

## Annexure 6

# Descriptions of the 16 Major Forest Type-groups According to Champion and Seth (1968)<sup>1</sup>

## **Tropical Wet Evergreen Forest**

These are tall, dense and multi-layered forests generally found in regions having rainfall in excess of 2500 mm. The total area under these forests is about 4.1 million ha, distributed mainly in the Western Ghats, Upper Assam, Arunachal Pradesh, Andaman and Nicobar Islands. The flora in these forests has Malayan affinities. Bamboos and canes occur in specific locations. Ferns and epiphytes are also common.

## **Tropical Semi-evergreen Forest**

These forests occur in areas adjoining tropical wet evergreen, and form a transition between evergreen and moist deciduous forests. They are found locally in the Western Ghats, Assam, Arunachal Pradesh, parts of Orissa and Andaman and Nicobar Islands. The total area under this forest type is 2.4 million ha. The growth of this forest is poorer when compared with that of wet evergreen forest. The canopies are not continuous and species richness is lower. Bamboos, canes, ferns, and epiphytes are abundant.

## **Tropical Moist Deciduous Forest**

These forests occur over an area of 22.4 million ha, distributed mainly in the Western Ghats, Assam, Arunachal Pradesh, Mizoram, Bihar, West Bengal, Orissa, and Uttaranchal. This forest type occurs in a strip along the foothills of Himalaya, another strip along the east side of Western Ghats and in a large area in Chhota Nagpur and north-east hills. These forests are common in areas where rainfall is 1500-2000 mm with a dry season of 4 to 6 months. The most important forest communities are those consisting of sal (*Shorea robusta*) and teak (*Tectona grandis*). The teak forests are characteristics of southern form, whereas sal forests form the greater proportion in the northern form. Bamboos are quite common. *Bambusa arundinacea* and *Dendrocalamus hamiltonii* are the most common bamboo. These forests are usually 2 to 3 layered with a much lower number of species as compared with the earlier type-groups.

## **Littoral and Swamp Forests**

These forests consist of evergreen species of varying densities and height, usually associated with mesic habitats. These forests occupy an area of 0.7 million ha along the coast. These forests are mostly in their developmental stage and are seral in nature; they occur throughout the country, wherever wet and waterlogged conditions prevail. The littoral and tidal forests occur along the coast, the latter being especially associated with deltas of larger rivers. Swamp forests occur in north-east India along major river systems. Mangrove forests are generally dominated by trees of the genera – *Rhizophora*, *Avicennia*, *Sonneratia*, *Bruguiera*, *Kandelia* and *Ceriops*. Some genera like *Heriteira* and *Xylocarpus* could be locally important, as in Sundarbans. The tidal and swamp forests are dominated by several evergreen and semi-evergreen species, while species like *Barringtonia* spp, *Syzygium cumini*, and *Dillenia* spp occur in seasonal swamps. Fresh water swamps contain species such as *Terminalia arjuna*, *Lagerstroemia speciosa*, *Trewia nudiflora*, and *Myristica* spp.

## **Tropical Dry Deciduous Forest**

These forests occur from Kanyakumari to the foothills of the Himalaya in irregular wide strips in areas having rainfall between 750 mm and 1250 mm. These forests are concentrated in Rajasthan, Madhya Pradesh, Maharashtra, Orissa, Uttar Pradesh, Karnataka, Andhra Pradesh and Tamil Nadu. The total area under these forests is approximately 29.7 million ha. These forests consist of trees less than 25m high, with a light canopy consisting of deciduous trees. Dry teak and dry sal communities predominate in the southern and northern regions respectively. In some areas both these species are absent and a mixture of trees like *Anogeissus pendula*, *Boswellia serrata*, *Hardwickia binata*, *Acacia nilotica*, *Madhuca indica*, and *Butea monosperma* occupies the area. *Acacia catechu* and *Dalbergia sissoo* are conspicuously present on newly formed soils.

## **Tropical Thorn Forest**

These forests occupy a large strip in southern Punjab, Haryana, northern Gujarat and almost entire Rajasthan, where rainfall is about

250mm and 750 mm. Such forests are also found over a large area in the upper Gangetic plains and Deccan plateau. The total area under this forest type is about 5.2 million ha. These forests are open, consisting of short trees, generally belonging to thorny leguminous species. The characteristic species include *Prosopis cineraria*, *Acacia leucophloea*, *Acacia nilotica*, *Ziziphus* spp, and *Salvadora* spp. *Acacia tortilis* and *Prosopis chilensis* have been widely planted in this region. In south India, important species are *Acacia chundra* and *Acacia planifrons*. These forests are highly degraded due to severe biotic pressure and occur in the form of scrub forests in most of the areas.

### **Tropical Dry Evergreen Forest**

These forests are found in a relatively small area (0.1 million ha) on the Carnatic coast, which receives little or no summer rainfall. The forests are low but often dense with hard-leaved evergreen trees in which thorny species predominate. The characteristic species are *Memecylon edule*, and *Maba buxifolia*.

### **Sub-tropical Broad-leaved Hill Forest**

These forests occur in the lower slopes of the Himalaya in Bengal and Assam and on other hill ranges such as Khasi, Nilgiri, Mahabaleshwar, Pachmarhi, Amarkantak and Parasnath, occupying an area of about 0.3 million ha. Important species in the southern hills are *Syzygium cumini*, *Ficus* spp, and some species of Lauraceae. The northern form consists of species like *Quercus* and *Castanopsis*.

### **Sub-tropical Pine Forest**

Sub-tropical chir pine (*Pinus roxburghii*) forest occurs throughout the central and western Himalaya, and Khasi pine forest occurs in Khasi hills. These forests are almost pure throughout their zone of distribution. The understorey is also not pronounced. The total area of these forests is approximately 3.7 million ha, distributed in several Himalayan states.

### **Sub-tropical Dry Evergreen Forest**

These forests occur in areas with low rainfall and consist of xerophytic, thorny and small-leaved evergreen species. Such forests are localized in the northwest corner of the country in an area of approximately 0.2 million ha. The typical species are *Olea cuspidata* and *Acacia modesta* in the top canopy and *Dodonea* shrub in the degraded forests.

### **Montane Wet Temperate Forest**

These forests are a characteristic feature of the eastern Himalaya and are found between 1800 m and 3000 m elevation in high rainfall areas. These forests occupy about 1.6 million ha. Some of the tops of southern hills, e.g. Nilgiris, are also occupied by these forests. In northern form of these forests, characteristic genera are *Quercus*, *Castanopsis*, *Machilus*, and *Rhododendron*. In the southern hills, important species belong to *Syzygium* and *Ternstroemia*. *Rhododendron nilagiricum* is an important component in Nilgiri hills. The forests are luxuriant with dense undergrowth.

### **Himalayan Moist Temperate Forest**

These are commercially important forests and are found between 1500m and 3000m elevations in the Himalaya. These are concentrated in the central and western Himalaya, except in areas where rainfall is below 1000 mm. The total area under these forests is reported to be about 2.7 million ha. These forests are classified into two forms; the lower form consists of *Quercus leucotrichophora*, *Quercus floribunda*, *Pinus wallichiana* and *Cedrus deodara*. As the altitude increases, the upper form consisting of *Abies pindrow*, *Picea smithiana*, and *Quercus semecarpifolia* becomes dominant. The east Himalayan hills are occupied by *Quercus lineata*, *Quercus lamellosa*, *Quercus pachyphylla*, *Tsuga dumosa*, *Picea spinulosa* and *Abies densa*. *Cupressus torulosa* is a conspicuous species found on limestone. Alders (*Alnus nepalensis*) and blue pine (*Pinus wallichiana*) colonise the new sites.

### **Himalayan Dry Temperate Forest**

These are open evergreen forests with open scrub undergrowth. These forests occur in the upper ranges of the Himalaya in low rainfall areas and cover about 0.2 million ha. These forests consist of both coniferous and broad-leaved species. In the western Himalaya, the characteristic species are *Pinus gerardiana*, *Cedrus deodara* and *Quercus ilex*. At higher elevation, *Juniperus macrospora* communities are also found. In the eastern Himalaya, the common species are from *Abies* and *Picea*. In higher hills, *Juniperus wallichiana* is common. Locally, between 2500 and 4000 m elevation, a few other species like *Larix griffithiana*, *Populus euphratica*, *Salix* spp., *Hippophae* spp. and *Myricaria* spp. also occur.

### **Sub-alpine Forest**

These forests occur throughout the Himalaya above 3000 m elevation up to the tree limit. Some of the characteristic species in the western Himalaya are *Abies spectabilis* and *Betula utilis* while those in the eastern Himalaya are *Abies densa* and *Betula* spp. High-level blue pine (*Pinus wallichiana*) forests occur on exposed sites. *Rhododendron* forms the understorey.

**Moist Alpine and Dry Alpine Scrub**

The moist alpine scrub occurs above the tree line up to about 5500 m elevations in Himalaya. The shrubs are rarely more than 1 m in height. Common species are *Rhododendron*, *Juniperus* spp and *Betula* spp. The dry scrub forests consist of open xerophytic dwarf shrub in areas where rainfall is below 400 mm. The major genera represented are *Juniperus*, *Caragana*, *Eurotia*, *Salix*, and *Myricaria*.

**Note**

1. Champion, H.G., and Seth, S.K. 1968. *A Revised Survey of the Forest Types of India*. Government of India, New Delhi.

