

TYPE OF LAKES Eutrophication

1) Eutrophic lakes Algae ↑↑ → (Algal bloom)
 organic matter + Nutrient rich
 O_2 की मात्रा कम ↓↓
 ↳ Microorganisms used

eg ⇒ chironomous larva
 ↳ Dal lake of Kashmir

2) Oligotrophic lakes
 ⇒ गहरी झीलें (Deep lakes)
 ⇒ (Nutrient matter + organic)

organic loading
 O_2 ↓↓ ⇒ ↓ organism Death

Accelerated Eutrophication / Cultural

* "Natural aging a lake may span thousands of years"
 (Industries + homes can radically accelerate the aging process)

$NO_3^- + PO_4^{3-} \Rightarrow$ (plant Nutrients)
 $DO \rightarrow$ dissolved oxygen ↓↓ BOD ↑↑ Animal ⇒ O_2 ↑↑ ↓↓ BOD ↑↑
 fish ⇒ X

(Heated)
Thermal waste water

- ⇒ electricity-generating units
 - ⇒ Thermal power plant
- } High temp.

Water → plants + fishes → Hot water

only after causing damage to the indigenous flora and fauna

Water pollution indicators

1) Daphnia, Trout fishes, Stonefly larva } Fresh water pollution indicators

2) ह्यूविफेस (Annelids), Chironomous larva
 E. coli, smear fungus, Sludge worms, Bladder worms
 ↳ 'polluted water'

"A case study of integrated waste water treatment"

Sewage

California → town of Arcata
(Northern coast of)

cleaning occurs in two stages

step ① a) The conventional sedimentation + filtering + chlorine treatments
lots of dangerous pollutants
dissolved heavy metals still remain

step ② b) the Biologist developed a series of six connected marshes over 60 hectares of Marshland.
plants + Algae + fungi + Bacteria
⇒ Neutralise, Absorb, assimilate of the pollutant

FOAM (Friends of the Arcata Marsh)

(Dry composting toilets)

★ ECOSAN ⇒

toilets →

→ Kerala

→ Sri Lanka

Sewage

\Rightarrow BOD \uparrow Bacteria O_2
DO \downarrow \Rightarrow pollution ka indicator

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“गंगा एक्शन प्लान”
+ “your action plan”

Sewage treatment

step 1

Primary treatment

filtration + sedimentation $\downarrow \downarrow$

filtration
“कूट-करण” (गिरे पत्थर)

“Primary Sludge”

primary effluent

primary settling tank

Biogas
{ CH_4
 H_2S
 CO_2

Digestion
 \leftarrow Fungi

Secondary treatment

Sewage + waste water
BOD \downarrow

secondary effluent

secondary settling tank

Bacteria (flocs) \downarrow sedim

Activated sludge

Anaerobic sludge digester

Bacteria variety
 \downarrow Anaerobic