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## Plastic Marine Pollution

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### Why in News

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A study published in ‘Nature Communications’ has estimated the **amount of microplastic pollution in the Atlantic Ocean** and put it at **11.6-21.1 million tonnes**.

There has been an uncertainty about the magnitude of **plastic pollution** in marine environments.

### Key Points

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- **Estimated Pollution:**

- Measurements of the **top 200 meters** of the Atlantic found 11.6 - 21.1 million tonnes of microscopic particles.
- Scientists studied pollution of the Atlantic Ocean caused by **three types of plastics - polyethylene, polypropylene, and polystyrene** - which were suspended in the top 200 metres of the ocean.

These three types of plastic are **most commonly used for packaging**.

- Based on plastic waste generation trends from 1950-2015 and considering that the Atlantic Ocean has received 0.3-0.8% of the global plastic waste for 65 years, the Atlantic waters could hold **17-47 million tonnes of plastic waste**.

- **Conclusion:**

- **Smaller plastic particles are a hazard**, as it is easier for them to sink to greater ocean depths and some marine species such as zooplanktons show preferential ingestion of smaller particles, making them easier to enter the food chain.
- Considering that plastics of other sizes and polymer types will be found in the deeper ocean and in the sediments, the study indicates that both inputs and **stocks of ocean plastics are much higher than determined**.
- It is thus critical to **assess across all size categories and polymer groups** to determine the fate and danger of plastic contamination.

# Plastic Pollution

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- **Issue:**

- Plastic is a **synthetic organic polymer made from petroleum** with properties ideally suited for a wide variety of applications, including packaging, building and construction, household and sports equipment, vehicles, electronics and agriculture. Plastic is **cheap, lightweight, strong and malleable**.
- **Over 300 million tons of plastic** are produced every year, **half of which is used to design single-use items** such as shopping bags, cups and straws.
- According to the **International Union for Conservation of Nature (IUCN)**, at least **8 million tons of plastic end up in the oceans every year**.

- **Sources of Marine Plastic:**

- The main sources of marine plastic are **land-based**, from urban and storm runoff, **sewer overflows**, beach visitors, inadequate waste disposal and management, **industrial activities**, construction and illegal dumping.
- **Ocean-based plastic** originates mainly from the **fishing industry, nautical activities and aquaculture**.
- Under the influence of **solar UV radiation**, wind, currents and other natural factors, plastic fragments into small particles, termed **microplastics (particles smaller than 5 mm)** or **nanoplastics (particles smaller than 100 nm)**.

In addition, **microbeads**, a type of microplastic, are very tiny pieces of manufactured polyethylene plastic that are added as exfoliants in health and beauty products, such as cleansers and toothpastes. These tiny particles **easily pass through water filtration systems and end up in the ocean** and lakes.

- **Impact of Plastic Pollution:** Plastic can take hundreds to thousands of years to decompose depending on the type of plastic and where it has been dumped.
  - **On Marine Environment:**
    - The most visible and disturbing impacts of marine plastics are the **ingestion, suffocation and entanglement of hundreds of marine species.**
    - Floating plastics also contribute to the **spread of invasive marine organisms** and bacteria, which disrupt ecosystems.
  - **On Food and Health:**
    - Toxic contaminants accumulate on the surface of plastic materials as a result of prolonged exposure to seawater. When marine organisms ingest plastic debris, these contaminants enter their digestive systems, and overtime accumulate in the food web.
    - The **transfer of contaminants between marine species and humans through consumption of seafood** has been identified as a health hazard, but has not yet been adequately researched.
  - **Impacts on Climate Change:**

Plastic, which is a petroleum product, also contributes to **global warming**. If plastic waste is incinerated, it releases carbon dioxide into the atmosphere, thereby increasing carbon emissions.
  - **Impacts on Tourism:**

Plastic waste damages the aesthetic value of tourist destinations, leading to decreased tourism-related incomes and **major economic costs** related to the cleaning and maintenance of the sites.

## **India's Plastic Waste Crisis**

- Single-use plastics or disposable plastics, are commonly used for packaging. Nearly half of the plastics produced in India are single use plastics.
- Most cities and towns have not implemented the provisions of the **Plastic Waste Management Rules of 2016 or PWR.**
  - According to PWR, plastic manufacturers and retail establishments that use plastics are legally bound to collect back plastic waste. This is referred to as **'extended producers responsibility'.**
  - The rules also mandate the responsibilities of local bodies, gram panchayats, waste generators and retailers to manage waste.
  - This includes collecting and segregating recyclable plastic, non-recyclable plastic and other waste separately for processing.
  - But most cities and towns have not implemented these provisions due to the lack of a disciplined system of segregation and recycling.
- India **banned imports of solid plastic waste only in 2019.**

- The government has set an ambitious **target of eliminating single-use plastics by 2022.**

## Suggestions

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- **Existing international instruments should be further explored** to address plastic pollution. The most important are:
  - **The 1972 Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter (or the London Convention).**
  - **The 1996 Protocol to the London Convention (the London Protocol).**
  - **The 1978 Protocol to the International Convention for the Prevention of Pollution from Ships (MARPOL).**
- **Recycling and reuse of plastic materials** are the most effective actions available to reduce the environmental impacts of open landfills and open-air burning that are often practiced to manage domestic waste.
- Governments, research institutions and industries also need to work collaboratively **redesigning products, and rethink their usage and disposal**, in order to reduce microplastics waste from pellets, synthetic textiles and tyres.

## Way Forward

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Knowledge of the full extent of plastic pollution and its impacts would provide policy-makers, manufacturers and consumers with scientific evidence needed to spearhead appropriate technological, behavioural and policy solutions. It would also accelerate the conceptualisation of new technology, materials or products to replace plastics.

**Source: IE**