ACTION PLAN ON PLASTIC WASTE MANAGEMENT FOR ZERO PLASTIC WASTE AT CHARUSAT, CHANGA

CHARUSAT
CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

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1. INTRODUCTION:

Plastic has become an almost-unavoidable part of modern everyday life. It is an established fact that plastic waste has a significant effect on the environment as it pollutes the basic resources of soil, water and air.

1.1 Types of Plastic:

The Society of the Plastics Industry, Inc. (SPI) introduced its resin identification coding system in 1988 at the urging of recyclers around the country.

The seven types of plastic include:

1. Polyethylene Terephthalate (PETE or PET)
2. High-Density Polyethylene (HDPE)
3. Polyvinyl Chloride (PVC)
4. Low-Density Polyethylene (LDPE)
5. Polypropylene (PP)
6. Polystyrene or Styrofoam (PS)
7. Miscellaneous plastics (includes: polycarbonate, polylactide, acrylic, acrylonitrile butadiene, styrene, fiberglass, and nylon)

Figure 1: Types of Plastic

Figure 2: Types of Plastic with examples

Plastics are generally categorized into two types:

• Thermoplastics: Thermoplastics or Thermo-softening plastics are the plastics which soften on heating and can be molded into desired shape such as PET, HDPE, LDPE, PP, PVC, PS etc.

• Thermosets: Thermoset or thermosetting plastics strengthen on heating, but cannot be remolded or recycled such as Sheet Molding Compounds (SMC), Fiber Reinforced Plastic (FRP), Bakelite etc. are the examples of the same

1.2 Harmful Effects of Plastic:

1.2.1 Environmental issues:

- Lack of proper collection and management.

- The 'throw away culture' result in these bags finding their way in the city drainage and thus choking the drains.
- Littering of land by plastic bags presents an ugly and unhygienic scene.
- littering also reduces rate of rain water percolation resulting in lowering water table levels.
- Plastics go into the water bodies which are already polluted due to many sources.
- Fish and other aquatic animals swallow plastic garbage mistaken as food items.
- Plastics become a nuisance because of their non-biodegradability.
- Animals eating carry bags sometimes die.
- Soil fertility deteriorates as plastic bags form part of manure and remain in soil for years.
- Polythene bags if burnt release highly toxic gases like phosgene carbon monoxide, chlorine. Sulphur dioxide, nitrogen oxide beside deadly dioxins
- Requires large are for disposal and there are further waste disposal impacts related to landfills and incineration.

1.2.2 Health Hazards:

During the manufacturing process of polythene carry bags various harmful components/chemicals like colorants, pigments, plasticizers, antioxidants, stabilizers and heavy metals are used. Colour used during the process are mostly non-food grade and leach out with other chemicals/components thus contaminating food and other items carried in these bags. These chemicals can cause diseases like cancer, degeneration of brain tissues, heart enlargement etc.

Most of us take following metals with ready-to-eat food items, if carried in the Coloured polythene carry bags:

- Lead through Black polythene carry bags
- Chromium through Red polythene carry bags
- Copper through Blue polythene carry bags
- Salt of Barium through Green polyethylene carry bags.

2. MANAGEMENT OF PLASTIC WASTE:

2.1 Plastic Waste Management (PWM Rules), 2016

The Government of India notified Plastic Waste Management (PWM) Rules, 2016 on 18thMarch, 2016, superseding Plastic Waste (Management & Handling) Rules, 2011. These rules were further amended and named as 'Plastic Waste Management (Amendment) Rules, 2018.

2.2 National Green Tribunal recommendations

National Green tribunal was established in 2010 under Article 21 of the Indian constitution which guarantees the citizens of India the right to a healthy environment. Since its inception, NGT has taken steps in different directions in order to reduce plastic pollution and other activities that are impacting the environment and health

2.3 AICTE and MHRD Guidelines on Plastic Ban in HEIs:

The Ministry of Education (Human Resource Development) GoI on August 29, 2019, issues guidelines for ban of plastic use in Higher Education Institutions (HEIs). The Government has issued guidelines to provide directions and tips which shall be applicable to all institutions in general. The guidelines encourage universities to adopt policies and practices towards cleaner and plastic free campuses.

2.4 UGC Guidelines on Plastic Ban in HEIs:

The University Grant Commission (UGC) on Friday, August 30, 2019, issued guidelines to ban the use of plastic in universities and educational institutions. Swachhata Hi Sewa Campaign is being launched by the Government of India from September 11, 2019, to October 02, 2019 with an aim to eliminate the use of plastic and to dispose of plastic waste. Towards achieving this objective through the Higher Education Institutions (HEI), detailed guidelines are enclosed which may be adopted in universities and colleges.

3. TRAINING & CAPACITY BUILDING:

3.1 Importance

It is important to enhance the capability and skills of the various stakeholder such as students, parents, faculty members, administrative staff, etc. for effective implementation of plastic waste Management Action plan. Therefore, training and capacity building programs related to various technical aspects are required to be conducted for different functionaries of relevant departments & organizations at various levels of hierarchies.

3.2 Objectives

- Raising awareness and changing the mindset.
- Building trust and appreciation for the purpose of various environment protection plans, environmental concerns, issues, roles and responsibilities of different stakeholders.
- Improving skills regarding existing practices, procedures and methodologies.
- Promoting an integrated and holistic approach for addressing the concerns.
- Reinforcing accountabilities and identifying aspects that require improvement
- Understanding new challenges and requirements

3.3 Involvement of Institutions and Experts

CHARUSAT promotes to enhance its technical capabilities by the collaborations with reputed institutions like Center for Environment Education (CEE), Ahmedabad which is a Center of Excellence of Ministry of Environment, Forest & Climate Change (MOEF&CC). University is a part of United Nations Plastic Tide Turner Challenge by actively involving its more than 250 student volunteers and will continue these activities in near future.

4. STRATEGY FOR PLASTIC WASTE MANAGEMENT AT CHARUSAT

Based on the guidelines of UGC and AICTE, CHARUSAT proposes the strategic Action Plan on Plastic Waste Management which will be taken up in the following order:

4.1 Reduce:

Plastic is uniquely problematic because it's non-biodegradable and therefore sticks around for a lot longer than the other forms of waste. Some of the steps shall be taken for reducing the plastic usage and associated waste shall be as follows:

4.1.1 Banning the use of disposal/ single use plastics in campus premises

The following plastic items shall be banned for usage in campus premises in view of the commitment of Govt. of India in eliminating the single-use plastic by 2022.

- Grocery/ carry bags,
- Food wrap,
- Plastic sachets
- Disposable cutlery,
- Plastic Straws,
- Coffee/ Tea-cup and lids
- foam takeaway containers
- Plastic disposable glass
- Plastic Spoons
- Plastic Food Plates

4.1.2 Minimize Buying Water

Minimize usage of packaged drinking water bottles in university events, canteen and other functions, etc.

4.2 Reuse

Reuse is a step up from recycling. It diverts plastic and takes pressure off the recycling services. Reuse of the plastic items shall be promoted on campus and plastic scrap shall be evaluated for all possible re-usability before being sent for recycling.

4.3 Recycle

Recycling and re-utilization of waste plastics shall be promoted for reduction of the use of virgin materials and of the use of energy.

4.3.1 Waste plastic to recycled plastic

All types of recyclable plastic scrap which cannot be reuse shall be sent to the university approved plastic recycler and record for the same shall be maintained.

4.3.2 Waste Plastic to Fuel (Pyrolytic Conversion Technologies)

All type of non-recyclable plastic waste shall be sent to the nearest Plastic Pyrolysis plant for conversion of plastic into usable fuel.

4.4. Disposal

4.4.1 Waste Incineration

Maximum efforts shall be taken to Reduce, Reuse and Recycle the plastic waste. In case of non-applicability of all above measures, plastic shall be incinerated in controlled conditions taking care of the gaseous emissions at university installed Incinerator plant.

Eliminating avoidable single-use plastics: CHARUSAT's action plan to 2021

Focus	**The challenge**	**Our actions to 2021**
Plastic bottles	Canteen-External and Internal Buyers	We will improve water dispenser provision across campus and produce high quality signage for drinking water facilities. Drinking water packed in clay bottles shall replace Plastic Water Bottles in Canteen.
Hot drink cups	Plastic cups has already been replace by paper cups	We will continue using paper cups and shall promote the use of dedicated earthenware in campus premises.
Plastic straws	Tetra packs and Cold drinks with Straw Provisions	We will continue to promote the avoidance of plastic straws and consider alternative materials, such as paper straw, bamboo straw, in line with Government policy. Tetra packs shall be provided with paper straws
Single-use plastic cups/ Glass	To serve the large number of gatherings	We are working towards introducing reusable cups/ steel glass in all such functions
Plastic cutlery	Disposable cutlery used across Campus Food outlets/ canteen	We shall replace all plastic cutlery to ecofriendly palm leaf cutlery from all Food on Campus outlets.
Labs suppliers' initiatives	Laboratories rely on suppliers for much of their equipment, but are often left with large amounts of packaging to	We will continue to promote sustainable initiatives across our laboratories and work with our suppliers to further reduce single-use plastic.

	dispose of through University waste streams.	
Stationery	Use and Throw Pens Plastic Files Plastic Covers Spiral Binding Plastic Writing Pads Markers/ Text liners Glue Gun Stick White Ink Correction Pen	We shall replace plastic items with Plantable Papers Pens/ Bamboo Pens Cardboard/ Paper Files Handmade Paper Cover Book Binding Paper/ Cardboard writing pads Markers/ Text liners with metal body Glue Gum Bottles Refillable Ink Correction pens
Freebies at events	Single-use plastics are often used at events for convenience and cost	We will promote plastic-free events across the University and encourage sustainability in event planning and waste management. In mass events, filters with paper glass shall be used instead of water bottles.
Research into plastics	Much research is still needed in the fight against plastic pollution, such as looking at the ways to reduce consumer demand for plastic.	CHARUSAT shall form a multidisciplinary team and shall promote research on plastic waste management. Outputs of our research will inform our ongoing approach to plastic reduction and be shared with students and staff.