A2-Climate Change - Workshop

Single-Use Plastics and Their Enviromental Impact

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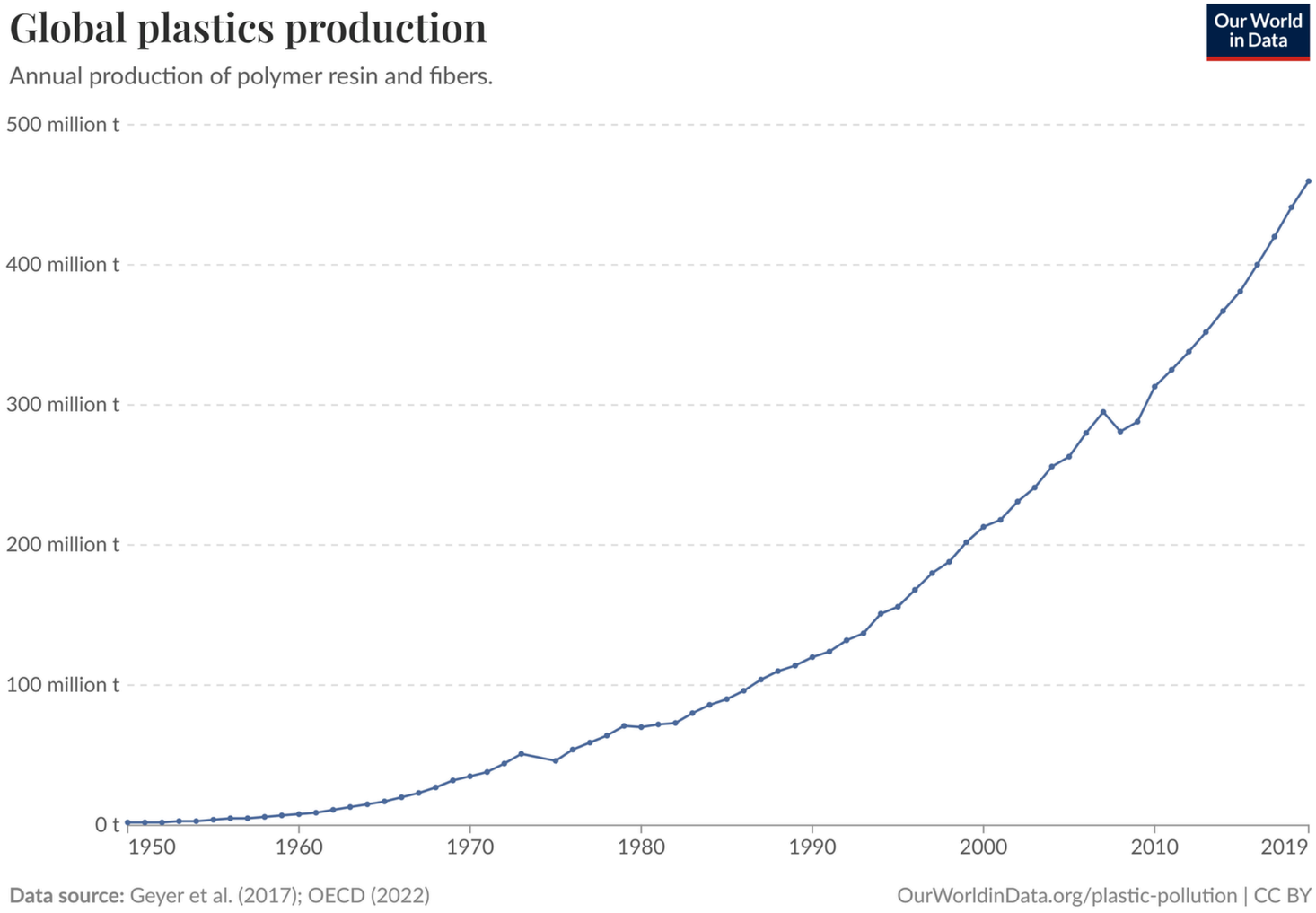
Topics

- **Plastic Pollution.**
- **Microplastics.**
- **Health Effects.**
- **How We Can Reduce Our Plastic Use.**
- **References.**

Plastic Pollution

Single-use plastic products—including shopping bags, beverage bottles, straws, and food packaging—are engineered for momentary convenience but become a persistent environmental burden due to their extreme durability. These disposable items, typically used for just minutes, constitute a significant proportion of the over 360 million metric tons of plastic manufactured globally each year (Geyer et al., 2017). Their lightweight nature and resistance to degradation allow them to disperse widely, polluting ecosystems for centuries. Unlike reusable or biodegradable alternatives, single-use plastics are rarely recycled; instead, they accumulate in landfills, contaminate freshwater systems, and contribute to the growing crisis of marine plastic debris.

Plastic Pollution



Source of the visual is: Geyer et al. (2017); OECD (2022) – with major processing by Our World in Data

Plastic Pollution: Types of Plastics

- Thermoplastics:
  - Polyethylene (PE)
  - Polypropylene (PP)
  - Polyvinyl Chloride (PVC)
  - Polystyrene (PS)

Plastic Pollution: Types of Plastics

- Thermosetting Plastics:
  - Epoxy Resins
  - Phenolic Resins
  - Polyurethane (PU)

Plastic Pollution: Types of Plastics

- Engineering Plastics:
  - Polycarbonate (PC)
  - Polyamide (Nylon)

Plastic Pollution: Types of Plastics

- Biodegradable Plastics:
  - Polylactic Acid (PLA)
  - Polyhydroxyalkanoates (PHA)

Plastic Pollution: Types of Plastics

- Recycled Plastics:
  - rPET (Recycled Polyethylene Terephthalate)

Plastic Pollution: Effects on The Enviroment

- Marine and Aquatic Ecosystems:
  - Microplastics and Toxicity
  - Habitat Destruction
  - Pollution Hotspots

Plastic Pollution: Effects on The Enviroment

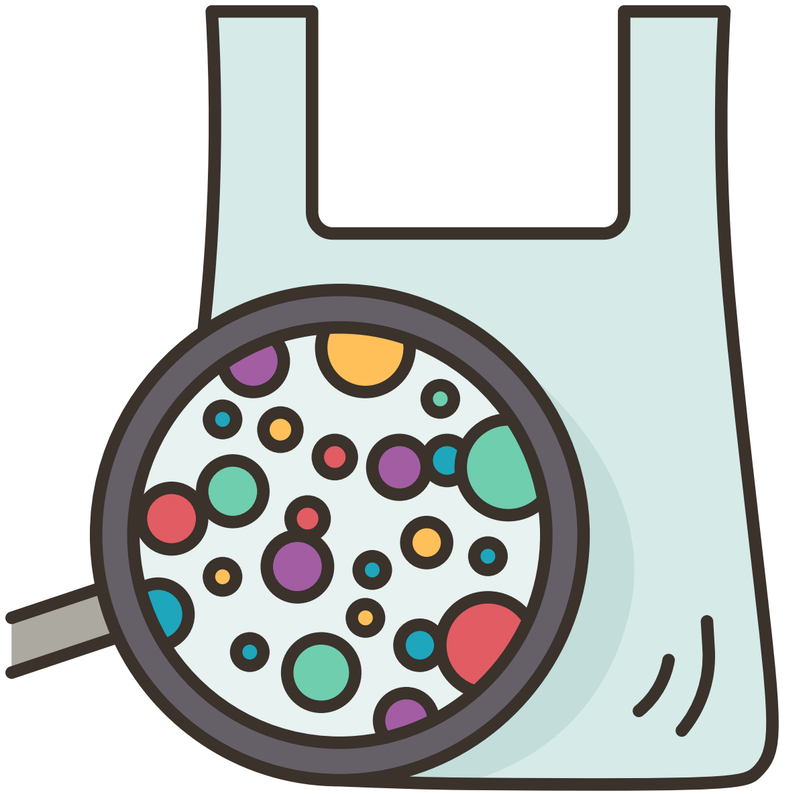
- Terrestrial Pollution:
  - Soil Contamination
  - Wildlife Threats

Plastic Pollution: Effects on The Enviroment

- Greenhouse Gas Emissions:
  - Plastic production and incineration contribute 3.4% of global GHG emissions

Microplastics

Microplastics, defined as plastic particles smaller than 5 mm, have become a pervasive environmental pollutant, posing significant risks to ecosystems and human health. These particles originate from the degradation of larger plastic debris (secondary microplastics) or are intentionally manufactured for use in products like cosmetics and textiles (primary microplastics). Their small size, durability, and widespread presence in air, water, and soil make them a global concern.



Microplastics: Phatways of Exposure

- Ingestion
- Inhalation

Health Effects

- Health effects caused by the incineration of plastics.
- Health effects caused by the microplastic exposure.

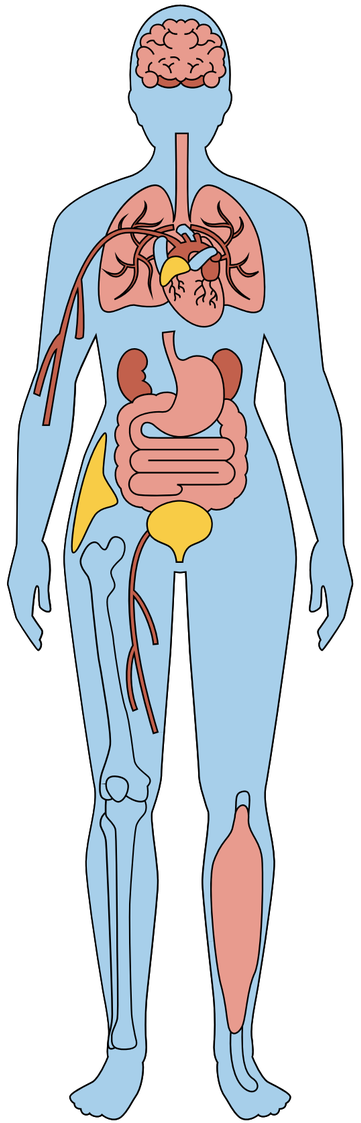
Health Effects: Incineration of Plastics

Open burning of plastic waste in low-income countries releases hazardous fumes, affecting air quality and respiratory health.



Health Effects: Microplastics

- Physical Effects:
  - Microplastics can cause inflammation, oxidative stress, and cellular damage when ingested or inhaled.
  - Smaller particles (nanoplastics) may cross biological barriers, such as the blood-brain or placental barriers, accumulating in organs like the liver, kidneys, and intestines.



Health Effects: Microplastics

- Chemical Toxicity:
  - Microplastics often contain additives and adsorb environmental pollutants. These chemicals can disrupt endocrine function, impair immunity, and increase cancer risk.

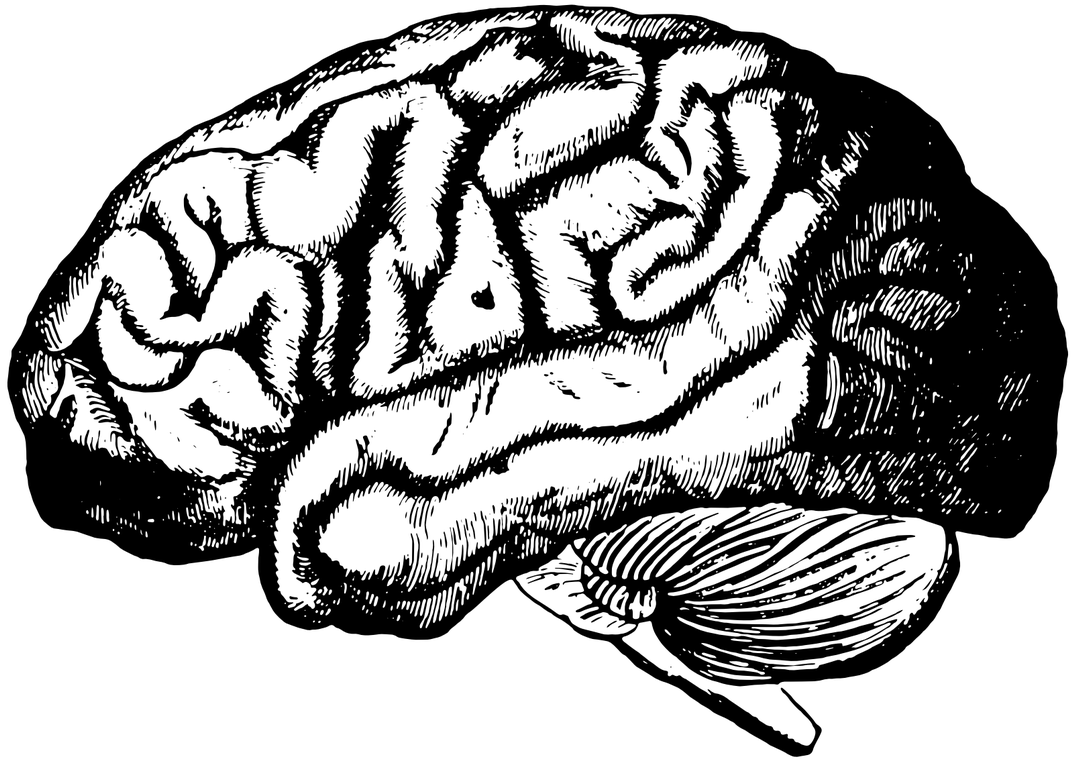
Health Effects: Microplastics

- Ecological and Trophic Transfer:
  - Marine organisms ingest microplastics, which then enter the food chain. This bioaccumulation can lead to higher concentrations of toxins in species consumed by humans.



Health Effects: Microplastics

- Long-Term Consequences:
  - Chronic exposure is linked to metabolic disorders, neurotoxicity, and reproductive issues.



How We can Reduce our Plastic Use

- Organizational level.
- Personal level.



Thank You

References

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