

Abiotic Components

Abiotic components of an ecosystem include all chemical and physical elements i.e. non-living components. Abiotic components can vary from region to region, from one ecosystem to another. They mainly take up the role of life supporter. They determine and restrict the population growth, number, and diversity of biotic factors in an ecosystem. Hence, they are called limiting factors.

Climatic Factors: Elements like temperature, sunlight, wind, rainfall, and humidity.

Temperature

- Generally, plants will develop more rapidly in warmer temperatures.
- Organisms need to maintain the internal temperature in order to survive.
- Temperature variation affects the distribution of organisms in terrestrial habitats.
- High and low temperatures lead to the organism's inactivity.
- There are different temperature zones in the different parts of the earth generally referred to as tropical, subtropical, temperate and alpine.
- The major effect of temperature is on the enzymes controlling metabolic reactions.
- However, many organisms show adaptability to changes in temperature.
- It is partly due to temperature that migrations occur.
- In the same way, Global warming is causing disturbance to the stability of an ecosystem.

Humidity

- Humidity reflects the amount of water vapour in the atmosphere.
- Humidity determines the amount of water an organism loses in the air.
- For example, in a desert ecosystem, only plants and animals adapted to live in low humidity will survive and retain as much water as possible.

Light

- The sun is the main source of energy for all forms of life on earth.
- Green plants and photosynthetic bacteria use sunlight to manufacture their food.
- In aquatic ecosystems, plenty of light is available to plants and animals in the euphotic zone.

- No light is available in the aphotic zone.

Edaphic Factors: Related to the soil, including soil type, topography, minerals, and pH.

Soil

The type of soil, pH, amount of water it holds, available nutrients, etc., determine what type of organism can successfully live in or on the soil.

Atmospheric Pressure

- Atmospheric pressure is the pressure of the atmosphere on the Earth's surface.
 - Atmospheric pressure varies with altitude.
 - It indirectly affects the ecosystem as it affects the amount of Oxygen available for respiration and of carbon dioxide for photosynthesis.
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- **Inorganic Substances:** Essential nutrients and gases such as water, oxygen, carbon dioxide, nitrogen, and phosphorus.
 - The distribution of living organisms in a particular habitat may be affected by inorganic substances.
 - These include various factors like Water, Oxygen, Carbon Dioxide and Nitrogen, among others.

Water

- In defining the distribution of organisms, water is perhaps the most important factor, as every organism requires water to varying degrees for its survival and growth.
- Example: Species density is high in the tropics and low in deserts because of the distribution of water.

Oxygen

- All organisms, whether terrestrial or aquatic, need oxygen for various reasons, including respiration and photosynthesis.

- The atmosphere has a 21 per cent oxygen concentration.

Carbon Dioxide

- Carbon dioxide is an important part of photosynthesis.
- Also, the dissolution of Carbon dioxide in the oceans defines their pH level, thus defining the zone in which aquatic organisms can live.
- With ocean acidification, corals cannot absorb the calcium carbonate which they need to maintain their skeletons thus the stony skeletons that support corals and reefs will dissolve.

Nitrogen

- Nitrogen is a component of Urea and Amino Acids.
 - Amino Acids are the fundamental building blocks of all proteins.
 - Proteins comprise not only structural components such as muscle, tissue, and organs but also enzymes and hormones that are essential for the functioning of all living things.
 - Thus, Nitrogen is essential for all living organisms.
- **Organic Substances:** Materials like proteins, carbohydrates, and lipids that are formed when inorganic nutrients are taken up and converted by living organisms.
 - These substances make a link between the biotic and abiotic components as they are the main building blocks of living systems.
 - These substances include Carbohydrates, proteins and lipids, among others.

Protein

- Proteins are of great nutritional value and are present in all living organisms.
- They are responsible for almost every task of cellular life, including cell shape and inner organisation, product manufacture and waste cleanup, and routine maintenance.
- A protein molecule consists of many amino acids joined together to form long chains.

Carbohydrates

- Carbohydrates are the primary source of energy for animals as well as plants, and thus its an essential compound of all organic lives.
- During photosynthesis, plants use the sun's energy and carbon dioxide to produce carbohydrates.

Lipids

- These are the molecules that make up the building blocks of the structure and function of living cells and they contain hydrocarbons.
- Examples of lipids include oils, fats, waxes, hormones, certain vitamins, and most of the non-protein membrane of cells.