Biodiversity and Conservation

- **Biodiversity:** It is the variety of living forms present in various ecosystems.
- There are three important components of biodiversity –
  - **Genetic diversity:** It is the diversity at the gene level.
  - **Species diversity:** It is the diversity at the species level.
  - **Ecological diversity:** It is the diversity at the ecosystem level.
- Total number of plant and animal species on earth is about seven million.
- **Among invertebrates**, insects are more diverse than molluscs and other invertebrates.
- **Among vertebrates**, fishes are more diverse, followed by birds, reptiles and then amphibians.
- **Among plants**, the maximum species-richness is found in angiosperms, followed by fungi, algae, mosses and then ferns.
- **Patterns of biodiversity**
  - **Latitudinal gradients:** The tropical regions show greater level of species- richness than the temperate regions. It is because the tropical regions have less seasonal variation, and have a more or less constant environment. Also, the temperate regions were subjected to glaciations while the tropical region remained undisturbed, which led to an increase in species-diversity in the tropical region.
  - **Species–area relationship:** The relationship between species-richness and area is represented by a rectangular hyperbola. The equation is

    Log S = log C + Z log A
    Where,
    S = Species-richness
    A = Area
    Z = Regression coefficient
    C = Y-intercept

    Graph representing species–area relationship

- In small areas, the values of regression coefficient are similar, regardless of taxonomic group.
- In large areas, the slope of regression coefficient becomes much steeper.

- In small areas, the values of regression coefficient are similar, regardless of taxonomic group.
- In large areas, the slope of regression coefficient becomes much steeper.

- **Loss of biodiversity:** It has been observed that the biodiversity around the world is declining at a very fast rate.
  The reasons behind loss of biodiversity are –

  - Habitat loss and fragmentation
  - Over-exploitation of resources
  - Alien species invasion
  - Co-extinction of species

- **Biodiversity conservation**
- **Need for conservation of biodiversity: It is grouped into three categories –**

  - **Narrow utilitarian argument** for biodiversity conservation focuses more on economic benefit, in the form of food, fibre, tannin, etc., provided by diverse plants and animals.

  - **Broad utilitarian argument** for biodiversity conservation focuses on ecosystem services such as pollination, soil formation, photosynthesis, etc., provided by nature.

  - **Ethical argument** regarding conservation of biodiversity focuses on ethical issues.

- **Methods for conserving biodiversity:**
  - **In-situ conservation:** The conservation of endangered plants and animals in their natural habitat is in-situ conservation. Example: sacred groves, biosphere reserves.

  - **Ex-situ conservation:** The conservation of endangered plants and animals outside their natural habitat in artificial conditions. Example: zoological parks, safari, tissue culture propagation, cryopreservation of gametes, etc.