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Forests of Kerala

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1. General.

The land area of Kerala, the smallest State in India is 38,855 sq. Kilometres and lies between latitudes 8° and $12^{\circ}45'$ and longitudes $74^{\circ}40'$ and $77^{\circ}50'$. Palm fringed, lagoon studded and adorned with lush green mountains, Kerala sprawls along the west coast of India, towards the apex of the Peninsula. The narrow belt of coastal plains is delimited by the mountain range of Western Ghats with peaks rising over 2440m and covered with luxuriant vegetation.

2. Physical Features.

The territory forming the State is shaped like a triangular slice. It is bounded in the east by the Western Ghats. These mountains are mostly of a 'relict' type composed of ancient crystalline or metamorphic rocks. They are not the mountains in the true sense of the term but are mere outstanding portions of the old plateaux. On the west is the Arabian Sea and the State has a comparatively long coast line with intrusions of backwaters and lagoons and can be distinguished as passing into 3 distinct zones of vegetal formations. The coastal area starts with a sandy stretch and can be classed as a typical coconut country which further eastwards meets undulating tract dominated with lateritic formations bearing the largest extent of agricultural and paddy fields. Passing further eastwards, submountain hill country with medium elevation of 460m to 915m stretches

out. This comprise predominantly of forest clad hills and considerable extent of estates of hill produce like rubber, coffee, cardamom etc. Rising further and forming the main chain of the western ghats is the High Ranges occupied mostly by extensive tea estates. Anamudi the highest peak in the western ghats 2695m is within the State. There are few prominent valleys viz., Nilambur, Attapadi, Silent, Idiyara, Pamba, Achencoil, Kallada and Shendurney carrying rich and luxuriant forests which form a real treasure.

3. Drainage.

A net work of streams, rivulets and rivers drains the area. The coastal plain being narrow, the rivers are short and they carry the water into the Arabian Sea. Some of the rivers have been harnessed for irrigation and hydel power. Few rivers are of immense service for cheap transport of timber and other forest produce.

4. Climate.

Though Kerala falls within the tropics it has an equable climate, the variation of temperature between summer and winter being small. The coasts have a smaller range of temperature and atmosphere is usually humid. Altitude

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tempers the heat and upon the hills it is delightfully cool. Still higher up the climate is typically subtropical with a distinct winter and occurrence of frost is characteristic. The mean annual temperature of the plains varies between 35° in summer to about 23° in cool months. The rainfall which tells on the nature and quality of vegetation is varying from about 406cm average in the northern districts to 127cm to 76cm along the southernmost and eastern limits of the State. The highest average rainfall recorded is in the High Ranges ranging up to 965cm at Anamudi. Major portion of the rain fall enjoyed by the State is borne by the South-West Monsoon between June to August. Few showers are also obtained from the North-East Monsoon during October-November. January to May are dry months.

5. Forest resources in Kerala.

Kerala has been famous even from very early times as the richest store-house of valuable timber trees and medicinal plants. It was the treasure of the west-coast-ivory, teak, rose-wood, ebony, cardamom, pepper and other hill products which attracted the Arabs, Portuguese, Greeks, Spaniards, British and others to India. It was these treasures that caused envy and enmity between local rulers and caused their downfall. History reveals that Kerala Forests had an important role in the field of foreign trade.

Though in the past, forests in Kerala covered more than 1/3 of the land area, at present, the effective forest area is less than 20% of the total land area whereas according to the National Forest Policy, the area under forests should be at least 33%. The area under exploitable forests in Kerala is even less, coming to nearly 14% only. The per capita forest area is as low as 0.072 hectares as compared to 0.18 hectares in India and 1.6 hectares for the whole world.

In a State like Kerala, forests form the most important renewable natural resources which have to be utilised to the best advantage. The productive capacity of the forests of Kerala is the highest in the country. Hence it is essential to increase the value of the forests by intensive forest management and by proper and sensible utilisation of the available forest resources. The forests of Kerala are botanically very rich comprising a good many varieties of species including more than 600 types of trees which are being used or likely to be used in a better way for a variety of purposes.

The forests of Kerala are mostly natural and partly artificial (forest plantations). The natural forests of Kerala are mixed and irregular and their nature and composition vary depending on the altitude, climate and soil conditions. Plantations of certain important species such as Teak, Elavu (*Salmalia malabarica*), Eucalyptus, Mathi (*Ailanthus malabaricus*), Kanala (*Evodia lunu-ankenda*), Mahogany are raised in suitable areas after extracting the tree growth in natural forests or in areas devoid of tree growth as in the grass lands of the High Ranges.

Wood forms the most important forest raw material in Kerala. Wood from Kerala forests are used for a variety of purposes—for construction, as industrial raw material and as fuel. Some of the important timbers commonly used for constructional purpose are Teak (*Tectona grandis*), Venga (*Petrocarpus marsupium*), Them-bavu (*Terminalia tomentosa*), Maruthy (*Terminalia paniculata*), Thampakam (*Hopea parviflora*) Unnam (*Grewia teliaefolia*), Anjili (*Artocarpus hirsuta*), Punna (*Calophyllum tomentosum*), etc.

The principal species used for plywood manufacture that are available in Kerala forests are Pali, (*Palaquium ellipticum*), Ooravu (*Machilus macrantha*), Venkotta (*Lophopetalum*

wightianum), Vellapine (*Vateria indica*), Karanjily (*Dipterocarpus indicus*), etc. All these species occur in the evergreen forests and are difficult to regenerate artificially in extensive plantations. Besides the above species commonly used for the commercial plywood, other species such as Teak, Rosewood (*Dalbergia latifolia*), White cedar (*Dysoxylum malabaricum*), Mahogany etc., available mostly in the deciduous forests are used for decorative veneers.

The main species used in the match industries are Elavu (*Bombax-Salmalia malabarica*), Pala (*Alstonia scholaris*), Kanala (*Evodia lunan-kenda*), Mathi (*Ailanthus malabaricus*) etc. Some of these species occur in the evergreen forests and others in the deciduous forests. A variety of species that are used for packing case and available in Kerala are Mavu (*Mangifera indica*), Aval (*Holoptelea integrifolia*), Kumbil (*Gmelina arborea*), Cheeni (*Tetrameles nudiflora*), Thanni (*Terminalia belerica*), Perumthol (*Hymenodictyon excelsum*), Thondi (*Sterculia urens*), Uthi (*Lannea grandis*), Charu (*Holigarna arnottiana*), Kalavu (*Hardwickia pinnata*), Malavembu (*Melia duba*), Aranjili (*Antiaris toxicaria*), Vatta (*Macaranga peltata*) and so on. The most important forest resources for the paper pulp and Rayon pulp industry are provided by bamboos, reeds, certain grass and certain wood species such as Eucalyptus, Padiri (*Stereospermum chelonoides*), Vekkali (*Anogeissus latifolia*), and Malapunna (*Dillenia pentagyna*). These species are available in the natural forests or in artificial plantations. Many other different species that are used for specific industrial purposes like furniture, textile auxiliaries, sports goods, pencils, building boards, mathematical instruments are also available in our natural forests in limited quantities. The cottage industries producing mats, baskets, furniture etc., are also depend on forest resources like reeds, bamboos and canes.

Kerala forests also produce certain minor forest produces like medicinal plants, ivory,

various fruits, tannin barks, honey etc., which are also used in industries here and abroad.

The demand for fuel wood and charcoal is also met mostly from the forests. The fuel wood generally comes from the top ends and branches of trees felled for industrial purposes, from dry and dead trees and also from non-commercial species.

Apart from industries directly dependant on wood as raw material, the timber transmission poles required by the Electricity Board and Posts and Telegraphs department and timber for the cabin and waggon construction, paneling etc., of the Railways and the wooden railway sleepers are also supplied from the forests. Wood is therefore an essential commodity in the national economy and is an integral part of modern civilisation.

Some of the Kerala timbers are famous for their importance in export trade. Rosewood and Teak are just two examples. Other common timbers such as White cedar (*Dysoxylum malabaricum*), Thembavu (*Terminalia tomentosa*) etc., are also likely to earn their value in export trade because of their decorative values, veneering qualities, strength and durability.

6. Forest Plantations.

In a State like Kerala with limited area under forests, it is essential to practice intensive forestry to meet the evergrowing demands for the forest produces. One of the main methods to increase the value of the forests is by converting the irregular mixed, less valuable natural forests into a regular series of plantations containing economically and industrially important species singly or in a mixture of two or three mutually adjustable types. The value of the forests so converted into plantations is many times its original value. The Forest Department has attained proud achievements in this field.

The following table will indicate the extent of forest plantations in the State till the end of 1967.

Species	Extent
Teak	49,390 Hectares
Softwood (Matchwoods)	14,204 „
Eucalyptus	16,270 „
Wattle	355 „
Bamboo	334 „
Miscellaneous types	1,800 „
Cashew	5,201 „
Anjily	186 „

The department has thus about 87,740 hectares of plantation at the close of 1967. A more ambitious programme of raising various economically and industrially important plantations is being carried out during the current and subsequent Plan periods. This will include not only species mentioned above but also many more valuable species both indigenous and exotics like Red sanders (*Pterocarpus santalinus*), Andaman padauk (*Pterocarpus dalbergioides*), Rose wood (*Dalbergia latifolia*), Tropical pines such as *Pinus insularis*, *Pinus merkusii*, *Pinus radiata*, *Pinus carrebaea*, *Pinus taeda*, various Eucalyptii, Bamboos, Silver oak (*Grewelia robusta*), etc.

7. The main forests type of Kerala.

The State, though small in extent, has a variety of climatic conditions, consequent on variation in rainfall and elevation. It is only conspicuous by the absence of desert type and the truly temperate and alpine types. The following are the main forest types occurring in the State.

(a) Southern tropical wet evergreen forests.

These are lofty, dense, evergreen forests 76m or more in height, and characterised by a large number of species of trees which occur together. Availability of moisture is the main

factor deciding the distribution of these forests and these forests are conspicuous by the preponderance of evergreen species. They occur up to an elevation of 1070m with an annual rainfall of over 254 cm. Main timber species met with are *Palaquium ellipticum*, *Vateria indica*, *Calophyllum tomentosum*, *Dysoxylum malabaricum*, *Artocarpus hirsuta*, *Mesua ferrea*, *Poeciloneuron indicum*, *Dipterocarpus indicus*, *Canarium strictum*, *Hepea parviflora*, *Machilus macarantha*, *Gluta travancorica* etc. Reeds and canes are common. Large areas of these forests are leased out for Cardamom cultivation.

(b) Southern tropical semi-evergreen forests.

These are closed high forests and represent a transition from the Evergreens to the drier types. The forests lie as an intermediate zone between the wet Evergreen and moist deciduous forests. Average rainfall may be taken as 203cm to 457cm and they occur from plains up to an elevation of about 762m. The dominant trees attain big dimensions and include both evergreen and deciduous ones. Climbers are heavy and epiphytes abundant. Bamboos are also usually present. The main commercial species met with are *Hopea parviflora*, *Canarium strictum*, *Trewia species*, *Eugenia species*, *Vateria indica*, *Calophyllum tomentosum*, *Terminalia paniculata*, *Streospermum chelonoides*, *Holigarna arnottiana*, *Lophopetalum wightianum*, *Artocarpus hirsuta* etc.

(c) Montane wet sub tropical evergreen forests.

This type of Evergreens is distinctly noticed from elevations over 1220m and thrives best at high elevations. Rainfall varies from 190cm to 760cm. These forests may be found in sheltered pockets and concave declivities along the High Ranges, the rest of the hills may be all grass lands. Mosses, Ferns, Lichens and epiphytes are characteristic. *Lauraceae*, *Myrtaceae*, *Ternstroemiaceae* etc., are the major families represented in this type. These forests

are not very valuable from revenue point of view.

(d) The temperate shola grass lands.

These grass lands form extensive areas in the high ranges scattered here and there with Shola patches which are mostly along the valleys and pockets. These grass lands may consist of small grass or coarse big grass with a sprinkling of *Phoenix*, *Phyllanthus*, *Terminalia* species etc. These grass lands are being planted up with Eucalyptus and wattle. The elevation of these grass lands is usually over 1220m.

(e) Southern tropical moist deciduous forests.

These forests are characterised by the dominant species being almost entirely leafless in the peak of the dry season, though there is often a sprinkling of Evergreens in the underwood. These are closed forests of 30m to 37m height, with abundance of climbers and bamboo undergrowth is characteristic. Annual fires are very common in these types of forests. These types of forests are commercially the most valuable and the most useful species is Teak; but percentage of composition of teak is only 10 to 15%. Other important commercial species are *Terminalia paniculata*, *Terminalia tomentosa*, *Lagerstroemia lanceolata*, *Grewia teliaefolia*, *Dalbergia latifolia*, *Adina cordifolia*, *Bombax malabaricum*, *Sterospermum chelonoides*, *Pterocarpus marsupium*, *Anogeissus latifolia*, *Xylia xylocarpa* etc. Best type of this forest occurs in localities where the rainfall is about 203cm. This type of areas are being converted into teak plantations by clearfelling and artificial regeneration. They may occur up to elevations of 762m.

(f) Tropical dry deciduous forests.

These are composed of a mixture of species, particularly all of which are deciduous for several months in the dry season. The lower canopy is almost entirely deciduous. The composition in the upper canopy is *Terminalia tomentosa*, *Terminalia bellerica*, *Terminalia chebula*, *Anogeissus*

latifolia, *Cassia fistula*, *Pterocarpus marsupium*, *Tectona grandis*, *Butea frondosa*, *Bridelia rhetusa*, *Cleistanthus collinus* etc. These are generally 15m to 23m in height. This type occurs in the eastern limit of the State at Marayur side. *Bambusa arundinacea* and *Dendrocalamus strictus* are found to occur in these areas. The presence of valuable *Santalum album* in forests makes them a valuable and rare asset.

8. Forests and Tourism.

Kerala forests with their characteristic green splendour, salubrious climate, majestic mountains and richness of flora and fauna are famous from the tourist point of view, also. The main aims of a tourist are pleasure, knowledge and rest. The majestic and magnanimous forests of Kerala provide all these to his heart's content.

The Kerala forests are abound with health resorts, wildlife sanctuaries and centres botanical, ecological and zoological studies. The green glory of the forests with its luxuriant vegetation studded with attractive and colourful wild flowers, the gurgling waters of the swift-moving streams and rivers, the rapids, waterfalls, innumerable lakes both natural and artificial, the towering grass-covered peaks projecting into the sub-tropical and temperate altitudinal zones are all fascinating to the inquisitive, industrious and pleasure seeking tourists. Those who are desirous of enjoying rest and comfort away from the maddening crowds of the urban surroundings will find ideal camping facilities within the sanctum sanctorum of the forests.

The main tourist centres in Kerala forest which have earned reputation are its wild life sanctuaries. Of these, the most famous one is the Periyar Wild Life Sanctuary covering an extent of 777 sq. km of hills and forests situated in the High Ranges at an altitude varying from 914m to 1829m surrounding a waterspread area of 2833 hectares of the artificial Periyar

lake. Large herds of elephants, gaurs, sam-burs etc., are sure sights in this sanctuary almost throughout the year. Wild dogs, wild pigs, barking deer also roam in the jungles and around the lake. Tigers and panthers are not rare. A variety of birds like jungle fowl, myna, parrots etc., also adorn the living beauty of this sanctuary. The characteristic peculiarity of this sanctuary is its facilities for pleasant cruising in the lake coupled with the safe and sure sights from the boats of the silent denizens of the jungle grazing, browsing and playing on the hill slopes and on the fringes of the lake. Fishing for Mahseer and Tilapia is a pleasing pastime in this sanctuary. A few well-furnished rest houses are available in the interior of the sanctuary for camping besides the modern hotels such as Aranyanivas and the Periyar house. Watch towers have been provided near the rest houses in the interior to enable the tourists to watch the wild life from safe height.

Another Wild life Sanctuary equally good but not so well known as the Periyar Sanctuary is the one at Parambikulam around the Parambikulam lake. Here also extensive Teak plantations, the deciduous, semi-evergreen and evergreen forests provide a very attractive sylvan setting. Elephants, gaurs, spotted deers, sambar etc., can be seen in plenty. There is a network of roads to move about within the sanctuary.

Other less well known wild life sanctuaries abounding in natural beauty but only being developed for its wild life population are the ones at Neyyar in the Trivandrum District and Peechi and Vazhani in Trichur District.

Considering the various prerequisites for tourism, particularly accessibility and camping facilities, a few localities situated within the forests or near about the forests in Kerala have already shot into prominence in recent years or have the necessary potentials to turn out into fascinating tourist centres or health resorts. Neyyar, Agasthiar Peak, Ponmudi hills and Chemmunji in Trivandrum District, Kakki, Pamba, Achenkovil and Palaruvi Waterfalls near Arienkavu in Quilon District, Peermade, Munnar and Devikolam situated in the High Ranges falling within Kottayam District, Sholayar, Poringal, Adirapally waterfalls, Peechi and Vazhani in Trichur District, Malampuzha and Mukkali (on the bank of the river Bhavany near about the silent valley) in

Palghat District, Sultan Battery in the high hills and Nedungayam near about Nilambur falling within Calicut District and Manantoddy of the Cannanore District are just a few forest areas of tourist interest where the visitors will be richly rewarded by the enchanting beauty and valuable experience.

Some of the famous temples are situated in the interior of the forests. Sabarimala, Arienkavu, Kulathupuzha, Achenkovil etc., are just a few examples. The most famous one is, of course, the Sastha temple at Sabarimala located much deep inside thick forests and high hills. The wild animals roam about in these forests as if they are the privileged children of God. This temple is attracting lakhs and lakhs of people every year from all over India particularly from the south. The main pilgrim season is between the middle of November and middle of January, though the worshipers in small numbers visit this temple throughout the year. A visit to this temple out of season is nothing less than an adventure which requires courage and determination. It will not be incorrect to say that the pilgrims visiting these famous ancient temples curiously located deep inside the mountain ranges and dense forests after undertaking an extremely arduous journey are also, in a sense, tourists of our forests. Once a pilgrim visits this temple, his urge to visit this place again and again year after year become greater and greater. This urge is necessarily due to call from the Almighty and also to the sanctity, serenity, tranquillity and enchantment of the nature's reservoir of beauty and majesty.

There is no doubt that the forests of Kerala form the main natural wealth of the State. Financially and educationally this wealth is incalculable. These forests provide raw materials for various wood based industries and other enterprises in which wood is an important requirement. It also provides medicinal plants in plenty. It helps to improve agriculture by ensuring perennial supply of water and organic manure. It prevents soil erosion in the hills. It provides facilities for sports and physical exercises. It also provides peace and enchanting beauty. Above all Kerala forests are excellent tourist centres which if properly dealt with will earn considerable revenue for the State.