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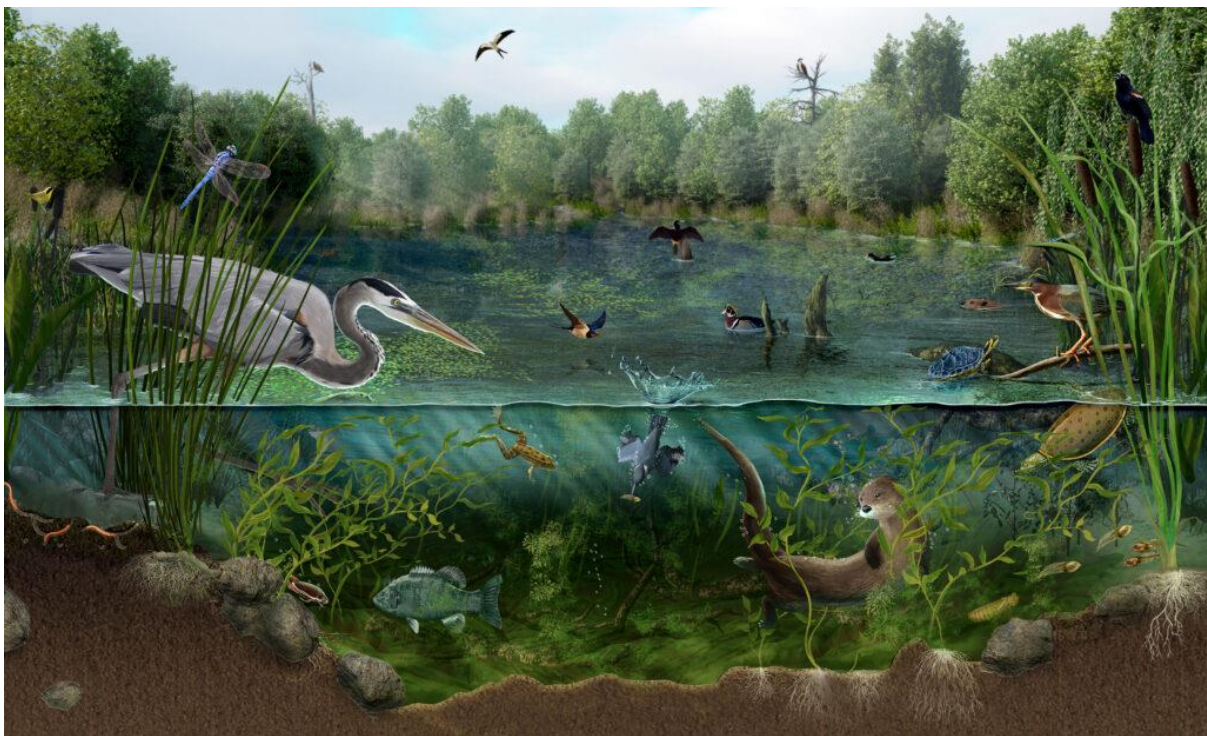
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Theme: Interrelationships

S4 New Curriculum Biology-Chapter 6– Concept of ecology



Ecology is the study of the relationship of living organism with each other and their non-living environment. The study of ecology lays a foundation for understanding agriculture, forestry, fisheries, conservation, impact of human activities on ecosystem and how to remedy these impacts.

Terminologies

Environment refers to all the external factors—both living and non-living—that influence an organism's survival, growth, and reproduction. It includes elements such as climate, soil, water, air, and interactions with other organisms.

Population refers to all individuals members of a particular species occupying the same habitat at a given time (same time).

Community is a group of living organisms that live and interact with each other in a specific environment forming a self-sustaining unit. For example, a game park has animals, bird,

reptiles, amphibians, plants and microorganisms; A community of a school has teachers, non-teaching staff and students.

Ecosystem: It is a community of living organisms that live and interact each other in a specific environment forming a self-sustaining unit. For example a tropical forest is an ecosystem made up of living organisms as trees, animals, insects, birds and microorganisms that are in constant interaction with each other and with their physical environment to form a self-sustaining unit.

Habitat is a specific area's environment with a certain set of conditions where an organism lives. The environment offers food, shelter, protection and mates for reproduction. It is made up of living components such as predators, parasites, prey etc. referred to as **biotic factor** and non-living components such as temperature, soil, light etc. called **abiotic factors**.

Types of ecosystems in East Africa

The five ecosystems in East Africa include savannah grassland, marine or coastal ecosystem, fresh water ecosystem, tropical rainforests and semi-arid ecosystems.

Savannah grassland



These are open grasslands that occupy extensive parts in East Africa; especially in Kenya, Tanzania and some parts of Uganda. Savannah grasslands have been set aside as habitats for wild life. They are also home for mixed pastoral and nomadic communities.

Characteristics of savannah grasslands

- **Climate:** Warm temperatures year-round with distinct wet and dry seasons. There is high rate of evaporation and periodic severe droughts.
- **Vegetation:** Dominated by grasses, shrubs, and drought-resistant trees like acacias and baobabs.
- **Wildlife:** Home to large herbivores such as elephants, zebras, and giraffes, along with predators like lions and cheetahs.
- **Soil:** Often nutrient-poor due to seasonal rainfall and leaching.
- **Fire Adaptation:** Frequent fires help maintain the balance between grasses and trees, preventing the biome from turning into dense forest.
- **Human Impact:** Used for agriculture and livestock grazing, but also threatened by deforestation and climate change.

Marine ecosystem of East Africa (Coastline and salty lakes)



The marine ecosystem of East Africa is incredibly diverse, stretching along the coastline from Somalia to South Africa. It includes coral reefs, mangrove forests, seagrass beds, and open waters that support a rich variety of marine life. The salty lakes in the region, such as Lake Natron, Lake Katwe and Lake Magadi, are unique environments that host specialized organisms adapted to extreme salinity.

Characteristics of coast line ecosystem

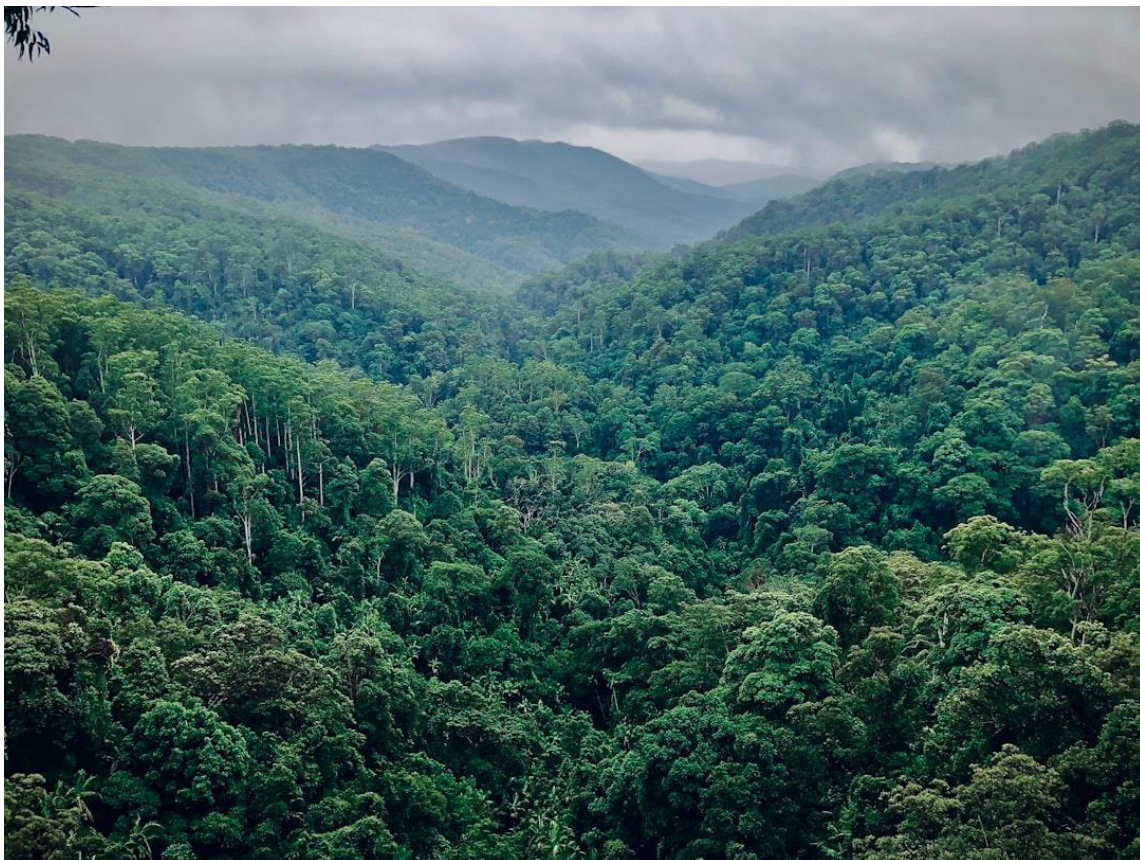
- **Biodiversity :** Coastal waters teem with life, including fish, crustaceans, mollusks, coral reefs, and countless microorganisms. Mangroves, seagrass beds, and tidal marshes play critical roles in supporting marine species.

- **Productivity:** Coastal areas support incredible primary production due to nutrient-rich waters from upwelling, runoff, and tidal mixing, making them crucial for marine food webs.
- **Buttress and breathing roots:** Mangroves have buttress roots to offer additional support. Additionally, marine plants have breathing roots to obtain air.

Characteristics of salty lakes

- They are inland sheltered water bodies
- Experience high rate of evaporation
- Have or surrounded by plants, fish and animals that are tolerant to high salinity.

Tropical rain forests



Tropical rainforests are dense and warm forests in tropical areas of heavy rainfall, typically between 10° north and south of equator. In Uganda examples include **Bwindi Impenetrable Forest, Budongo Forest, Mabira Forest, and Kibale Forest.**

Characteristics of tropical rain forest

- Have abundant plants and animal species.
- High temperature and rainfall throughout the year
- Due to constant warmth and moisture, organic matter decomposes quickly, with nutrients rapidly absorbed by plants rather than accumulating in the soil.
- The floor is dark with sparsely distributed plants

Freshwater ecosystem

Freshwater ecosystems include lakes, rivers, streams, ponds, and wetlands, each with unique physical and biological traits.

Characteristics of fresh water ecosystem

- Support large number of species including fish, amphibians, insects, birds, plants, and microorganisms, many of which depend on clean water for survival.
- Plants are completely or partially submerged
- Plants have large leaves with thin cuticles to promote transpiration
- Wetlands and river banks have waterlogged soils
- Water temperature can vary based on location, depth, and season, influencing which species can thrive in different areas.

Semi-arid ecosystem

These are areas on the leeward sides of mountains. Examples in Uganda include Karamoja and Teso.

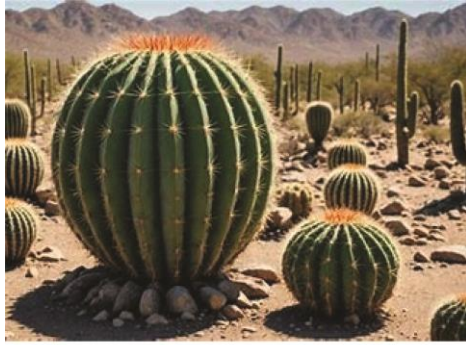
Characteristics of semi-arid ecosystems

- Receive low rainfall and regular droughts.
- Experience high temperatures during day and low night temperature
- Have sparse vegetation with drought resistant plants such as cactuses.
- Have drought resistant animals such as reptiles and camel

Dominant species in ecosystems

Dominant species in ecosystems are those that have the greatest influence on their environment due to their abundance, biomass, or ecological role. They shape habitat conditions, food webs, and overall ecosystem dynamics. Here are some examples across different ecosystems:

- **Forests** – In tropical rainforests, trees like mahogany, rubber, and muvule dominate.
- **Grasslands** – Grasses such as Bermuda grass, buffalo grass, and wheatgrass form the backbone of these ecosystems, supporting herbivores like bison and antelope.
- **Freshwater Ecosystems** – Aquatic plants like water lilies and cattails dominate wetlands, while fish species such as tilapia, trout, or catfish are often key players in lakes and rivers.
- **Marine Coastal Ecosystems** – Coral reefs are shaped by corals like staghorn and brain coral. Kelp forests, dominated by large kelp species, provide shelter for marine life.
- Semi-arid ecosystem: cactuses dominate



cactuses

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