I welcome you all for today's presentation. The program is Bachelor of Science, subject Botany, Semester 6, course code is BOC- 110 and the course title is Plant Ecology and phytogeography.

The title of the unit is phytogeography, module name is Phytogeographical divisions of India.

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The outline of this model includes phytogeography, phytogeographical divisions of India and, characteristics of each of these division.

Upon completion of this module, students will be able to define the term phytogeographical region and also will be able to explain the phytogeographical divisions of India.

The term phytogeography has come from two Greek words *phyton* meaning plants and *geographia* meaning distribution.

It is the branch of biogeography which deals with the geographic distribution of plant species and their influence on the earth surface.

It is also known as botanical geography.

A phytogeographical region is an area of uniform climatic conditions having distinctly recognizable type of vegetation. These regions are also called as botanical regions or floristic regions.

Total nine phytogeographical regions have been recognized in India and all these regions have different type of vegetation, climate and rainfall.

In these regions, the plant distribution is controlled by factors like temperature, altitude, rainfall, moisture and intensity and duration of light and, also depends on types of soil and biotic factors.

Chatterjee in the year 1962, divided India into nine phytogeographical divisions, which includes Western Himalayas, Eastern Himalayas. Indus Plain, Gangetic Plain, Central India, Deccan Plateau, Western Coast of Malabar, Assam and Andaman and Nicobar. Now coming to the first phytogeographical division, the Western Himalayas.

It consists of Kashmir, Himachal Pradesh, part of Punjab, Garhwal and Kumaon and this zone is wet in the outer southern region and, dry in the inner northern region.

The average annual rainfall received by this region ranges between 100 to 200 centimetres and the snowfall is seen only in the winter season.

Western Himalayas are further divided into 3 sub zones altitudinally, Sub montane zone, Montane or temperate zone and Alpine zone.

Coming to sub montane, it includes outer Himalayas, comprises mostly of Siwalik ranges. Ranges between 300 m to 1500 m above the sea level and the forests are mainly tropical and subtropical type.

This zone is dominated by plants like *Shorea robusta, Salmalia malabarica, Butea monosperma, Acacia catechu* and *Zizyphus* species whereas in the swampy areas plants like *Dalbergia sissoo, Ficus glomerata, Eugenia jambolana* are of common occurrence whereas species of pine are seen at higher elevations and ground vegetation is very scanty in this zone. These are the images of plants which are of common occurrence in this zone. And these are some of the plants seen in the swampy area which includes *Ficus glomerata, Eugenia jambolana* and *Dalbergia sissoo* 

Coming to the next montane or temperate zone, which extends in the Western Himalayas between the altitudes 1500 meters and 3500 meters, and dominated by plant species like *Populus*, *Rhododendron*, *Betula*, *Pyrus*, and the common herbs of the zone includes *Ranunculus hirtila*, *Polygonum*, *Primula*, *Clematis* etc. Some of the plants which are seen in the regions receiving heavy rainfall includes *Pinus excelsa*, *Cedrus deodara*, *Picea*, *Abies*, *Cupressus*, *Taxus baccata*. But in Kashmir, the plants which are of common occurrence are birch cane poplar *Quercus* and Chestnut.

Coming to the Alpine zone which extends between 3500 meters and 4500 meters altitude, receives very scanty rainfall, and the climate in this zone is very cool and dry.

The vegetation comprises of Alpine forests with scrubs and meadows and dominated by plants like *Abies, Betula, Juniperus, Rhododendrons.* In the upper Alpine region. Herbaceous plants which are of common occurrence are *Polygonum, Primula, Cassiope, Saxifraga, Geranium, Aster, Potentilla.* 

Coming to the second Phytogeographical division that is Eastern Himalayas which extends from Sikkim to Assam. In its vegetational zone it is similar to western Himalayas and have greater variety of oaks and Rhododendrons and less conifers as compared to Western Himalayas.

It is characterized by heavy monsoon rainfall, less snowfall, high humidity and higher temperature. Eastern Himalayas are further divided into three zones like tropical zone, temperate zone and Alpine zone.

The tropical zone in eastern Himalayas extends from the foothills up 1850 m altitude and comprise the vegetation like tropical semi evergreen or moist deciduous forest.

The dominant plants of the zone includes *Shorea robusta; Dalbergia sissoo; Acacia catechu; cedrela toona, albizia procera, terminalia salmalia and bamboo species.* 

The temperate zone extends between 2800 meters to 3000 meters altitude. Vegetation comprises mainly of montane temperate forests and dominated by plants like *Michelia, Quercus, Pyrus*, etc. at lower levels whereas at higher cooler levels the plants of common occurrence are *Juniperus, Cryptomeria, Pinus, Salix, Rhododendron, Arundinaria*.

The Alpine zone extends from 4000 meters up to snow line and the climate is very cool and dry in this zone. This zone is devoid of trees and dominated by plants like *Junipers, Rhododendron*.

Coming to the third phytogeographical division, the Indus Plain, this region includes arid and semiarid regions of Punjab, Rajasthan, Kutch, parts of Gujrat and Delhi. The climate is very hot and dry in the summer and cold in the winter and this region receives rainfall less than 70 centimetres and dominated by Bushy and Thorny vegetation.

The dominant plants of this region are Acacia arabica, Prosopis species, Tamarix species, Salvodora species, Eugenia species, Mangifera indica, Dalbergia sissoo, and Albizzia lebbeck.

The next region is Gangetic Plain. It is the region having richest vegetation in India and this region extends over Uttar Pradesh, Bihar, Bengal and part of Orissa. The average annual rainfall received by this region ranges between 50 centimetres to 150 centimetres from East to West.

The vegetation comprises of tropical moist deciduous forests and dry deciduous forests.

Some of the dominant plants of this region includes *Dalbergia sissoo; Acacia arabica; Butea monosperma; Acacia catechu; Ficus religiosa*. Weeds and grass likes, *Xanthium, Cassia, Amaranthus* etc.

Coming to the next phytogeographic division that the Central India it comprises of parts of Madhya Pradesh, Orissa and Gujarat and receives average annual rainfall ranging between 150 to 200 centimetres.

The vegetation consists of thorny mixed deciduous antiques, teak forest, and dominated by plants like *Tectona grandis*, *Shorea robusta*, *Butea monosperma*, *Dalbergia sissoo*, *Terminalia*, *Carissa*, *Acacia* and *Mangifera*.

These are the images of some of the plants which are seen in this region like *Carissa*, *Butea monosperma*, *Shorea robusta*, *Mangifera indica* and *Tectona grandis*.

Coming to the 6<sup>th</sup> phytogeographical division the Deccan Plateau. This region includes Southern peninsular India comprising of Andhra Pradesh, Tamil Nadu and Karnataka. It receives average annual rainfall up to 100 centimetres.

The vegetation comprises of tropical dry deciduous forests in the **central hilly plateau** and tropical dry evergreen forests in the lower eastern dry Coromandel Coast.

The plants which are of common occurrence in this region are *Boswellia serrata*, *Tectona grandis*, Chandan that is *Santalum album*, *Cedrela toona*, *Phyllanthus*, *Euphorbia*, *Capparis* and, halophytic species are seen in the Coromandel coast.

Coming to the 7th Phytogeographical Division Western Coast of Malabar.

This region extends from Gujarat to Kanyakumari, receives heavy rainfall over 400 centimetres and it has four types of forests- tropical forest, mixed deciduous forest, Temperate Evergreen forest and, mangrove forest.

When you look at the plants of these forests, the tropical moist Evergreen forest is dominated by plants like *Cedrela toona, Mangifera indica, Artocarpus hirsutus, Sterculia alata* whereas, mixed

deciduous forest comprised of plants like *Terminalia species, Tectona grandis, Dalbergia sissoo, Bamboo* species. In the temperate evergreen forests, which are commonly known as Sholas plants like *Gardenia obtusa, Michelia nilagirica, Eugenia* species are seen. Whereas the mangrove forest shows presence of mangrove plants.

Coming to the eight phytogeographical division, Assam. This is a region which receives heaviest of rainfall. It is rich in vegetation and covers most of the Assam. It covers valleys of Brahmaputra, Naga hills, Manipur and receives rainfall between 200 to 1000 centimetres. Cherrapunji is the place which receives highest rainfall of over 1000 centimetres.

The vegetation comprises of dense evergreen forest or subtropical forest.

The dominant plants of these regions are *Bambusa pallida*, *Shorea robusta*, *Ficus elastica*, *Dipterocarpus macrocarpus*. Here are the images of plants which are seen in this region. *Bambusa*, *Shorea* and *Ficus*.

Grasses like *Saccharum* species, *Imperata cylindrica, Themeda* species are also present in this region. insectivorous plants like *Nepenthes*, epiphytes like ferns and orchids are also of common occurrence. In the northern cooler regions' plants like *Alnus nepalensis, Rhododendron arboreum, Mangifera indica* and *Betula* species are also found whereas in the hilly tracts, some of the conifers like *Pinus khasiya* and *P. insularis* are found.

Now coming to the 9<sup>th</sup> Phytogeographical division- Andaman. This region includes islands of Andaman and Nicobar. The climate in this region is warm and humid and it has very high temperature.

The vegetation comprises of mangrove and Beach forests at its coasts and Evergreen forests in the interiors and some of the plants of this region includes *Rhizophora*, *Mimusops*, *Calophyllum*, *Lagerstroemia*.

Here are the references which are used for creating the e content, thank you.