social audit training for officials of TMC

Snapshots of beach clean-up drives

6.6 TIMELINE



** Even though the activities of the cell concluded by 30 December 2023, the beach clean-up drives continued till 8 June 2024.*

Figure 9: Timeline of the project

6.7 RESOURCES

1. Personnel (6 experts): 1 Team leader for the over coordination of the cell, 1 Information Education & Communication (IEC) Expert and 1 Research Associate, stationed in TMC; 1 Project Coordinator and 2 Field Associates coordinating on ground activities like beach cleanup drives. All personnel were working full-time over a period of 1 year (*December 2022- December 2023*)
2. Budget: Creation of awareness materials and 25 awareness programmes (this includes, street plays, awareness sessions in schools, colleges, resident associations, trainings for various stakeholders), 50 beach cleanup drives and associated sorting and disposal of collected litter, art installations for awareness (4 in number), travel expenses and associated operational costs. (*Approximately 15, 500 Euros*)

6.8 SCALABILITY AND MECHANISM FOR REPLICATION

The TMC administration has decided to transfer the management of the CE & WM cell to the city administration, which would be implemented further using the city's plan fund. Before the handover, the project team presented key learnings and insights during a periodic annual review meeting with TMC. This ensured that the city administration was well-informed and prepared to manage the CE & WM cell effectively moving forward.

The model of the CE & WM Cell can be replicated in other cities with similar frameworks. The replication of the model may include following steps:

1. Key elements for scalability include stakeholder engagement, comprehensive training programs, strong awareness campaigns, and the establishment of digital solutions.
2. The project design must include iterative development and feedback mechanisms to ensure adaptability and scalability.
3. Building partnerships with local government institutions, waste management bodies, regulatory authorities, NGOs, community groups, and private sector players to ensure effective implementation and sustainability of waste management initiatives.
4. Utilise innovative communication tools and materials to reach a broader audience, including digital campaigns, mass media, and community events.
5. Organise regular clean-up drives, recycling initiatives, and behavioural change activities in collaboration with local communities and volunteers and also develop a pool of regular volunteers for social activities in the city.
6. Continuously evaluate the effectiveness of the interventions and make necessary adjustments based on feedback and evolving local conditions

Chapter 7

EPR LED DECENTRALISED PLASTIC WASTE

7. Extended Producer Responsibility (EPR)-led Pilot Model for Decentralised Plastic Waste Management in Trivandrum- Kerala

7.1 CONTEXT

In Kerala, with its extensive coastline, unmanaged plastic waste significantly impacts marine ecosystems. As per the project baseline studies in 2022 and aligning with the UN-Habitat study (2021), Trivandrum had generated 440-450 tonnes per day (TPD) of Municipal Solid Waste (MSW) in 2022, with plastic waste contributing to 13-14% of the overall MSW composition. Hence, it is essential to address and strengthen existing decentralised waste management systems through technical measures with the involvement of a multitude of stakeholders and also operationalise Extended Producer Responsibility (EPR) in a city like Trivandrum.

7.2 OBJECTIVE

The overall aim of the project intervention is to reduce the amount of litter that washes into the sea from the city of Thiruvananthapuram by supporting decentralised, circular and EPR-led plastic waste management practices in coastal locations of the city. The approach was targeted at an extremely vulnerable population primarily engaged in fishing and also integrate women's self-help groups for waste management. The collected materials are sorted and sent for final plastic waste processing (recyclers/ cement plants/ etc.) and possibly generate plastic credits working closely with Producers, Importers and Brand Owners (PIBOs) and Plastic Waste Processors (PWPs).

7.3 STAKEHOLDERS & INSTITUTIONAL MECHANISM

Table 1 Stakeholders and Institutional Mechanism

State Nodal Department and State Level Agencies	• Directorate of Environment & Climate Change (DoECC), Government of Kerala • Kerala State Pollution Control Board (KSPCB) • Thiruvananthapuram Municipal Corporation (TMC) • Kudumbashree, Government of Kerala and Kudumbashree units • Suchitwa Mission (Technical Support Group in waste management under Local Self Government Department), Government of Kerala
Technical Support	• Indo-German Development Corporation project "Circular Economy Solution (CES) Preventing Marine Litter in Ecosystems" by GIZ India. (BMUV and MoEFCC)
Implementing partners	• GreenWorms (Kerala) [Develop and implement an economically sustainable circular model for waste management in coastal region of Trivandrum, focusing on reducing marine litter, Operationalize EPR in selected wards, Strengthen the existing waste management system and integrate women's self-help groups]

	• Centre for Environment and Development (State-level project management unit for advisory services)
External partner collaboration	• The project involves linkages with PIBOs and PWPs, Waste management agencies for operationalizing EPR
Institutional Mechanism	• Decentralized model of waste management working closely with self-help groups (SHGs)

7.4 INTERVENTIONS

1 Preliminary Assessment

- Assess existing waste management infrastructure and systems.
- Evaluate health, safety, and social security of waste workers.
- Conduct ward-wise studies for waste quantity, composition, and collection mechanisms.

2 Deployment and Execution

- Garner community support and implement source segregation.
- Integrate digital solutions for waste tracking and monitoring.
- Compile data on collected waste and its management, including forward linkages.

3 Awareness Creation & Capacity Building

- Develop engaging Information, Education, and Communication (IEC) materials.
- Conduct awareness programs in schools, colleges, and communities.
- Organize weekly group discussions and focus group discussions.

4 Enabling compliance aspects & EPR

- Documentation and tracking systems for waste management.
- Establish a mechanism to engage with PIBOs and PWPs to collect, sort and process waste.
- Ensure sustainability of waste management systems; provisions available in the EPR rules are tried to be utilised.

7.5 IMPACTS

- The pilot project has addressed plastic waste management for at least 5,000 households with an approximate population of 30,000 people. The project has been able to manage 182.14 tonnes of waste (till March 2024) from the material collection facilities in these pilot locations.

- Till April 2024, EPR Credits for a total Volume of 54,650 kg of CAT-2 (Flexible – single or multilayer, could include different types of plastic) and CAT-3 (Multilayered plastics) has been allocated to two brands (PIBO) working with PWPs- three cement plants in Tamil Nadu, Andhra Pradesh and Maharashtra as well as one recycler in Kerala.

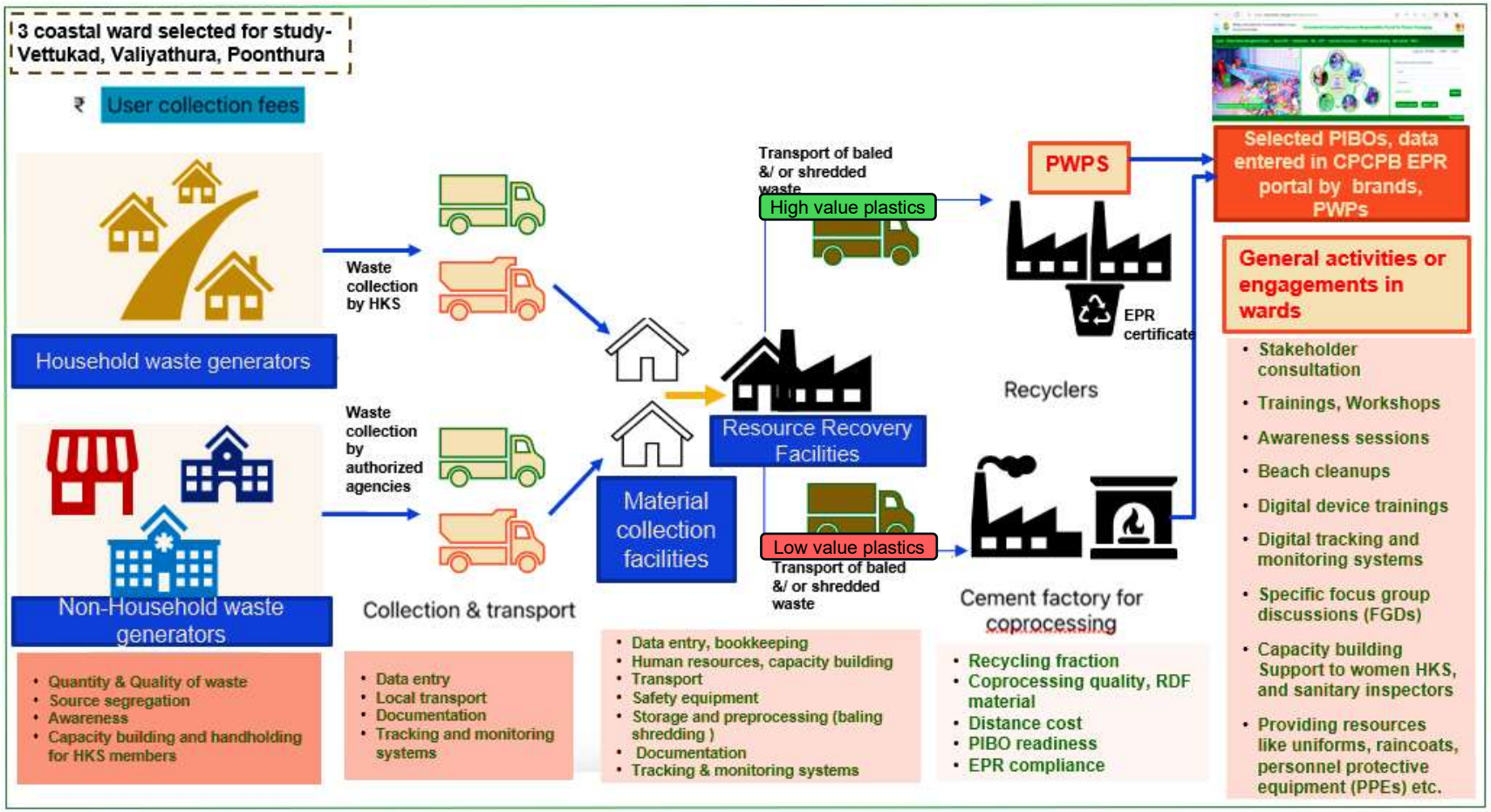


Figure 10: Process flow diagram of the decentralised EPR-led plastic waste management system adopted in the pilot project

7.6 TIMELINE

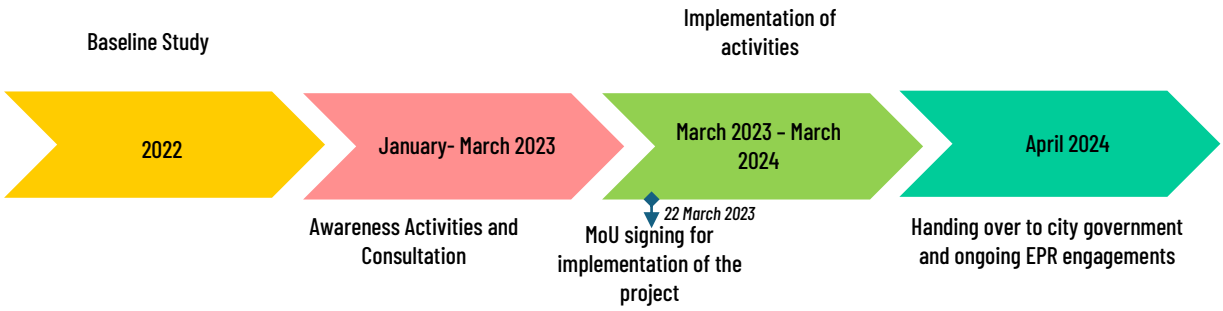


Figure 2: Timeline of the project

7.7 RESOURCES

1. Personnel (full-time positions): 1 Team leader, 3 Waste Management Experts (one for each ward), 6 Field Associates (two associates per ward) (December 2022- April 2024)
2. Budget: Technical and operational support for aspects related to waste sorting and storage, Logistics and end-of-life management support for the collected waste for 1 year, PPE for all kinds of operations of the self-help groups, 24 Awareness activities for community engagement (cultural festivals, fishing for plastics, sports, livelihood, beach clean-up drives etc), Digital technology solutions for tracking, monitoring and reporting on waste flow. (Approximately 48,000 Euros)

7.8 SCALABILITY AND MECHANISM FOR REPLICATION

The model developed in Trivandrum is planned to be replicated in the city specifically focusing on the coastal regions. The learnings include enhancing people's participation in waste management operations, especially amongst coastal communities, waste segregation and channelisation of waste to authorised processors, and digital solutions for enhancing traceability of operations. The model can be scaled by replicating the SHG involvement in other states and regions. The replication of the model may include the following steps

1. Contextual Understanding and Customization
    - **Local Context Analysis**: Conduct a baseline assessment to understand waste generation patterns, social structures, and existing waste management practices.
    - **Customisation**: Adapt the model to fit the local context, considering cultural, social, and economic factors. For instance, leveraging existing community groups or self-help groups (SHGs) in any city replicating the model of Haritha Karma Sena in Trivandrum engaging in a decentralised waste management approach
2. Stakeholder Engagement and Institutional Support
    - **Stakeholder Mapping**: Identify and engage key stakeholders including local government bodies, CPCB EPR portal registered waste processors, and community organizations.

- **Institutional Mechanisms**: Establish strong coordination mechanisms among stakeholders to ensure alignment and support.

3. Capacity Building and Awareness Creation
    - **Training Programs**: Implement comprehensive training programs for SHGs, local waste workers, and community members on waste segregation, collection, and processing.
    - **Awareness Campaigns**: Develop engaging Information, Education, and Communication (IEC) materials tailored to the local context. Use street plays, competitions, and digital media to reach a wide audience.
4. Financial Sustainability and Incentive Mechanisms
    - **EPR Credits**: Promote the concept of Extended Producer Responsibility (EPR) credits. Ensure that producers, importers, and brand owners (PIBOs) are involved and committed to purchasing these credits.
    - **Revenue Sharing**: Implement a transparent and fair revenue-sharing model where earnings from EPR credits are shared with local SHGs and municipal bodies. This not only incentivizes participation but also ensures financial sustainability.
5. Infrastructure Development and Technological Integration
    - **Facility Upgradation**: Upgrade or establish new material collection facilities (MCFs) and resource recovery facilities (RRFs) as needed. Ensure these facilities meet safety and operational standards.
    - **Technological Solutions**: Integrate digital tracking systems to monitor waste collection and processing. This can improve efficiency and transparency in waste management.
6. Monitoring, Evaluation, and Reporting
    - **Regular Monitoring**: Implement a robust monitoring system to track progress, identify challenges, and make necessary adjustments (e.g., Weekly/ monthly progress reports).
    - **Impact Assessment**: Conduct periodic impact assessments to measure the effectiveness of the interventions. Document and share success stories and lessons learned.
7. Community Engagement and Ownership
    - **Community Involvement**: Foster strong community involvement and ownership of the project. Ensure that residents understand the benefits and are actively participating.
    - **Feedback Mechanisms**: Establish feedback mechanisms to gather community input and continuously improve the project.

Chapter 8

ZERO WASTE MEASURES- BULK WASTE GENERATORS

8. Implementation of Zero-Waste Measures for Bulk-Waste Generators and Tourist Locations

8.1 CONTEXT

The Solid Waste Management (SWM) Rules, 2016 define Bulk-waste Generators (BWGs) as waste generators that generate more than 100 kg of waste per day. The rule mandates that the BWGs should properly segregate the wet and dry waste and dispose of the dry waste to authorised recyclers/agencies. It is estimated that 30-40% of waste generation is coming from BWGs (MoHUA, 2017).

BWGs play a significant role in improving waste management, especially for plastics as well as creating a circular economy ecosystem. Countering plastic pollution is an integral part of the global sustainability agenda catering to the SDGs in the context of PWM illustrated below.

8.2 OBJECTIVE

The objective of these interventions was to minimise waste generation, efficient recovery of waste and proper waste management by Bulk Waste Generators & Tourist Sites, aligning with environmental sustainability goals.

8.3 STAKEHOLDERS & INSTITUTIONAL MECHANISM

Table 1 Stakeholders and Institutional Mechanism

State Nodal Department & State/National Level Agencies	• Department of Environment, Forest, & Climate Change (DoEFCC), Government of Uttar Pradesh and Northern Railways • Department of Environment Climate Change & Forest (DoECCF), Government of Tamil Nadu • Directorate of Environment & Climate Change, (DoECC), Government of Kerala • Kerala State Pollution Control Board (KSPCB) • Suchitwa Mission, Government of Kerala • Thiruvananthapuram Municipal Corporation (TMC)

	• Department of Tourism, Government of Kerala
Technical Support	• Indo-German Development Corporation project "Circular Economy Solution (CES) Preventing Marine Litter in Ecosystems" by GIZ India. (BMUV and MoEFCC)
Implementing partners	• Saahas • Recity Network • GreenWorms
Private Sector Collaboration	• The intervention involves various modes of collaboration including market linkages and facilitates partnering with waste management agencies.
Institutional Mechanism	• Implementation of pilot solutions working closely with the Northern Railways authorities in Varanasi, • Bus Terminus stakeholders in Chennai and • Veli tourist village in Kerala with technical support from waste management agencies.

8.4 INTERVENTIONS

Varanasi Cantt Railway Station, Uttar Pradesh	**Koyambedu bus Terminus, Tamil Nadu**	**Veli Tourist Village, Kerala**
Being the world's second-largest railway network, Indian railways have a high volume of passenger traffic, and they need to handle high volumes of solid waste generated during the trips.	Chennai's primary entry-exit point manages over 2,000 buses and 200,000 passengers daily. The waste management process involves collection by an agency, sorting and manual recovery of recyclables.	A wetland area that is a lively habitat for brackish water fish and migratory birds. The tourist village has a footfall of 700-1000 people per day on a weekday and 3500-4000 people over weekends.
1. Awareness of source segregation of waste through IEC & BCC.	1. Developed a methodology for rapid assessment of type, quantities, human resources (including the informal sector), and flow of waste in the Bus terminus.	1. Established a system, a sustainable waste management model and established Green Protocol guidelines.
2. Training and capacity building of the sanitation staff and railway officials	2. Set up a plastics value chain with an EPR business model with the local actors and other stakeholders to be involved.	2. Implemented innovative solutions to reduce marine litter along with educational campaigns.
3. Streamlining the process for waste collection, transportation and processing.	3. Identified of roles and responsibilities of various stakeholders, along with the necessary technical support through training and capacity development, as required.	3. Identified the roles and responsibilities of various stakeholders that shall be involved in plastic waste management, along with the necessary technical support through training and capacity development, as required.
4. Setting up a well-defined system for monitoring to ensure that the existing	4. Proposed an effective waste management model from end-to-end activities, including the EPR-led approach with the	4. Awareness campaigns for tourist visitors for sustainable plastic waste management and

station team can manage the process themselves	prominent role of recyclers and PIBOs.	promotion of alternatives.

8.5 IMPACTS

Varanasi Cantt Railway Station, Uttar Pradesh

- About 1,800 persons, including railway officers, sanitation staff, vendors and passengers in Varanasi Cantt Railway station and 230 households in the AEN colony made aware of the source segregation of waste, using multiple means such as group discussions, posters, movies, and one-to-one discussions.

Koyambedu Bus terminus, Tamil Nadu

- Provided technical support in upgrading the transfer station/dumping site into a material recovery facility with proper space for sorting, bailing and storage. The MRF can handle up to 2.5 MT per day with a functional bailing unit. The bottleneck to recovery of waste streams is due to existing contracting conditions.
- The interventions have shown a better recovery of waste that can be easily practised. Up to 200 Kg/day has been piloted as increased recovery above the baseline with minimalist interventions (in current contract conditions) leading to additional revenue estimated as 40,000 per month.
- The recovery rate at baseline has been observed to be 5% which has been increasing to more than 12%. However, the recovery rate has been limited by source segregation practices and the availability of no dedicated human resources for sorting operations and bailing.

Veli Tourist Village, Kerala

- Licenced vendors have been connected to Haritha Karma Sena to collect the Non-Biodegradable Waste Generated at the Veli Tourist Village. Since the launch of the project 644.58 kg of dry waste has been managed (till November 2023).
- Various IEC and capacity-building activities have been conducted in Veli Tourist Village to promote the Sustainable Waste Management Model.

8.6 TIMELINE

Varanasi – December 2022- June 2023
Tamil Nadu- Koyambedu (November 2022 - December 2023)
Kerala – Veli (July 2023 – ongoing)

8.7 RESOURCES

1. Varanasi Cantt Railway Station, Uttar Pradesh: GIZ India's team consisted of multiple projects that combined their resources and enabled these on-ground impacts with the support of both the Department of Environment, Government of Uttar Pradesh and Northern Railways. (Resources: 33,604 Euros) (1 team leader, 1 project manager, & 4 volunteers)
2. Koyambedu, Tamil Nadu – Baseline study along with the technical support from ReCity (Resources: 21,312 Euros)

3. Veli, Kerala - Implementation activities like capacity building and training, stakeholder consultations, technology interventions to trap litter [pilot], Weekly sorting, storage and disposal of the collected litter to the nearest certified PWPs, Awareness activities which include beach cleanups, integration of local culture, sports, livelihood, tradition supported by GreenWorms (Resources: 32,000 Euros) [1 Team leader, 1 Waste management Expert, 4 Field Associates)

8.8 SCALABILITY AND MECHANISM FOR REPLICATION

1. The Zero Waste measures implemented at the Varanasi Railway station demonstrate and institutionalize source segregation, the very first step towards becoming zero waste. The model has replicability for bulk waste generators aiming at zero-waste campuses/ institutions.
2. The Koyambedu model can be replicated in Bus terminals generating more than 1 MT/day waste. A SOP/guidebook is prepared for replication in April 2023.
3. Strengthening value chain linkages with multitude of stakeholders will help in replication in other tourist destinations learning from interventions in Veli village, Kerala.
    - Tourism / local bodies and many other actors to come together.
    - Many actors/ stakeholders coming together for scalability and sustainability
4. BWGs must plan the entire waste management operations to comply with PWM rules and benefits under the EPR framework.
    - The BWG may involve the PIBOs in their facility/campus if it's a Mall/commercial complex to fund the collection, sorting and recycling of the plastic waste.
    - If not a commercial facility, the BWG may operationalize a proper plastic waste management system and exchange the recyclables to a Plastic waste processor (PWP), who can generate EPR credit, which PWP could further trade to a PIBO (Producers, Importers and Brand Owners).

The detailed flow of work is illustrated below.

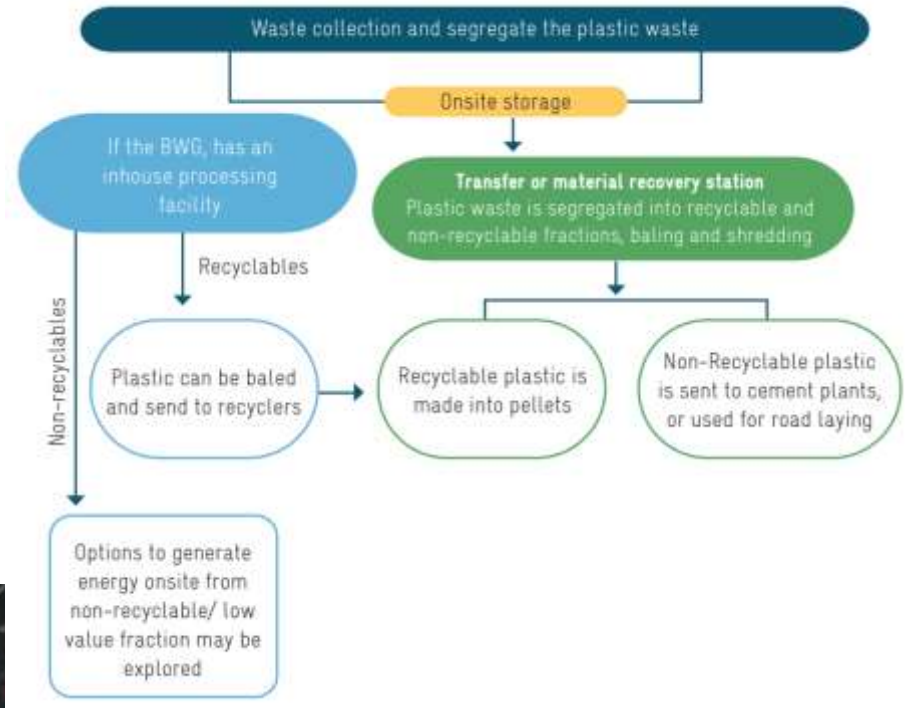


Figure 1 Step-by-Step Action Plan for the Bulk Waste Generator
Source: A Guidebook for Bulk Waste Generators (BWGs), GIZ Indi

Chapter 9

GENDER TRANSFORMATIVE APPROACHES

9. Gender Transformative Approaches in Plastic Waste Management for Inclusive and Sustainable Communities

9.1 CONTEXT

An estimated 19 to 23 million tonnes of plastic waste enter aquatic ecosystems annually (UNEP, 2021[2]), posing severe threats to marine life and accelerating climate change. India has taken steps to combat plastic pollution by banning specific single-use plastic (SUP) items starting from July 1, 2022, and emphasizing the implementation of Extended Producer Responsibility (EPR) for plastic packaging. In Kerala, with its extensive coastline, unmanaged plastic waste significantly impacts marine ecosystems. As per the project baseline studies in 2022 and aligning with UN-Habitat study (2021), Trivandrum had generated 440-450 tonnes per day (TPD) of Municipal Solid Waste (MSW) in 2022, with plastic waste contributing to 13-14% of the overall MSW composition. In addition, a recent CPCB study, supported by GIZ, found that banned SUPs make up 8.2% of Trivandrum's total plastic waste, with carry bags being the most common banned SUPs, constituting over 90% by weight.[3]

9.2 OBJECTIVE

The intervention pilot solutions to tackle the multifaceted issues of waste management by integrating inclusive local participatory approaches to promote plastic alternatives and support plastic waste management operations.

9.3 STAKEHOLDERS & INSTITUTIONAL MECHANISM

Table 1 Stakeholders and Institutional Mechanism

State Nodal Department and State Level Agencies	• Directorate of Environment & Climate Change (DoECC), Government of Kerala • Kerala State Pollution Control Board (KSPCB) • Thiruvananthapuram Municipal Corporation (TMC) • Kudumbashree, Government of Kerala, Kudumbashree units functioning under TMC • Suchitwa Mission (Technical Support Group in waste management under Local Self Government Department), Government of Kerala
Technical Support	• Indo-German Development Corporation project "Circular Economy Solution (CES) Preventing Marine Litter in Ecosystems" by GIZ India. (BMUV and MoEFCC)
Implementing partners	• GreenWorms (Kerala) [Develop and implement an economically sustainable circular model for waste management in coastal region of Trivandrum, focusing on reducing marine litter, Operationalise Extended Producer Responsibility (EPR) in selected

[2] UNEP (2021). Drowning in Plastics – Marine Litter and Plastic Waste Vital Graphics

[3] http://www.indiaenvironmentportal.org.in/files/file/sop%20for%20plastic%20waste%20generation.pdf

	wards, Strengthen the existing waste management system and integrate women's self-help groups] • Thanal (Promoting plastic alternatives through women self-help groups) • Centre for Environment and Development (State level Project management unit)
Institutional Mechanism	• Community-based models working closely with self-help groups (SHGs) for its execution at various scales

9.4 INTERVENTIONS

- Women-led SHGs in Trivandrum are **organised as "*Haritha Karma Sena- HKS (Green Warriors)*"** under the Kudumbashree movement of Govt. of Kerala and encourage citizens to segregate their waste into bio-degradable and non-biodegradable, promoting responsible waste disposal practices. Working closely with the TMC, **the project has supported capacity building, digital and social skill development and the formalisation of the HKS members** *(Figure 1)*. Revenue is made from the user fees collected from waste generators and from the sale of recyclable items to plastic waste processing units.

Figure 1: HKS Workers and CES project team in training session for financial accounting (PC: GreenWorms)

- The SHG members are **supported and trained** *(Figure 2)* **to produce eco-friendly items (cloth bags, bamboo products, cloth sanitary pads) to minimise waste and boost women-led businesses**. Dedicated awareness and training sessions are conducted to promote menstrual health and hygiene and use of sustainable menstrual products like cloth pads or menstrual cups.

Figure 5: SHGs getting trained to make cloth sanitary pads (PC: Thanal)

- The project has tried to garner public cooperation emphasising the importance of community involvement in waste management. The project efforts may inadvertently reinforce gender stereotypes in waste management by associating women with traditional caregiving roles. To counter this, with the support of TMC, **specific campaigns were organised prioritising inclusivity, involving representatives of all genders, aligned with the state government's inclusive initiatives**. Recognising the emotional and psychological challenges faced especially by women in waste management, the project had initiated **'wellness initiatives and medical camps'** to provide support and conversations around **mental health and well-being.**

Figure 3: Inclusive, consumer-centric and compliance aspects of this CES intervention addressing the challenges of plastic waste management and community empowerment through women leaders (*with the support of city and state government*)

9.5 IMPACTS

The project has significantly shifted public perceptions towards women in waste management, promoting respect and acceptance. Women-led SHGs in Trivandrum have been trained and supported to manage waste effectively and produce eco-friendly products, which has led to increased financial independence and empowerment. The project has also formalized these SHGs, enhancing their organizational and leadership skills, and establishing collaborations with local businesses, thereby promoting a sustainable market for their products.

Formalization and Efficiency	The project has been able to streamline the work of SHGs to achieve maximum efficiency and also become self-reliant to create sales for the products. Collaborations with local businesses were established.
	Innovative approaches ensured that women workers have a right to decent work management (including the creation of charts and work cycles - establishing a consistent schedule which is understandable and acceptable to the workers) aligning to SDG 5 and 8
Digital Integration and Innovation:	Due to India's 'Digitalisation policies', specific digital service trainings were conducted for HKS members, such as using a smart device. This helped to enhance the digital literacy of the women SHGs.
	The Government of Kerala's Haritha Mithram App was utilized for digital recording of door-to-door services and waste generation.
	Digital tools and social media platforms were leveraged for service promotion and effective data management, serving as monitoring tools for government activities.
	A Cloth bag vending machine (first in the state of Kerala) was installed in the city to serve as a marketing medium for the sale of cloth bags manufactured by the SHGs

Financial and Social Empowerment:	Capacity-building activities empowered women, resulting in wages nearly tripling in project locations.
	The project facilitated the transition of SHGs from being perceived as "people collecting garbage" to "professionals and entrepreneurs serving the community."
	By empowering women as leaders, equal rights, participation in decision-making processes as well as access to resources for skill development is provided to women

9.6 TIMELINE

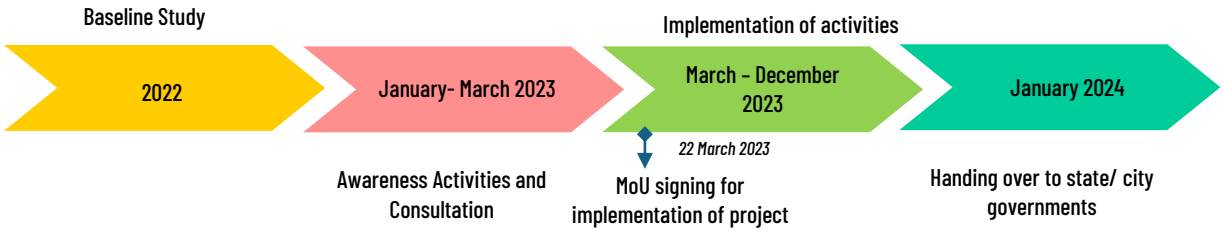


Figure 11 Timeline of the project

9.7 RESOURCES

1. Human Resources: Women workers in SHGs, sanitation staff, and technical support from partner organizations.
2. Financial Resources: Funding from local and state government incentives, and revenue from waste management operations.

9.8 SCALABILITY AND MECHANISM FOR REPLICATION

The intervention has developed a **successful enterprise model** addressing waste management and livelihood issues, altering the way the community views these groups. To replicate this model. Key steps include:

1. **Organizing Women into SHGs:** Utilize local women's groups to form SHGs, similar to Kudumbashree in Kerala, Kagad Kach Patra Kashtakari Panchayat (KKPKP) and associated waste picker cooperative- SWaCH working in Pune
2. **Formalizing Waste Management Enterprises:** Provide training and support to formalize groups, ensuring they have the necessary skills for efficient waste management.
3. **Leveraging Digital Tools:** Implement digital monitoring and promotional tools to enhance transparency and efficiency. This includes apps for recording services and social media for public engagement.
4. **Government and Institutional Support:** Collaborate with local and state governments for technical and financial support, ensuring alignment with existing waste management policies and initiatives.
5. **Public Awareness and Involvement:** Conduct awareness campaigns to shift public attitudes and promote community involvement in waste management, ensuring inclusivity and gender equality.

Chapter 10

ECO- ALTERNATIVES FOR BANNED SUPs

10. Promoting Eco-Alternatives for Banned SUP Items Through Self-Help Groups (SHGS)

10.1 CONTEXT

The Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India has notified the Plastic Waste Management (Amendment) Rules, 2021, on 12th August 2021, prohibiting the manufacture, import, stocking, distribution, sale, and use of 19 identified single-use plastic (SUP) items, including polystyrene and expanded polystyrene. The SUP ban for SUP items with low utility and high littering potential has been in effect since 1st July 2022. In addition to this, as part of the 20-city study on the assessment of SUPs in selected cities in India[4], plastic carry bags were found to be the largest portion of banned SUPs. They account for about 80% (by weight) of the total banned SUPs. On average, banned SUPs accounted for about 20% of the plastic waste generated in the assessed cities. Hence, it was decided to develop the pilot models of creating Self-Help groups (SHGs) which can aid in promoting the SUP alternatives and support local solutions by enhancing community participation.

10.2 OBJECTIVE

The objective of this assignment is to create SHGs which can aid in promoting SUP alternatives in the respective state and support local solutions by enhancing community participation. The specific assignment seeks to provide resilience-based development solutions for managing the challenge of plastics while promoting green economy opportunities and enabling equitable access to financial service solutions to ensure no one is left behind.

10.3 STAKEHOLDERS & INSTITUTIONAL MECHANISM

Table 1 Stakeholders and Institutional Mechanism

State Nodal Department and State Level Agencies	• Department of Environment Climate Change and Forest (DoECCF), Government of Tamil Nadu • Tamil Nadu Pollution Control Board (TNPCB) • Tamil Nadu Green Climate Company (TNGCC) • Directorate of Environment & Climate Change (DoECC), Government of Kerala • Kerala State Pollution Control Board (KSPCB) • Thiruvananthapuram Municipal Corporation (TMC) • Kudumbashree, Government of Kerala
Technical Support	• Indo-German Development Corporation project "Circular Economy Solution (CES) Preventing Marine Litter in Ecosystems" by GIZ India (BMUV and

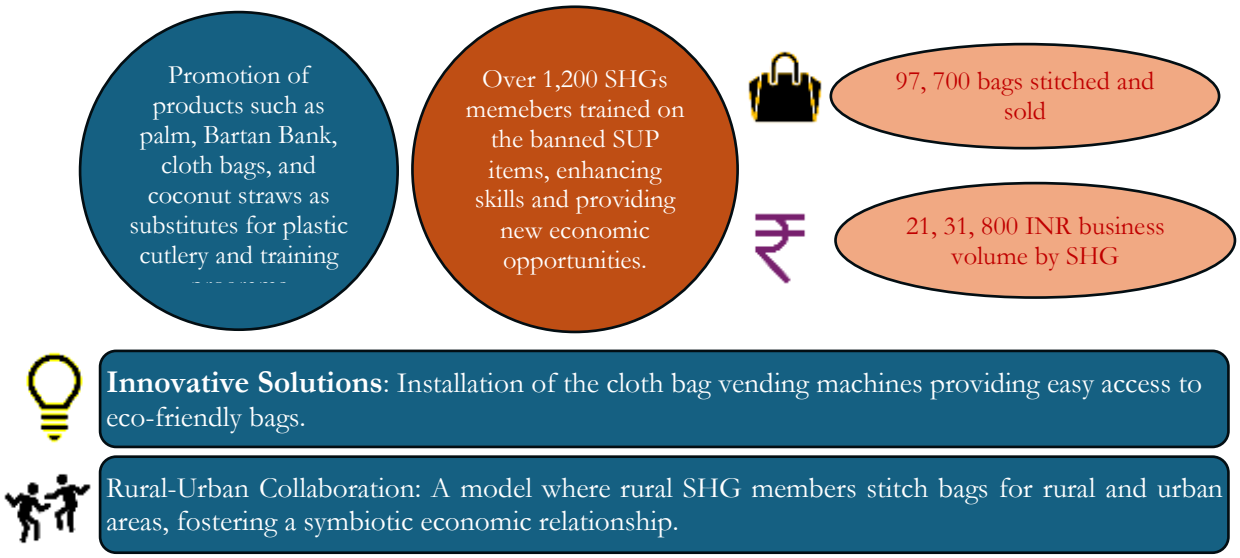
[4] http://www.indiaenvironmentportal.org.in/files/file/sop%20for%20plastic%20waste%20generation.pdf

	MoEFCC)
Implementing partners	• Hand in Hand (Tamil Nadu), Thanal (Kerala) [Identification of ecosystem for SHGs and local communities involved in promotion of alternatives to SUPs; Creation, organization and functioning of SHGs with defined scheme of work and social services] • GVK ventures (cloth bag vending machine)
External partner collaboration	• The project intervention involves various modes of market linkages and facilitates partnering with industry players for the sale of plastic alternatives
Institutional Mechanism	• Community-based models working closely with SHGs for their execution at various scales

10.4 INTERVENTIONS

Identification of Alternatives:	Models to provide alternatives to banned SUPs and potential livelihood options.
Awareness Creation	SHGs encouraged people to undertake SUP alternatives as livelihood activities and create public awareness of plastic pollution.
Value Chain Establishment	Innovation in the value chain based on product requirements.
SHG Involvement	Mainstreaming gender activities by engaging women and informal sector workers; capacity building for SHGs.
Innovation	Under the pilot, cloth bag vending machines have been supported in the state of Tamil Nadu and Kerala
Policy Alignment	Coordination with government administration to implement the system.

10.5 IMPACTS



10.6 TIMELINE

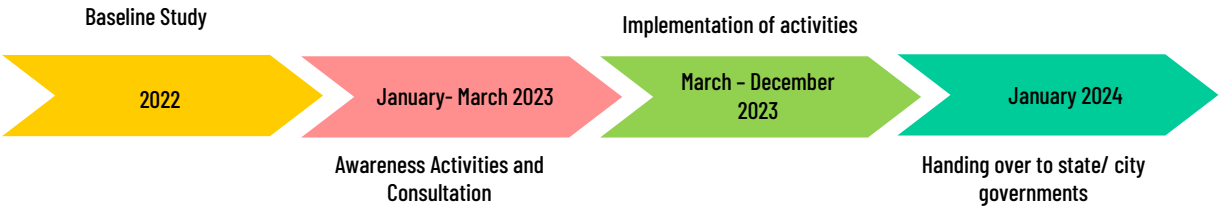


Figure 12 Timeline of the intervention

10.7 RESOURCES

- Personnel (5 experts- full-time): 1 Team leader for overall coordination of the project, 1 Subject Expert (to understand the ecosystem of plastic alternatives as well as the models of self-help groups), 1 Sales Executive (for creating business linkages, market creation and innovative approaches), 2 Field Associates (for coordinating activities on ground, training and capacity building for making plastic alternative products) (December 2022-January 2024)
- Budget: Costs for travel, outreach events, awareness materials, training, and implementation (15-20 awareness and capacity building initiatives) (Approximately 10,000 Euros)

10.8 SCALABILITY AND MECHANISM FOR REPLICATION

The model can be scaled by replicating the SHG involvement in other states and regions. The replication of the model may include following steps:

1. ***Identification of Region-Specific Alternatives:*** By identifying and promoting alternatives to SUPs that are suitable for specific regions, the initiative can be tailored to local contexts, making it more effective and acceptable.

2. **Capacity Building and Training Programs:** Providing targeted training programs for SHGs enhances their capabilities to produce and market eco-friendly alternatives. This approach ensures that SHGs are equipped with the necessary skills and knowledge to sustain their operations and expand.

3. **Establishing Supply Chains and Market Linkages:** Developing robust supply chains and creating market linkages for the products made by SHGs ensures a steady demand and supply, facilitating the growth and expansion of SHG operations.

4. **Continuous Support and Evaluation:** Ongoing support and regular evaluations help in identifying challenges and areas for improvement, ensuring that the initiative remains effective and sustainable in the long term.

Mechanism for Replication

The replication of this model involves a systematic approach that can be adapted and implemented in other states and regions. The steps include:

- **Stakeholder Engagement:** Engaging with local government bodies, community organizations, and other stakeholders to build a support network for the initiative.

- **Pilot Implementation:** Starting with pilot projects in selected regions to test the model, gather feedback, and make necessary adjustments before scaling up. It is also essential to link the project to existing government schemes and benefits.

- **Standardized Training Modules:** Developing standardized training modules that can be used to train SHGs in different regions, ensuring consistency in the quality of training and implementation.

- **Resource Allocation:** Allocating resources for personnel, outreach events, awareness materials, training, and implementation to support the replication process. Such projects can be taken up further under the own funds of city administration on specific schemes of state government

- **Policy Alignment and Support:** Ensuring alignment with local and national policies on plastic waste management and sustainability and securing support from government agencies.

Chapter 11

MICROPLASTIC ASSESSMENT

11. Microplastics Assessment and Development of Methodology

11.1 CONTEXT

Globally, plastic waste is classified into four major classes based on size: macro plastics (>25mm), meso-plastics (5-25mm), microplastics (<5mm), and nanoplastics (<100nm). Among the four size classes, microplastics and nanoplastics have the greatest potential to enter the marine food web through predators. Microplastics have been detected in diverse ecosystems (oceans, lakes. Rivers, wetlands, deep sea, etc.), ranging from the depths of the oceans to the sediment of land areas bordering waste bodies such as beaches and coastlines. Microplastics pollute water, land, air, and groundwater environments. To address the challenges related to microplastics, resource efficiency and circular economy must approach for closing material cycles of marine litter are implemented using technology-based solutions in partnership with public and private actors, and supportive frameworks on the state and national levels. This implementation requires a clear and exhaustive database on (macro and micro) plastic waste generation and deeper insights into microplastic assessment and methodology.

11.2 OBJECTIVE

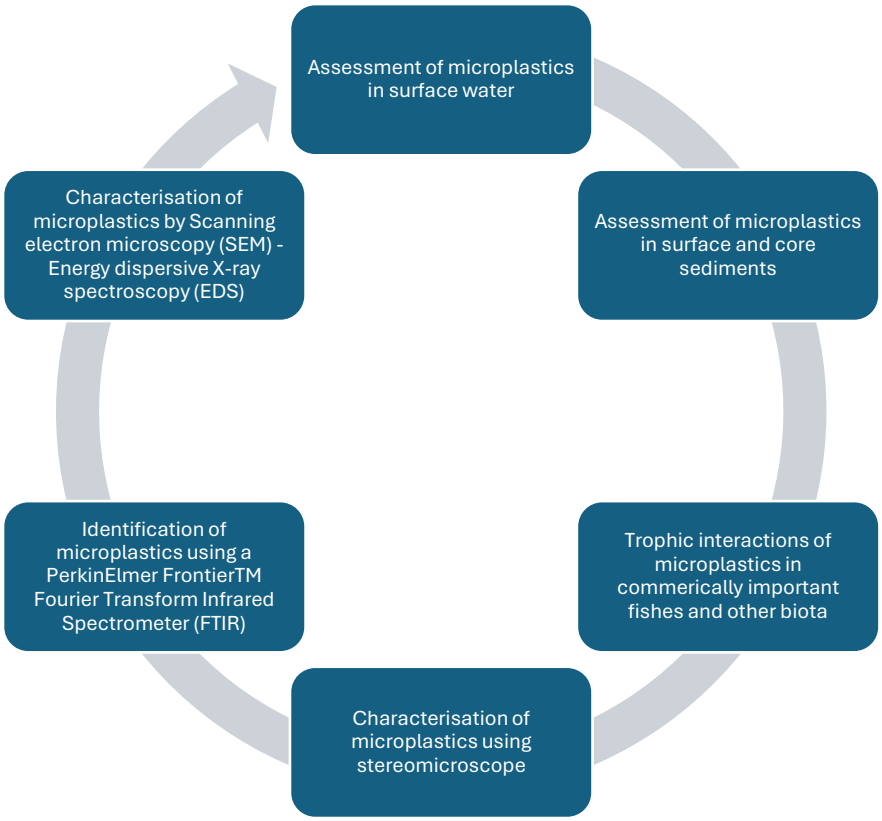
The objective of this intervention is the assessment of sources of microplastics in hotspot areas and the development of a common methodological approach to estimate the flux of waste that leads to microplastic distribution across water bodies, sediments and biota.

11.3 STAKEHOLDERS & INSTITUTIONAL MECHANISM

Table 1 Stakeholders and Institutional Mechanism

Partner Agency	• National Centre for Sustainable Coastal Management (NCSCM), Ministry of Environment, Forest and Climate Change (MoEFCC)
Technical Support	• Indo-German Development Corporation project "Circular Economy Solution (CES) Preventing Marine Litter in Ecosystems" by GIZ India. (BMUV and MoEFCC)
Institutional Mechanism	• NCSCM has joined hands with GIZ India as knowledge partner • NCSCM has conducted the Sampling in consultation with State Departments and city administration – Uttar Pradesh, Tamil Nadu and Kerala.

11.4 INTERVENTIONS



11.5 IMPACTS

1. Development of methodology for the assessment of microplastics to be followed uniformly at the national level. The methodology has been submitted to Hon`ble NGT by NCSCM as one of the methodologies for the assessment of microplastics.
2. Carried out a scientific study on marine litter, riverine litter and Microplastics in three States and five cities.
3. The DSS was prepared to facilitate policymaking (DSS is a computer-based tool that helps in assessing the impacts of marine litter, identify the most effective management strategies, and evaluate the outcomes of different interventions)
4. A total of 149 events were organised under the various themes of Mission LiFE. During these events, around 7537 coastal communities were sensitized.
5. NCSCM provided technical support as the lead technical partner in preparation of the G20 Report on Actions Against Marine Plastic Litter Fifth Information Sharing based on the G20 Implementation Framework 2023.
6. In May 2023, NCSCM joined hands in the G20 beach clean-up. The clean-up drive was conducted at six beaches across two project states. In Tamil Nadu, nearly 521 volunteers collected a cumulative amount of 561 kg of litter from three beaches, and in Kerala,

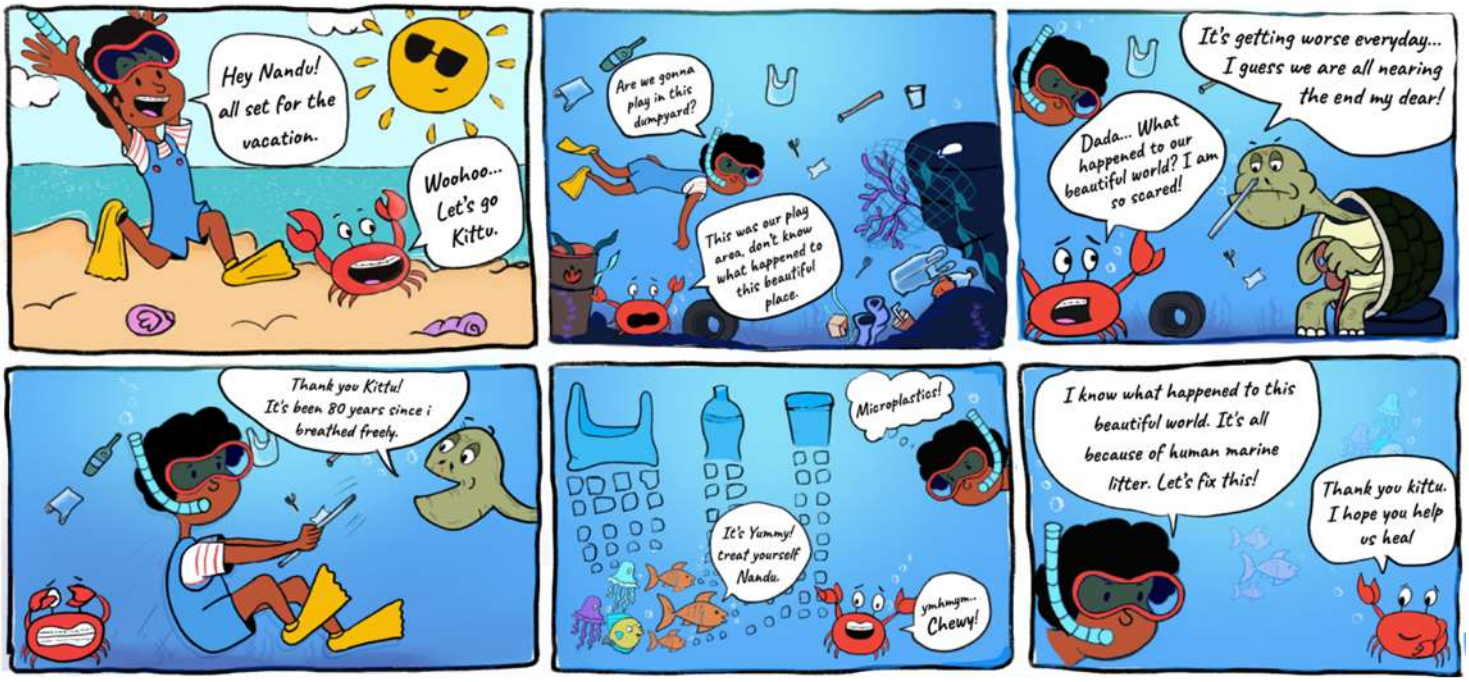
more than 500 volunteers across three beaches collected litter weighing around 1710 kg. During this event, NCSCM prepared posters and pamphlets and displayed them on the beaches to raise awareness of the need to reduce plastic, conserve water and energy, and live in harmony with nature.

11.6 TIMELINE

NCSCM has been supported for activities including the development of methodology for microplastic from October 2021 to December 2023.

11.7 SCALABILITY

The methodology for the assessment of microplastics can be applied in other riverine and coastal ecosystems. NCSCM methodology has been acknowledged by Hon'ble NGT, along with methodology from the other two institutions. NGT has directed for a single methodology, the scalability in this case will be dependent on the approved methodology. However, based on the assessment detailed report has been produced including action plans for marine litter and microplastic which can be used by different stakeholders.



Chapter 12

TRAINING & CAPACITY BUILDING ON EPR & SUPs

12. Training, Capacity Development and Development of Knowledge Products on Extended Producer Responsibility (EPR) & Single-Use Plastics (SUP_s)

12.1 CONTEXT

Under the project, various measures have been implemented to train stakeholders, boosting their capabilities and knowledge in plastic waste management. The primary goal of these knowledge-based products is to equip policymakers, regulators, and enforcers with a thorough and current understanding of Extended Producer Responsibility (EPR) and Single-Use Plastics (SUP) regulations, both in theory and practice, within the context of plastic waste management in India. These initiatives include developing training toolkits, manuals, and online training modules, crafted in consultation with Indian and German experts, to offer comprehensive insights into EPR principles and SUP regulations, along with practical strategies for implementation.

12.2 OBJECTIVE

To enhance stakeholders' knowledge and capabilities in plastic waste management through comprehensive training resources on Extended Producer Responsibility (EPR) and Single-Use Plastics (SUP) regulations for effective implementation in India.

12.3 STAKEHOLDERS & INSTITUTIONAL MECHANISM

Table 1 Stakeholders and Institutional Mechanism

Central/State Nodal Department and State-Level Agencies	• Central Pollution Control Board (CPCB) • Department of Environment, Forest and Climate Change, Government of Uttar Pradesh • Uttar Pradesh Pollution Control Board (UPPCB) • Department of Environment Climate Change and Forest (DoECCF), Government of Tamil Nadu • Tamil Nadu Pollution Control Board (TNPCB) • Tamil Nadu Green Climate Company (TNGCC) • Directorate of Environment & Climate Change (DoECC), Government of Kerala • Kerala State Pollution Control Board (KSPCB) • Respective Urban Local Bodies in the Project States
Technical Support	• Indo-German Development Corporation project "Circular Economy Solution (CES) Preventing Marine Litter in Ecosystems" by GIZ India. (BMUV and MoEFCC)
Implementing partners	• iForest, Landbell Greenforest Solutions-BFS, FICCI, KPMG, ICLEI, CED, Kabadiwala Connect, MagicSpangles Pvt Ltd, Adelphi, Individual Consultants
Institutional Mechanism	• The training and capacity-building interventions have been targeted for both the public and private sectors with the development and dissemination of training toolkits, online/on-site workshops, and online modules.

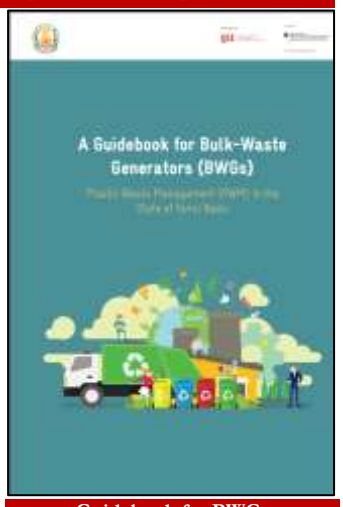
12.4 INTERVENTIONS

- Development of National Level Compliance Assessment Methodology for SUPs, EPR Training Toolkits for Public and Private Sectors, and an Online EPR Training Module with animated videos, case studies, and a compendium of success stories.
- Dissemination of Knowledge Products: EPR Advisory (RACE), Guidebook for Bulk Waste Generators (BWG_TN), Data Repository for Plastic Alternatives (SUP Alternatives) and IEC Cell resources.
- Conducting training and consultation workshops with stakeholders including Regional Directorates (RDs), State Pollution Control Boards (SPCBs), and Urban Local Bodies, and training on EPR implementation and registration modalities for Producers, Importers & Brand Owners (PIBOs) and Plastic Waste Processors (PWPs), State Level EPR Campaigns, as well as training self-help groups and MSME sector.
- Discussions by focused group on legacy waste management, panels on EPR & SUP ban.

Training Workshop on EPR, Tamil Nadu

Training Workshop on EPR, Uttar pradesh

Animated videos for the online training modules of EPR portal



Guidebook for BWGs

12.5 IMPACTS

During Jan-Dec 2023, more than 92 training/workshop/consultations with more than 6179 participants were conducted reaching out to around 38,355 people by direct information,

education, and communication (IEC) initiatives. Overall, the collective reach to the stakeholders for the project states (Uttar Pradesh: 2021-March 2024; Tamil Nadu: 2021-23; Kerala: 2021-24) is depicted below:

12.6 TIMELINE

The training, capacity building and development of knowledge products is ongoing during the project span.

12.7 SCALABILITY AND MECHANISM FOR REPLICATION

The project aims to enhance the scalability and replication potential of its training and capacity-building interventions through the following:

1. Understanding and sharing of knowledge to be utilized for enriching Training of Master Trainers on EPR and SUPs in consultation with the respective industries/ waste management agencies for on-ground implementation. These should further be documented and disseminated as success stories and case studies.
2. Interstate training exchanges can be organized to foster the sharing of best practices and experiences among stakeholders from different regions.
3. Training modules should be designed and updated for their adaptability to ground challenges in the context of implementation (for example, learning from the land-related allotment case from Kerala).
4. Training materials and modules can be translated and adapted for replication in various regional languages to ensure widespread accessibility and understanding.
5. Posters and other educational materials can be created and distributed through the translation and training of officials, enhancing awareness and knowledge at the grassroots level.
6. The iGOT Karmayogi platform can be leveraged by the government to replicate and scale these training interventions across the country effectively.

Chapter 13

STATE LED- MEENDUM MANJAPPAI

13. Support to State-led Meendum Manjappai Campaign to Create Public Movement – Tamil Nadu

13.1 CONTEXT

Single-use plastics, such as bags, bottles, and packaging when improperly disposed of, can end up in rivers, lakes, and ultimately in the ocean. Marine litter is a direct consequence of plastic pollution. It affects marine animals through ingestion or entanglement, leading to injury and death. Additionally, studies show plastics also release toxic chemicals into the water, endangering marine species and entering the food chain, ultimately ending up impacting human health.

The Government of Tamil Nadu has launched the "Meendum Manjappai" (Return to the Yellow Bag) campaign to address this issue. The campaign aimed to create a public movement to encourage people to return to the use of eco-friendly manjappai, discarding the use of plastic bags. Manjappai is a traditional yellow cloth bag commonly used in Tamil Nadu, India. Historically, it has been an integral part of Tamil culture, used for carrying daily groceries, vegetables, and other items. The campaign aims to revive the practice of using Manjappai to reduce plastic pollution and promote sustainable living.

13.2 OBJECTIVE

To support State Led Campaign – Meendum Manjappai towards creating a public movement against the use of single-use plastic.

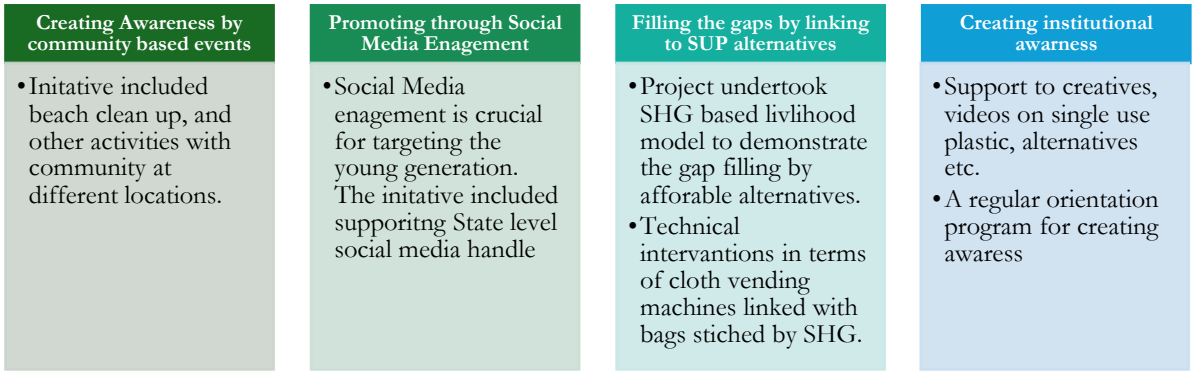
13.3 STAKEHOLDERS & INSTITUTIONAL MECHANISM

Table 1 Stakeholders and Institutional Mechanism

State Nodal Department & State-Level Agencies	• Department of Environment Climate Change and Forest Government of Uttar Pradesh • Tamil Nadu Pollution Control Board (TNPCB) • Tamil Nadu Green Climate Company (TNGCC)
Technical Support	• Indo-German Development Corporation project "Circular Economy Solution (CES) Preventing Marine Litter in Ecosystems" by GIZ India. (BMUV and MoEFCC)
Implementing partners	• K S Smart: A technology partner involved in developing solutions for the campaign. • Hand in Hand India: An NGO working on community mobilization and

	awareness campaigns. • VGK Ventures • Vidhai Recycling
Private Sector collaboration	• Support to Self-Help Groups (SHGs) for market linkages for selling of Manjappai Bags
Institutional Mechanism	• Project implemented the activities in close coordination with Tamil Nadu Green Climate Company (TNGCC)

13.4 INTERVENTIONS



13.5 IMPACTS

The project has supported many events and activities such as "community awareness programmes, beach cleanups, street plays, social media support" under the "Meendum Manjappai" Campaign having direct and indirect impacts. The key direct impacts of activities undertaken-

1. 27 Focused group discussions were conducted with the Fishermen community on SUP awareness and fishing net disposal.
2. More than 11,217 participants were reached by different activities such as consultations, signature campaigns, sports meetings, and street play.
3. With 1150 SHG members across diverse regions being part of an awareness campaign.
4. As of December 2023, a total of 94300 bags worth INR 20,74,600 has been stitched, which includes the distribution of 6850 bags to the vending machines. This has provided an additional income for SHGs and offered the public an affordable alternative to plastic bags. SHGs in rural areas were supporting the cloth vending machines in Urban Areas.
5. Eight Cloth vending machines were installed under the project. The state has installed more than 130 Cloth vending machines.
6. Social media posts include information on multilayer plastics (MLP), single-use plastics (SUP), alternatives and plastic waste to create awareness among the public.
7. Social media support includes 898 followers and a profile reach - more than 16,294 people.

8. Development of a comic of Kittu & Nandu – The Sustainability Heroes for creating awareness.
9. Guidance Manual for Organizing the Low-carbon and Zero-Waste events.

13.6 TIMELINE

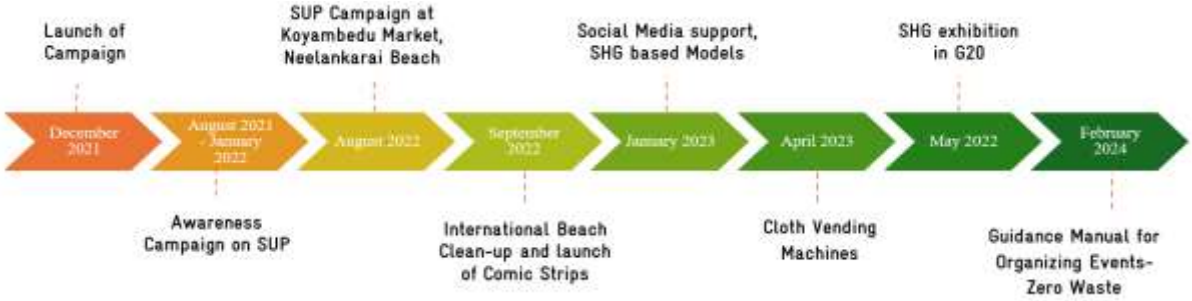


Figure 4 Timeline of the project

13.7 RESOURCES

1. The "Meendum Manjappai" campaign successfully involved multiple partners in organizing the events with the community, SHGs, NGOs, and others.
2. The project supported 8 cloth vending machines, social media support, Creation, and support to SHG-based cloth bags 130,000 Euro over three years.

13.8 SCALABILITY AND MECHANISM FOR REPLICATION

The success of the "Meendum Manjappai" campaign demonstrates the potential for a large-scale public movement towards sustainable living and environmental conservation. By promoting the use of traditional, eco-friendly alternatives like Manjappai, Tamil Nadu is setting a benchmark for other states and regions to follow in the fight against plastic pollution. The "Meendum Manjappai" is a state-led campaign that offers a scalable model for promoting sustainable practices and reducing plastic waste. Key factors for scalability include:

1. Leveraging collaborations between government agencies, NGOs, and the private sector.
2. Targeting key hotspots which are generating the waste as well as where the waste is getting accumulated.
3. Expanding community-based initiatives and inclusion of SHGs.
4. Replicating the SUP-free institution model in other government and private organizations.
5. Identifying the gaps in the supply of alternatives and reduce with the help of market-based mechanisms.
6. Active social media support for the campaign by involving different platforms and user groups.

Extending awareness campaigns and educational programs to schools, colleges, and community centres across Tamil Nadu and beyond.

Chapter 10

RACE CAMPAIGN FOR SUPs

14. RACE (Reduction, Awareness, Circular Solutions, Mass Engagement) Campaign for Single-Use Plastics (SUPs)- Uttar Pradesh

14.1 CONTEXT

The state of Uttar Pradesh generates over 1.6 lakh tons (as reported in the annual PWM report 2019-20, CPCB). To address this serious concern and to deliberate on plastic production, consumption, and its impact on the environment the Department of Environment, Forest, and Climate Change (DoEFCC) and the Urban Development Department, Government of Uttar Pradesh with GIZ support (CES Marine Litter project) launched the mass movement RACE (Reduction, Awareness, Circular Solutions, Mass Engagement) Campaign for Single-use Plastic (SUP) free Uttar Pradesh. The week-long plan of the RACE Campaign schedule was created under two sections: Planning and Monitoring, and Implementation.

14.2 OBJECTIVE

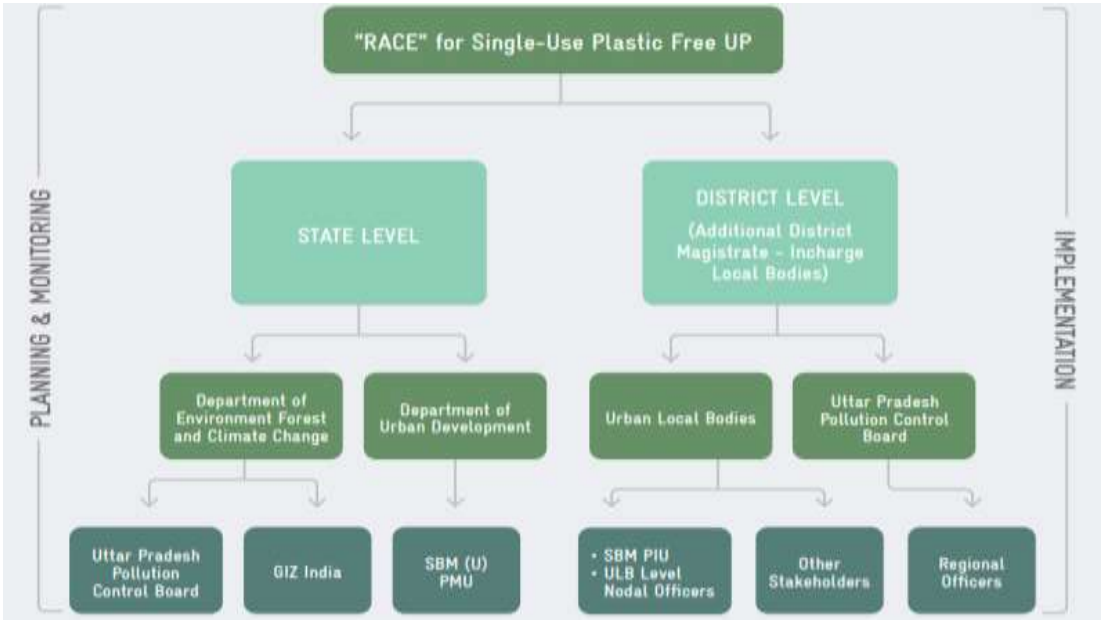
The objective of this initiative is to create awareness about plastic waste management, through government representatives and stakeholders including Sustainability Managers/Leaders, Industry Representatives, Producers, Importers and Brand Owners (PIBOs), Recyclers and processors.

14.3 STAKEHOLDERS & INSTITUTIONAL MECHANISM

Table 1 Stakeholders and Institutional Mechanism

State Nodal Department & State-Level Agencies	• Department of Environment, Forest, & Climate Change (DoEFCC), Government of Uttar Pradesh • Urban Development Department, Government of UP
Technical Support	• Indo-German Development Corporation project "Circular Economy Solution (CES) Preventing Marine Litter in Ecosystems" by GIZ India. (BMUV & MoEFCC)
Key Stakeholders	• The RACE campaign brought together key representatives from the Central and the State government along with 734 ULBs, Research and academic institutes, industry experts, entrepreneurs, start-ups, RWAs, NGOs, youth groups, and civil society organisations to address the

	challenge of reducing Single-use plastic.



14.4 INTERVENTIONS

1. Three major cities were picked to organise mega plogging[5] drives and mass ghat (Ganges) cleaning drives - Lucknow, Prayagraj and Varanasi. In comparison, all other cities and towns contributed with local plogging drives.
2. Plastic Banks, Jhola Bank and Bartan Banks were installed throughout the state under the RACE campaign.

[5] A combination of jogging with picking up litter

Installation of Barton Bank, Ghaziabad

3. UP Plasticathon Challenge on 5 June 2022 (World Environment Day)- to crowdsource workable circular solutions for sustainable plastic waste management from start-ups and innovators.
4. The development and implementation of Refillable models were planned and initiated with pilot implementation in Lucknow to encourage sustainable consumption practices and reduce consumer use of plastic packaging.
5. A Technology Exhibition for showcasing single-use plastic alternative solutions was also organized (Lucknow).
6. RACE 2.0 - "RACE FOR LiFE: Circular Economy & Local Climate Action"
    a. 'Advisory' for the Implementation of EPR for plastic packaging in UP & 'Factsheet' of the EPR-led Business Model for Legacy Waste Management of Prayagraj.
7. RACE 3.0 in Ayodhya: "Unveiling New Dimensions for UP Government's SUP-Free Campaign"
8. 'RACE 3.0, SUP Free Ayodhya, mega public awareness campaign organized on January 9, 2024. Hon'ble Chief Minister inaugurated the exhibition showcasing alternatives to SUP. [10 exhibitors and around 150 participants]
    a. Plog Run organized at Ram Ki Paudi [around 300 participants]
    b. SUP Alternative Booklet and Movie on Plastic Free UP were released.
    c. Pakka Ltd (one of the exhibitors) signed a MoU with Ayodhya Ram Mandir Trust as the official compostable tableware brand. Many others are in discussion with Trust and ULB's

14.5 IMPACTS

Social Media Outreach-

1. LinkedIn (5,522 followers), Facebook (3,000 followers), Twitter (563 followers), and Instagram (4,789 Followers).
2. Citizens, ULBs and partners were encouraged to share the green stories by tagging the State handle.
3. The hashtag #RACE4SUPFreeUP was trending at 2nd position in India and ended at 5th by the end of the day on 3 July 2022.

Impacts of RACE 1.0 -

1. B2B Meet to Promote Single:
    a. Use Plastic Alternative Solutions resulted in collaboration and partnership opportunities – B2B and B2G as well as Research and Development support for plastic alternatives in the state of Uttar Pradesh.
    b. B2B meet led to potential solutions from 70+ SUP Alternatives
2. Boost under current Extended Producer Responsibility (EPR) Regime for the Plastic Packaging Sector:
    a. Engagement with Plastic Waste Processors under the EPR regime: 25+
    b. Brand Owners engaged under the EPR regime: 13+
    c. Work under progress with 5+ Cement Coprocessing
    d. Ongoing interaction with 5+ coprocessing plants

Impacts of RACE 2.0-

1. A SAMVAAD (online discussion) on "RACE for LiFE" was organized on World Environment Day 5.6.2023. [58000 Panchayats, 762 ULBs participated, 500 were present in the event]

Impacts of RACE 3.0-

1. The key learnings and results from the pilot "EPR-led business model for Legacy Waste Management" in Prayagraj, UP was shared.
2. This model, initiated as part of the RACE campaign in 2022, stands as one of the pioneering efforts in this domain.

14.6 TIMELINE

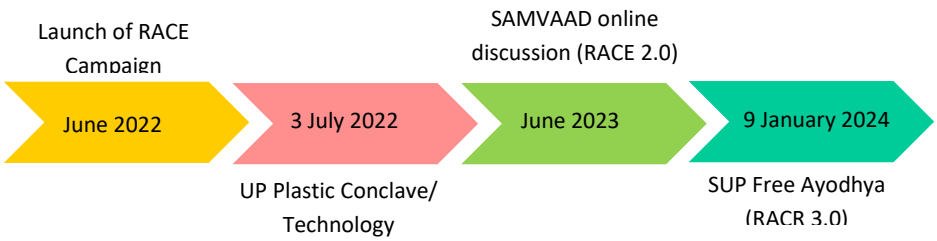


Figure 13 Timeline of the project

14.7 RESOURCES

Technical support (Venue, Experts travel, Movies, Material, Instruments, etc.):105,000 Euros

14.8 SCALABILITY AND MECHANISM FOR REPLICATION

1. Forming a charter aligned with Sustainable Development Goals (SDGs) can effectively close gaps in the plastic value chain and enhance collaboration between government and private sector stakeholders.

2. Like the RACE Campaign, B2B meetings can provide a platform for innovators and start-ups to showcase economical single-use plastic alternatives and explore opportunities for piloting solutions in Uttar Pradesh, ensuring circularity in the plastic value chain.

3. Mentorship sessions with industry experts can help selected innovators and start-ups improve their business models and pitches while providing handholding support for preparing action plans for pilot implementation in Uttar Pradesh.

4. Engaging both government stakeholders, such as the Uttar Pradesh Pollution Control Board and Urban Local Bodies, and private sector stakeholders can facilitate access to innovation, finance, skills, and expertise, leading to improved operational efficiencies for sustainable waste management.

5. Transitioning to circular packaging requires industries to shift to mono-material packaging (mono plastic and paper) to increase recyclability and ensure deinking, thereby improving the quality of recycled content.

6. Planning a campaign strategy involves multi-stakeholder consultations, engaging with ULBs and government departments, and conducting technical consultations and workshops to ensure comprehensive stakeholder engagement.