Grassland ecosystem

- Grasslands are areas where the vegetation is dominated by grasses (poaceae) however, sedge (cyperaceae) and rush (juncaceae) families can also be found along with variable proportions of legumes, like clover (legume) and other herbs.
- Grasslands occur naturally on all continents except Antarctica.
- Grassland cover around 25% of the earth's surface.

What Is Grassland Eco-System?

- A **grassland ecosystem** is the collection of plants, animals and micro-organisms that live within an environment where grasses are the primary form of vegetation. Examples of grassland ecosystems include the prairies of western North America, the Pampas of Argentina and the Russian steppes.

Characters of grassland

- Grasslands are dominated by grasses with few or no tress.
- They develop in areas where there is not enough rain for a forest, therefore referred to as a traditional landscape.
- Grasslands are found in both temperate and tropical areas where rainfall is between 250mm-900mm per year.
- Annual average temperture from -5 to 20°C.
- Some grassland occurs in colder (-20 °C) and hotter (30°C) climatic conditions.
- It can be natural or a result of human activity.

- Grasslands are also one of the most endangered biomes and easily turned to desert.
- In Australia they are one of the most threatened habitats.

- Grasslands are found on every continent except Antarctica.

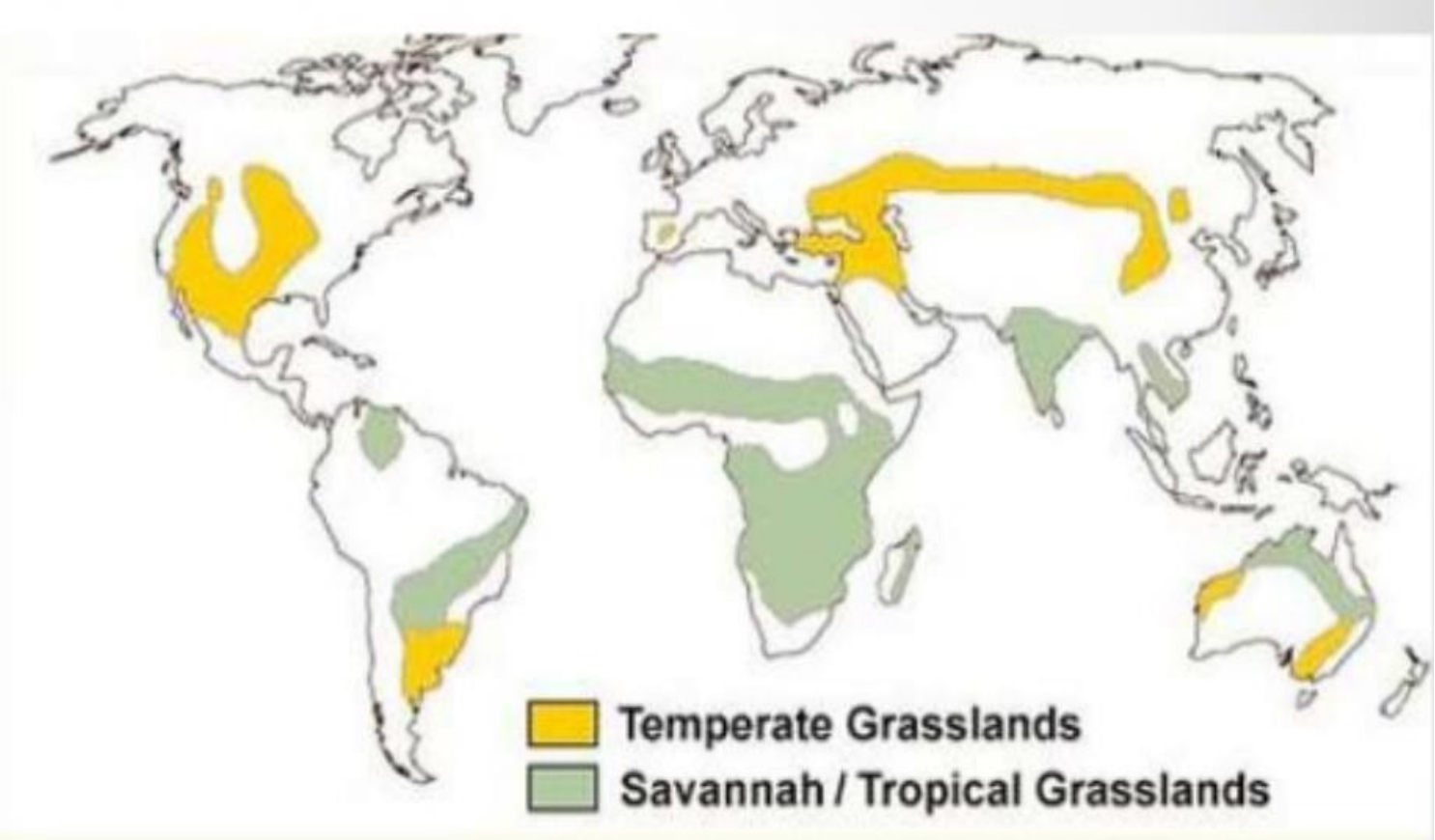


Fig 1.1: Map shows the temperate grasslands and the savaannah/tropical grasslands in the world.


Grasslands of the World
Tundra
Tundra
Steppes
Prairies
North America
Europe
Asia
Tropic of Cancer
Africa
Savanna
Llanos
Equator
South America
Savanna
Pampas
Veldt
Campos
Australia
DOWN
Tropic of Capricorn
Grassland
Pampas

Biotic Components

- Producer Organisms

  In grassland, producers are mainly grasses; though, a few herbs and shrubs also contribute to primary production of biomass. Some of the most common species of grasses are:

  1. Brachiaria sp.
  2. Cynodon sp.
  3. Desmodium sp.
  4. Digitaria sp.

Cont.

- **Consumers**

  In grassland, consumers are of three main types:

  1. Primary Consumers

  The primary consumers are herbivores feeding directly on grasses.

  2. Secondary Consumers

  These are carnivores that feed on primary consumers (Herbivores).

  3. Tertiary Consumers

  These include hawks etc. which feed on secondary consumers.

- **Decomposers**

  These include wide variety of saprotrophic micro-organism like: Bacteria; Fungi; Actinomycetes.

A-biotic Components

- These include basic inorganic and organic compounds present in the soil and aerial environment.
- The essential elements like C, H, N, O, P, S etc. are supplied by water, nitrogen, nitrates, sulphates, phosphates present in soil and atmosphere.

Types of grasslands

- Tropical and subtropical
- Temperate
- Flooded
- Montane
- Tundra grasslands
- Desert and xeric

Tropical and subtropical

- These grasslands can be classified as the savannas and shrub-lands biome.
- The rainfall level for that grassland type is between 90-150 centimeters per year.
- Grasses and scattered trees are common for that ecoregion, as well as large mammals, such as wildebeest (Connochaetes taurinus) and zebra (Equus zebra).
- Example: Notable tropical and subtropical grasslands include the Llanos grasslands of South America.

Temperate

- Mid-latitude grasslands, including the prairie and Pacific grasslands of North America,
  the Pampas of Argentina, Brazil and Uruguay, and
  the steppes of Europe.
- Temperate grasslands are the home to many large herbivores, such as bison, gazelles, zebras, rhinoceroses, and wild horses. Carnivores like lions, wolves, cheetahs and leopards are also found in temperate grasslands.
- Other animals of this region include deer, prairie dogs, mice, jack rabbits, skunks, coyotes, snakes, foxes, owls, badgers, blackbirds, grasshoppers, meadowlarks, sparrows, quails, hawks an d hyenas.

Flooded

- Grasslands that are flooded seasonally or year-round, like the Everglades of Florida, the Pantanal of Brazil, Bolivia and Paraguay or the Esteros del Ibera in Argentina, are classified with flooded savannas as the flooded grasslands and savannas biome and occur mostly in the tropics and subtropics.
- The species that live in these grasslands are well adapted to the hydrologic regimes and soil conditions.
- The Everglades (in florida)- the world's largest rain-fed flooded grassland - is rich in 11,000 species of seed-bearing plants, 25 species of orchids, 300 bird species, and 150 fish species.
- Water-meadows (area controlling irrigation) are grasslands that are deliberately flooded for short periods.

Montane

- High-altitude grasslands located on high mountain ranges around the world, like the Páramo of the Andes Mountains.
- They are part of the shrublands biome and can be tropical, subtropical, and temperate.
- The plants and animals, that can be found in the tropical montane, are able to adapt to cool, wet conditions as well as intense sunlight.

Tundra grasslands

- Similar to montane grasslands, polar Arctic tundra can have grasses, but high soil moisture means.
- However, during the Pleistocene glacial periods (commonly referred to as ice ages), a grassland known as steppe-tundra or mammoth steppe occupied large areas of the Northern Hemisphere.
- These areas were very cold and arid and featured sub-surface permafrost (permanently frozen layer of earth hence tundra) but were nevertheless productive grassland ecosystems supporting a wide variety of fauna.
- As the temperature increased and the climate became wetter at the beginning of the Holocene much of the mammoth steppe transitioned to forest, while the drier parts in central Eurasia remained as a grassland, becoming the modern Eurasian steppe.

Desert and xeric

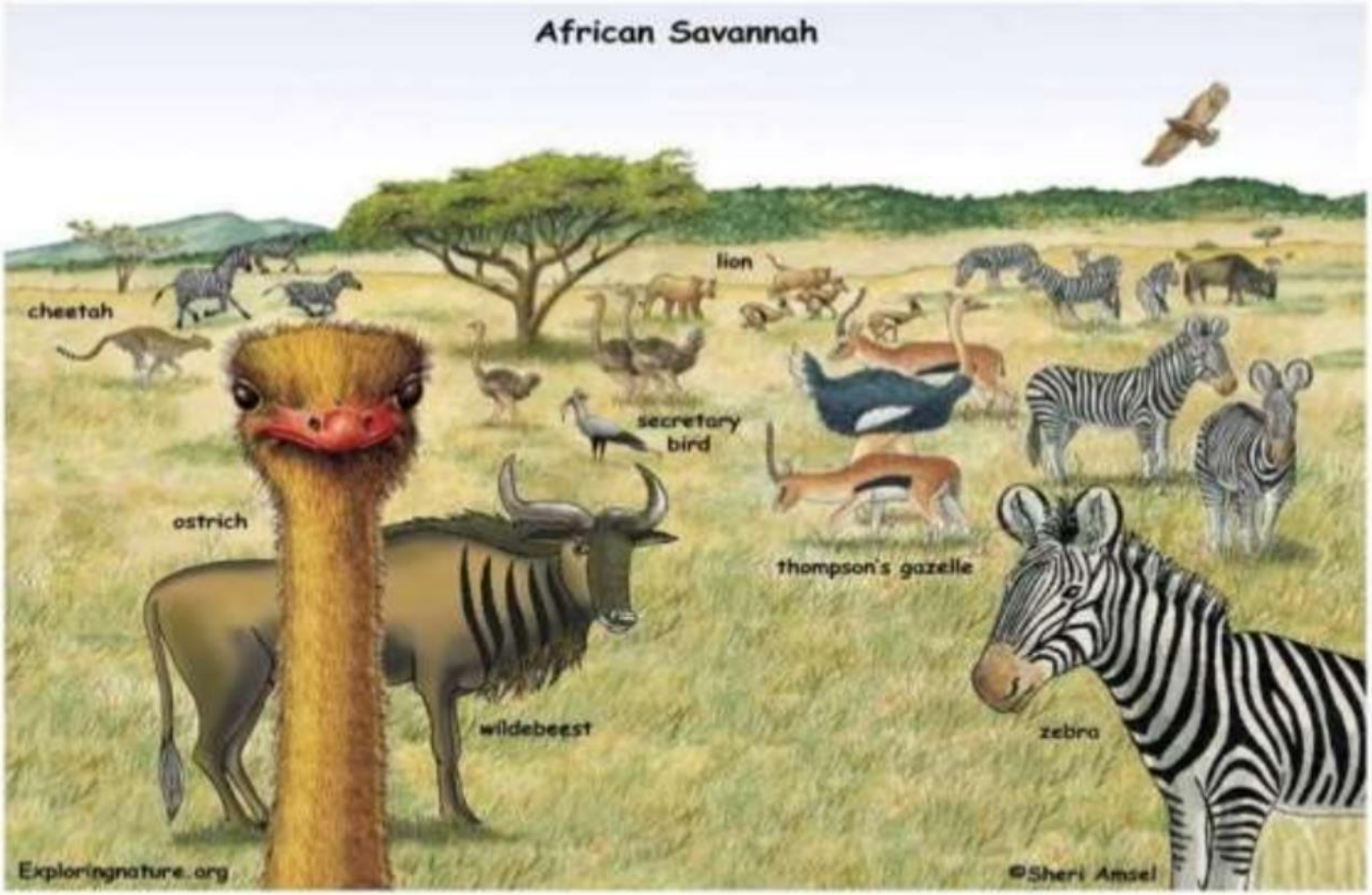
- Also called desert grasslands, they are composed of sparse grassland ecoregions located in the deserts and xeric shrublands biome.
- Temperature extremes and low amount of rainfall characterize these kinds of grasslands.
- Therefore, plants and animals are well adapted to minimize water loss.

Difference between Temprate And Tropical Grassland

Temperate Grassland	Tropical Grassland
Located in the temperate latitude	Located in the tropical latitude
Grass is very short, soft, juicy and nutritive	The grass is tall (3m) coarse and spiky which is neither juicy nor nutritive and there are scattered deciduous trees
They have treeless plains as rainfall is less	Soil is not very fertile
Soil is very fertile	Very dry climate

Fauna of the Grasslands

- Grassland have high number of invertebrates than any other taxonomic group
- Most reptiles and amphibians are predators
- Few bird species inhibit grasslands
- Small mammals like moles, shrews, squirrels are present in North American Grassland


African Savannah
cheetah
lion
secretary bird
ostrich
thompson's gazelle
wildebeest
zebra
Exploringnature.org
©Sheri Amsel

Adaptation in animals

- Speed: animals rarely reach top speed when running. Example: Gazelles, cheetah
- Nesting behaviour: Birds nest on or under the ground. They try to hide eggs and protect from predators.
- Camouflage
- Social systems: Many species form large aggregations to increase the chance of predator detection and alert the rest group.
- Burrowing behaviour: Lacking the protection of trees, animals living in grasslands must cope with extreme weather and temperatures that accompany the exposed habitat. so, many species dig tunnels or burrows that provide shelter from poor weather, and relief from temperature extrem
- Hunting style: many owls live in forests, some have adapted to live near and hunt in grasslands. They adapt to grassland habitats tend to glide a few feet over the ground before diving onto located prey.

Plants of the grasslands

- When rainy season arrives, many grasslands become coated with flowers, some of which can survive well into winter with the help of underground storage organs and thick stem bases.
- Grasslands are the most agriculturally useful habitat to humans.
- Soils tend to deep and fertile, perfect for cropland and pastures.

Importance

- They are natural carbon sink.
- Important for raising livestock for human consumption and for milk and other dairy products.
- Grasslands provided home to many different animals that were hunted and domesticated.
- They maintain biodiversity.
- Protects restored habitat for many plants and animals including pheasant, ducks, songbirds and endangered species.

Treats to grassland eco-system

- Continuous global warming could turn current grasslands into deserts as rainfall patterns change.
- Development of urban areas, increasingly cutting grassland habitat.
- Invasive species: drought-heardy, cold-resistant, and herbicide-tolerant varieties of soybeans, wheat and corn allow crops to expand into native grassland.
- Poor agriculture practices: without crop rotation.
- Monocropping: Where only one crop is grown, pests and disease can spread easily, creating need for potentially toxic pesticides.
- Grazing livestock

How conserve?

- Preventing illegal wildlife hunting
- Prevents grassland from turning into brush land
- Prevent grassland fires
- Prevent overgrazing by cattles and introduced stall feeding
- Creating protected areas such as Parks and wildlife sanctuaries.
- Continue education efforts
- Restore wetlands

- Finish….