From the creation of the planet earth, forests are the part and parcel of living creatures. India is such a country that has vast forest land from ancient time. In different religious books and epics forests have been described as one of the main features of the land. Indian socio cultural history provides excellent examples of the preservation of forest resources from the ancient thoughts of religious injunctions. The Indian sub-continent ruled and governed by different religions and rulers from so many parts of the world. The forests of the country have seen the princely statehood of native kings as well as the emperor of British Government. During the Islamic invention forest was used for hunting and pleasure. The colonial Government used the forest resources as supply of wood to the railways and navy. Although they have shaped the forest area in a systematic management. After two world wars the forest area of the country has decreased with the loss of other resources. After independence the Government of India had taken so many steps and policies to manage the green vegetation of the country. Forest of Bengal is spread over the whole state from the hill top of Himalayas to the Mangrove of Sundarban. The Forest of the state has changed by the different periods from ancient time to this present generation.
2.1 The Changing Earth:

If we consider the relationship of trees and living creatures, then we see that from the early period of this planet both are living with harmony. The earth formed from a cloud of dust and gas drifting through space about 4,600 million years ago. Dense minerals sank to the centre while lighter ones formed a rocky crust. However, the first known life-forms—bacteria and blue green algae and it was only 700 million years ago that more complex plants and animals began to develop. The earth itself is continually changing. Although continents neared their present locations about 50 million years ago, they are still drifting slowly over the planet’s surface, and mountain ranges such as the Himalayas—which began to form 40 million years ago only.

When the earth formed about 4,600 million years ago, its atmosphere consisted of volcanic gases with little Oxygen, making it hostile to most forms of life. The first primitive life-forms emerged around 3,400 million years ago in shallow, warm seas. The build up of Oxygen began to form a shield of Ozone around the earth, protecting living organisms from the sun’s harmful rays and helping to establish an atmosphere in which life could sustain itself. The first land plants appeared around 400 million years ago during the Devonian period (409 – 363 million years ago) and the first land animals about 30 million years later.

The carboniferous period (363 – 290 million years ago) takes its name from the thick, carbon rich layers, now coal, that were produced during this period as swampy tropical forests were repeatedly drowned by shallow seas. The humid climate across northern and equatorial continents throughout carboniferous times produced the first dense plant cover on earth.
The Triassic Period (245 – 208 million years ago) marked the beginning of what is known as the Age of Dinosaurs (the Mesozoic era). During this period, the present-day continents were massed together, forming one huge continent known as Pangaea. This land-mass experienced extremes of climate, with lush green areas around the coast or by lakes and rivers, and arid deserts in the interior. The only forms of plant life were non-flowering plants, such as conifers, ferns, cycads, and ginkgos; flowering plants had not yet evolved.

The Jurassic Period, the middle part of the Mesozoic era, lasted from 208 to 146 million years ago. During Jurassic times, the land-mass of Pangaea broke up into the continents of Gondwanaland and Laurasia, and sea-levels rose, flooding areas of lower land. The Jurassic climate was warm and moist. Plants such as ginkgos, horsetails, and conifers thrived, and giant redwood trees appeared, and did the first flowering plants.

The Mesozoic Era ended with the Cretaceous period, which lasted from 146 to 65 million years age. During this period, Gondwanaland and Laurasia were breaking up into smaller Land-masses that more closely resembled those of the modern continents. The climate remained mild and moist but the seasons become more marked. Flowering plants, including deciduous trees, replaced many cycads, seed ferns, and conifers. Animal species became more varied, with the evolution of new mammals, insects, fish, crustaceans, and turtles.
Following the demise of the Dinosaurs at the end of the Cretaceous period, the Tertiary period (65-1.6 million years age) was characterized by a huge expansion of mammal life. India’s collision with Asia led to the formation of the Himalayas. During the middle part of the Tertiary period, the forest-dwelling and browsing mammals were replaced by mammals such as the horse, better suited to grazing the open savannahs that began to dominate.

In present time there are more than 3,00,000 species of plants. They show a wide diversity of forms and Life-styles, ranging, for example, from delicate liverworts, adapted for life in a damp habitat, to cacti, capable of surviving in the desert, and from herbaceous plants, such as corn, which completes its life-cycle in one year, to the giant redwood tree, which can live for thousands of years¹.

2.2 History of the Environment:

The conception of the environment changes in the course of this evolution. Ecological conditions which may appear hostile to man at one stage of this evolution may prove to be attractive and inviting at another stage. The hunter and food gatherer armed only with stone tools preferred to live on the edge of forests near the plains or in open river valley by cutting the trees and developed it into fertile soil. With the rainfall or by irrigation man started to produce the food grains. In this way man become civilized and such civilizations and empires were very much dependent on their agrarian base.

¹ Ultimate visual Dictionary, (Plant variety) – (Dorling Kindersley, 2005) p – 112
Indian history provides excellent examples of this evolution. The cultivation of grain started around 7000 BC in southern Asia, according to recent archaeological research. This was a time of increasing rainfall in the region which has allays depended on the monsoon².

The resurgence of old traditions throughout Indian history prevents the ready transfer of the Western periodisation of history to India. Ancient, medieval and modern history cannot be easily identified in India. For this reason many historians adopted another division for Indian history: Hindu, Islamic and British periods. Hindu historians tended to glorify the golden age of the Hindu period and considered Islamic and British rule as two successive periods of foreign rule. Islamic historians accepted this clear cut division though they may have had their own ideas about the Hindu period. British historians were equally comfortable with this division as it implied that British rule made such a mark on Indian history that one could very well forget about everything else³.

2.3 Definition of Forest and its development in various ages:

The word Forest is derived from the Latin word ‘foris’, meaning outside, the reference being to a village boundary or fence, and it must have included all uncultivated and uninhabited land. The Indian word ‘jungle’ has been adopted in the English language to describe a collection of trees, shrubs etc., that are not grown in a regular manner, as contrasted with ‘forest’, which is any vegetation under a systematic management. Technically forest has been defined as:

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² Kulke Hermann and Rothermund Dietmer: A History of India (Routledge 1999) p – 2
³ ibid P-6
a. (In general) An area set aside for the production of timber and other forest produce, or maintained under woody vegetation for certain indirect benefits which it provides, e.g. climatic or protective;

b. (In ecology) A plant community predominantly of trees and other woody vegetation, usually with a closed canopy; and

c. (In law) An area of land proclaimed to be a forest under a forest law\(^4\).

According to Oxford English Dictionary forest means, a large tract of land covered with trees and undergrowth sometimes mixed with pastures (in proper names also a district formerly forest but now cultivated); the trees growing in such a tract.

According to Britannica Ready Reference Encyclopedia forest is nature’s most efficient ecosystem, with a high rate of PHOTOSYNTHESIS affecting both plant and animal systems in complex organic relationships.

According to United Nations Convention on combating Desertification forest means dense canopy with multi-layered structure including large trees in the upper storey.

UN-FAO defined that, land under forestry or no land use, spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ.

United Nations Framework Convention and climate change stated that, young natural stands and all plantations which have yet to reach a crown density of 10 – 30 percent or tree height of 2 – 5 meters are included under forest.

In T. N. *Godavarman Thirumalpad vs. Union of India*, an ongoing case under whose umbrella all forest cases are today sheltered. For, in a December 12, 1996 order, the Supreme Court provided the definition of ‘forest’ by bringing all areas into the ambit areas of forests not under the forest department, but under tree cover.

So, apart from all the views it can be said that forest is a unique blend of botanical and Zoological units with a vast social organization of living creatures of this planet. To this systematic organization belong not only the trees but also animals and minerals.

To this special organization belong not only the trees but also innumerable other living organism from the plant world viz. shrubs, herbs, mosses, lichens, algae, fungus and bacteria, and from animal kingdoms mammals, birds, reptiles, insects and protozoa. The mineral has its place in the soil and is the bedrock of the forests. Time does not stand still in a forest as is popularly imagined and there is continual action and reaction amongst the members of these communities belonging to one or more of natural kingdoms involving both cooperation and conflict and producing change. Nature resolves such conflicts, if any, in her own inexorable way by weeding out the weak and the inefficient and producing an ‘equilibrium’ which we call as “Nature’s balance.”

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5 Down to Earth, June 15, 2007 p – 37  
2.4 Historical Forest Jurisprudence in India:

From the ancient time forests have been admired and feared by the aboriginal Indians, as they worshiped the trees as their god. There are so many sacred groves throughout the country which are worship by the tribal peoples. The country and its peoples witnessed so many rulers, mainly from abroad, some of them have restored the greenery and some have destroyed the same.

2.4.1 In Geological Ages:

Palaeo–botanical evidence testifies to the fact that there were dense forests in India in the Permian period, 250 million years ago. A fossilized trunk of a tree found in the Raniganj coal-field is nearly 30m long and 75 cm in diameter at the butt end and 35cm at the top end and is now kept in the Indian Museum in Kolkata. Fossil wood is found in several places in Madhya Pradesh and in the Siwalik hills along the Himalayas.

Man was evolved in the beginning of the Pleistocene Age, only about a million years ago. At this time India had thick forests except in Rajasthan and parts of Punjab which lay buried under a swamp, the remnant of the receding Tethys Sea.⁷

2.4.2 Ancient Thoughts:

Since time immemorial forests have been admired and feared. According to Agni Purana there is a 4000 years old injunction to protect trees to earn religious merit, and to ensure material prosperity of the family.

Portions of forests have been regarded as Dev-aranya (God’s Abode) and strict prohibition was placed on cutting living trees and large number of leaves generally. Still there is an religious injunction to cutting flowering or fruits bearing trees in their season. In the *Vishnu Purana* there is a reference to vanas (forest) existing across the length and breadth of the country. The *Brihad Aranyak Upanisad* compares man to a tree. His hair is leaves and his skin is its outer bark. The banyan tree occupies a special position in the *Bhagwad Gita* itself. It is said that there is an imperishable banyan tree that has its roots upwords and its branches down and whose leaves are the *vedic* hymns, One who knows this tree is the knower of the Vedas.8

In ancient India, protection and cleaning up of environment and conservation of forest was the essence of vedic culture. The *Vedas* and the *Upishads* named God ‘Brahma’, from awareness that this cosmos in every part of it is animated by the spirit. In ancient culture concept of *tapovana* or study within the vicinity of forest grows. On the ecological front, the *tapovana* concept and the basic agrarian culture posed humanity in a friendly posture towards the flora and fauna of the world. Man loved to live in the proximity of Nature.

In present India in some parts particularly in Himalayan forest forests and water body are spiritually considered. Because there is scarcity of water in hill area. In Buxa Forest of north Bengal there is one lake, Pokhri, 700 foot above the Jayanti range, water of the lake is being believed to be God from the time immemorial by the local forest dwellers. Similarly Tanakpur of Champabat district of Uttranchal is busy

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town with so much population and traffic, within its 10 – 20 k.m., there is Purnagiri, a beautiful hill forest. But none had damaged its green. Only there is some religious sense that if anyone falling its trees, he will die.

So, since ancient time, religious beliefs and verdicts are regarded as the best way for conservation. The traditional Deo-Bani in Rajasthan, the sacred groves of the north-east are few of the other indicators of the modern times that reflect the immense spiritual attachment of the Indian psyche to the forest.

Literature of Hindu religion gives a detailed description of trees, plants and wildlife and their importance to the community. The *Rigveda* highlights the potentialities of nature in controlling the climate, increasing fertility and improvement of human life emphasising for intimate kinship with nature. *Atharva Veda* considers trees abode of various Gods and Goddesses. *Yajur Veda* emphasises that relationship with nature and animals should not be that of dominion and subjugation but of mutual respect and kindness.9.

Kailash Thakur in his Environmental Protection Law and Policy in India discussed about the trees in ancient Indian beliefs.10 He pointed out that in *Narsimha Puran* trees have been personified as God (Brahma) Himself. In *Skandpuran* Peepal is considered supreme to all other trees. *Varahapuran* advocates regular plantations as a means to achieve heaven. In *Matsyapurana* plantation of a tree has been equated with progeny of the sons. *Vishnu Dharmasutra* says that of you plant a tree it will be your son in the next generation. In *Skand Puran* a long list of trees is given the cutting of

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9 Thakur Kailash : Environmental Protection Law and policy in India (Deep & Deep 1999) p – 102  
10 ibid P – 102
which is prohibited. In *Yagyavalkay Smriti*, cutting of trees and forests was a punishable offence and penalty of twenty to eighty *pana* (old coin) was prescribed. Even in Ramayana and Mahabharata where in we find reference of beautiful forests of *Dhandakaranya, Nandovana* and *Khandavana*. In Hindu Vedic society destruction of vegetation and forests was considered to be great sin.

In ancient time there were some beliefs of planting and worshipping of sacred herbs and trees, is still a part of the country’s religious philosophy. The bar (*Ficus bengalensis*), peepal (*Ficus religiosa*), bilva (*Aegle marmelos*), neem (*Azadirachta indica*) and sami (*Acocia ferruginea, prosopsis cineraria*) continued to be planted and mentioned in present times.\(^{11}\)

The history of forests in India, as any where else in the world, is related to the history of civilisation. The civilisation began in India much before the migration of the Aryans which took place between 2500 and 2000 B.C. The civilisation of Mohenjodaro, Harappa and Channudaro in Sindh, Punjab and Rajputana back to between 4000 and 5000 BC. There is also evidence of a thriving Dravidian civilisation existing deep in the south about 2000 BC. There is however, no record to indicate if the Indus valley civilisation in the north perished because of wars with the foreign invaders or internal conflicts, or because of the break-down of the ecosystems they subsisted upon. Whatever may be the reasons for the destruction of the Indus valley civilization, there is evidence to show that the people in that period of civilisation used wood for obtaining energy and for producing bricks, and at the same time they venerated trees. The supreme God of the Indus valley was supposed to live

in Peepal trees. Peepal and babul were plants considered to have descended on earth from heaven. The Dravidian civilisation, however, appears to have lived in consonance with its eco-system and forests. The consonance was not the result of any design on the part of the people. It just happened that forests produced more than what people needed. The people were few, and their requirements did not exceed the growth in forests in a period.

The relics of the Dravidian civilisation still exist. They are the tribal communities of central and south India. There requirement was less or about the same order as the annual growth in forests till a few decades ago.\(^{12}\)

2.4.3 The Maurya Dynasty:

Before Chandra Gupta Maurya established a relatively big empire about 300 BC, the territory in the country was divided among various rulers whose kingdoms extended to small geographical units. The ancient period was marked by destruction rather than any attempt on conservation of forests.

Chanakya, the Prime Minister to Chandra Gupta Maurya, did realise the need to establish a forest administration. He not only appointed a superintendent of Forest, but also classified the forests on a functional basis.

Chanakya and his *Arthasastra* considered for ages as the source and spirit of econo-political frame work, which could be referred to at any moment of time of crisis or otherwise. His managerial acumen had been too significantly expressed for the maintenance of a stable flora and prosperous eco-system. He had made viable

reforms in flora management as well as in Economies and Polities. Probably, he was aware and convinced of the importance of the flora as the major and unique component of eco-system that provides everything to rest of the biotic world. Chanakya’s knowledge of various categories of plants, their products, socio-religious uses, economical benefits and medicinal properties is well reflected in *Arthasastra*.

It is found that during the Maurya period with the Prime Minister ship of Chanakya forest administration was classified as :

i. Forests set apart for the study of religion,

ii. Forests reserved for the supply of forest produce,

iii. Forests set apart for the grazing of royal elephants,

iv. Forests reserved for hunting by the royalty,

v. Forests open to public for hunting

So, from that very time concept of reserved forest for various purposes created. In that time there was also special conservation of elephants. Because the elephants was domesticated by the Hourappan times, but it was only later that it began to be put in wider use. It was at the same time used as medium of transportation, as military war craft, as a sign of status and a mobile platform to hunt in tall grass country. But the war elephants on which imperial Magadha based its military strength were ideal supporters of power monopoly. The eastern environment of Magadha provided an ample supply of wild elephants, but maintenance was of greater importance than supply. The entrance of elephants into Indian Military history around 500 BC when Chandragupta Maurya gifted 500 elephants to Seleuks Nikator was one of the most important military aid transactions of the ancient world.
According to Mahesh Rangarajan in India’s wildlife History, “The protection of elephants became serious business by the time of Mauryan rulers such as Ashoka. The *Arthashastra*, containing maxims of ancient statecraft, lays down the duties of the protector of the Elephant Forests. Even the tusks of animals dying from natural causes in the forest were to be handed over to the government”. The same rule of custom is still established in the wildlife protection Act. It is therefore, no surprise that in the Maurya period, the punishment was very high for unauthorised killing of an elephant.

So in my observation for feeding the elephants forest was reserved. Because the elephants can won or lost a war for an emperor. In other way for game entertainment and for supply of fuel wood the forests were protected.

In Mauryan time forests was a state property, its proper maintenance and use had been undertaken by the state officials. This was a separate department controlled by a head Samaharta similar to collector. There were several subordinated persons appointed under a superintendent of forest to look after every related matter of the forest. The officials were divided with their duties, responsibilities and accountabilities. The superintendent was entitled to collect the forest produce like timber, fruits, fibers, medicines etc., process it, store it, fix the price and sell it at proper time in the market. He too was responsible to provide water or irrigation facility to the forest plants during drought or other seasons. The superintendent of forest was empowered to impose penalty or fine for miss utilising forest products or destruction of vegetation.

The collector-general of revenue was assigned to collect the revenue from forest trades and increase the economy finance of the state. Aksatapal (controller of accounts and audits) was to maintain the record of income and expenditure of the forest department. The entire system was integrated in such a way that each one was as a check for another. The result was luxurious growth of the forests all over the sub-continent during Chanakya’s time.  

The importance of forest wealth is recognised in the Arthasastra. Chanakya states that no one is permitted to cut any part of the forest without the permission of the state. This was to ensure a control over revenue both from the produce of the forest and from the land cleared and brought under cultivation. Chanakya is also very precise in describing how the state should clear wasteland and settle families of agriculturists on it as part of the process of extending agriculture and enhancing revenue. Emperor Ashoka took pride in the roads which were constructed by his administration and these he states were lined with shade-giving trees and with wells. 

Buddhism and Jainism then began to play a role in once again designing social conventions which promoted the prudent use of resources. In part, such conservation practices would have been founded on earlier ones, inherited from food-gathering societies. The best-known ancient State-sponsored conservation campaign was undertaken by the Mauryan emperor Ashoka, following his conversion to Buddhism. The Ashoka advocated for both restraint in the killing of animals and the planting and

\[14\] Jha, V. N. (Ed.) Kautilya’s Arthasastras and social welfare (Sahitya Akademi 2006) p – 280
\[15\] Mahesh Rangarajan : (Ed.) Environmental Issues in India (Pearson Longmen 2007) p – 38
protection of trees. One such edict, from the third century BC, in Dhauli (in present-day Orissa), goes in translation as follows:

The king with charming appearance, the beloved of the gods, in his conquered territories and in the neighboring countries, thus enjoins that: medical attendance should be made available to both man and animal; the medicinal herbs, the fruit trees, the roots and tubers, are to be transplanted in those places where they are not presently available, after being collected from those places where they usually grow; wells should be dug and shadowy trees should be planted by the roadside for enjoyment both by man and animal. 16

The Gupta Empire ended in 673 AD, and the country reverted back to the situation which prevailed prior to the establishment of the Maurya kingdom. The country was again divided into small states which perpetually fought among themselves. The looser in wars, in their flights from the victors, took refuge in previously undisturbed forests and cleared them to create new abodes for them. Virtually every war took a toll of a new forest. The political instability caused by the local conflicts was aggravated by repeated Muslim invasions from the west. Internal battles and foreign invasions both led to the uprooting of people from their original settlements, and their seeking refuge in remote, undisturbed forests. Every battle, every invasion caused not only human suffering, but also destruction of forests. People made fresh clearing, for their habitation, and for agriculture. The Indian peninsula lost substantial forests on account of political instability that prevailed in the country for over nine centuries, that elapsed between the fall of the Gupta dynasty.

16 Gadgil & Guha: This Fissured Land (OUP 2008) Pp 88 – 89
in the later years of the seventh century and the consolidation of the Moghul Empire by Akbar about close of the sixteenth century. While in most times the loss of forests is related to population rise and growth of civilisation, this was a singular period in the history of India when forests were destroyed on account of political instability.\(^\text{17}\)

2.4.4 The Mughal Period:

The Mughals made no attempts on forest conservation. They did not ever realise the need. Perhaps the reason that, they came from dry arid lands, where there are no concept of forestry or forest conservation. To Mughals rulers themselves, forests meant no more than wooded lands where they could hunt and collect some revenue. There was restriction on cutting of trees other than some specific royal trees.

Only during the time of Shershah Suri plantation of trees along the Delhi-Patna Highway was done. The Mughals were not forest-minded as such, but they created exquisite gardens. Emperor Jahangir introduced the famous Chinär tree in the valley of Kashmir which has now become synonymous with Kashmir. In that time the Marathas and the Gonds planted mangoes and other useful trees along their marching routes and halting places, some of which are still surviving. Soon after, under a some what more stable government, the population rapidly increased and indiscriminate destruction of forests began, particularly in the basins of important rivers such as the Ganga, Yamuna, the Chambal and the Narmada.\(^\text{18}\)

\(^{17}\) Lal. J. B : India’s Forests : Myth & Reality (Natraj Pub 1989) p – 17

From environment conservation point of view, a significant contribution of Mughal emperors has the establishment of magnificent gardens, fruit orchards and green parks, round about their palaces, central and provincial headquarters, public places, on the banks of the rivers and in the valley and dales which they used as holiday resorts or places of retreat or temporary headquarters during the summer season.\textsuperscript{19} Shalimar garden and Nishat Bagh in Srinagar and Nur-i-Afsan in Agra are some such types of cultural heritage of the imperial Mughals.

It is found in those times excepting royals gardens and plantations other tree covers were not under protection. Particularly in vast natural forest areas there were no such rules or regulations for protecting flora and fauna. But regarding the position of forest economy local communities have some rules and regulations regarding use and abuse of forest products.

Through the Mughal emperorship established first in India by Babur, a disinherited central Asian prince, the Mughal Empire was really set on a firm footing by his grandson Akbar who ruled for nearly half a century, ending in 1605. His biographer, Abul Fazl, claimed that the hunt was means of gathering intelligence about the state of the realm. At a different level, the Mughals developed hunting into a ritualised activity, Laden with political meaning Arrangements were overseen by a Hunt Master or Mir Shikaran.\textsuperscript{20}

So, from various writings and paintings of Mughal times it is found that from Babar to Aurangzeb the Mughals presided over an empire of great diversity, both

\textsuperscript{19} Thakur Kailash : Environmental Protection Laws and Policy In India (Deep & Deep 1997) p – 107
\textsuperscript{20} Rangarajan Mahesh : India’s wildlife History (Permanent Black 2001) p – 12
ecological and cultural. The forests and grassland were many things at the same time: Sites of hunts, great and small, potential revenue-yielding arable land or simply and impediment to military operations. Certain lands had to be set aside to ensure the success of royal hunts. Unlike the elephant forests of the Mauryas, the Mughals selected different areas of imperial hunting grounds in different provinces. Under Mughal rule, no killing was permitted at sacred sites of the Jains like the Shetrunjaya hill, Saurashtra or Parashnath in Chhotanagpur.

It is found that in the first twelve years of his reign alone, Jahangir killed over 17,000 animals. These included as many as 889 nilgai, 86 tigers and lions and 1,670 gazelle and antelope. Elephants were caught later in the sixteenth century from parts of central India like Hoshangabad, Raisen and Chanderi. At one stage there were over 12,000 elephant in the possession of Emperor Jahangir.  

So, the Gupta period (200 – 600 AD) witnessed a distribution of forests whereas the Mughal period (1526 – 1700) was characterised by the continuous destruction of both flora and fauna in the subcontinent for timber and clearance of green cover for cultivation.

2.4.5 Early British Period:

If the Mughal rulers took no steps to conserve forests, the early British administrators did worse. The tremendously diverse tree growth of India’s forests was liquidated to build British ships and lay extensive railway lines. Mixed forests were replaced by single species commercially valued trees, such as teak, sal and deodar.

21 Rangarajan Mahesh: India’s wildlife History (Permanent Black 2001) p – 14
The British wanted to retain India as a supplier of cheap raw materials and a market for higher priced manufactured goods.

The British who conquered and unified India were at that time the world’s premier omnivores, drawing resources of the entire biosphere to their tiny island kingdom. The man presiding over the British Empire perched on chairs of Burma teak at tables of African mahogany, consuming Australian beef washed down with French and Italian wines. Their women were decked in Canadian furs and clothes of Egyptian cotton, dyed with Indian indigo, glittering with diamonds from South Africa and gold from Peru.\(^{22}\)

The Mughals were only indifferent to forests; the British administrators were predators. The only concern of the early British administrators in the Indian forests was to secure big supplies of teak and other timber for the Royal Navy. They did not consider even regulating felling in forests, let alone make any efforts to conserve the resource. Till about the middle of the nineteenth century, the attitude of the British administrators, with some notable exceptions was:

- to obtain and export large quantities of Indian timber for use by British Navy;
- to obtain timber for local constructions;
- to fell and export the scented sandalwood to various European countries;
- to allow free development of agriculture by clearing forests.

\(^{22}\) Gadgil & Guha : Ecology and Equity (OUP 2008) p – 9
It is, indeed, ironical that the first officer, Captain Watson of the Police, appointed a conservator of Forest in November, 1806, was assigned the duties of procuring maximum quantities of Indian timber for building the ships of the British Navy. Watson plundered rather than conserved the forests in Travancore and Malabar. It was some justice that this post of so-called conservator of Forest was abolished in 1823.23

Thus, under the imperial considerations and in the absence of any conservation policy, the Indian forests were used for the supply of wood for export; for British Navy; for local construction (such as roads and railways) and development of agriculture and had to suffer a great deal of brunt till about the middle of the nineteenth century. Private Contractors, Indian and European, were chiefly responsible for the devastation of forests.

The first action to improve the forests in the country came in 1842, when Conolly, the then collector of Malabar, assisted by an Indian, Chatter Menon, a sub-conservator of Forests, raised the pioneer teak plantations of Nilumbur. The plantations were highly successful, and over the years became world famous. Conolly’s efforts made the British rulers (the Directors of the East India Company) recognise the need to improve the forests of South India. Gibson was appointed the Conservator of Forest in the Bombay Presidency in 1847, and Cleghorn, a medical surgeon, the conservator of Forest in Madras in 1856, who followed Conolly’s example and made regular, though limited, efforts in raising teak plantations. No steps were, however, taken either to regulate felling or to improve forests in central and

23 Lal J. B : India’s Forests : Myth & Reality (Natraj Pub 1989) p – 18
north India till a few years after the sovereignty of Queen Victoria as Empress of
ing India was declared by a Royal proclamation in 1858, and in the densely populated
region of Avadh clearance of forests for agriculture continued to be rapid and
extensive. The years that immediately passed after the Royal proclamation were
marked by massive felling in forests nearly all over the country, to obtain timber for
railway sleepers. If the needs of the Royal Navy destroyed the forests in the early
years of the British administration, the requirement for the local railways ruined the
forests in the middle years of the foreign rule.

By around 1860, Britain had emerged as the world leader in deforestation,
devastating its own woods and the forests of Ireland, South Africa and north-eastern
United States to draw timber for shipbuilding, iron-smelting and farming. Upon
occasion, the destruction of forests was used by the British to symbolize political
victory. Their early treatment of the Indian forests also reinforces the claim that the
destructive energy of the British race all over the world was rapidly converting forests
into deserts. With oak forests vanishing in England, a permanent supply of durable
timber was required for the Royal Navy as the safety of the empire depended on its
wooden walls. In a period of fierce competition between the colonial powers, Indian
teak, the most durable of shipbuilding timbers, saved England during the war with
Napolean and the later maritime expansion, ships were built in dockyards in Surat and
on the Malabar coast, as well as from teak imported into England. An indication of
the escalating demand is provided by the increase in tonnage of British merchant
ships (i.e. excluding the Royal Navy) from 12,78,000 tones in 1778 to 49,37,000
tones in 1860. A large proportion of the wood required came from Britain’s newly-
required colonies. As late as the 1880s, the Indian forest department was entertaining repeated requests from the British admiralty for the supply of Madras and Burma teak.

This process greatly intensified in the early years of the building of the railway network after about 1853. Before the coal mines of Raniganj became fully operative, the railway companies drew upon the forests for fuel as well. Thus the progress of the railway produced marvelous changes on the face of the country as regards tree vegetation. In the Madras presidency over 2,50,000 sleepers (or 35,000 trees) were required annually from indigenous sources. The pace of railway expansion—from 1349 kms of track in 1860 to 51,658 kms in 1910—and the trail of destruction left in its wake brought home forcefully the fact that India’s forests were not inexhaustible.

The crisis had assumed major proportions as only three Indian timbers—teak, sal, and deodar—were strong enough in their natural state to be utilized as railway sleepers. Sal and teak, being available near railway lines in peninsular India, were very heavily worked in the early years, necessitating expeditions to the north-western Himalaya in search of deodar forests. The deodar of the Sutlej and Yamuna valleys was rapidly exhausted in the years following the inception of the forest department—over 65,00,000 deodar sleepers were supplied from the Yamuna forests alone between 1869 and 1885.24

2.4.6. Destruction of wild life:

In the same time of British period with destroying of woodland they have fought war against wild species. They were a scourge to be wiped out. Such practices

were new to India; no previous ruler had ever attempted to exterminate any species. District level administration went out of its way and facilitated hunts, local landed gentry lent their elephants. Officers and soldiers in cantonments were encouraged to spend their vacations acquiring more trophies. The Rhino and wild buffalo, major prey items, vanished from the North Bengal plains by the 1850s; in the drier regions the Nilgai became scarce. In fact, the numbers of animals killed for rewards were often a good index of the land deforested for agricultural expansion. Over 80,000 tigers, more than 1,50,000 leopards and 2,00,000 wolves were slaughtered in the fifty years from 1875 to 1925.\[25\]

The primary aim of Britishers was to utilize the resources of the colony to meet the industrial requirements in their home country and the administrative expenditure in the colony. In their policy, there were two benefits in a single event: clearing the woodland means selling of timbers and side by side it would create new farmland in the cleared forestland. For this reason they have appointed a certain number of paid tiger-killers or snake-destroyers. Fewer tigers mean more cultivation and more revenue. Unprecedently, larger rewards were given out for killing of tigresses, and special prizes for finishing off cubs. A continuum of tree forest, savannah and abandoned farmland was giving way to a countryside divided into two landscapes, of cultivated space or of forest.

The 1850s were a time of political turmoil: the rebellion of the Santhals in the east was followed by the Great Rebellion or Sepoy Mutiny of 1857. One immediate consequence was the crackdown on anything that could lead to disorder colonial

strictures against the annual hunts of the Santhal tribals removed a major check on wild animal populations with pressure mounting on the British Government to meet the revenue requirements of the colony, especially the expenditure on the army which had increased from 41.9 percent of India’s budget to 51.9 percent in 1904 – 05, the colonial government was forced to fall back on forests. Many tribals and other forest dwellers opposed this violent confiscation of the long cherished rights of the people.

2.4.7 The First World War:

The World War I not only interrupted but reversed the march of the country towards scientific forestry. Large quantities of timber, fire wood and other produce (for example, hay for the ponies) were required for the War which was being fought, not on India, but foreign soils. Siviculture was ignored, the principle of sustained yield forgotten and the forestry in India was oriented to one single purpose; meet the timber and other requirements of the fighting forces under the British command in full measure, and well on time. The War took a heavy toll of the Indian forests.

Attention was also given to wild life conservation and a few pioneer sanctuaries (for instance, Milroy in Assam) were set up. The twenties of the century also marked some important legislative and administrative developments. In 1921, the subject of forest administration was transferred to the Provincial governments, and in 1927, the Indian Forest Act revised once again. The revised Act made provisions for regulations of fellings in forests under private ownership.
The criterion fixed for the good management of a forest was not the saving of forests from injuries, not even securing good regeneration, but obtaining maximum earnings to the State exchequer.26

2.4.8 The Second World War:

The World War II was fought nearer home, and made much bigger demands on the forests of the country than did the earlier War. Quantities of timber far in excess of the prescribed silvicultural limits were felled in nearly every part of the country from high up in the Himalayas to deep in the south to meet the requirements of the War. It would be no exaggeration to say that the War depleted all utilizable stock of standing timber in the country.

The few years that made the gap between the end of the second World War and the Independence of India were marked by relatively large efforts to raise plantations, to improve communication and to introduce planned working in the forests which had been worked on an adhoc basis before. However, these efforts were little compensation for the ravages done to the forests during the War.

The British had given the country a tradition and a system of regular forest working. Though the East India Company plundered and used the forests for their

own benefit, the ninety years form the declaration of the British Sovereignty to the Transfer of Power made a sea change in the notion of the forest.\textsuperscript{27}

\subsection{2.4.9 Major Use of Forest in Different Ages:}

Forestry is a relatively new science. But forests are older than man. Man has made different uses of forests in different periods. In ancient times forest were being used for religious purpose, hunting and shelter of war victims. Thereafter the forests are being used for revenue earning by the different rulers. Forest was the last resort of cave dwellers to the present generation who are economically depending upon the wealth of the forest. Forests have nourished the human beings with motherly care in the time of war and natural calamities. We could trace the major uses of forests from ancient India to the end of the British rule in the following steps:

\footnotesize\textsuperscript{27} ibid Pp 22 – 23
### Table 2.1

Using of Forest in Different Ages

<table>
<thead>
<tr>
<th>Period</th>
<th>Major use of forest</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 BC – 300 BC</td>
<td>i. Meditation</td>
</tr>
<tr>
<td></td>
<td>ii. Religious studies</td>
</tr>
<tr>
<td></td>
<td>iii. Hunting</td>
</tr>
<tr>
<td>300 BC – 650 A.D.</td>
<td>i. Hunting</td>
</tr>
<tr>
<td></td>
<td>ii. Procuring of elephants</td>
</tr>
<tr>
<td></td>
<td>iii. Grazing by domesticated elephants</td>
</tr>
<tr>
<td>650 A.D. – 1700 A.D.</td>
<td>i. Hunting</td>
</tr>
<tr>
<td></td>
<td>ii. Shelter to victims of internal wars and foreign invasions</td>
</tr>
<tr>
<td></td>
<td>iii. Revenue to local rulers from sale of timber of selected species (Royal trees)</td>
</tr>
<tr>
<td>1700 A.D. – 1850 A.D.</td>
<td>i. Production of timber for building of fighting ships of the British Navy</td>
</tr>
<tr>
<td></td>
<td>ii. Reserves for expansion of cultivation</td>
</tr>
<tr>
<td>1850 A.D. – 1900 A.D</td>
<td>i. Production of timber for railway sleepers and firewood for steam engines</td>
</tr>
<tr>
<td></td>
<td>ii. Reserves for expansion of cultivation</td>
</tr>
<tr>
<td></td>
<td>iii. Available lands for tea and coffee plantations</td>
</tr>
<tr>
<td></td>
<td>iv. Hunting</td>
</tr>
<tr>
<td>1900 A.D. – 1914 A.D.</td>
<td>i. Regulated production of timber for commercial and social needs</td>
</tr>
<tr>
<td></td>
<td>ii. Revenue of Government</td>
</tr>
<tr>
<td></td>
<td>iii. Hunting</td>
</tr>
<tr>
<td>1914 A.D. – 1918 A.D.</td>
<td>i. Production of timber and hay for war supplies</td>
</tr>
<tr>
<td>1918 A.D. – 1940 A.D.</td>
<td>i. Regulated production of timber to meet commercial and social needs</td>
</tr>
<tr>
<td></td>
<td>ii. Revenue to government</td>
</tr>
<tr>
<td>1940 A.D. – 1944 A.D.</td>
<td>i. Production of timber in very large quantities for war supplies</td>
</tr>
<tr>
<td>1944 A.D. – 1947 A.D.</td>
<td>i. Revenue to government</td>
</tr>
<tr>
<td></td>
<td>ii. Regulated fellings to meet social and industrial demand</td>
</tr>
<tr>
<td></td>
<td>iii. Grazing by cattle</td>
</tr>
</tbody>
</table>

2.4.10 Policy and Conservation during Colonial Government:

In 1855, the Government of India issued a memorandum outlining the rules for the conservation of forests for the whole country. A qualified forester, Dr. Dictrich Brandis, was appointed as the first Inspector General of Forests in 1864. The first Indian Forest Act was drafted in 1865. A revised Indian Forest Act came into existence in 1878 and it was made operational in most of the provinces. For the first time, the forests were classified into Reserved and protected forests. In 1927, the Act of 1878 was consolidated to regulate the law relating to forests and forest produce. The first Forest school was opened in Dehradun in 1878. The provincial Forest Service was inaugurated in 1891. Thereafter, technical education and training were organised. The imperial Forest Research Institute was established in 1906 in Dehradun.

In 1910, the Board of Forestry was created at the national level under the chairmanship of the Inspector-General of Forests. The national character in forest administration was considerably diluted with political changes in 1921 when forests became a provincial subject and their administration came to rest in the Government of the concerned provinces.28

2.4.11 Post-Independence Period:

After independence in 1947, almost all the British officers of the erstwhile Imperial Forest Service left India and Indian officers assumed charge. With the integration of princely States with the rest of the country, the task of consolidation of forests, unification of forest laws and extension of scientific management on a

reasonably uniform basis became the most important pre-occupation of the forest administration at the national and provincial levels.

Through some of the relatively large princely States like Travancore, Mysore, Hyderabad and Jammu & Kashmir had organised forest departments and introduced fair measures of regularity in their forest working, and some like Bhopal and the States in Central and Eastern India States Agency had engaged trained foresters form the neighbouring provinces of British India and brought their forests under a reasonable state of working, by and large, the ex-princely forests under a reasonable state of working, by and large, the ex-princely forests had been managed on an adhoc basis either to serve as a source of revenue, or to provide game for hunting.

In 1946-47, that is immediately before Independence, the recorded area of the forests in the Provinces of British India (excluding the area that was transferred to Pakistan as a result of partition) was 39.94 million hectare. With the addition of ex-princely and ex-proprietary forests, the recorded area of forests increased to 68.02 million hectare in 1950-51.29

In the early 1950s, most of the States enacted new legislations affecting land tenure systems and large areas of privately-owned forest came to rest with the Forest Departments of the States. In the same time the country adopted a national festival of tree planting, Vanamahotsava, wildlife conservation, soil conservation etc. in 1950, and resolved a new forest policy in 1952.

Amidst all these changes the National Plan of Development commenced in 1951. Under the Five Year plan, artificial man made forests were began to be created on an unprecedented scale. Thus forestry’s development found an important place in the National Plans.

2.4.12 National Forest Policy, 1952:

The forest policy resolution of 1894 had four major drawbacks, first it allowed forests no intrinsic right to space, and in land use subordinated forestry to agriculture; secondly, it did not give adequate emphasis to protective and regulative services produced by forests; thirdly, while it advocated the meeting of people’s need in full measure it did not stipulate the management of forests on the principle of sustained yield; lastly, it did not suggest protection of forests from harmful practices of shifting cultivation and excessive grazing.

The new Forest Policy enunciated in 1952 made good the inadequacies of the old policy substantially. The new Policy recognised the protective functions of forests, and specifically stated that the notion that forestry has no intrinsic right to land but many be permitted on the residual land not required for any other purposes, should be discarded. It stipulated that the country as a whole should aim at maintaining one third of its total land area under forests. It suggested that while in the plains where erosion is not a serious problem, a proportion of 20 per cent be attained, in mountainous regions liable to erosion the percentage of the land under forests should be much higher, about 60 per cent. The Policy advocated scrupulous regard for sustained yield in the management of all classes of forests. On the controversial
question of grazing, the Policy left no ambiguity in its enunciations. Continuous and cheap grazing should not be allowed in forests, grazing by goats should be totally excluded, and grazing by sheep should be restricted, the policy stated.

To facilitate fixing of priorities in management, the Policy indicated a functional classification of forests. The classification suggested was:

(a) **Protection forests**, i.e., those forests which must be preserved or created for physical and climatic considerations.

(b) **National forests**, i.e., those which have to be maintained and managed to meet the needs of defence, communications, industry, and other general purposes of public importance.

(c) **Village forests**, i.e., those which have to be maintained to provide firewood to release cow-dung for manure, and to yield small timber for agricultural implements and other forest produce for local requirements and to provide grazing for cattle.

(d) **Tree-lands**, i.e., those areas which though outside the scope of the ordinary forest management are essential for the amelioration of the physical conditions of the country.

2.5 **Forest Types and their Distribution in India**:

They are distinguished in forestry mainly for the purpose of management and, therefore, the degree of subdivision depends on the intensity of treatment a particular type has to receive for purposes of its regeneration and tending. In delimiting types emphasis is laid on the most emergent vegetation, namely, the main tree layers and

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their important constituents from the economic view-point. Thus the most complex and variable wet tropical evergreen forest with its luxuriant vegetation of big and small trees, shrubs, herbs, climbers, parasites, etc., of numerous species, which is not valuable, is referred to as a single type. On the other hand, the tropical deciduous forests, though comparatively open and with but a few species, have been categorized into moist, semi-moist, dry, arid, and other types because the methods of regeneration and tending differ for each of these types of valuable forests. The main factors which define forest types are climatic, edaphic and biotic. Of climatic factors the most important are temperature and moisture and in particular their combination and seasonal variation. Provided adequate moisture is available, temperature shows itself in the luxuriant growth of the forest, in its height, density, variety of species and rate of growth. The conifers reach their best development in temperate climate in which they surpass their broad-leaved associates which grow best in a tropical climate. At higher elevations with cold increasing, winter deciduous species become more prevalent. Further higher up vegetation degenerates into scrub and only evergreen broad leaved species such as *Rhododendrons* are left. It moisture conditions are less favourable in areas of higher temperature, the vegetation gets stunted, sparse and is reduced to a few species most of which are summer deciduous and have other xerophytic adaptations such as small leaves, thick bark, etc.\(^{31}\)

### 2.5.1 Tropical Wet Evergreen Forest :

Lofty, very dense, multilayered forest with mesosphytic evergreens, 45m or more high, with a large number of species, numerous epiphytes, few climbers. Found

along the western face of the Western Ghats and in a strip running south-west from upper Assam through Cachar, and in Andamans.

*Example*: (i) *Ranni, Kerala*, 1000 m.


(ii) *Cachar, Assam*

*Important species*: Gurjan, Chaplasha, Jamun, Mesua, Agar, Muli, Bamboo etc.  

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### 2.5.2 Tropical semi-Evergreen Forest:

A closed high forest with large trees dominate, sometimes deciduous, with tendency to gregariousness, many species, buttressed trunks frequent, bark thicker and rougher and canopy less dense than in previous type, climbers heavy, bamboos less prevalent, epiphytes abundant. Occurs on the western coast, Assam, lower slopes of the Eastern Himalayas, Orissa and in Andamans.

*Example*: (i) *Palghat, Kerala*


(ii) *Kalimpong, West Bengal*

*Important species*: Bonsum, white Cedar, Indian Chestnut, *Litsea*, Hollock, Champa, Mango, etc.  

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32 ibid p – 62  
33 ibid p – 63
2.5.3 Tropical Moist Deciduous forest:

Irregular top storey of predominantly deciduous species, 40 m or more high, heavily buttressed trees, definite second storey of many species with some evergreens, fairly complete shrubby undergrowth with patches of bamboos, climbers heavy including canes. Occurs throughout Andamans, moisture parts of Uttar Pradesh, Madhya Pradesh, Gujarat, Maharashtra, Karnataka and Kerala.

Example: (i) Andamans

Important species: Padauk, White Chuglam, Badam, Dhup, Chikrasi, Kokko.

(ii) Allapalli, Maharashtra

Important species: Teak, Laurel, Haldu, Rosewood, Mahua, Bijasal, Lendi, Semul, Irul, Dhaman, Garari, Amla, Kusum, Common bamboo etc.

(iii) Dehra Dun, Uttaranchal

Important species: Sal, Lendi, Haldu, Paula, Litsea, Jamun, Mahua etc.\(^{34}\)

2.5.4 Littoral and Swamp Forest:

Mainly evergreen species of varying density and height, always associated with wetness. Littoral forests are found all along the coast and swamp forests in the deltas of bigger rivers.

Example: Sunderbans, West Bengal

Important species: Sundari, Bruguiera, sonneratia, Agar, Bhendi, Keora, Nipa, etc.\(^{35}\)

\(^{34}\) ibid
\(^{35}\) ibid
2.5.5 **Tropical Dry Deciduous Forest** :

Upper canopy closed though rather uneven, composed of a mixture of a few species practically all deciduous during the dry season, some for several months; upto 20 m high, some species tend to predominate over selected areas but most non-gregarious, lower canopy almost entirely deciduous, shrub present but enough light reaches the forest floor to permit growth of grass; bamboos present unless exterminated by over cutting but not luxuriant, climbers few but some large and woody, epiphytes and ferns inconspicuous. Occurs in an irregular wide strip running north-south from the foot of the Himalayas to Kanyakumari except in Rajasthan, Western Ghats and Bengal.

*Example:*  
(i) *Betul, Madhya Pradesh*

*Important species*: Teak, Axlewood, Tendu, Bijasal, Rosewood, Amaltas, Palas, Haldu, Kasi, Bel, Lendi, common bamboo, etc.

(ii) *Cuddapah, Andhra Pradesh*

*Important species*: Red Sanders, Axlewood, Bhilama, Achar, Khair, Ghont, Bel, etc.

(iii) *Ramnagar, Uttar Pradesh*

*Important species*: Sal, Laurel, Axlewood, Bhilama, Achar, Khair, Ghont, Bel, etc.\(^{36}\)

2.5.6 **Tropical Thorn Forest** :

Open, low, pronouncedly xerophytic forest, thorny leguminous species predominate, trees with short boles and low branches, an ill-defined lower storey of smaller trees and shrubs, spiny and with xerophytic characteristics, climbers few. This

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\(^{36}\) ibid p – 64
type grows in a large strip in South Punjbaj, Rajasthan, upper Gangetic Plains, the Deccan plateau and the lower peninsular India.

Example:  (i) Sholapur, Maharashtra

*Important species*: Khair, Reunjha, Axlewood, Neem, Sandalwood, Nirmali, Dhaman, etc.

(ii) Jaipur, Rajasthan

*Important species*: Acacia Senegal, Reunjha, Khejra, Kanju, Neem, Palas, Ak, etc.  

### 2.5.7 Tropical Dry Evergreen Forest:

A low forest, upto 12 m high with complete canopy, mostly of coriaceous leaved evergreen trees of short boles, no canopy layer differentiation, bamboos rare or absent, grass not conspicuous. Restricted to a small area of Karnataka coast which receives some summer rain also.

*Example*: Sriharikota, Andhra Pradesh

*Important species*: Khirni, Jamun, Kokko, Ritha, Tamarind, Neem, Machkund, Toddypalm, Gamari, Canes, etc.

### 2.5.8 Sub-Tropical Broad-Leaved Hill Forest:

Luxuriant forest evergreen species predominating limited to the lower slopes of the Himalayas in Bengal and Assam and other hill ranges such as Khasi, Nilgiri and Mahabaleshwar.

*Example*: Trivandrum, Kerala

*Important species*: Jamun, Machilus, Meliosma, Elaeocarpus, Celtis, etc.

37 ibid
38 ibid p – 65
2.5.9 Sub-Tropical Pine Forest:

Practically pure association of Chir pine, considerably influenced by periodical fires, no underwood, few shrubs. Found throughout the whole length of the north-west Himalayas between 1000 – 1800 m. Absent in Kashmir due to weakened south-west monsoon. In Khasi, Manipur and Naga Hills, Khasi pine occurs at similar altitudes.\textsuperscript{40}

2.5.10 Sub-tropical Dry Evergreen Forest:

Low, practically scrub forest, small evergreen stunted trees and shrubs including thorny species, herbs and grasses appear in monsoon. Met with in the Bhabar, the Siwaliks and the western Himalayas upto about 1000 m.

\textit{Important species}: Olive, \textit{Acacia modesta}, \textit{Pistacia}, etc.\textsuperscript{41}

2.5.11 Montane Wet Temperate Forest:

A closed evergreen forest. Trees mostly short-boled and branchy attaining large girth, height rarely 6 m, crowns dense and rounded leaves coriaceous, red when young, branches clothed with mosses, ferns and other epiphytes, woody climbers common. Found in the higher hills of Tamil Nadu and Kerala from 150 m upwards and in eastern Himalayas on the higher hills of Bengal, Assam, Sikkim and Nagaland from 1800 to 3000m.

\textit{Example}: Kalimpong, West Bengal

\textit{Important species} : \textit{Machilus}, \textit{Cinnamomum}, \textit{Litsea}, \textit{Magnolia}, Chilauni, Indian Chestnut, Birch, Plum.\textsuperscript{42}

\textsuperscript{39} ibid
\textsuperscript{40} ibid
\textsuperscript{41} ibid
\textsuperscript{42} ibid p – 66
2.5.12. Himalayan Moist Temperate Forest:

Coniferous forest, mostly pure, 30 to 50 m high with varying, underwood mostly evergreen, mosses and ferns grow freely on trees. Extends along the entire length of the Himalayas between the pine and the sub-alpine forest in Kashmir, Himachal Pradesh, Punjab, U.P., Darjeeling and Sikkim between 1,500 and 3,300 m.

Example: (i) Chakrata, Uttar Pradesh

Important species: Oak, Fir, Spruce, Deodar, Celtis, Chestnut, Maple, etc.

(ii) Sutlej Valley, Himachal Pradesh

Important species: Spruce, Deodar, Fir, Kail, Oak, Yew, Maple, Birch, etc.\textsuperscript{43}

2.5.13. Himalayan Dry Temperate Forest:

Predominantly coniferous forest with xerophytic shrubs, hardly any epiphytes and climber. Found in the inner dry ranges of the Himalayas where south-west monsoon is very feeble, precipitation below 100 mm, mostly snow; in Ladakh, Lahaul, Chamba, Kinnaur, Garhwal and Sikkim.

Example: Kinnaur, Himachal Pradesh

Important species: Chilgoza, Deodar, Oak, Maple, Ash, Celtis, Parrotia, Olive, etc.\textsuperscript{44}

2.5.14. Sub-Alpine Forest:

Dense growth of small crooked trees or large shrubs with coniferous overwood, mostly Fir and Birch. Conifers 30 m high, broad-leaved trees 10 m high.

\textsuperscript{43} ibid
\textsuperscript{44} ibdi
Occurs at the upper limit of tree forest in the Himalayas adjoining alpine scrub and grasslands.

*Example: Kulu, Himachal Pradesh*

*Important species:* Fir, Kail, Spruce, Rhododendron, Plum, Yew, etc.\(^{45}\)

### 2.5.15. Moist Alpine Forest:

Low evergreen dense growth of Rhododendron and Birch. Mosses and ferns on the ground with alpine shrubs and flowering herbs. Occurs along the entire length of the Himalayas above 3000 metres and extends to the snowline.

*Example: Kumaun, Uttar Pradesh 3,800 m.*

*Important species:* Birch, *Rhododendron*, Berberis, Honeysuckle, etc.\(^{46}\)

### 2.5.16. Dry Alpine Scrub:

The uppermost limit of scrub xerophytic, dwarf shrubs, over about 3,500 meters found in the dry zone.

*Example: High Himalayas over 4,000 m.*

*Important species:* Juniper, Honeysuckle, *Artemesia*, Potentilla, etc.\(^{47}\)

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\(^{45}\)*ibid*

\(^{46}\)*ibid p – 67*

\(^{47}\)*ibid*
The extent of forests of different groups of the country as a whole, is as under-

### Table 2.2

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Forest Group</th>
<th>Area (Mha)</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tropical Wet Evergreen</td>
<td>5.12</td>
<td>8.0</td>
</tr>
<tr>
<td>2</td>
<td>Tropical Semi-evergreen</td>
<td>2.624</td>
<td>4.1</td>
</tr>
<tr>
<td>3</td>
<td>Tropical Moist Deciduous</td>
<td>23.68</td>
<td>37.0</td>
</tr>
<tr>
<td>4</td>
<td>Littoral and Swamp</td>
<td>0.384</td>
<td>0.6</td>
</tr>
<tr>
<td>5</td>
<td>Tropical Dry Deciduous</td>
<td>18.304</td>
<td>28.6</td>
</tr>
<tr>
<td>6</td>
<td>Tropical Thorn</td>
<td>1.664</td>
<td>2.6</td>
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<tr>
<td>7</td>
<td>Tropical Dry Evergreen</td>
<td>0.128</td>
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<tr>
<td>8</td>
<td>Sub-tropical Broad-leaved</td>
<td>0.256</td>
<td>0.4</td>
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<tr>
<td>9</td>
<td>Sub-tropical Pine</td>
<td>4.224</td>
<td>6.6</td>
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<tr>
<td>10</td>
<td>Sub-tropical Dry Evergreen</td>
<td>1.6</td>
<td>2.5</td>
</tr>
<tr>
<td>11</td>
<td>Montane Wet Temperate</td>
<td>2.304</td>
<td>3.6</td>
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<tr>
<td>12</td>
<td>Himalayan Moist Temperate</td>
<td>2.176</td>
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<td>13</td>
<td>Himalayan Dry Temperate</td>
<td>0.192</td>
<td>0.3</td>
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<tr>
<td>14</td>
<td>Sub-alpine</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>15</td>
<td>Moist alpine Scrub</td>
<td>1.344</td>
<td>2.1</td>
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<tr>
<td>16</td>
<td>Dry Alpine Scrub</td>
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<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>Total -</strong></td>
<td><strong>64.0</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

*Source*: Indian Forester, July 1971 p – 436

The most abundant groups are Tropical Moist and Dry Deciduous forests, occupying over 70 per cent of the country’s forest area, followed by the Tropical Thorn forest (6.9 per cent), Tropical Wet Evergreen (6 per cent) and Sub-tropical Pine forest (5 per cent)\(^{48}\)

### 2.6 Forest and Forestry in Bengal:

Keeping in view of the present research project it is highly indispensable to highlight on the woodlands of Bengal. The history of Bengal has some special characteristics. The downfall of the Gupta Empire was followed by the rise of

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\(^{48}\) ibid p – 68
independent states in different parts of Northern India. Gouda and Vanga, previously included in the Gupta empire, gradually acquired independent status in the second half of the sixth century A.D. Karnasuvarna, capital of Gauda, occupied a prominent place in the history of Bengal when Kanauj has already been recognised as the chief metropolis of Northern India. The origin of the Gauda and the city was most probably on the bank of the river Ganga, not very far from the point where its course enters into West Bengal and extended upto the coast of Bay of Bengal in South.

So, apart from various studies, Gauda, the ancient Bengal was under various ruler of Hindu Kings and Muslim Nawabs. The alluvial river valley was very fertile and there is also evidence of large woodlands. Finally the East India Company won the battle of Plassey and spread their political supremacy over the people, land as well as woodland of Bengal.

Within two decades of defeating the rulers of Bengal in the historic Battle of Plassey in 1757, the British decreed special rewards for any tiger killed. The idea was to help push back the jungle. It was part of the constant tug of war between axe and plough on the one hand and the incredible ability of natural vegetation to spring back.

On the 29\textsuperscript{th} of March 1787, the British Government undertook the direct administration of the two great frontier principalities of Lower Bengal. Situated on the extreme verge of unwieldy jurisdictions, and separated from headquarters by rivers and swamps, and almost impassable jungle. In the northern district vir-bhumi, literally Hero Land, or as it commonly written in English documents, Beerbhoom and in the
southern district, ancienctly called Mala-bhumi, the lord of Wrestlers, but now known as Bishenpore.\footnote{Hunter, W. W.: The Annals of Rural Bengal (Cosmo Pub. 1975) p – 9}

W.W. Hunter in his “The Annals of Rural Bengal” described the Bengal in that time as: “On the frontier of lower Bengal, fifty miles west from the field of plassy, are to be traced the landmarks of two ancient kingdoms. They lie along the intermediate country between the lofty plateau of central India and the valley of the Ganges….over the uplands the jungle still holds its primitive reign, affording covert to wild beasts and cool glades for herds of cattle. In general the plains undulate gently east ward, dotted with fruit-bearing groves, enameled with bright green rice fields, and studded with prosperous villages. The soil, although less fertile than the swamps of Eastern Bengal, returns in low-lying grounds two crops each year; and the bracing atmosphere makes ample amends to the cultivator for the additional labour demanded by his fields. The forest yields a spontaneous wealth of timber, gums and brilliant lac-dye; the valleys produce the finest indigo, cotton, jute, sugar-cane, oil-seeds, and cereals grow abundantly ….and the country has long been famous for its iron and coal”.\footnote{ibid Pp 1 – 2}

So, it is clear that the Britishers attracted to the rich soil of Bengal which has crops and vegetation in one hand and coal and timber in other hand. Just after ten years of the battle of Plassey the Britishers started to manage the jungle mahal of Bengal.
In January 1767 the emerging company raj took its first steps to settle the jungle zamindars. After receiving charge of revenue collection in Midnapore, the East India Company had been preoccupied with the eastern part of the district, where settled agriculture, an accessible country side, and its apparently well established zamindaris were quickly controlled. In 1773, Edward Baber, the collector of Midnapore, provided the first detailed description of the jungle Mahals as Western jungle is an extent of country of about 80 miles in length and 60 miles in breadth. On the east it is bounded by Midnapore, on the West by Singhbhoom, on the north by Panchete, and the South by Mayurbhanj. He described that the soil is very rocky and mountainous and overspread with thick woods. The area was thinly populated compared to the alluvial plains of eastern Midnapore and the inhabitants were mostly paiks who were negligent of cultivation. These paiks had a hierarchy of sardars (headman), khandaits (swordsmen) and churs. The chuars, who were mostly Bhumij people, lived mainly in the hills between Ghatstila and Barabhum and were probably the original inhabitants of the jungle mahals.\(^{51}\)

Besides the South Western jungle mahals there is Sundarban Delta situated in West Bengal, the world famous largest delta in the world formed by the Ganga-Brahmaputra river system. Sundarban particularly famous for mangroves forests and home of Royal Bengal tigers is consisting of 54 small islands separated from each other by a network of tidal channels, rivers and creeks.

In fact, the Portuguese occupied Takdaha on the river Bidyadhari a century before the foundation of Calcutta by Job Charnock. Lower Sundarban was dominated

by the Portuguese for quite sometime. After the battle of Plassey, Mir Jafar, the Nawab of Bengal assigned to the East India Company on the 20th December, 1757, the Zamindari of Calcutta or 24 Parganas which included Sundarban. The grant did not confer a full proprietary status till 1759 when such right was assigned to Robert Clive by a ‘Sanad’. In the revised deed of 1765, the company received the right from 1775 permanently and unconditionally.52

Another woodland of Bengal situated in the great Himalaya. The great Himalayan ranges, 2400 km long and 240-400 km wide, the most striking feature in the geography of the world.

The Himalayan forests are diverse and comprise tropical, sub-tropical, mountain temperate, temperate and dry and moist alpine forests and scrubland. The Eastern Himalayas have, however, valuable broad leaved forests. All these forests are also very rich in fungi, lichen, moss and liverwort flora.53

So anywhere in the soils of Bengal, the Britishers day by day establishing their supremacy. There are certain selective plantation schemes were visualized and implemented in the jungles surrounding civil or military stations and landed estates. Soon after their establishment in 1788, the Calcutta Botanical Garden became a source of seed, advice and encouragement for tree planting programmes in Bengal and beyond. From 1794 teak seed and seedlings were distributed from there to every part of the country and plantation were taken up in different parts of Bengal. In Midnapore, Burdwan, and Bihar, the scheme was taken up through several Zamindars

52 Sharma, B. C. : Lower Sundarban :Role of fisheries in its Sustainable Development (The Asiatic Society 1994) p – 7
who did plant teak in their jungly wastes. In the next two decades Britishers distributed several thousands trees of teak, mahogany, sissoo and other timber species all over India. So, this plantation is a type of colonial forestry under the company raj for supplying timber to the British Crown. I have no hesitation to say from this company time commercial forestry was established; the legacy of which are still existing after 60 years of removing the colonial power from our country. So, in this way the natural woodland and its habitats were destroyed and replaced by commercial colonial plantation.

During the period of 1795 to 1850, the company raj chiefly viewed forests as limiting agriculture. In Bengal, forested lands, classified as wastelands, had been included in landlord estates. Dr. T. Anderson, superintendent of the Royal Botanical Gardens, Calcutta, was appointed as the first conservator of Forests in Bengal in August 1864. Under his direction, operations for fellings, conversion for logs into sleepers and the establishment of plantations began in British Sikkim, Jellapahar hills and the Darjeeling terai. A timber slide was installed near Kurseong. Probably the law makers also took inspiration from the prevalent forest laws in Europe, such as the French Forest code of 1827, the Austrian Law (Forestgesetz) of 1852 and the Bavarian Law of 1852. Be as it may, the first forest law tilled “The Government Forests Act, 1865 came into force on 1st May 1865 in many parts of the British India including Bengal.54

In 1871, as the Bengal Forest Rules came into force, the province remained a major importer of wood. The Darjeeling terai was found well stocked with sal and

54 ‘Banabithi’ Forest week edition 2009
some sissoo on river banks. A good part of what was estimated to be an area in excess of 50,000 acres had been leased to one Wardroper in 1854 to extend cultivation. In Jalpaiguri 25 per cent of the area leased out for cultivation was held by European tea planters. In Bankura, Birbhoom, and Midnapore, the sal jungles were extensive, entirely owned by Zamindars and only occasionally of timber quality. The jungle mahals of Midnapore were about 1,200 square miles in extent, of which 700 square miles were forested. The proprietors were already engaged in timber trade, while also giving annual licences for collecting dhuna, cocoons of silkworms and making charcoal. Subarnarekha and Kangasabati (Kansai) rivers were important to the timber trade. In the dry season timber also went by carts along tracks running parallel to the rivers. Midnapore town was a major centre for firewood.55

Since 1925 there were rapid deterioration of sal jungles in Midnapore. Except for the Raja of Jhargram whose forests were in better shape than most surrounding areas, all other small landlords and patnidars had been incapable of resisting forest destruction. Some trees were cut at one to one-half feet above ground so that the stump could be dressed down and burned to make charcoal. Live sal stools were preferred for charcoal by blacksmiths in Bankura and Midnapore. The Bengal-Nagpur Railway (BNR) opened in Jhargram forests in 1898, and the Kharagpur-Adra branch opened in 1903 and destroyed the sal jungles of Bankura.56

2.7 Forest Land, Forest cover and Vegetation in West Bengal:

The state of West Bengal extends from the Himalayas in the North to the Bay of Bengal in the South. It lies between 20° 31’ North and 27° 12’ North latitude and 85° 50’ East and 89° 52’ East longitude covering a geographic area of 88,752 sq. km. Five States (Sikkim, Assam, Bihar, Jharkhand and Orissa) and three countries (Bhutan, Nepal and Bangladesh) surround West Bengal—Sikkim to the North, Bhutan to the North-East, Assam and Bangladesh to the East, Nepal, Bihar and Jharkhand to the West and Jharkhand and Orissa to the South-West. The extreme south end into the Bay of Bengal.57

Total recorded forest land in the state is 11,879 sq. km. of which 7,054 sq. km. is Reserved Forest, 3,772 sq. km. is Protected Forest and 1,053 sq. km. is Unclassed State Forest, thus constituting 13.38% of the geographical area of the state.58 Forest land in this State mainly spread over in the Terai Dooars region, Sundarban Mangrove and in South Western Junglemahal. Other than these three areas there are so many green plantation by the Government and by the villagers. Apart from the village forest there are so many sacred groves covering green vegetation in the State.

58 ibid
Table 2.3

Legal Status of Forests in West Bengal Since 1901

<table>
<thead>
<tr>
<th>Year</th>
<th>Reserved Forests</th>
<th>Protected Forests</th>
<th>Unclassed State Forests</th>
<th>Private Protected Forests</th>
<th>Tea Garden Forests</th>
<th>Other Private Forests</th>
<th>Total Forest Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1901</td>
<td>2,401</td>
<td>4,856</td>
<td>115</td>
<td>0</td>
<td>398</td>
<td>5,271</td>
<td>13,491</td>
</tr>
<tr>
<td>1911</td>
<td>2,471</td>
<td>4,431</td>
<td>78</td>
<td>0</td>
<td>398</td>
<td>5,654</td>
<td>13,032</td>
</tr>
<tr>
<td>1921</td>
<td>2,530</td>
<td>4,408</td>
<td>78</td>
<td>0</td>
<td>325</td>
<td>5,950</td>
<td>13,291</td>
</tr>
<tr>
<td>1931</td>
<td>5,209</td>
<td>1,661</td>
<td>31</td>
<td>0</td>
<td>263</td>
<td>5,133</td>
<td>12,297</td>
</tr>
<tr>
<td>1941</td>
<td>5,199</td>
<td>1,645</td>
<td>31</td>
<td>0</td>
<td>258</td>
<td>4,995</td>
<td>12,128</td>
</tr>
<tr>
<td>1951</td>
<td>6,845</td>
<td>17</td>
<td>128</td>
<td>0</td>
<td>258</td>
<td>5,007</td>
<td>12,255</td>
</tr>
<tr>
<td>1961</td>
<td>6,979</td>
<td>3,451</td>
<td>483</td>
<td>598</td>
<td>257</td>
<td>204</td>
<td>11,972</td>
</tr>
<tr>
<td>1964</td>
<td>7,000</td>
<td>3,512</td>
<td>520</td>
<td>593</td>
<td>244</td>
<td>118</td>
<td>11,987</td>
</tr>
<tr>
<td>1971</td>
<td>7,054</td>
<td>3,772</td>
<td>1,053</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11,879</td>
</tr>
<tr>
<td>1981</td>
<td>7,054</td>
<td>3,772</td>
<td>1,053</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11,879</td>
</tr>
<tr>
<td>1991</td>
<td>7,054</td>
<td>3,772</td>
<td>1,053</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11,879</td>
</tr>
<tr>
<td>2001</td>
<td>7,054</td>
<td>3,772</td>
<td>1,053</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11,879</td>
</tr>
<tr>
<td>2002</td>
<td>7,054</td>
<td>3,772</td>
<td>1,053</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11,879</td>
</tr>
<tr>
<td>2003</td>
<td>7,054</td>
<td>3,772</td>
<td>1,053</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11,879</td>
</tr>
<tr>
<td>2004</td>
<td>7,054</td>
<td>3,772</td>
<td>1,053</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11,879</td>
</tr>
<tr>
<td>2005</td>
<td>7,054</td>
<td>3,772</td>
<td>1,053</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11,879</td>
</tr>
<tr>
<td>2006</td>
<td>7,054</td>
<td>3,772</td>
<td>1,053</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11,879</td>
</tr>
<tr>
<td>2007</td>
<td>7,054</td>
<td>3,772</td>
<td>1,053</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11,879</td>
</tr>
</tbody>
</table>

Source upto 1964: West Bengal Forests, Centenary Commemoration Volume, 1964
### Table 2.4

**District wise Area under Forests by Legal Status in West Bengal**

(in Sq. Km.)

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>District</th>
<th>Reserved Forests</th>
<th>Protected Forests</th>
<th>Unclassed State Forest &amp; others</th>
<th>Total Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Darjeeling</td>
<td>1,115</td>
<td>0</td>
<td>89</td>
<td>1,204</td>
</tr>
<tr>
<td>2</td>
<td>Jalpaiguri</td>
<td>1,483</td>
<td>217</td>
<td>90</td>
<td>1,790</td>
</tr>
<tr>
<td>3</td>
<td>Cooch Behar</td>
<td>0</td>
<td>42</td>
<td>15</td>
<td>57</td>
</tr>
<tr>
<td>4</td>
<td>Bankura</td>
<td>80</td>
<td>1,311</td>
<td>91</td>
<td>1,482</td>
</tr>
<tr>
<td>5</td>
<td>Purba Medinipur</td>
<td>8</td>
<td>1,166</td>
<td>535</td>
<td>1,709</td>
</tr>
<tr>
<td>6</td>
<td>Paschim Medinipur</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Burdwan</td>
<td>3</td>
<td>192</td>
<td>82</td>
<td>277</td>
</tr>
<tr>
<td>8</td>
<td>Purulia</td>
<td>112</td>
<td>729</td>
<td>35</td>
<td>876</td>
</tr>
<tr>
<td>9</td>
<td>Birbhum</td>
<td>8</td>
<td>54</td>
<td>97</td>
<td>159</td>
</tr>
<tr>
<td>10</td>
<td>Hooghly</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>11</td>
<td>Nadia</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>12</td>
<td>Murshidabad</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>13</td>
<td>Malda</td>
<td>8</td>
<td>5</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>14</td>
<td>Uttar Dinajpur</td>
<td>8</td>
<td>4</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>15</td>
<td>Dakshin Dinajpur</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>24-Parganas (N)</td>
<td>43</td>
<td>0</td>
<td>0</td>
<td>43</td>
</tr>
<tr>
<td>17</td>
<td>24-Parganas (S)</td>
<td>4,177</td>
<td>42</td>
<td>1</td>
<td>4220</td>
</tr>
<tr>
<td>18</td>
<td>Howrah</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>19</td>
<td>Calcutta</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>7,054 (59.38%)</td>
<td>3,772 (31.75%)</td>
<td>1,053 (8.87%)</td>
<td>11,879 (100%)</td>
</tr>
<tr>
<td><strong>All India</strong></td>
<td></td>
<td>4,23,311</td>
<td>2,17,245</td>
<td>1,27,881</td>
<td>7,68,437</td>
</tr>
</tbody>
</table>

2.7.1 Classification of Recorded Forest Land (Legal status):

According to Indian Forest Act, 1927 forest areas of the state classified in three major categories. Estuarine water bodies like rivers and creeks in mangrove forest and river flowing through the recorded forest land in Jalpaiguri and other districts have been included while computing the forest cover. Similarly large portions of farm forestry plantations, raised outside forest land, having forest like micro-ecosystem, have been enumerated as forest cover. The main forest cover of West Bengal mainly spread over three parts of the state: The Terai – Dooars, the Mangroves and South Western Jungle Mahal. The legal status of the forestry can be classified as follows:

**Reserved Forest**: An area notified under the provisions of Indian Forest Act, 1927 having full degree of protection. In Reserved Forests all activities are prohibited unless specifically permitted (Sec. 20 of IFA, 1927).

**Protected Forest**: An area notified under the provisions of the Indian Forest Act having limited degree of protection. In Protected Forest all activities are permitted unless prohibited (Sec. 29 of IFA, 1927).

**Unclassed Forest**: An area recorded as forest but not included in Reserved or Protected forest category. Ownership status of such forests varies from state to state.
Table 2.5

District wise Distribution of Geographical and Recorded Forest Land in West Bengal

<table>
<thead>
<tr>
<th>District</th>
<th>Geographical Area (Sq. Km.)</th>
<th>Recorded Forest Area (Sq. Km.)</th>
<th>% age of Recorded Forest Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darjeeling</td>
<td>3,149</td>
<td>1,204</td>
<td>38.23%</td>
</tr>
<tr>
<td>Jalpaiguri</td>
<td>6,227</td>
<td>1,790</td>
<td>28.75%</td>
</tr>
<tr>
<td>Cooch Behar</td>
<td>3,387</td>
<td>57</td>
<td>1.68%</td>
</tr>
<tr>
<td>Bankura</td>
<td>6,882</td>
<td>1,482</td>
<td>21.53%</td>
</tr>
<tr>
<td>Medinipur</td>
<td>14,081</td>
<td>1,709</td>
<td>12.14%</td>
</tr>
<tr>
<td>Burdwan</td>
<td>7,024</td>
<td>277</td>
<td>3.94%</td>
</tr>
<tr>
<td>Purulia</td>
<td>6,259</td>
<td>876</td>
<td>14.00%</td>
</tr>
<tr>
<td>Birbhum</td>
<td>4,545</td>
<td>159</td>
<td>3.50%</td>
</tr>
<tr>
<td>Hooghly</td>
<td>3,149</td>
<td>3</td>
<td>0.10%</td>
</tr>
<tr>
<td>Nadia</td>
<td>3,927</td>
<td>12</td>
<td>0.30%</td>
</tr>
<tr>
<td>Murshidabad</td>
<td>5,324</td>
<td>8</td>
<td>0.15%</td>
</tr>
<tr>
<td>Malda</td>
<td>3,733</td>
<td>20</td>
<td>0.54%</td>
</tr>
<tr>
<td>Uttar Dinajpur</td>
<td>3,140</td>
<td>10</td>
<td>0.32%</td>
</tr>
<tr>
<td>Dakshin Dinajpur</td>
<td>2,219</td>
<td>8</td>
<td>0.36%</td>
</tr>
<tr>
<td>Calcutta</td>
<td>104</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Howrah</td>
<td>1,467</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>24-Parganas (S)</td>
<td>10,159</td>
<td>4,221</td>
<td>41.54%</td>
</tr>
<tr>
<td>24-Parganas (N)</td>
<td>3,977</td>
<td>43</td>
<td>1.08%</td>
</tr>
<tr>
<td>Total</td>
<td>88,752</td>
<td>11,879</td>
<td>13.38%</td>
</tr>
</tbody>
</table>

### Table 2.6
**Forest Area under Major Forest Type in West Bengal**

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Forest Type</th>
<th>Area (in million hectares)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>West Bengal</td>
<td>All India</td>
</tr>
<tr>
<td>1</td>
<td>Tropical Moist Deciduous Forests</td>
<td>0.459</td>
<td>23.245</td>
</tr>
<tr>
<td>2</td>
<td>Tropical Dry Deciduous Forests</td>
<td>0.430</td>
<td>29.149</td>
</tr>
<tr>
<td>3</td>
<td>Sub-tropical Broadleaved Hill Forests</td>
<td>0.005</td>
<td>0.287</td>
</tr>
<tr>
<td>4</td>
<td>Montane Wet Temperate Forests</td>
<td>0.005</td>
<td>1.613</td>
</tr>
<tr>
<td>5</td>
<td>Littoral and Swamp Forests</td>
<td>0.279</td>
<td>0.671</td>
</tr>
<tr>
<td>6</td>
<td>Alpine Forest</td>
<td>0.005</td>
<td>1.790</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>1.183</strong></td>
<td><strong>56.755</strong></td>
</tr>
</tbody>
</table>


### Table 2.7
**Principal species under Major Forest Types in West Bengal**

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Forest Type</th>
<th>Principal Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tropical Moist Deciduous Forests</td>
<td>Shorea robusta, Michelia champaca, Lagerstroemia parviflora, Terminalia belerica, Chukrasia velutina.</td>
</tr>
<tr>
<td>2</td>
<td>Tropical Dry Deciduous Forests</td>
<td>Shorea robusta, Anogeissus latifalia, Boswellia serrata, Terminalia belerica, T.tomentosa etc.</td>
</tr>
<tr>
<td>3</td>
<td>Sub-tropical Broadleaved hill forests</td>
<td>Schima wallichii, Castanopsis indica, Phoebe attenuate, Castanopsis tribuloides etc.</td>
</tr>
<tr>
<td>4</td>
<td>Montane Wet Temperate Forests</td>
<td>Quercus spp., Acer spp., Michelia spp. etc.</td>
</tr>
<tr>
<td>5</td>
<td>Littoral and Swamp Forests</td>
<td>Ceriops spp., Avicennia spp., Rhizophora candelaria etc.</td>
</tr>
<tr>
<td>6</td>
<td>Alpine forests</td>
<td>Tsuga brunoniana, Picea spp., Abies densa, Quercus spp., Juniperus spp., Rhododendron spp and Betula utilis.</td>
</tr>
</tbody>
</table>

*Source*: State Forest Report, West Bengal, 2006 – 2007 p – 21
2.8 West Bengal Forest Development Corporation Limited:

West Bengal Forest Development Corporation Limited came into existence in 1974 on the recommendations of National Commission of Agriculture in their interim report in 1972 on ‘Production Forestry – man-made forests’. Having been registered as a Company and incorporated under the Companies Act, 1956, the Corporation started functioning on 19th November, 1974.

2.8.1 Objectives of the Corporation:

- To help conserve fragile eco-system of Darjeeling Himalayas in areas in which it operates.
- To promote Joint Forest Management (JFM) with people’s participation in South West Bengal and North Bengal.
- To offer timber, non-timber forest produce and value-added products at reasonable prices.
- To help develop awareness for conservation of nature through eco-tourism.
- To help develop and promote wood-based industries.
- To generate rural employment through forestry and related activities.
- To promote and market filtered honey of the Sundarbans.

2.8.2 Activities of the Corporation:

The corporation holds lease of 440 Sq. Km. of forest areas primarily in the Kalimpong Forest Division. Entrusted by the Govt. of West Bengal, the Corporation undertakes the management of such leased out areas in terms of prescriptions of the approved Working Plan and the relevant orders. Every year it takes up afforestation of degraded forest areas. As part of a shift in the afforestation plan in the hills, the
plantations are now being enriched, to the extent possible through planting out of varieties of board-leaved indigenous species instead of raising mono-culture of conifers.

The Corporation has been entrusted by the State Govt. with the harvesting and marketing of timber, poles, pulpwood and firewood on agency basis from all territorial Divisions under the territory of the Forest Directorate. Earlier, such harvesting activities were confined to territorial Divisions of the northern part of the state. However, in 1990’s the Corporation extended its harvesting operation of Sal coppice forests of South West Bengal. Much later, from 1998 – 99 onwards, such Sal coppice areas in South West Bengal as well as plantations as are being harvested from the areas leased out to Corporation on a progressive basis as part of a MOU between West Bengal Forest Development Corporation Limited and the Forest Directorate in terms of the Project on Consolidation of JFM and Enhancement of Forest Productivity.

Besides taking up the afforestation work of degraded forest areas in the hills, the Corporation had undertaken afforestation with Cashew in Midnapore District over an area of 1,870 ha., of which about 1,480 ha. Has a reasonably good crop of Cashew. The balance areas which have been rendered blank or degraded because of biotic interference are being replanted with Eucalyptus clones. The Corporation has promoted high-tech plantation under the Project on Consolidation of JFM and Enhancement of Forest Productivity. Such high-tech plantations included clonal plantations and experimental plantations.
It has seen that from the ancient time human beings are sheltered, nourished and helped by the resources of forests. The religious injunctions protect the forest from the hands of human civilization by various thoughts and beliefs. From the dawn human civilization, particularly after the industrial revolution the forest and its resources are being destructed in the name of development. The welfare government made certain policies and laws to save the forest eco-system, but still there is need for protecting the forests and the living creatures around the forests.