

UNIT – II ECOSYSTEMS

Points to be covered in this topic



INTRODUCTION

CONCEPT OF AN ECOSYSTEM

STRUCTURE AND FUNCTION OF AN ECOSYSTEM

FOREST ECOSYSTEM

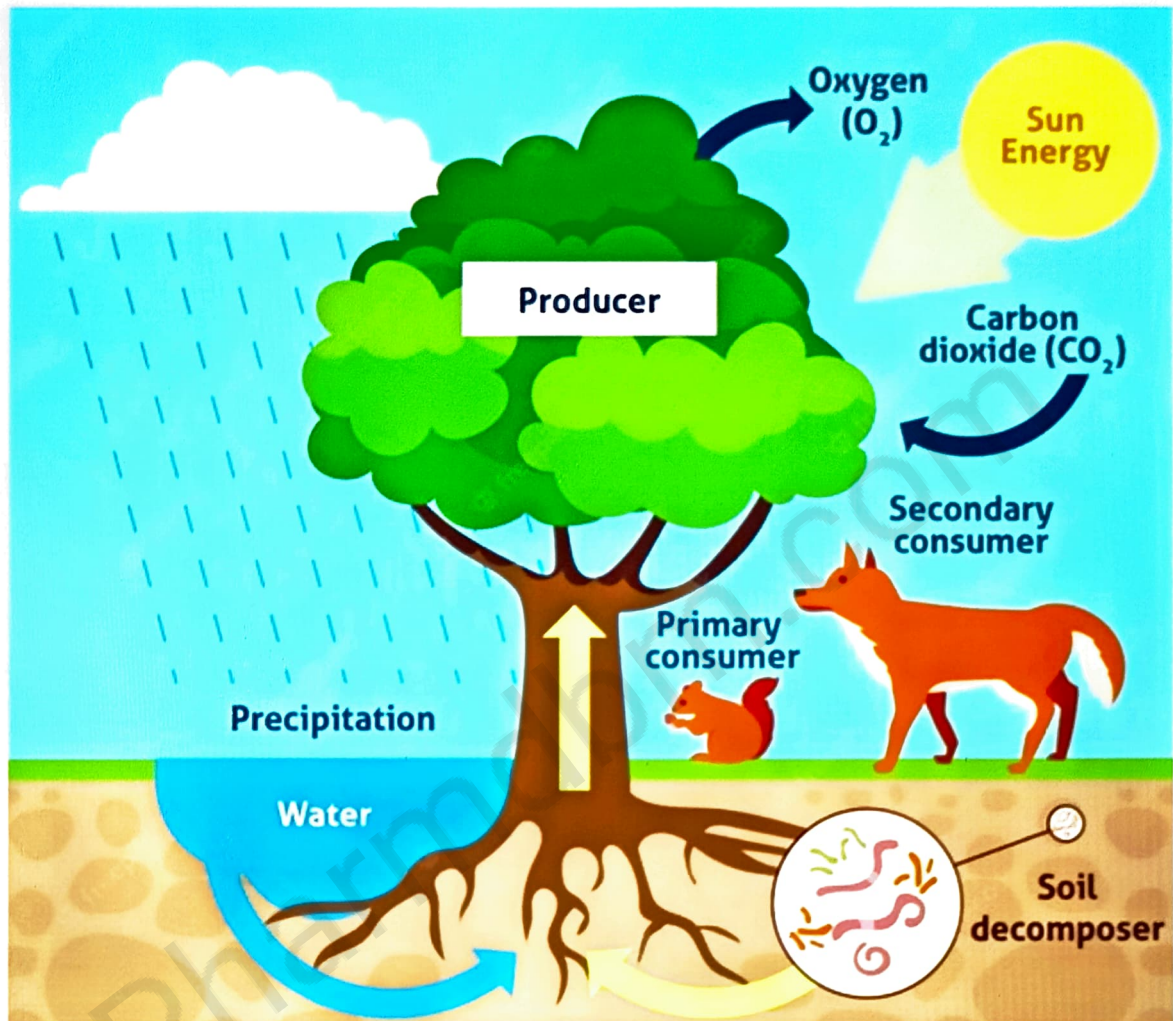
GRASSLAND ECOSYSTEM

DESERT ECOSYSTEM

AQUATIC ECOSYSTEM

INTRODUCTION

- Eco-system is defined as a **self regulating group** of biotic communities of **species interacting** with their **non living environment** exchanging energy and matter.

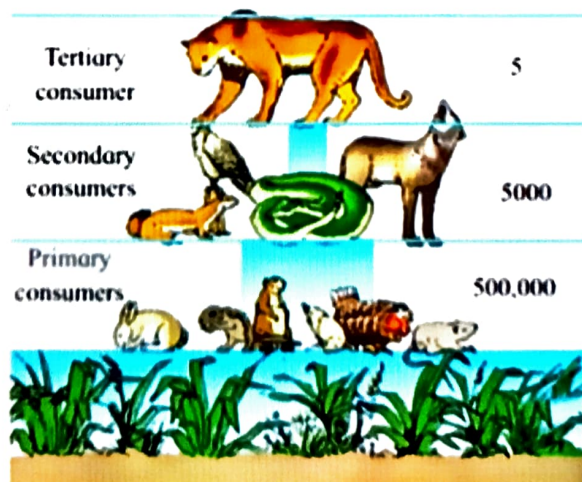
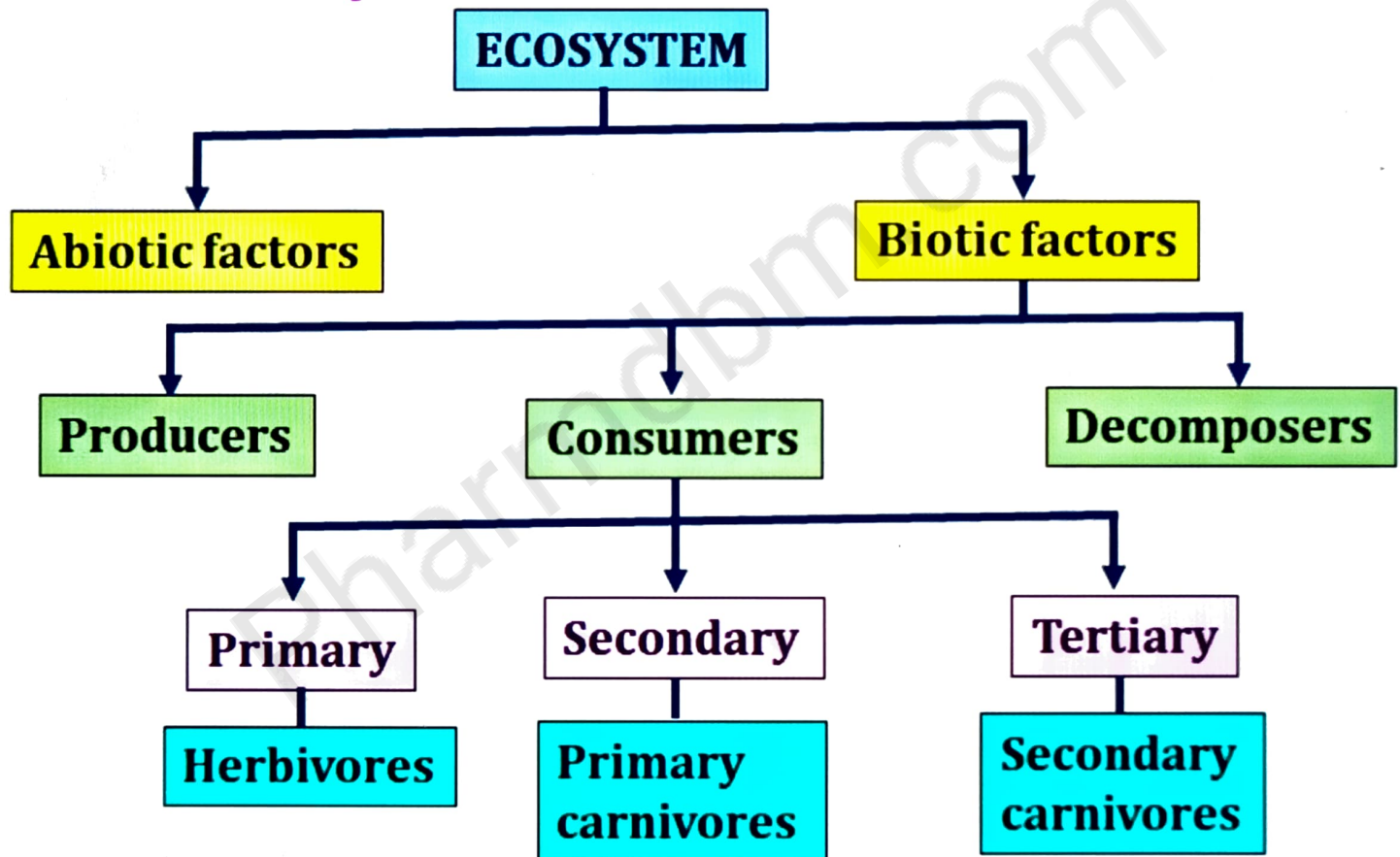


CONCEPT OF AN ECOSYSTEM

- Living organisms** cannot live isolated from their **non-living environment** because the latter **provides materials** and energy for the survival of the former i.e. there is interaction between a **biotic community** and its environment to **produce a stable system**; a natural **self-sufficient** unit which is known as an **ecosystem**.
- Ecosystem are the **parts of nature** where living organism interact among themselves and with their **physical environment**.

STRUCTURE AND FUNCTION OF AN ECOSYSTEM

- The **structure of an ecosystem** is characterized by the organization of both **biotic and abiotic components**.
- This includes the **distribution of energy** in our environment.
- It also includes the **climatic conditions** prevailing in that particular environment.
- The structure of an ecosystem can be split into **two main components**, namely
 - ✓ **Biotic Components**
 - ✓ **Abiotic Components**



1. ABIOTIC COMPONENTS

- **Abiotic components** are the **non-living component** of an ecosystem. It includes air, water, soil, minerals, sunlight, temperature, nutrients, wind, altitude, turbidity, etc.



2. BIOTIC COMPONENTS

- **Biotic components** refer to **all living components** in an ecosystem. Based on nutrition, biotic components can be categorized into autotrophs, heterotrophs and saprotrophs (or decomposers).



❖ PRODUCERS

- **Producers** include **all autotrophs** such as plants. They are called autotrophs as they can **produce food** through the process of photosynthesis. Consequently, all other organisms higher up on the **food chain** rely on **producers for food**.

❖ CONSUMERS

- **Consumers** or **heterotrophs** are organisms that depend on other organisms for food. Consumers are further classified into **primary consumers**, **secondary consumers** and tertiary consumers.
- ✓ **Primary consumers** are always **herbivores** as they rely on **producers for food**.
- ✓ **Secondary consumers** depend on **primary consumers** for **energy**. They can either be **carnivores or omnivores**.
- ✓ **Tertiary consumers** are organisms that **depend on secondary consumers** for food. **Tertiary consumers** can also be **carnivores or omnivores**.
- ✓ **Quaternary consumers** are present in some **food chains**. These organisms **prey on tertiary consumers** for energy. Furthermore, they are usually at the **top of a food chain** as they have no **natural predators**.

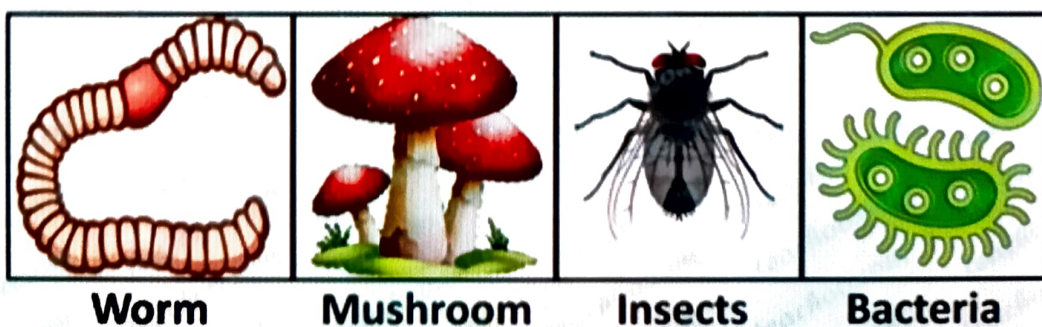
Sample Food Chains

Trophic Level	Grassland Biome	Pond Biome	Ocean Biome
Primary Producer	grass 	algae 	phytoplankton 
Primary Consumer	grasshopper 	mosquito larva 	zooplankton 
Secondary Consumer	rat 	dragonfly larva 	fish 
Tertiary Consumer	snake 	fish 	seal 
Quaternary Consumer	hawk 	raccoon 	white shark 

❖ DECOMPOSERS

- Decomposers** include **saprophytes** such as fungi and bacteria. They directly thrive on the **dead and decaying organic matter**. Decomposers are essential for the **ecosystem** as they help in **recycling nutrients** to be **reused by plants**.

Decomposers



➤ FUNCTIONS OF ECOSYSTEM

- The functions of the ecosystem are as follows:
 1. It regulates **the essential ecological processes**, supports life systems and **renders stability**.
 2. It is also **responsible** for the cycling of nutrients between **biotic and abiotic components**.
 3. It maintains a balance among the **various trophic levels** in the ecosystem.
 4. It cycles the **minerals** through the biosphere.
 5. The **abiotic components** help in the synthesis of **organic components** that involve the exchange of energy.

➤ TYPES OF ECOSYSTEM

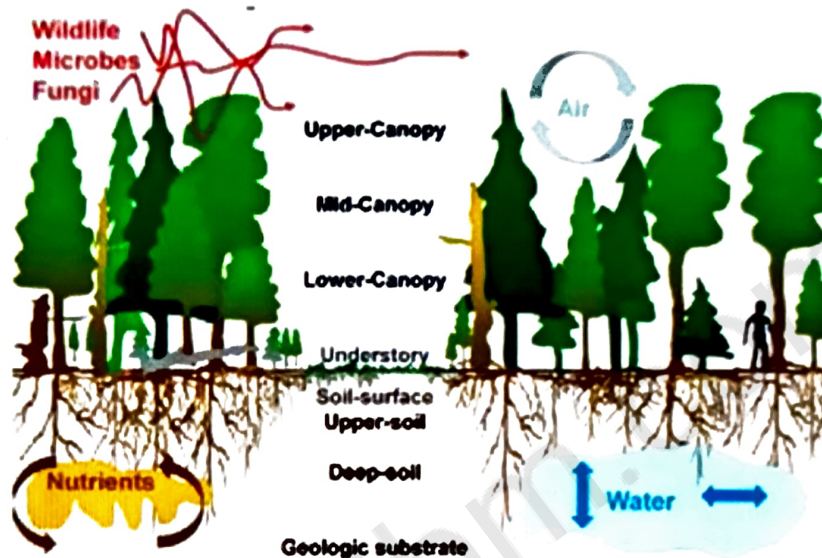
- An **ecosystem** can be as small as an **oasis in a desert**, or as big as an **ocean, spanning** thousands of miles.
- There are two types of ecosystem:
 - ✓ **Terrestrial Ecosystem**
 - ✓ **Aquatic Ecosystem**

❖ TERRESTRIAL ECOSYSTEM

- **Terrestrial ecosystems** are exclusively land-based ecosystems.
- There are different types of terrestrial ecosystems distributed around various geological zones.
- They are as follows:
 1. **Forest Ecosystem**
 2. **Grassland Ecosystem**
 3. **Tundra Ecosystem**
 4. **Desert Ecosystem**

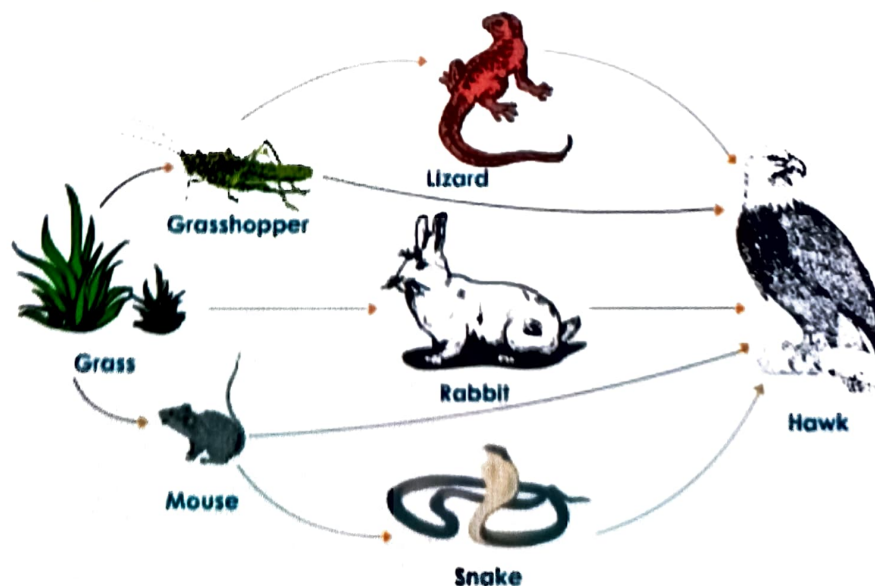
FOREST ECOSYSTEM

- A **forest ecosystem** consists of several plants, particularly trees, **animals and microorganisms** that live in coordination with the **abiotic factors** of the **environment**.
- Forests help in **maintaining the temperature** of the earth and are the major **carbon sink**.



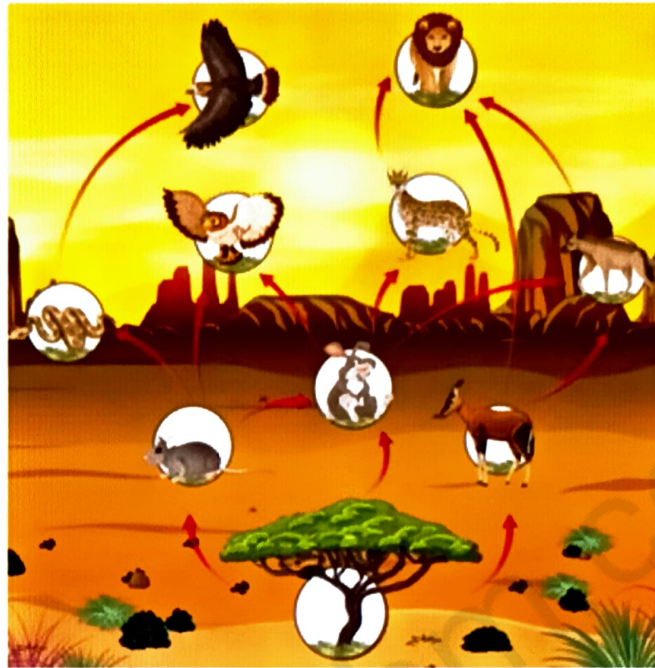
GRASSLAND ECOSYSTEM

- In a **grassland ecosystem**, the **vegetation** is dominated by **grasses and herbs**.
- Temperate grasslands** and tropical or **savanna grasslands** are examples of grassland ecosystems.



DESERT ECOSYSTEM

- **Deserts** are **found throughout** the world.
- These are regions with **little rainfall** and **scarce vegetation**.
- The days are **hot**, and the **nights are cold**.



AQUATIC ECOSYSTEM

- **Aquatic ecosystems** are ecosystems present in a **body of water**.
- These can be further divided into **two types**, namely:
 - ✓ **Freshwater Ecosystem**
 - ✓ **Marine Ecosystem**

✓ Freshwater Ecosystem

- The **freshwater ecosystem** is an **aquatic ecosystem** that includes lakes, ponds, rivers, streams and wetlands.
- These have **no salt content** in contrast with the **marine ecosystem**.

✓ Marine Ecosystem

- The **marine ecosystem** includes **seas and oceans**.
- These have a more **substantial salt content** and greater biodiversity in comparison to the **freshwater ecosystem**.

