

Ecosystem

Concept of Ecology & Ecosystem

Introduction:

- * All living organisms are surrounded by the environment.
- * They derive their required substances from the environment for their survival.
- * Each living component interacts with non-living components for their basic requirements from different ecosystem.

Ecology:

Definition: Ecology is the study of interactions among organisms or group of organisms with their environment. The environment consists of both biotic components (living organisms) and abiotic components (non-living organisms).

(or)

Ecology is the study of ecosystems.

Ecosystem:

Definition: A group of organisms interacting among themselves and with environment is known as ecosystem. Thus, an ecosystem is a community of different species interacting with one another and with their non-living environment exchanging energy and matter.

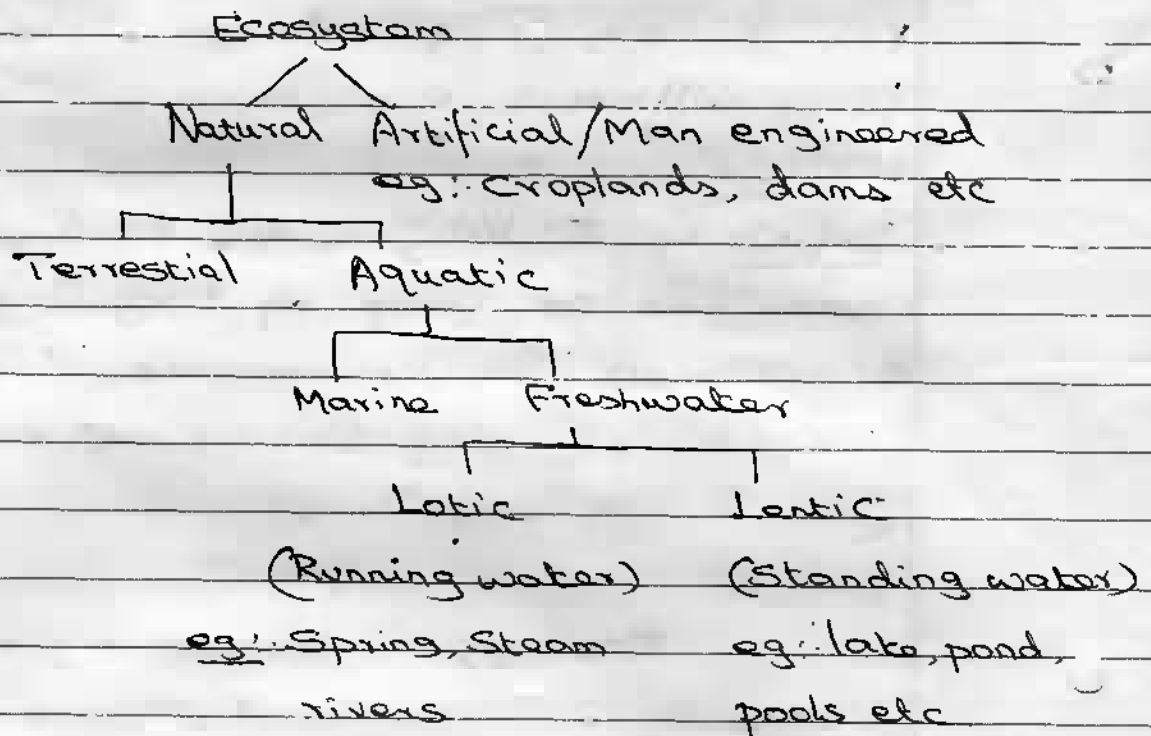
Ex: Animals cannot synthesize their food directly but depend on the plants either directly or indirectly.

Biome: (Small Ecosystem)

There are many sets of ecosystems which are exposed to same climatic conditions and having dominant species with similar life cycle, climatic adaptations and physical structure. This set of ecosystem is called a biome.

Biome is a small ecosystem with in an ecosystem.

Types of ecosystem:



Natural Ecosystem:

Natural ecosystems operate themselves under natural conditions.

Based on habitat types, it can be further classified into three types.

Terrestrial Ecosystem → Related to land & types of vegetation

ex: Grassland ecosystem, forest ecosystem, desert

Aquatic Ecosystem → Related to water

i) Fresh water ecosystem → Running water ecosystem
Standing water ecosystem
ex pond, lake
ex Rivers
Streams

ii) Marine ecosystem
ex: Seas → Sea shores.

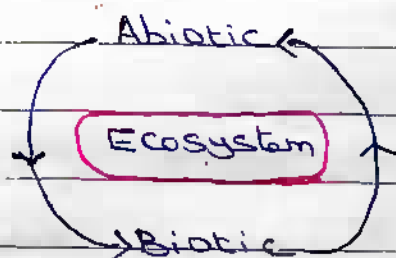
Man-made (or) Artificial ecosystems

Artificial ecosystem is operated (or) maintained by man himself
ex: Croplands, gardens.

Structure (or) components of an ecosystem

Structure of an ecosystem explains the relationship between the abiotic → the biotic components.

- ✓ Abiotic (non-living) components
- ✓ Biotic (living components)



Abiotic (non-living) components

The non-living components (physical and chemical) of an ecosystem collectively form a community called abiotic components (or) abiotic community
ex: Climate, soil, water, air etc

Physical components:

They are useful for the growth and maintenance of its members

ex: Air, Water, Soil

Chemical Components:

They are the sources of essential nutrients.

ex: Organic Substances: protein, Lipids, Carbohydrates

Inorganic Substances: All micro (Al, Co, Zn, Cu) and macro elements \rightarrow few other elements

Biotic Components:

The living organisms in an ecosystem collectively form its community called biotic components (or) Biotic Community.

* Autotrophic Components \rightarrow The members of autotrophic components are producers, which are autotrophs (self-nourishing organisms).

They derive energy from sunlight and make organic compounds from inorganic substances.

ex: Green plants, algae.

* Heterotrophic Components \rightarrow The members of heterotrophic components are consumers and decomposers, which are heterotrophs (dependent on others for food).

They consume the autotrophs (producers).

\checkmark Macroconsumers \rightarrow herbivores, omnivores or carnivores

\checkmark Saprotrophs (microconsumers) \rightarrow Decompose (bacteria, fungi)

Members of biotic components of an ecosystem

Classification of biotic components:

* Producers * Consumer * Decomposers

Producers (plants) (Autotrophs):

Producers synthesize their food themselves through photosynthesis.

ex: All green plants, trees

Photosynthesis:



Consumers (Heterotrophs) (Animals):

Consumers are organisms, which cannot prepare their own food and depend directly or indirectly on the producers.

They cannot make organic compounds, but can transform one form of organic compounds into other form of organic compounds.

Ex: * plant eating species ex: insects, rabbit, goat

* Animal eating species Ex: Fish, Lion, tiger

Types of consumers

Primary consumers (Herbivores) (plant eaters)

They directly depend on the plants for their food. So they are called plant eaters.

ex: insects, rat, goat

Secondary consumers (primary carnivores) (meat eaters)

Secondary consumers are primary carnivores, they feed on primary consumers. They directly depend on the herbivores for their food.

Ex: Frog, Cat, Snakes

Tertiary Consumers (Secondary Carnivores) (meat eaters)

They feed on Secondary Consumers. They directly depend on the primary Carnivores for their food.

ex: Tigers, Lions etc



Decomposers:

Decomposers are those organisms which feed on dead organisms plants and animals & decompose them into simple compounds. During the decomposition inorganic nutrients are released.

These inorganic nutrients together with other Organic Substances are then utilized by the producers for the synthesis of their own food.

ex: Microorganisms like bacteria → fungi

Herbivores - Vegetarian - Animals eat plants

Carnivores - Non vegetarian - " → Animals

Omnivores - Both

Function of an ecosystem

Types of functions → primary function: production - Manufacture of starch (photosynthesis)

secondary function: Distributing energy in the form of food to all consumers by the energy stored by consumers.

Tertiary Function: All living systems die at a particular stage. These dead systems are decomposed to initial 3rd function.