CHAPTER III
FORESTS AND VEGETATION

Every one of us, during each day of our lives, depend to some extent on forests or on the products from forest. In fact the old saying "Wood is required from cradle to grave" is true in every sense. From birth Man is nurtured in wooden cradle, plays with wooden toys, lives and grows in wooden houses, dies on a wooden cot and finally consigned to flames, with fuel wood or buried in a wooden casket. Forests are considered as our most important renewable natural resources and confer considerable benefits on both the people and the nation as a whole; provided that this valuable natural resource is conserved, exploited and utilized properly on sound scientific lines.

With the advent of British rule, forests formed a part of the revenue department, and there was no separate forest department till middle of last century. The early period of forest development in India was primarily concerned with transferring an enormous area of waste land and private land to public ownership and management. At present forest is recognised as a renewable natural resource. Development of forestry as a factor in agricultural progress, as a source of raw material for industrial and other uses; for export, as a means for sustaining ecological balance, and above all providing employment to a large section of rural people in and
around forest areas. An aggressive policy of man made forestry with quick growing species has replaced the age old conservation forestry during the last three decades.

The vegetation of Andhra Pradesh is very varied depending upon the climate, altitude and edaphic factors. Industry, habitation and other purposes reduced the area of natural forests to a mere 23.11% of the total land area (tables 4 & 5). It can be broadly divided into four categories such as:

A. Coastal vegetation
B. Island vegetation
C. Interior Plain vegetation and
D. Hill and Mountain vegetation.

A. Coastal vegetation:

Coastal Andhra Pradesh approximately occupies two-thirds of the peninsular India along the east coast. In the background of the coastal plain to a greater part, runs the Eastern Ghat division. The entire coastal plain on an average is below the elevation of 20 m MSL. The coast of Andhra Pradesh stretching from the pulicat lake in the south to Bhimilipatnam in the north covering Srihari kota, Krishnapatnam, Maypadu, Manginapudi, Machilipatnam, Coringa estuary, Kakinada, Uppada, Poodimadaka and Waltair.

A.R.K. Sastry and T. Ananda Rao (1973) have dealt with the coastal vegetation of Andhra Pradesh. The coastal
Table: 4. Land area and Forest area - district wise data

<table>
<thead>
<tr>
<th>No.</th>
<th>District</th>
<th>Land area</th>
<th>No. of blocks</th>
<th>Forest area</th>
<th>% of Forests</th>
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<tbody>
<tr>
<td>1.</td>
<td>Srikakulam</td>
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<td>5.</td>
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<td>7.</td>
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<tr>
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<td>14.</td>
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<td></td>
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<tr>
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<td>275.1</td>
<td>3266</td>
<td>63.58</td>
<td>23.11</td>
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Table: 5. Region-Wise Forest area

<table>
<thead>
<tr>
<th>No.</th>
<th>Region</th>
<th>Land area (sq.kms)</th>
<th>Forest area (Sq.kms)</th>
<th>% of Forest region</th>
<th>% of Forest area to land area</th>
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<td>30.77</td>
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<td>Rayalaseema</td>
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<td>15,006</td>
<td>23.60</td>
<td>22.30</td>
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<td>3</td>
<td>Telangana</td>
<td>1,14,863</td>
<td>29,012</td>
<td>45.63</td>
<td>25.26</td>
</tr>
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<td></td>
<td><strong>Total. Andhra Pradesh</strong></td>
<td><strong>2,75,068</strong></td>
<td><strong>63,580</strong></td>
<td><strong>100</strong></td>
<td><strong>23.11</strong></td>
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</tbody>
</table>
vegetation of the state is divisible into two sub-groups:

1) Strand vegetation and 2) Estuarine vegetation.

1) Strand vegetation: - The strand vegetation is characteristic with open, at forming pioneer species followed by scattered herbs, shrubs and trees dispersed along the relief beyond the high tide limit or the back shore region. Based on the composition this is further divisible into sand strand and rock strand.

The sand strand vegetation along the sandy beaches exhibits zonations distinguishable into:

(i) Open pioneer zone: - This is the first zone in supra tidal region immediately preceding the drift line, in which the vegetation is sparse with few plants like Ipomoea pes-capre, Cyperus arenarius, Trachys muricata and Zosia matrella.

(ii) Closed herbaceous zone: - In this vegetation attains a little more dense with some matforming herbaceous plants, of which Gonioqyna hirta, Heliotropium curassavicum, Trachys muricata, Portulaca tuberosa, Phvla nodiflora, Molluco nudicaulis, Gisekia pharnaceoides, Pennisetum pedicellatum Setaria pumila, Spinifex littoreus are some of the common plants.

(iii) Middle mixed or bushy zone: - In which Caesalpinia bonduc, Carissa spinarum, Cassia auriculata, Cissus quadrangularis, Allmania nodiflora, Crotalaria verrucosa, Clerodendrum inerme, Dodonaea viscosa, Jatropha gossypifolia,
Opuntia dillenii, Synostemon bacciforme and Tephrosia purpurea are common.

(iv) Inner woodland zone: This is mainly dominated by trees like Borassus flabellifer, Calophyllum inophyllum, Cocos nucifera, Drypetes sepiaria, Mimusops elengi, Pandanus fascicularis, Phoenix pusilla, Pongamia pinnata, Prosopis cineraria, Syzygium ruscifolium, Thespesia populnea. The common climbers met with in this zone are Gloriosa superba, Hemidesmus indicus, Leotadenia reticulata, Pergularia daemia, Tiliacora acuminata. This zone gradually merges into the waste lands and cultivated fields in the hinterland region in the coastal belt.

The rock strand vegetation is limited to small strips at Waltair and Poodimadaka in the whole of Andhra Coast, where the inland hillocks and their rocky promontories project into the sea. The flora in this zone are mostly a mixture of coastal and inland plants. The vegetation of this area can be classified into:

(i) Exposed rocky low lying reefs: The marine present in this region are red, brown and green marine algae belonging to species of Padina, Sargassum, Enteromorpha, Caulerpa and Ulva.

(ii) Rocky relief mostly with exposed laterite and rocky boulders with thin mantle of sand in crevices or weathered surfaces: Blepharis repens, Euphorbia thymifolia, Sonotyra hirta, Hybanthus enneaspermus and Vernonina cinerea are common in this region.
(iii) Less rocky to gravelly or sandy areas: - This region is mainly dominated by spiny thickets and shrubby herbs. The common plants are Acalypha indica, Acanthospermum hispidum, Barleria prionitis, Caralluma attenuata, Carissa spinarum, Dichrostachys cinerea, Echinops echinatus, Euphorbia tirucali, Hybanthus enneaspermus, Indoneesiella longipedunculata, Mavtenus emarginatus, Pavonia zevlanica, Stachytarpheta urticaefolia, Toddalia asiatica, Tylophora asthmatica, and Ziziphus oenoolia.

2) Estuarine vegetation: - Champion and Seth (1968) designated it as tidal swamp forest, while A.R.K. Sastry and T. Ananda Rao (1973) described it as estuarine vegetation.

Venkatesan (1966) classified this vegetation under the general term "mangrove" following Schimper (1903).

The mangrove vegetation which develops along muddy tidal banks, is primarily restricted to the Godavari and Krishna estuarine systems in Andhra Pradesh. In the Coringa and Gaderu tidal estuaries of the Godavari estuarine system on the newly formed silt deposits in the intertidal region, the grass Porteresia coarctata grows as a pioneer together with a few seedlings of Avicennia and Sonneratia. Further interior Avicennia alba and Sonneratia apetala dominate forming a thick strata of vegetation. Along the estuarine mouth well grown trees of Rhizophora apiculata, R.mucronata and Bruguiera gymnorrhiza are common. Further away from the estuarine mouth
the vegetation (photo 1 b) is composed of mixed mangrove species like *Avicennia alba*, *A. marina*, *A. officinalis*, *Aegiceras corniculatum*, *Bruguiera gymnorrhiza*, and *Geriops decandra*. Behind this zone under the influence of fresh water influx the vegetation appears like a mosaic with *Avicennia officinalis*, *Excoecaria agallocha*, *Hibiscus tiliaceus*, *Lumnitzera racemosa*, *Sonneratia apetala* etc. The climbers which are luxuriently grown on the trees are *Caesalpinia crista*, *Dalbergia spinosa*, *Derris trifoliata*, *Ipomoea macrantha*, *Sarcolobus carinatus*. The upland dry 'blank' areas that lie behind and away from tidal influx, support a sparse growth of halophytic species.

The vast mudflats/saline flats that occur particularly at places in the vicinity of Kakinada, Machilipatnam, Krishna-patnam (photo 1 b) and Tada supports sparse vegetation, composed of halophytic species like *Suaeda maritima*, *S. monoica*, *S. nudiflora*, *Salicornia brachiata*, *Sesuvium portulacastrum*, *Heliotropium curassavicum*, *Enicostemma hyssopifolium*, *Aleuropus lagopoides* and *Cressa cretica*, *Psilostachys sericea* is to be seen only at Krishnapatnam for the entire east as earlier reported by Gamble.

**B. Island vegetation:**

The islands of Sriharikota and Irakkam in the pulicat lake exhibit strand flora which is almost similar to that of coast vegetation. Not very far from the coast line in Sriharikota, in same undistributed areas the vegetation is composed of tree species of *Albizia amara*, *Hvinocarpus* sp. *Sapindus emarginatus*
Strychnos nux-vomica, Tamarindus indicus, Terminalia arjuna
and the shrubby zone is chiefly dominated by Dodonaea viscosa
and Memecylon umbellatum. The common climbers in this zone
are Abrus precatorius, Hemidesmus indicus, Ichnocarpus frutescens.
Luxuriently growing dense thickets of Calamus sp. along the
ponds suggests the existence of a moist deciduous type of
vegetation in the island in the past. Now the extensive planta­
tions of Eucalyptus, Casuarina and cashew-nut are existing.

C. Interior plain vegetation.

The vegetation of the plains at the foot or some
times on the gently undulating slopes of hills and hillocks
in the rocky area bordering the coastal plains comes under
Southern tropical thorn forests of Champion and Seth (1968).
Though this type of vegetation is quite considerable in area
but is very poor when compare with hill and mountain vegetation.
In these scattered forests trees seldom reach 10 m in height
and they are hardwooded and often armed with spines and prickles.
Most plants including climbers manifest, several xeromorphic
features such as succulence, stunted growth, thorniness etc.
Most of the plants present in this forests are also met with
deciduous and scrub forests in hills. As this forests are
degraded to a greater extent due to biotic interference.

D. Hill and Mountain vegetation: - Eastern ghats comes under
this type of vegetation. The vegetation in hills and mountains
in Andhra Pradesh can be broadly categorised thus: 1. Tropical

1. Tropical semi-evergreen forests (Moist deciduous forests mixed with evergreen elements):

This type of vegetation is prevalent in moist valleys and on hills at about 800 m. Sapparla, Dharakonda, Galikonda, Thanjavarnam, Minumuluru, some areas near Anantagiri in Visakhapatnam district, Nulakamaddi and Maredumilli etc, areas in East Godavari district. The top storey comprised Michelia champaka, Mangifera indica Artocarpus lakoocha, Dillenia pentagyna, Firmiana colorata, Bridelia tomentosa, Xyloca xycolorca in addition to the small trees such as Polyalithia cerasoides, Macaranga peltata, Phoebe lanceolata and Murraya koenigii forms the middle storey.

The common climbers are Ampelocissus latifolia, Cissus repanda, Bauhinia vahli, Entada pursaetha and Smilax zevlanica. Gnetum ula is also not uncommon in certain forests of this type.

2). Tropical moist deciduous forests:

Based on the dominancy of certain tree species this forests can be subdivided in to three types.

(a) Northern tropical moist deciduous forests (sal type)
(b) South Indian tropical moist deciduous forests (non-sal type)
(c) Southern tropical moist deciduous reverian forests.

(a) Northern tropical moist deciduous forests (Sal type):-
(a) Northern tropical moist deciduous forests (Sal type):-

This type is found in Srikakulam forests. The top storey consists of *Shorea robusta* as dominant tree, which is associated with *Adina cordifolia*, *Albizia procera*, *Anogeissus latifolia*, *Madhuca longifolia*, *Pterocarpus marsupium*, *Syzygium cumini*, *Terminalia tomentosa*, and *Xyliya xylocarpa*. The middle storey is formed by *Buchanania lanzan*, *Careva arborea*, *Cleistanthus collinus*, *Dillenia pentagyna*, *Diospyros melanoxylon*. The shrubby layer comprises *Cipadessa baccifera*, *Colebrookia oppositifolia*, *Grewia hirsuta*, *Holarrhena antidysentrica*, *Woodfordia fruticosa* etc. The dominant grasses which form the ground cover are *Arundinella setosa*, *Themeda triandra* and *Thysanolaena maxima*.

b) South Indian Tropical moist deciduous forests (non Sal type):

Gudem Rampa agency, parts of West Godavari district, Gundlabrahmeswaram in Kurnool District and Rollapenta in Prakasam district (photo 2a & b) are showing this type of forests. The top storey comprises *Adina cordifolia*, *Albizia odoratissima*, *Anogeissus latifolia*, *Dillenia pentagyna*, *Mangifera indica*, *Mitragyna parviflora*, *Terminalia tomentosa* etc. The middle storey consists of *Bambusa arundinacea*, *Careva arborea*, *Dendrocalamus strictus*, *Kvdia calycina*, *Polvalthia cerasoides*, *Semecarpus anacardium* etc. In rocky slopes the common members in this middle storey are *Cleistanthus collinus*, *Emblica officinalis* and *Strvchnos potatorum*. The common climbers are
Bauhinia vahlii, Butea monosperma, Entada pursaetha and Millettia auriculata, which predominate the growth and forming serious menace to the standing vegetation.

c) Southern tropical moist deciduous riverian forests:

This is found along the banks of river Godavari (photo 3 a) other hill streams in a narrow belt. Top storey consists of Alangium salvifolium, Anogeissus latifolia, Barringtonia acutangula, Butea monosperma, Cratava nurvala, Mitragyna parviflora, Strychnos nux-vomica, Terminalia arjuna etc.

The lower storey comprises of Homonolia riparia, Rotula aquatica, Pedalium murex, Euphorbia dracunculoides in addition to the grasses like Brachiaria distachya, Digitaria ciliaris.

3) Southern tropical dry deciduous forests:

These forests are widely spread in Eastern ghats (photo 4 a & b). The top storey is formed by a mixture of trees all of which are practically deciduous during the dry season. The dominant trees are Anogeissus latifolia, Cassia fistula, Chloroxylon swietenia, Cochlospermum religiosum, Dalbergia paniculata, Gardenia latifolia, G. resinifera, Pongamia pinnata, Pterocarpus santalinus (dominant and endemic to Seshachalam hill range), P. marsupium, Pterospermum xylocarpum, Semecarpus anacardium, Strychnos nux-vomica, Tectona grandis, Terminalia spp., Wrightia tinctoria etc.

The middle storey comprises Helicteres isora, Cissus pallida, Desmodium pulchellum, Leea crista, Tarenna asiatica and
Woodfordia fruiticosa and others. The under storey is predominantly dominated by grasses.

4) Dry savannah forests:

This type of forests formed as a result of intense biotic interference, which are scattered throughout the Eastern ghats (photo 3 b) The stunted trees are Emblica officinalis Phoenix humilis, Pterocarpus marsupium, Terminalia chebula are associated with grasses like Arundinella setosa, Chrysopogon aciculatus, Cymbopogon flexuosus, Imperata cylindrica, Themeda triandra etc.

5) Tropical dry evergreen forests-

This type is seen in Kodur-Balapalle range in Cuddapah district, Mamandur valley in Chittoor district, Krishnanandi near Mahanandi in Kurnool district, Sriharikota island near Nellore. The top storey comprises of Albizia amara, A. lebbeck, Cleistanthus patulus, Drypetes sepiaria, Manilkara hexandra, Pterospermum canescens, Sapindus emarginatus, Strvchnos nux-vomica, Syzygium cumini etc., while the middle storey is dominated by Cordia dichotoma, Garcinia spicata, Atalantia monophylla, Flacourtia indica, Memecylon umbellatum. The common climbers are Calamus viminalis, Derris scandens, Ziziphus oenoplia etc. Interestingly the evergreen elements like Piper hymenophyllum, P. nigrum and P. tricicum are seen in Gundlabrahmeswaram, the nucleus of Nallamalais in Kurnool district. The climbers like Calamus rotang and Bahinia vahlii make this forests beautiful by their thick foliage and rugged climbing in Krishnanandi region.
6. Tropical scrub forests:

Yerramalais in Rayalaseema (photo 1 a), most of the palakonda hills, foot hills of Nallamalais, opened out forests are showing this type of vegetation. The top storey consists of *Alanqaum solvifolium*, *Atalantia monophylla*, *Balanites aegyptiaca*, *Chloroxylon swietenia*, *Capparis divaricata*, *Catunaregum spinosa*, *Diospyros chloroxylon*, *Mavtenus emarginata*, *Marqning alata*, *Sterculia urens*, *Ziziphus mauritiana*, *Z. oenoplia* and others.

The middle storey consists of *Acacia caesia*, *A. chundra*, *A. horrida*, *A. leucophloea*, *Cadaba fruticosa*, *Capparis zevlanica*, *Dodonaea viscosa*, *Grewia spp.*, *Pterolobium hexapetalum*, *Rhus mysoresensis*, *Ziziphus xylopyrus* etc.

The undergrowth in scrub vegetation is dominated by *Alysicarpus scariosus*, *Allmania nodiflora*, *Crotalaria spp.*, *Hibiscus ovalifolius*, *Koxnia sumatrensis*, *Polycarpaea aures*, *Triumfetta rhomboidea*, *Waltheria indica*, *Zornia gibbosa* etc. The dominant grasses are *Apluda mutica*, *Aristida adscensionis*, *A. mutabilis*, *A. setacea*, *Arthraxon echinusus*, *Cenchrus biflorus*, *Chloris barbata*, *Chrysopogon fulvus*, *Cymbopogon coloratus*, *Dicanthium annulatum*, *Iselema laxum*, *I. prostratum*, *Panicum repens* and others.

The presence of three *Oryza* species viz., *O. granulata*, *O. melampuzhensis*, *O. sativa* in Gundlabrahmeswaram forests, the heart of Nallamallais in Eastern Ghats are quite interesting.