



INTRODUCTION TO ECOLOGY

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Concept of Ecology :

- Important branch of science also called as environmental biology.
- Derived from two Greek words i.e Oikos means house & Logos means study
- The studies of inter- relationship of organisms with their physical and biotic environment called ecology
- Term Ecology defined as a branch of science which deals with the total relationship of organisms to both their organic and inorganic environment
- Ecology can be divided into 1) Autoecology
2) Synecology

Environment :

- The conditions that influence and affect the development and sustainability of life of all organisms present on the earth.
- It is an immediate surrounding of living organisms in which it lives and operates.
- Organisms and environment are interrelated and interdependent.
- Any change in the environment affects the living organisms and vice-versa.

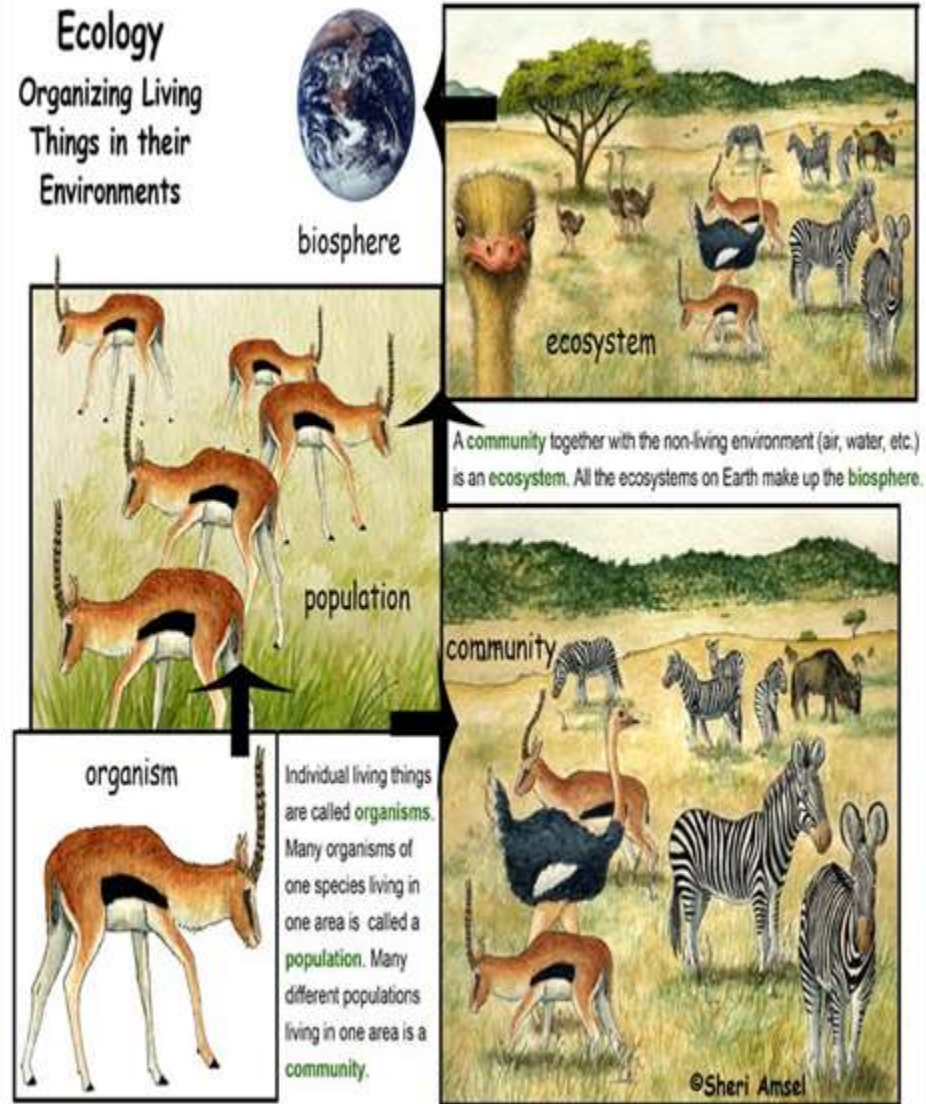
Population:

➤ members of the same species living in a specific geographical area.

➤ A species is a group of organisms that have a common gene pool and can interbreed to produce fertile offspring.

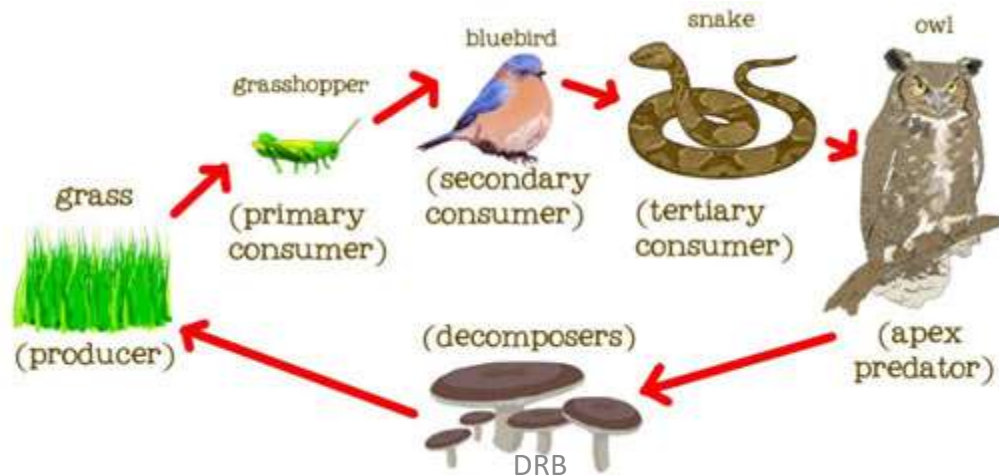
Community:

➤ the interacting group of various different species living in an area, it includes plants, animals and microbes.



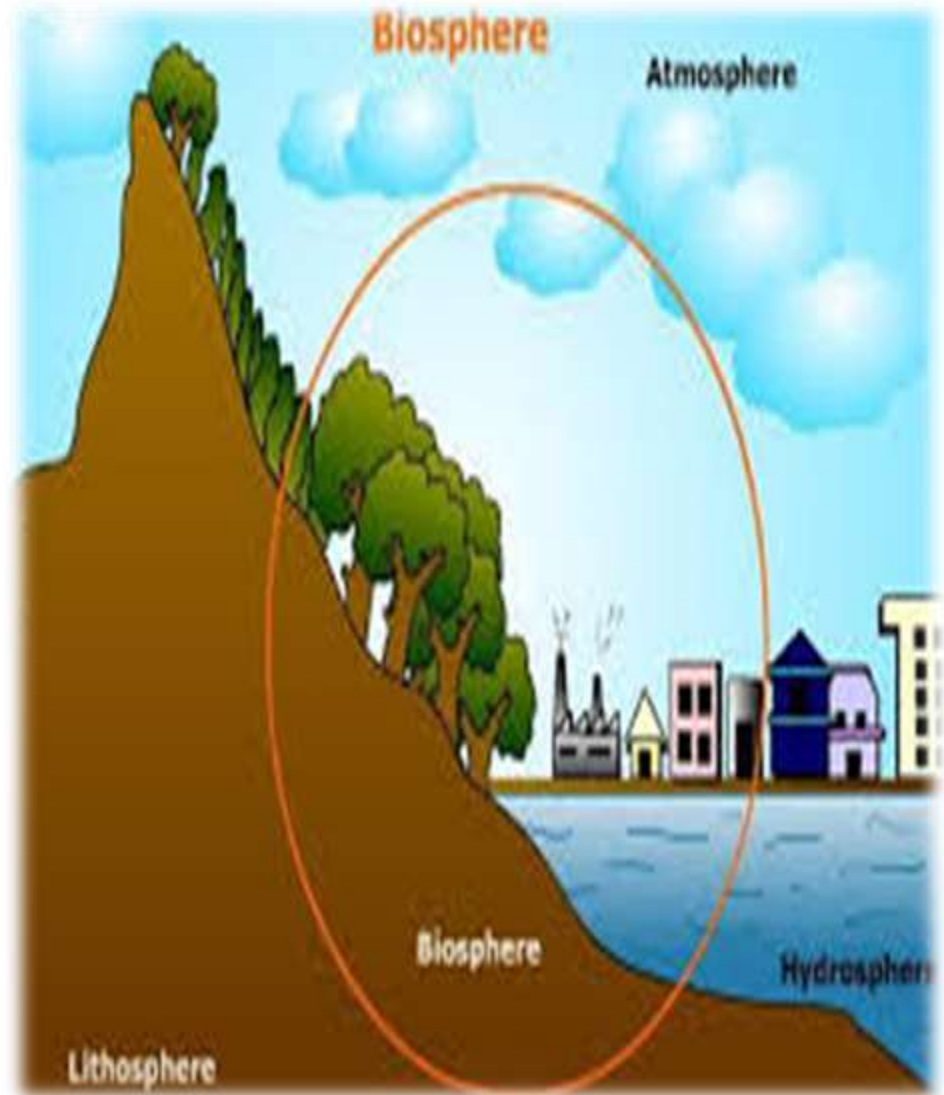
Ecosystem:

- The structural and functional unit of ecology.
- It is a community of living organisms along with the abiotic components interacting together through energy flows and nutrient cycles.
- Biotic components and abiotic components constitute an ecosystem.
- **Biotic components** include producers, consumers and decomposers.
- **Abiotic components** include climatic conditions such as temperature, soil, water, air, light; inorganic and organic substances such as nitrogen, phosphorus, sulfur, carbohydrate, protein, lipid, etc.



Biosphere:

- it is the total sum of all ecosystems.
- It is also known as the zone of life on Earth.
- It includes all the living organisms, their relationships and interaction with the elements of atmosphere, hydrosphere and lithosphere.
- Biosphere is that part of earth where life can exist.
- It is a narrow layer around the surface of the earth



Autoecology :

- Also called Species Ecology & Population Ecology
- The study of the interactions of an individual organism or a single species with the living and nonliving factors of its environment.
- It helps us to understand the relationships between individual plants and animals and environment
- Two approaches to autological studies:
 - a) Individual species are studied
 - b) Individuals of same species are studied
- Example : If a neem tree or several neem trees Studied in relation to environment.

Synecology :

- The study of group of organisms of different species which are associated together as a unit in form of a community.
- Also known as community ecology
- It helps us to understand the relationships between communities and environment
- Two types of Synoecological studies :
 - a)Community Ecology : the study of biotic community in a particular area
 - b)Ecosystem Ecology : the study of community of living organism & their environment as an integrated unit of nature
- Example : Study related to whole forest community i.e. Shrubs, herbs, trees and animals

Autecology	Synecology
It is the study of individual organism or individual species or a population in relation to their environment	It is the study of group of organisms or many species or communities in relation to their environment
It is also called as population ecology	It is also called as community ecology
The study is at the level of an individual, a population or an entire species	Synecology is concerned with study of the highest level of biological organization; many populations in an area (called as community) interacting with each other and also with the environment. It can even be the study of an ecosystem
Autecology is comparatively simple experimental and inductive.	Synecology is complex, philosophical and deductive. (Refer: Inductive vs Deductive)
Autecology studies can be accommodated in a laboratory setup and data is interpreted using conventional mathematical tools	Synecology studies refers to the interaction of a whole system and that cannot be accommodated in a laboratory setup as the system is naturally formed after interactions of hundreds of years such as a forest ecosystem
Example: Study of Zebra population in relation to its environment (may be factors like rainfall, hunting, lion population etc in a grassland ecosystem) see the figure (in dotted black lines)	Example: Study of entire grassland ecosystem (including all the species or communities) see the figure (in green thick border)

