

UNIT II - WATER RESOURCES AND ENVIRONMENT MICROBIOLOGY

2.4 CONFLICTS OVER WATER

1. What are Water Conflicts?

- Water conflicts occur when different groups or regions compete over access to water resources.
- Arise due to limited water availability and increasing demand.

2. Causes of Water Conflicts

1. Scarcity:
 - Uneven distribution of water resources.
 - Overuse, pollution, and climate change reduce water availability.
2. Population Growth:
 - Increasing demand for water for drinking, agriculture, and industries.
3. Agriculture and Industry:
 - Over-extraction of water for irrigation and factories.
4. Shared Water Bodies:
 - Rivers, lakes, and aquifers shared between countries or states lead to disputes.
 - Example: Ganges-Brahmaputra (India and Bangladesh).
5. Dams and Diversions:
 - Large dams or diversions reduce water flow downstream, affecting others.
6. Pollution:
 - Contaminated water reduces usable water, causing conflicts.

3. Examples of Water Conflicts

1. International:
 - Nile River: Ethiopia, Sudan, and Egypt dispute over the Grand Ethiopian Renaissance Dam.
 - Jordan River: Israel, Jordan, and Palestine compete for water.
2. National/State:
 - Cauvery Water Dispute (India): Karnataka and Tamil Nadu fight over river sharing.
 - Colorado River (USA): Disputes among states over allocation.
3. Local:
 - Conflicts between farmers and urban areas over groundwater extraction.

4. Impacts of Water Conflicts

1. Economic Loss:
 - Affects agriculture, industries, and livelihoods.
 2. Social Tensions:
 - Protests, violence, and strained relations between communities.
 3. Environmental Damage:
 - Overextraction and mismanagement harm ecosystems.
 4. Political Instability:
 - Conflicts between countries or regions can escalate.
-

5. Solutions to Water Conflicts

1. Efficient Water Use:
 - Promote conservation, rainwater harvesting, and recycling.
2. Water Treaties:
 - Agreements for fair water sharing (e.g., Indus Water Treaty).
3. Integrated Water Management:
 - Holistic planning considering all users and ecosystems.
4. Community Participation:
 - Involve locals in managing and conserving water.
5. Technology:
 - Desalination, efficient irrigation, and wastewater treatment.
6. Dispute Resolution Mechanisms:
 - Establish laws and courts to mediate conflicts peacefully.

2.4.1 WATER AVAILABILITY AT GLOBAL LEVEL, SURFACE LEVEL AND GROUND LEVEL SOURCES

1. Global Water Availability

- Earth's Water Distribution:
 - 97% in oceans (saline, not drinkable).
 - 3% is freshwater:
 - 70% in glaciers and ice caps (not easily accessible).
 - 30% in groundwater.
 - Less than 1% is surface water (rivers, lakes, etc.).
-

2. Surface Water Sources

- Definition: Water found on the Earth's surface.
- Examples:
 - Rivers: Used for drinking, irrigation, and power (e.g., Nile, Amazon).
 - Lakes: Natural reservoirs (e.g., Lake Victoria, Great Lakes).
 - Reservoirs: Man-made storage behind dams.
 - Ponds: Small-scale local water storage.

- Availability:
 - Uneven distribution; some regions have abundant rivers, while others are arid.
 - Seasonal variation due to rainfall patterns.
-

3. Groundwater Sources

- Definition: Water stored underground in soil and rock layers.
 - Examples:
 - Aquifers: Underground layers that store and transmit water.
 - Unconfined Aquifers: Close to the surface; recharge easily.
 - Confined Aquifers: Deeper and harder to recharge.
 - Wells and Boreholes: Extract groundwater for use.
 - Availability:
 - Found globally but more abundant in regions with permeable soil and rocks.
 - Over-extraction can lead to depletion and land subsidence.
-

4. Challenges in Water Availability

- Surface Water:
 - Pollution from industries and agriculture.
 - Drying rivers due to overuse and climate change.
 - Groundwater:
 - Over-extraction lowers water tables.
 - Contamination from chemicals and saltwater intrusion.
 - Global Issues:
 - Uneven distribution leads to water scarcity in arid regions.
 - Climate change disrupts water cycles, affecting availability.
-

5. Importance of Sustainable Use

- Conservation: Avoid wastage of surface and groundwater.
- Recharge Efforts: Rainwater harvesting to replenish aquifers.
- Pollution Control: Prevent contamination of water sources.
- Technology: Desalination and efficient irrigation to improve access.