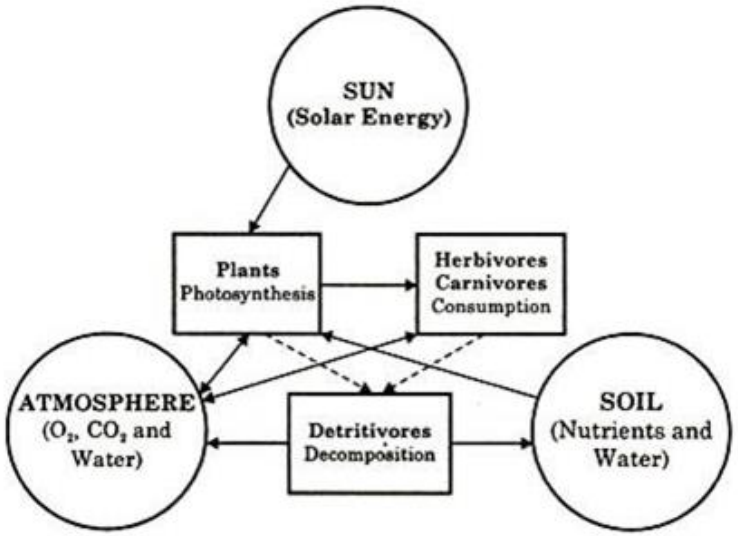
What is Forest Ecosystem

- An ecosystem refers to a functional unit of nature in which living organisms interact among themselves as well as with the surrounding physical environment
- A forest ecosystem is a functional unit or a system which comprises of soil, trees, insects, animals, birds, and man as its interacting units. A forest is a large and complex ecosystem and hence has greater species diversity.

Factors of forest ecosystem

- Biotic factor:–

  They are the living parts of ecosystem
  [producer, consumers, decomposer]
  for.eg=plants, animals, birds,human etc..



Relationship within an Ecosystem.

- Abiotic factor:–

They are the non living parts of the ecosystem
For.eg= Mountains, Rocks, Rivers etc..

Structural Features of the Forest Ecosystem

The two main structural features of a forest ecosystem are:

1.Species composition: It refers to the identification and enumeration of the plant and animal species of a forest ecosystem.

2.Stratification: It refers to the vertical distribution of different species which occupy different levels in the forest ecosystem. Every organism occupies a place in an ecosystem on the basis of source of nutrition. For example, in a forest ecosystem, trees occupy the top level, shrubs occupy the second and the herbs and grasses occupy the bottom level.

Components of a Forest Ecosystem

1. Productivity

•The basic condition for any ecosystem to operate and sustain itself is the continuous supply of solar energy.

•Plants are too the producers in a forest ecosystem.

•There are two sorts of productivity in a forest ecosystem: primary and secondary.

(a).Primary productivity refers to the amount of solar energy captured or biomass production per unit area over some time by the plants through photosynthesis.

•A further classification is made into Gross Primary Productivity (GPP) and Net Primary Productivity (NPP).

•GPP of an ecosystem is the rate of capture of solar energy or the complete production of biomass. But, plants similarly use a substantial amount of GPP in respiration.

•Therefore, NPP is the amount of leftover biomass after being used by plants or producers. We can therefore say that NPP is the amount which is accessible for the intake of herbivores and decomposers.

(b).Secondary productivity refers to the rate of absorption of food energy by the consume.

2. Decomposition

Decomposition is an extremely oxygen-requiring process. In the process of decomposition, decomposers convert the complex organic compounds of detritus into inorganic substances such as carbon dioxide, water and nutrients.

3. Energy flow

Energy flows in a single direction. Firstly, plants capture solar energy and then, transfer the food to decomposers. Organisms of different trophic levels are connected to each other for food or energy relationship and thus form a food chain.

Energy Pyramid is always upright because energy flows from one trophic level to the next trophic level and in this process, some energy is always lost as heat at each step.

4. Nutrient Cycling

Nutrient cycling refers to the storage and movement of nutrient elements through the various components of the ecosystem. There are two types of Nutrient cycling, gaseous and sedimentary.

For Gaseous cycle (i.e. nitrogen, carbon), atmosphere or hydrosphere is the reservoir whereas for the sedimentary cycle (i.e. phosphorus) Earth's crust is the reservoir.

Why do different regions have different biomes?

•Major reasons are:

1.Tempreature

2.Precipitation

•Mean value of temperature and precipitation determines the kind of biomes in that area.

•Climate, plants and animal species of the region varies with latitude and longitude.

•The unique feature is that every species has adapted the climate and has found It's niche in the community.

Types of Ecosystem

1.Natural Ecosystem:–

a.Terrestrial

- Forest
- Grassland
- Desert

b.Aquatic

- Ponds
- Lakes
- Rivers
- Wetland
- Marine

2.Artificial Ecosystem:–

- Cropland
- Wetland

Types of Forest Ecosystem

- Temperate forest ecosystem.
- Boreal or Taiga forest ecosystem.
- Tropical rainforest ecosystem.

Temperate forest ecosystem

•A **temperate forest** is a forest found between the tropical and boreal regions, located in the temperate zone.

•It is the second largest biome on the planet, covering 25% of the world's forest area, only behind the boreal forest, which covers about 33%.

•These forests cover both hemispheres at latitudes ranging from 25 to 50 degrees, wrapping the planet in a belt similar to that of the boreal forest. Due to its large size spanning several continents, there are several main types: deciduous, coniferous, mixed forest, and rainforest.

Types of temperate foest

a. Deciduous

They are found in Europe, East Asia, North America, and in some parts of South America. Deciduous forests are composed mainly of broadleaf trees, such as maple and oak, that shed all their leaves during one season. They are typically found in three middle-latitude regions with temperate climates characterized by a winter season and year-round precipitation: eastern North America, western Eurasia and northeastern Asia.

b. Coniferous

Coniferous forests are composed of needle-leaved evergreen trees , such as pine or fir. Evergreen forests are typically found in regions with moderate climates. Boreal forests, however, are an exception as they are found in subarctic regions. Coniferous trees often have an advantage over broadleaf trees in harsher environments. Their leaves are typically hardier and longer lived but require more energy to grow

c. Mixed temperate forest

As the name implies, conifers and broadleaf trees grow in the same area. The main trees found in these forests include fir, oak, ash, maple, birch, beech, poplar, elm and pine. Other plant species may include magnolia, Prunus , holly, and rhododendron. In South America, conifer and oak species predominate . In Australia, eucalypts are the predominant trees .Hardwood evergreen trees which are widely spaced and are found in the Mediterranean region are olive, cork, oak and stone pine.

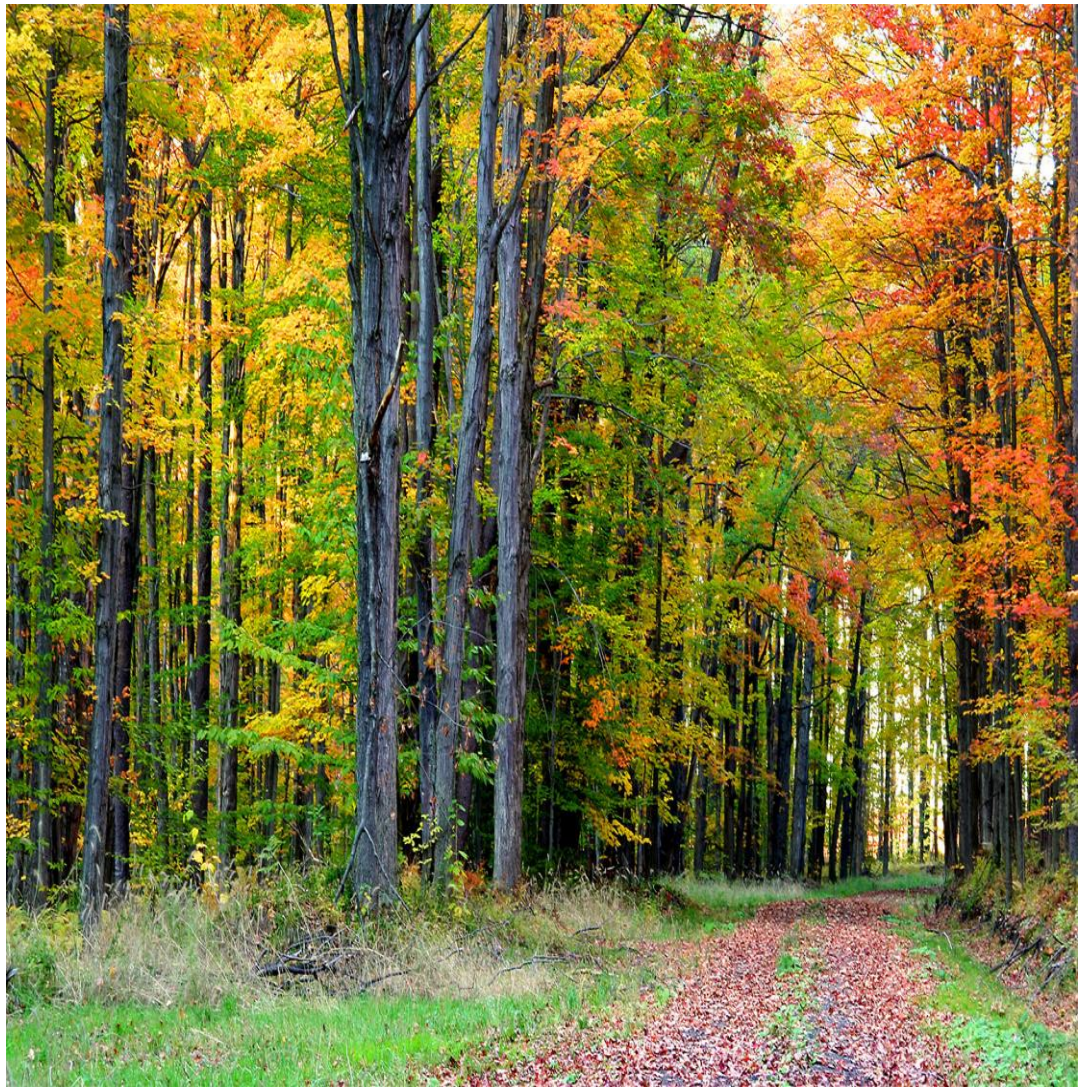
d. Temperate rainforest

Temperate rainforests are the wettest of all the types, and are found only in very wet coastal areas. Trees here are all evergreens, and are typically covered with thick moss and underbrush. Adding to its rarity is that most of the temperate rainforests outside protected areas have been cut down and no longer exist. Currently, complete temperate rainforests can only be found in select areas of the Pacific Northwest, parts of Chile and New Zealand. Small stands can be found in Great Britain and southern Australia.

Tropical Rainforest system

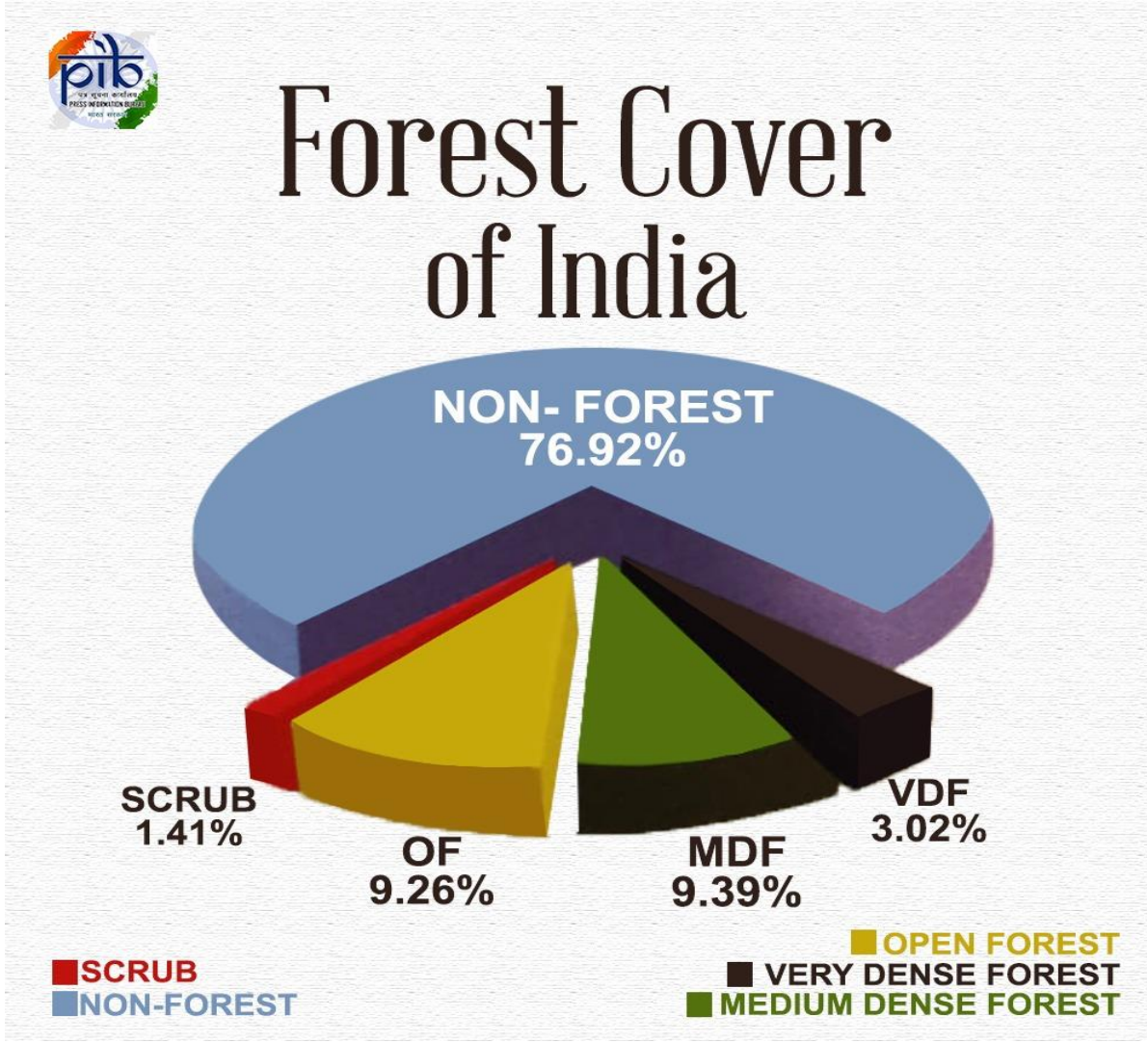
1.Tropical Evergreen Rainforest: Only a small percentage of tropical forests are rainforests where average rainfall is 80−400 inches in a year. This forest is characterised by deep and dense vegetation consisting of tall trees reaching different levels.

2. Tropical Deciduous Rainforest: The main characteristic of tropical deciduous rainforest are broad-leaved trees along with dense bushes, shrubs, etc. Two main seasons- summer and winter are distinctly visible there. This type of forest is found in many parts of the world. A large variety of flora and fauna are found here.



Tropical evergreen rainforest
and
Tropical deciduous rainforest

Forest covered in India



Forest and Tree cover of India in 2019

Class	Area (sq km)	Percentage of Geographical Area
Forest Cover		
Very Dense Forest	99,278	3.02
Moderately Dense Forest	3,08,472	9.38
Open Forest	3,04,499	9.26
Total Forest Cover*	**7,12,249**	**21.67**
Tree Cover	95,027	2.89
Total Forest and Tree Cover	**8,07,276**	**24.56**
Scrub	46,297	1.41
Non-Forest#	25,28,923	76.92
Total Geographic Area	**32,87,469**	**100.00**

* Includes 4,975 sq km under Mangrove Cover

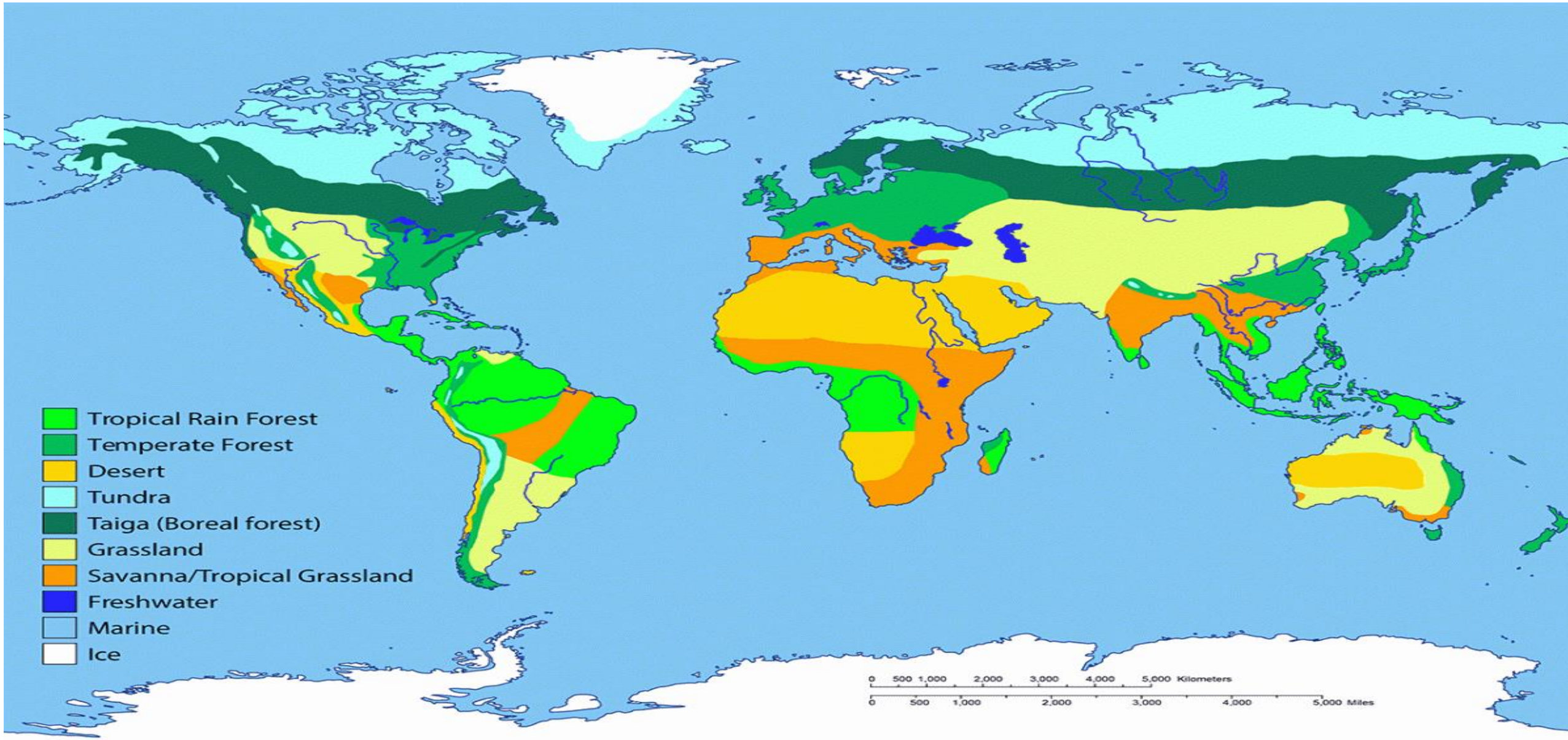
\# Non-forest includes Tree Cover (Percentage rounded off)

Boreal or Taiga forest

•The boreal forest, or taiga, occupies large regions of both North America and Asia between temperate forest and tundra.
•These regions are characterized by harsh winters, but water is not usually limiting.
•Plant biodiversity is far smaller than that of the temperate forest, with the tree community being dominated by a small number of coniferous species.
•Faunal biodiversity is also smaller than that of the temperate forest, but the taiga supports large numbers of breeding birds during the summer.
•The boreal forest holds the largest pool of living biomass of the terrestrial surface.
•It is thought to be a net sink for carbon at present, but global climate change could affect the balance of carbon fluxes.
•Taiga is a terrestrial biome with lowest annul average temperatures,with maen annul temperature generally varing from −5 to 5 °C

Pictures of boreal and taiga forest

Different types of forests all over the world



Different types of forest in India