



Plastic Marine Pollution

Why in News

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

▪ 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

▪ 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

- **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

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

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