Water Pollution

Addⁿ of unwanted substances in a water body | source in such quantities that it becomes harmful for:

- the ecosystem
- human health

Types of water pollution

(1) Underground Water Pollution

→ Heavy metals in industrial areas

→ NO_3^- in agricultural areas

→ PO_4^{3-} " " "

⇒ has the highest probability of entering human food chain

- Direct Consumption
- Irrigation

(2) River pollution

→ Sewage (Human waste)

→ Agricultural wastes

→ Household wastes

→ Industrial discharges (effluents)

- → Enters human food chain
- → Irrigation → Crops → Humans
- → Enters seas & oceans

(3) Still water body pollution

(1) Ponds (2) Lakes

— mostly agricultural wastes esp. NO_3^- & PO_4^{3-}

— sewage

⇓

Eutrophication & Algal Bloom

(4) Marine Pollution

Sources

- River water
- Vessels & oil tankers
- mining & oil explorⁿ

⇓

Marine Ecosystem

Types of Sources

3

Point sources

1. Clearly identifiable source of pollutants
   - industrial unit
   - untreated sewage discharge

Non-point sources

→ Diffuse sources
→ A single source can not be identified
→ farm led water pollution.

Transboundary Sources

- Pollution by other upstream country

Major pollutants

(1) Abiotic pollutants

(a) Physical

Hot water released by nuclear power plants.

(b) Chemical

→ Heavy metals: Zn, Pb, Hg, Cu, As

→ Agricultural fert. residues: PO_4^{3-}, NO_3^-

→ Pesticide residues: PCB (Polychlorinated biphenyl substances)

→ Organic waste: from human settlements
from farms

(2) Biotic pollutants

→ Various **bacteria**: *V. cholera*
S. typhi
E. coli

Viruses:
↳ Hep A → Common jaundice
→ Polio

Protozoans: *Entamoeba histolytica*

Worms:
Eggs of Thread worm, Pinworm

Eutrophication & Algal Bloom

Eutrophication: High levels of nutrients in water (PO_4^{3-} and NO_3^-)

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vigorous algal growth (= Algal Bloom)

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Later, when the algae die → decomposition bacteria use up most O_2 (High BOD)

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Depletion of O_2

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Death of fishes etc.

Control Measures in India

Water Act, 1974

- to prevent & control the level of water pollution
- est. CPCB & SPCB

Ganga River Rejuvenation

- Ganga Action Plan, 1986
- National Ganga River Basin Authority, 2009
- Namami Gange, 2014