



Marine Pollution

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The oceans cover **over 70% of the globe**. Its health, wellbeing of humanity and the living environment that sustains us all are inextricably linked. Yet neglect of **ocean acidification, climate change, polluting activities and over-exploitation** of marine resources have made **oceans**, one of the **earth's most threatened** ecosystems.

Marine pollution, also known as ocean pollution, is the spreading of harmful substances such as oil, plastic, industrial and agricultural waste and chemical particles into the ocean.

Causes of Ocean Pollution

There are various ways in which pollution enters the ocean:

- **Sewage:** Sewage or polluting substances flow through sewage, rivers, or drainages directly into the ocean.
- **Toxic Chemicals From Industries:** Industrial waste which is directly discharged into the oceans, results in ocean pollution.
 - The hazardous and toxic chemicals affects marine life.
 - Also, they raise the temperature of the ocean and cause **thermal pollution**. Aquatic animals and plants have difficulty surviving at higher temperatures.
- **Land Runoff: Land-based sources** (such as agricultural run-off, discharge of nutrients and pesticides and untreated sewage including plastics) account for **approximately 80% of marine pollution**.

The runoff picks up man-made, harmful contaminants that pollute the ocean, including fertilizers, petroleum, pesticides and other forms of soil contaminants.
- **Large Scale Oil Spills:** Pollution caused by ships, is a huge source of ocean pollution, the most devastating effect of which is **oil spills**.
 - **Crude oil lasts for years** in the sea and is extremely toxic to marine life, it suffocates the marine animals to death.
 - Crude oil is also extremely difficult to clean up.

- **Ocean Mining:** Ocean mining sites drilling for silver, gold, copper, cobalt, and zinc create sulfide deposits up to three and a half thousand meters down into the ocean.
- **Plastic Pollution: In 2006, the United Nations Environment Programme estimated that every square mile of ocean contains 46,000 pieces of floating plastic.**
 - Once discarded, plastics are weathered and eroded into very small fragments known as **micro-plastics**. These together with plastic pellets are already found in most beaches around the world.
 - Plastic materials and other litter can become concentrated in certain areas called gyres as a result of marine pollution gathered by oceanic currents.
 - For example, the North Pacific Gyre** is now referred to as the **Great Pacific Garbage Patch**, where waste material from across the North Pacific Ocean, including coastal waters off North America and Japan, are drawn together.
- In addition to all these factors, the oceans are highly affected by **carbon dioxide and climate changes**, which impacts primarily the ecosystems and fish communities that live in the ocean.
 - In particular, the rising levels of CO₂ leads to **ocean acidification**.
- Other factors like **coastal tourism, port and harbour developments, damming of rivers, urban development and construction, mining, fisheries, aquaculture** etc., are all sources of marine pollution threatening coastal and marine habitats.

Effects of Ocean Pollution

- **Effect of Toxic Wastes on Marine Animals:** The long term effect on marine life can include cancer, failure in the reproductive system, behavioural changes, and even death.
- **Disruption to the Cycle of Coral Reefs:** Oil spill floats on the surface of the water and prevents sunlight from reaching marine plants and affects the process of photosynthesis.
- **Depletes Oxygen Content in Water:** Most of the debris in the ocean does not decompose and remain in the ocean for years.
 - Due to this, oxygen levels go down, as a result, the chances of survival of marine animals like whales, turtles, sharks, dolphins, penguins for a long time also goes down.
 - Excessive nutrients from sewage outfalls and agricultural runoff have contributed to the number of low oxygen (hypoxic) areas known as **dead zones**, where most marine life cannot survive, resulting in the collapse of some ecosystems.
 - **There are now close to 500 dead zones covering more than 245,000 km² globally, equivalent to the surface of the United Kingdom.**

- **Eutrophication:** When a water body becomes overly enriched with minerals and nutrients which induce excessive growth of algae or **algal bloom**.
This process also results in oxygen depletion of the water body.
- **Failure in the Reproductive System of Sea Animals:** Chemicals from pesticides can accumulate in the fatty tissue of animals, leading to failure in their reproductive system.
- **Effect on Food Chain:** Small animals ingest the discharged chemicals and are later eaten by large animals, which then affects the whole food chain.

Global Initiatives

- **The Global Programme of Action (GPA) for the Protection of the Marine Environment from Land-based Activities:**
The GPA is the only global intergovernmental mechanism directly addressing the connectivity between terrestrial, freshwater, coastal and marine ecosystems.
- **International conventions:**
 - **MARPOL convention (1973)**
 - It covers pollution of the **marine environment by ships** from operational or accidental causes.
 - It lists various forms of marine pollution caused by oil, noxious liquid substances, harmful substances in packaged form, sewage and garbage from ships, etc.
 - **The London Convention (1972)**
Its objective is to promote the **effective control of all sources of marine pollution** and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter.
- **Greenpeace:**
 - It is an environmental NGO that is dedicated to conserving the oceans and marine life across the globe.
 - Its grassroots efforts have resulted in the ban of destructive fishing practices, companies changing their fishing policies, and the creation of whale sanctuaries.

How to prevent Ocean pollution?

- Implement **renewable energy sources**, such as wind or solar power, to limit off-shore drilling.
- Limit agricultural pesticides and **encourage organic farming** & eco-friendly pesticide use.
- **Proper sewage treatment** and exploration of eco-friendly wastewater treatment options.

- Cut down on the industry and manufacturing waste and contain it into **landfills** to avoid spillage.
 - **Use of Biotechnology: Bioremediation** (use of specific microorganisms to metabolize and remove harmful substances) to **treat oil spills**.
- At individual level reduce carbon footprint by adopting a "**green**" lifestyle.
- **Have a global treaty** on banning single-use plastics and collaborated effort to clean up the ocean.

The world's oceans – their temperature, chemistry, currents and life - drive global systems that make the Earth habitable for humankind. **Over three billion people** depend on marine and coastal biodiversity for their livelihoods.

In this context, ocean health must be treated as a global issue and all nations should act in concert to implement **Sustainable Development Goal: 14 i.e. To conserve and sustainably use the oceans, seas and marine resources for sustainable development.**