

Achieving Environmental Sustainability

by involving young minds for a Circular Future

Report on 'Collective Responsibility Drive for Plastic Waste Management'
Moving towards Garbage Free Cities under SBM-Urban 2.0





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Keynote Message



Plastic has been a part of our daily lives and has grown indispensably. Unfortunately, due to its persistent nature, plastic has accumulated in nature over the years and has impacted the well-being of millions of people. The three pillars of the circular economy - eliminate, innovate, and circulate offer a new vision to tackle the crucial issue of plastic pollution. By supporting various projects in the sector of circularity, UNICEF is consistently collaborating with governments across the globe to tackle the plastic pollution issue.

UNICEF has partnered with several enterprises for reinforcing the circularity approach in plastic waste management by diverting plastic waste into infrastructure development in schools. UNICEF India has been providing constant support to the Government of India in its journey for creating 'Garbage Free Cities' under Swachh Bharat Mission 2.0.

UNICEF Maharashtra is committed to support the Government of Maharashtra (GoM) in addressing the issues with plastic waste management. In alignment with this, a pilot project 'Collaborative Responsibility Drive for Plastic Waste Management' was undertaken by UNICEF Maharashtra through Maharashtra Urban WASH and Environmental Sanitation Coalition (MAHA-UWES-C). The project was undertaken with a vision of reinforcing the significance of at-source segregation of plastic waste and promoting the citizens participation in plastic waste management. The initiative involved students as a catalyst to bring about behavior change in a larger population and address the objectives of SDGs 12 and 13. The present publication "Achieving Environmental sustainability by involving young minds for circular future" has been created in order to disseminate important takeaways of the project and provide a direction to other urban local bodies to adopt and replicate such innovative approaches for effective plastic waste management.

I would like to congratulate the entire team of the Citizens Association for Child Rights (CACR), Mumbai for their efforts in encouraging young minds, to contribute to the journey of reaching a sustainable future by adopting a circularity approach. I would like to extend my gratitude to the Municipal Corporations of Thane, Navi Mumbai and Panvel for adopting this initiative. I would also like to appreciate the respective school authorities for participating and facilitating the initiative.

I would like to congratulate the team at Secretariat of MAHA-UWES-C at RCUES of AILSG, Mumbai for providing support and guidance for successful implementation of the initiative and capturing this journey in this document, which may encourage local governments, schools and the development partners to adopt the suggested models for effective plastic waste management in their cities.

Rajeshwari Chandrasekar
Chief of Field Office
UNICEF Maharashtra



Keynote Message



Plastic pollution has emerged as a persistent challenge and has impacted several lives across the globe. In order to tackle the concerns of plastic pollution and promote effective plastic waste management, India has launched Plastic Waste Management Rules in the year 2016. Urban local bodies are mandated under the Plastic Waste Management Rules, 2016, to manage plastic waste at the city level. To further enhance the efforts, scientific management of plastic waste and circular economy have been included as some of the major focus areas under national flagship missions such as Swachh Bharat Mission 2.0.

As a pioneer, All India Institute of Local Self Government has been in the forefront in providing support to the state and local governments through capacity building, research, advisory, implementation and IEC activities. AIILSG has always aligned its focus with the national and international programs and missions. Considering the focus on creating 'Garbage Free Cities' under SBM 2.0 and improving waste management under SDG 12 and 13, AIILSG is also engaged in providing technical support to Urban Local Bodies for enhancing the existing Solid Waste Management systems.

'Collaborative Responsibility Drive for Plastic Waste Management' was a unique pilot project undertaken by the Citizens Association for Child Rights (CACR) with support from Regional Center for Urban and Environmental Studies (RCUES) of AIILSG, Mumbai and UNICEF Mumbai Field Office. This pilot project aimed at promoting circularity in plastic waste management and involved school children as catalysts for behavioural change. Involvement of schools and children in plastic waste management helps in reaching larger audiences and brings about a change in citizen's perspective towards plastic waste management. The present publication "Achieving Environmental Sustainability by Involving Young Minds for Circular Future" is an outcome of the pilot project and discusses key learnings and potential approaches for scaling up the project.

I would like to congratulate the entire team of the Citizens Association for Child Rights (CACR), Mumbai, the Municipal Corporations of Thane, Navi Mumbai & Panvel and the participant schools from these cities, for successful implementation of the project. Involvement of teachers and students in making it a success story is incredible.

I appreciate UNICEF Maharashtra for providing support to the project addressing the critical issue of plastic waste management. Lastly, I would like to acknowledge the efforts of the team at Secretariat MAHA-UWES-C at RCUES of AIILSG Mumbai for providing required support, documenting these efforts and organizing a dissemination workshop for ensuring wider reach of the initiative.

Dr. Jairaj Phatak, IAS (Retd.)

Director General

All India Institute of Local Self Government

Acknowledgement

With the launch of the Swachh Bharat Mission (Urban) 2.0, India has taken a significant step to further reinforce the Swachhta momentum achieved in the first phase of the mission with focus on creating Garbage Free Cities. Plastics waste constitutes approximately 46% to the total dry waste generated in India. For achieving effective plastic waste management, greater emphasis is laid on source segregation, waste processing facilities, phasing out of single-use plastics (SUPs) and moving towards circular economy. SBM 2.0 has also highlighted the significance of IEC and behaviour change through citizen outreach and Jan-Andolan, towards achieving the mission's objectives. Schools play a key role in creating social awareness and behavioural change in the future generation.

'Collaborative Responsibility Drive for Plastic Waste Management' is a project that demonstrates how behaviour change in children can lead to circular economy through systematic segregation and collection of plastic waste. Citizen's Association for Child Rights (CACR), Mumbai, a partner organization of Maharashtra Urban WASH and Environmental Sanitation Coalition (Maha-UWES-C), implemented this on a pilot basis in the cities of Navi Mumbai, Thane and Panvel of Maharashtra.

It is our pleasure to thank Navi Mumbai Municipal Corporation, Thane Municipal Corporation and Panvel Municipal Corporation for welcoming this initiative and supporting its implementation by CACR in the schools.

Their directives and encouragement to the schools resulted into active participation of schools in this drive. We must appreciate and thank the entire team of CACR for exemplifying this approach for achieving circular economy by involving young minds to drive a collaborative change. We thank all those change-maker students and teachers from the government and private schools of these cities, for their heart-warming contribution to this 'Collective Responsibility Drive' to make it a success story. We would also like to thank Kushaagra Innovations Foundation, Pune for supporting us in capturing this successful journey of stakeholders in this drive, through this report.

We take this opportunity to thank UNICEF, Maharashtra for supporting incubation and implementation of such innovative ideas, which may be instrumental in achieving circular economy and making cities Garbage Free, as envisaged in SBM (U) 2.0. We express our deep gratitude for the Hon'ble President and Director General, All India Institute of Local Self Government for their continued support in our initiatives under Maha-UWES-C.

The team at Secretariat of Maha-UWES-C at RCUES of AILSG, Mumbai deserves a heartfelt thank you for their support in making every initiative under the Coalition a success.

Ms. Utkarsha Kavadi,
Senior Executive Director,
All India Institute of Local Self-Government, Mumbai,
(Director, Secretariat of Maharashtra Urban WASH & ES Coalition, RCUES of AILSG Mumbai)



Acronyms

AIILSG	All India Institute of Local Self-Government
CACR	Citizens Association for Child Rights
CAS	Creativity, Activity, Service
CCRI	Children's Climate Risk Index
CSR	Corporate Social Responsibility
EPR	Extended Producer Responsibility
GFC	Garbage Free Cities
IEC	Information, Education and Communication
KIF	Kushaagra Innovations Foundation
LMS	Learning Management System
Maha-UWES-C	Maharashtra Urban WASH and Environmental Sanitation Coalition
MCGM	Municipal Corporation of Greater Mumbai
MMR	Mumbai Metropolitan Region
NDC	Nationally Determined Contribution
NMMC	Navi Mumbai Municipal Corporation
PWM	Plastic Waste Management
RCUES	Regional Centre for Urban and Environmental Studies
RWAs	Resident Welfare Associations
SDG	Sustainable Development Goals
SHG	Self Help Group
SUPs	Single-Use Plastics
TMC	Thane Municipal Corporation
ULBs	Urban Local Bodies
WASH	Water, Sanitation and Hygiene

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Figure 1: Recycled Plastic Waste into Resource displayed at D.G. Khaitan school
Figure 2: Transformation of plastic waste into utility products

01 Executive Summary

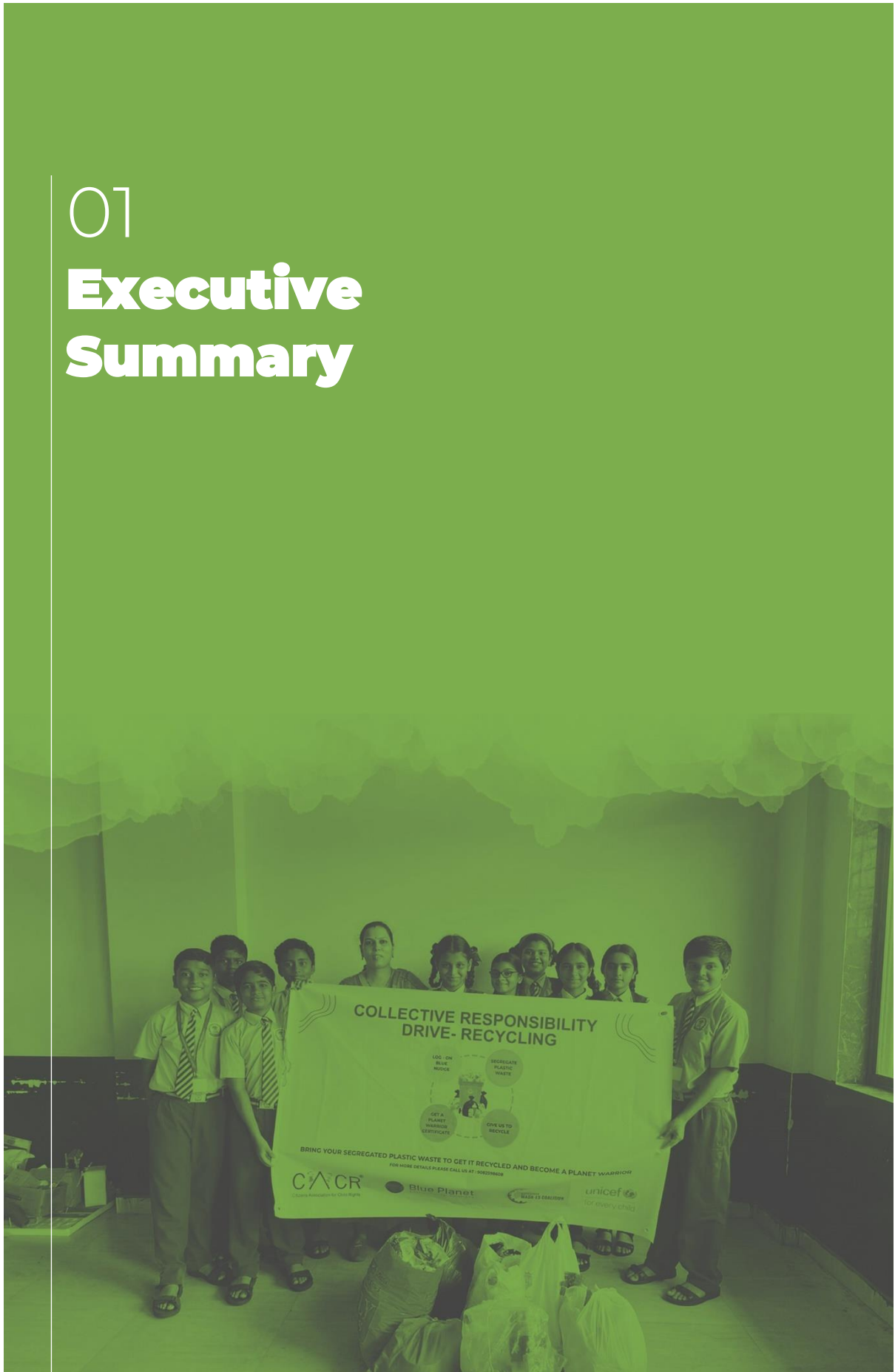




Figure 3: Weighing the plastic waste collected at Indo Scots Global Highschool

01- Executive Summary

Plastic, since its discovery in 1907, has become an integral part of our daily lives due to its diverse applications. However, its excessive usage and persistent nature have led to the accumulation of plastics in several ecosystems. Thus, Plastic pollution has emerged as one of the most severe environmental issues of 21st century. Completing the circle of Plastic, through recycling and management of the plastic waste is the need of the hour. Non segregated plastic is difficult to recycle and if mixed in organic waste that is converted to compost, can reduce the fertility of the topsoil. Littered plastic clogs the drains leading to flooding. Segregating and collecting the plastic after its use as close to the point of use reduces its chances of becoming contaminated with organic waste thus improving its potential to be recycled and scientifically managed. It also improves the conditions under which the waste pickers have to sort it.

Maharashtra Urban WASH and Environmental Sanitation Coalition (Maha-UWES-C) is a joint initiative of the Regional Centre for Urban and Environmental Studies (RCUES) of All India Institute of Local Self-government (AIILSG), Mumbai and UNICEF Maharashtra established to facilitate partnerships, policy discourse, encourage innovations, knowledge support & dissemination and enhance capacities of stakeholders towards improvement in service delivery of WASH and ES. Under the initiative of the Maha-UWES-C, UNICEF

Maharashtra has funded Citizens Association for Child Rights (CACR) for a small-scale intervention for the Demonstration of Resource Recovery and Circular Economy with Plastic Wastes Management (PWM) in 3 Urban Local Bodies¹ in Mumbai Metropolitan Region (MMR) engaging School Children and Resident Welfare Associations to inform an approach for collective responsibility for garbage free city under SBM 2.0 (Urban). CACR is one of the partners of the Maha -UWES-C and has implemented this project under the support of its Secretariat at RCUES of AILSG, Mumbai.

CACR has substantial experience of working with children and schools in the MMR. It has leveraged its past connections with the ULBs and schools to approach the schools with the 'Collective Responsibility Drive' project. CACR works in the area of Water, Sanitation and Hygiene (WASH); and menstrual hygiene with schools. Though the waste collection was a new area for CACR, the project was implemented successfully in 126 schools, creating awareness on plastic waste management within the students, schools (teachers) and families.

In April 2022, the project was started by conducting meetings with concerned stakeholders. Simultaneously a database was created of all the public and private schools in the 3 Urban Local Bodies (ULBs). June onwards CACR field coordinators started approaching the schools to onboard them for the project.

Orientation sessions were held with 176 schools. The students were introduced to 'Blue nudge'² platform, to sign in and complete the course. A simple offline mode of LMS was created on the importance of plastic waste segregation, impacts of plastic on the environment and recycling potential of plastic. This presentation was used in an interactive format during the orientation sessions.

August 26th, 2022, was the first plastic collection day of the project. Schools were informed to collect the plastic from the students a day prior and a collection vehicle was organized to collect the plastic from schools. A monthly collection from each school was planned from August 2022 to December 2022. On an average 8 to 10 schools were visited by the collection van per collection day. Plastic was collected on 34 days over the period of 4 months. The schools were very responsive, and the project successfully collected a total of 11,700Kg of plastic during the four-month period.

The plastic waste was transported to a recycler located in MMR region. As an incentive to the schools, a recycled plastic product was to be given to the schools based on the quantity of plastic they collected. Recycled products worth INR. 6,75,000 were procured in the form of benches, flowerpots, pens, etc. and distributed to children and school towards build back for better future.

The project has created awareness amongst 1,52,967 students, estimated 2640 teachers and an estimated 1,00,000 families³. This pilot also demonstrated the need for behaviour change while managing plastic waste.

Financially, 45% of the project cost was utilized for the IEC activities in the school, followed by 36% towards logistics of collection of plastics and procurement and delivering recycled products to schools; 11% was for capacity building and learning modules and the remaining 5% was for all other project costs. The project was able to create awareness in five times its targeted students and double the number of targeted populations.

11.7 tonnes of plastic waste was collected resulting in reducing carbon emissions to the tune of 40,950 kg.⁴ This is an integral part of our global commitment towards pollution control and climate change.

¹ Three Municipal Corporation – Thane, Navi Mumbai and Panvel Municipal Corporations

² 'Blue Nudge' is an online environmental awareness module developed by Blue Planet

³ Assuming 15 teachers per school, and approximately 80% of student families.

⁴ Most conventional plastics are made using fossil fuels. Plastic production uses 4% of petroleum produced globally per year, and the refining process uses another 4%. Producing just 1kg of plastic emits between 2 and 3.5kg of carbon emissions. <https://small99.co.uk/materials/packaging/why-plastic-free-isnt-the-same-as-carbon->

Recommendations for Sustainability, Replicability and Scalability of the Project

The sustainability of the project depends on two critical elements, first, a sustained periodical awareness nudge to the students and creation of a long-term plastic collection and management system. Forming the habit and ensuring the system to sustain is very important, or the lessons learned can be quickly forgotten.

The 'Collective Responsibility Drive' project has great potential for replicability and scalability in different geographies. It can be easily customized for different socio-economic and language background. The online module if made child friendly can become a good LMS for the young student population.

The financial viability of the project can be increased through a few steps. The proposed budget for implementation of the project in 150 schools with a target of collecting plastic of 78MT over a four-month period is estimated at INR 31 Lakhs. The business model has to create revenues from the sale of collected plastic. This revenue can offset the logistic cost of collection of the plastic and provide for the provision of recycled products to the schools. The estimated revenue that can be generated from the sale of plastic is INR 15 lakhs this is 49% of the project cost. The financial gap for the project is 51%. This can vary based on the quantity and quality of plastic collected as well as market rate for the plastic prevalent then.

Alternatively, the involvement of the ULB for collection systems can also reduce the collection costs. In cases where existing waste management stakeholders from the ULBs are involved for collection of plastic, the revenues could be used for IEC cost. E.g. If existing ULB vehicles are used, or existing waste pickers network is mobilized. The initial IEC project cost required to implement the project in new ULBs is estimated in the range of INR. 1 million. The project can be self-sustainable post one year considering its inclusion in local waste management system and if it meets the requirements of EPR compliance.

[free/#:~:text=Image%20credit%3A%20Pexels-](#)

,How%20does%20plastic%20contribute%20to%20carbon%20emissions%3F,3.5kg%20of%20carbon%20emissions.

02

Project Background





Figure 4: Plastic waste collected by Shree Balaji international School, Kalamoli

02 - Project Background

2.1 Introduction to the Project

The climate crisis is the defining human and child's rights challenge of this generation, and is already having a devastating impact on the well-being of children globally.⁵ The impacts of climate change on the children are in the form of their exposure to climatic hazards such as heatwaves, cyclones, flooding, vector borne diseases and air pollution. This is further compounded for children due to malnutrition and poor access to facilities. The climate crisis is a child rights crisis. Though children are least responsible for the global emissions that have led to the warming of the planet, they feel the greatest impacts.⁶

The Children's Climate Risk Index developed by UNICEF provides a comprehensive view of children's exposure and vulnerability to the impacts of climate change.⁷ The CCRI ranks India at 26 in comparison to 163 countries in the world. The CCRI considers three parameters: Climate and environmental factors, Child vulnerability and Children's climate risk index. The purpose of the CCRI is to help prioritize action for those most at risk and ultimately ensure today's children inherit a liveable planet.

One of the biggest contributing factors for climate change in the world today is Plastic pollution. National Geographic found that 91% of all plastic that has ever been made is not recycled.⁸ This is one area where awareness and right action is the only way to prevent plastic pollution and its detrimental impacts on the environment.

⁵ UNICEF - *Introducing the Children's Climate Risk Index*

⁶ *Future at Risk _ Executive Summary*

⁷ *Introducing the Children's Climate Risk Index*

⁸ <https://earth.org/the-biggest-environmental-problems-of-our-lifetime/>

The report – Environmental and Economic assessment of plastic concludes that- 'the preferred waste management option from a life cycle perspective is the one maximising material recovery while minimising impacts from waste processing (primarily energy consumption). Recycling (mechanical, physical or chemical) is preferable to energy recovery in all pathways analysed, because the environmental savings from energy recovery are not sufficient to compensate for the environmental impacts from waste incineration and the related CO₂ emissions.' Thus, segregating the clean plastic at source and providing it for mechanical recycling has positive impacts for climate change as it reduces production of new plastic.

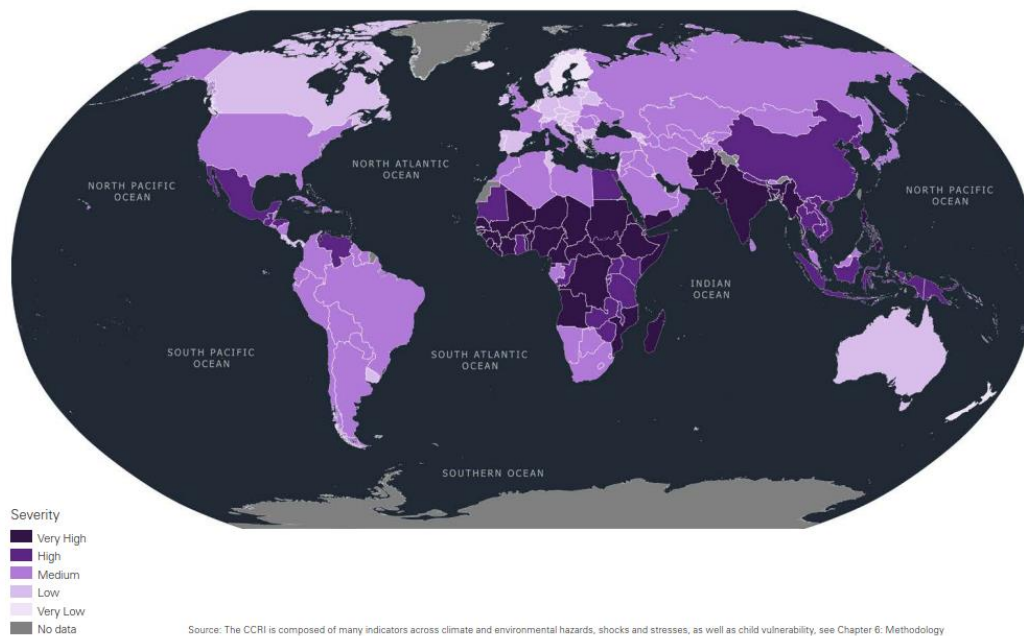


Figure 5: Global map of children's climate risk index

With the launch of the Swachh Bharat Mission (Urban) 2.0, India has taken a significant step to further reinforce the Swachhta momentum achieved in the first phase of the mission with focus on Garbage Free Cities. With greater emphasis on source segregation, waste processing facilities – recycling, and phasing out of single-use plastics (SUPs), SBM 2.0 is set to fast-track country's smooth transition to a circular economy. Swachh Bharat Abhiyan has emphasised the role of IEC and Behaviour Change to reach these goals.

Under the initiative of the Maharashtra Urban WASH & Environmental Sanitation Coalition (Maha-UWES-C), UNICEF Maharashtra has funded CACR for the project - the Demonstration of Resource Recovery and Circular Economy with Plastic Wastes Management (PWM) in 3 Municipal Corporations in MMR (Mumbai Metropolitan Region) engaging school children and Resident Welfare Associations to inform an approach for collective responsibility for garbage free city under SBM 2.0. CACR has implemented this project with support from the Secretariat of Maha-UWES-C at RCUES of AILS, Mumbai. This project is aptly designed for creating awareness on climate change and provide a tool for children to take positive actions to prevent climate change.

2.2 Project Details

This project intervention is aimed at demonstrating Resource Recovery and Circular Economy in Plastic Waste Management involving school students as Blue planet warriors and other key stakeholders with collective responsibility. The proposed approach was to engage primarily with students and children, adults, government functionaries, rag pickers, RWAs, ULBs etc. for source segregation and then resource recovery in

the form of recycling. It also focused on the engagement of various institutions in collaboration with ULBs. to address both SDG 12 and SDG 13 goals under Climate Change and Environmental Sustainability pillar.

Project Duration	March 2022 to December 2022
Project Funds	INR 2,725,000.00
Primary Implementation organisation	Citizens Association for Child Rights (CACR)
Partner organisation	Blue Planet Environmental Solutions
Supporting Organisations	UNICEF Maharashtra
	Secretariat of Maharashtra Urban WASH and ES Coalition at RCUES of AILSG, Mumbai
Government Stakeholders	Municipal Corporations of Thane, Navi Mumbai, Panvel and Brihanmumbai
Geographical coverage	Cities of Thane, Navi Mumbai, Panvel, and Mumbai, Maharashtra
Population focus	Children, residents, housewives, ragpickers, waste managers, stakeholders from corporations, RWAs (Resident Welfare Associations) etc.

Aim: Demonstrating resource recovery and circular economy in Plastic waste management through the engagement of school students and other key stakeholders with emphasis on collective responsibility.

Objectives

This 'Collective Responsibility Drive' approach had the following objectives:

- ❖ To create an opportunity for 25,000 plastic users to contribute towards Plastic Waste Management & engage stakeholders such as institutions and individuals to reduce, reuse recycle and be part of a circular economy.
- ❖ To create awareness and impact in 50,000 population from 100 housing societies and 10 respective RWAs with a behaviour change drive with school children as well as residents of the housing societies, and resident welfare association on appropriate ways of plastic waste management.
- ❖ To amend/develop innovative mechanisms for facilitating the collection drive through the concepts such as 'warriors', 'champions', and monitoring systems to build capacities of various stakeholders mentioned above.
- ❖ To develop an understanding of cost-effective plastic waste management and to demonstrate a self-reliant business model of plastic waste management.
- ❖ To demonstrate an inclusive model of PWM in alignment with the SDG 6.0, SDG 12 and SDG 13 mandate and integrate with SBM 2.0 for urban areas under Climate Change and Environmental Sustainability.
- ❖ To facilitate cross-learning of plastic waste management amongst ULBs.
- ❖ To develop a capacity-building module on corporation-level interventions and share it with stakeholders through the city or state-level workshops/meetings.

2.3 Project Compliance to Existing Policies

The project was envisaged to meet the various National and international policies, goals and commitments.

Policy, Regulation and Treaties	Project Role in the Ecosystem
<p>LiFE - An India-led global mass movement to nudge individual and community action to protect and preserve the environment. – NITI Aayog</p> <p>Transitioning from throwaway culture to a circular economy is imperative.</p>	<p>The children were encouraged to do segregation at source.</p> <p>Once children start practicing and following these important initiatives, it will lead to effective waste management and also less waste reaching the dump sites, reducing the resultant health issues and climate change.</p>
<p>Majhi Vasundhara – A Maharashtra State initiative to make citizen aware of the impacts of climate change and environmental issues and to encourage them to make a conscious effort towards improvement of the environment.</p>	<p>Most of the schools have subjects on environment and climate change and are being taught about these issues and even government schools have topics on "Majhi Vasundhara" which help them in understanding the importance of these issues. This project was an experiential learning opportunity for students on these topics.</p>
<p>Garbage Free Cities - Ban on the use, sale, and storage of non-biodegradable plastic bags/ single- use plastic products/Styrofoam/Thermocol.</p>	<p>To increase awareness, videos on harmful effects of plastic waste were shared on the teacher’s groups. The videos were further shared with all the parents which helped in awareness creation in adults as well.</p> <p>Under GFC star rating protocol, 300 marks of total 7500 marks have been allotted to enforce plastic ban. The project provides an opportunity for ULBs to reduce and recycle plastic waste. The project also conducts awareness as part of measures to be taken by ULB to encourage alternatives to single use plastic to children, such as use of cloth bags, water bottles etc.</p> <p>Report of the quantity of plastic collected were shared with the ULBs.</p>

Policy, Regulation and Treaties	Project Role in the Ecosystem
<p>Swacch Sarvekshan promotes segregated collection of plastic waste. Under this, 150 (10%) marks have been allotted for plastic waste management by preparing a plan and setting up a PWM facility..</p>	<p>Project provides an opportunity for segregated plastic waste collection. It can be considered a important project under the plastic waste management plan.</p>
<p>Plastic Waste Management Rules, 2016 and its Amendments (2018, 2021, 2022)</p>	<p>The project emphasizes the responsibility of the waste generator to segregate the plastic waste at source and providing it in a segregated manner for collection.</p> <p>A system for collection of segregated plastics can be established for the ULB and the Producers, Importers and Brand owners.</p>
<p>EPR - Extended Producer Responsibility for plastic producers, importers and brand owners</p>	<p>The project creates a channel for collection of good quality segregated plastic from the users. EPR can be applied to create a buy back system too.</p> <p>Records of the plastic from each school can be maintained to meet the companies EPR requirements.</p>
<p>SDG 12 – Responsible consumption and production</p>	<p>The project on ‘-plastic waste management’ with focus on children in schools is an extremely important step in understanding and reaching SDGs12 and 13.</p> <p>The IEC material created for the awareness session with the students was targeted to promote responsible consumption and production. Specific examples of use of cloth bags, personal water bottles etc. were cited.</p> <p>The recycled products returned to the schools became a symbol for use of recycled plastic and thus reduction in virgin material production.</p> <p>A check list for reduction of plastic in day to day lifestyle was provided, as complete elimination of plastic is difficult.</p>

Policy, Regulation and Treaties	Project Role in the Ecosystem
<p>SDG 13 - urges to take action to combat climate change and its impacts</p>	<p>The project created a habit of collecting plastic and being conscious of the use of plastic.</p> <p>11.7 tonnes of plastic waste was collected resulting in reducing carbon emissions to the tune of 40,950 kg.⁹ This is an integral part of our global commitment towards pollution control and climate change.</p>
<p>NDC – Nationally Determined Contribution. NDCs embody efforts by each country to reduce national emissions and adapt to the impact of climate change.</p>	<p>The awareness session laid emphasis of day to day lifestyle changes that can be easily adopted versus changes such as organic brands etc. It gave the participants alternatives to the current lifestyle practices and means to increase recycling.</p> <p>Waste Management is an issue of great concern and awareness and habit formation in children are important steps in ensuring the 3Rs (Reduce, Reuse and Recycle) as well as Dry/Wet Waste segregation which further helps in recycling of most of the dry waste collected.</p>
<p>Eco System of Circular Economy</p>	<p>The gifting of recycled product to the school, portrays the potential for a circular economy. The schools have displayed the products to encourage the students to recycle.</p> <p>Choosing a local recycler was critical to ensuring the circular economy potential.</p>

⁹ Most conventional plastics are made using fossil fuels. Plastic production uses 4% of petroleum produced globally per year, and the refining process uses another 4%. Producing just 1kg of plastic emits between 2 and 3.5kg of carbon emissions. <https://small99.co.uk/materials/packaging/why-plastic-free-isnt-the-same-as-carbon-free/#:~:text=Image%20credit%3A%20Pexels-How%20does%20plastic%20contribute%20to%20carbon%20emissions%3F,3.5kg%20of%20carbon%20emissions.>

03

Scope and Methodology





Figure 6: Interactive session at Indo Scots Global High School, Thane

03 - Scope and Methodology

3.1 Scope of the Project:

The project was initiated with the below planned scope,

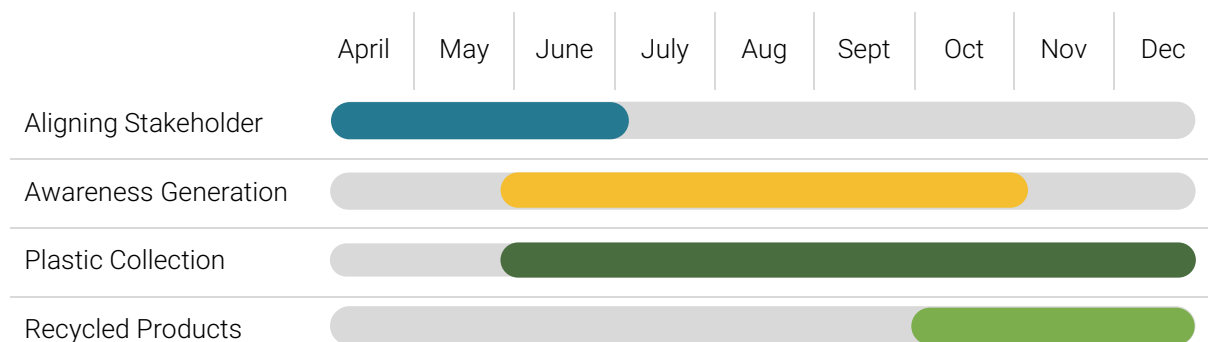
- ❖ Ground Mapping and Data Base to be collected out for schools and societies from the corporations.
- ❖ Approach all stakeholders. Meet School authorities across locations and talk about the initiative: 'Collective Responsibility Drive' post the interaction with the ULB officials.
- ❖ About 100 schools with at least 200 enrolment or students were to be engaged in this drive.
- ❖ The students would be asked to complete their Recycling module via Blue Nudge Platform. The recycling module is a 30 min module giving nudges to the learners with 12- 15 MCQs.
- ❖ The students will be collecting the plastic as part of their own drive at the home, in residential societies, and in other areas.
- ❖ By collecting empty, clean milk pouches, Milk pouches/PET Bottles/Tetra Packs, students will earn 10 points/20 Points/50 Points depending upon the article.
- ❖ To earn a planet warrior certificate, they should have 2000 points.
- ❖ Approach housing societies and conduct meetings with office bearers.
- ❖ IEC materials to be developed to share details about the project while approaching schools and societies.
- ❖ All the plastic collected during the drive be recycled and converted into Benches and will be sent to various government schools and completed. The 'Collective Responsibility Drive' will facilitate the shift from a linear economy to a circular economy.
- ❖ Based on this, a financially sustainable business model to be prepared.

3.2 Methodology

The project was implemented with four main steps:



The timeline of activities overlapped as schools started participating in the project.



Applying the theory of change methodology challenges in each phase were reviewed, analysed and solutions adopted.

Phase	Proposed Methodology	Problem	Solution used
1. Aligning the Stakeholders	Meetings with Government Officials including the Commissioner and Deputy Commissioner of Solid Waste Management and Education Department from 4 Corporations.	The time required for coordination was more than estimated. Required the school data and permission, especially for Government schools.	The next stage of creating the database of schools and contacting them was started.
	Ground Mapping and Building Data Base	Desk research and calling schools through personal contacts. Emails did not get responses.	Used personal contacts to reach to schools and directly approached the schools through visits.
	Approach Schools to participate in the project	Directly visiting the schools and waiting for appointments. Multiple stakeholders had to be contacted in the school such as Principal, PR, Management, Board etc.	The team divided the schools within themselves, with each becoming a point person for 10 to 20 schools.
2. Awareness Generation	Training of individuals who can act as potential trainers.	Training of Trainers of online platform conducted, the training given to field coordinators.	All the team was trained to provide the orientation session in schools.
	Designing an interactive orientation session to sensitize as well as orient children and teachers.	Schools reported challenges assessing the Blue planet interactive platform. Certification had to be a hard copy or email certificate.	Prepared an offline Power point presentation which was delivered in an interactive method. A reward system was designed based on quantity of plastic collected per school.
	Dissemination of training modules to students	Schools reported challenges accessing the Blue planet interactive platform.	A presentation and in person session were conducted by CACR, instead of online trainings by students. These were conducted as per batches or division wise to interact with the students.
Phase	Proposed Methodology	Problem	Solution used

3. Plastic Collection	Collection from schools once certain quantities are collected	Schools expected immediate collection of plastics	A specific time was not given, but day of collection was given.
		The Volume of plastic was large; thus, the vehicles sent would get filled up quickly	Multiple trips had to be planned.
4. Recycled Product	Recycled products were to be given as per the plastic collected, as were to be sourced from the recycler	The recycled products were not available from the plastic collector.	These had to be sourced separately and procured.

Details of each of the project interventions are explained in the next section.



Figure 7: Students from Thane Municipal Corporation school no. 54 showing ball pens made from recycled plastic

04

Key Interventions





Figure 8: Plastic waste collection at Goldcrest School, Vashi

04 - Key Interventions

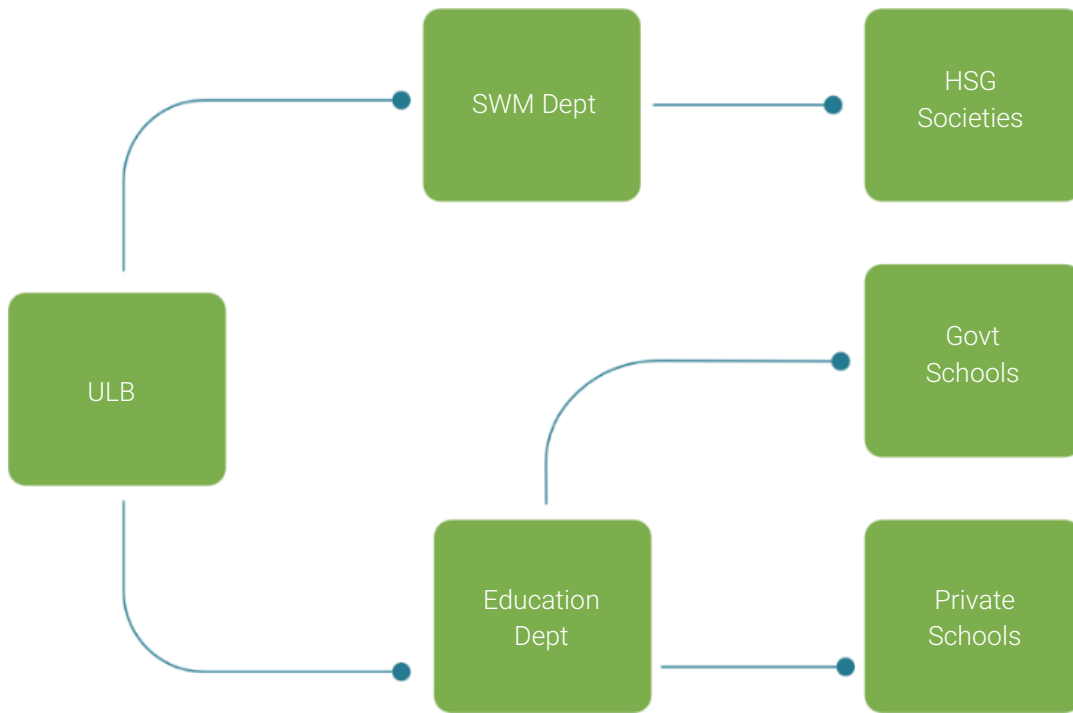
4.1 Scoping and Feasibility Mapping

The project required three types of stakeholders:

- ❖ Urban Local Bodies
- ❖ Project participants – Schools and Housing Societies
- ❖ Implementation partner – Awareness generation, IEC material and Plastic collection and recycling.

Urban Local Bodies: The project was implemented in four ULBs of MMR region, Thane, Navi Mumbai, Greater Mumbai and Panvel. CACR leveraged its existing connect with the Education and SWM departments of all these ULBs. A letter was obtained from the ULBs issuing consent to conduct the project.

To implement the project CACR scoped the following stakeholders per ULB:



Participants – Schools and societies were approached to participate through Phone calls, emails and meetings.

Table 1: Number of schools mapped/targeted from each selected ULB

City	Type of Schools			Total per ULB
	International	Private	Government	
Panvel	9	79	24	112
Thane	2	6	29	37
Navi Mumbai	2	4	7	13
Greater Mumbai	8	9		17
Total	21	98	60	179

Implementation Partners:

The project implementation partners were, CACR for IEC, field implementation, creation of online content and collection of plastic; and the Secretariat for documentation and business model development.

The project implementation team consisted of one field coordinator per ULB, supported by two field supervisors. All the field persons were trained to conduct the orientation sessions, and each developed a connect with a school.

ULB as drivers of the project

In Thane and Navi Mumbai, the time taken for meeting the ULB officials and getting the consent for the project took more time than anticipated. A letter was sought from the ULBs providing their consent to participate in the project. The letter encouraged schools and societies to participate in the project. However, the participation of schools and societies was not made mandatory. Additionally, no letters were directly issued to school directing them to participate in the project.

In contrast to this, Panvel municipal Corporation participated in the the project in October 2022 and actively promoted the project in all its schools. Panvel municipal Corporation conducted a workshop for all school principals and provided printed registers and bins to schools for record keeping and collecting plastics, respectively. They made it compulsory for all schools to participate in the project, thus the highest number of school (82) were from Panvel. For all the orientation projects the Sanitary Inspector of the area was also present.

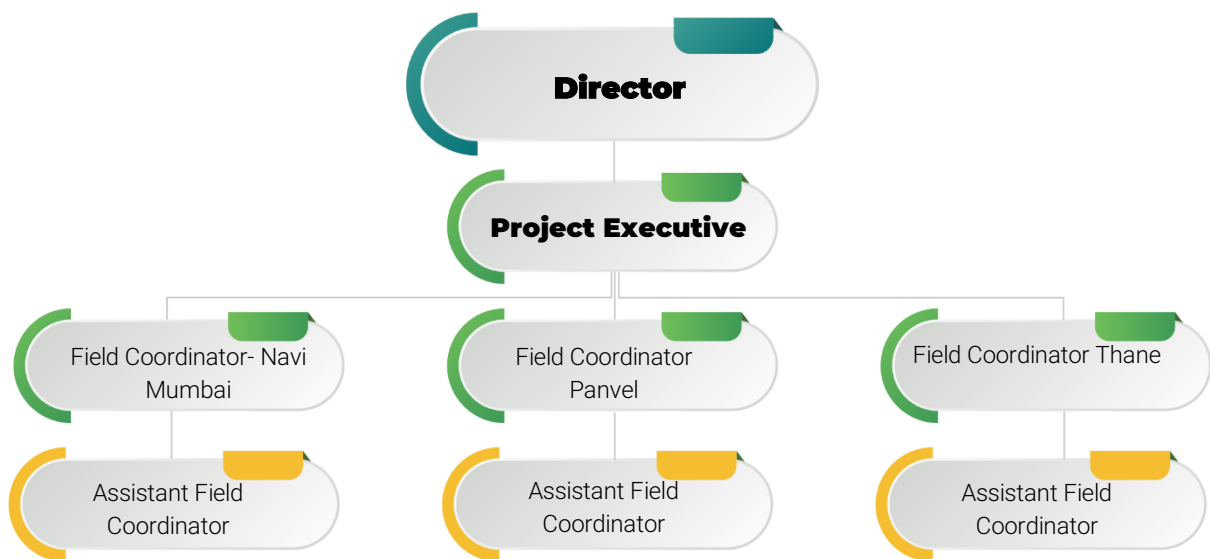


Figure 9: Project team organogram

The roles of Blue Planet included development of learning modules, plastic collection and development of IEC material. Blue Planet's mission is to incorporate sustainability learning opportunities into the learner's daily life, including health and environmental sustainability.

Blue Planet had developed an online learning module named 'Blue nudge', which could be used for the awareness and orientation of the project among school children. The recycling module was a 30 mins module giving nudges to the learners with 12- 15 MCQs. The project has an inbuilt point system to track the student's participation. The point system was based on each child self-certifying the quantity of plastic they deposited at the school. By collecting empty, clean milk pouches, Milk pouches/PET Bottles/Tetra Packs, students will earn 10 points/20 Points/50 Points depending upon the article. Based on these points the Students were to become 'Planet warriors'. To earn a planet warrior certificate, they should have 2000 points. The students were to receive certificates directly online.

Blue Planet worked in the waste management sector and had identified a plastic waste aggregator and recycler for the collection of plastic. They provided the logistical support for collection and recycling of plastic collected.

Blue Planet – Role in the project

Blue Planet is a Singapore based company working in environment and waste management. It has created an education and awareness online platform called – Blue Nudge, which has different modules related to environment, green transport and waste management. Blue Planet (BlueNudge - blue-nudge.com) is a unique platform that gives learners a nudge for becoming more responsible towards the earth. Blue Nudge is a simple yet effective way for learners to use resources efficiently and earn a Planet Warrior Certification for their efforts.

To promote Plastic waste awareness module, Blue Planet developed the concept of the project – ‘Collective Responsibility Drive’. It is implementing this project in 600 schools in Delhi as part of a continuous project under Directorate of Education and MoHUA, South Delhi.

The project in Mumbai was proposed through UNICEF funding and NGO partner CACR. The Blue nudge platform was to be used for creating awareness and giving awards within the students. The platform included modules on harmful impacts of plastic, how to handle and reduce the use of plastic.

Blue Planet provided a training to CACR team on the handling of the online module. Blue planet also converted the content to an offline mode of a ppt.

Blue Planet facilitated the collection of plastic waste and its recycling during the initial months of the project. They identified the recycler to take the plastic and give recycled products in return. The plastic collected was sold to the recycler and a revenue of Rs. 40,000- 50,000 was generated after deducting the transport costs. This was used for procuring recycled plastic products for distribution to schools. The collection of plastic in Panvel and later months was done by CACR.

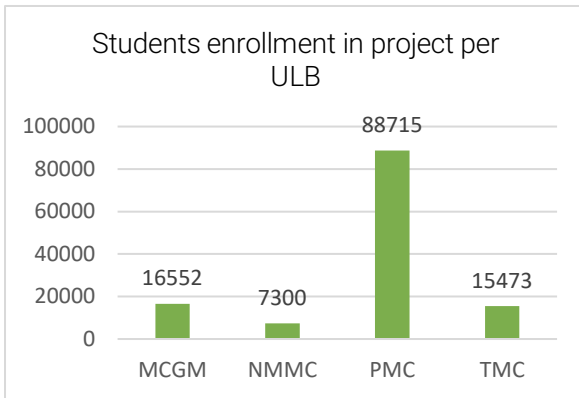
As per Blue Planet, IEC activities contribute highest to cost of such a project, and the plastic collection, transportation and recycling costs can be borne from the revenues of plastic collected.

4.2 Outreach and Enrolment

Scoping and onboarding the schools for the project was the next challenge. In absence of a direct list of schools from ULBs, a database of schools was created from desk research. Contact details were sourced, and initial emails and messages were sent to the schools. This was followed up with direct phone calls and scheduling appointments to meet with the principals or management. Where appointments were not given, the field coordinators directly visited the schools and met with the principal/management to explain the project. This was an extensive and time-consuming exercise. The decision-making process in each school differed, and CACR adapted the approach accordingly. Initially, a consent letter was taken from the schools to provide them with log in details on the Blue planet platform.

A total of 207 schools were contacted, on first consent, orientation projects were held in 176 schools and plastic collection was practised in 127 schools. Persistence of the field team resulted in the project reaching the target of 127 schools participating in the project, more than double the approximately 60 schools required to meet the target of 25,000 students.

Graph1 : Students enrolled in the project per ULB



The number of participating schools in Panvel was the highest at 82 as Panvel Municipal Corporation adopted the project as part of their initiatives under the Swachh Bharat Abhiyan. PMC made the participation mandatory for all schools and provided them with registers, dustbins and other support to implement the project. For each of the orientation project a Sanitary Inspector from the PMC would be present to further provide inputs to the students. This resulted in increased awareness and participation rate from the schools in Panvel.

The average number of students enrolled per schools were more than 1000 for MCGM and Panvel, and 800 for NMMC and TMC. This was four times higher than the estimated value of 200 students per school.

Maha -UWES-C in consultation with UNICEF prepared the Project informative pamphlets and posters for creating awareness and encouraging students to participate in the project. The pamphlets and posters provided information on impacts of plastic pollution and a brief introduction to the 'Collective Responsibility Drive' Project.



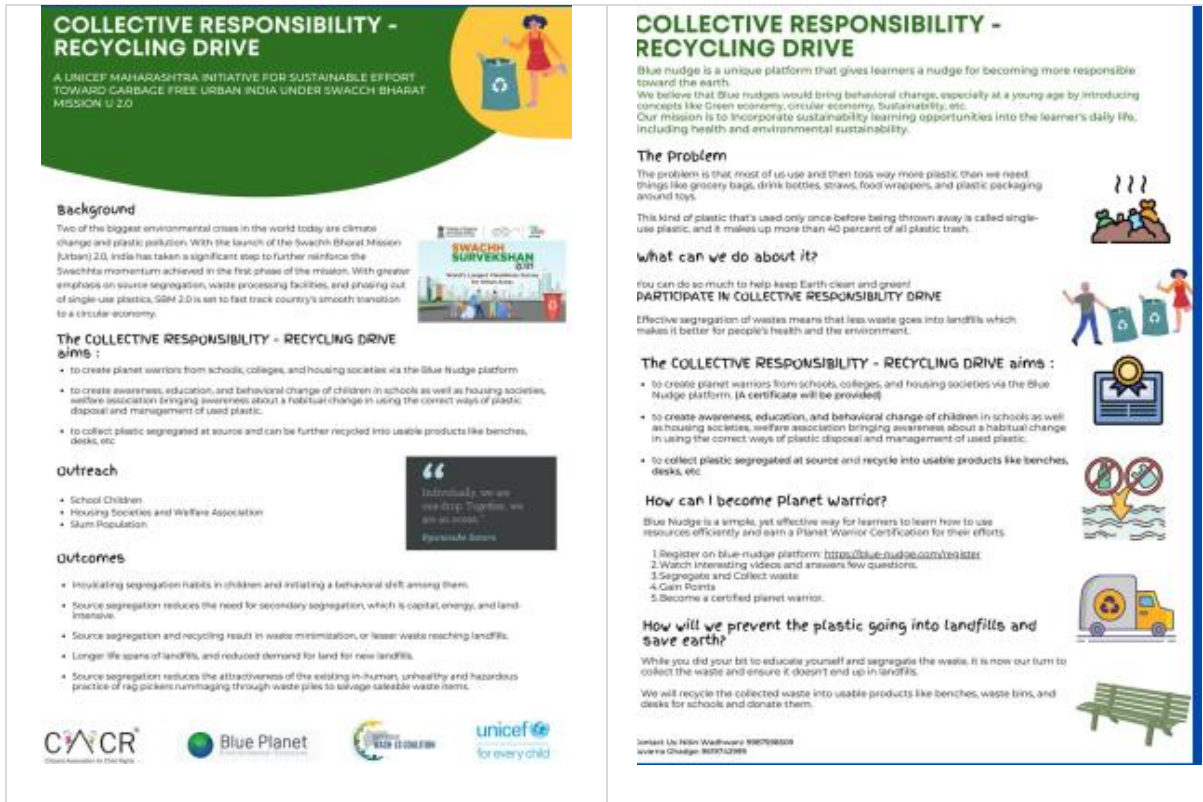


Figure 10: Awareness creatives

4.3 Awareness Generation and Capacity Building

The project is focused on creating awareness on plastic waste recycling, importance of source segregation and 3R. This was conveyed through the interactive training module developed by Blue Planet. To generate awareness with the participation of schools and students, the implementation team had to be trained to deliver the awareness session. The project thus had the two components:

Capacity building of trainer – Blue Planet conducted training of trainers for the Blue Nudge Online Learning Module System, with the project team.

Awareness generation for the school children – The plan was for the trained field coordinators to then conduct the orientation for the online modules to the students in the schools.

- An interactive session was designed to sensitize as well as orient children and teachers.
- The session was designed to sensitize children about climate change, 3 Rs, segregation at source importance of recycling etc.
- The process of signing up on Blue- Nudge Platform and completing the module to become Planet Warriors was also explained.

A child friendly power point presentation on same topics was also prepared and presented to the school children through an interactive orientation session. This was one hour orientation session that was held once with each batch of school students from standard 5th to 9th standard. Depending upon the school, these were either per class or together for the entire school.

Challenges with the online training platform: Awareness generation using the online module presented major challenges.

- ❖ Technical difficulties in its functionalities
- ❖ The modules were not child-friendly.
- ❖ The English language-based modules were difficult to understand for Government school children especially from Marathi medium.
- ❖ Students from lower economic background did not have access to computers or devices for the module.

Learning module and certification

The online recycling module was to receive certificates online for the student based on a point system as explained above.

To manage the digital divide, a new recognition system based on the quantity of actual plastic collected per school was introduced. The point system was as below:

Criteria	Recognition
Schools collecting less than 200kg	Participation certificate will be provided to school. Hard copy of the certificate will be given. Participation – E learning certificate will be provided to all the school students
Schools collecting more than 200kg.	Participation – E learning certificate to all the school students. School will receive a recycled bench

4.4 Behavior Change and Monitoring

The project worked on several influencers of Social & Behaviour Change methodology to create the awareness on Plastic waste.

Factors of SBCC	Method used
Messenger	School and teachers are the greatest influencer for a student, and thus promoting the project through school has the greatest impact.
Norms	The students act as a peer pressure group for each other, and if one student is doing it the other will also follow.
Salience	Bringing the plastic to school was a novel idea for the students. The interactive platform would have been an additional Salience feature.
Incentives	Certificates and being called a Champion/ Blue planet warrior were the biggest motivational factors for students. Receiving recycled products further encouraged the students to participate in the project proactively.

Factors of SBCC	Method used
Affect	<p>Helped students in understanding the linkages between climate change, flooding and other environmental impacts through their science classes</p> <p>Motivated students to continue waste segregation practices at home as they witnessed the positive impacts of the project</p>
Commitments	The 4-month long collection drive, provided time for the students to show commitment towards their actions.

The project was an activity-based project, and the children learned through experiential learning. The Science teachers used the project as an example for several of their topics related to climate, chemistry, geography, etc. emphasizing the impact of plastics on the environment.

Panvel Municipal Corporation provided schools with registers to maintain a record of the daily plastic collection per student. This record taking by the teacher per day, created default standard for each student to get their plastic waste from the homes.

There were several instances shared by the teachers that depict the behaviour change within the students:

- ❖ The classroom dustbins are now devoid of all plastic waste.
- ❖ Even a toffee wrapper is collected in bottles and not put in waste.
- ❖ Schools reported less littering by students in the school, and any plastic seen is promptly picked up for recycling. increased.
- ❖ Students are more conscious of things that have plastic.
- ❖ There was a competitive spirit amongst the students for collection of plastic.
- ❖ Parents reported that the students insisted on implementing waste segregation practices at home and made family members aware about its importance.

Mr. Rajeev Kumar Garg, Principal Datta Meghe World Academy and Office bearer of Sahodaya School Complex MMR

'This is an excellent initiative, and behavior change training should be provided to children and also engage their parents. We will implement the project in our school and get all CBSE schools under Sahodaya School Complexes in MMR involved in this program.'

Sarvamangala Koti Singhal, head of Public Relations, Orchids The International School

'Our children are the changemakers of tomorrow. So, they must understand how our everyday activities can significantly impact the environment and avert the effects of climate change. Children are empowered to educate others around them about sustainable practices and act as responsible climate warriors at home and school. Hence this is the perfect time to make them aware of the toxic after-effects of our actions toward nature.'

Other responses

- ❖ Parents appreciated the initiative and supported it, none of the parents complained.
- ❖ Schools took this further, by making sculptures of the plastic collected and displaying it.
- ❖ Schools have stopped using plastic bottles at their functions.

Nitin Wadhvani

Overall experience of interacting with children was very good and they were very enthusiastic to understand the importance of segregation of plastic waste and possibilities of getting them recycled.

The quantity of plastic collected from the schools is also an indicator of the increasing awareness within the students.

Table 2: Categorization of schools based on the quantity of plastic collected

Quantity of Plastic	Number of Schools	Quantity of plastic in (kg)	Number of students in the participating schools
1 To 30 kg	57	616.02	43756
31 To 99 kg	34	1589.58	30958
100 To 200 kg	18	2430.72	24126
200 and Above	18	7073.68	33716
Total	127	11710	132556

Parent

I am proud to talk about my son Aaryan Gaonkar who considers himself a planet warrior.

His school, Orchids International Mulund Branch introduced him to the concept.

Frankly speaking, he got excited and initiated work on this project just for the Planet Warrior certificate. Like most of his other projects, we thought he would collect for a few days and forget about it. Little did we know the seriousness that was to come in about this entire thing.

He kept collecting the plastic to increase the points. The point reward system worked for him. He went on collecting all forms of plastic and started filling them with cartons of plastic pieces. And our started filling with cartons of plastic parts. The turning point was when he started doing the e-learning modules, where he gained knowledge and understood the gravity of the issue. He became quite environment-conscious post this.

The way he would hunt for plastic was terrific. Few hilarious incidents as well: when at public events, he would collect the plastic bottles used by his relatives and educate them about recycling. Also at the movie theatre, he went around collecting plastic 3D glasses for his collection. At his school, too, when some new musical instrument arrived, he was behind the teacher to give him all the waste packaging material.

4.5 Collection Drive and Incentivization

In several schools, such activity was undertaken for the first time. Few schools were active in such extracurricular activities and found it easy to adapt the project. International schools have a subject CAS – Creativity, Activity, Service. The project fitted perfectly under this subject; thus, these schools adopted the ‘Collective Responsibility Drive’ project as a part of their CAS subject.

In Navi Mumbai and Thane the orientation projects were conducted in June – July 2023, and the first collection drive was done on 26th August. The collections were then done every month from each school in Navi Mumbai, and Thane. In some schools the collection was undertaken twice a month. As Panvel accepted the project later, the first collection in Panvel was in October.

The planned concept was to ask the students to get the plastic after they have collected 500 points worth of waste at home, as per the Blue nudge platform. This was modified and adapted, and the children were asked to segregate the plastic waste at home and bring the plastic waste to schools on the decided day in the month. The schools were told to collect the plastic from the students and store it. They were provided with bags to store the plastic in.

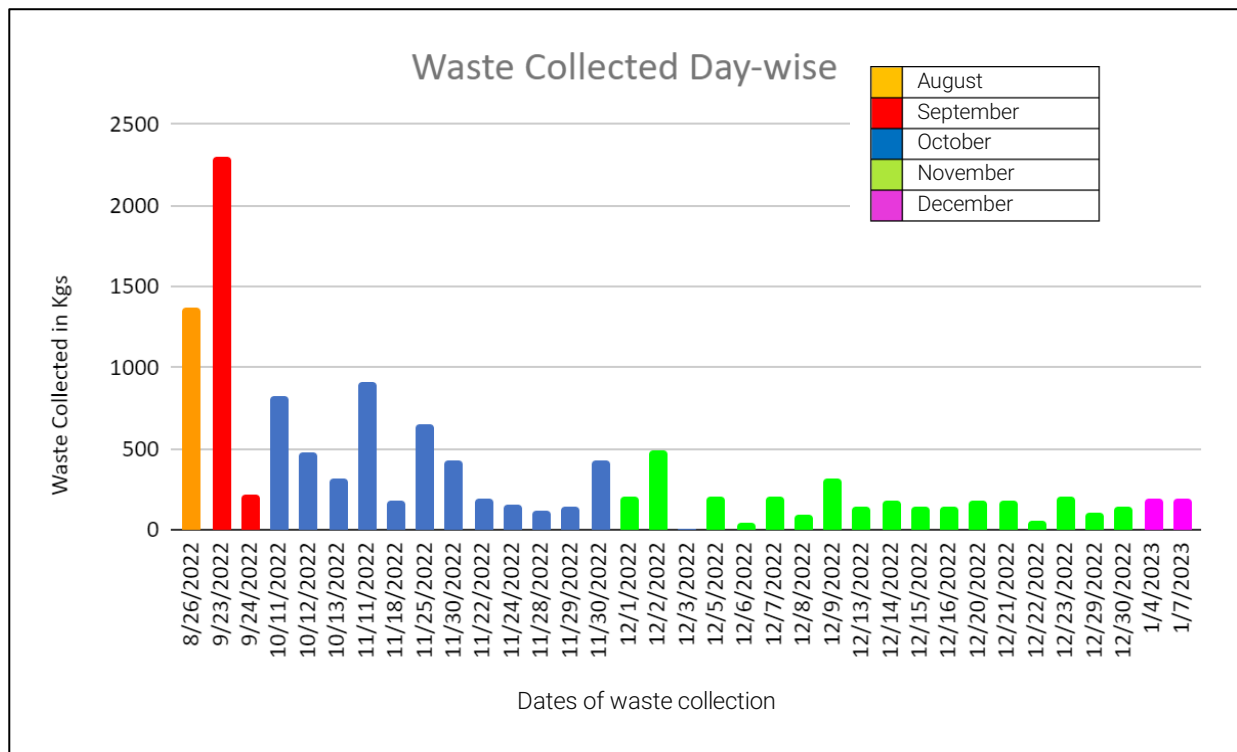


Figure 11 –Quantity of plastic waste collected from August to December 2022

The variations in the quantity of plastic collected in every month is shown in Figure 11. It is evident that the quantity of plastic collected was the largest in the 1st few collection weeks, and gradually dropped. This was as the awareness activities were only conducted once per school. *A continuous awareness activity would have maintained the collection quantities.*

Incentivization:

All the plastic collected during the drive was to be recycled and converted into Benches and sent to schools at the end of the project. The 'Collective Responsibility Drive' was to facilitate the shift from a linear economy to a circular economy.

The plan was to give 150 benches, one or two bench per participating school. The procurement cost for the recycled plastic product exceeded the budgeted cost, secondly it was decided to distribute different variety of recycled good. Several other recycled plastic products such as pens, compass boxes and flower pots were selected that could be given back as incentive to the schools. Schools were keenly interested in getting the recycled product to showcase the activity. They followed up with CACR for the products. For the students the certificate and the title of – 'Planet Warrior' was the incentive to participate in the project.

Panvel – ULB's ownership of the project

The Panvel Municipal Corporation (PMC) adapted the 'Collective Responsibility Drive' project for its Garbage Free City/ Swachh Sarvekshan activities. PMC decided to involve all the government and private schools in the city. As a first step, PMC conducted a workshop inviting all the school principals in Panvel and explained the project. During the workshop, the concerns raised by the school principals regarding the project were addressed. Dustbins were distributed to the schools to collect the segregated waste.

Orientation and awareness sessions were organised by the project teams in each of the school. A PMC Sanitary Inspector was present at each of these sessions. They participated in the interactive session and created the awareness within the students.

PMC printed registers/pass book for each class and distributed these in the schools. The teacher kept a daily record of the amount of plastic brought in by each student. The point system was given on the back of the register. The children competed to collect points.

82 schools from Panvel participated in the project, with 88715 students and a total of 6437 kg of segregated plastic waste being collected from October 2022 to December 2022. The schools have continued the practice of waste collection. PMC provides the collection vehicle to collect the plastic.

A felicitation program for schools and students was organised by PMC on 16th February 2023. PMC distributed certificate to students and recycled products like benches, flower pots and ball pens to the participating schools. Nine schools collected more than 200kg of plastic and received benches made from recycled plastic.

PMC has decided to continue the project with the encouraging response from the schools and students.

The image shows two open registers. The left register is titled 'Points Table' and lists student names, their parents' names, and the amount of plastic collected. The right register is titled 'POINTS SUMMERS OF PASSBOOK' and lists student names, their parents' names, and the amount of plastic collected.

Figure 12: Registers provided by PMC for maintaining daily records of plastic collection at schools

4.6 Logistics Planning and Mitigating Challenges

The collection and recycling of the plastic collected was subcontracted to Blue planet and a recycler.

Schools were provided with big bags to collect the plastic. The students were instructed to keep collecting the plastic waste at their homes, and bring it to school on a particular day. The coordinator would call the school a week before and convey the collection date. The school conveyed the same to the students and asked them to get the plastic either a day before or on that particular day. The coordinator conveyed the same to the Project manager, who worked on the logistics and provided the time of collection from the school. On an average daily 8 to 10 schools were visited by the collection van. The van at times visited more than one ULB.

The vehicles were hired by CACR on per day fixed rates basis. On some of the days, more than one vehicles were hired for waste collection. The waste collection team consisted of a driver and three helpers. They would weigh the waste quantity in each school using a weighing scale and issue a challan to the school on the quantity collected. This challan was used for maintenance the records of waste quantity collected per school on the same day.

Schools were informed a week prior to the day of collection. The collection schedule and routes were planned as per the confirmations received from schools. School timings were also taken into consideration while planning the routes. Challenges faced in logistics were:

- ❖ In some schools they did not want the waste within the premises, thus had to be collected at the entrance directly from the students.
- ❖ If the vehicle did not reach on time, there use to be frantic calls. CACR then conveyed that the truck would come anytime between 10 to 6pm anytime, and the school had to be ready.
- ❖ If required they could leave the waste with the security guard and the waste would be collected and challan given.
- ❖ The biggest challenge with Private schools was that they were not willing to keep the collected plastic waste in their schools for more than a few days. Schools would call asking/ demanding that the plastic waste be collected immediately, even if the quantity accumulated was less than 50kg.
- ❖ Most of the schools needed separate dustbins/bags for plastic waste collection since the municipal corporations focussed on providing bins for dry and wet waste primarily.
- ❖ Plastic is a voluminous waste, and the comparative weight is less. Thus, at the first trip, CACR arranged a 3.5MT capacity vehicle, however even after the vehicle was completely filled, it weighed only 900 kg. This reduced the efficiency of collection.

- ❖ The weighing scale used was a hanging scale, finding an appropriate place to hang it and weight the plastic was not always convenient.
- ❖ At times if the vehicle was not available, the coordinator would request the ULB Sanitary Inspector to collect the plastic waste, however these would create a problem in record keeping, as they would not keep a record.

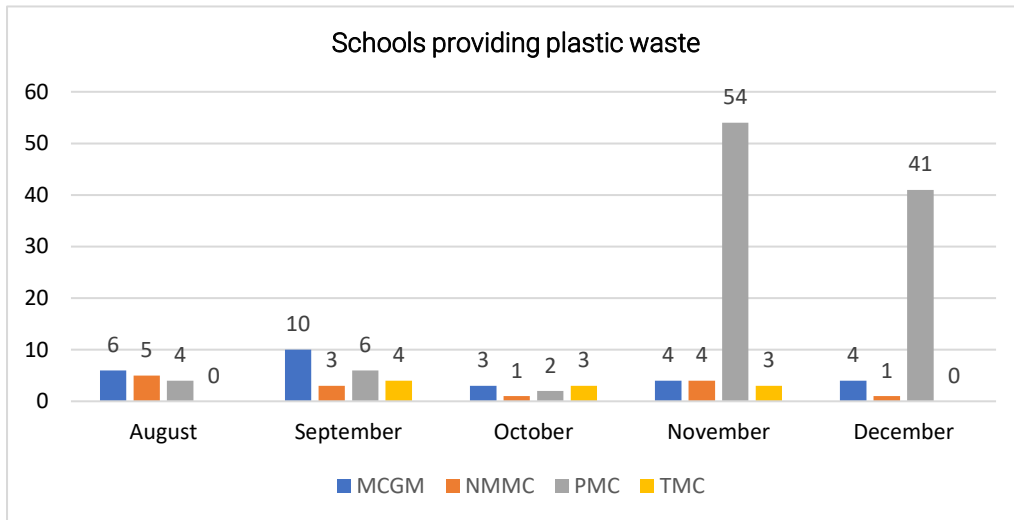


Figure 13 – Number of schools provided plastic waste from each ULB

Table 3: Month-wise plastic collection from schools in each ULB

ULB's	August		September		October		November		December	
	Schools	Waste Collected in kg	Schools	Waste Collected in kg	Schools	Waste Collected in kg	Schools	Waste Collected in kg	Schools	Waste Collected in kg
MCGM	6	749	10	947	3	220	4	103	4	150
NMMC	5	315	3	346	1	44	4	140.2	1	41
PMC	4	306	6	682	2	399	54	1802.8	41	2348.8
TMC	0	0	4	545	3	957	3	156	0	0
Total	15	1370	23	2520	9	1620	65	2202	46	2539.8

The other logistic to be managed by CACR is the transport to school of the recycled product. The vendor of recycled product would deliver the product to CACR, and CACR was to transport it to the schools.

4.7 Reporting

Reporting systems were between CACR to UNICEF. These were monthly updates on a log frame format and as power point updates. Challenges faced were written down and communicated. Reports were also submitted to Urban Local bodies of activities done in the schools for their information.



NMMC Schools Orientation and Onboarding Completed					
Sr. No	Name	Location	Principal Name	Designation	Enrollment
1	NMMC School No 11	Navi Mumbai Municipal Corporation	Suryavanshi	Principal	175
2	NMMC School No 92	Navi Mumbai Municipal Corporation	Mrs. Anuja Mirkute	Principal	143
3	NMMC School No 121	Navi Mumbai Municipal Corporation	Mrs. Anuja Mirkute	Principal	1134
4	NMMC School No 15	Navi Mumbai Municipal Corporation	Tanvi Surve	Principal	1225
5	NMMC School No 101	Navi Mumbai Municipal Corporation	Madhuri Narkhede	Principal	425
6	NMMC School No 18	Navi Mumbai Municipal Corporation	Pratibha Panchal	Principal	704
7	NMMC School No 116	Navi Mumbai Municipal Corporation	Shobha kamalakar Kudle	Principal	164
Total Outreached					3970

Figure 14: Reports submitted to ULBs on progress of the project

Project monitoring reporting consisted of field reports from the field team to CACR. Data on schools contacted, students enrolled, plastic collected etc. was maintained in a excel worksheet by the Project manager.

Some schools maintained a file of the project, keeping a record of all the challans issued of the plastic collected.

05

Key Outputs





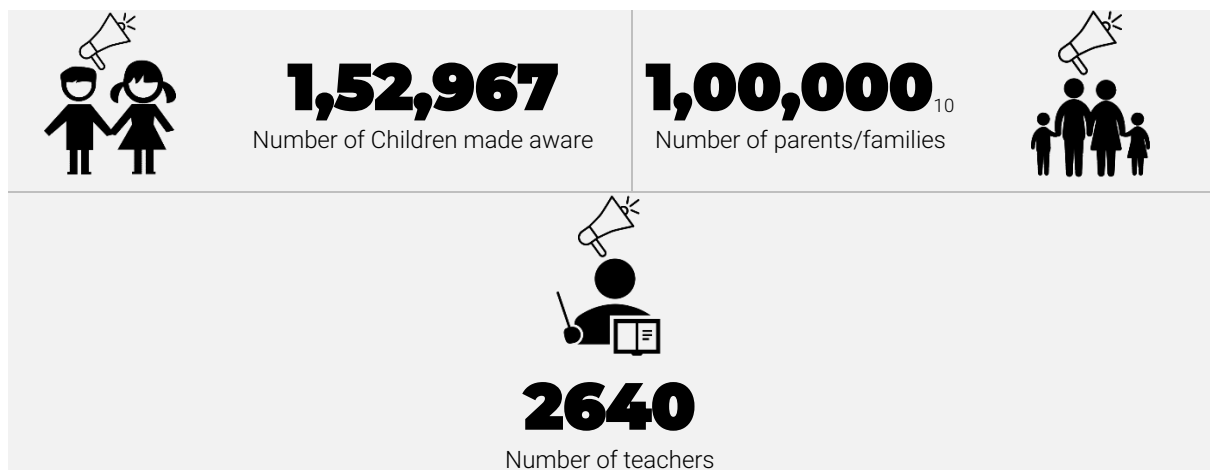
Figure 15: Bench made from recycled plastic collected from D G Khaitan school

05 - Key Outputs

5.1 Increase in Awareness

The project aimed to create awareness and impact in 50,000 population from 100 housing societies and 10 respective RWAs with a behaviour change drive with school children as well as residents.

The project worked mainly in four ULBs with school children for awareness generation. Children in turn created awareness within their families as waste was to be brought from home.



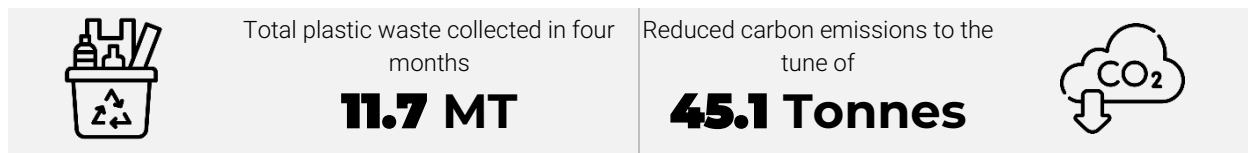
¹⁰ Assuming approximately 80% of student families

5.2 Plastic Recycled

The main objective is to create an opportunity for 25,000 plastic users to contribute towards Plastic waste management. The 'Collective Responsibility Drive' provided a direct opportunity for each child of the school to collect and bring the plastic for recycling. The monthly average per school is as given below:

Table 4 : Average waste collected per ULB from August to December 2022

Average waste collected per school per month in kg					
	August	September	October	November	December
ULBs					
MCGM	124.83	94.70	73.33	25.75	37.50
NMMC	63.00	115.33	44.00	35.05	41.00
PMC	76.50	113.67	199.50	33.39	57.29
TMC	0.00	136.25	319.00	52.00	0.00



A total of 11700 kg (11.7MT) of plastic was collected over a 4-month period from end of August to December end. This 11.7 MT of plastic waste collected results in reducing carbon emissions to the tune of 40,950 kg.¹¹ This is an integral part of our global commitment towards pollution control and climate change.

5.3 Circularity in Waste

Circular Economy tends to articulate complementary objectives as given below :

- (a) Preserving the value of products, materials, and resources for as long as possible;
- (b) Phasing out waste by intervening at the different stages of the product life cycle, including during design and production;
- (c) avoiding inefficiencies, thereby inducing resource savings within the whole production consumption cycle; and
- (d) encouraging innovation through new business models that minimize the negative environmental externalities associated with extraction, production, and consumption processes.

¹¹ Most conventional plastics are made using fossil fuels. Plastic production uses [4%](#) of petroleum produced globally per year, and the refining process uses another 4%. Producing just 1kg of plastic emits between [2 and 3.5kg](#) of carbon emissions. <https://small99.co.uk/materials/packaging/why-plastic-free-isnt-the-same-as-carbon-free/#:~:text=Image%20credit%3A%20Pexels-How%20does%20plastic%20contribute%20to%20carbon%20emissions%3F,3.5kg%20of%20carbon%20emissions.>

Its conceptualization has evolved by extending end-of-pipe waste management approaches centered on the 3Rs rule (reduce, reuse, and recycle) to more extensive and fine-grained frameworks encompassing upstream consideration of materials. Given that material management accounts for up to two-thirds of global GHG emissions, the CE can play a key role in climate change mitigation. In industry, circularity can cost-effectively reduce GHG emissions, which are considered hard to abate—particularly in the production of iron, steel, aluminum, cement, and plastics.

A Circular Economy aims at creating welfare while minimizing the production, consumption, and disposal of materials. Circular Economy-related policies, investments, and business models strive to maximize resource efficiency by organizing production-consumption systems into closed loops, thereby reducing extraction, waste, and related environmental pressures. The concept of circularity is one of the key principles for achieving global sustainability. Encouraging environmentally responsible behaviors is one of the six priority areas identified as critical for promoting global sustainability and circularity. This is also in line with the vision envisaged in the LiFE mission of the Government of India.

Plastic is a recyclable resource when collected in a clean and segregated manner. Several initiatives have showcased its potential for to be upcycled or recycled into new products. Upcycling plastic waste into trendy bags, mats and usable products; using as a fiber in clothes, using plastic in roads, or as fuel are various ways plastic can become a circular economy product instead of a linear economy that sends it to a dumpsite causing harmful impacts to the soil. The difference is the collection system.

Recycling plastic such as plastic wrappers, food wrappers, bags, HDPE containers which have a short term use into products that have a long-term use such as benches, flowerpots, pens etc. showcases the potential of circular economy.

This project effectively showcased circularity principles by converting the plastic into products that are usable to the school children again. Children in municipal schools were gifted ballpens made from recycled plastic waste. The message of circularity was emphasized through the real-life use of recycled products by the school children who collected the plastic waste.

Children and the schools were very happy seeing the products and felt a sense of onus while using the pens or benches. Schools were proud of their participation of the project and showcased the products to parents and outsiders. The recycled product was perceived as a trophy for the active participation in the project. The sense of preventing the plastic from harming the environment by reusing the product and contributing to reducing the climate change was expressed.



Figure 16: Students showing recycled ball pens at TMC school no. 54

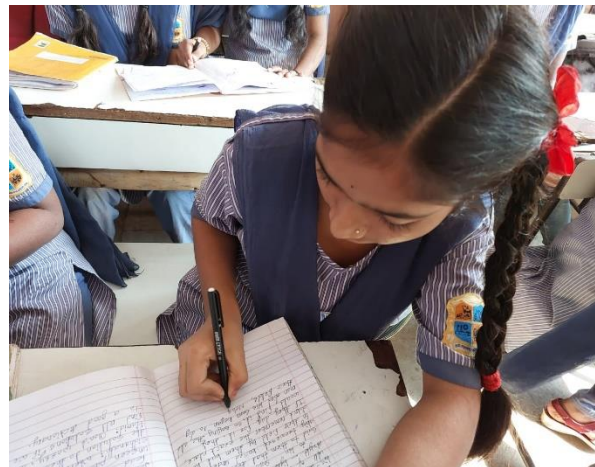


Figure 17: Student using recycled ball pen made from plastic waste

5.4 Schools Made Aware



The 'Collective Responsibility Drive' project was planned to reach 25000 users, this relates to roughly 60 to 63 schools (assuming 350 to 400 students per school). CACR reached 125 schools, almost double the planned schools.

5.5 ULBs Involvement

The 'Collective Responsibility Drive' project involved the ULBs as key stakeholders, and demonstrated the potential to collect segregated plastic and spread awareness. ULB can partner with NGO's and undertake such project to promote the 3R principles, and meet its commitments towards Swachh Bharat Mission and various other targets.

Project to Programme

The students continue to bring the plastic and schools are accepting the same. Thus, the school demands collection of the plastic from CACR. The active schools continue to collect plastic from the students, even after exit of the project. It depicts that this model has a potential of institutionalising and sustaining such systems in association with the respective ULBs.

06

Approach for Future Projects





Figure 18: Orientation session at Goldcrest School, Vashi

06 – Approach for Future Projects

6.1 Build Back for Better Future

The environmental impacts of the plastic on the various ecosystems have been startling. This has raised the concerns over our dependence on the plastic materials. Considering this, completing the circle of Plastic through recycling of the plastic waste is the need of the hour. Collecting the plastic after its use as close to the point of use reduces its chances of becoming contaminated with organic waste, improving its potential to be recycled. It also improves the conditions under which the wastepickers have to sort it. Making segregation of plastic at source a habit requires behaviour change of citizens. One of the influencing factors of behaviour change is the messenger, and children are the best messengers. The 'Collective Responsibility Drive' project has worked on these objectives and piloted the interventions to be taken.

Applying the theory of change, there are several learnings and suggestions for future projects to build back for a better future.

6.1.1 Partnering with Urban Local Body

It is the responsibility of an ULBs under the Swachh Sarvekshan, Garbage Free cities, and State initiatives such as Majhi Vasundhara to create awareness on plastic waste hazards and its proper segregation. In relation to plastic the following are key responsibilities of a ULB:

- The ULB has to enforce the ban on plastic bags and use of plastic below 120 microns.
- Establish systems for plastic waste collection, segregation and processing
- Implement awareness on impacts of single use plastic and low level plastic
- Promote the 3R principles for plastic
- Explore ways to garner EPR for plastic was collection and awareness

The ULB has a major responsibility to become a strong stakeholder in such awareness and collection project. ULB guiding the project brings it the credibility required to motivate and mandate participation from schools.

The 'Collective Responsibility Drive' clearly showed the impact that ULB participation can have on the project. Panvel Municipal Corporation adopted the project and drove it as their own project, thus 82 schools participated, where as in Navi Mumbai and Thane the schools participation was less.

The sustainability of the project also depends upon the ULB incorporating the project as a routine IEC activity. ULB is best placed to provide the IEC and logistic support required.

Ideas from ULB

Officials from Panvel Municipal Corporation stated that they are planning to have the project as a regular yearly activity and keep a revolving trophy for best performing school.

Officials from Brihanmumbai Municipal Corporation and Uran Municipal Council mentioned that they have existing Material Recovery Facilities where the plastic waste can be brought in for further segregation.

6.1.2 Awareness and Behaviour Change

Behaviour change is a long process and requires consistent engagement with the target group. After the orientation session with the students, a weekly or fortnightly engagement with the students, teacher and school can be maintained on Plastic waste awareness. Various tools can be used such as competitions, video sharing, poster displays, talks by different experts, etc. This should be planned at least once for the school term.

There is a need to bring in novelty in the awareness activities for a long-term project. If this is not done waste quantity will diminish over time. Engaging the students to plan for next activities can bring in novelty too. Bringing in a competitive spirit also can encourage participation.

Ideas from Schools and teachers

1. Students can be given the activity of collecting clean plastics as a homework assignment.
2. Creating a display of waste and recycled products exhibition where the parents and neighbourhood are invited. Srirang Vidyalaya, Thane conducted such a exhibition and this was acknowledged by neighbourhood and the ULB Municipal Commissioner.
3. Schools can further enhance the program to create awareness in students, parents and their neighborhood.

6.1.3 Recycling of the Plastic- Products to Schools

A plastic recycled product such as a bench, table, book shelve, pens etc. are still a novelty. Schools and students are keen to receive these, thus the project should ensure that the recycled product is given to each of the participating schools. The incentive has a major behaviour change impact. Further if the recycled product can be made from the plastic collected from the students itself that will be very relatable and will prove the waste to wealth concept.

6.1.4 Targets for Plastic Collection

On an average the per family plastic generated is 60 gm per day. With this benchmark, one of the major indicator of such a project is the quantity of plastic collected. The potential for plastic collection can be increased, by providing a target quantity for collection per school. This can be 50% of the total quantity of plastic generated by the target participants. The targets can provide the competitive spirit between the schools. This also requires continuous awareness generation to ensure sustained targets are met. The logistics for collection are also better met when the quantity of plastics are large.

6.1.5 Waste Collection Logistics

There are existing networks of waste collection in any area. This can be the ULBs own collection system, the wastepickers network or a scrap shop network. The project should utilise these instead of creating a separate collection system. ULBs have a fleet of waste collection vehicles, ULB can be requested to provide a vehicle for the separate collection of plastic from schools after the daily collection. If the project becomes a ULB owned project, this cost can become one of the ULBs inbuilt cost.

Any existing wastepickers association can be tied up with to collect the plastic from the nearby schools. Wastepickers would be willing to collect when they are getting clean high value plastic directly. The system to collect the low value plastic back from them has to be worked out. Similarly, scrap shop dealer would also be willing to collect the plastic directly from schools.

This can save the transportation costs for the plastic, also reduce the trip lengths and thus make it more environment friendly. This system will also be more sustainable and can be continued even after the project ends.

Logistics is Very Important for the Business Model.

Waste collection has always been the largest financial component in waste management. Thus, the system adopted for waste collection will impact the business model. Even if a vehicle is provided just for plastic

collection from the schools, a per day rate with the van does not work. The rates have to be based on weight and distance to be travelled.

The collection day and frequency from the schools should be scheduled as per the route planning done. The schools should be provided a window of collection time instead of a fixed time. This will prevent the frantic calling and demands from the schools for the collection vehicles.

6.1.6 Integration of Urban Local Bodies

As mentioned above a project driven through integrating the ULB can ensure that the ULB strategy for Plastic waste management dovetails into the project and plastic collection from schools becomes part of the ULB collection systems. As discussed before the participation of societies and schools will be more effective when the project is driven through ULBs.

6.1.7 Record Keeping

The impact of a project can only be accessed through its records. The recommended records for such a project are:

- a. Formal Project tie-up with schools - The project team should submit a formal letter requesting participation from the schools approached. This should be followed up with an acceptance letter of participation from schools. This will ensure a commitment from the schools for the project.
- b. A record of all awareness sessions conducted and attendance should be maintained.
- c. A before and after survey of sample students can be conducted to measure the impact on awareness.

6.2 Proposed Methodology for Future Projects



Solution as per the proposed methodology:

Proposed Methodology	Problem	Solution
Meetings with Government Officials including the Commissioner and Deputy Commissioner of Solid Waste Management and Education Department from 4 Corporations.	The time required for coordination was more than estimated. Required the school data and permission, especially for Government schools.	Commitments letters to be collected from the ULBs at the proposal stage. Time required to be estimated, and parallel activities have to be planned.
Ground Mapping and Building Data Base	Desk research and calling schools through personal contacts. Emails did not get responses.	Identify other channels such as Teacher's forums, Educational boards, etc.
Approach Schools to participate in the project	Directly visiting the schools and waiting for appointments. Multiple stakeholders had to be contacted in the school such as Principal, PR, Management, Board etc.	Estimate additional time and team for outreach to school. A person with Marketing background should be included in the team. Submit a brief project proposal to each school for their internal approvals.
Training of individuals who can act as potential trainers	ToT of online platform conducted, the training given to field coordinators	Trainings can also be for teachers from the schools at a joint workshop. The teachers can thus conduct the sessions more often. Teachers are also the best messengers for students.
Designing an interactive orientation session to sensitize as well as orient children and teachers	The Blue planet interactive platform did not function, thus CACR had to prepare its own IEC material. Certification had to be a hard copy or email certificate. The reward system was reworked based on total plastic collected by school instead of per student	Developing as app-based scoring mechanism, or a google form are quick ways to increase participation. These could be used for per student scoring. Use of Social media at school level (not individual student level) could also increase school participation through a competitive spirit.

Proposed Methodology	Problem	Solution
Dissemination of training modules to students	A presentation and in person session were conducted by CACR, instead of online trainings by students. These had to be divided as batches or division wise.	A higher emphasis should be given to conducting these training modules to the students. Creating an interactive session with inputs from experts in waste management and child psychology for scaled up projects is essential.
Arranging meetings with Housing Societies	Society chairperson did not entertain the project, thus after several attempts, it was decided to focus on schools instead of societies.	ULB support for making this a mandatory training session to societies is necessary. Collection of segregated plastics from Societies can become a sustained activity, with involvement of wastepickers for daily collection too if required.
Collection from schools once certain quantities are collected	Schools expected immediate collection of plastics.	Scheduled collection of plastic, once a month to be planned.
	The Volume of plastic was large, thus the vehicles send would get filled up quickly	Provide a baler machine on the vehicle to compress the plastic waste
Recycled products were to be given as per the plastic collected, as were to be sourced from the recycler	The recycled products were not available from the plastic collector.	Identify a suitable local recycler

6.3 Sustainability with Market Linkages

The 'Collective Responsibility Drive' project is replicable, as other than the awareness tools used, the concept and implementation methodology can be replicated across geographies, socio-economic conditions and size of schools. The 'Collective Responsibility Drive' project has already replicated it in Government schools, International schools and Private schools. Language of communication is the only adaptable factor for these.

The project can be scaled up to reach out to increasing number of schools per year and increasing number of Urban local bodies. The project can be conducted in schools repeatedly to maintain the awareness levels.

The 'Collective Responsibility Drive' is a Behaviour change project with its outcome as awareness generation and creating the habit for segregation of waste. The collection system of children bringing the plastic waste to school and collection from schools, cannot be a long term system of collection.

Plastic waste is a valuable commodity, with varying rates for the different types of plastic. The plastic waste Recycling market is selective, with the HDPE, LDPE type of plastic getting better rates than the single use, and multi-layered plastic. At the planning phase the project has to study the existing recycling market in the ULB to weave the plastic collected into the system.

The current Extended Producer Responsibility has also given impetus to the plastic recycling sector. Collection of plastic waste is the major challenge faced. This project can be funded through EPR by a Producer of plastic products to set up a plastic collection system. The producer can meet their EPR targets for the particular year based on the quantity of plastic collected through the schools. For example, the 11.7MT of plastic waste collected through this project can meet the EPR targets of a Producer company that introduced plastic packaging of approximately 30MT in the same financial year.

The project has potential for long term sustainability as an awareness project, by generating revenues from the plastic waste collected and recycled.

07

Revenue and Green Business Model





Figure 19: Interactive session at Goldcrest School, Vashi

07 – Revenue and Green Business Model

7.1 Current Project

Around 127 schools were tapped over the four months period for collecting around 11.7MTs of plastics with a total cost of project being around 25 lakhs. The IEC activity implementation required the largest budget allocation (45%), followed by the incentivizing schools and students with recycled products is around (28%) and then expenditure on capacity building, learning modules at 11%. It was referred that more than estimated cost was utilized for logistics as on call collection was practiced.

Table 5: Implemented project budget

Sr No	Head	Existing budget allocation (INR)	Percentage
1	IEC activities in school (Coordinators, Trainers and Managers)	1110000	45%
2	Capacity building, learning modules, certificates etc. (Blue planet)	280000	11%
3	Designing and printing of IEC	75000	3%
4	Recycled product including delivery and distribution	675000	28%
5	Logistics waste collection and delivered to blue planet	195000	8%
6	Dissemination workshop	40000	2%
7	Central team management cost	74000	3%
	Total project cost	2449000	100%
	Per student cost	59	

Analysing the project budget on basis of efficiency of the program, the following is observed.

Table 6: Project efficiency parameters

	Head	Qty	Unit
1	Total waste collected	11710	Kg
2	Total number of schools	127	No
3	Total number of students participated	152967	No
4	Amount of plastics collected per school	92.20	Kg/school
5	Amount of plastic collected per student in four months	0.09	Kg
6	Amount of plastic generated by a household in one day	0.06	Kg
7	Approx number of HHs collected	100000	No
8	Potential collection considering these number of HHs give plastic at least on a day every month	6000	Kg
9	Potential collection for four months	24000	Kg
10	Total waste collected over four months	11700	Kg
11	Per Kg collection cost for the project	213	INR/Kg

The existing project schedule proved to be good learning curve for understanding the factors for improving on the financial sustainability of the project.

7.2 Proposed Project Costs

The project needs to be structured in a way to optimize the resources available and bring out the maximum impact possible.

Assumptions considered:

1. The structure of the team will be divided into outreach and central function where each team will be of 3 resources.
 - 1.1 Outreach will be responsible to connect with each school once in every month to keep up the communication and target to maintain the collection
 - 1.2 Central function will be responsible for managing the logistics with a scheduled collection system and coordinate verbally and in written form with all schools on collection of plastic from schools in a particular week
2. It is assumed that the on call collection will be replaced with scheduled weekly collection.
 - 2.1 It is proposed to have a scheduled collection established as an integral part of the project itself. This will increase the credibility of the project for the collector side i.e. schools as there is resistance from the schools for keeping the collected recyclables for long
 - 2.2 For having a scheduled collection all schools will be mapped and approximately divided into group of 10 to have a scheduled collection drive
 - 2.3 There can be a case where this logistics support is provided by the ULB, but the continuous and separately collection systems may not be possible for ULBs considering lack of sufficient resource available with the ULB.
3. It is assumed that 0.06 kg of plastics get generated per household per day.

4. The program is assumed to bring in a habit change where a student will deliver plastics at least three days of a week.

Based on these assumptions following are the proposed project costs and breakup of the budget as per the given heads. Details of the same have been attached as Annexure 1.

Table 7 : Proposed project budget

Sr no	Head	Proposed budget allocation in (INR)	Percentage
1	IEC activities in school (Coordinators, Trainers and Managers)	805000	26%
2	Capacity building, learning modules, certificates etc.	175000	6%
3	Recycled product including delivery and distribution	900000	29%
4	Logistics waste collection and delivered to blue planet	840000	27%
5	Dissemination workshop	40000	1%
6	Central team management cost	340000	11%
	Total project cost	3100000	100%
	Per student cost	74	

The budget cost though seems to be higher than the existing due to the scheduled collection systems and focus on system for proactively connecting with schools throughout the tenure of the program, the revenue model will also be strongly developed to balance the cost.

Also, to optimize the resources, it will be best to have a longer tenure of the project giving it a time to include and then sustain the participation of the students. This will also distribute the one-time cost of the project.

7.3 Proposed Revenue Model

Scenario 1 -

As per the proposed model in 7.2 following can be targeted as an expected outcome.

Table 8 – Proposed efficiency levels

Total number of schools	150	no
Average number of students per classroom	70	no
Number of grades considered	4	no
Total number of students	42000	no
Approx plastic generated by each student per day	0.06	kg
Potential qty of recyclables per day	2520	kg
Considering 65% participation per day	1638	kg
Considering 3-day collection every week by 65% students	4914	kg
Total collection in four months (Kg)	78624	kg
Total collection in four months (MTs)	78.624	MT

Thus, the program even after considering total number of students to be targeted as 42000 factoring with participation of around 65% students that to only 3 days a week, still the potential for collection of the plastic will be around 78.624 MT in four months.

The collected plastic as it is directly coming from the generator the quality of sorting will be good and contamination will be less. Under this condition it is assumed that the rate at which we can sell the mixed plastic will be more than the usual rate for mix plastic. (current rate INR12 per kg). It is assumed after understanding the material received from our current program that it can fetch the rate of around INR 19 per kg.

Considering the rate of INR 19 per kg for selling of the collected mix plastic, the total revenue targeted for quantity of 78.62 MT can be Rs 14,93,856 which can be put back into the system for continuing with the system.

Of the total estimated project cost of INR 31,00,000; with a revenue of approx. Rs. 15,00,000 (49%). The financial gap for funding required is INR 16,00,000 (51%).

The financial gap is based on the quantity of plastic collected. It can be reduced further through the following two options.

Scenario 2 –

Taking ahead the scenario 1, the cost of the project can be further supported by the EPR and CSR options.

EPR stream can support the logistics for collection partially or fully as we work in coordination with empanelled plastic recyclers.

CSR funding possibility needs to be explored for IEC and awareness for the schools.

Both these possibilities will distribute the cost of the project and thus bring multiple stakeholders to same table which may be good scenario under a well-built structured

Scenario 3 –

Taking ahead the scenario 1, the logistics and the awareness responsibility can be shared with the local SHG groups which will reduce the central management and logistics costs.

Any further model needs to be structured to understand if the collected material can be sold to a local formal recycling chain which will also reduce the logistics cost.

Thus, to structure the project, it will be best to have a concentric model theory to be implemented where an NGO is supported with the annual funding for the project with responsibility to fund back project from sale of material collected and inclusion of CSR options and probable scenarios in case of EPR availability.

Annexure



Annexure 1

Financial model for proposed project costs

Head	Count	Unit
Total number of schools	150	no
Average number of students per classroom	70	no
Number of grades considered	4	no
Total number of students	42000	no
Approx plastic generated by each student per day	0.06	kg
Potential qty of recyclables per day	2520	kg
Considering 65% participation per day	1638	kg
Considering 3 day collection every week	4914	kg
Total collection in four months	78624	kg
Total collection in MTs	78.624	MT

Outreach and Awareness Cost				
Cost of networking with schools	No of units	Per unit cost (INR)	No of months engaged	Total cost (INR)
Outreach consultant	1	35000	2	70000
Outreach coordinator	4	20000	2	160000
Awareness sessions in schools	150	2500	1	375000
Outreach material				200000
Total cost				805000

Content Creation				Total cost (INR)
Video content				100000
Certificates				25000
Program content				50000
Total				175000

Logistics Cost		
Assumption	1. There will be scheduled collection from schools with a frequency of weekly collection with a group of 10 schools in each trip	
Number of groups	15	Nos
Number of vehicles required	15	Nos
Number of trips per month	60	Nos
Cost per trip	3500	INR
Total logistics cost per month	210000	INR
Cost for four months	840000	INR

Admin and Management					
Admin expenses	No of units	Per unit cost	No of months engaged	Total cost	
Central staff required for coordination	1	50000	2	100000	INR
	1	35000	4	140000	INR
	1	25000	4	100000	INR
Total				340000	

Incentives to schools					
Recycled products for gifting schools	No of units	Per unit cost	Total cost		
Recycled benches	150	6000	900000		INR
Recycled pens	42000	25	0		INR
Total			900000		INR

Dissemination Workshop				40000	
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Cost of Waste Collected		
Assumption	Pure segregated mix plastic will be collected from schools which can be sold at higher rate than the average price for mix plastic	
Average per unit cost of the material collected	19	INR
Total cost of the material collected	1493856	INR
Total cost for the project	3100000	INR
Total collection of material	79	MTs
Per Kg collection cost	39	INR
Cost recovered from sale of material received	1493856	INR
Actual cost of the project	1606144	INR
Per kg collection cost	20	INR



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