#EndingPlasticPollution

Circular Economy for Plastic

World Environment Day Seminar on
Ending Plastic Pollution Globally
by
Government of Gujarat

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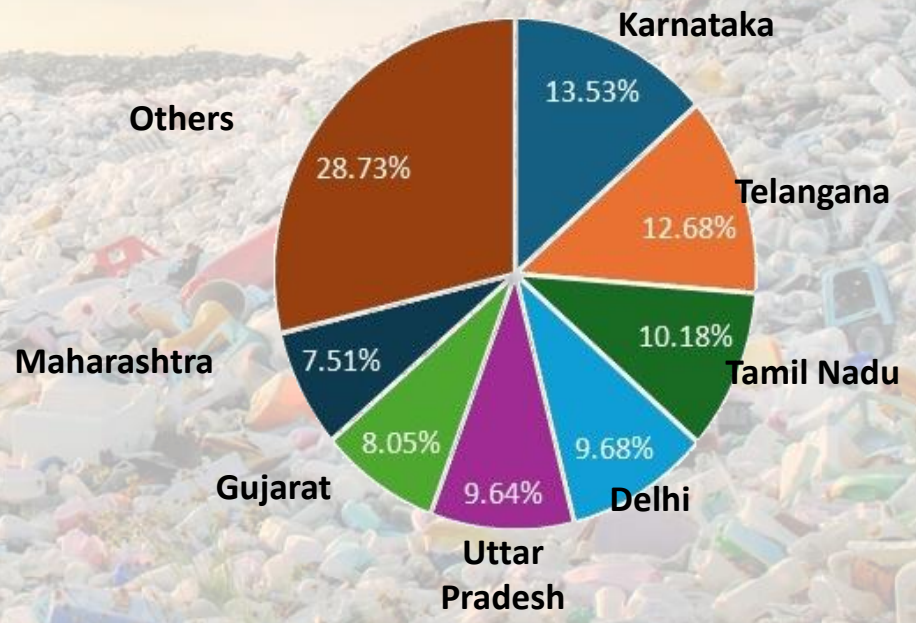
Plastic Waste Generation – India & Gujarat

~ 39 lakh TPA

~ 3.14 lakh TPA

As per CPCB report - 2022-23,

- **Every two minutes, Gujarat added one tonne of plastic waste**
- **Gujarat ranked 6th in the country for plastic waste generation**



Source: CPCB Annual report 2022-23

Alarming Impacts of Plastic Waste on Ecosystem

- **83% of our drinking water contains plastic which could** lead to cancer and heart related issues.
- Plastics have been found **in the blood of newborn babies.**
- Over **600 marine species** are **affected** by **plastics.**
- Nearly **45,000 marine animals** have ingested plastics and **80% were injured or killed**.
- **As plastics travel with ocean currents,** an island of trash called the **"Great Pacific Garbage Patch" has been created.**
- Issue of **drain overflow and flooding** because of **plastic waste clogging the drains**

There are **8 million** tonnes of plastic waste entering the ocean every year

The total plastic in the ocean amounts to **150 million tonnes**

Plastic packaging accounts for **62%** of all items recovered in coastal clean-up efforts

In 2014, there was **1 kg of plastic in the ocean for every 5 kg of fish, and by 2050 there will be more plastic than fish**

Source: Plastic Waste Management, Issues, Solutions, Case Studies, MoHUA, March 2019

Plastic Waste Consumption Vs. Recycling

- Approximately **70% of plastic packaging** products are converted into plastic waste in a short span.
- **40%** of plastic generation remains uncollected or mismanaged
- Over **9,400 tonnes** of plastic waste is either landfilled or ends up polluting rivers, land or ground water resources.

Source: Plastic Waste Management - Issues, Solutions & Case Studies, MoHUA, March 2019

Gujarat, the largest plastic manufacturing state should tap this opportunity…

The big question now – Is plastic a problem for cities?

Plastic becomes pollution

- “Take-Make-Dispose" approach as linear economy model, where resources are extracted, used to produce goods, and then discarded as waste.
- Absence of source segregation of waste
- Mixed waste collection resulted in disposal to landfill or open dumping
- Lack of strict enforcement of single use plastic ban
- Lack of awareness about the use of polyethylene substitutes

Used plastic is not a waste. It's an opportunity trough adopting a circular economy approach

- Circular economy goes beyond recycling as 9R approach. Waste is minimized and resources are kept within the economy when a product has reached the end of its life, to be used again to create further value.

Source: https://research.csiro.au/rpwi/wp-content/uploads/sites/412/2022/01/Enabling-behaviour-change-towards-a-circular-economy-for-plastics-in-India.pdf

Benefits of adopting Circular Economy in Plastic

- Reducing **raw material dependence** by optimising manufacturing processes and designing products for longevity.
- Help in lowering the carbon emissions. Recycling 1 tonne of plastic could **reduce emissions by 1.1 to 3 tonnes** of CO2e compared to producing the same tonne of plastics from virgin fossil feedstock.
- **Reduce** the annual volume of **plastics entering our oceans by 80%,** reduce **GHG** emissions by **25%**, create **700,000+ new jobs.**
- By reducing landfill waste, the circular economy mitigates land pollution and helps **restore soil health**.
- A study shows a loss of almost USD 133 billion worth of plastic material value till 2030 due to unsustainable packaging in India. **CE based interventions** have the potential of **recovering almost 75% (USD 100 billion)** of this projected loss value.

Source: Plastic Waste Management, Issues, Solutions, Case Studies, MoHUA, March 2019

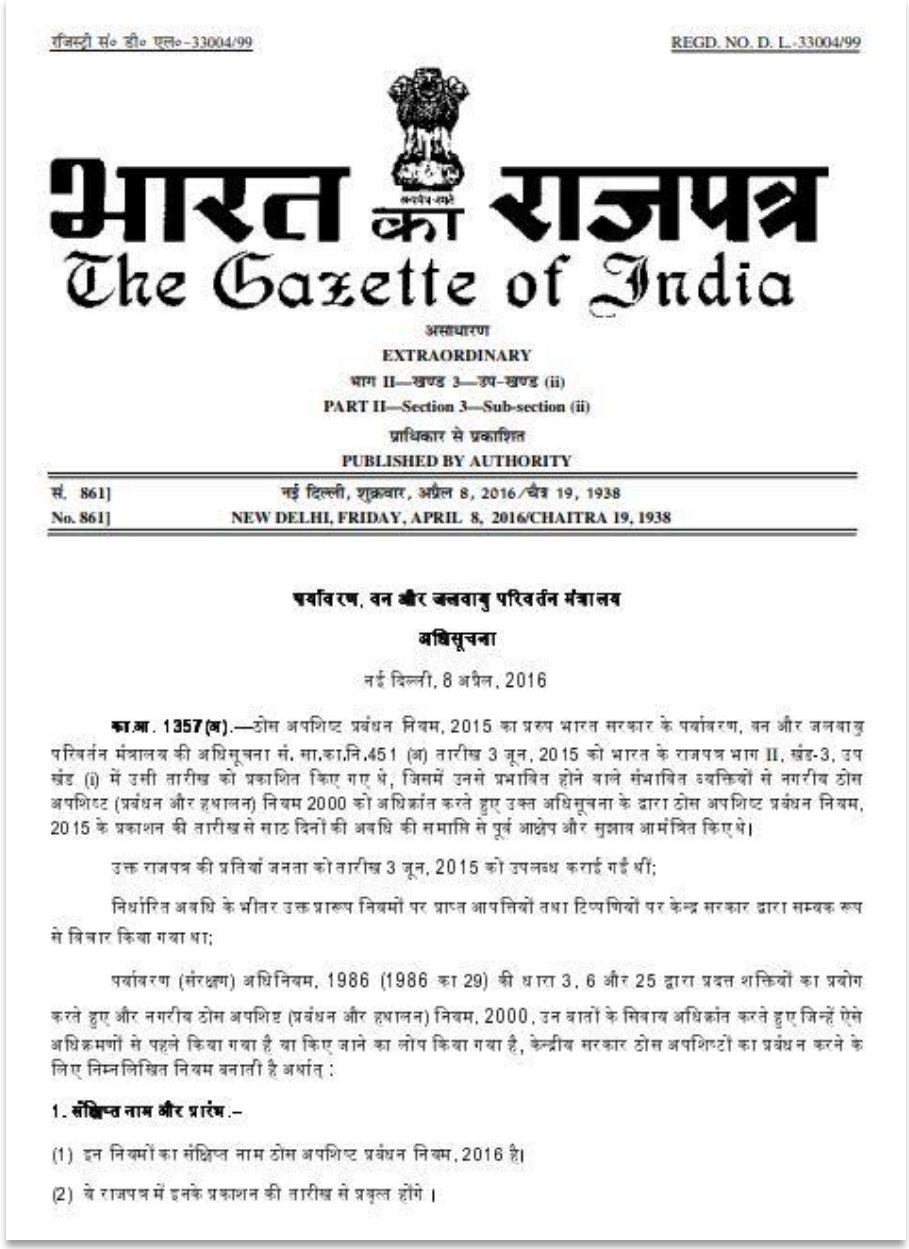
SWM Rules focuses on circular economy

- **Segregation at source level** with an intend of focusing on circular economy by converting waste to wealth by recovery, reuse and recycle.

- In special economic zones, **5% of the total plot area or minimum 5 plots/sheds are required** to be dedicated **for recovery and recycling facility.**

- **Manufacturer of disposable products** (such as tin, glass, plastic packaging etc) are required to provide **financial assistance** to the ULBs **for establishing proper waste management facility.**

- **Industrial units** who are depended on fuel and **located within 100 km from any solid waste-based RDF plant,** shall **replace 5% of their fuel requirement by the RDF produced fuel.**



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अधिसूचना

नई दिल्ली, 8 अप्रैल, 2016

का.आ. 1357(अ).—ठोस अपशिष्ट प्रबंधन नियम, 2015 का प्रारूप भारत सरकार के पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय की अधिसूचना सं. सा.का.नि.451 (अ) तारीख 3 जून, 2015 को भारत के राजपत्र भाग II, खंड-3, उप खंड (i) में उसी तारीख को प्रकाशित किए गए थे, जिसमें उनसे प्रभावित होने वाले संभावित व्यक्तियों से नगरीय ठोस अपशिष्ट (प्रबंधन और हथालन) नियम 2000 को अधिक्रांत करते हुए उक्त अधिसूचना के द्वारा ठोस अपशिष्ट प्रबंधन नियम, 2015 के प्रकाशन की तारीख से साठ दिनों की अवधि की समाप्ति से पूर्व आक्षेप और सुझाव आमंत्रित किए थे।

उक्त राजपत्र की प्रतियां जनता को तारीख 3 जून, 2015 को उपलब्ध कराई गई थीं;

निर्धारित अवधि के भीतर उक्त प्रारूप नियमों पर प्राप्त आपत्तियों तथा टिप्पणियों पर केन्द्र सरकार द्वारा सम्यक रूप से विचार किया गया था;

पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 3, 6 और 25 द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए और नगरीय ठोस अपशिष्ट (प्रबंधन और हथालन) नियम, 2000, उन बातों के सिवाय अधिक्रांत करते हुए जिन्हें ऐसे अधिक्रमणों से पहले किया गया है या किए जाने का लोप किया गया है, केन्द्रीय सरकार ठोस अपशिष्टों का प्रबंधन करने के लिए निम्नलिखित नियम बनाती है अर्थात् :

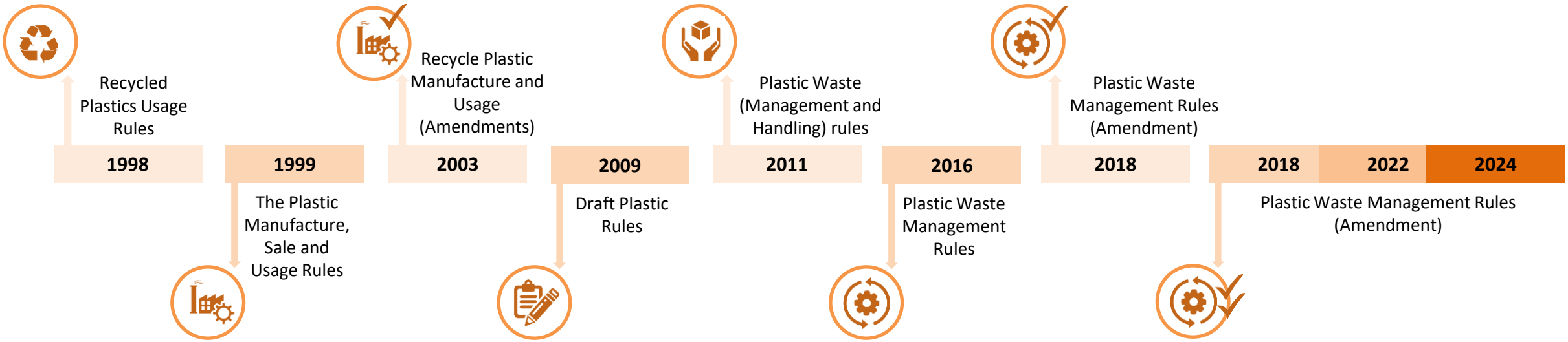
1. संक्षिप्त नाम और प्रारंभ.–

(1) इन नियमों का संक्षिप्त नाम ठोस अपशिष्ट प्रबंधन नियम, 2016 है।

(2) ये राजपत्र में इनके प्रकाशन की तारीख से प्रवृत्त होंगे।

Source: Solid Waste Management Rule (2016)

Policy framework on plastic waste management in India



- Restriction on manufacture, sale, distribution and usage of virgin and recycled plastic carry bags/ containers
- Minimum Thickness 50 microns

- Thickness of bag 40 Microns
- State Level Advisory assigned for monitoring
- Multilayered packaging prohibited
- Strengthening state level monitoring system
- Extended Producer Responsibility (EPR) on Producer, Importer, and Brand Owner and EPR shall be applicable ULBs responsible for setting up MRF (2016)

- Centralized registration system for producers, recyclers and manufacturers
- Explicit pricing of carry bags omitted
- Brand owner, plastic waste processors etc definition included
- Thickness of carry bags not less than 120 microns

Cities should understand the characteristics of generation of types of plastic

Study by Central Pollution Control Board (CPCB) indicated that "…plastic waste generated in cities like Ahmedabad, a major chunk (88%) was high-density and low-density polyethylene such as carry bags, milk pouches, packing items..."

1. Thermo Plastic: Recycle Plastic

2. Thermo Setting Plastic : Non-Recyclable plastic

80% of the plastics produced are thermoplastics. e.g. Polyethylene, Polypropylene, Polystyrene and Polyvinylchloride (PVC) are most commonly used.

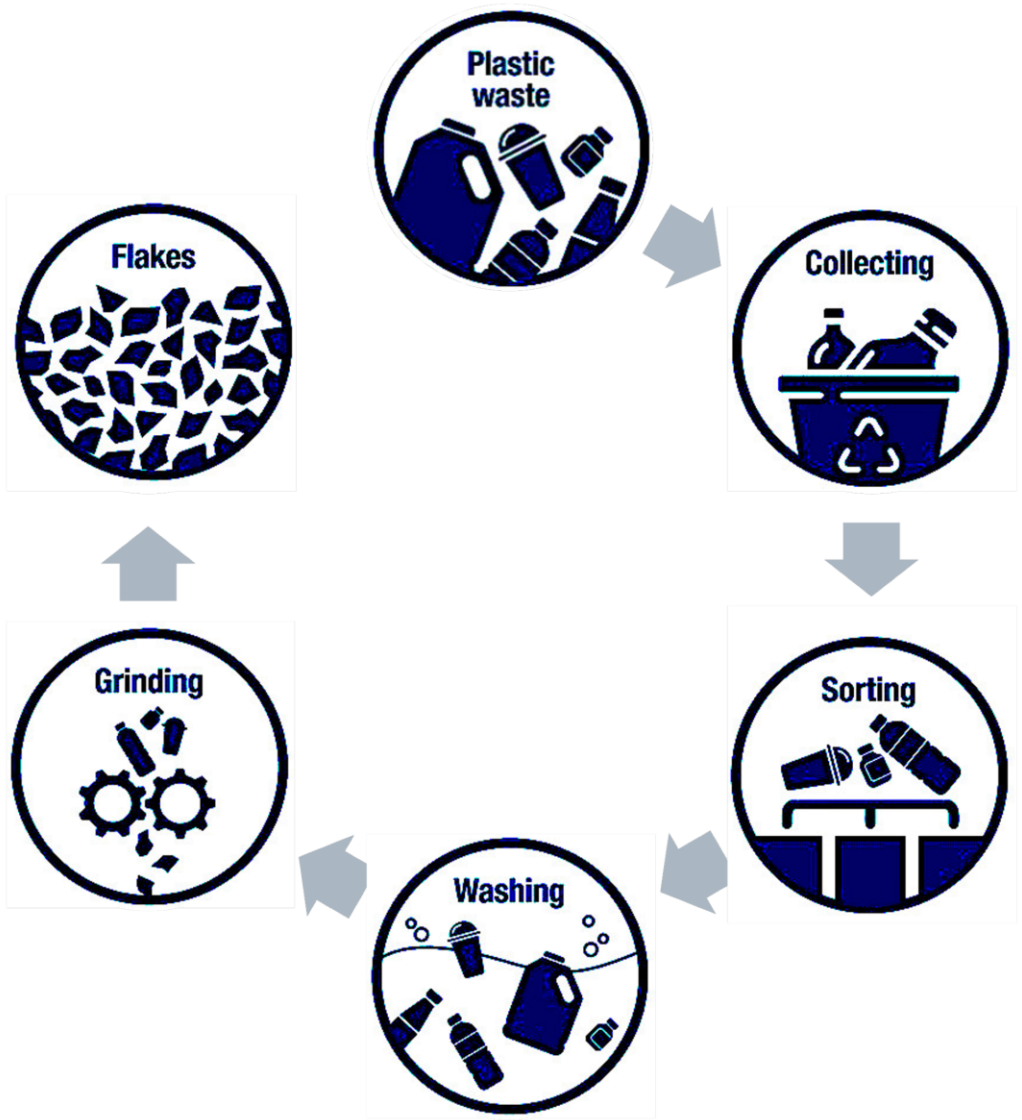
Symbol	Polymer	Common Uses	Properties	Recyclable?
1 PETE	Polyethylene terephthalate	Plastic bottles (water, soft drinks, cooking oil)	Clear, strong and lightweight	Yes; widely recycled
2 HDPE	High-density polyethylene	Milk containers, cleaning agents, shampoo bottles, bleach bottles	Stiff and hardwearing; hard to breakdown in sunlight	Yes; widely recycled
3 PVC	Polyvinyl chloride	Plastic piping, vinyl flooring, cabling insulation, roof sheeting	Can be rigid or soft via plasticizers; used in construction, healthcare, electronics	Often not recyclable due to chemical properties; check local recycling
4 LDPE	Low-density polyethylene	Plastic bags, food wrapping (e.g. bread, fruit, vegetables)	Lightweight, low-cost, versatile; fails under mechanical and thermal stress	No; failure under stress makes it hard to recycle
5 PP	Polypropylene	Bottle lids, food tubs, furniture, houseware, medical, rope, automobile parts	Tough and resistant; effective barrier against water and chemicals	Often not recyclable; available in some locations; check local recycling
6 PS	Polystyrene	Food takeway containers, plastic cutlery, egg tray	Lightweight; structurally weak; easily dispersed	No; rarely recycled but check local recycling
7 OTHER	Other plastics (e.g. acrylic, polycarbonate, polyactic fibres)	Water cooler bottles, baby cups, fiberglass	Diverse in nature with various properties	No; diversity of materials risks contamination of recycling

Source: CPCB Report and https://environment.delhi.gov.in/sites/default/files/inline-files/plastic_waste_awareness_ppt_1.pdf

SBM focuses on concept of 3R (Reduce, Reuse, Recycle) stimulating circular economy

- **To ensure maximum resource recovery by converting waste to wealth,** entire India is echoing the concept of 3R promoting circular economy for reduce, reuse and recycle.
- The theme of **Swachh Survekshan** (world's largest urban cleanliness survey), **for 2024 is Reduce-Reuse-Recycle**
- Under the campaign **"Meri LiFE, Mera Swachh Seher"** thousands of **RRR (Reduce-Reuse-Recycle) centres have been set up** in India
- **Encouraging community participation as citizens contribute** their clothes, shoes, old books, toys and used plastic to be reused or recycled.
- Other than RRR centers, there are **other unique RRR initiatives** such as making murals, artefacts and reusable products, generating energy etc **engaging local governments, Self help group, private organizations etc.**

Source: https://sbmurban.org/storage/app/media/Meri_LiFE_Mera_Swachh_Shehar_documentation.pdf



Initiatives in Plastic Waste Management

Surat, Ahmedabad use of plastics in road construction

Surat leads in plastic waste management: Roads built using 6 lakh tonnes of recycled plastic; 5R model adopted

સુરત 3 કલાક પેહલા

R. Vasudevan, who gave his patent for the system to the government for free

Reduce, Reuse, Recycle I નગરી હોસ્પિટલથી ગુજરાત કોલેજના રોડને પ્લાસ્ટિકનો યૂઝ કરીને બનાવવામાં આવ્યો છે

પ્લાસ્ટિક રોડ ! AMC વેસ્ટ પ્લાસ્ટિકનો યૂઝ કરીને શહેરના રસ્તાઓ બનાવશે

નજીકના ભવિષ્યમાં રોડના કોન્ટ્રાક્ટમાં AMC પ્લાસ્ટિક વપરાશને ફરજિયાત બનાવશે

સિટી લાઇફ I આ વર્ષે વિશ્વ પર્યાવરણ દિવસની થીમ 'Beat Plastic Pollution' છે. પર્યાવરણને નુકસાન પહોંચાડતા વેસ્ટ પ્લાસ્ટિકને લઈને વિશ્વના દેશો સમાધાન શોધી રહ્યાં છે ત્યારે અમદાવાદ મ્યુનિસિપલ કોર્પોરેશન દ્વારા આગામી સમયમાં પ્લાસ્ટિક વેસ્ટનો ઉપયોગ કરીને શહેરના રોડ-રસ્તા બનાવવાની પહેલ હાથ ધરશે. અગાઉ ૨૦૧૮માં અમદાવાદ મ્યુનિ. દ્વારા શહેરના નગરની હોસ્પિટલથી ગુજરાત કોલેજ અને બીજા કેટલાંક સ્થળો પર પાયોગિક ધોરણે રસ્તા બનાવવામાં પ્લાસ્ટિકનો યૂઝ કરાયો હતો. જેની સફળતા બાદ હવે AMC નજીકના ભવિષ્યમાં નાના-મોટા રસ્તાઓના નિર્માણમાં પ્લાસ્ટિકનો વપરાશ કરશે.' આ અંગે સિટી લાઈફ સાથેની વાતચીતમાં AMCના ડેપ્યુટી કમિશનર મિરાંત પરીખે કહ્યું 'હાલ પીપળજ ખાતે હોટ મિક્સ પ્લાન્ટ કાર્યરત છે જેમાં અમે કપચી, ડામર સાથે ત્રીજા મટિરિયલ તરીકે વેસ્ટ પ્લાસ્ટિકનો ઉપયોગ કરી રહ્યાં છીએ. નજીકના ભવિષ્યમાં અમે આ પ્લાન્ટને વધુ અપગ્રેડ કરીને પ્લાસ્ટિકનો વધારેમાં વધારે ઉપયોગ થાય તેવા પ્રયાસો હાથ ધરીશું.'

હાલ અમદાવાદમાં પ્લાસ્ટિકનો યૂઝ કરીને ક્યાં રોડ બનાવવામાં આવ્યા છે

અંકુર કોસ રોડ: મ્યુનિ દ્વારા આ રોડના નિર્માણમાં વેસ્ટ પ્લાસ્ટિકનો ઉપયોગ કરાયો હતો. વર્ષો પછી પણ આ રસ્તા ડામરની સરખામણીએ વધારે લાંબા ગાળા સુધી ટક્યાં છે.

રામનગર, સાબરમતી: આ વિસ્તારમાં પણ મ્યુનિ. દ્વારા વેસ્ટ પ્લાસ્ટિકનો ઉપયોગ કરીને રોડ બનાવામાં આવ્યો હતો. આ રસ્તા પરથી વાહનોની અવર-જવર વધારે હોવા છતાં આ રોડ લાંબા ગાળા સુધી કાર્યક્ષમ રહ્યો છે.

નગરી હોસ્પિટલ રોડ: અમદાવાદ મ્યુનિસિપલ કોર્પોરેશન દ્વારા નગરી હોસ્પિટલથી ગુજરાત કોલેજ સુધીના રોડમાં વેસ્ટ પ્લાસ્ટિકનો ઉપયોગ કર્યો હતો. આ રોડ વર્ષોના વાણા વિત્યા પછી પણ અડીખમ છે

સરસપુર: આ સાથે સિટીના પૂર્વ વિસ્તારમાં આવેલા સરસપુરમાં પણ પ્લાસ્ટિક વેસ્ટનો ઉપયોગ કરીને રસ્તાઓ બનાવામાં આવ્યા છે.

પ્લાસ્ટિક મિક્સ્ડ રોડ પ્રદ્ધતિથી કેવી રીતે રોડ બનાવવામાં આવે છે?

પ્લાસ્ટિક મિક્સ્ડ રોડ પ્રદ્ધતિમાં સિંગલ યૂઝ પ્લાસ્ટિક જેમાં પાઉચ અને ચિપ્સ સહિતી વસ્તુઓના પેકેટનો ઉપયોગ કરાય છે. આ સાથે મલ્ટી લેયર પ્લાસ્ટિકનો પણ ઉપયોગ કરાય છે. આ પ્લાસ્ટિક વેસ્ટને મશિનના ગ્રાઇન્ડ કરીને પાવડ(પ્લાસ્ટિક પેલેટ્સ અથવા ફાઈન્સ) બનાવવામાં આવે છે. આ પાવડ કે પ્લાસ્ટિકના દાણાને હોટ મિક્સ મશિનમાં ડામર, કપચી સાથે ત્રીજા મટિરિયલ તરીકે મિક્સ કરવામાં આવે છે અને રોડ બનાવામાં આવે છે. આ રોડ ડામરના રોડ કરતા વધારે ટકાઉ અને પાણી સામે લાંબું ટકી શકે છે. આ પ્રદ્ધતિને ભારતમાં લાવવાનો શ્રેય મદુરાઇના પ્રોફેસર રાજગોપાલનને ફાળે જાય છે. તેઓએ ભારતમાં સૌપ્રથમવાર તમિલનાડુમાં પ્લાસ્ટિક વેસ્ટથી રસ્તો બનાવ્યો હતો.

પ્લાસ્ટિક વેસ્ટમાંથી આગામી સમયમાં શહેરમાં ૧૦ કિ.મી.ના રોડ બનાવાશે

અમદાવાદ મ્યુનિસિપલ કોર્પોરેશન દ્વારા આગામી સમયમાં શહેરના વિવિધ વિસ્તારોમાં પ્લાસ્ટિક વેસ્ટનો ઉપયોગ કરીને અંદાજે ૧૦ કિ.મીનો રોડ બનાવશે. આ રોડ બનાવવાનું કામ ચોમાસાની સિઝન પુરી થયા બાદ હાથ ધરાશે. આ સાથે ચોમાસામાં શહેરના તૂટેલા રસ્તાઓના પેચવર્કમાં પણ પ્લાસ્ટિકનો ઉપયોગ કરાશે.

પ્લાસ્ટિકનો ઉપયોગ કરીને બનતા રસ્તાની ખાસિયત:

- પાણી સામે લાંબુ ટકે છે
- ડામર કરતા ઓછા ખર્ચે નિર્માણ
- લાંબા ગાળા સુધી ટકી શકે છે
- લોડ કેપેસિટી પણ ડામર કરતા વધારે

ચેન્નાઈમાં ૧૦૦ કિ.મી.થી વધુ રસ્તામાં પ્લાસ્ટિક વેસ્ટનો ઉપયોગ થયો

પ્લાસ્ટિકમાંથી રોડ બનાવવાની બાબતમાં ચેન્નાઈ દેશમાં પ્રથમ સ્થાને આવે છે. ચેન્નાઈમાં ૧૦૦ કિ. મીથી વધારે રસ્તાઓ પ્લાસ્ટિક વેસ્ટમાંથી બનાવામાં આવ્યા છે. આ સાથે દિલ્હી અને મહારાષ્ટ્રમાં પણ પ્લાસ્ટિકમાંથી રસ્તા બનાવામાં આવ્યા છે.

Bhavnagar Corporation – Eco Bricks from Plastic Waste

- Citizens were asked to fill one-liter PET bottles with around 350 grams or more of non-recyclable plastic waste, including wrappers from snacks, milk bags, gutkha, chocolate, and other similar plastics.
- Paid Rs. 10 for every three such filled bottles, or the equivalent of 1 kilogram of plastic waste.
- Implemented in collaboration with schools.
- 14 tons of plastic waste was used in developing a garden.

Source: SKP training, Bhavnagar Municipal Corporation

Junagadh Corporation – Prakrutik Café

- 'Prakrutik Plastic Cafe' - innovative approach to plastic waste management by offering food in exchange for plastic waste
- Started in June 2022, the customers served with juices for 500 grams of plastic and sancks like *Dhokla*, *Thepla*, *Poha*, and *Aloo parathas* for 1 kg of plastic.
- Managed SHG named Sarvoday Sakhi Mandal and the government provided infrastructure to SHG for setting up cafe.
- Not only promotes recycling but also emphasizes healthy eating by using organically grown vegetables and serving food in clay utensils.
- The collected plastic is sold to recycling companies which generates further income for the SHGs.

Greener Kedarnath - India's First Digital Deposit Refund System

A litter-free Kedarnath Yatra was facilitated by India's first Digital Deposit Refund System (DRS), a highly effective, community-owned joint initiative.

20 Lakhs plastic bottles collected and recycled; 110 new jobs created and government savings of 3.7 Crore

Problem Statement

The significant footfall in Kedarnath, a prominent tourist destination, generated a considerable amount of plastic waste. To address this issue, a Digital Deposit Refund System was implemented by the Kedarnath Municipal Council.

Project Highlights

1. Bottles were labeled by the brand owner, USI and sold to distributors.
2. A distribution network collected and sold USI-labeled bottles to retailers.
3. Retail outlets purchased USI-labeled bottles from distributors at ₹X per bottle and sold them to consumers.
4. Consumers purchased the product, paying ₹X per bottle to retailers.
5. Customers returned USI-labeled empty bottles to the Reverse Vending Machine (RVM) and received ₹X per bottle from an Escrow Account.
6. A mobile application was developed to efficiently manage the Digital Deposit Refund System (DRS), facilitating collection and payment mechanisms, complemented by back-end solutions for operations and scheme management..

Project Impacts

Environmental Impact:

- Clean material was utilized for reuse and recycling.
- A total of 1200 kg of legacy waste was collected and recycled.
- The Nainital High Court issued a directive through Writ Petition (PIL) 93 of 2023 to implement the scheme statewide.

Social Impact:

- A behavioral shift toward responsible disposal was promoted.

Personal Impact:

- Local green jobs were generated.
- A national award was instituted by the Ministry of Electronics, Information, and Technology (MeiTY) for the first Digital Innovation on the Deposit Refund System implemented in Uttarakhand.

Technological Impact:

- Unique Serial Identification (SUI) was implemented for verification and authenticity.
- System transparency and data security were assured.
- Traceability for recovered material was established, facilitating reuse, refill, and recycling efforts.

Plastic Waste Recycling in Itarsi, Madhya Pradesh

- Pioneering initiative to manage plastic waste while generating economic and environmental benefits.
- Converts plastic waste into usable items, reducing landfill burden and promoting sustainable urban development
- Plastic waste is collected through MRF Centers and it is then sorted into categories like PET, HDPE, and LDPE before shredding and melting
- Converted into products such as benches, chairs, and paver blocks.
- These recycled plastic items are installed in public spaces like parks and temples.
- A recycled plastic bench costs INR 4,500 compared to INR 8,000 for a cement bench.

Recycled Plastic Bench, Weight: 40 Kg

Quality: Excellent

Strength: 500 Kg

Water Proof

Rust Proof

Light Weight

Long Lasting

Rate: Low as compared to Cement/Iron Benches

Recycled Plastic Bench, Weight: 50 Kg,

Source: INDIA'S CIRCULAR SUTRA, A COMPENDIUM OF GOOD PRACTICES, NIUA, 2025

Eliminating Single-Use Plastic: Chhattisgarh's Innovative Steps

- Ambikapur's innovative approaches such as the Bartan Bank and Jhola Bank for eco-friendly alternatives to single use plastic
- Bartan Bank initiative - enables residents to rent steel utensils, under the 'ask-use-wash-return' model, at a minimal cost for community gatherings, marriages, and other social functions.
- Run by SHGs. Total 8 Bartan banks are being run empowering 89 women.
- The Bartan Banks generated a total revenue of INR 16.78 lakhs since 2017, significantly reducing the consumption of single-use plastic utensils.
- The Jhola Banks have sold thousands of cloth and jute bags, amounting to a revenue of INR 3.5 lakhs.

Source: INDIA'S CIRCULAR SUTRA, A COMPENDIUM OF GOOD PRACTICES, NIUA, 2025

Tackling Multi-Layer Plastics: Punjab's Plastic to Chipboard

- Patiala has established Plastic Recycling Facility (PRF) under CSR initiative
- Facility recycles multilayered plastic (MLP) and converts into chipboards.
- These chipboards offer an environmentally friendly alternative to plywood, furniture, roofing sheets, temporary shelters, and damp-proof walls.
- Plastic waste is sorted and cleaned, then it is shredded into flakes of around 10 mm in size. These plastic flakes are then further processed to make a durable chipboard which is resistant to water, termites, and rust.
- The facility operates with a processing capacity of 10 tonnes of waste per day, producing around 75 to 100 chipboards daily.

Source: INDIA'S CIRCULAR SUTRA, A COMPENDIUM OF GOOD PRACTICES, NIUA, 2025

Plastic to Alternate Fuel: Co-Processing of Plastics Waste in Cement Kiln- ACC Cement Limited (Gagal Cement Works)

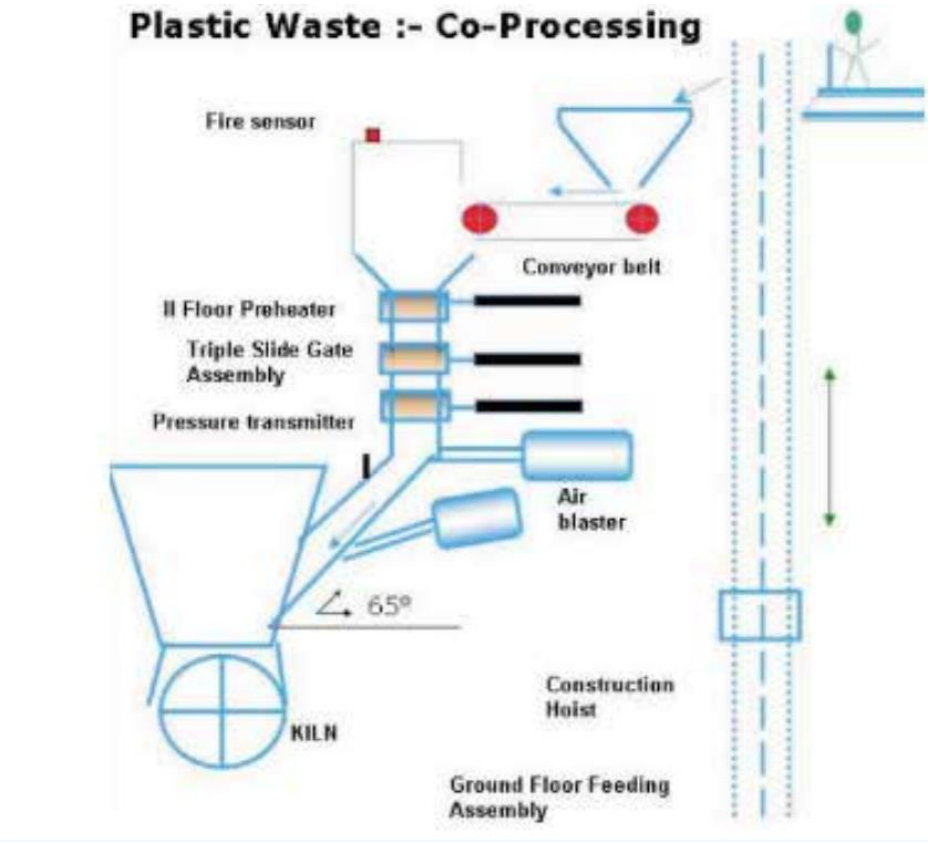
The Initiator: ACC Limited is India's foremost manufacturer of cement and concrete. Gagal Cement Works is one of cement plants in ACC Group.

The Preperation: Green Soldiers from Gagal Cement works launched first project titled 'Making Gagal Plastic Free'. Segregation is the essence of effective waste management and hence, a workshop was organized for the stakeholders. All colony and local village residents were invited for a discussion on the strategy. Green Soldiers team was trained on the ways to segregate the plastic waste. The Green Soldiers team collected about 53 Tonnes of plastic waste, which was successfully co-processed in Gagal cement kiln.

The initiative: The plastic waste collected from the villages, colony and plant premises were weighed at the weighbridge each week after the collection drive. The drive started with collection of 50 kgs/week, which is presently recording approximately 2 Tonnes of collection per week. This gave a clear indication that the stakeholders were increasingly becoming more aware about segregation and concerned about their environment.

The result:

- Co-processing of waste at cement kiln is the best disposal option than conventional options of landfilling and incineration. It also substitutes fossil fuel.
- The initiative can be replicated across other industries and companies countrywide, as well as at a global level. The beauty of the initiative is that, keeping the ideas intact, the projects can easily be moulded to suit the climate, topography and biodiversity of any area across the world.



Dehradun – Know Your Plastics Drives

To enhance the Plastic Waste Management rules at Dehradun, India, Earth5R, an Environmental Organization based in India initiated a project called **'Know Your Plastics'.** The project aims at **raising awareness about plastic waste** and also **aspires to increase recycling rates of products**.

Clean-Up And Classification Of Plastic Waste

Volunteers visited 10 locations in their neighbourhood to collect the maximum amount of plastic waste

Waste Data Utilised For Research Work And Creating Awareness

10 clean-up sessions, analysed the waste collected
246 plastic waste items were collected
150 Multi-Layer Packaging(MLP)Products
48 Low Density Polyethylene Products (LDPE) waste
19 Tetra Packs
9 High Density Plastic (HDPE) Products
5 Polyethylene terephthalate (PET)Products

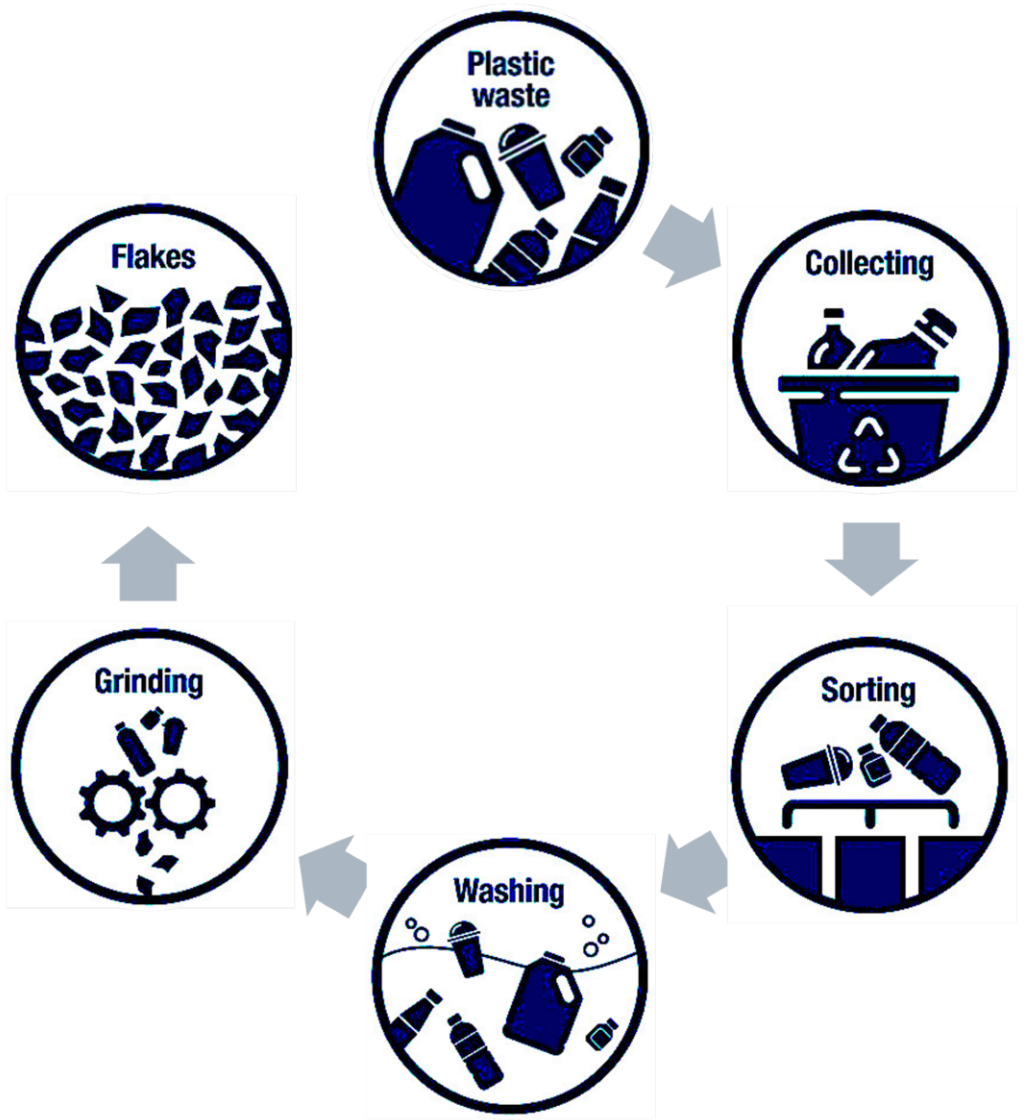
- **Based on this Plastic waste management awareness drives were conducted**
- **Reduction of Single Use Plastic (SUS)**
- **Recyclable and reusable plastics**

A holistic IEC campaign to promote behavioural change on waste management: Jammu

Jammu has undertaken extensive citizen engagement initiatives, including clean-up drives, river restoration projects, nukkad nataks, segregation drives, Swachhta Rath (mobile messaging vehicle), etc., as part of its IEC campaign that was launched in 2019.

- The Jammu Municipal Corporation (JMC) engaged with Regional and Urban Development Agency (RUDA), a consulting firm in Jammu supporting sustainable development, to plan an IEC campaign identifying the threats caused by improper waste disposal like public health and environmental degradation.
- The JMC and RUDA mapped the stakeholders responsible for the waste management process. They also focussed on BWGs while designing the campaign and devised a special strategy to reach out to these institutions.

IEC initiative	About the initiative
Plastic Lao Thaila Pao Campaign	This campaign is a part of an ongoing effort to spread awareness of the need for responsible plastic use and its disposal. A mini material recovery stall has been set up in a prominent market location to promote sustainable waste management practices as part of the campaign. Under the campaign, citizens are encouraged to deposit their household plastic waste at the stall in exchange for reusable & recycled cloth bags (1 kg of plastic waste = 1 cloth bag).
Save Tawi Campaign	RUDA initiated a massive campaign, 'Save Tawi' at Har Ki Pauri temple, collaborating with Jammu Municipal Corporation. The purpose of the campaign was to sensitize people who visit the temple to offer reverence in an eco-friendly manner and not throw plastics or other kinds of waste in the Tawi river. Volunteers were deputed to instruct people to follow physical distancing norms and throw waste, basis the categories. Awareness was created through public announcements and jingles in the temple premises. The campaign collected 1,220 kg of dry waste.
Swachhta Rath -Bin It Right Campaign	A vehicle, mostly a three-wheeler, is fitted with a speaker playing jingles and runs through the streets of Jammu to sensitize residents for segregation of their household waste and motivating them to put the right waste in the right dustbin.



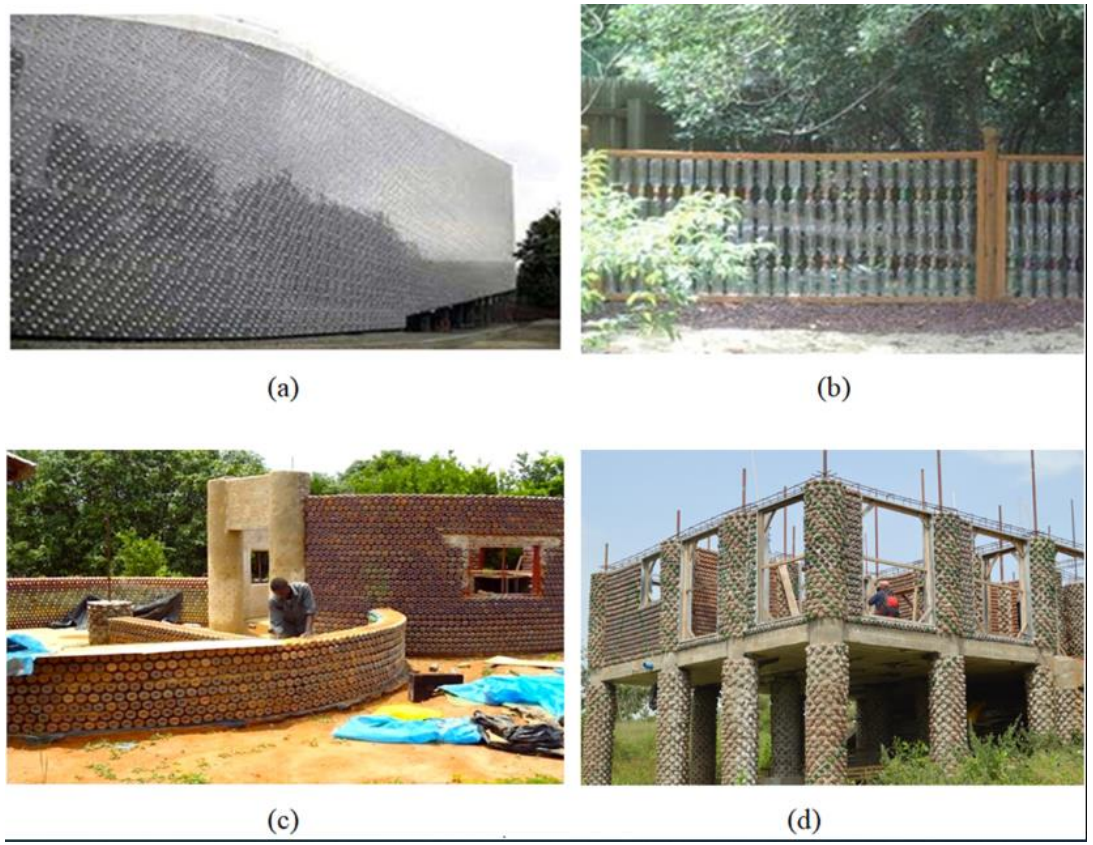
Opportunities for Urban Gujarat

Promote technology innovation – Construction Industry

3D Printing Street Furniture – From Plastic Waste to Functional Designs

https://www.wastemanaged.co.uk/our-news/recycling/innovations-plastic-recycling/#:~:text=Ecobricks:%20Turning%20Plastic%20Waste%20into,waste%20while%20creating%20sustainable%20infrastructure.

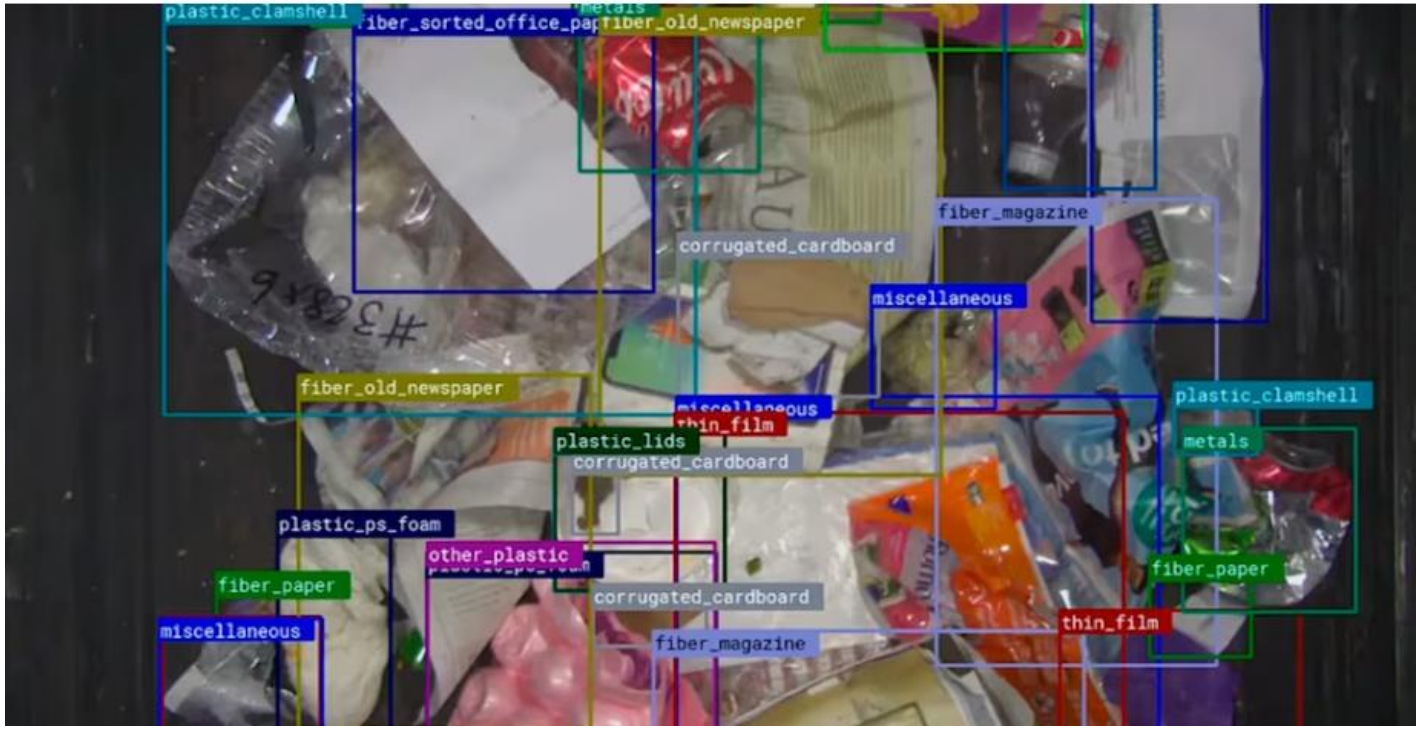
Eco bricks and construction works



https://www.sciencedirect.com/science/article/pii/S2405844022012725

Promote technology innovation – Use of AI and digital tools

AI Enabled Sorting Solution For A Profitable Circular Economy; promote machine learnings and potential use of robotics



https://www.wasterecyclingmag.com/news/sort-smarter-not-harder

https://www.ellenmacarthurfoundation.org/circular-examples/artificial-intelligence-for-recycling-amp-robotics

Partnership with startup and eco - entrepreneurs

Reverse Vending Machine for plastic bottle collection

Cloth bag vending machine at market areas

Source: Ahmedabad Municipal Corporation

Corporate partnership under EPR and CSR– Bisleri greener promise

https://www.bottlesforchange.in/home

Collaboration and Partnerships for Circular Economy

SHGs and informal workers

- Engaging Self Help Groups (SHG) for creating awareness such as impacts of plastic pollution, ban on SUP, alternatives of SUP etc.
- Engaging SHG for operation of MRF centers for proper segregation of plastic waste
- Creating enterprise of SHGs/informal workers for making cloth bags, acting as Bartan bank (renting steel/glass utensils for making zero waste events) etc.

Startups and innovators

- To enhance the collection system through use of advance technology
- Introduce the advance sorting technology using AI/ML/Robotics
- Scaling up the recycling technology to address the need for different categorisation of plastics
- Promote digital monitoring for operations
- For increase the value addition for upcycled plastic products

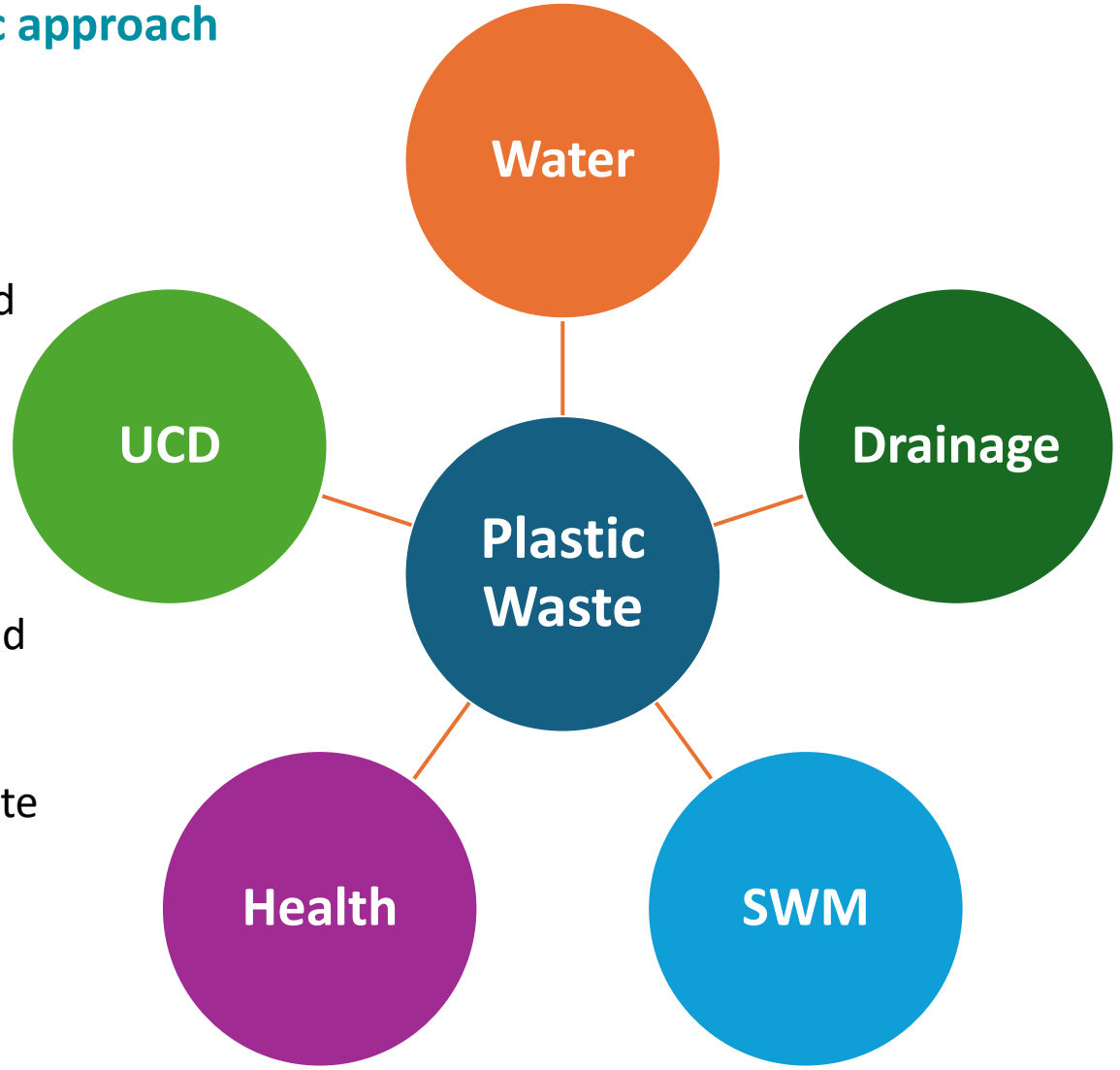
CSR, NGOs, Academic

- To promote research and development to address the prevailing issues
- Demonstrate innovation on ground
- Community engagement models
- Monitoring systems, impact assessment and evaluation

Cities to adopt the holistic approach for addressing Plastic Waste Issue

Plastic waste should not be seen in silos, but it needs holistic approach

- **Water Supply Department -** Plastic littering pollutes lakes and microplastics threaten drinking water quality.
- **Drainage & Sewerage Department -** Plastic waste clogs drains and sewers, leading to urban flooding and sewage overflows
- **Health Department -** Burning and dumping of plastics cause respiratory and environmental health issues.
- **Urban Community Development (UCD)** - Engage communities and generate awareness among them on issues due to plastic waste
- **Cross-department coordination** essential for effective plastic waste reduction.
- Joint planning, monitoring, and awareness campaigns needed to tackle the issue of plastic waste management



In Summary…

- Community participation for source segregation is key to attaining circular economy
- Collaboration and partnership with stakeholders to promote design circularity

- Financial incentive to promote recycle and reuse – Performance based contract, incentives to household for segregation
- Forward linkages with viability – Market assessment and tie up with industries
- Cluster level recycling and processing facilities for small cities

- Engagement of women led self-help group and informal workers for operations across the service chain
- Promote awareness and readiness of community

Thank you

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About us

The Center for Water and Sanitation (CWAS) is a part of CEPT Research and Development Foundation (CRDF) at CEPT University. CWAS undertakes action-research, implementation support, capacity building and advocacy in the field of urban water and sanitation. Acting as a thought catalyst and facilitator, CWAS works closely with all levels of governments - national, state and local to support them in delivering water and sanitation services in an efficient, effective and equitable manner.

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