Components of Ecosystem
3rd semester/paper-303

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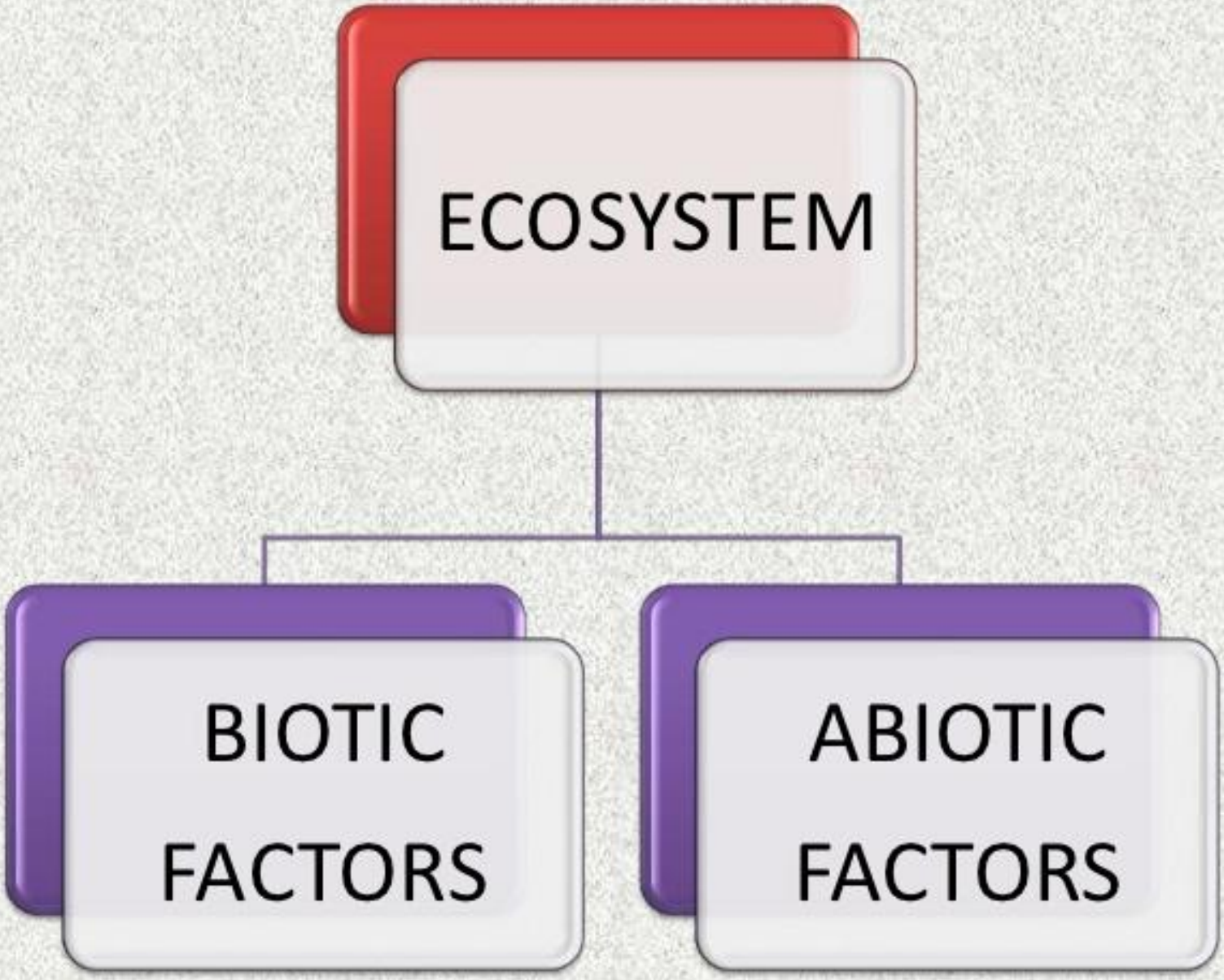
Ecosystem

- An **ecosystem** is a biological environment consisting of all the living organisms or **Biotic component,** in a particular area, and the nonliving, or **Abiotic component** such as air, soil, water and sunlight with which the organisms interact


ECOSYSTEM
BIOTIC FACTORS
ABIOTIC FACTORS

Abiotic Factors

Non living components of an ecosystem

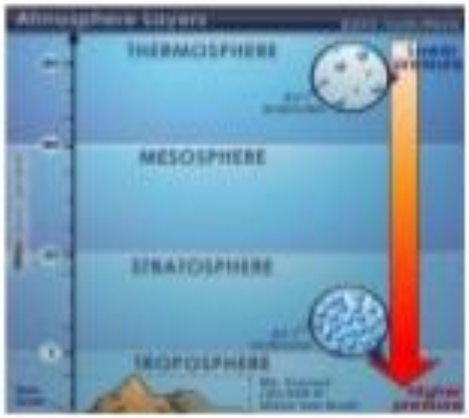
Abiotic Factors

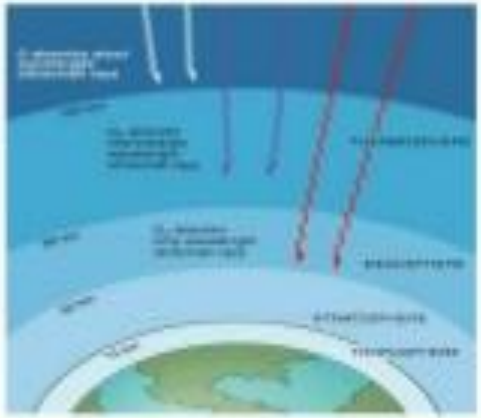
- The structural components of nonliving arena
- The largest ecosystems is the "Biosphere"
- The abiotic portion of the biosphere consists of three parts .They are the,
  - Atmosphere (Air)
  - Hydrosphere (The water)
  - Lithosphere (The solid earth)

- Each of these three fundamental units of the ecosystem has properties of its own, which determine its role in the total ecosystem.

1. The atmosphere

- The atmosphere is an ocean of air which blends in to outer space of the earth and reaches over 560 kilometers (348miles) from the surface of the earth.
- This can be differentiated on the basis of temperature in to four layers. They are the Troposhere,The sratosphere,The mesophere and The thermosphere.
- In relation to the ecosystem the most important layer is the troposphere; which is the lowest stratum. It is roughly 10km in thickness and is usually thicker in equatorial regions than at the poles.
- The ozone layer in the stratosphere, absorbs ultra violet radiation, thus preventing it from reaching the surface of the earth.





Source:www.theozonehole.com

The role of troposphere

- All organisms obtain their requirement of gasses from the troposphere which is composed of 78% Nitrogen, 21% Oxygen, and 0.03% Carbon dioxide, and less of others such as Hydrogen, Helium and Methane.
- determining the weather phenomena.
- Formation of the clouds.The dust particles serves as nuclei around which water vapour condense. Such droplets of water accumulate to form the clouds.
- Changes in troposphere results in changes of climatic factors such wind and ocean currents.
- These currents of air and water in turn strongly influence the distribution of precipitation, both in time and in space.
- Water in the troposphere is warmed both by the solar energy and the heat radiating from the earth's surface. part of this heat is radiated back to earth. this leads to the retention of heat, keeping the earth relatively warm even at night when there is temporarily no flux of solar energy.

2.The Hydrosphere

The role of water

- Water is one of the most unusual natural compounds found on earth. It is essential to all life as both and internal and an external medium.
- Water is one of the main agents in the weathering of rocks which is necessary for the formation of soil, and erosion, deposition of sediment, the process that shape land forms.
- Water covers 71% of the earth's surface and is the medium for several different ecosystems.
- The water molecule has polar covalent bonds and thus causes ionic compounds to dissociate and dissolve in it.-The universal solvent.

- Water is the main medium through which chemical constituents are transported in ecosystems.
- Acts as a medium through which constituents can pass from the abiotic portion of the ecosystem in to the biotic portion.
- Water can absorb relatively large amounts of heat without greatly changing its temperature.
- The anamoulus expansion properties of water, eg: expansion of water when cooled beyond 4°C, result in which is less denser than water.
- High cohesive property.
- High surface tension.

Water

3. The lithosphere

- The lithosphere can be divided into three main components. Rocks, Sediments and Soil .
- Rocks can be defined as consolidated units of the earth's crust which are formed of minerals that have come together by hardening.
- The role of rocks include facilitating storage and movement of ground water. serve as sources of mineral constituents of sediment and soils.
- Weathering
- The distribution and nature of rocks determine the types and distribution of ecosystems.

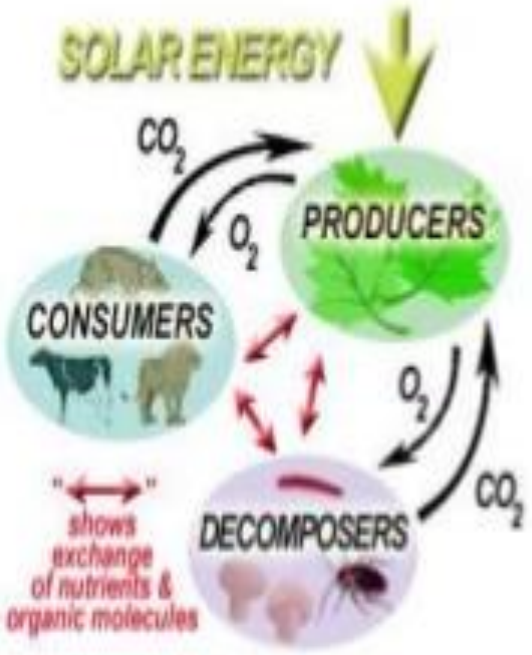
- Sediments can be defined as rock fragments that may not be chemically altered by weathering.
- Soils consists of complex mixture of rock fragments, highly altered minerals, organic debris and living organisms.
- The importance of soil to the ecosystem lies in that they are the source of almost all nutrients and much of the water available to the organisms in terrestrial ecosystems.
- Soils are the medium for the detritus food chain, and support all organisms.

Biotic factors

Living components of an ecosystem

Biotic factors

- The biotic/living components of the ecosystem can be classified as flora and fauna based on their structure and other features.
- Functionally the living organisms can be classified as,
  - Producers
  - Consumers
  - Decomposers



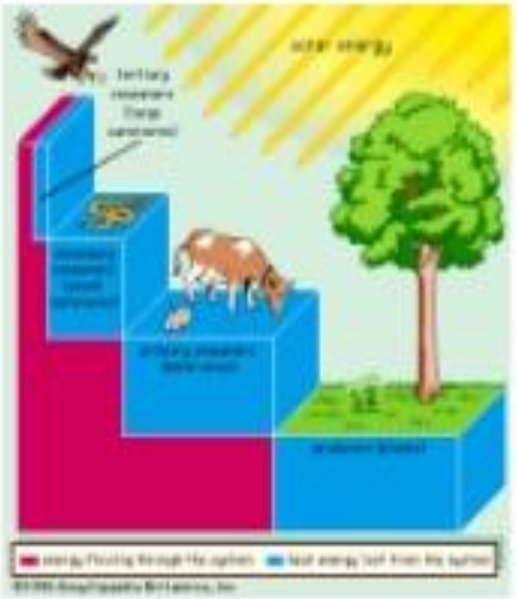
1.Producers

- Producers are called as autotrophs .
- They can be of two main types; Photosynthetic forms, chemosynthetic forms.
- The photosynthetic forms are green plants that covert solar energy into chemical energy-Photosynthesis
- The producers therefore include green plants, photosynthetic bacteria and chemosynthetic bacteria.
- On land photosynthesis is carried out mainly by higher plants.
- In the sea the main photosynthetic organisms are the microscopic algae, planktons, diatoms and the flagellates.

2.Consumers

- Heterotrophic organisms are unable to synthesize their own food and hence obtain them by feeding on other organisms.
- The decomposers also fit in to this definition.
- The consumers are classed into various categories based on the nature of the food they consume. Such as Herbivores, Carnivores and Omnivores
- And also be classified as,

  - Primary consumers
  - Secondary consumers
  - Tertiary consumers



Primary consumers

- Primary consumers are herbivores, which feed on plant material.
- The amount they consumed are commonly referred to as the consumption rate. Based on these the ecosystem can be grouped as high rated, low rated.
- Primary consumers can be grazers or browsers.

Plant eating insect

Grazing cattle

Secondary consumers

- Heterotrophic animals which feed on herbivorous organisms or primary consumers are termed as the secondary consumers.
- These animals therefore carnivrous.

Fox

Tertiary consumers

- These are carnivorous heterotrophs that feed on other carnivorous animals.
- Top carnivorous are few in number.
- Most birds of pray and cats fit this category.

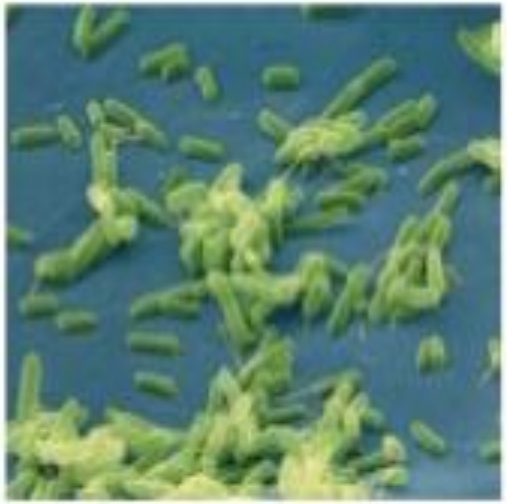
Hawk

Leopard

3.Decomposers

- Decomposers feed on dead meterial,and that is first broken down before being absorbed.
- The detritivores ,plays the initial role of breaking up large bodies in to small particles.
- Decomposers are mainly fungi and bacteria

Fungus



Bacteria