

⇒ ^{Kinds} Types of Ecosystem : —

Natural Ecosystem →

They operate by themselves under natural conditions without any major interference by man.

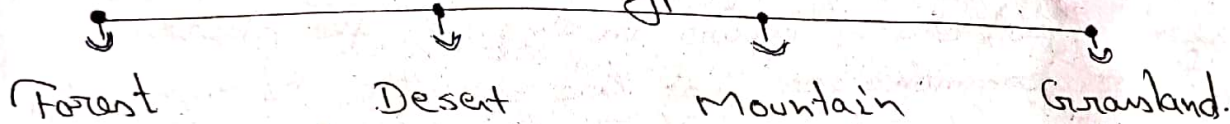
It has two major types—

(A) Terrrestrial Ecosystem → Nature of terrestrial ecosystem—

Properties 1,2,4,5,7,8,10,12)

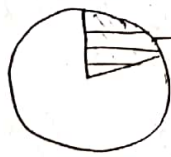
They are found in their natural state and influenced by latitude, amount & periodicity of rainfall.

Sub-Types



FOREST Ecosystem →

Forests are formed by a community of plants, which is predominantly structurally defined by its trees, shrubs, climbers & ground cover. Each forest type forms a habitat for a specific community of animals that are adapted to live in it.



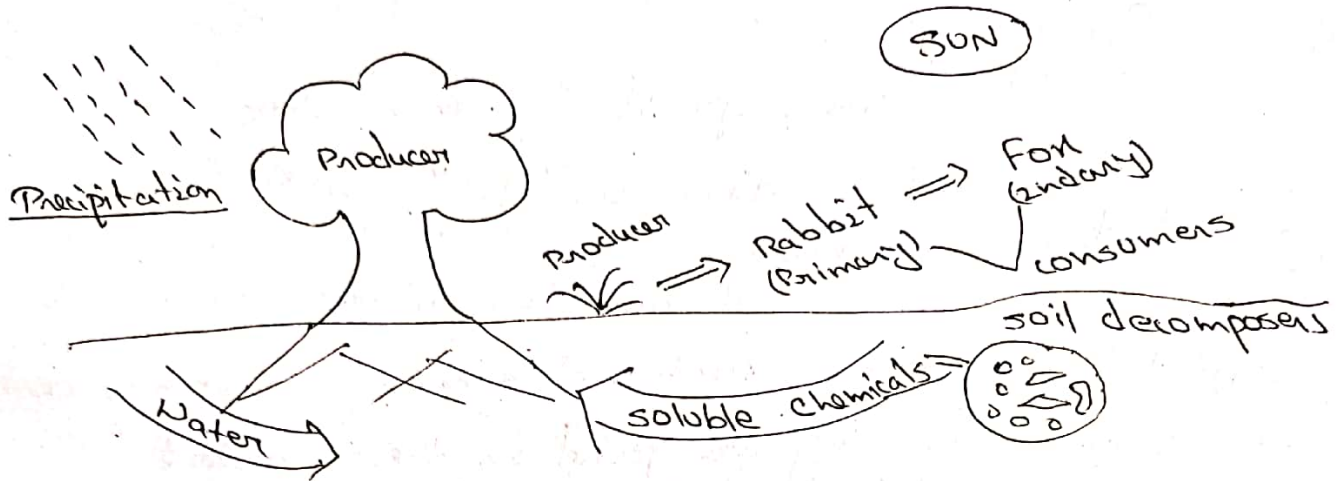
Area occupy by forest ecosystem on land.

⇒ Components of Forest Ecosystem →

(A) Abiotic Components → They consist of—

- (1) Inorganic as well as organic substances present in the soil and the atmosphere.
- (2) Minerals present in forests.
- (3) Dead organic debris chiefly in temperate climate.
- (4) Sunlight vary due to complex stratification in the plant communities.

Structure of a Forest Ecosystem



(b) Biotic Components →

The living organisms present in the food chain occur in this i.e. the plants and animals form communities that are specific to each forest type.

(1) PRODUCERS → (a) These are mainly trees of different species with great degree of stratification.

(b) Herbs & shrubs also exist here.

(c) Various types of grasses like -

Shorea robusta, Cedrus deodara, Pinus roxburghii are the main producers of forest ecosystem.

(2) CONSUMERS → They are found in different orders -

(a) Consumers of 1st order →
(Primary Consumers) These are herbivores animals which depends on producers for their nutrition i.e. food.

⇒ Animals feeding on tree leaves →

ants, flies, beetles, leaf hoppers, bugs, spiders etc.

⇒ Larger animals grazing on shoots on fruits of

Producers → Elephants, deer, nilgai, moles, squirrel, fruit bats, mongoose etc.

(b) Consumers of 2nd order →

(Secondary Consumers / Carnivores) These are mainly carnivores which eat consumers of 1st order. They are snakes, cat, hawk, eagle, frog, lizard fox etc feeding on the herbivores.

(c) Consumers of 3rd order →

Dog, fox, wolf etc are consumers of 3rd order. They eat consumers of 2nd order.

(d) Consumers of Top order →

(Tertiary Consumers) They are lion, tiger, human beings constitute top carnivores that eat carnivores of 2nd & 3rd order.

3) Decomposers → These are wide variety of microorganisms

Fungi (Polyporus, Alternaria) Bacteria (species of streptomyces) are common decomposers. They release C, N₂, P, Ca etc. back in the atmosphere by decomposing dead organisms.

* Rate of decomposition in tropical & sub-tropical forests is more rapid than that in the temperate forests.

Major Forest Ecosystem types :-

4) Taiga (Boreal / North Coniferous forest) →

Extent / Location → (a) It occurs just south of tundra across North America, Europe & Asia.

(b) In southern hemispheres eg. parts of NZ.



10% area under taiga forest.

Physical Characteristics → The conditions for life is harsh becoz of adverse climate.

(a) Precipitation → It is highly variable
→ 10-35cm in drier parts
→ >100cm in wetter parts

→ Precipitation occurs in both form i.e snow as well as rain.

⇒ Temperature & season →

→ winters are quite chilly with long dark nights.

→ Avg. temp. doesn't exceed 6°C .

→ summers are pleasant with long hours of day light.

→ Avg. temp is less than 20°C .

Growing season is for about 150 days.

⇒ Producers Biotic Components :-

(a) Dominant vegetation consist of evergreen conifers trees which form a dense canopy.

(b) Species of Pine, Fir, Hemlock, spruce, Juniper, Yew, Larch, Deodar tend to be dominant throughout.

(c) The ground flora consists of herbs, ferns, mosses and lichens.

(d) Birch and maple are found at several places while Vines & wild flowers are common.

⇒ Consumers :-

Fauna → There is a very small amount of animal biomass as well as lack of diversity.

(a) Herbivores → The invertebrates are predominant here Primary while the vertebrate herbivores are numerous in seral areas where foliage is thicker.

animals are mouse, deer, rabbit, hare, squirrels & species of insects.

(b) Carnivores → wolf, lynx, otters, elk, raven, pumas, 2ndary grouse, jay are common here.

(c) Omnivores → mainly black & grizzly bears found here.

* Migrants → Reindeer & Caribou from Tundra region.

other features :-

- 1) The primary productivity is still low compared to that of other types of forest.
 - 2) The combination of coniferous dominants which are low in nutrient cycles.
 - 3) Most decomposition is fungal since bacterial activity will be slow in these conditions.
 - 4) Forest is found growing on podzols which tend to become highly acidic.
 - 5) Limited energy is available.
- 2) TEMPERATE DECIDUOUS FOREST →

Extent → It is found in -

Northern hemisphere → Canada, E. USA, N. Central Europe, E. Asia)

southern hemisphere → New Zealand, Eastern Australia.



→ 18 million km²

▨ area under temperate forest

Physical Characteristics →

Temp./season → The areas have warm summer and moderately cold winter.

Precipitation → It lies b/w 75-150 cm.

* There is a longer growing season.

⇒ FLORA → The dominant climatic vegetation consists of following :-

Europe → There are 12 main dominant species including diff. sorts of oak, beech & ash.

N-America → 60 dominant species of chestnut, maple & hemlock.

others → Elm, Hickory, Magnolias, Poplars are other imp. species.

Shrubs are also abundant.

⇒ Other ^{forest} characteristics

- (1) Top stratum is occupied by trees reaching a height of 30-40m.
- (2) There is an understorey of small trees.
- (3) Intermediate stratum of shrubs like bluebell produced a species-rich community.
- (4) Ground stratum made of herbs, grasses, ferns, mosses and lichens; while vines are found here & there.

⇒ FAUNA → It consists of frogs, salamander, turtles, snakes, lizards, rabbits, hares, squirrels, opossums, foxes, raccoons, deer, bear, thrushes, owls, sparrows & several song birds. Animal popⁿ is more stable here.
* In winter, some animals undergo hibernation or migrate to warmer areas.

⇒ Ecosystem features:-

- (a) The primary productivity is much greater compared to others.
- (b) Larger amounts of biomass at the autotroph level & larger standing crop can be supported at the heterotroph level.
- (c) Rate & amount of energy flow is more than boreal.
- (d) Food chains are complex & long.
- (e) Deciduous trees are nutrient demanding & larger amounts of nutrients are used.
- (f) Bacterial activity is more prominent which decays the leaf-litter into mull humus.
- (g) Soil → Brown earths.

③ TROPICAL RAIN FOREST →

Extent → It occupies low-altitude areas near the equator in —

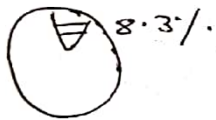
Central America — along Amazon & Orinoco rivers.
South America, Congo river basin of Africa, Central & West Africa, Malagasy republic, Indo-Malaya peninsula and New Guinea regions. S.E. Asia i.e. India.

Physical characteristics →

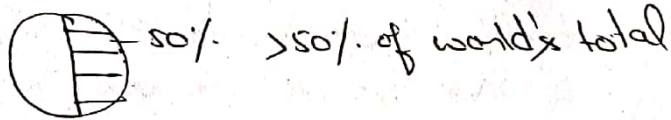
Climate / season → The hot, wet tropical climate exist. There is very little seasonality.

Precipitation → It is above 140 cm/yr. & usually 200-500 cm/yr.

Land occupied



Flora & Fauna



⇒ Flora → The vegetation shows stratification known as stratas or storeys.

Upper storey → (i) occupied by very tall emergent trees (50ft+)
(ii) Canopy is open.

2nd storey → It is constituted by tall trees (35-40) which form a dense & closed canopy.

Understorey → Also called intermediate of small trees, a shrub layer & a ground layer of ferns, mosses & herbs.

Forest others :-

(a) Epiphytic growth is rich due to humidity includes orchids, lichens, mosses & ferns.

(b) Vines & lianans are abundant especially on the edge of forests.

Imp. Plants → Rosewood, Mahogany, Ebony, Rubber tree, Figs, Artocarpus, Nutmeg, Cinnamon, some palms & bamboos.

Characteristics

- Buttress roots, dark leaves, & thin bark.
- Cauliflory or formation of flowers on stems & branches is common.
- Leaves of tall trees are leathery with drip tips for the flow of rain water.
- 200 species of trees.

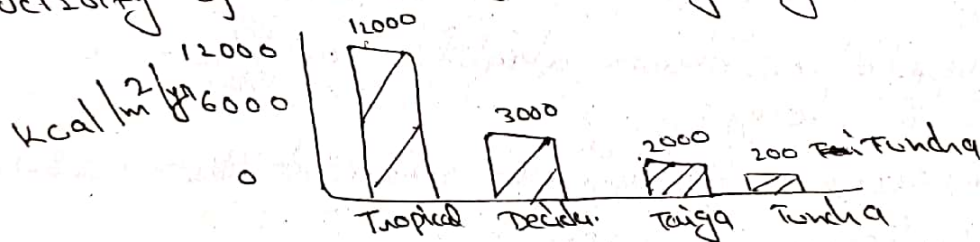
⇒ Fauna →

Upper storeys → Birds, insects, bats, monkeys, lemurs, tree frogs, lizards & anteaters.

Ground → Snakes, some lizards, deer, forest goat, antelope, tapir, elephant, leopard, jaguar etc.

Other features / Ecosystem :-

- 70-80% of world's insects & 80-85% of birds known.
- Productivity of the biome is very high with high rates



- Nutrient cycling is rapid & very few nutrients are stored in soil.
- Decomposition is accomplished quickly by bacterial action.

(Map - Pg 276)
Rupa publi. - source

⇒ Threats to the forest ecosystem :-

⇒ Consequences if forest disappear :-

⇒ Steps to conserve forest ecosystem :-

~~Source :- H.M. & P.W. G.S. book~~ Forest degradation, change of forest land into wasteland occurs. Mining, agriculture, use of fuels are also threats of forest ecosystem.

Conclusion :-

By utilising properly our natural resource we can protect forest ecosystem of our planet earth.