WATER RESOURCE

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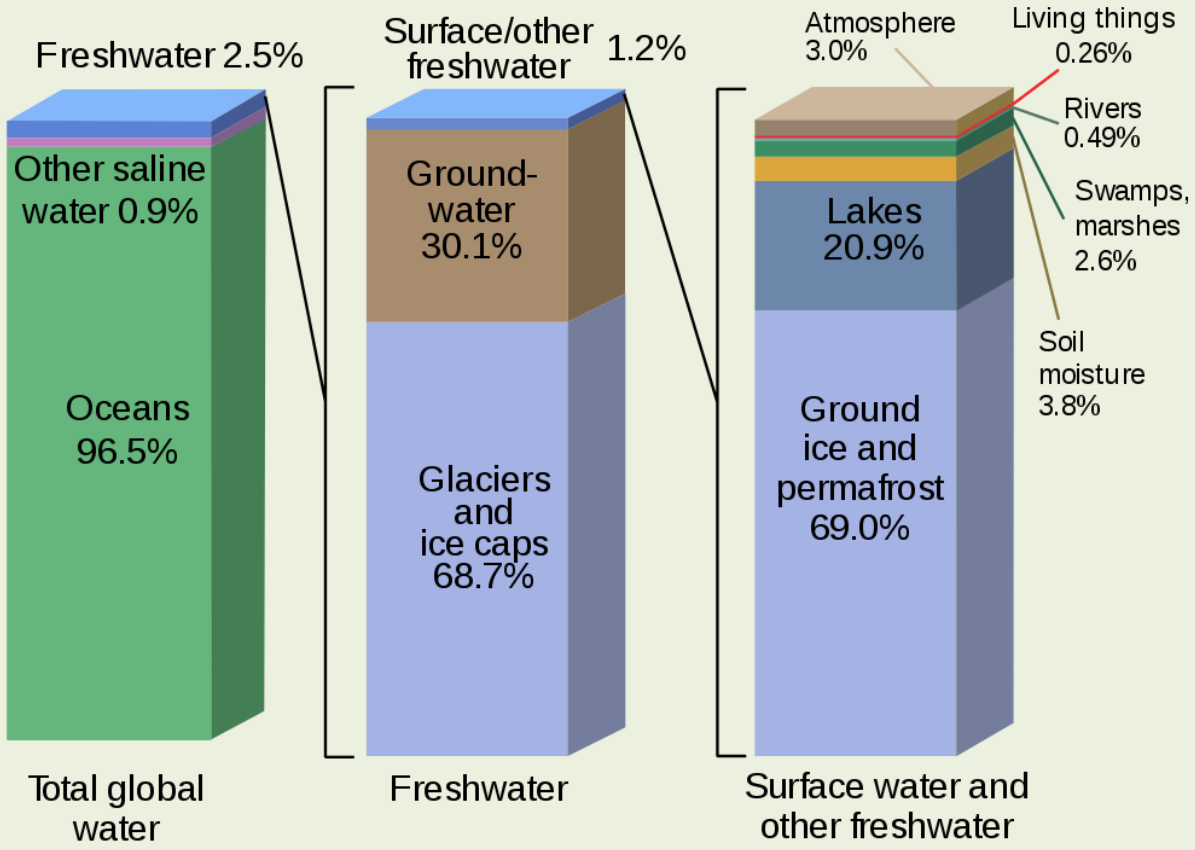
Water Resources

- Water availability



Properties of water and its effects

- It has the highest specific heat, due to which it warms up and cools down very slowly without causing shocks of temperature jerks to the aquatic life.
- It has a high latent heat of vaporization Hence, it takes a huge amount of energy for getting vaporized. That's why it produces a cooling effect as it evaporates.
- It is an excellent solvent for several nutrients. Thus, it can serve as a very good carrier of nutrients, including oxygen, which are essential for life. But, it can also easily dissolve various pollutants and become a carrier of pathogenic microorganisms.
- Due to high surface tension and cohesion it can easily rise through great heights through the trunk.
- It has an anamolous expansion behaviour. It is because of this property that even in extreme cold, the lakes freeze only on the surface. Being lighter the ice keeps floating, whereas the bottom waters remain at a higher temperature and therefore, can sustain aquatic organisms even in extreme cold.

Importance of water

- Water is the basic component of every living cell.
- Water is one of the input required for agriculture.
- Industries consume water for cooling, heating and other processes.
- Electricity generation
- Waterways are used for inland transport.
- Water may be used for obtaining common salt.
- Water provides habitat to aquatic flora and fauna.

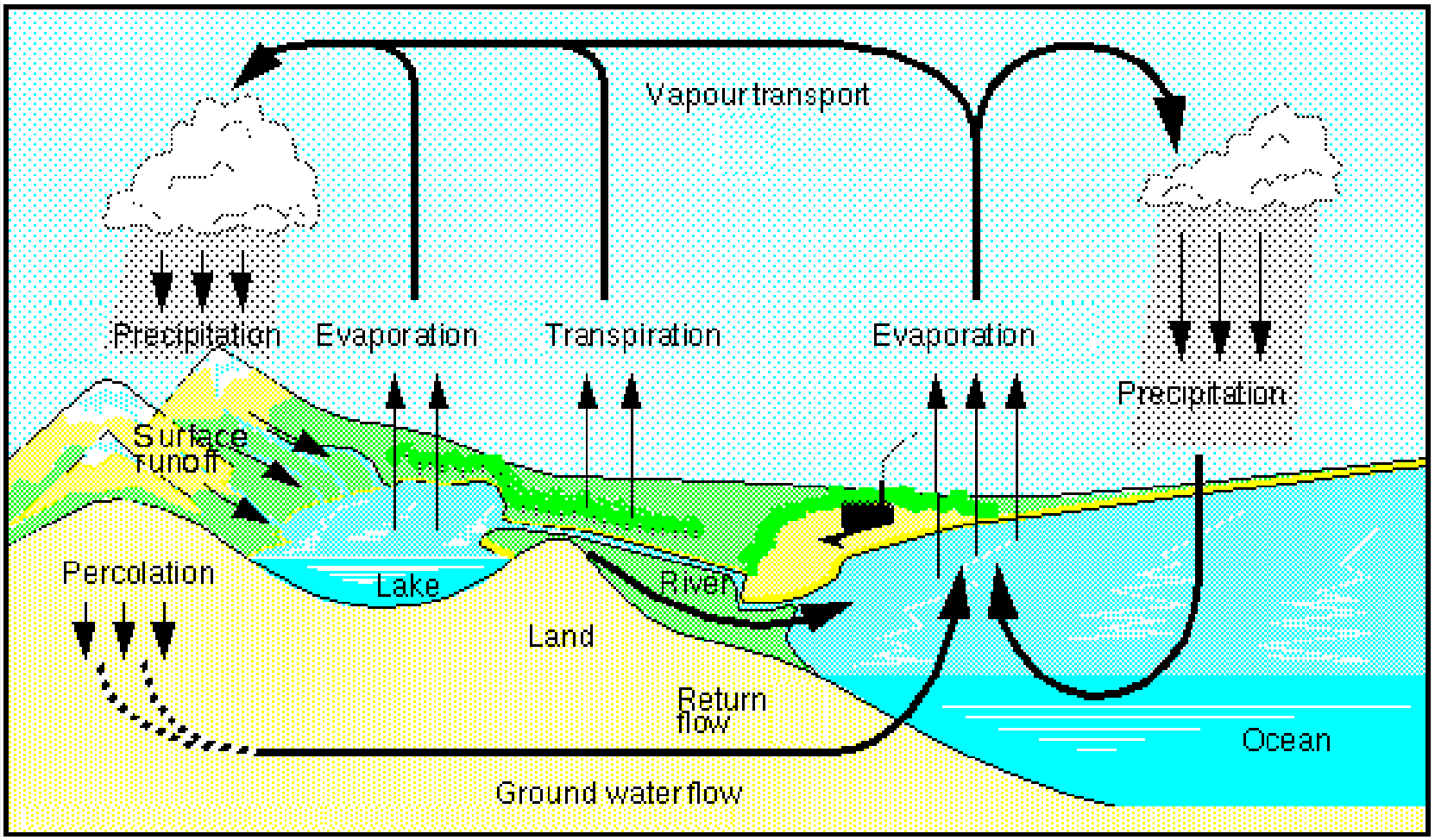
Water usage

- Agriculture – 70%, Municipal – 11%, Industrial – 19%
- Average requirement is 20 – 40 liter per head per day (Twice of the usage 50 years ago)
- About 30% of fresh water is used by US (4% of world population) where, middle east (5% of world population use 1% of fresh water).
- More than 1 billion people don't have fresh water supply.
- Presently 31 countries facing water scarcity.
- By 2025, 48 countries will face water shortage (including India).
- By 2050, 4 billion people will suffer water shortage.

Conflict over water

- Tigris and Euphrates conflict (Turkey – Syria – Iraq)
- Nile conflict (Egypt – Ethiopia – Sudan)
- Jordon river conflict (Israel - Lebanon – Jordon – Palestine)
- Aral sea conflict (Kazakhstan – Uzbekistan – Tajikistan – Turkmenistan)
- Indus water treaty (Jhelum - Chenab: Pakistan, Satluj, Ravi, Beas: India)
- Kaveri dispute
  - Origins in brahmagiri hill (Karnataka)
  - Then enters Tamil Nadu
  - First agreement in 1892
  - Mettur dam was built in 1970 – Tamil Nadu raised objection
  - 1991 a tribunal is formed – Karnatake opposed
- Satluj-Yamuna Link (SYL) canal dispute (Punjab – Haryana)

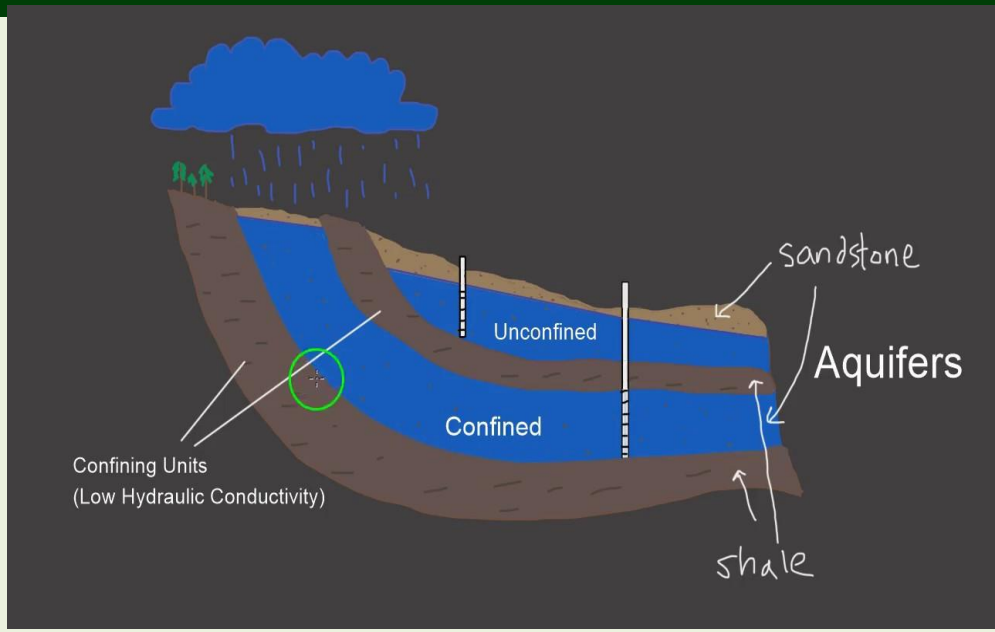
Water cycle



This PPT should be used as reference only. Reading books (mentioned in syllabus) is mandatory for the preparation of the examinations.

Source of water

- Surface water
  - Rainfall, snow
- Ground water
  - Confined aquifer
  - Unconfined aquifer



- Aquifer
  - An aquifer is a body of porous rock or sediment saturated with groundwater. Groundwater enters an aquifer as precipitation seeps through the soil. It can move through the aquifer and resurface through springs and wells.

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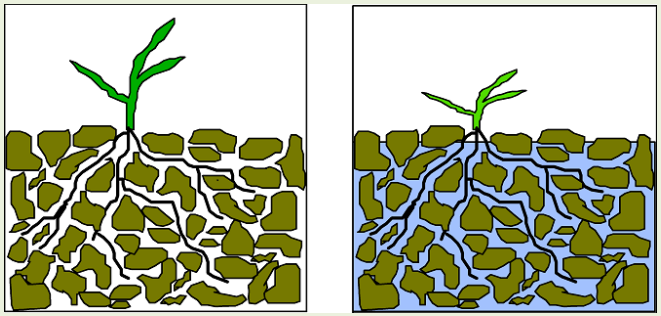
Over exploitation of ground water

- Ground subsidence
- Lowering water table
- Reduced surface water flow
- Increased power consumption
- Water logging
- Ground water pollution



Water calamities (Flood)

- Types
  - Flash flood: Heavy rainfall, dam failure, river obstruction
  - River flood: Precipitation over large catchment area, melting of snow
  - Coastal flood: Hurricanes, tropical cyclone, tsunami
- Causes
  - Upslope factors
    - Melting of snow
    - Intense rainfall
    - Time of concentration
  - Downslope factors
    - Dams and reservoirs
    - Tides
    - Natural events: Tsunami, Storm

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Water calamities (Flood)

- Effects
  - Negative effects: Loss of life and property, damage to crops, damage to power transmission, water-borne diseases, difficulty in health facilities, decline in tourism
  - Positive effects: Distribution of nutrients, relocation of fishes

Water calamities (Drought)

- Types
  - Meteorological drought: Less rainfall
  - Hydrological drought: Low stream flow
  - Agricultural drought: Low soil moisture
- Causes
  - Dry season
  - Climate change
  - Erosion and human activity

Water calamities (Drought)

- Effects
  - Decrease in crop growth
  - Dust storm
  - Famine and mal nutrition
  - Habitat change
  - Mass migration
  - Reduced electricity
  - Wild fire

Dams

- Benefits
  - Electricity generation
  - Employment
  - Irrigation water supply
  - Drinking water supply
  - Reduction in famine
  - Flood control

Dams

- Problems
  - Displacement of tribal people
  - Loss of forest
  - Changes in aquatic environment
  - Waterlogging near reservoir
  - Breeding of vectors
  - Microclimatic changes
  - Reduced water flow
  - Flash flood
  - Salt water intrusion
  - Sediment carrying nutrients get deposited in reservoir.
  - Outbreak of vector-borne diseases like malaria.

Thank You

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