

Plastic Pollution

Microplastic Pollution: Comprehensive Overview

What are Microplastics?

Definition: Microplastics are synthetic solid particles ranging from **1 micrometre (µm) to 5 millimetres (mm)** in size.

Characteristics:

- They are **insoluble in water**.
- Microplastics can originate from various sources, including the breakdown of larger plastic debris, synthetic clothing fibres, and industrial processes.

Extent of the Problem

Recent scientific estimates highlight the pervasive nature of microplastic pollution:

- The world's sea floor is littered with an estimated **14 million tonnes of microplastics**.
- In India, the river Ganga carries about **1 million tonnes of microplastics** each year.

Sources and Genesis of the Problem

Untreated Sewage and Industrial Waste

- Cities discharge untreated sewage and industrial waste into water bodies.
- These waste streams often contain plastic products that degrade into microplastics.

Non-degradable Religious Offerings

- Religious offerings wrapped in non-degradable plastics are frequently disposed of in rivers.

Breakdown of Plastic Products

- Plastic waste materials break down into smaller particles, becoming microplastics.
- These particles can be carried downstream and eventually reach the ocean, the ultimate sink for all plastics used by humans.

Case Study: River Ganga

Pollution Sources

- Significant microplastic pollution has been reported in the river Ganga by the Delhi-based environment NGO Toxics Link.
- The pollution originates from industrial discharges, domestic sewage, and religious practices.

Impact

- The pollution affects aquatic life and poses risks to millions of people dependent on the river for drinking water, agriculture, and fishing.

Health Hazards

Marine Life

- Marine organisms ingest microplastics, leading to physical harm, exposure to toxic chemicals, and disruption of biological processes.
- This results in increased mortality rates and impaired reproductive systems in marine species.

Human Health

- Microplastics enter the food chain, potentially impacting human health through the consumption of contaminated seafood.

Environmental Impact

Marine Pollution

- Microplastics are a major source of marine pollution.

- They affect the health of marine ecosystems, including coral reefs and seabed habitats.

Ecosystem Disruption

- The ingestion of microplastics by marine species leads to malnutrition and biological disruption.

Conclusion

Need for Comprehensive Strategies

- There is a need to improve waste management practices, reduce plastic production and usage, and increase public awareness about the environmental and health impacts of microplastics.

Collaborative Efforts

- Local, national, and global collaboration is essential to mitigate the adverse effects of microplastic pollution and safeguard ecological and human health.

Single-Use Plastics

Introduction

Single-use plastics, designed for one-time use before being discarded, have become a significant environmental concern. With a large share of global plastic production dedicated to items like packaging materials, polythene bags, and bottles, the impact of these plastics is immense.

Global Production and Consumption

Single-use plastics constitute one-third of all plastic produced worldwide, with 98% derived from fossil fuels. The prevalence of these plastics in daily life, particularly in packaging, has led to a proliferation of waste that poses serious environmental and health risks.

Challenges in Collection and Recycling

The collection and recycling of single-use plastics are fraught with challenges. These plastics, being light and flexible, are difficult to collect and recycle, often not providing enough economic incentive for recycling efforts. As a result, they accumulate in the environment, leaching toxins into the soil and waterways.

Adverse Impact of Single-Use Plastics

1. **Environmental Impact:** Plastic waste is a major cause of urban flooding due to clogged waterways. Burning plastic waste releases hazardous chemicals like furans, dioxins, mercury, and PCBs. If production trends continue, single-use plastics could contribute significantly to global greenhouse gas emissions by 2050.
2. **Health Risks:** Non-degrading plastics break down into microplastics, contaminating food supplies and posing health risks. Plastic litter also fosters disease transmission by providing breeding grounds for pests.
3. **Economic Impact:** Plastic pollution affects tourism and marine industries, with economic damage estimated at \$13 billion annually.

India's Scenario

India, despite lower per capita plastic usage compared to many developed nations, ranks third globally in plastic waste generation. The country's growing economy and population have led to a surge in plastic consumption, with significant contributions from states like Maharashtra, Tamil Nadu, and Gujarat.

Plastic Waste Management Regulations in India

India has implemented several regulations to address plastic waste:

1. **Plastic Waste Management Rules, 2016:** These rules emphasize reducing plastic waste generation, preventing littering, and ensuring proper segregation and disposal. They also impose Extended Producer Responsibility (EPR) on producers, importers, and brand owners.
2. **Amendments to the Rules:**
 - **2018:** Introduced phased-out multi-layered plastics.
 - **2021:** Banned certain single-use plastic items and increased the thickness of plastic carry bags.
 - **2022:** Introduced EPR guidelines for plastic packaging.

- **2024:** Defined biodegradable plastics and expanded definitions of "importer", "manufacturer", and "producer".

Recent Regulations

2021:

- **Ban on Specific Single-Use Plastics:** Items like plastic earbuds, balloon sticks, flags, candy sticks, ice-cream sticks, plates, cups, glasses, cutlery, and polystyrene decorations were banned.
- **Thicker Plastic Bags:** The required thickness of plastic bags increased from 50 microns to 75 microns by September 30, 2021, and to 120 microns by December 31, 2022. Thicker bags are less likely to be thrown away after one use.

2022:

- **Extended Producer Responsibility (EPR):** Producers must manage the disposal of plastic waste from their products.
- **Environmental Compensation:** Companies not meeting EPR targets must pay for environmental damage.
- **Circular Economy:** Focus on reusing, recycling, and reducing plastic waste to keep plastics in use longer.

2024:

- **Biodegradable Plastics:** Defined as materials that degrade naturally in environments like soil and landfills, without leaving harmful microplastics.
- **Expanded Definitions:**
 - **Importer:** Includes those bringing in plastic materials for commercial use.
 - **Manufacturer:** Includes those making plastic raw materials, compostable plastics, and biodegradable plastics.
 - **Producer:** Includes those making intermediate packaging materials and contract manufacturing for brands.
- **Certification for Biodegradable Plastics:** Manufacturers must get certification from the Central Pollution Control Board (CPCB) before selling compostable or biodegradable plastic products.

Other Initiatives to Curb Plastic Waste in India

1. **Swachh Bharat Mission:** This campaign promotes cleanliness and proper waste management, emphasizing source segregation of plastic waste.
2. **India Plastics Pact:** Aims to transition to a circular plastics economy by reducing problematic plastic packaging and fostering collaboration across the plastics value chain.
3. **Project REPLAN:** Focuses on sustainable plastic waste management and empowering waste pickers.
4. **Un-Plastic Collective:** Encourages responsible plastic use and waste management practices.

Global Strategies for Addressing Single-Use Plastics

Several countries have implemented measures to tackle single-use plastics:

1. **United Nations Initiative:** A resolution endorsed by 124 nations aims to manage the entire lifecycle of plastics.
2. **Plastic Bag Regulations:** Various countries, including Bangladesh, New Zealand, and China, have implemented bans on plastic bags.
3. **European Union Directive:** Targets specific single-use plastics like cutlery, straws, and expanded polystyrene products.

Conclusion

The battle against single-use plastics is a global challenge requiring coordinated efforts. While significant strides have been made, particularly in countries like India, more comprehensive and sustained actions are necessary to mitigate the environmental and health impacts of plastic pollution. Embracing sustainable practices and fostering innovation in plastic waste management are crucial steps toward a cleaner and healthier planet.