

Subject: Basic Ecology (ZOL-502)
(BS Zoology 6th Semester)

Terrestrial Ecosystems
(Grassland Ecosystem)

By: Shozab Seemab Khan
(PhD Zoology Scholar)

ABAIIDULLAH COLLEGE PAKPATTAN



Grassland Ecosystem:

- **1. What is a Grassland Ecosystem?**
- A grassland ecosystem is a terrestrial ecosystem dominated by grasses and herbaceous (non-woody) plants, with few or no trees. These ecosystems typically occur in regions with moderate rainfall, which is not sufficient to support forests but more than deserts receive.
- **Grasslands** are known for their fertile soil, rich biodiversity of herbivores and carnivores, and high productivity, especially in terms of grazing and agriculture.

Characteristics of Grassland Ecosystems

- **Vegetation:** Dominated by grasses, sedges, and small shrubs.
- **Climate:** Moderate rainfall (25–75 cm/year), seasonal droughts common.
- **Soil:** Usually deep and fertile, rich in organic matter.
- **Fire and Grazing:** Natural and essential for maintaining the ecosystem.
- **Fauna:** Large herbivores (grazers) and carnivores adapted to open landscapes.

Types of Grassland Ecosystems

- Grasslands are classified based on climate and geography into two main types:
-  A. Tropical Grasslands (Savannas)
-  B. Temperate Grasslands

Tropical Grasslands (Savannas)

- **Location:** Africa, South America and Australia
- **Climate:** Warm year-round with distinct wet and dry seasons
- **Vegetation:** Tall grasses with scattered trees (acacia, baobab)
- **Wildlife:** Elephants, zebras, giraffes, lions, hyenas
- **Features:**
 - Frequent fires and grazing help maintain the open landscape
 - Supports migratory and large-herbivore populations

Temperate Grasslands

- **Location:**
- Prairies — North America
- Pampas — South America
- Steppes — Eurasia (Europe and Asia)
- Veldt — Southern Africa
- **Climate:** Hot summers, cold winters, moderate rainfall
- **Vegetation:** Short or tall grasses, few shrubs
- **Wildlife:** Bison, antelope, foxes, wolves, ground-nesting birds
- **Soil:** Deep, nutrient-rich; excellent for agriculture

Structure of a Grassland Ecosystem

- **Biotic Components (Living)**
- **i. Producers:** Mainly grasses (e.g., buffalo grass, bluegrass, ryegrass), Some herbs and shrubs
- Convert solar energy into biomass via photosynthesis
- **ii. Consumers:** Primary Consumers (Herbivores): Bison, antelope, rabbits, zebras, grasshoppers
- Secondary Consumers (Carnivores): Foxes, snakes, lizards, birds of prey
- Tertiary Consumers (Top Carnivores): Lions (in savannas), wolves (in temperate grasslands)

Structure of a Grassland Ecosystem

- **iii. Decomposers:** Bacteria, fungi, earthworms, insects
- Break down dead matter, recycle nutrients into the soil
- ○ **Abiotic Components (Non-living)**
- **Climate:** Temperature and rainfall determine grass type
- **Soil:** Rich in organic material (humus), especially in temperate grasslands
- **Sunlight:** Abundant, driving photosynthesis
- **Fire:** Natural and important for nutrient cycling and regeneration

Adaptations in Grassland Ecosystems

-  **Plants**
 - Narrow leaves to reduce water loss
 - Deep root systems to access groundwater and withstand droughts
 - Rapid regeneration after fire or grazing
-  **Animals**
 - Camouflage coloring
 - Grazing adaptations (flat teeth, digestive systems)
 - Speed and herd behavior for predator avoidance

Functions and Importance of Grassland Ecosystems

-  **Ecological Functions**
- **Soil formation and fertility:**
- Deep root systems promote nutrient recycling
- **Carbon sink:**
- Stores carbon in soil and vegetation
- **Supports biodiversity:**
- Especially large herbivores and carnivores
- **Water infiltration:**
- Helps in groundwater recharge and prevents erosion

Functions and Importance of Grassland Ecosystems

-  **Economic Importance**
- **Agriculture:**
- Many grasslands converted to crop production (wheat, corn)
- **Grazing land:**
- Supports livestock (cattle, sheep)
- Medicinal and industrial plants
- **Ecotourism:** Especially in savannas (wildlife safaris)

Threats to Grassland Ecosystems

- Despite their importance, grasslands are highly threatened:
- Conversion to cropland and urban areas
- **Overgrazing:** Leads to desertification and soil degradation
- Suppression of natural fires
- **Climate change:** Alters rainfall patterns and increases drought frequency
- **Invasive species:** Outcompete native grasses and disturb the ecosystem

Conservation of Grasslands

- Efforts to protect and sustainably manage grasslands include:
- Rotational grazing systems
- Controlled burning to mimic natural fire cycles
- Protected grassland reserves
- Rehabilitation of degraded areas
- Education and awareness about sustainable grassland use

THANK YOU