IPCA
SUSTAINABILITY IS OUR GOAL

Enabling Change Through Change

Annual Report
2021-22

Director's Message

I am pleased to present the Annual Report of Indian Pollution Control Association for FY 2021-22. Despite the challenging beginning of the year with severe second wave of COVID-19 pandemic, we have scaled up and ventured new verticals. Another challenging year was well-managed and we continued with adding new operational sites, partners, members, volunteers, expanding network, and innovation.

COVID-19 continued to impact the operations of our services and many of us had lost our near and dear ones during pandemic and my deepest condolences to them! We, at IPCA, relied on agility and a pragmatic approach to manage the situation. To beat this tough situation, our team worked together in a mission mode to help the humanity. IPCA raised the funds to support patients and their families with oxygen concentrators, cooked meal and dry grocery. We would like to thank 'CA Parivaar' for their generousness towards humanity and collaboration with IPCA for this noble cause.

Despite of this tough time, this year was very special for us as we completed our journey of 20 years. The journey of serving the society & environment, which started in 2001, was not easy and we went through lots of ups and downs. But this journey was full of learnings, facing challenges & overcoming them, opportunities, achievements and through Project RELISH we transferred these learnings to 20 young passionate individuals, who also wanted to contribute in environment conservation and its protection.

We continued to expand our projects on Plastic Waste Management, Decentralized Solid Waste Management including on-site composting of wet waste through Aerobins, operation of WAYU for better ambient air quality, development of green area, and community engagement program with lots of innovative approach and served the community.

We have created infrastructure of Material Recovery Facilities and Plastic Recycling Facility which we are maintaining and operating successfully. These infrastructures helped us in developing sustainable supply chain of plastic waste. We have facilitated our sister concern 'Avasa Technologies Pvt. Ltd.' in setting-up E-Waste Dismantling Facility and created awareness for E-Waste Management. We collected E-Waste from the door step of residents & channelized it for recycling. Through our consistent R&D, we developed a range of plastic waste recycled products in various applications which we displayed & demonstrated at many platforms to promote circular economy and encourage people to practice source segregation of waste. We have signed MoUs with educational and research institutes to strengthen our research wing and involve students in Swachh Bharat Mission.

I am blessed to have a dedicated and passionate team of professionals, who executed the planned activities very effectively and efficiently keeping environment conservation and community benefits as their top most priority and because of their sincere hard work, we could achieve several milestones and received recognitions & awards from reputed organizations.

At last, I would like to thank all my members, teammates, partners, donors, associates, clients, vendors, and well-wishers for their trust, support and wishes. We aspire to keep working with all of them and achieve more milestones and serve the Nation as a team!

Ashish Jain
Director, IPCA

Impact at a Glance

88359.776 MT
of plastic waste recycled/co-processed

Developed 3.2 km of Greenbelt with **5000** plants

Developed infrastructure for 3 Material Recovery Facilities in East Delhi, each with capacity to handle 2 TPD of dry waste

Facilitated Avasa Technologies Pvt. Ltd. to set-up E-Waste dismantling facility and collected 500 kg of E-Waste from households of Delhi NCR

Implemented decentralized Solid Waste Management System at 50+ RWAs, Schools and Colleges

Developed infrastructure for plastic Plastic Recycling Facility in Greater Noida with capacity to recycle **10,800** MT of plastic waste

3 Lac+
individuals of Delhi NCR joined campaigns for source segregation of plastic waste

Operations in 35 States & UTs

Treated **1,90,612 kg** of wet waste and produced **34,853.58 kg** of organic compost

Decrease in PM2.5 concentration **by 10%-59%** at traffic junctions

Organized 500+ awareness sessions for the residents, educational institutes, market & industrial associations and corporates on waste management

Conducted **500+** training programmes on personal hygiene with the waste workers

Decrease in PM10 concentration by **13%-50%** at traffic junctions

Trained and mentored 20 entrepreneurs

Developed 47 vegetable gardens

200+
Aerobin composters installed

Sustainable income to **30,000+** waste workers

500+ trained and skilled manpower

Achieved ISO 9001:2015, ISO 14001:2015 & ISO 45001:2015

Mitigated 30 Lac kg of CO_{2e} emissions through a range of waste management activities

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About IPCA

SUSTAINABILITY IS OUR GOAL

Indian Pollution Control Association started its journey in the year 2001. It was led by a group of passionate and environmentally conscious individuals, who believed that there is a need to instil a keenness for environment protection and conservation in India. IPCA, in more than 20 years of its existence, has established itself as a reputed organization in the area of environmental research and conservation, which provide multifaceted solutions to community, corporate, industries, educational institutes, policy makers, regulatory bodies etc. In a short span of its existence, IPCA has diversified in the domains of plastic waste management, organic waste management, air quality monitoring and management, research & development, plastic recycling, awareness and capacity building of different stakeholders, and mentorship programmes for the start-ups. It has reached out to both public and private sectors to sensitize them about the importance of incorporating issues of environmental considerations and self-sustainability into project or policy development for a greener future of India.

To ensure best quality measures and sustainable practices in all its operational activities, IPCA has gone through the certification process and got ISO 9001:2015, ISO 14001:2015 & ISO 45001:2018 certifications. IPCA demonstrated impactful work at pan India level which got recognized by Centre and State/UT level Governments and civic bodies. IPCA and its members have been appointed as expert members in various committees constituted by Ministry of Environment, Forest and Climate Change (MoEFCC), Central Pollution Control Board (CPCB), Delhi Pollution Control Committee, Government of NCT of Delhi, Government of Jammu & Kashmir, Government of Uttarakhand, Chandigarh Pollution Control Committee and Municipal Corporation of Delhi.

Domains of Indian Pollution Control Association

IPCA
SUSTAINABILITY IS OUR GOAL

Vision

Sustainable Economic Development of India in a way that it ensures environmental protection

Mission

To improve livelihood through responsible use of natural resources for the welfare of present and future generations

To ensure proper recycling/processing of different kinds of waste to produce other useful consumable products

To provide solutions to environment and climate related problems

IPCA & Sustainable Development Goals

Environmental Sustainability is the responsibility to conserve natural resources and protect global ecosystem to support health and well being, now and in the future. IPCA's activities are much aligned with the Sustainable Development Goals (SDGs) introduced by the United Nations in 2015 to provide targets and indicators for global sustainability achievements. IPCA has streamlined and implemented its efforts, functioning and processes based on at least 15 of the 17 SDGs.

IPCA & Sustainable Development Goals

1 NO POVERTY	• Sustainable income to 30,000+ waste workers and mentored 20 entrepreneurs
3 GOOD HEALTH AND WELL-BEING	• Developed and maintained greenbelt in 3.2 km stretch of NHAI • Distributed 1,00,000+ PPE kits and eatable items with high nutritional value to the waste workers • Conducted 500+ training programmes on personal hygiene with the waste workers • Installed and operated 100+ WAYU (Ambient Air Purifiers)
4 QUALITY EDUCATION	• Environmental education programmes with schools and colleges students
5 GENDER EQUALITY	• Gender neutral working environment and opportunity to all
6 CLEAN WATER AND SANITATION	• Conducted clean up drives in the vicinity of water bodies • Carried out R&D for sustainable solutions of drain cleaning
7 AFFORDABLE AND CLEAN ENERGY	• Operating Plastic Recycling Plant on cleaner fuel i.e. PNG
8 DECENT WORK AND ECONOMIC GROWTH	• Provide direct employment and healthy working environment to more than 100 people with prospective growth opportunities • Enabled waste workers to the Material Recovery Facilities to ease their work and reduced the occupational health hazard • Worked with waste workers' community to increase their per capita income
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	• Set-up Plastic recycling Facility • Set-up Material Recovery Facilities • Developed recycled products • Signed MoUs with research institutes and ran a Certificate Course to encourage entrepreneurship in waste management • Published Handbooks based on Plastic Waste Management
10 REDUCED INEQUALITIES	• Provided equal work opportunities to waste workers of all cast and creed • Zero discrimination in terms of wages

- Implemented decentralized system of solid waste management in 100+ RWAs, Schools and Colleges
- Conducted 100+ capacity building sessions for waste workers' communities

- Produced more than 34,000 kg of compost from organic waste
- Developed vegetable gardens in 70+ societies

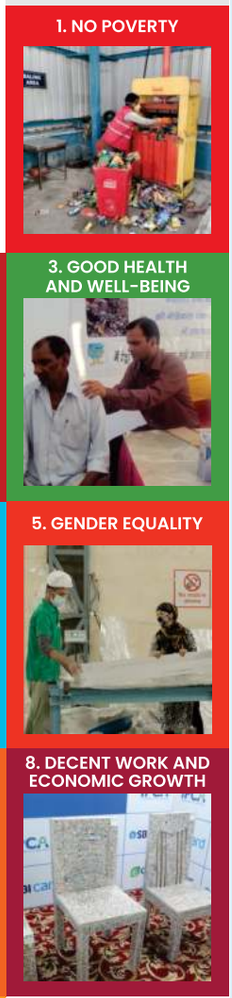
- 88,000+MT of plastic waste prevented from reaching to landfills
- Developed and maintained greenbelt in 3.2 km stretch of national highway
- Mitigated more than 30,00,000 kg of CO_2e Greenhouse Gas emissions

- Prevented significant amount of plastic waste from reaching to water bodies
- Conducted Waste clean-up drives near river water bodies

- Reduction in plastic waste littering
- Up to 50 percent reduction in concentration of particulate matter

- Partnered with organizations sharing the similar goals of Sustainable Development

Enabling Change Through Change

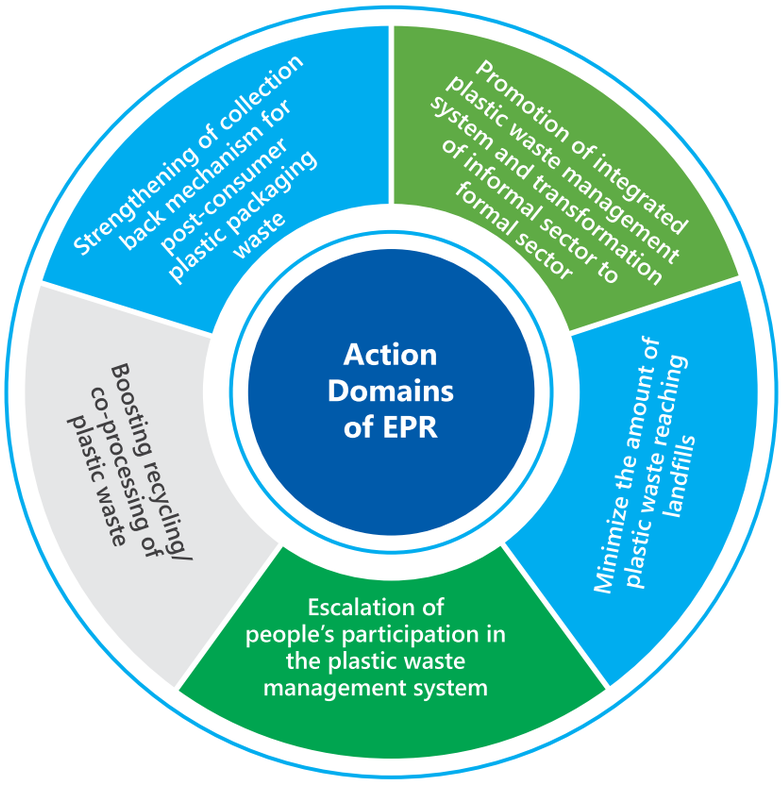


Vertical A

Plastic Waste Management

Extended Producer Responsibility Services

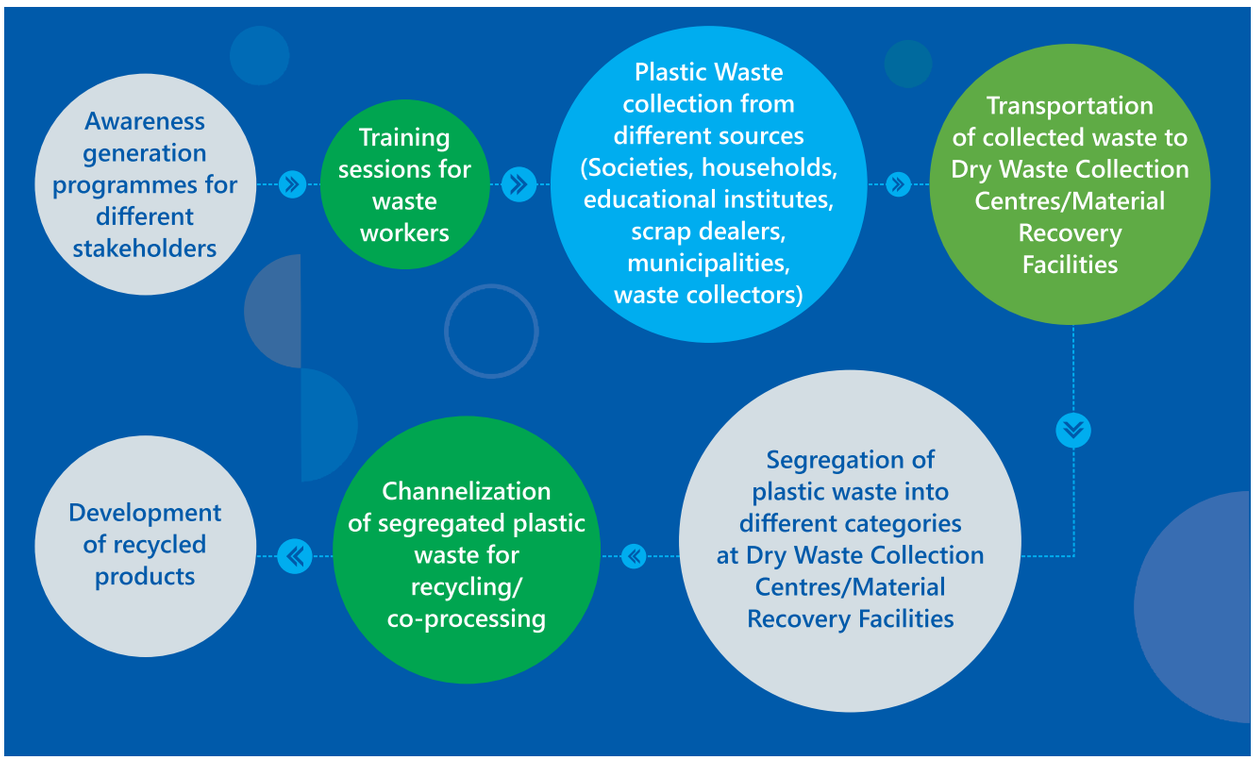
To minimize the damaging impacts of plastic pollution on the environment, the Ministry of Environment, Forest and Climate Change notified the Plastic Waste Management (PWM) Rules, 2016. The rule introduced the mandate for the Producers, Brand Owners & Importers (PIBOs) to bear a certain responsibility for the negative environmental impacts of their products due to plastic packaging. The rule clarifies the accountability of the PIBOs for post-consumer stages of the products life and instructs them to develop a collect back mechanism for equivalent quantity of plastic packaging consumed by them, and this whole system is referred as Extended Producer Responsibility (EPR). The rule on EPR aims to make industries more mindful towards environment and guide them in internalizing the element of pollution prevention and sustainable management of natural resources in their processes.



IPCA is the trailblazer who prepared & executed the EPR Action Plan in 2017 for five leading brands (PepsiCo., Dabur India Limited, Perfetti Van Melle, Dharampal Satyapal Ltd., and Nestle) to fulfil their EPR obligations. To accomplish the action plan efficiently, IPCA has evolved a network of waste workers, scrap dealers, aggregators, and authorized recyclers/co-processors for the collection, segregation and recycling/co-processing of plastic waste including Multi-layered Plastic, PET, LDPE, HDPE, PP, PS, and PVC. During FY 2021-22, IPCA has intensified up its operation significantly and established collection back mechanism for plastic waste in 35 States and UTs of the Country. Currently, IPCA is assisting over 100 PIBOs in fulfilling their EPR compliances through its established methodology that addresses all the crucial components beginning from awareness generation till scientific disposal of plastic waste.

IPCA's team of dedicated and enthusiastic professionals has developed a strong collection back mechanism for different commodities of plastic waste and established a strong relationship with all stakeholders involved in supply chain. IPCA has made their action plan execution strategy aligned with the latest Standard Operating Procedures (SOP).

EPR Approach



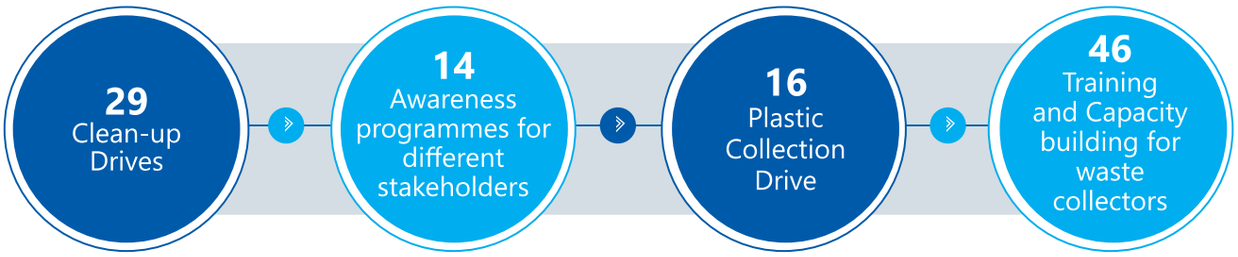
To make EPR implementation effective, there is need of synergy between three crucial components, the ULBs who have been collecting waste and are a part of the organized waste collection channel, the informal sector covering the waste workers and the component of Information, Education and Communication (IEC) to build cognizance, knowledge and capacity. IPCA dedicatedly works towards all three components to have a measurable positive impact on the society.

Annual Statistics for EPR

In the year 2021-22, IPCA partnered with more than 400 organizations including brand owners, Municipal Corporations, Collection partners, Co-processers and Recycling partners.

One of the major components that IPCA takes care of, while executing EPR, is the generation of awareness related to plastic waste management. To do so, IPCA has conducted more than 100 awareness programmes including clean-up drives, training and capacity building sessions for waste workers, plastic waste exchange programmes and others, at Pan India level.

Awareness Related Activities



During FY 2021-22, IPCA has made sincere efforts to scale up the plastic waste collection in the country and at present has presence in 35 States and Union territories of India.

> Environment protection is neither a responsibility of one organization nor of a single person but if each one of us do our bit, we can and we will achieve this goal certainly.
>
> **-Ashish Jain,** Founder-Director, IPCA


IPCA
प्लास्टिक वेस्ट लाओ
फ्री थैला / मास्क पाओ


IPCA


IPCA


IPCA
PPWMS
प्लास्टिक कचरे के संग्रहण
एवं पुनः चक्रण के लिए
जागरुकता बैठक
PUNJAB PLASTIC WASTE MANAGEMENT SOCIETY
INDIAN POLLUTION CONTROL ASSOCIATION
PPWMS
IPCA
Supporting


एवं पुनः चक्रण के लिए
जागरुकता बैठक
PUNJAB PLASTIC WASTE MANA
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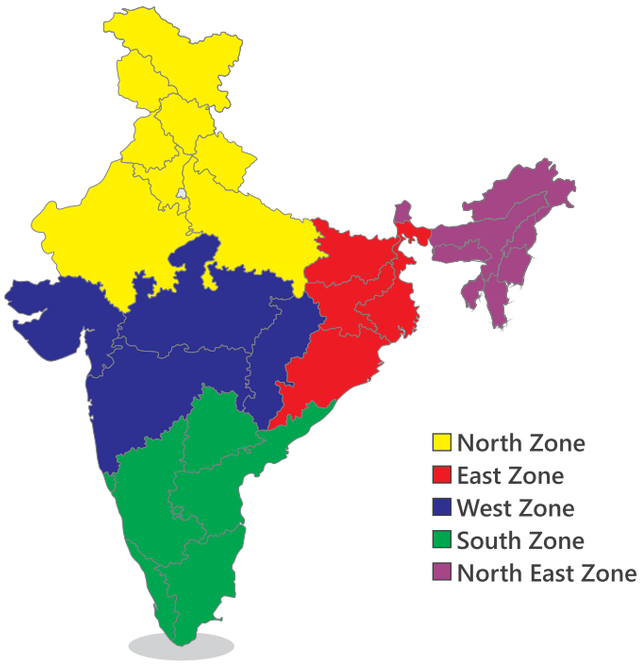
PPWMS

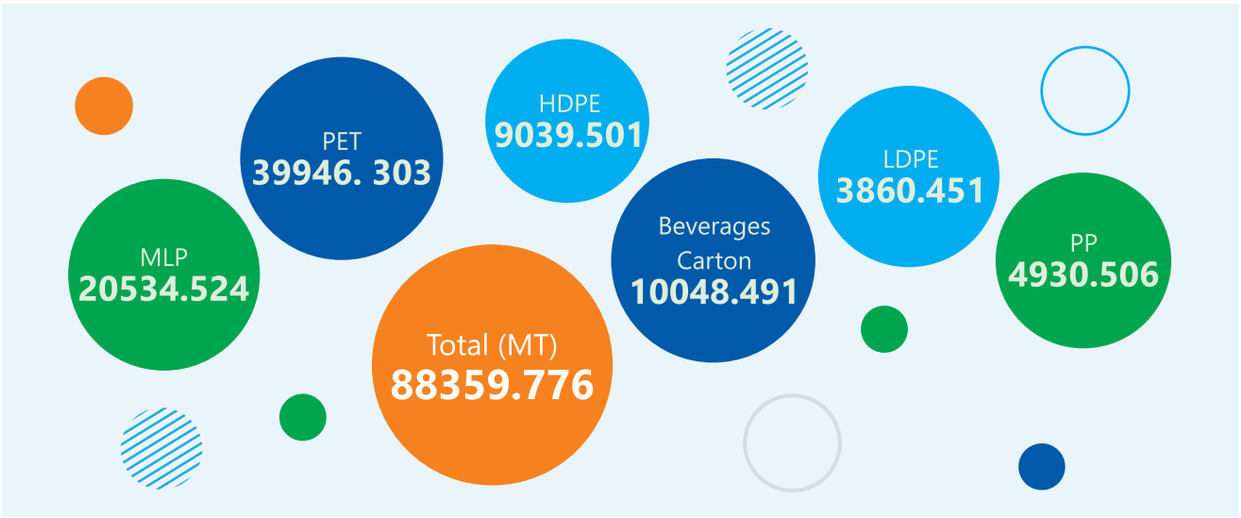
Plastic Waste Collection from Different Zones of India



Total plastic waste collected (MT)

North	47518
East	7844
West	19894
South	9646
North East	3415

Category Wise Plastic Waste Collection During 2021-22



The increase in our operations has not only impacted our processes significantly but has transformed into deeper impacts in terms of improved environmental conditions, better livelihood opportunities to waste workers and change in consumers' behaviour towards plastic waste. With increase in our nation-wide presence, we were able to increase the quantum of dry waste collected and hence decreased the load on landfills significantly.

As the quantity of plastic waste handled across 35 States/UTs increased, it was pertinent to scale up the operations' supply chain as well. IPCA has expanded the network of Dry Waste Collection Centres (DWCC) across the nation and is in consensus with more than 100 DWCCs. Apart from building and strengthening the network of DWCCs at Pan India level, IPCA is developing its own infrastructure to augment the plastic waste management system in Delhi NCR.

Infrastructure Development

Sustainable supply chain for plastic waste management need effective and appropriate infrastructure. Plastic Waste is a material with very low density and occupies more space when stored, if not packed appropriately. This leads to high logistic cost in managing plastic waste and make the entire supply chain non-sustainable with poor economics. Therefore, IPCA has worked to develop appropriate infrastructure to enhance segregation and storage of plastic waste into desirable categories and channelize the segregated plastic waste to its respective recycling or co-processing facilities.

IPCA has adopted two approaches in developing the right infrastructure for managing plastic waste.

1. Improving Existing Collection Centres

There were collection centres in different parts of the country, which were used to segregate and store the waste but these centres were at high risk with respect to safety of material and workers and the logistic cost in transporting material from these centre were also high. Therefore, IPCA has worked to improve the quality of such existing centres and placed balers and fire extinguishers in these. IPCA has also provided training to the workers at these centres and provided them PPE kits for their safety along with facilitating the centres with drinking water and toilets.

These interventions have improved the working conditions at the centres and they are now able to segregate and store more categories and quantities of waste. This has reduced the logistic cost and improved the profit margin.

2. Establishing New Infrastructure

IPCA, under the CSR initiative of SBI Cards and Payment Services Limited, has developed Material Recovery Facility (MRF) in East Delhi with capacity to segregate and store 2 TPD of waste on the land allotted by East Delhi Municipal Corporation (Now Municipal Corporation of Delhi) and one Plastic Recycling Facility with capacity to process 900 MT of plastic waste per month in Greater Noida. The objective was to establish a sustainable supply chain for low grade plastic waste including MLP and to improve its collection and segregation rate.

This CSR project entitled 'Innovative Mechanism for Management of Plastic Waste- Phase II' was sanctioned to IPCA in previous financial year but completed and executed in current financial year with the approval of three additional MRFs (two with 2 TPD capacities and one with the capacity of 10 TPD). During Phase I of the project, IPCA has set-up one Material Recovery Facility of capacity 2 TPD in Geeta Colony, which was inaugurated by Sh. Vikas Anand, Commissioner, EDMC, on 29th July 2021 and started receiving dry waste (Plastic Waste) material for further segregation. It has been established in a plot area of 300 square meter provided by East Delhi Municipal Corporation. Dry Waste is collected by waste collectors from its source of generation and is sent to the MRF for segregation, baling and transportation to the Plastic Recycling Facility.

Material Recovery Facilities in Delhi, Jammu and Katra

In addition to this, IPCA also inaugurated Material Recovery Facilities in Jammu and Katra. The initiative aims to make Katra and Jammu plastic free Municipalities. The facility will help in efficient recycling of plastic waste through collection and segregation of plastic waste.

Work in Progress at Material Recovery Facilities in Patparganj and New Seemapuri, New Delhi

The Plastic Waste Recycling Facility (PRF) was inaugurated on 5th August 2021 by Shri Narendra Bhooshan (I.A.S), Chief Executing Officer, Greater Noida Industrial Development Authority and Ms. Seema Kapahi, Chief People Officer, SBI Cards and Payment Services Limited and the facility is operational since then. The recycling facility has been set up at the lease properties of 5000 square meter with the covered shed area of 2000 square meter and rest 60% open area with green and landscaped, as per local byelaws. At the PRF, baled and compacted plastic waste received from MRF is shredded into 10 mm particles and fed into a hot and cold press to manufacture plastic chip boards.

The project also undertook awareness and capacity building program for stakeholders like ULBs, RWA's, waste workers, etc. Through this project, IPCA has reached to approximately 15000 households. This project created good social, environmental and economic impacts by increasing the per capita income of waste collectors, improving their life style and reducing the waste on land and water bodies. This project helped in mitigating more than 5,80,000 kg of CO_{2e} emissions. Through sustainable supply chain, waste collectors earned extra income by selling their collected waste to the project team. Every month significant amount of plastic waste did not get burn, littered, and dumped in landfill and water bodies.

Awareness and Capacity Building Program

Plastic Waste is being generated by all of us and if we dispose it of properly by discarding it into designated bin then plastic waste management will not be an issue. Once it is in the bin, it needs to be collected by waste collector or other agency for further segregation and treatment. Thus, there are stakeholders like residents, shopkeepers, administrators, housekeeping staff, waste collectors, ULBs officers etc. who need to be aware and trained for their behaviour towards waste management practices and their responsibility toward environment.

IPCA believes that any waste management plan is incomplete without peoples' participation and therefore, IPCA has worked towards creating awareness among all sectors of our society and tried to reach maximum people in different geographical locations. IPCA has celebrated different special occasions and festival with the people and encouraged them to be part of clean and green environment. IPCA has used different communication tools to educate people on source segregation, zero littering and 5 Rs' of Waste Management (Be Responsible to Reduce, Reuse, Repair, and Recycle).

IPCA has organized clean up drives with the support of EPR partners, municipalities and State Pollution Control Boards/Committees. These clean up drives have been joined by many volunteers and organizations. IPCA along with the volunteers has collected littered plastic waste, which was then recycled or co-processed by the recycling partners.

> “We all have to participate in maintaining cleanliness in our environment. We can do this by simply adopting two habits, Not littering and Segregating waste at source. If we embrace these two habits, it will be of immense help in effective waste management.”
>
> **-Ajay Garg,** Secretary, IPCA

Clean-up Drives Organized at Different Locations

IPCA has organized awareness programmes for the residents, school/college students and encouraged them to segregate their waste into three categories and practice zero littering. IPCA delivered awareness sessions at all ten centres of Police Families Welfare Society (PFWS) and was recognised by Smt. Anu Asthana, President, PFWS, during their Annual Function. IPCA has developed fun learning games and interactive activities to educate these stakeholders about segregation of waste at source.

Awareness Programmes Organized for Different Stakeholders

IPCA also participated in different **exhibitions** to display recycled products developed in its plastic recycling facility in order to promote plastic recycling.

IPCA has conducted **training programs** for the waste workers as it is very important to educate and train them on differentiating between various categories of plastic waste, which can be sold and channelized for the recycling or co-processing. IPCA also aimed to increase their per capita income and improve their lifestyle and health issues through these training programs. We have distributed safety gadgets like mask, gloves, shoes, cap etc. to waste workers during these programs and trained them on personal hygiene. The waste workers are an essential part of the waste management supply chain. Strengthening their skill and building their capacity not only uplift their socio-economic status but also help improve the solid waste management in India.

Training and Capacity Building Programmes for Waste-Workers

MoEF&CC has notified amendment to Plastic Waste Management Rules, 2016 on 12th August 2021 and identified 19 single use plastic items, which were to be banned by 30th June 2022 and increased the thickness of carry bag from 50 micron to 75 micron w.e.f 30th September 2021. These mandates needed to be disseminated among the stakeholders, therefore, IPCA put up **kiosks in** commercial markets to create awareness among the shopkeepers and commuters. Through these kiosks, we also encouraged people to segregate plastic waste and dispose it responsibly.

As a token of motivation, we exchanged plastic waste deposited by the people at kiosk with **cloth bags and masks**.

IPCA has carried out a month long shop to shop **Plastic Free Campaign** in busy commercial market of Vikas Marg and reached to every shopkeeper of the market for effective implementation of plastic waste management rules. We ran special vehicle for the collection of plastic waste deposited by the shopkeepers and commuters of Vikas marg. IPCA's team has educated shopkeepers on carry bag thickness and ban on 19 single use plastic items.

With the support of Punjab Plastic Waste Management Society (PPWMS) and Punjab Pollution Control Board (PPCB), IPCA ran special plastic waste collection vehicle in seven districts of Punjab for the collection of littered plastic from road sides, open grounds, parks etc throughout the year. These vehicles also played jingles on source segregation and zero littering with the message of **Sadda Punjab, Swachh Punjab**.

IPCA's design team has worked very hard to create innovative art works with social messages on plastic waste management and ran **social media campaign** throughout the year to create awareness on plastic waste management. Through these campaigns, we could reach to millions of people and able to spread the messages on environmental protection.

IPCA ran plastic waste free campaign on **92.7 Big FM** in four cities (Delhi NCR, Chandigarh, Patiala, and Shimla).

The famous RJ Khurafati Nitin interviewed Mr. Ashish Jain, Director, IPCA and Mr. Ajay Garg, Secretary, IPCA, and broadcasted their views and messages on his popular show. He also interviewed Commissioner, EDMC and Member Secretary, DPCC and aired their views also. This campaign ran for entire month and we could reach to millions of people.

People are always curious about the plastic recycling process and want to understand how it is done! Therefore, IPCA organized **exposure visit** to MRF and plastic recycling facility for different stakeholders including residents, students, government officials, ULBs and other groups to enhance their understanding on plastic recycling and encourage peoples' participation in plastic waste segregation.

> Now, the time has come to work as a unified force for the betterment of environment because every effort counts. We have to conserve and cherish the resources of Mother Earth.
>
> **-Madhu Jaswal,** Senior Manager, IPCA

Peoples' participation in the waste management system is extremely crucial. It is pertinent that every waste generator segregates waste at source and stores it in designated bin and hand it over to municipal workers or authorised waste collectors. IPCA understands that no rule can be implemented successfully if people do not participate in it willingly. Therefore, with the objective to bring social behavioral change among the citizen of India with respect to collection, segregation and storing of plastic waste, IPCA conceived & executed peoples' participation campaigns with the help of its supporting partners.

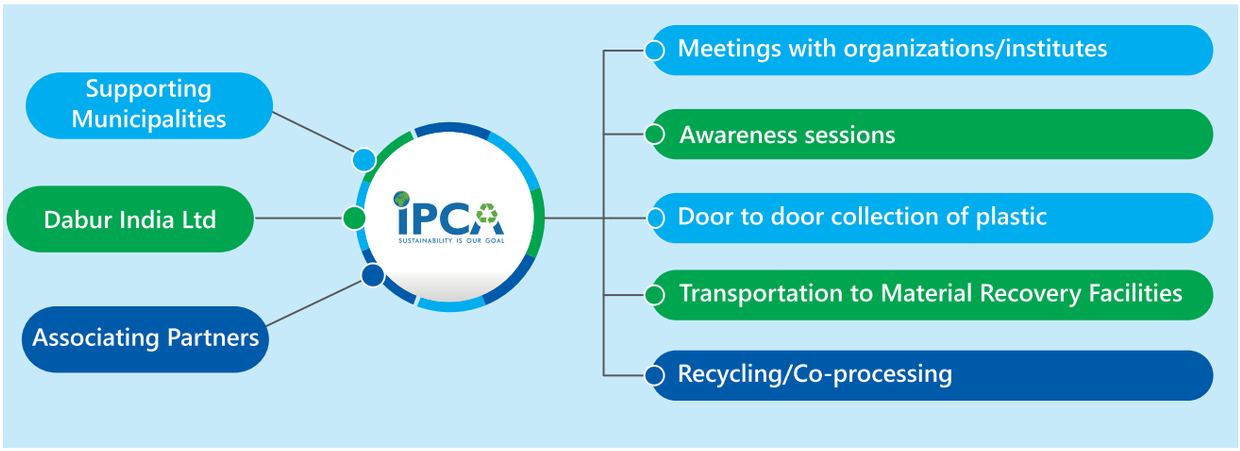
My 10 kg Plastic Campaign

IPCA conceived and implemented My 10 kg Plastic Campaign in 2019 which was supported & adopted by Dabur India Limited and executed in association with East Delhi Municipal Corporation. The campaign's holistic aim is to educate waste generators on waste segregation & implement decentralized system of plastic waste management. The campaign's activities include awareness generation on plastic waste collection, segregation and right disposal. campaign promotes recycling of plastic waste.

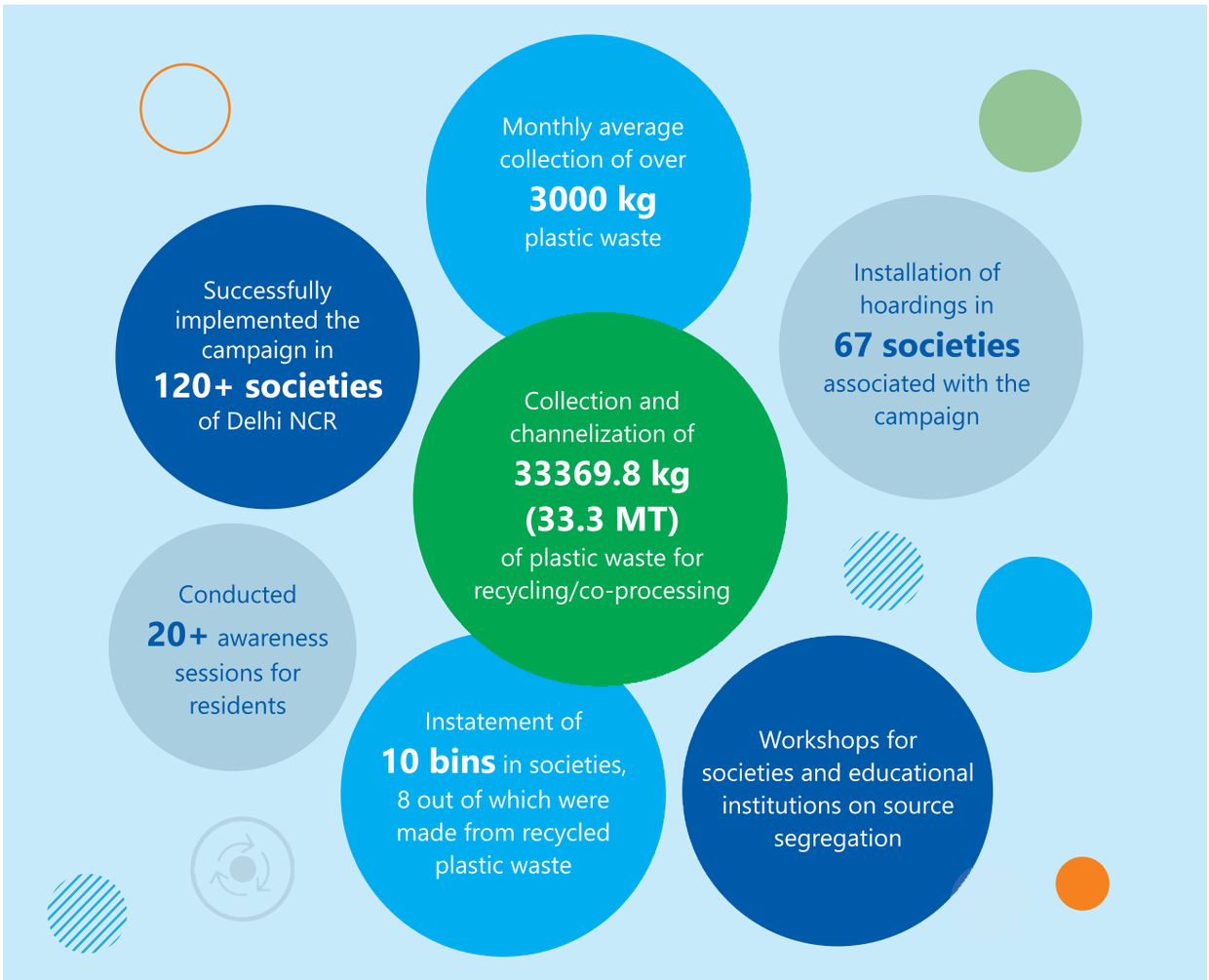
The idea behind this campaign came from the fact which states that per capita consumption of plastic in India is near about 10 kg per annum (FICCI, 2017-18) and this figure is estimated to rise in the coming years. To avert the plastic waste crisis, it is required to have a strategy that has a vision to solve the problem sustainably. My 10 kg Plastic Campaign provides a sustainable solution to India's problem with plastic waste and it is driven by community it self.

My 10 kg Plastic Campaign, which promotes Extended Citizen Responsibility, has become the campaign of more than 50,000 house holds in Delhi NCR. This campaign is by the people, for the people and is driven solely due to eager participation of community. To acknowledge their participation, IPCA rewards them with appreciation certificates & recycled products made from their segregated plastic waste.

Campaign's Process



Impact of the Campaign



States/UTs	States/UTs	Districts	Municipalities supporting	No. of beneficiaries
3 (Delhi, Haryana & Uttar Pradesh)	6 (Delhi, Noida, Greater Noida, Ghaziabad, Meerut, Gurugram, Faridabad)	More than 20 districts in Delhi NCR	➢ Municipal Corporation of Delhi ➢ Municipal Corporation Faridabad ➢ Meerut Municipal Corporation ➢ Municipal Corporation of Gurugram ➢ Ghaziabad Nagar Nigam ➢ Greater Noida Industrial Development Authority ➢ Noida Authority	More than 2 Lac individuals

Glimpses of My 10 kg Plastic Campaign

Bottles for Change

Bottles for Change Programme is an initiative by Bisleri International Pvt. Ltd. that aims to create awareness among citizens about importance of waste segregation and plastic recycling. IPCA is executing this programme in Delhi NCR and ensuring the channelization of all post-consumer clean plastic for recycling and hence safeguarding the environment. This programme aims to bring behavioral change through indoctrinating the habit of recycling plastic waste and adopting best practices to reduce plastic consumption. The programme identifies the value of right disposal methods and efficient recycling so as to add value to the plastic waste. The recycled plastics is utilised to make recycled products like furniture, hand bags, window blinds and, even fabric.

What does Bottles for Change do?

01 Educate citizens & bring awareness about a habitual change in the plastic disposing methods

02 Create a channel and opportunity for waste workers to collect used but clean plastic (hard as well as soft) from waste generators

03 Sort clean plastic waste as per their types received from user, at the segregation centres and sending it for recycling/co-processing

04 Provide waste workers a hygienic working condition and a respectable life & eventually uplifting their economic status

IPCA initiated the execution of the programme in the month of October, 2020, with a few residential societies of Noida and in a very short span it expanded to over 70 locations of Delhi NCR. IPCA is actively engaged in generating awareness among citizens, providing logistic support to execute the programme, focusing on inclusion of informal sector into the system for the collection of plastic waste, channelizing the plastic waste to authorised recycling/co-processing facilities; and also, supporting the Bisleri's App based registration and documentation.

Approach to Execute this Programme

Annual Statistics of Bottles for Change

The programme has made significant impact in thousands of households. The statistics of the campaign are as follows:

> "We should create an environment that doesn't need protection, where every person is consciously fulfilling his responsibility towards every aspect of environment management."
>
> **-Reena Chadha,** General Manager, IPCA

Glimpses of Bottles for Change Programme

Vertical B

Solid Waste Management

Urban India produces about 62.0 million tons of municipal solid waste annually which translates to 1.69 lakh metric Tons per day (MTD) (Ministry of Housing and Urban Affairs). It is also predicted that this annual volume will increase to 165 million tonnes by 2030. A massive portion of the untreated solid waste is dumped erratically on the outskirts of towns or cities, causing several pollutions including groundwater contamination, air pollution. Therefore, there is a need to detect these irregularities in waste management system which is, mostly, related to collection and transportation of waste. To address this problem, IPCA, in association with its supporting partner, devised a project that tackles these issues efficiently and in a very innovative manner.

Segregation of Organic Waste for Recycling and Treatment (S.O.R.T.)

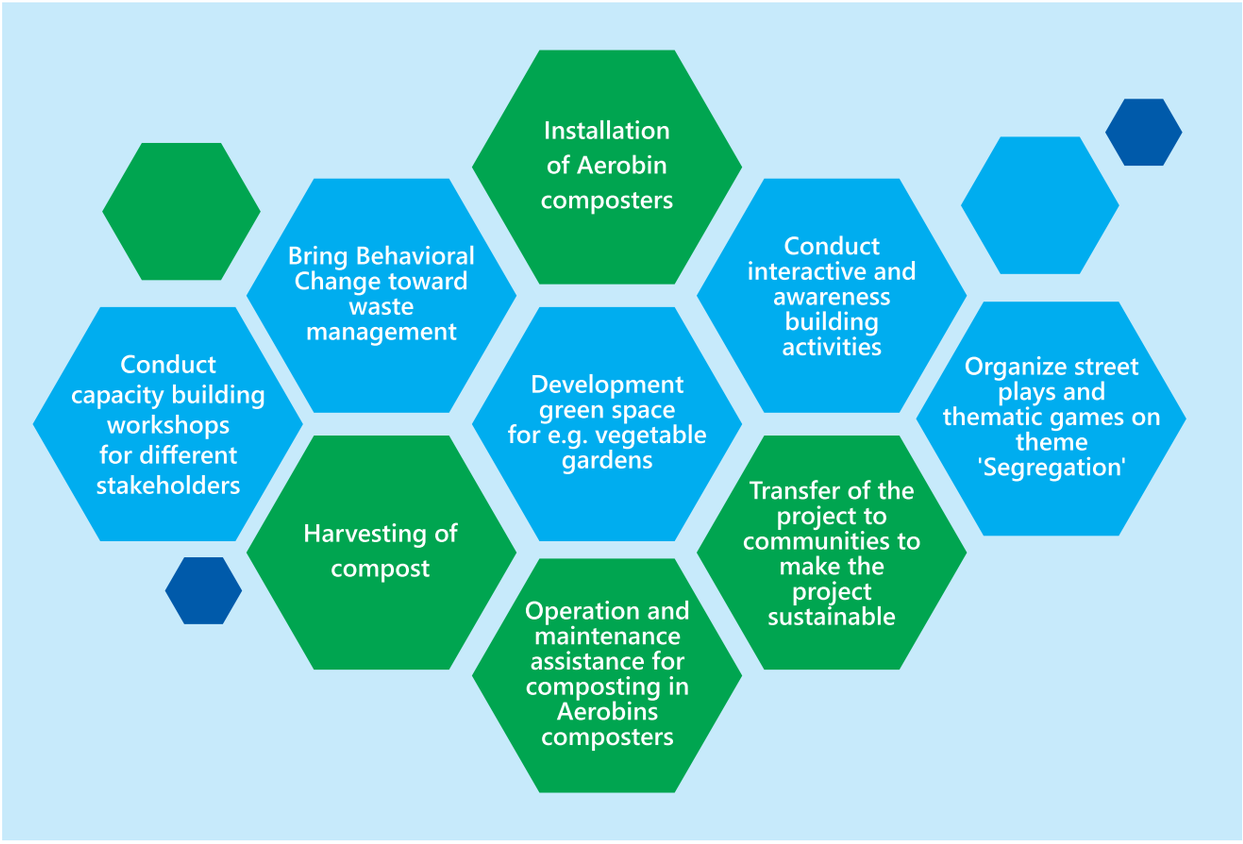
Project Segregation of Organic Waste for Recycling and Treatment (S.O.R.T.) is the flagship project of Motherson Group under its CSR initiative run by Swarn Lata Motherson Trust (SLMTT), which is implemented by Indian Pollution Control Association. The project has successfully been implemented at more than 50 locations in Delhi NCR (including Delhi, Noida, Greater Noida, Ghaziabad and Gurugram). The Project was first implemented in Delhi-NCR in the year 2018 and now, has reached in its fourth phase.

The project was conceptualized with the aim to promote source segregation of waste followed by maximum recovery through onsite treatment of organic waste. Creating awareness, training and capacity building of different stakeholders were the key activities of the project which has resulted in behavioral change of the consumers and increased rate of source segregation.

One of the major components of the project is the installation of Aerobins. More than 200 Aerobins have been installed in over 50 locations across Delhi NCR. The Aerobin is designed as such that it requires no energy input. The only input required is of wet/organic waste from the kitchen or garden. The composter is easy to use and is based on thermal insulation which conserves the internal heat for rapid breakdown of biomass. It employs an aeration core that promotes aerobic decomposition of organic waste. The composting process is free from foul odour and the first compost can be harvested after 40-45 days. The composters installed at the project sites are of 200L or 400L capacity and are operated by a designated operator, who is responsible for its daily operations like feeding organic waste, monitoring the temperature, moisture and harvesting compost.

The composter is easy to use and is based on thermal insulation which conserves the internal heat for rapid breakdown of biomass. It employs an aeration core that promotes aerobic decomposition of organic waste. The composting process is free from foul odour and the first compost can be harvested after 40-45 days.

Action Domains of Project S.O.R.T.



At present, the Project S.O.R.T is operational at 52 locations in Delhi NCR that include residential societies, educational institutes, corporates and embassies. Since the day of implementation, the project has brought behavioural change towards waste management to more than 62,000 people of Delhi NCR and the project treated 1,85,429 kg of organic waste and resulted in making 67,678 kg of organic compost and 10,000 litres of liquid manure.

Operational Process

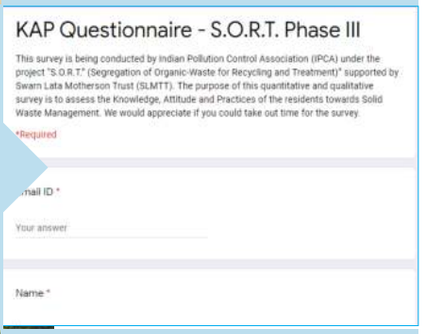
IPCA takes the lead in the project implementation and undertakes all the steps necessary for successful implementation from conducting preliminary survey for selection of sites, running and facilitating operations and maintenance; providing trainings to the residents and staff to aiding in harvesting, processing and using the organic compost.

> "The environment is where we all meet; where we all have a mutual interest; it is the one thing all of us share. There fore it is imperative that we preserve and converse it for forever."
>
> **-Akansha Gupta,** Senior Manager, IPCA

Steps of Project S.O.R.T. Execution

1 Identification of site/location

2 Knowledge, Attitude and Practice (KAP) Study



3 Training Workshops and awareness generation activities

4 Installation of Aerobins and their O&M

5 Compost Harvesting

6 Development of vegetable garden and its O&M

7 Formation of Waste Management Committee on location

Highlights of the Project

Spread across 46 residential societies (**12698 houses**), corporate (1) & educational institutes (5) in Delhi, Gurugram and Noida

In 40 societies, source segregation level **> 75.26%**

In 40 societies a total of **1,90,612kg** wet waste got processed and **34,853.58 kg** of organic compost produced

Reduced dumping in landfills and has cut down GHG emission by **2260.35** Tons of CO_2 equivalent per year

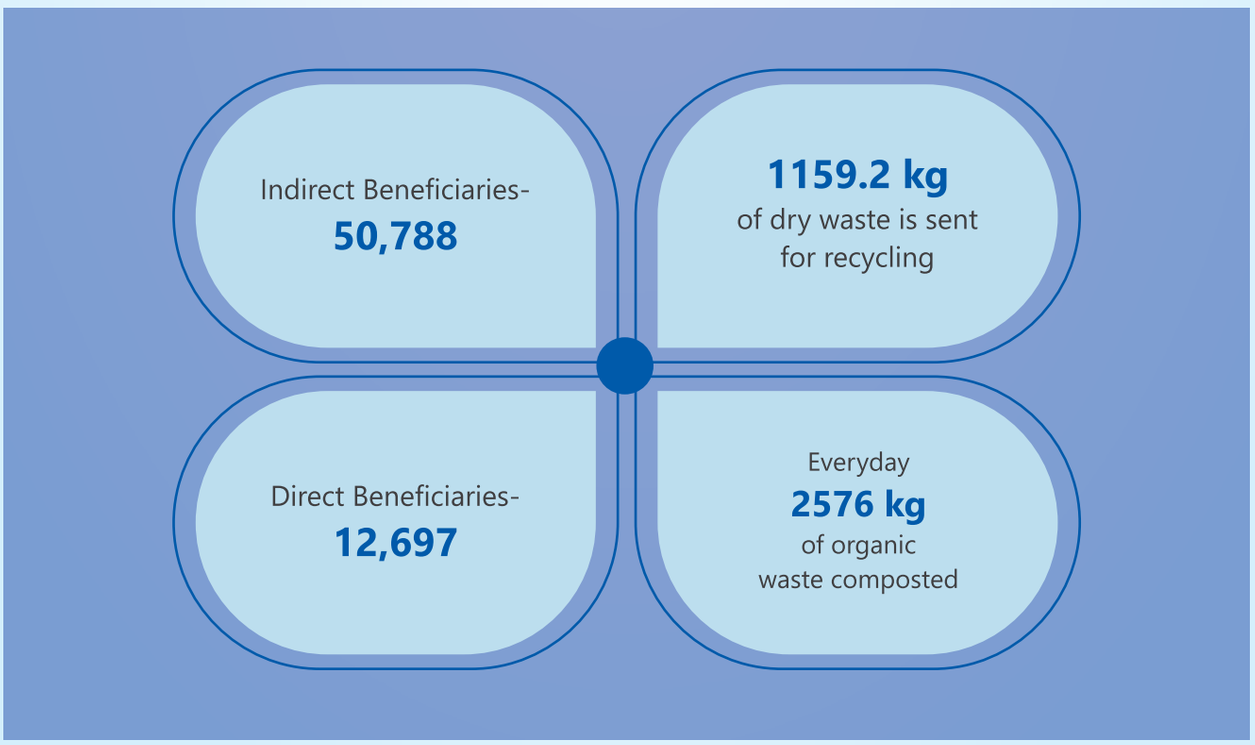
Sensitised and trained **2732** Residents, **350** students, **30** office employees, **4105** Maids and **1797 House** Keeping staffs on waste segregation

Conducted **374 training** sessions

Distributed **940** pair of gloves & masks to House Keeping staff

Provided **96 PPE kit** to the house keeping staff of all the project locations

Developed **47** vegetable gardens to close the loop of waste generation

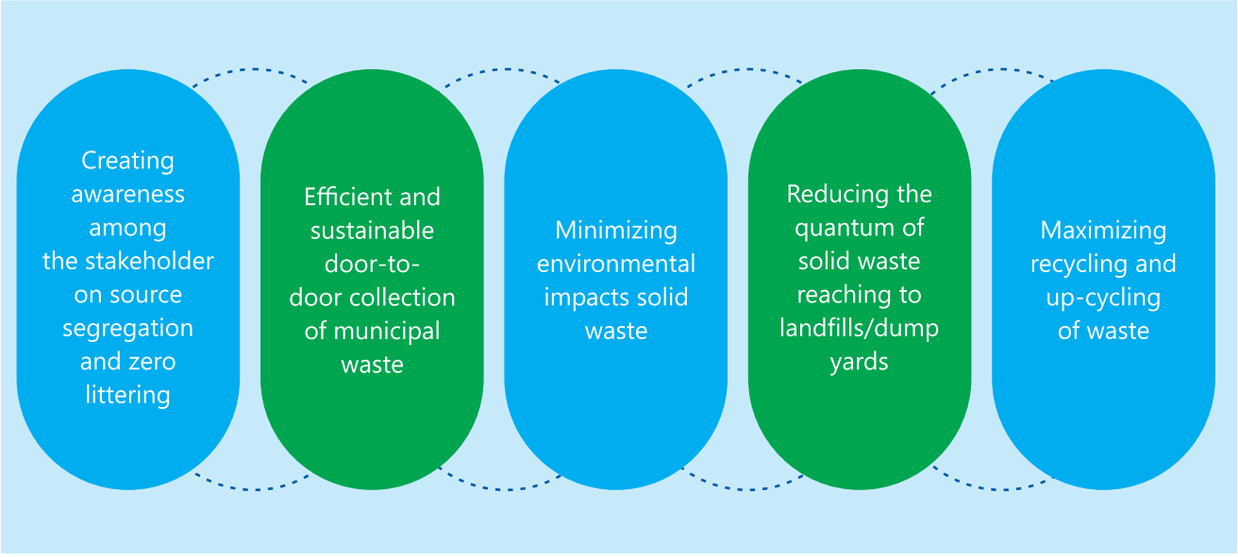



BO-1

Garbage Recycling Program

In 2003, IPCA started its journey in solid waste management with Garbage Recycling Program and this is oldest and very first project of IPCA and still operational. This project is indeed actual representation of IPCA's approach of sustainability. The project is about providing door-to-door waste collection service to residential societies, corporate office, educational institutes, hotels and industries with the objective of maximum recovery of waste resources and upliftment of waste workers. The Garbage Recycling Program is a community-centric program that aims to bring about social transformation.

Key Components of Garbage Recycling Program



Through this project, IPCA is attempting to provide 100% collection of waste from the door steps of its project sites and bring certainty to waste workers life by providing them job security. IPCA depute waste workers at project site for the collection of waste and provide training to these workers on collection and segregation of waste. IPCA also educate them on different grade of recyclable waste and linked them to the buyers or aggregators so that they can earn more and improve their lifestyle.

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Action Domains of Garbage Recycling Program

Annual Statistics

During FY 2021-22, IPCA provided its garbage recycling services to 50+ residential colonies, corporates, educational institutes, hotels & industries (for e.g. Advant IT Park, NASSCOM, Golden Tower, BReal State, Haldirams Ethnic Food Private Ltd. etc) and collected more than 500MT of garbage for recycling.

Garbage collection from **50+** locations

3000+ Households, Corporates, Educational institutes associated

240 Waste collectors engaged

590 MT waste collected & treated

Impacts of Garbage Recycling Program

Environmental Impacts

- Reducing pressure on land fills
- Reduced Greenhouse Gas emissions
- Maximizing recycling of waste
- Reducing pressure on natural resources
- Vermicomposting of bio-degradable waste
- Promoting zero littering

Social Impacts

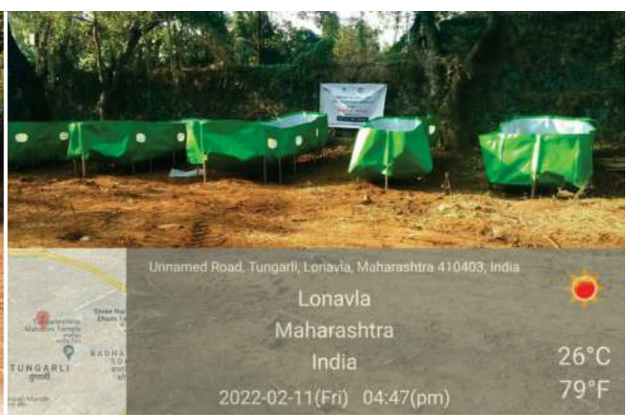
- Generating awareness among stakeholders
- Capacity building of waste workers
- Educating the waste workers about personal hygiene and safety protocols
- Distribution of PPE kits and other safety gears among waste workers
- Behavioural change among end users towards waste management
- Increasing community participation

Economic Impacts

- Providing a sustainable income source to the waste workers
- Enhancing livelihood status
- Giving ownership rights over the waste collected by them
- Connecting the waste collectors authorised to recyclers/co-processors to increase their per capita income
- Sense of job security

Composting Pit at Lonavala, Maharashtra

IPCA in association with Lonavala Municipal Council (Maharashtra) has initiated Project of decentralised waste management system at Ward Tungarli. The project was about having Atmanirbhar Ward under the Swachha Sarvekshan 2022. IPCA installed 10 nos. of composting pits at the land provided by the Municipal Council. IPCA has also conducted awareness workshops with the residents of Tungarli Ward to motivate and encourage them for source segregation of municipal waste and composting of organic waste.



Vertical C

Air Quality Monitoring and Management

The essentiality of clean air to breathe for health and vitality cannot be stressed enough. Air, the core element required for the sustenance of life, has become severely polluted and the deteriorating air quality has become a major area of concern for India. The poor air quality is responsible for exacerbation of asthma, increase in respiratory infections, increased mortality due to cardiovascular diseases, chronic respiratory diseases and many more ailments. To tackle the problem of air pollution the Government launched the National Clean Air Programme (NCAP) in 2019, which calls upon 122 non-attainment cities to develop city-level Clean Air Action Plans to implement mitigation strategies for ambient PM concentrations. It sets a target of reducing the levels of key air pollutants PM_{10} and $PM_{2.5}$ by 20-30 percent by 2024, from the levels of 2017 as the base year. Out of the 122 cities which have annual average air pollution exceeding the specified National Ambient Air Quality Standards (NAAQS), the National Capital Region (NCR) is of particular interest. In NCR there have been numerous incidences of severe air pollution in the last few years with PM_{10} and $PM_{2.5}$ levels increasing to dangerous levels resulting in higher incidence of respiratory diseases than normal.

To undertake the challenge of mitigation of air pollutions, sustainable technological innovations and indigenous service delivery solutions were integrated and the outcomes were Project Air Care (PAC) and Project Solution of Air Pollution (SAP).

Project Air Care (PAC)

IPCA partnered with GlaxoSmithKline (GSK) Consumer Healthcare to undertake "PROJECT AIR CARE" as a part of the CSR initiative of GSK in 2020-21. The project is supported by Gurugram Metropolitan Development Authority (GMDA) and CSIR-NEERI (Council of Scientific & Industrial Research-National Environmental Engineering Research Institute) and executed in Gurugram.

The main objective of the project is to reduce air pollution, in the form of Respirable Suspended Particulate Matter (RSPM), from major traffic junctions and air pollution hot spots in Gurugram city. The project was initiated with 65 Wind Augmented Purifying Units (WAYU) units and 20 more units were installed in the year 2021.

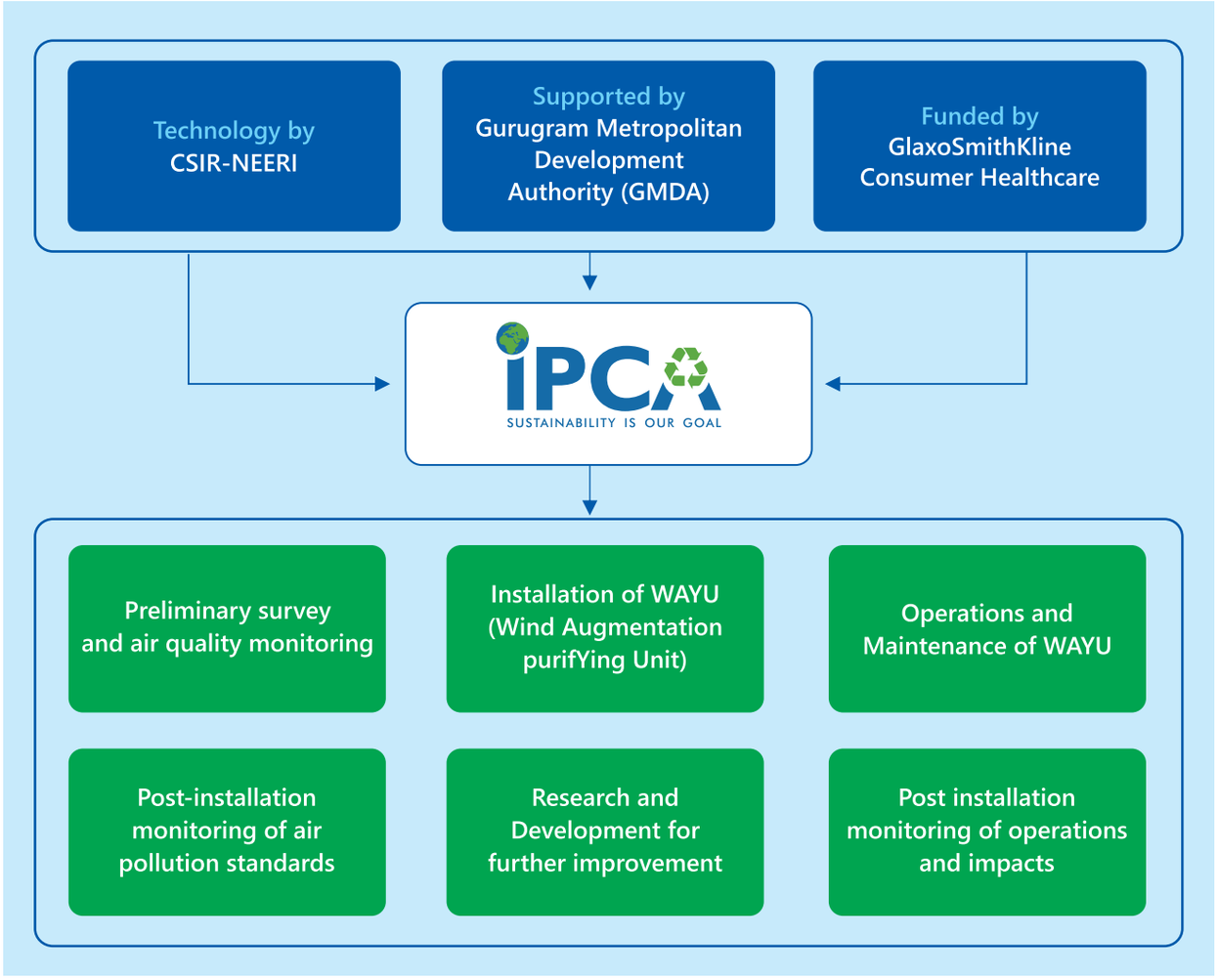
About WAYU

The air purifiers installed are known as Wind Augmentation Air Purifying Units (WAYU) and are designed and developed by CSIR-NEERI (Council of Scientific & Industrial Research-National Environmental Engineering Research Institute), IPCA's knowledge partner. The air purification units are customised to reduce $PM_{2.5}$ and PM_{10} particles, through the use of various filters. The device has the capacity to purify air in an area of radius 15 m. It is energy efficient and has low maintenance cost. The purification system works on two principles- i) wind generation for dilution of air pollutants and; ii) Active pollutant removal. In ideal conditions it has the efficiency to reduce PM_{10} by 60-70 % and $PM_{2.5}$ by 30- 40 %.

To tackle the problem of air pollution the Government launched the National Clean Air Programme (NCAP) in 2019, which calls upon 122 non-attainment cities to develop city-level Clean Air Action Plans to implement mitigation strategies for ambient PM concentrations. It sets a target of reducing the levels of key air pollutants PM_{10} and $PM_{2.5}$ by 20-30 percent by 2024, from the levels of 2017 as the base year.

Operational Process

IPCA plays the key role in the operation process of Project Air Care and looks after all processes including installation of WAYU, maintenance, monitoring of standards and future developments and customization.



Annual Statistics for Project Air Care

The impact of Project Air Care is evidently visible on ground. The installation has helped decrease PM_{10} by 22%-39% and $PM_{2.5}$ by 17%-43% at the ten traffic junctions. The continuous monitoring and assessment of dust collected by WAYU air purifiers has also helped delineate the causes of pollution in the area, which are re-suspension of dust and vehicular exhaust emissions. The reduction in particulate matter and delineating sources of air pollution are major contributions of the project.

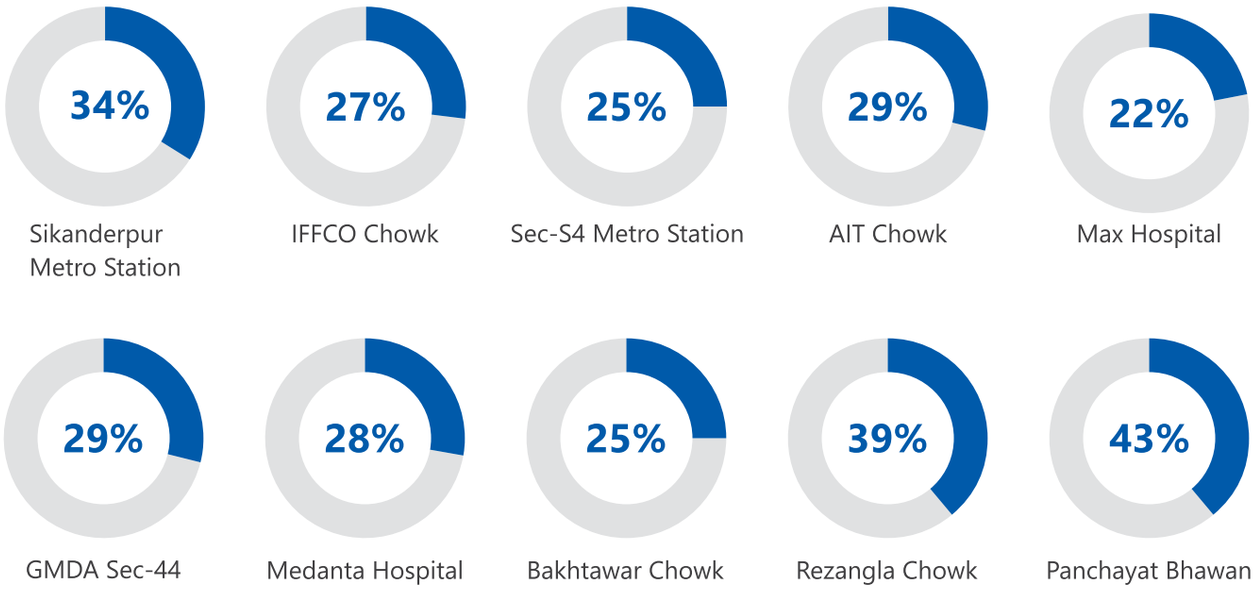
No. of WAYUs Installed: 85 units

S.No.	Locations	No. of Units
1	Sikanderpur Metro Station	12
2	IFFCO Chowk	15
3	Sec-54 Metro Station	4
4	AIT Chowk	8
5	Max Hospital	10
6	Medanta Hospital	8
7	GMDA Sec-44	6
8	GMDA Office	1
9	Bakhtawar Chowk	7
10	Rezangla Chowk	8
11	Panchayat Bhawan	6

Reduction in the PM_{10} Concentration

Air quality monitoring activities carried out on weekly basis at all operational sites, based on the difference in PM_{10} concentrations during WAYU OFF and WAYU ON conditions, the reduction in PM_{10} varied from 13%-50%. The average reduction in PM_{10} on each of the ten sites is given in the infographic below and the maximum reduction was found at Panchayat Bhawan (at 43%) and minimum reduction was found at Max hospital (at 22%).

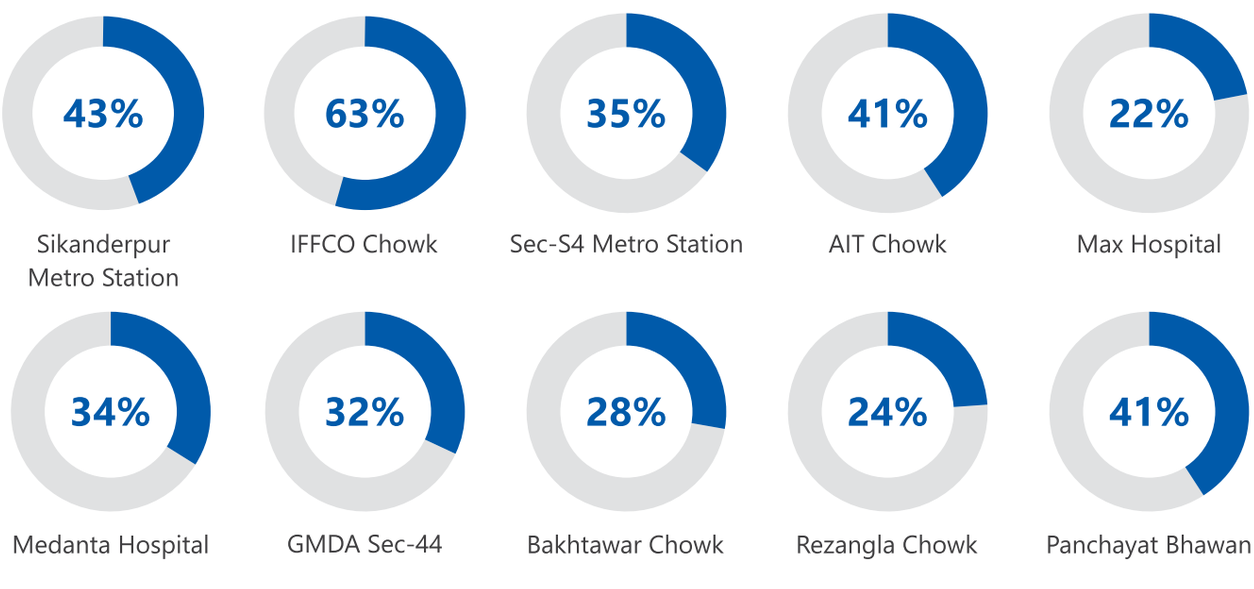
Percentage Reduction in PM_{10} Concentration



Reduction in the $PM_{2.5}$ Concentration

Along with the air quality monitoring for PM_{10}, monitoring was carried out for $PM_{2.5}$ particles as well. The principle applied for the monitoring was on the basis of difference in $PM_{2.5}$ concentrations during WAYU OFF and WAYU ON conditions of the air purifying device. The reduction in $PM_{2.5}$ varied from 10%-59%. The average reduction of $PM_{2.5}$ concentration on each of the ten sites is given in the infographic below and the maximum reduction was observed at Sikenderpur Metro Station Hospital (at 43%) and minimum reduction was found at Max hospital (at 17%).

Percentage Reduction in $PM_{2.5}$ Concentration



Solution of Air Pollution (SAP)

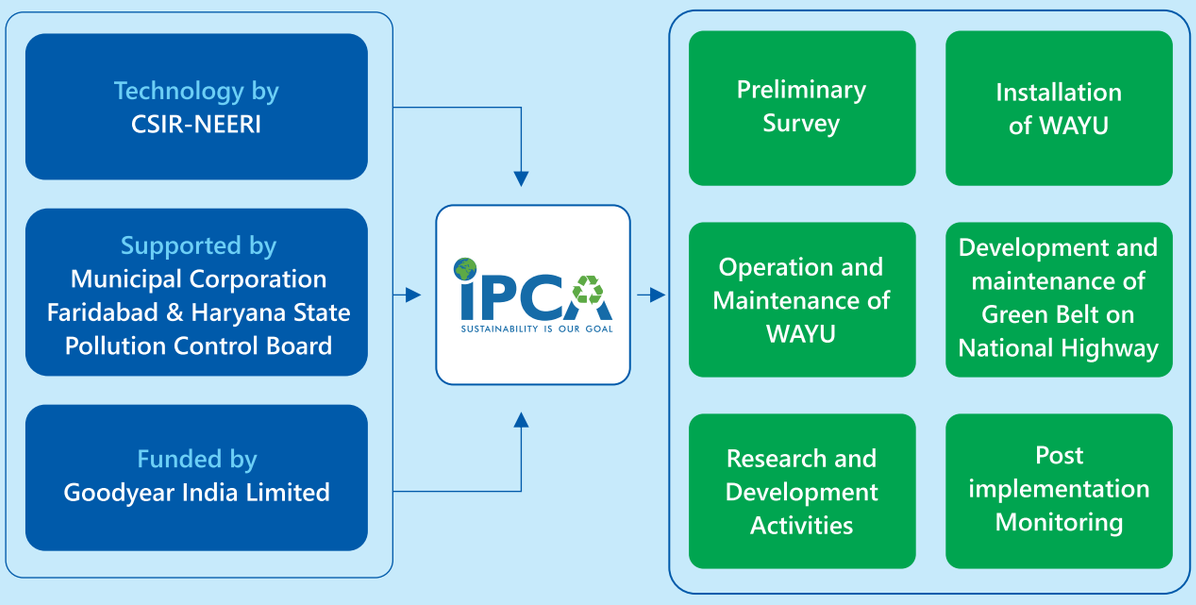
Industrial and traffic related air pollution are one of the responsible sources for generating high spatio-temporal variations in air quality in the city. It is generally high at traffic intersection due to idling conditions and lots of re-suspension of road dust. There is no such system developed at present that eliminates air pollutants, but nature has created some systems to deal with the detrimental fallouts of different anthropogenic activities up to a certain limit. There are some plants that can survive well with higher pollutant concentration. They act as a pollution scavenger without sustaining serious decline in their growth. They improve air quality by providing oxygen to the atmosphere and can serve as tolerant species.

Operation & Maintenance of WAYU Purifiers and Installation of Air Quality Monitors Under Project PAC

With this view, IPCA collaborated with Municipal Corporation Faridabad (MCF) and Goodyear India Ltd. to install the air purification units at different traffic intersection in Ballabhgarh city and to develop a greenbelt of 3.2 km at the National Highway of India from Escort Mujesar Metro Station to Goodyear India Ltd. Factory under the project Solution of Air Pollution (SAP). The project was launched by Shri Yashpal, IAS, Hon'ble Commissioner, Municipal Corporation Faridabad and Shri M.K. Bansal, Project Director, CMU, in the presence of senior officials from Haryana State Pollution Control Board (HSPCB), CSIR- NEERI and other concerned government departments, on 27th March, 2021.

In this project, IPCA adopted two mechanism to curb the issue of air pollution i.e. by using natural method by planting shrubs and plants at the national highway which have air purification qualities and secondly, using artificial method by installing air purification units at 3 locations, chosen strategically, which helps in curbing air pollution at the source through identification of the local hotspots in Ballabhgarh.

Operational Process



Annual Statistics

1. Development of the Greenbelt

A total of 312 plants existed before March 2021 within the stretch of the National Highway between Escort Mujesar to Sant Surdas Marg Metro Station and the central verge has the maximum width of 12 feet and minimum to 2 feet towards the Escort Mujesar Metro Station. The central verge between it was mostly barren and had very few plantations. Therefore, to address this issue and to enhance the visual and landscape quality of the highway, total of 4801 plants have been planted on the greenbelt in which 1273 plants have been planted from the Goodyear India Ltd. factory Gate 2 to Goodyear India Ltd. Gate 1 and 3528 plants have been planted from the Goodyear India Ltd. factory to Escorts Mujesar. Out of 4801 plants, around 1262 Bougainville plants and 2352 Kaneer plants were planted from March to July month and 840 saplings of Dianthus, Calendula and Petunias were planted in December month.

Other than plant saplings, 6 large safety boards and 40 environment slogan boards were also installed. The safety board ensures smooth traffic as it informs the driver about the correct lanes to drive in.

Before

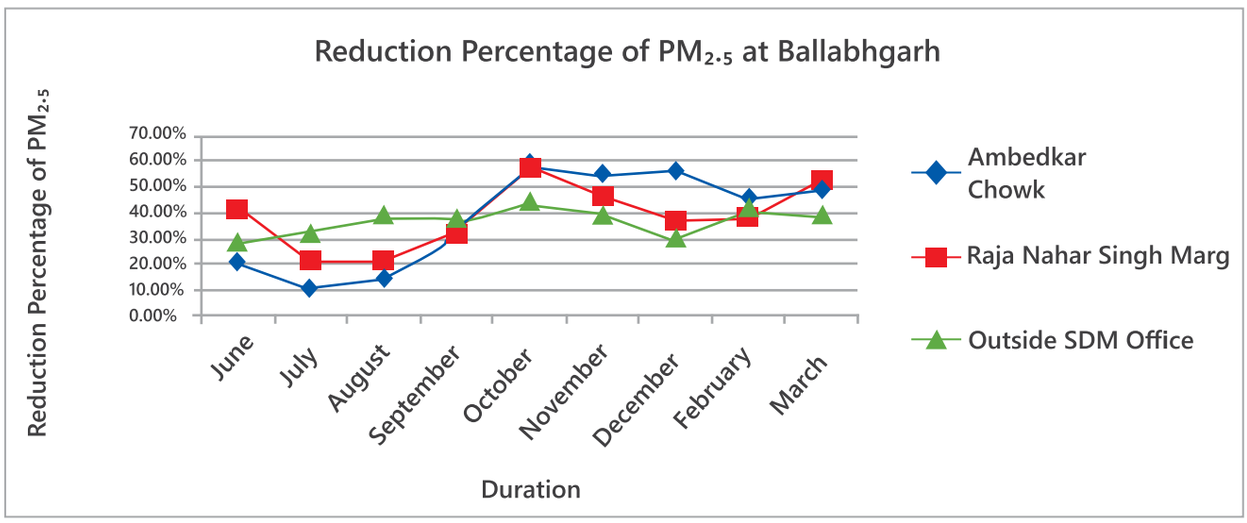
After

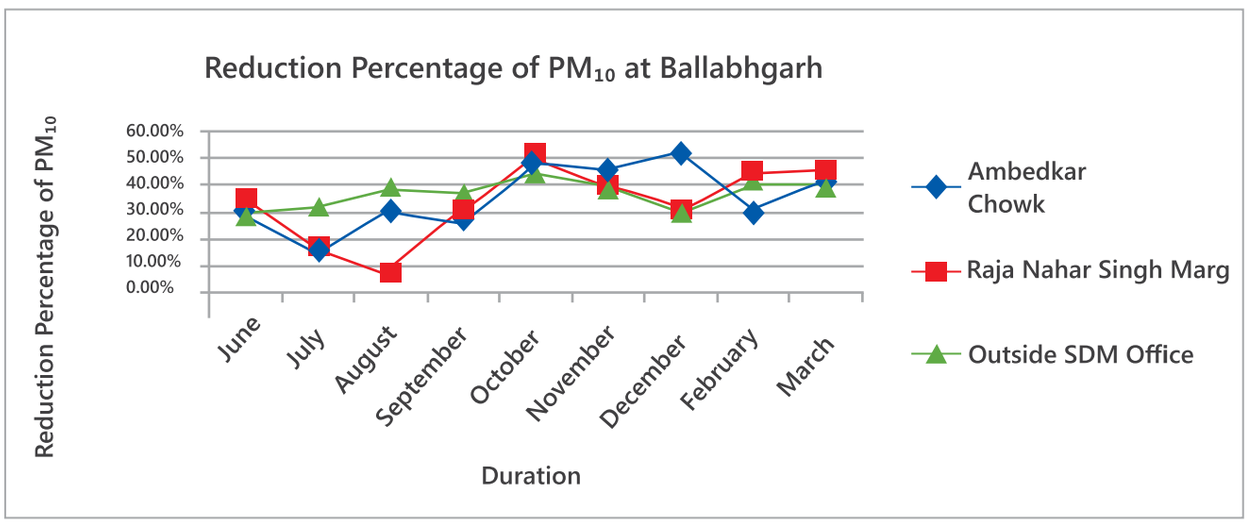
Development of 3.2 km Greenbelt on National Highway Between Escort Mujesar to Goodyear India Ltd. Factory Under Project SAP

WAYUs Installed under Project SAP

Reduction Percentage of $PM_{2.5}$ & PM_{10} Concentrations at Project Locations

During the air quality monitoring period of June 2021 to March 2022, the reduction percentage of particulate matter in terms of PM_{10} and $PM_{2.5}$ has been significantly increased at the project locations. At Ambedkar Chowk, the maximum reduction percentage of PM_{10} and $PM_{2.5}$ is found to be 52 % in December month and 58 % in October month respectively. At Raja Nahar Singh Marg, the maximum reduction percentage of PM_{10} and $PM_{2.5}$ is found to be 51% and 57% respectively in the month of October. At SDM Office, the maximum reduction percentage of PM_{10} and $PM_{2.5}$ is found to be 43% and 44% respectively in the month of October. All these results show that WAYU purifiers are working efficiently and improved the ambient air quality of Faridabad (Ballabhgarh) throughout the year 2021-22.





> "Air pollution is not just a problem of Delhi NCR but it is the problem of almost the entire country. It is a trans boundary issue hence India needs to follow the holistic air-shed management approach, where coordinated actions are required at interdepartmental inter-cities & interstates levels."
>
> **-Radha Goyal,** Deputy Director, IPCA

Operation & Maintenance of WAYU Purifiers Installed Under Project SAP

Vertical D

E-Waste Management

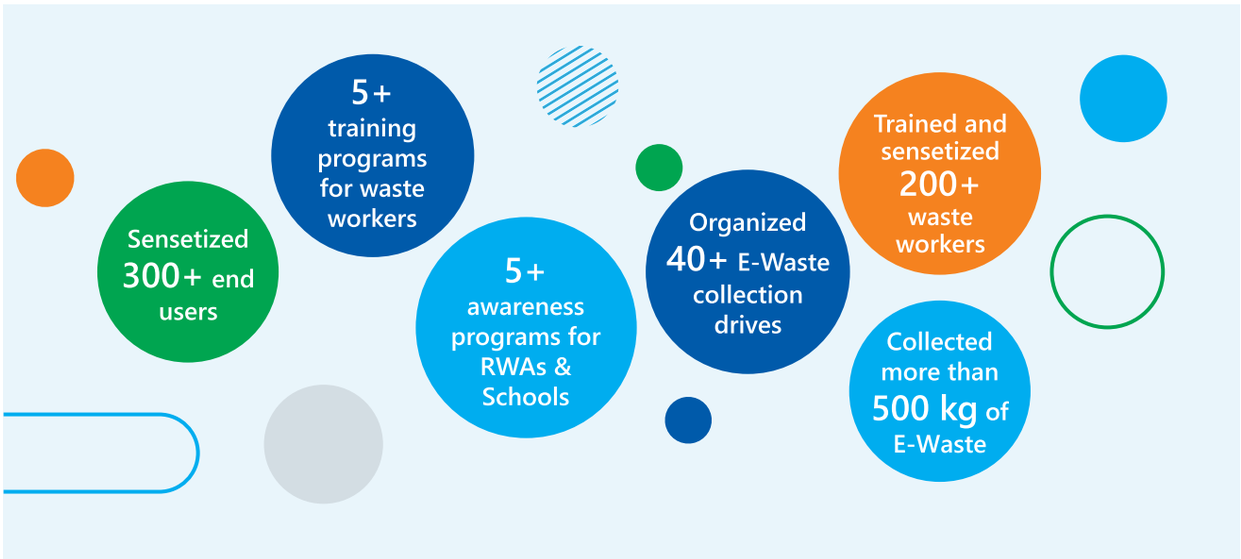
Growth in the technology sector has enhanced usage of electronics leading to exponential rise in Electronic and Electrical Waste (E-Waste). According to a Central Pollution Control Board report, in financial year 2019-2020, India generated 1,014,961.2 Ton of E-Waste for 21 types of electronic items. E-Waste includes IT & Communication devices, household electrical appliances, consumer electronics that are discarded, unsold electrical items and faulty electronics. Faster Rate of up-gradations leaves behind redundant and discarded technologies as E-Waste and it is dangerous due to toxic chemicals that naturally leach from the metals of E-Waste that contaminate the Environment. India has become the largest producer of E-Waste after China and the United States. More than 95 per cent of this waste is handled by the informal sector, which only adds to the problem.

Considering the issues related to E-Waste management in India, IPCA, with the support of OSRAM, a global leader in optical solutions, under their CSR initiative has executed a project for 'Societal awareness on importance of segregation-at sources and safe handling of E-Waste' in Delhi NCR. The project aimed to create awareness among the residents for separate storage of E-Waste and safe handling of segregated E-Waste through authorised E-Waste dismantlers or recyclers. Initially, the project was executed for three months in RWAs and schools of Delhi NCR.

Infrastructure Development: E-Waste Dismantling Facility

IPCA fostered an E-Waste dismantling facility named as Avasa Technologies Pvt. Ltd. Avasa is sister concern of Indian Pollution Control Association and work in the field of E-Waste management. Avasa provides refurbishing solution in IT to major Government and Private sector organizations. Avasa started its voyage in the field of E-Waste management in the year of 2021 after getting CTE and CTO certificate for E-Waste collection and manual dismantling from Delhi Pollution Control Committee (DPCC). At the facility, E-Waste is disposed of scientifically and hence it has lesser negative impacts on environment and it also issues recycle certificate against each E-Waste picked.

Project Statistics



Awareness & Capacity Building Programmes

E-Waste Collection and Channelization

Vertical E

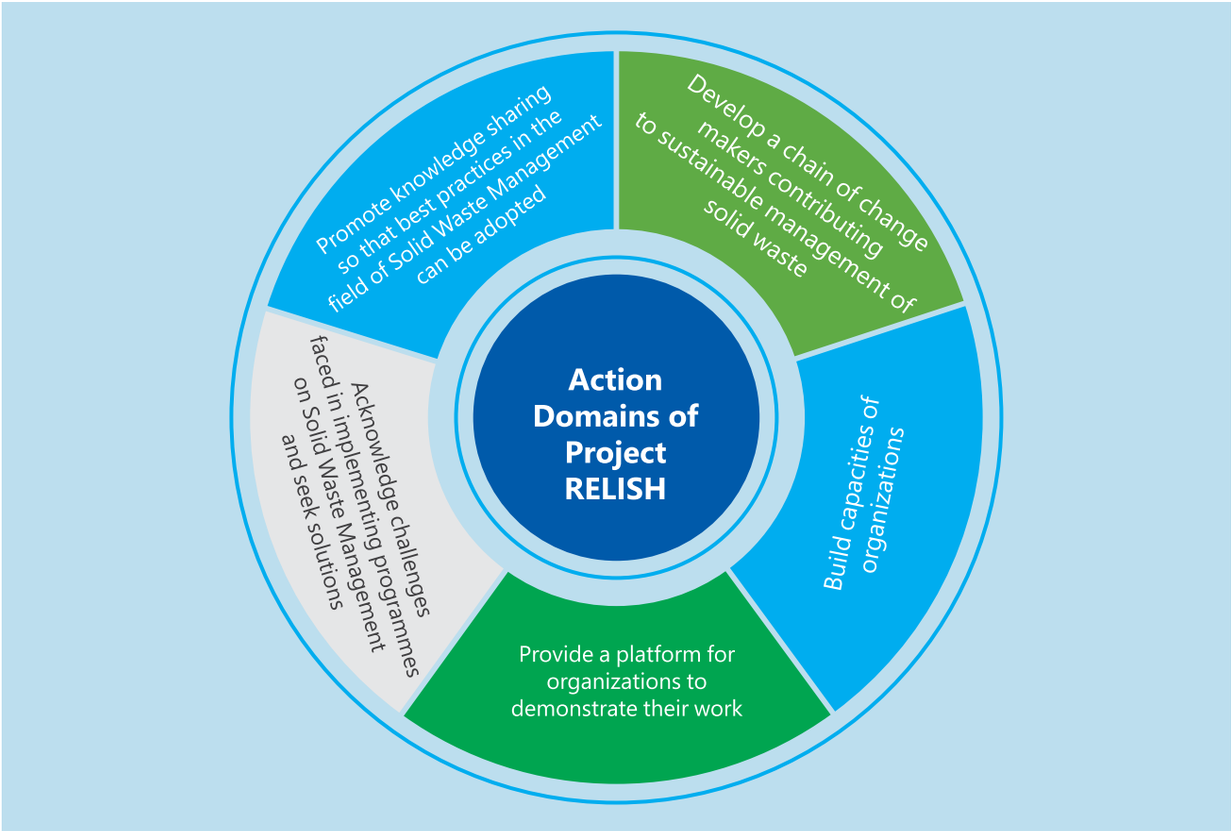
Academia

IPCA gives emphasis to the fact that environmental sustainability and academics goes hand in hand. And hence, IPCA has been consciously working towards development of its academic arm and has evolved as an educational institution that encourages entrepreneurship in solid waste management, support equal job opportunities to women, and work towards creating more and more green jobs through its collaboration with institutes like Skill Council for Green Jobs (SCGJ), TERI SAS & Jamia Hamdard University. In the previous financial year, IPCA has successfully executed online training programme (Project RELISH), Certificate Course on Entrepreneurship in Solid Waste Management and signed MoUs with several institutions in order to promote entrepreneurship in solid waste management, provide job opportunities to SHGs and promote research & development in the allied fields.

Project RELISH

Project RELISH (Recognizing and Empowering Local Initiatives for a Sustainable Habitat), a pan- India project, was launched in October 2020. This project aimed to recognize, train and build the capacity of organizations working at the grassroots level on solid waste management. It also empowered individuals who were passionate about starting their enterprise in the realm of waste management.

The project has highlighted the success of participating organizations & individuals without ignoring the challenges they have been facing while implementing waste management projects. The project enhanced the capabilities of these organizations and connected them with larger platforms. The project was successfully completed with 20 participants from 10 different states/UT and IPCA celebrated its 20th anniversary with these 20 participants with the hope and wish that these 20 participants will replicate IPCA's vision and learning in their area of working for the betterment of environment and society.



Highlights of the Project

The participants were from grass-root organisations who had been working diligently for solid waste management but could not expand their operations due to the limitation of-resources, industry know how, and established networks. Project RELISH provided a holistic platform to these participants and helped them in overcoming the limitations they were facing.

- Trained & built capacities of 13 organizations
- Trained & mentored 7 individuals to start, scale up and diversify their enterprises
- Project received kind support of SDSN Youth, SDSN South Asia and Waste Wise Cities (UN Habitat)
- Participants were trained by experts from the field of waste management, business development, project management, communication, financial management, and marketing & branding
- Project concluded with a grand Culmination ceremony on 23th October 2021 where participants and mentors were felicitated at Hotel Lemon Tree, Ghaziabad

Culmination Ceremony of Project RELISH

Achievements of the Project

Mr Eswaramoorthy, a participant from Tamil Nadu, has been successful in setting up his entrepreneurial venture Envidote Foundation after completion of the training program. IPCA has supported the start-up in identifying avenues and opportunities for work.

Three participant organizations from Delhi, Maharashtra and Manipur have been successful in scaling up their organization's work after completion of the project. IPCA has collaborated with them as partners in implementing waste management programmes in their respective regions.

Alliance with Institutions

TERI School of Advanced Studies

IPCA signed Memorandum of Understanding (MoU) with TERI School of Advanced Studies to advance the collaborative ideas and objectives related to academics and research in the field of waste management. The aim is to undertake research projects on waste management, awareness and training program for the students, and run campaign to bring behavioural change in the society for sustainable environment.

As a result of this collaboration, IPCA& TERI SAS launched the Certificate Course on Entrepreneurship in Solid Waste Management. The certificate course is designed to focus on training the minds to explore the scope of entrepreneurship in managing waste effectively and enhancing its recycling and recovery. This joint initiative aims to develop efficient future social entrepreneurs.

Deendayal Antyodaya Yojana-National Urban Livelihoods Mission (DAY-NULM)

Project SWABHIMAN is an acronym for 'Skilled Women Activities Based on Handicraft, Innovation, Marketing and Accounting under NULM'. It is an initiative of Indian Pollution Control Association with the support of District Magistrate, Central Delhi under National Urban Livelihood Mission, Ministry of Housing and Urban Affairs, Govt. of India. The project was launched on 8th March 2022 to celebrate the World Women Day at Zakir Hussain College, Delhi University by Smt. Akriti Srivasatava,IAS, District Magistrate, Central Delhi. Project SWABHIMAN is launched under Deendayal Antyodaya Yojana-National Urban Livelihoods Mission (DAY-NULM) Scheme.

The project aims to empower and support Self Help Groups (SHGs) in enhancing their efficiency, proficiency and earning capacity. Under the project, SHGs are to be selected on the basis of a two- tier review system. The need of each SHG will be studied extensively and the project will provide customised support on the basis of identified needs. Support will be in terms of one-to-one mentoring, technical training sessions, functional training sessions, and financial support. Experts from respective sectors (in which selected SHGs will be working) will be brought together to build the capacity of SHGs.

Certificate Course on Entrepreneurship in Solid Waste Management

IPCA in collaboration with TERI School of Advanced Studies launched a Certificate Course on Entrepreneurship in Solid Waste Management to facilitate individuals who are passionate and keen on starting an enterprise in the realm of solid waste management. The course aimed to enhance the understanding of participants on waste management, its associated issues and opportunities. It is a one-of-its-kind course, designed to help them explore the scope of entrepreneurship in the supply chain of waste management.

Actions Domains of the Certificate Course

- To impart knowledge on solid waste management
- To identify gaps / challenges in the sector and explore scope of intervention
- To promote entrepreneurial mind-set and temper among students, young professionals or others passionate to contribute to the sector
- To provide mentorship and support to aspiring entrepreneurs
- To create a batch of technically sound and professionally trained entrepreneurs in the realm of solid waste management

Experts from IPCA, senior academicians from TERI SAS and other industry professionals are mentors for this course. As part of the course, field visit is also organized to provide an exposure of the supply chain of waste and the way in which it is managed at the ground level. The registrations for the first batch of the course started in January.

Highlights of the Course

- 13 participants enrolled for the course
- Participants from 7 States/ UTs have enrolled (Delhi/NCR, Karnataka, Tamil Nadu, Bihar, Telangana, Maharashtra and Punjab)
- More than 50% of the participants were women (54%)
- The group is diverse in terms of age, experience, educational background and field of work
- Course had undergrad students as well as people with more than 10 years of experience in different fields as participants

> We need to bring youth and children to the forefront of environmental discourses. Their perspectives and decisions are going to make a lot of difference in the time to come.
>
> **-Ms Garima Kaushik,** Expert- Program & Partnership, IPCA

Shiksha Sahyog Scholarship Scheme

To help the underprivileged students, who wanted to pursue CA during the difficult times of COVID-19 pandemic, IPCA partnered with CA Parivaar and Concentrix under its CSR wing and initiated a scholarship scheme, namely Shiksha Sahyog Scholarship Scheme (SSSS). The scholarship scheme was designed for students who wanted to pursue CA and their family income was less than Rs. 5 Lac p.a. The scheme helped the students in paying up of all the fees to ICAI, provided them with free books from selected publishers, enabled them in getting articleship and job, granted tablets to rank holders, offered communication skills training and other required assistance. More than 100 students were provided this scholarship during this financial year.

Vertical F

Research & Development

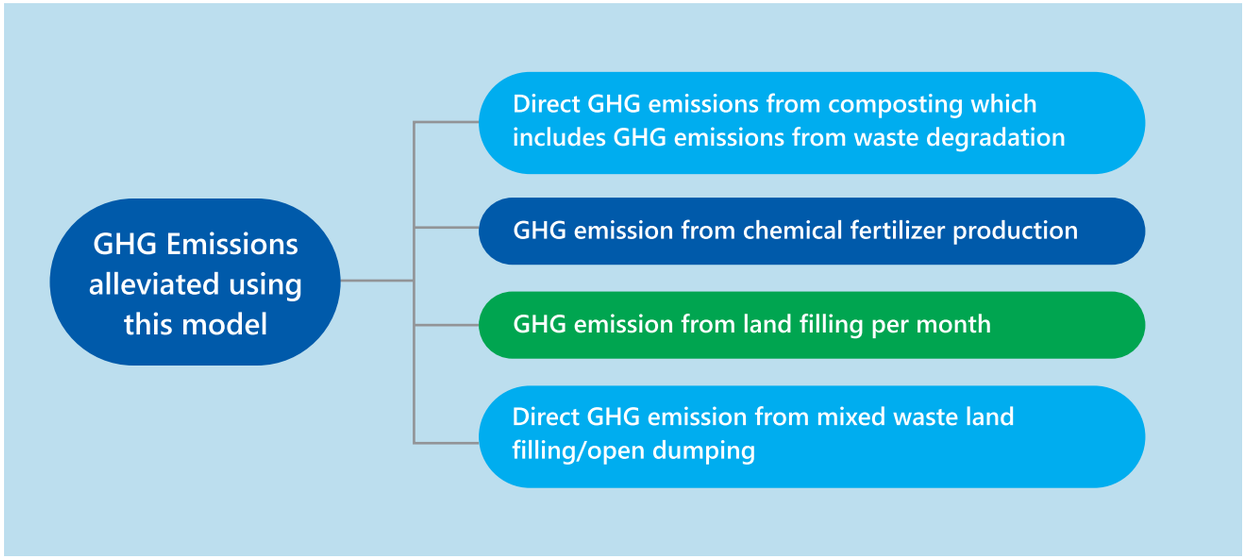
Research & Development (R&D) plays an important role in improving the performance of any project undertaken by organization. R&D is important because it provides powerful knowledge and insights into the operations of organization, leads to improvements to existing processes where efficiency can be increased and costs can be reduced. It also allows developing new products and services to allow it to survive and thrive in competitive markets. IPCA, currently, executing multitude of projects and providing a range of services to the society. Consistent R&D in the operations of project and product development and has helped the organization in reducing the cost and improving the efficiency of the organizations working.

Greenhouse Gas Emission Offset Simulation Model

IPCA has been implementing decentralized system of Solid Waste Management for past 20 years. Source segregation and treatment of waste has become the most practical and acceptable solution to the issue of solid waste management. Treatment of Organic Solid Waste through composting method helps in promoting green growth, reducing GHG emissions and also reducing the cost of transportation of solid waste from its generation point to the waste disposal site. IPCA, under Project S.O.R.T, calculated the GHG emissions which the project was able to mitigate by implementing the practice of source segregation and community composting at around 56 locations in Delhi NCR. The simulation spread sheet model developed by Institute for Global Environmental strategies (Japan) has been used for calculating the GHG emissions for 30 societies, which were part of SORT phase III at Delhi NCR.

Highlights of the Model

- Useful in estimating GHG emission reductions from the current waste management practice after the project intervention of installation composters at the source site
- Useful to estimate GHG emission reductions from the current waste management practice in the municipality taking into account the climate benefits from resource recovery from waste in a life cycle perspective
- GHG emissions are calculated in terms of carbon dioxide equivalents ($CO_{2\text{-eq}}$)
- It can easily calculate the GHG emissions from each and every processes or stages of waste management practices without any complex information or equations
- All GHG emissions from different gases like N_2O and CH_4 are converted into $CO_{2\text{-eq}}$ and abbreviated as $CO_{2\text{-eq}}$ which is a metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential (GWP.)



Home | Transportation | Mix waste landfilling | Composting | Anaerobic digestion | MBT | Recycling | Incineration | Open burning

Simulation for quantification of GHG emissions from waste management methods

Version II (edited)-September 2013

Please select the country: India

Please select the climatic zone of your country: Dry Tropical

Summary of GHG emissions from your municipality

Activity	Direct GHG Emissions	Indirect CHG Savings	Net GHG Emissions	Unit
Transportation	5.39	0.00	5.39	kg of CO2-eq/tonne of waste
Landfilling of mix MSW	629.86	0.00	629.86	kg of CO2-eq/tonne of mix waste
Composting	177.00	1275.25	-1098.25	kg of CO2-eq/tonne of organic waste
Anaerobic digestion	0.00	0.00	0.00	kg of CO2-eq/tonne of organic waste
Mechanical Biological Treatment (MBT)	0.00	0.00	0.00	kg of CO2-eq/tonne of waste
Recycling	0.00	0.00	0.00	kg of CO2-eq/tonne of mixed recyclables
Incineration	0.00	0.00	0.00	kg of CO2-eq/tonne of incinerated waste
Open burning	0.00	0.00	0.00	kg of CO2-eq/tonne of open burned waste
GHG reduction from whole system	**408.82**	**637.63**	**-228.81**	**kg of CO2-eq/tonne of collected waste**
Total GHG emissions per month	**8,095.56**	**12,752.52**	**-4,656.97**	**kg of CO2-eq/monthly managed waste**

<<<minus 'net GHG emissions' means potential savings (via materials and energ recovery and avoided organic waste landfilling) are higher than the direct emissions

The Simulation Model

Saved around 85000 kg of $CO_{2\text{-eq}}$ GHG from processing of organic waste at 30 societies, which were the part of SORT Phase III (F.Y. 2021-22).

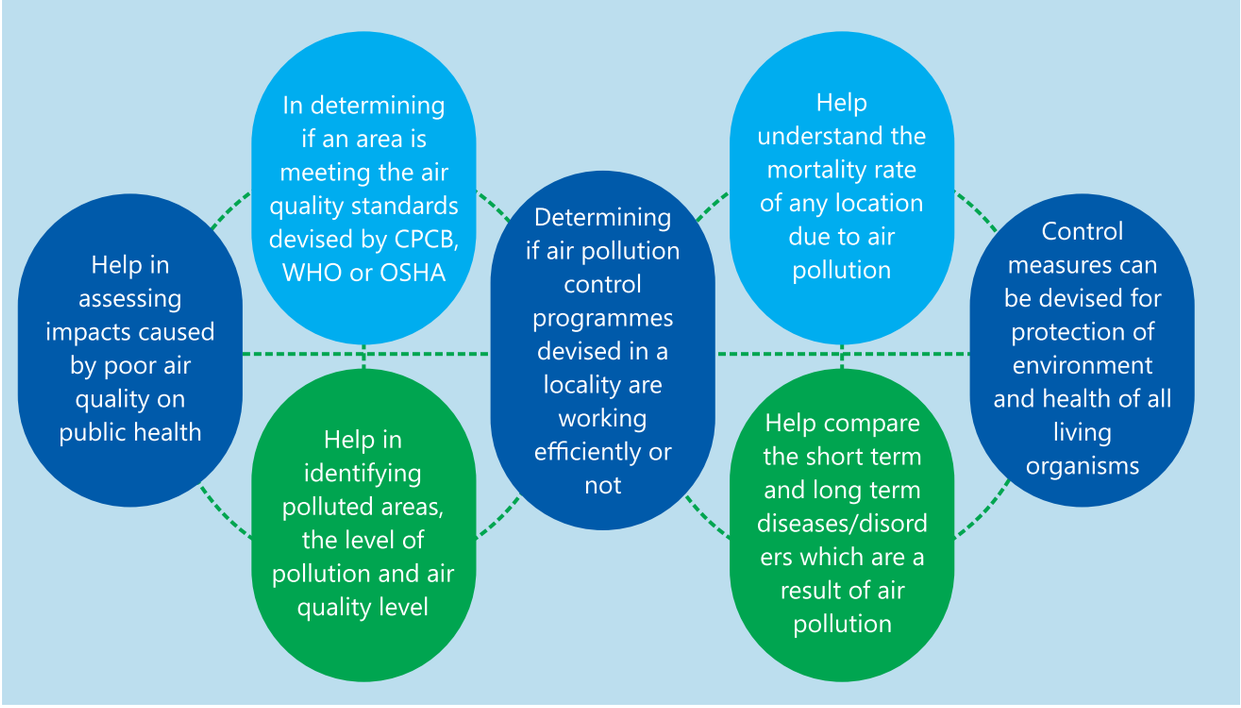
Air Quality Monitoring System – Laminar

Air quality monitoring is a process used to determine existing quality of air, evaluate effectiveness of control programmes and to identify areas in need of restoration. Pollutants such as Carbon Monoxide (CO), Particulate matter (PM_{10} and $PM_{2.5}$), Volatile Organic Compounds (VOCs), Oxides of Nitrogen (NO_x), Sulphur Dioxides (SO_2) are monitored using low cost monitoring instruments. Aeron LAMINAR AQM21 is a smart air quality monitoring system, ideal for real time monitoring of criteria pollutants, particulate matter, noise level, weather parameters and other gaseous contaminants. Under the project 'Project Air Care (PAC)' 8 laminars AQM21 were installed at strategic locations of Gurugram. The monitoring is carried out for 24 hour duration for whole day.

S.No.	Locations	S.No.	Locations
01	Rezang La Chowk	05	AIT Chowk
02	Panchayat Bhawan	06	Medanta Hospital
03	IFFCO Chowk	07	GMDA office sector 44
04	Sikenderpur Metro Station	08	Max Hospital

Benefits of Air Quality Monitoring

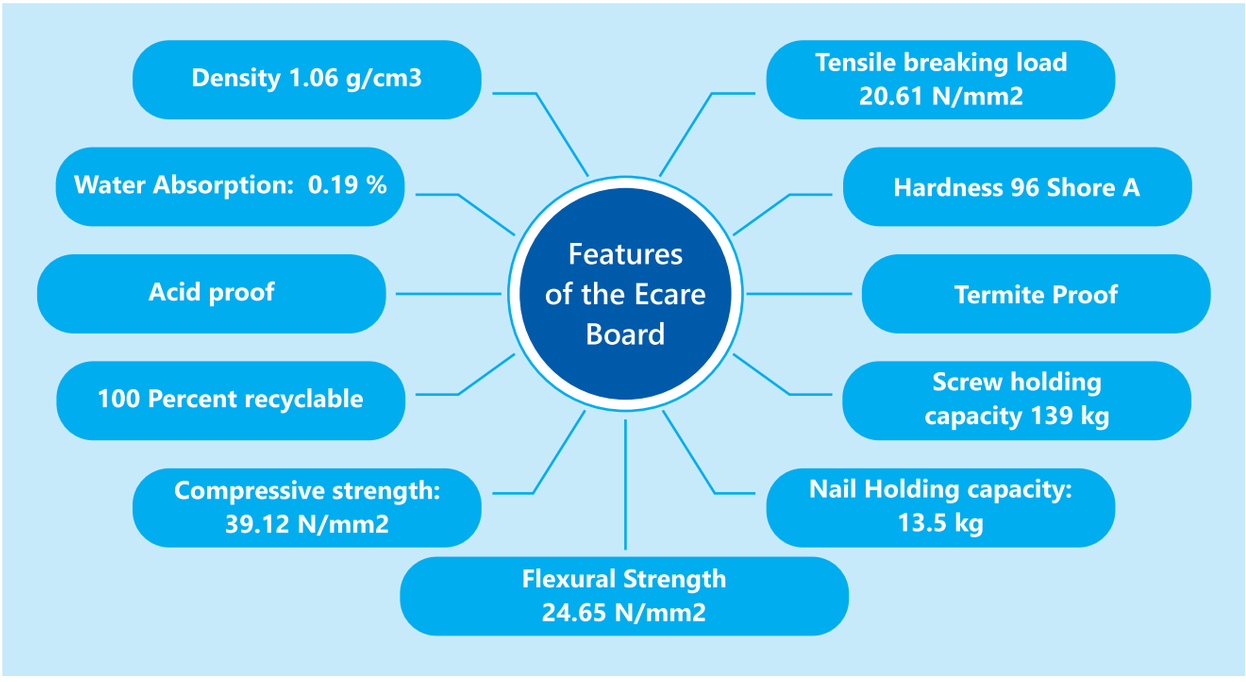
AQM21 is equipped to monitor air pollution data for $PM_{2.5,}$ PM_{10},and environmental data for temperature, humidity, pressure, wind speed, wind direction along with the noise, UV, Light intensity and more. The benefits of installing air quality monitor – Laminar are:



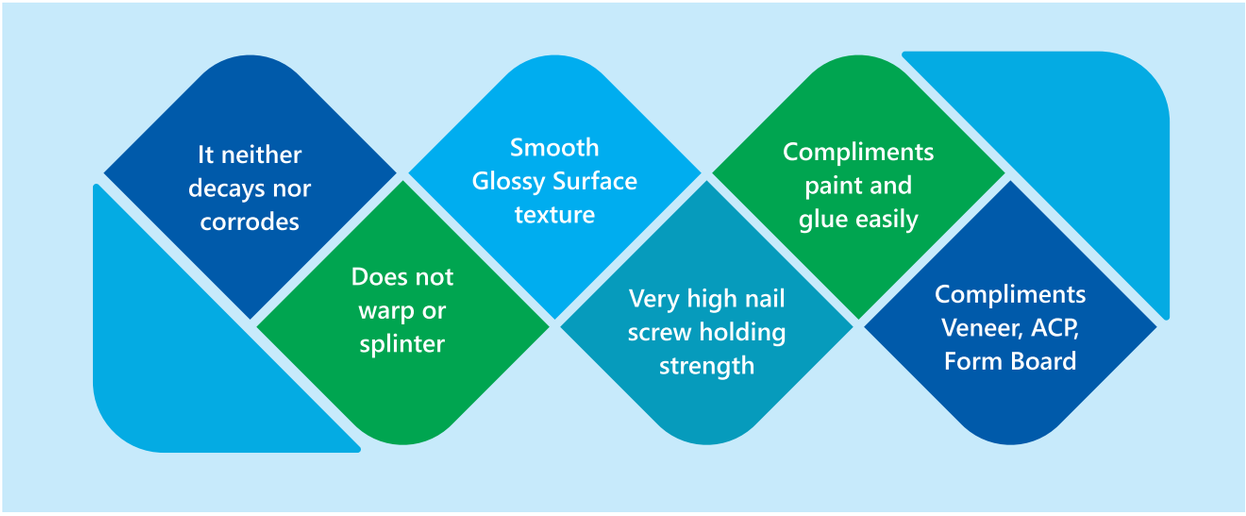
To access the real time data and analyse the locations air quality, Aeron's Live3 Web portal to access the device data on real time basis & on remote locations was also made. The real time data was also shared with Gurugram Metropolitan Development Authority (GMDA) for their central system of low cost air quality monitor. This has helped in source apportionment study of air quality for the whole Gurugram City. AQM21 is easy to install, calibrate and maintain and it consumes very less power. The device is built on scalable architecture to accommodate sensors suitable for various applications and communication requirements.

Ecare Products

IPCA has carried out extensive research on the selection of plastic waste material for the production of Ecare Boards (Recycled plastic board) and we are now producing Ecare boards of various thicknesses ranging from 4mm to 24mm. IPCA is also producing corrugated sheets from MLP waste which is a good substitute of asbestos roofing sheets. IPCA developed uses of Ecare boards in multiple applications like construction, automobile, furniture, playing equipment, school stationary, pallets and in home décor. The quality and range of these products has been improved with time with more intensive R&D.



Key Advantages of Ecare Board Over Plywood



Vertical G

Publications

Handbook

IPCA is one of the pioneer organizations that implemented decentralised system of solid waste management in India and also the foremost Waste Management Agency to execute EPR action plan on behalf of PIBOs. IPCA has more than 20 years of experience in this field and hence, it becomes crucial to share this knowledge base with a range of stakeholders to benefit the society. In the previous year, IPCA has published relevant literatures circling around waste management system in India.

Published 'A Handbook for Entrepreneurs on Solid Waste Management: A Step towards Atmanirbhar Bharat' in February 2022 printed by Cambridge Scholars Publishing, UK. The book was authored by Dr Shyamli Singh, Mr Ashish Jain, Dr Nidhi Pasi and Ms Garima Kaushik. The handbook is an outcome of the learning experience of the twenty-year journey of Indian Pollution Control Association (IPCA) and authors' own learning in the realm of waste management. The handbook was released by Shri Bhupender Yadav, Hon'ble Minister of Environment, Forest and Climate Change, Government of India.

> Handbook on Solid Waste Management for Entrepreneurs: A Step towards Atmanirbhar Bharat aims to train and empower budding entrepreneurs to take up waste management as a profession. The handbook is a complete package of guidelines that enables readers to understand the sector at the conceptual level and on the practical level skills and processes that are involved in working in the sector.
>
> **-Dr Padma Vasudevan Sen,** Patron & Retd. Professor, IIT, Delhi

Magazine Articles

IPCA has also published in leading magazines where it has shared the rich experience in solid waste management with special reference to plastic waste management, critically commented on the policies and shared the wisdom on how innovations can change the game of waste management system in India.

1. The Waste Supply Chain on Waste Management', published in Clean Indian Journal
2. What really matters?', published in Vasundhara, Issue 10, TERI SAS
3. "Steering Towards better future", published in Health Impact Groundbreakers, Volume 1, Edition 2022
4. "Ground reality and Action Plan in new EPR policy", published in Policy Times Newsletter, 2022
5. Published in Annual Report (2021-22) of Police Families Welfare Society
6. "Impact of COVID -19 on India's Circular Economy", published in Urban Life Ability Forum

International Conference

IPCA, in association with India Development Service & the University of Colorado – Colorado Springs, organized 5th Education Conference on Resilient Networks Adapting to the Post-Pandemic Environment at pan India level. The purpose of this conference was to draw upon shared experiences in relationship to COVID mitigation, and learning which could be then implemented upon. The conference provided a rich opportunity to share, learn and implement strategies on the ground.

Research Papers

Johnson, N., Prasad, S., Vahedian, A., Altay, N. & Jain, A. (2022). Modelling ragpickers' productivity at the bottom of the pyramid: the use of artificial neural networks (ANNs). Published in International Journal of Operations & Production Management, Volume 42(4), ISSN: 0144-3577

Khandelwal, P. & Jain, A. (2021). A New Paradigm to Sustainable Plastic Waste Management published in Icon SWM-CE & IPLA Global Forum 2021

Taking a Step Beyond

'Every Life is Precious': Mission to Beat the Second Wave of COVID-19

India faced severe consequences in the form of spiralling cases, reduced supplies of essential treatments, and increased deaths during the deadly second wave of COVID-19. Delhi, the capital of India, too faced the dearth of essential supplies like oxygen concentrators, food, medicines and other utilities. It was a tough time for the country and for everyone. Which is why, IPCA, in collaboration with CA Parivaar, took the much required step and raised the funds to help the needy people. With the raised fund, IPCA and CA Parivaar distributed the crucial supplies like free ration, medicines, oxygen concentrators and helped the COVID-19 patients in connecting them with the right hospitals and blood banks.

"हम प्लास्टिक कचरे के मुद्दे को हल कर सकते हैं यदि हम सचेत प्रयास करें और हमारे द्वारा उत्पन्न कचरे के लिए जिम्मेदार बनें। यदि हम प्लास्टिक की खपत को कम नहीं कर सकते हैं तो हमें यह सुनिश्चित करना होगा कि हम उत्पन्न प्लास्टिक कचरे का पुनः उपयोग और पुनर्चक्रण करें।"

– प्रत्युष शुक्ला, प्लांट प्रमुख, IPCA

"ईश्वर की कृति प्रकृति, अपने कृत्यों से ना लाएं इसमें विकृति"

– श्याम शुक्ला, एकाउंट्स प्रमुख, IPCA

Awards & Recognition

'Outstanding work in the field of social work' awarded by Office of the District Magistrate

'Best initiative in recycling bio-degradable waste (Project SORT)' awarded by BW Business world during Recycling for Greener Tomorrow Awards 2022

'Public Awareness Campaign for recycling (My 10 kg Plastic Campaign)' awarded by BW Business world during Recycling for Greener Tomorrow Awards 2022

'Innovations in Corporate Social Responsibility' awarded by World CSR Congress during NGO Global Leadership and Excellence Awards 2022

Second prize in 'Swachh Innovative Technology Challenge' for Innovation in Waste Management and Monitoring awarded by Municipal Corporation Chandigarh

Appreciation letter by Smt. Akriti Sagar, District Magistrate, Central Delhi, for co-organizing Mega Cleanliness Drive in October 2021 under "Clean India" Program

IPCA in Media

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Prof. P K Sen
(Patron)

Dr. S.K. Nigam
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Mr. Ashish Jain
(President cum Director)

Ajay Garg
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Dr. Shyamli Singh
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Amit Jain
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(Executive Member)

Neha
(Executive Member)

Pragya Kaushik
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Ajay Garg

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Shyam Lal Shukla

Pratyush Shukla

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Garima Kaushik

Madhu Jaswal

Akansha Gupta

Kriti Jain

Raj Kumar Gupta

Deepanshi Gandherva

Ranvir Singh

Nitin Sharma

Rakhi ghosh

Karuna Shankar Shukla

Rahul Saini

Sachin Jaiswal

Abhishek Shrivastava

Tarkeshwar Pandey

Nitika Chandel

Sachin Prasad

Lokesh Kumar

Amandeep

Dashmeet Singh

Amit Kumar

Pankaj Semwal

Ramji Saxena

Subodh Kumar

Ansh Rastogi

Deepak Kumar

Praveen Jha

Devinder Singh

Prateek Saxena

Testimonials

IPCA has been the Implementing Partner for Motherson Group CSR Project – S.O.R.T. for the last 4 years. The journey into yet another phase of the project in 2022 with the team led by Ashish, Ajay & Dr. Radha has been a pleasure to work with. IPCA & SLMTT are now responsible for impacting over 1.3 Lac individuals via training and awareness activities and diverted over 200 metric tonnes of waste from landfills which has come with its own challenges. But with the vision, dedication and commitment displayed by IPCA, the project has grown organically over these years and Motherson Group is proud to be part of a sustainable initiative that positively impacts communities to make our cities cleaner & greener!

–Aditya Joshi, Manager-CSR, Motherson Group

With the help of IPCA, composters have been installed in my society, alot of people are very happy about this too as now khaad is available to them free of cost. I would like to thank the Motherson trust for this.We have started this 5-6 days back and are hoping to continue this in future and become a zero waste society. This is an amazing way to save the environment and truly a great initiative

–Archna Pathak, (Resident, Uppal Southend Society, Gurugram)

A seed of aerobic composter was sown in Amrapali Green'ssoil on 15th August. It was watered by RWA and Resident by segregating the wet waste daily and taking care by the supervising team, house-keeping staff and maali. The fertilizers in this process were training sessions, zoom calls, nukkadnaataks and regular monitoring by SLMTT & IPCA Team. This seed bloomed into a beautiful flower in the form of organic manure and the fruit was the organic kitchen garden in the society and the terrace of residents! We wanted to become 0 waste generator and Project SORT helped us to achieve it

–Roli Bansal, Resident, Amrapali Green

It was dream come true for me, when SBI Card and IPCA set up a dry waste collection centre in Geeta Colony, where in plastic waste is collected, segregated in different categories and then sent to recycling plant established in Greater NOIDA by SBI Card and IPCA to make recycled products. Over the span of seven months, I have deposited more than 1000 kg of plastic waste in around 60 trips on my bicycle. I have scaled up waste channelization by engaging like-minded people with myself. I am thankful to IPCA and SBI Card for setting up the infrastructure for waste management

–Ramesh Chander Goyal, Resident, Gandhi Nagar

I was part of Project RELISH, a mentorship program in the field of waste management by IPCA. My main expertise was in organic waste management, but during this program I learnt about plastic waste management, E-Waste management, financial management, documentation, how to set up organizations and lots of other useful topics. It helped me in growing my company one level up

–Sejal Parikh, Founder, Shreeji InnovEdge Solutions

We started with a start-up idea when we were selected as a participant of Project RELISH and now have registered our enterprise called Envidote Foundation. Through the project, we gained knowledge on various rules and regulations in SWM, plastic waste management and E-Waste management. We also obtained clear understanding on how to plan and execute the projects, and manage its financial aspects

–Eswaramoorthy, Co-Founder, Envidote Foundation

It is with great enthusiasm that I involved with Project RELISH and IPCA. It gave me a transformative idea on plastic waste which will be helpful in our journey of waste entrepreneurship in area such as sustainable waste management, documentation, monitoring and evaluation

–Ananda Meetei Waikom, Workers Union Manipur (WUM)

SUSTAINABILITY IS OUR GOAL

Indian Pollution Control Association

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