UPSC Civil Services Examination

UPSC Notes [GS-I]

Topic: Nitrogen Cycle [Geography Notes For UPSC]

Nitrogen

- Nitrogen is a chief constituent of the bodies of living organisms as the Nitrogen atoms are found in all proteins and DNA
- It is a common limiting nutrient in nature and agriculture.
- It exists in the atmosphere as N_2
- Usually, nitrogen is usable only after it is fixed.
- Nitrogen fixation is a process where bacteria convert N_2 into ammonia, a form of nitrogen usable by plants.
- Only a few types of organisms like and blue-green algae and certain species of soil bacteria are skilful of consuming nitrogen directly in its gaseous form.
- When animals eat the plants, they obtain usable nitrogen compounds.
- A limiting nutrient is a nutrient that's in shortest supply and limits growth.
- When fertilizers comprising phosphorous and nitrogen are transported in a runoff to rivers and lakes, they can result in blooms of algae. This is called eutrophication.

The Nitrogen Cycle

- The nitrogen cycle is the biogeochemical cycle.
- Nitrogen is a main constituent of the atmosphere encompassing about 75% of the atmospheric gases.
- It is also a vital constituent of different organic compounds such as the vitamins, nucleic acids, pigments, amino acids, and proteins.
- The major source of free nitrogen is the action of soil micro-organisms and associated plant roots on atmospheric nitrogen found in pore spaces of the soil.

Fixation

- Fixation is the primary step in the process of converting nitrogen, usable by plants.
- Normally, bacteria change nitrogen into ammonium.

Nitrification

- This is the process by which ammonium converted into nitrates by bacteria.
- The plants absorb these Nitrates.

Assimilation

- Through assimilation only plants get nitrogen.
- They absorb nitrates from the soil into their roots.
- Then nitrogen gets used in chlorophyll, nucleic acids, and amino acids.

Ammonification

- This is part of the decaying process.
- When a plant or animal expires, decomposers such that bacteria and fungi turn the nitrogen back into ammonium so it can go back into the nitrogen cycle.

De-nitrification

- Surplus nitrogen in the soil gets put back out into the air.
- There are special bacteria that execute this job as well.