



## Marine Pollution

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 CO<sub>2</sub> 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 km<sup>2</sup> 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.**

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