

Biomes:

3) A Biome or a biotic region is a major terrestrial community. It is the largest land community which can be recognised. The unit comprises both vegetation and animal life. 4)
Each and every biome is the product of the interaction of regional climates with regional biota (plant and animal life). In a broad sense, a biome may be described as an area possessing a particular set of climatic conditions. ~~These~~ these conditions give rise to a particular kind of vegetation which in turn provides home for a particular type of animal life. The biomes are the equivalent of the plant ecologies, plant formation and the geographers' major vegetation regions. The biomes are named after the predominant vegetation in any region but, they include the characteristic animal life of those vegetation regions as well. The biome is a total community and not merely a vegetation unit. A particular combination of temperature, moisture and soil conditions produce a distinctive type of vegetation which may be a forest, grassland or desert. Whatever vegetation type results will have its own characteristic animal life as well.

The totality of life resulting from particular physical conditions results in a unique biotic region. The biomes which can be distinguished at the present time have the following characteristics —

- 1) They have their own diagnostic combination of plants and animals.
- 2) They have each passed through a series of developmental stages to attain their present biotic character.

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- 3) They have each attained an approx. condition of equilibrium with the regional environment.
- 4) Each displays a condition of natural balance which differs from the equilibrium reached in any of the other biomes.
- (It should be noted that although biomes are more or less complete communities they are seldom sharply separated from one another. And one grades gradually into another community through a transition zone known as an Ecotone.) X

The Biotic Community Concept:

This is one of the most important principles in ecological thought and practice. The biotic community is constantly changing its appearance. But, it has structures and functions which can be studied and described and which are unique attributes of the group. V.E. Shelford, a pioneer in biotic community ecology has defined the community as an "Assemblage with unity of taxonomic composition and a relatively uniform appearance and with a definite trophic organisation and metabolic pattern. Communities may be sharply defined and separated from each other. But, very frequently communities blend gradually into one another so that there are no sharply defined boundaries. The community concept is important in ecology because as the community goes, so goes the organism."

Communities may be conveniently named and classified according to major structural features such as —

- 1) Dominant species, life forms or indicators

- 2) The physical habitat of the community.
- 3) Functional attributes such as the type of community metabolism.

Community in the ecological sense also known as biotic community includes all of the populations occupying a given area. The community and a non-living environment function together as an ecological system or as an ecosystem. Biocoenosis and biogeocoenosis, terms frequently used in European and Russian literature are roughly equivalent to community and ecosystem respectively.

Ecotone:

Although vegetation can be regionalised and although vegetation maps show the different formation types neatly circumscribed by bounding lines, it should be remembered that vegetation like climate breeds from one type to another. Such a transition zone is termed an ecotone—a term which has been introduced by A.G. Tansley. An ecotone can also be defined as a transition between two or more diverse communities, e.g. between forest and grassland. It is a junction zone or a transition belt which may have considerable linear extent but is narrower than the adjoining community areas themselves. The ecotonal community commonly contains many of the organisms of each of the overlapping communities and in addition, organisms which are characteristic of and often restricted to the ecotone. Often both the number of species and the population density of some of the species are greater in the ecotone than in the communities

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thinking is. The tendency for increased variety and density at community functions is known as the edge effect. One of the most important general types of ecotones as far as man is concerned is the forest edge. A forest edge may be defined as an ecotone between forest and grass or shrub communities. The major biomes of the world are as follows:

- 1) Tundra.
- 2) Northern Coniferous Forest.
- 3) Temperate Deciduous Forest.
- 4) Temperate Grassland.
- 5) Broad-leaved Evergreen Forest.
- 6) Mixed Sub-Tropical Forest.
- 7) Desert.
- 8) Tropical Savanna.
- 9) Tropical deciduous forest.
- 10) Tropical scrub forest.
- 11) Tropical rain forest.
- 12) Mountain vegetation.

Tropical Rain Forest:

The tropical rain forest biome occurs in equatorial latitudes within a few degrees north and south of the equator which are always hot, humid and wet. The tropical rain forest occurs in 5 main areas.

- i) Amazon basin.
- ii) On the coastlands of west Africa.
- iii) Congo basin.
- iv) Malay-Indonesian region.
- v) North-east Australia.

Small outlayings occur elsewhere in inter-tropical latitudes.

Climate

The average monthly temperatures are always about 27°C (80°F) and the diurnal range of temperature is greater than the annual range. Heavy convection rains fall daily. The average annual rainfall is usually about 80 inches or 203 cm. But, 2 periods of exceptionally heavy rainfall commonly occur a little after the equinoxes. There is no seasonal change or rhythm. The same sequence of weather repeats itself day after day. Such monotonous regularity is not stimulating and the climatic conditions are enervating. (This is specially true of the interior locations where the air may be still. Conditions are more pleasant in coastal localities where sea breezes bring air movement.) *

Vegetation

The constantly high temperature and the plentiful and regular supply of moisture provide optimum conditions for plant growth. Even today little is known about these impressive and productive ecosystems. The flora is extremely varied and the tropical rainforest biome probably possesses around 100,000 species. Since, natural life thrives in hot, humid climate, the outstanding characteristic of this biome is the richness of this natural life not only plant but, animal or micro-organism life as well.

The biome whether occurring in South America, Africa or Australia possesses certain features in common:

1) They are evergreen because owing to the lack of any dry or cool seasons, there is no general period of leaf fall - germination, growth, flowering, fruiting, dying go on side by side.

2) They show a wonderful wealth of plant species comprising trees, shrubs, ferns, epiphytes and parasites. They usually exhibit a stratification into layers or tiers.

In the struggle for light and air, trees grow tall and trunks are usually supported by huge buttresses. The foliage forms a canopy at roof top level. Tree peckers frequently suspend their roots through the air securing food and water from the atmosphere. Parasites find space by using the forest trees as hosts while the trunks and branches of trees are often entwined by thick stemmed mid-air creepers or lianas. In coastal areas, the forests often terminate in mangroves where the stilt-like roots of mangroves hold the trees firmly in the mud of tidal flats.

Species Composition -

The tropical evergreen rainforest biome accounts for the largest number of plant species, though there is uniformity and similarity in the life forms and the structure of the plants in all parts of this biome. There is much variation in the composition of the plant species. There are numerous types of plants in the various parts of the ~~tropics~~ Tropical Evergreen Rainforest biome. e.g. 6000 to 7000 species of flowering plants in West Africa; 20,000 species of flowering plants in but quite different from West Africa in

Malaysia; 40,000 species of flowering plants in Brazil and 2000 species of flowering plants in Panama Canal zone have been identified.

Types of vegetation:

Tree—

Tree is the most significant member of the Tropical Evergreen Forest. The number of species is very large. The tree species account for 70% of the total plant species in the Tropical Evergreen Rain Forest. Creepers and climbers are the 2nd important floral members of the rain forest. This belong to the category of vines and range in form from stream-like stems to massive cable-like forms. Climbers are divided into 2 major groups by P.H. Richards ~~off~~

- 1) e.g. Climbers of the lower strata of the forest include herbaceous plants.
- 2) Long woody climbers known as Lianas are found in all strata of the forests.

Epiphytes—

A 3rd type of tropical climber is known as Epiphytes which do not have their roots on the ground rather they are evolved on the trunks, branches, leaves of trees, shrubs, herbs, climbers etc. They live in almost all the strata of the forests and they do not require climbing ability as a grow upward and reach the uppermost canopy of the forest in search of sunlight. This epiphytes provide certain habitats to micro-organisms such as earthworms.

snails, centipedes, scorpions, ants, grasshoppers, snake lizards and a host of insect larvae.

Vertical stratification—

The vertical stratification of the vegetation community means the composition of plant assemblages from the soil surface or ground surface to the uppermost forest canopy. (Thus, the different strata of the vertical profile of plant community in a given region represents different layers or habitats of different plant groups.) There are 5 layers or strata from the ground to the uppermost canopy of the Tropical Evergreen Rainforest biome out of which upper layers consists of trees:

i) Forest or top layer (strata)—

It represents the upper canopy of the tallest trees of the forest. The top surface of the uppermost strata is an umbrella but, the level is not uniform rather it is discontinuous and wavy in character. This layer receives maximum of sunlight. The height ranges between 45 and 60 m and is also called the Dominant

ii) Second layer—

Second layer is formed below 1st and uppermost layer of the forest at the height of 25 to 30 m. It is called the Co-dominant layer. The upper part of this layer is map-shaped.

iii) 3rd layer is formed of lianas and

trees, the crown of which is at the height of 15-20 mts from the ground surface.

iv) 4th layer represents the shrub layer and is not continuous, rather it is fragmented and sporadic in nature. This layer also includes some saplings and young trees (less than 5 mts in height). (This is called the shrub layer and) the crown is usually 5 mts from the ground.

v) 5th or ground layer represents the plants growing at the ground surface dominated by herbaceous plants and ferns of height not more than 2 mts.

Animal Life —

These are some unique characteristics of the animals of the Tropical Rainforest biome which are not observed in other biomes: 1) There is regular growth of plants throughout the year and therefore there is regular and constant supply of abundant food for the animals with the result they do not have to migrate for food and hence, animals of this biome are less mobile.

ii) The forest is full of animal activities throughout 24 hours because animals of different species live in the different strata of the forests. Some of this are active during the day while others are nocturnal.

According to P.H. Richards, during the day the biological environment of the lowest strata or the ground layer is

made lively through the activities of ^{various} species of deer while monkeys jump from branch to branch of smaller trees. The upper strata are made lively through the curassows (a type of South American bird) and numerous colourful humming birds and numerous butterflies make the environment of the lower strata very charming. (While numerous lizards and other climbing animals move vertically along the stems and branches of trees of different vertical strata.) X

The ground animals have to pass through the dense and thick covers of trees, shrubs and clambes and thus, they have acquired special qualities to make their way through the forest. Mammals generally have larger and sturdy bodies so that they can pass through dense veget. Some ground animals are very small in size but, are very much mobile and clever so that they can pass through dense vegetation. The 3rd category of ground animals includes hidden organisms belonging to the group of cryptozoic animals. (They live beneath stones, logs, dead branches of trees, litter of leaves etc.) X

The number, density and diversity of animals in the Tropical Evergreen Rainforest biome increase from the ground layer to the increasing strata upward because of the fact that food supply also increases upward to the ground strata due to increasing trend of sunlight in the same direction. Sunlight is essential for the plants to manufacture food through the process of photosynthesis.

Stratification of animals —

J.L. Harrison in 1962 has divided the animals of Tropical Rain Forest biome into 6 categories —

I) Upper Air Animal Community—

(The upper surface of the canopy of the topmost strata of the rain forest) ^{the} is dominated by insectivorous birds and bats but a few species are also carnivorous.

II) Main Canopy Animal Community—

Main Canopy Animal Community includes those birds and fruit bats which live in the canopy of the tallest trees forming the uppermost strata. The important animals of the topmost canopy of Amazonia are parakeets, barbets, bill birds etc. A few mammals such as squirrels and monkeys are also found in this strata.

III) Middle zone flying Animal Community—

This includes mostly flying birds and insectivorous bats.

IV) Middle zone climbing Animal Community—

The animals of this zone have various climbing mechanisms. (and they reach the topmost stratum through the stems and branches of trees and climb down to the ground strata.) This belong to both carnivorous and herbivorous animals.

V) Large ground Animal Community—

(This includes mostly animals but, there are also some birds in the ground strata.) These animals have large but sturdy bodies and lack in climbing.

qualities and mechanism. The herbivorous large animals are few in number, important being mouse, deer and cassowaries. The largest animals of the Tropical Rain Forest are smaller in size than their counterparts in other open forests and grasslands because here the ground animals have to pass through dense vegetation, cover and therefore, they have been provided relatively smaller bodies but with great power and strength so that they can make their way through dense forests.

VI) Small ground Animal Community—

This includes small animals and micro-organisms. Most of these are insectivorous such as Argus Pheasant, Peacock Guinea Fow, etc.

Ecological Productivity: The Primary Productivity of the Tropical Rain Forest biome is the highest of all biome types. This biome represents 13% of the total geographical area of the world but this biome accounts for 40% of the total NPP of the world.

The conditions prevailing in a Rainforest environment exert a profound influence upon man. In general, the Rainforest environment is an unhealthy one and people living in it frequently show a low state of health. Agriculture is difficult except in the more open areas. Transport and communication are not easy in the Rainforest as waterways have always provided the chief of communication.

Temperate grassland:

Location.—

In mid-latitudes and typically in mid-continental regions. The principal temperate grassland areas in the Northern Hemisphere are the Great Plains ~~flora~~ region of North America, the Steppe belt of Eurasia and the Plains of Manchuria. In the Southern Hemisphere there are also 3 areas—

The Pampas of Argentina—Uruguay,
The Veld of the South Africa,
The Interior Plains of the Murray—Darling
basin of Australia known as Downs and
The ~~Antagony~~ grassland of New Zealand, South
Island ~~Antarctica~~
In Hungary, the Steppes are called ~~Pustoz~~ Pustoz.

Climate—

The Temperate grasslands lie typically in mid-continental areas between approximately 30°N – 50°N in the Northern Hemisphere but, in rather lower latitudes in the Southern Hemisphere. In the Northern Hemisphere, the temperate grasslands have strong seasonal temperature contrasts with cold winters (several months are usually below freezing and hot summers). Winters are much less severe in the Southern Hemisphere and the ^{July} rainfall temperature is greatly reduced, to the narrower width of the southern continents in the temperate latitudes. Characteristically, the temperate grasslands have a low total precipitation about 15–20 inches. The exception to the

general rule is the humid Pampa of Argentina where rainfall is appreciably greater and in coastal areas may be as high as 40 inches. Rain, mainly of the convectional type comes in late spring and early summer. There is occasional light snow in the Northern Hemisphere.

Vegetation Community—

Grasses are the most dominant in both hemispheres. The perennial grasses of this biome are considered to be the climax community. Some herbaceous plants are also found in this biome but, trees and shrubs are absent. This biome exhibits close relationships among vegetation types, soil types and climatic condition and between plant and animal communities. The temperate grassland biome is unique because it has single-layer structure of vegetation community where the upper canopy of grasses is formed by their leaves but, for a short period the flowering stalks join it and add beauty to the top layer.

As the vast areas of this grassland had now been cleared for agriculture they have become the granaries of the world and the heartland of the world's dairy industry. A brief description of the vegetation characteristics of each region is given below.

1) Temperate Grasses—

These extend from eastern Europe to western Siberia and are divided into 2 sub-types on the basis of vegetation.

7. i) Forest Steppe.
 ii) Grass Steppe.

The former consists of alternate bands of woodland and open Steppe represented by Oak, Elm and Maple in Europe and Birch and Betula in the Siberian part. The intervening strips of open Steppe in the forests are meadow Steppes characterised by grasses. The soils of the woodland Steppe are degraded Chernozem, while further south the grass Steppe is characterised by true Chernozem soil.

ii) North American Prairie —

This has developed in the U.S.A. and Canada between the Rockies in the west and the temperate deciduous forest biome in the east. On the basis of decreasing trend of mean annual precipitation from east to west and a gradient of falling NPP. These are divided into 3 sub-regions namely —

- 1) Tall grass Prairie.
- 2) Mixed grass Prairie.
- 3) Short grass Prairie.

Some of the most dominant species of tall grass are blue stem and Switch Grasses (1.5-2.5m) and that of mixed grasses are Little Blue Stem, Needle Grass, Tame Grass and Buffalo Grass (0.6-1.2m).

iii) South American Pampas —

They are most extensive in Argentina and are comparatively more humid

than other grasslands. The mean annual precipitation decreases from east to west. Thus, these are divided into two sub-types, viz. —

- i) Humid Pampas.
- ii) Sub-humid Pampas.

The important grasses of the Pampa include *Panicum*, *Lolium*, *Bromus* etc. These grasses have multi-layered structure which is the result of the availability of moisture, soil and effects of grazing by the animals.

iv) African Veld —

Veld has developed on the high plateau land of varying heights in the South-eastern part of South Africa. The growth of plants is not possible due to uncertainty of rainfall, increasing acidity, severity of frosts and high diurnal range of temperature. Thus, the true climax community has developed. There are much variations in the composition and structure of grasses because of variations in the topographic characteristics, soils, altitudes and climatic conditions. Based on the above, the South African Veld biome is sub-divided into three types:

- i) Thornveld.
- ii) Alpine Veld.
- iii) Savanna Veld.

v) Australian Downs —

These have developed in the south-eastern parts of Australia and the northern parts of Tasmania and are characterized by —

- i) Relatively warmer winter season than the Eurasian Steppes and North American Prairies.

1) Mixture grasses with eucalyptus trees — the grass-lands change from south to north with the decreasing trend of mean annual precipitation from south to north. Thus, three distinct types of grasslands are found in the Australian Downs.

- i) Temperate Tall Grasslands.
- ii) Temperate Short Grasslands.
- iii) Xerophytic Grasslands.

ii) Grasslands of New Zealand —

Canterbury

The original grassland was developed in the eastern part of Southern island and central part of Northern island but man transformed the original structure by his economic activities. At present, there are 2 main types of grasses —

- i) Short Tussock grasses — About 50 cms tall and
- ii) Tall Tussock grasses — They are found over relatively higher grounds.

The average NPP of the Temperate Grassland biome is 600 dry gm/m²/year — whereas the total NPP of all the regions of this biome in the world is 5.4×10^9 tons/year.

Animal Community —

The Animal Community of the Temperate grassland is characterized by a unique property that every grassland region of both the Hemispheres is dominated by a few species of large mammals. Secondly, the large herbivores are endowed with sturdy bodies so that they are able to protect themselves from predator animals and thirdly, the

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grazing mammals have developed migratory habits. Despite of the aforesaid similarities, there are some regional variations as well.

i) The most important animals of Eurasian Steppes are antelopes and rodents (burrowing animals). Predator animals include wolves, eagles, large weasels etc. which depend on rodents for their food.

ii) The bisons and prong-horns dominated the animal community of the North American Prairies. There are numerous species of rodents such as prairie dogs, predator species such as eagles, ~~fox~~ foxes and wolves are also found but, have decreased in number as most of the grassland has been cleared for large-scale agricultural development.

iii) In the South American Pampas, deer is important ~~Among~~ ^{among} many species of herbivores whereas rodents mainly ~~Vizacha~~ ^{Vizacha} and Mara are important burrowing species of animals. Rhea is very important flightless species of birds. The Pampas are enriched by many migratory seasonal birds such as ~~herons~~, herons, geese, ducks etc.

iv) The animal life of the South African Veld has been modified and effected by human activities. The region was earlier enriched by large herds of game, antelopes, jackals, lions, leopards and zebra but, now these animals have been replaced by domesticated animals such as cattle, sheep and weasels. Some of the birds and most of the rodents are still found in this biome. Spicing Hare is the important species of rodents whereas important species of

Carnivorous browsing animals include yellow mongoose.

- v) The Australian biomes are dominated by kangaroos which are of 3 types -
e.g. a) Great kangaroos,
b) Grey kangaroos,
c) Wallaroos.

The introduction of sheep for commercial purposes has also altered the composition of animal community in this grassland biome.

Emu is the typical flightless bird species of this region.

- vi) The New Zealandian grassland biome is characterised by almost general absence of herbaceous mammals. Previously, this biome was inhabited by giant flightless birds - the Moas.

Man and the Temperate grassland biome:

The climatic conditions, resultant soils, natural and transformed regional vegetation, animal communities and of course man produced an unique interactive temperate grassland biome ecosystem but, the dominant activities of man and their widespread impacts on the total transformation of this biome have altogether changed the very nature of this biome and have led to the emergence of several ecological and environmental problems -

- i) The conversion of natural grasslands of this biome resulted in the obliteration of natural habitats of the animals of numerous species.
- ii) Large-scale hunting of animals have resulted in

the phenomenal decrease of the population of some animals, migration of some animals to other areas and disappearance and extinction of some animals.

III) The introduction of new species of exotic animals has altogether changed the composition of native vegetation.

IV) The introduction of new species of exotic plants in many parts of the temperate grassland has either suppressed the native natural vegetation or has eliminated many plant species.

V) Extensive cultivation of the semi-arid Prairie region of the Great Plains of U.S.A. has resulted in the enormous deflation of dry, loose and friable soils by wind which generates dust storms causing great damage to crops and human property.

VI) The large-scale removal of vegetation for agricultural purposes has resulted in the loosening of the soil cover which further accelerates the rate of soil erosion and therefore, loss of otherwise rich and fertile soils.

Taiga biome :

Location and extent —

The Boreal forest biome also called the Temperate Coniferous Forest Biome or the Taiga biome. Represents the Taiga or the Siberian type of climate and includes the area of some Arctic regions of North America (extending from Alaska of U.S.A. to Hudson of the east) and Eurasia (from the Scandinavian Peninsula across Russian Siberia to the ~~Bering~~ Bering Sea).

Climate —

The Taiga or Siberian Climate of the Boreal Forest or the Temperate Coniferous Forest Biome is characterized by continental climate marked by bitterly cold winter of long duration and brief cool summer season. Spring and autumn are nearly brief transitional period between summer and cold seasons. The 10°C isotherms of the warmest month forms the northern boundary of this biome. The winter months are always below the freezing point. The temperature of the coldest and warmest month in the Moscow are -12°C and 20°C respectively. Thus, the annual range of temperature becomes 32°C . Verkhoyansk of the Soviet Siberia records the lowest temperature of -68°C . Soil water is frozen for 5-7 months of the winter season in continuation.

Vegetation Community —

The Coniferous trees are the most dominant members of the Boreal Forest Biome. The Coniferous trees are well adapted to the

extreme environmental conditions of the Siberian climate in this biome. This tree form a dense cover of forests which are the richest sources of the softwood in the world. These trees are used for various purposes, e.g. for building, construction, furniture, matches, paper and pulp, rayon and other branches of chemical industry.

There are four major species of evergreen trees, e.g. 1) Pine, 2) Fir, 3) Spruce, 4) Larch.

Besides, a few species of Temperate deciduous trees have also developed in the biome mainly in those areas which have been cleared by man through felling of original Temperate Coniferous tree. Thus, the Temperate deciduous tree represent the secondary succession of vegetation.

On the basis of regional variation in the overall characteristic of vegetation communities, the Boreal Forest or the Temperate Coniferous Forest Biome were divided into 2 sub-types —

e.g. 1) The Eurassian Temperate Coniferous Forest Biome and

2) The North American Coniferous Forest Biome.

Eurassian Temperate Coniferous Forest Biome —

The Eurassian Temperate Coniferous Forest Biome stretches over distance of some 5000 miles or 8000 kms from the Atlantic coast of Scotland and Scandinavia to the coast of North Pacific. The European part of formation is less which is than the Asiatic part. Within this great belt of Coniferous Forest it is possible to distinguish 5 main types —

- i) The Fennoscandinavian Forest.
- ii) The ^{Finn} Forest.
- iii) The West Siberian, Siam Forest.
- iv) The East Siberian Forest.
- v) The Pacific Coast.

To this type, a 5th form may be added that is the mountain forest occurring in the mountains of Central Europe. The Caucasus and the Ta Khingashan which are mainly Coniferous Forest consists of Fir, Pine and Spruce with which are frequently mixed in lower latitude temperate deciduous species of Oak, Chestnut, Birch.

North American Coniferous Forest Biome —

The Boreal Forest of North America is very similar to that of Eurasian but, there are 2 differences:

- 1) There are more species in the North American formation than in its Eurasian counterpart, and
- 1) The Dominants varying from area to area within the American formation.

Although the American forest more or less same across the ~~to western~~ ^{to western} and eastern part are different. The most widespread tree is the White Spruce which occurs from the Atlantic coast although may across Canada to Alaska in the eastern sector of the formation, the white spruce is accompanied by ~~larch~~ ^{larch}. These are associated with better drained soils while the better grain soils are dominated by the Jack Pine, the Black Spruce and the Tamarack. These eastern dominants are replaced in the west by the Alpine Fir and the Lodge Pole pine. The Coniferous Forest sometimes have a Willow and Birch undergrowth.

The Mountain Coniferous Forest

The altitudinal climatic changes associated with mountains result in altitudinal zones of vegetation. Therefore, Coniferous Forest are found in the North American Cordillera, the Alps etc.

Animal Community

Animals of the Taiga Biome are divided into 2 categories on the basis of functions and feeding habits:

- i) Sap Sucking Species. Bumming
- ii) Grazing and ~~grazing~~ grazing species.

V.E. Selys in 1963 divided the animals of the Taiga Biome into 3 major groups on the basis of effects of animal in the biome mainly—

- i) Dominant Animals.
- ii) Influent Animals.
- iii) Minor Influent Animals.

The Dominant Animals affect the biome to such an extent that the ecosystem that is the vegetation community and in turn the other animals are transformed. The dominant animals include the large herbivorous animal such as moose. The Influent Animals include the vertebrate Carnivorous animals and man, but man should be included in dominant animals because he has been the most powerful destroyer of forests in the last 100 years. The Minor Influent Animals include mostly invertebrate, carnivorous animals and parasites. Caribou and Moose are the important herbivorous animal of the boreal

Forest or Taiga Forest Biome. They help in maintaining the ecological balance of this biome. The dominant crecta carnivorous animals include Hönber wolf, Lynx, White bears and Wolverines are important species of scavengers.

The Taiga Biome is characterised by the seasonal migration of some animals southwards into Temperate Deciduous Forest Biome and some grasslands in winter. A few animals migrate northwards into Tundra biome in summer. Most of the animals of this biome have thick skin and fur such as moose, Marten and Beaver. There are also some hibernating animals. Insect life is prolific in summer. The swarms of insects attract many birds of migratory nature.

The average NPP of the boreal forest or the Taiga Biome is 800 $\text{gms}/\text{sq. m}/\text{year}$ whereas the total Primary Net Production of all the Boreal biomes of the world is 9.6×10^9 tonnes/year.

Man and the Taiga Biome:

The Taiga still remains one of the few substantial areas relatively untouched by man. Along the southern margins of the forest, human settlement has long taken place and there is a continuing tendency for man to colonise these southern fringes, but, even where the climate is suitable for hardy crops, the acid Podzols are of limited agricultural value and their infertility restricts tillage. In the early days, hunting and trapping were almost the only occupations but, due to depletion of many fur-bearing

animals that has been restricted. At present the greatest value of the Coniferous forest land economically lies in their timber resources specially lumber and wood pulp. The wholesale destruction of vast areas of the forest occurred during the 20th century but, in most countries now, a policy of conservation and replanting has been adopted to ensure a continuing resource. The Coniferous forest apart from their timber and sporadic mineral wealth offer little to man and therefore, large areas will continue to remain in their pristine stage for a long time to come.