

BSc. (H) Botany Sem- IV
CC- 9 (Ecology)

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Biogeochemical Cycles

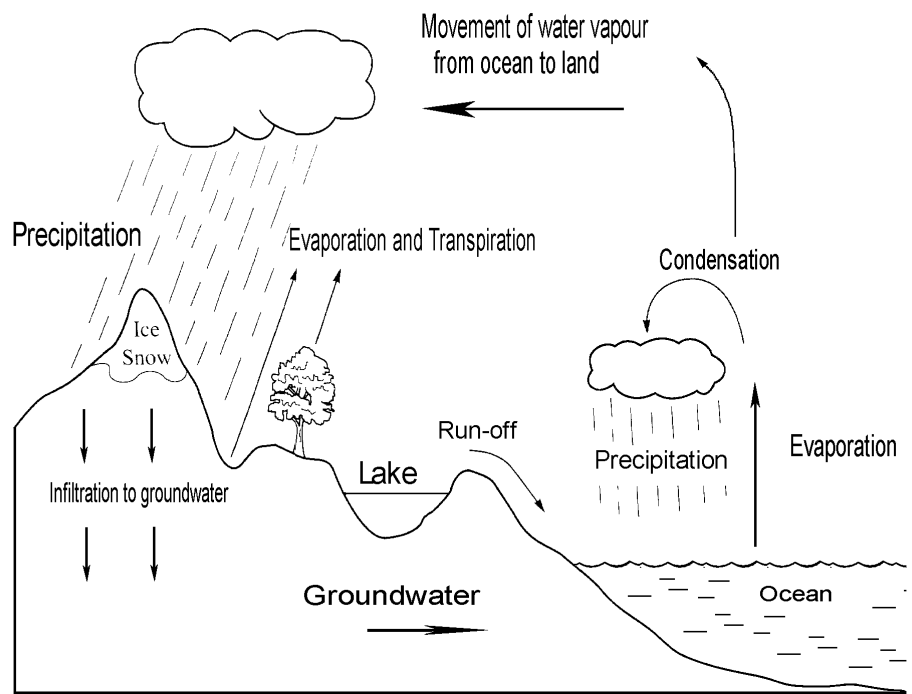
describe the flow of **essential elements** from the environment through living organisms and back into the environment.

There are three types of biogeochemical cycles

- **Hydrological cycle / Water cycle**
- **Gaseous Cycles**
- **Sedimentary Cycles**

Hydrological Cycle

1. **Reservoir** – oceans, air (as water vapor), groundwater, lakes and glaciers; evaporation, wind and precipitation (rain) move water from oceans to land.
2. **Assimilation** – plants absorb water from the ground, animals drink water or eat other organisms which are composed mostly of water.
3. **Release** – plants transpire, animals breathe and expel liquid wastes.

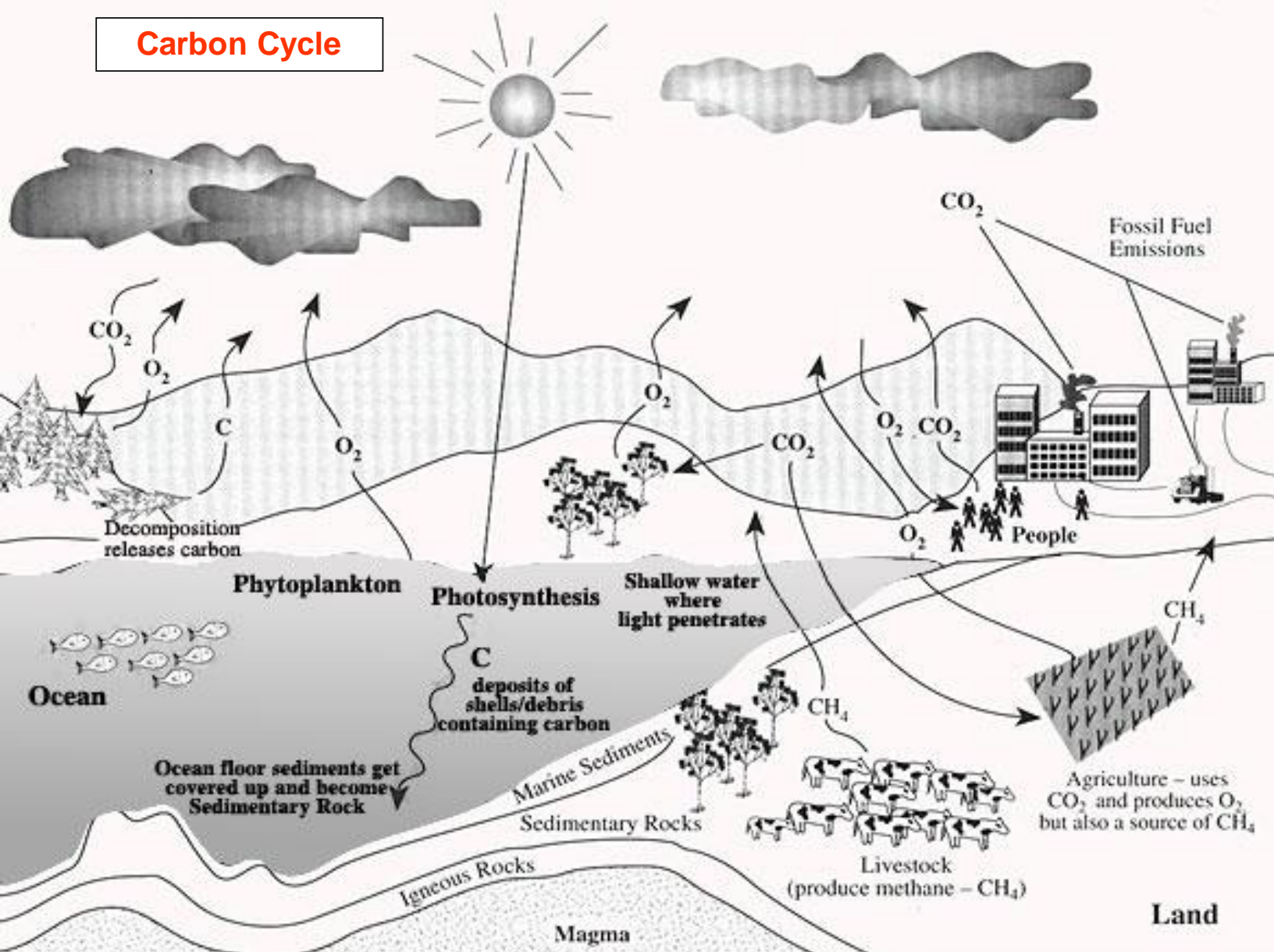


Carbon Cycle

(carbon is required for building organic compounds)

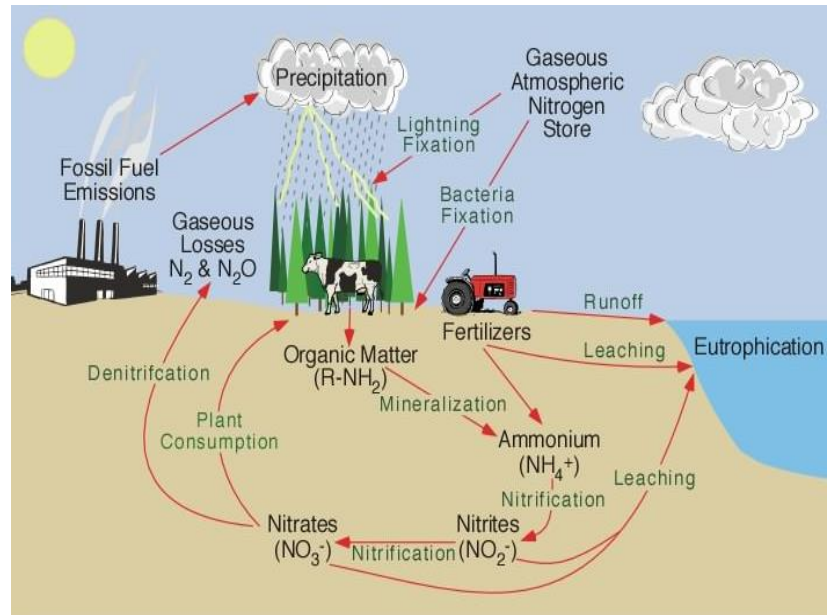
1. **Reservoir** – atmosphere (as CO_2), fossil fuels (oil, coal), durable organic materials (for example: cellulose).
2. **Assimilation** – plants use CO_2 in photosynthesis; animals consume plants.
3. **Release** – plants and animals release CO_2 through respiration and decomposition; CO_2 is released as wood and fossil fuels are burned.

Carbon Cycle



Nitrogen Cycle

1. **Reservoir** – atmosphere (as N_2); soil (as NH_4^+ or ammonium, NH_3 or ammonia, NO_2^- or nitrite, NO_3^- or nitrate)
2. **Assimilation** – plants absorb nitrogen as either NH_4^+ or as NO_3^- , animals obtain nitrogen by eating plants and other animals.
3. **Release** – Denitrifying bacteria convert NO_3^- back to N_2 ; detritivorous bacteria convert organic compounds back to NH_4^+ ; animals excrete NH_4^+ , urea, or uric acid.



Phosphorus Cycle

(Phosphorus is required for the manufacture of ATP and all nucleic acids)

1. **Reservoir** – erosion transfers phosphorus to water and soil; sediments and rocks that accumulate on ocean floors return to the surface as a result of uplifting by geological processes
2. **Assimilation** – plants absorb inorganic PO_4^{3-} (phosphate) from soils; animals obtain organic phosphorus when they eat plants and other animals
3. **Release** – plants and animals release phosphorus when they decompose; animals excrete phosphorus in their waste products

Phosphorus Cycle

