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Q8

What is oil pollution? What are its impacts on the marine ecosystem? In what way is oil pollution particularly harmful for a country like India?

UPSC Civil Services Mains 2023 · GS III · 10 marks · Environment and Conservation

Conservation, environmental pollution and degradation, environmental impact assessment.

Core demand of the question

- Define oil pollution
- State impacts on the marine ecosystem
- Explain why it is particularly harmful for India

Revision summary

Oil pollution is crude or fuel oil released into the sea from tankers, wells, ships and ports.

It blocks light, kills plankton and larvae, smothers mangroves and coral, and poisons birds and mammals.

India's risk is a long inhabited coast, Gulf-to-Asia tanker traffic, and offshore fields next to ports.

Small-scale fishers have little buffer when a landing centre closes.

The **Indian Coast Guard** runs the National Oil Spill Disaster Contingency Plan; prevention is cheaper than cleanup.

Introduction

Oil pollution is the release of crude or refined petroleum into the sea, estuary, or coast in amounts that harm life and livelihood. It comes from tanker accidents, offshore wells, ship operations, ports, and pipeline leaks. For India it sits on a **long coastline**, a busy **tanker lane**, and millions of **fishers**.

Body

What oil pollution is

- A **slick** of crude or fuel oil on the surface; dissolved fractions in the water column; tar balls on beaches; and chronic low-level discharge from shipping and ports.
- Large events are tanker wrecks and blowouts; the daily load is often **bilge, bunkering and port runoff**.

Impacts on the marine ecosystem

- Surface oil blocks **light and gas exchange**; it coats plankton, which are the base of the food web.
- **Fish eggs and larvae** in the upper water die or deform; adult stocks fall after a lag.

- **Mangroves, salt marsh and coral** smother; recovery takes years because oil sticks to sediment.
- **Birds and marine mammals** lose insulation and ingest oil while preening.
- Microbial breakdown raises **biochemical oxygen demand** and can create local hypoxia.
- Persistent **polycyclic aromatic hydrocarbons** cause long-term toxicity and taint seafood.

Why particularly harmful for India

- India has about **7,500 km** of mainland and island **coastline** and a large **Exclusive Economic Zone** in a crowded Indian Ocean tanker route from the Gulf to East Asia.
- **Mumbai High** and other offshore fields, plus major ports (Mumbai, Kandla, Chennai, Visakhapatnam, Kochi), concentrate spill risk next to dense coasts.
- **Sundarbans, Gulf of Mannar, Palk Bay, Gulf of Kachchh** and Kerala backwaters combine high biodiversity with fishing and salt-making.
- A very large **small-scale fishery** has almost no buffer if a slick closes a landing centre for weeks.
- Monsoon winds and currents can beach oil on **densely inhabited** strands quickly.
- The **National Oil Spill Disaster Contingency Plan**, with the **Indian Coast Guard** as central coordinating authority, is the response frame; prevention at ports and tankers remains the cheaper defence.

Flow diagram

Oil in sea -> Slick and tar
Slick and tar -> Plankton fish larvae
Slick and tar -> Mangrove coral birds
Slick and tar -> India coast tanker lane
India coast tanker lane -> Fisher livelihood

Conclusion

Oil pollution is petroleum in the sea at harmful levels. It smothers plankton, fish nursery grounds, mangroves, coral and birds. India is exposed because of its **tanker lane**, offshore oil, long inhabited coast and fisher dependence. Coast Guard contingency plans must sit with port and shipping discipline.

Facts & figures

Coastline

India's coastline is about 7,500 km including islands, with a large Exclusive Economic Zone.

NOS-DCP

National Oil Spill Disaster Contingency Plan: national framework for spill response.

Indian Coast Guard

Central coordinating authority for oil-spill response in Indian waters.

Mumbai High

Western offshore oil province; a spill here sits next to a dense metropolitan and fisher coast.

Tanker lane

Much Gulf crude to East Asia passes through the Indian Ocean and approaches Indian waters.

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