

Course Code:MCC102A
Course Title:Environmental Studies

Lecture No: 14
Title: Water pollution
Course Leader : Ms. Priyanka N



Lecture-14

Intended Learning Outcomes

At the end of this lecture, students will be able to

- List scenarios related to water
- Define water pollution
- Identify different diseases caused by water pollution
- Explain sources and impacts of water pollution



Water Pollution



Ouch! What happened to my house?!

Water pollution

- Water pollution is the contamination of water bodies (e.g. lakes, rivers, oceans, aquifers and groundwater)
- This form of environmental degradation occurs when pollutants are directly or indirectly discharged into water bodies without adequate treatment to remove harmful compounds



Water Facts

- Only about 3% of surface water is fresh water
- One-fifth of the world population lack access to clean drinking water
- Over 2.6 billion people do not have adequate toilets, sewers or latrines
- Water-borne Diseases : Affect four billion people every year
- Earth's oceans are the most important carbon sink on the planet along with rain forests
- Demand for water will double in next 30 years
- Floods are most frequent disaster worldwide



Sources and impacts

Domestic wastes and sewage -- Sewage of municipalities, boats, ships, etc.

- It causes depletion of oxygen
- It produce foul Odour and makes the water oily and brownish.
- Increase the sludge which make the water unfit for recreational and industrial use
- It induces the growth of algal blooms



Surface Run-off

The pollutants present on the surface of land and fertilizers are washed down into water bodies.

- The nitrites enter the blood and combine with hemoglobin to form methaemoglobin
- The latter is unable to transport oxygen and gives rise to disease called as methaemoglobinaemia



Industrial Effluents

- They are industrial wastes which are either dumped in the soil or are allowed to pass into water bodies.
- The effluents contain heavy metals, Cyanides, Thiocyanates, Chromates, acids, Alkalies, organic solvent, etc.
- Mercury sources ; Coal, smelting of ores, paper/paint industry
- Mercury causes Minamata disease



Industrial Effluents

- Mina Mata disease is the name given to mercury toxicosis (poisoning) that developed in people who ate contaminated sea food take from Minamata Bay
- The disease results in crippling deformity



Lead pollution Sources

- Paints, smelters, chemical and pesticide industries, petrochemicals.
- Lead poisoning (also known as Plumbism, Colica Pictorum, Saturnism, Painter's colic) is a medical condition caused by increased levels of the heavy metal lead in the body.



Lead poisoning symptoms in children

- Developmental delay
- Learning difficulties
- Irritability
- Weight loss
- Sluggishness and fatigue
- Abdominal pain
- Vomiting
- Hearing loss



Lead poisoning symptoms in adults

- High blood pressure
- Abdominal pain
- Joint pains
- Muscle pain
- Declines in mental functioning
- Headache
- Memory loss
- Miscarriage or premature birth in pregnant women



Cadmium Pollution Sources

- Smelting and refining of metals, or from the air in plants that make cadmium products such as batteries, coatings, or plastics .
- Cigarettes are also a significant source of cadmium exposure Cadmium is used in industry as a protective coat for iron, copper and steel
- Eg: Telephone wires. Paint pigments
- Cadmium causes renal damage, emphysema and hypertension and Itai-Itai diseases



Symptoms

- Weak and brittle bones.
- Spinal and leg pain is common
- waddling gait often develops due to bone deformities caused by the cadmium.
- Other complications include coughing, anemia, and kidney failure, leading to death

Effects

- Effects seen on liver and kidney mainly.
- Organs of toxicity:- Central Nervous System, Kidney



Amoebiasis

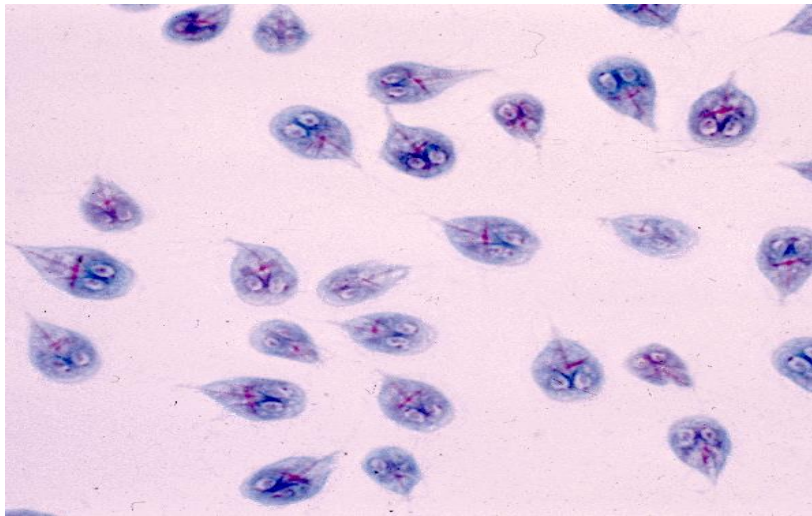
- Amoebiasis, sometimes spelt amebiasis, is one of those common diseases, caused by a parasite which infects the bowel causing a type of gastroenteritis infection.

- This disease generally occurs in young to middle aged adults who ingest contaminated food or water containing the *Entamoeba histolytica* microorganism



Giardiasis

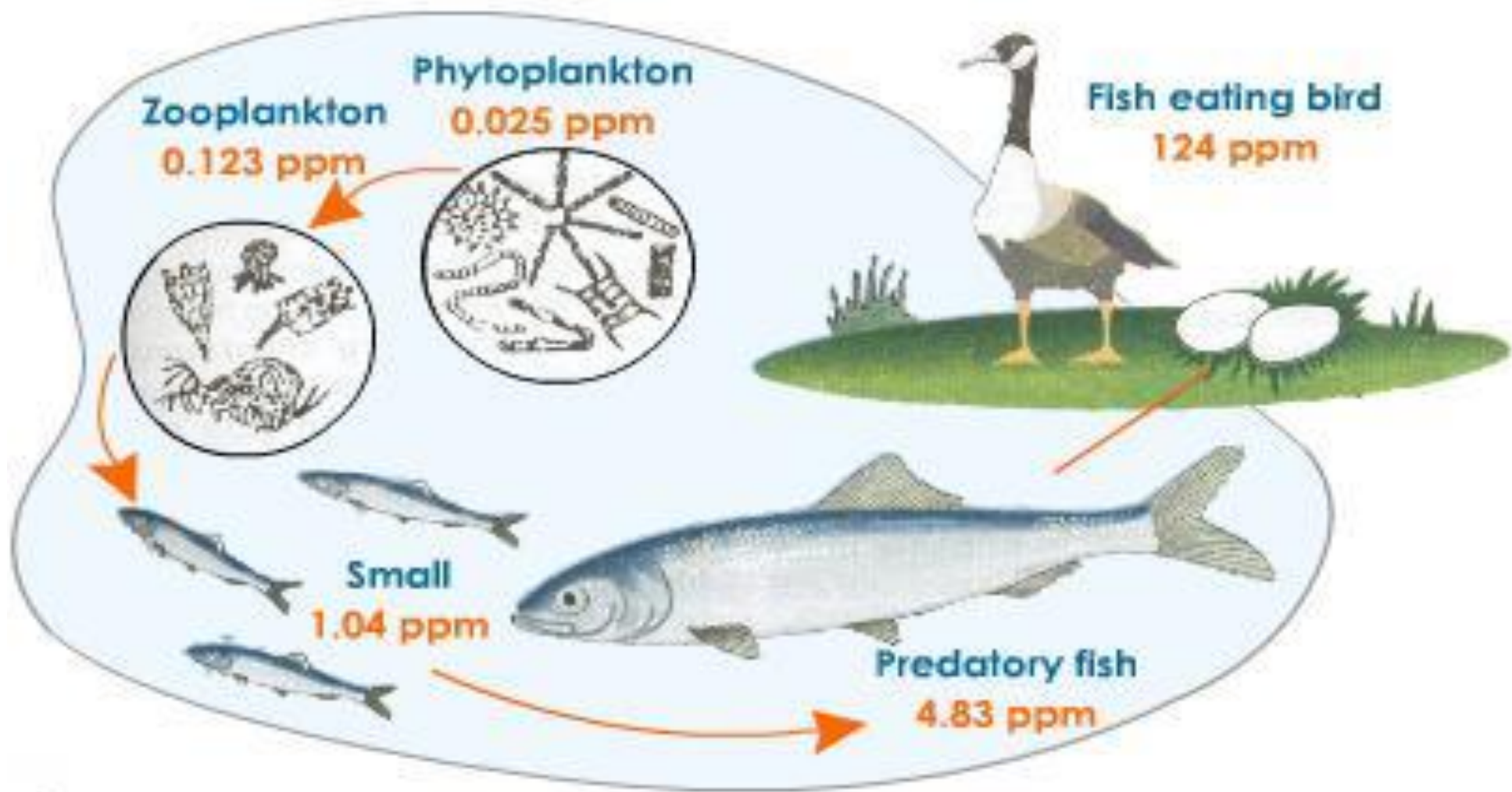
- Giardiasis (gee-ar-die-a-sis with a soft "G") is an infection of the small intestine that is caused by the parasite, *Giardia lamblia*
- The most common manifestations of Giardiasis are Diarrhea and abdominal pain, particularly cramping; however, diarrhea is not invariable and occurs in 60% to 90% of patients



Pesticides pollution

- They are discharged to the water body through the agricultural run-off.
- Chlorinated Hydrocarbon, organo pesticides and inorganic pesticides are poisonous and causes sweating, salivation, nausea, vomiting , diarrhea and muscular tremors for the people





Process of Biological Magnification;
DDT concentrations increase in organisms along the food chain

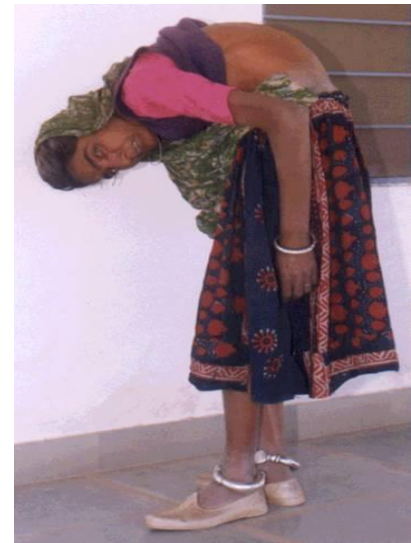
Fluoride Pollution

- Fluorine is essential for the normal mineralization of bones and formation of dental enamel.
- About 96 % of fluoride is found in bones and teeth.
- Water resources near granitic rocks containing more than 2.5 ppm cause Fluorosis
- The cause of this diseases mainly due to consumption of high quantity of fluoride through water, food, cosmetic like fluoridated tooth paste, drugs and inhaling air contaminated with fluoride in industrial environment.



Fluoride Pollution

Fluorosis was first detected in India among cattle by the farmers of Andhra Pradesh State during early 1930.



Water Pollution Solutions

- Keep lakes clean
- Take your used motor oil to a drop off place
- Use latex paint instead of oil and rinse your brushes in the sink rather than the yard
- Fill a spray bottle with soapy water instead of bug spray
- Plant trees to prevent soil erosion
- Keep litter, pet waste, leaves, and grass clippings out of gutters and storm drains.



Summary

- Water pollution is the contamination of water bodies (e.g. lakes, rivers, oceans, aquifers and groundwater)
- Amoebiasis, sometimes spelt Amebiasis, is one of those common diseases, caused by a parasite which infects the bowel causing a type of gastroenteritis infection
- While the foremost necessity is prevention, setting up effluent treatment plants and treating waste through these can reduce the pollution load in the recipient water

