Chapter One

INDIA'S FORESTS AND FORESTRY ENVIRONMENT

History of Indian Forestry:

Forestry has a long history in India. The start of the modern scientific forestry is taken from the year 1861, when the Government of India appointed the first Inspector General of Forests for the administration of country's forests. This chapter attempts to explain the forestry system in India. It is necessary to understand the whole forestry system before any improvement is considered to make it more effective.

Ancient Indian literature from Vedic times has numerous references to the variety of benefits that the trees and forests bestowed on mankind. Trees were worshiped. Growing trees and protecting them was considered as a good act. In Agni Purana, Rishis warned people about the impending disasters like drought and floods resulting from the destruction of forests. The Vishnu Purana mentions nine forest regions or 'Vanas', somewhat similar to the reserved forests of the present. Such 'Vanas' were also identified by their densities, viz 'Kunjar Vanas' (Elephant Forests) were denser forests where elephants roamed. 'Kantak Vanas' were the thorn forests.

Forestry in India: AP Dwivedi, Jugal Kishore & Co, Dehra Dun 1981
and scrub lands. The Mahabharata makes a distinction between a natural forest (Aaranya) and man-made forests (Vanas). Sugriva (one of the Pandavas) created the famous 'Madhu Vana'. Regular Forest Administration is presented in Kautilya's Arthashastra² which is a well known treatise on state administration. Officials like the Superintendent of Forests and Superintendent of Elephants were suggested in King's Administration. Duties and Obligations of all such forest officials were laid down. Disposal of all forest produce, including animal products such as ivory, is meticulously explained. Creation of forests, where lands are barren, is prescribed. Arthashastra also laid down strict game laws for the protection of the denizens of forests. The Maurya Empire mentions creation of five forest divisions. During Gupta period (600-700 AD) forests were the principal source of state revenue.

Beginning of Scientific Forestry in India:

Glorious era of forestry came to an end after the Gupta period. Forests were cleared in large areas, particularly in the Gangetic plains, for cultivation during Moghul period. Large scale exploitation of important trees like teak occurred during early British Rule for feeding industries in England and for ship building. However, forest conservation was also adopted during the late part of the British Raj. The East India Co. appointed the first 'Forest Officer' in 1806 at

Madras to organise timber exploitation. Chathu Menon, a forester, created India's first teak plantation at Nilumbur in 1842 under the direction of Conolly, the then Collector of the district. India enunciated its first Forest Policy in 1894, which laid down public benefit as the sole object of forest administration. Forests situated on hill slopes were to be maintained for preserving physical and climatic conditions and for protection of the cultivated plains below. Forests which were the reservoirs of valuable timber were to be managed on commercial lines as a source of revenue to the state. This Forest Policy unfortunately harmed the interests of Forestry. It's prescription that, wherever an effective demand for cultivable land existed and could only be supplied from forest area, the land should ordinarily be relinquished without hesitation, subject to certain conditions, relegated forestry to a secondary role. Forests that yielded inferior timber, fuelwood and fodder, were to be managed mainly for the local population. In short, the Forest Policy made it clear that agricultural interests prevailed over forestry. The first codification of the law relating to the administration of forests was enacted in 1865 in form of the Indian Forest Act, 1865, which was later on modified and expanded in 1927 as Indian Forest Act XVI of 1927. After the country attained Independence, it was considered necessary to revise this Forest Policy, because revolutionary changes which had taken place during the interval in the
physical, economic and political fields called for a reorien-
tation of the Old Policy.  

India's National Forest Policy:

The National Forest Policy was formulated in 1952 after Independence. It proposed a functional classification of forests and prescribed a minimum of 33% of country's land to be maintained under forests. The policy emphasized the need for evolving a system of balanced and complementary land use under which each type of land was to be allotted to that form of use under which it would produce most and deteriorate least. It recognized the intrinsic right of forests to the land because of their productive, protective and bio-aesthetic role in promoting public well-being and for ensuring balanced economy. The nation's forests were to be managed on the principle of 'progressively increasing sustained yield' to meet the growing demands. Unfortunately, the National Forest Policy of 1952 did not prove effective in practice due to various reasons. Increase in human and cattle population on one hand created diverse demands on forests while various developmental activities on the other took a heavy toll of land under forests. This resulted in diminishing the forest lands by 4.5 million hectares in the first twentyfive years since Independence.

Government of India appointed a National Commission on Agriculture (NCA) in the year 1970 to look into all the aspects of agriculture in the country. The Commission also reviewed forestry. The NCA made economic role of forestry more explicit. A two-pronged approach to forestry development in the country was recommended, viz: the Production Forestry, to cater to the growing needs of forest-based industries; and the Social Forestry to make the rural India self-sufficient in its requirements of small timber, fuel and fodder. The NCA clearly brought out the short-comings of existing forest management and suggested many corrective measures. The Commission also emphasized the need to build an efficient National Forest Information System and to bring about Management Orientation in forestry system. A new forest policy to suit the present times was also an important recommendation.

In spite of a long history of forest administration in the country, the forests cannot be said to be always properly managed. The scientific forestry laid emphasis on management of forests on a sustained yield basis. This was the universally accepted principle in forestry and involved harvesting of the increment put on by the forests, without ever touching the capital i.e.

\[ \text{Govt of India: Report of the National Commission on Agriculture Part IX: Forestry - 1976} \]

\[ \text{Forest Planning Process in India: JC Nautiyal & RL Chaudhary: Faculty of Forestry, University of Toronto: July 1979 p 1} \]
the forest growing stock. Though this approach suited the times in the past, it proved to be rather conservative and rigid in present times. After the Independence the forests were invariably at the receiving end and were allotted a very low priority in the nation's development efforts. The cause of forestry was always invariably compromised to accommodate interests of other sectors, such as agriculture, irrigation, power, road-building, etc. According to Thapar (1975), forest management after Independence was treated with complacency. Increasing population, technological advances in wood utilization, enhanced prices of commercial fuels, and the decreased and depleted forests have created a very complex situation for forestry management in India.

Role of Forests in Indian Economy:

Forests are an important natural and renewable resource. They are expected to contribute handsomely to the country's development, as evidenced in many western countries. The place of forests in Indian economy will be discussed with reference to following benchmarks: viz. (1) Land Use, (2) Growing Stock, (3) Production and Revenue, (4) Forest-based Industries, (5) Employment, (6) Achievement during Five Year Plans.

A brief comment on the quality of India's forests and requirements of wood in future, will also be made with a view to understand the capabilities and limitations of forests in the country.

1 The Land Use

Forests occupy a little less than a quarter (22.8%) of the total geographical surface of the country and represent a second major single land use after agriculture. Following Table gives the present land use picture of India:

Table-1

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Land Use</th>
<th>Total Area (Mill Hec)</th>
<th>% of Total Geograph. Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agriculture (cultivated)</td>
<td>152.6</td>
<td>46.4</td>
</tr>
<tr>
<td>2</td>
<td>Forests</td>
<td>75.0</td>
<td>22.8</td>
</tr>
<tr>
<td>3</td>
<td>Other cultivated land</td>
<td>42.3</td>
<td>12.9</td>
</tr>
<tr>
<td>4</td>
<td>Land under non-agriculture use</td>
<td>16.2</td>
<td>4.9</td>
</tr>
<tr>
<td>5</td>
<td>Barren and uncultivable land</td>
<td>42.7</td>
<td>13.0</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>328.8</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

(Source: Central Forestry Commission - Bulletin - 1976)

2 Growing Stock

The forest growing stock works out to 2400 million cubic metres after making a 40% allowance for the contribution of younger and unenumerated classes. Annual increment from the forests is about 33 mill m³ which is at the rate of 1.39%/1/

India's forests are however potentially capable of producing 492.07 mill $\text{m}^3$ of wood as against average annual total production of 21.7 mill $\text{m}^3 (0.61 \text{ m}^3/\text{ha/year})$ today.\[^2\] 65% of the forests with the Department are covered by Working Plans and Schemes, and are under systematic management.

3 Production and Revenue

Total wood production increased from 14.97 mill $\text{m}^3$ in 1955 to 26.2 mill $\text{m}^3$ in 1975. Total revenue earned by forests in 1974-75 was Rs 2531.85 million. Expenditure (Plan and Non-Plan) during the same year was Rs 1420.17 million. Revenue and expenditure per hectare were Rs 38.04 and Rs 20.53 respectively.

Table below gives the details. Total value of forest produce at 1974-75 prices was Rs 6740 million. India exported forest produce worth Rs 858 million and imported worth Rs 766 million in that year.

Table

<table>
<thead>
<tr>
<th>Year</th>
<th>Forest Area owned by FDs of States (Lakhs ha)</th>
<th>Forest Per Capita ha of States</th>
<th>Forest Revenue per hectare (Rs in crores)</th>
<th>Revenue land (Rs)</th>
<th>Expenditure (Rs)</th>
<th>Revenue and expenditure per hectare (Rs)</th>
<th>Total forest produce at 1974-75 prices (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960-61</td>
<td>665.0</td>
<td>59.58</td>
<td>-</td>
<td>8.96</td>
<td>176</td>
<td>1.26</td>
<td>6740</td>
</tr>
<tr>
<td>1961-62</td>
<td>678.0</td>
<td>63.51</td>
<td>1.42</td>
<td>9.37</td>
<td>200</td>
<td>1.35</td>
<td></td>
</tr>
<tr>
<td>1962-63</td>
<td>683.0</td>
<td>69.52</td>
<td>1.54</td>
<td>10.18</td>
<td>208</td>
<td>1.32</td>
<td></td>
</tr>
<tr>
<td>1963-64</td>
<td>685.0</td>
<td>75.10</td>
<td>1.63</td>
<td>10.96</td>
<td>250</td>
<td>1.39</td>
<td></td>
</tr>
<tr>
<td>1964-65</td>
<td>697.0</td>
<td>82.59</td>
<td>1.75</td>
<td>11.85</td>
<td>263</td>
<td>1.25</td>
<td></td>
</tr>
<tr>
<td>1965-66</td>
<td>698.0</td>
<td>91.05</td>
<td>1.89</td>
<td>13.04</td>
<td>320</td>
<td>1.46</td>
<td></td>
</tr>
<tr>
<td>1966-67</td>
<td>698.1</td>
<td>97.98</td>
<td>1.99</td>
<td>14.03</td>
<td>343</td>
<td>1.36</td>
<td></td>
</tr>
<tr>
<td>1967-68</td>
<td>694.4</td>
<td>106.68</td>
<td>2.11</td>
<td>15.36</td>
<td>352</td>
<td>1.18</td>
<td></td>
</tr>
<tr>
<td>1968-69</td>
<td>693.6</td>
<td>118.02</td>
<td>2.29</td>
<td>17.01</td>
<td>389</td>
<td>1.27</td>
<td></td>
</tr>
<tr>
<td>1969-70</td>
<td>693.8</td>
<td>124.43</td>
<td>2.36</td>
<td>17.93</td>
<td>404</td>
<td>1.19</td>
<td></td>
</tr>
</tbody>
</table>

\[^2\] Ncutiyal and Chaudhary: ib id: Table 10
4 Forest Based Industries in India

Forests supply raw material to different industries in India. Maslekar reports various forest based industries as shown in the following Table.

Table
DIFFERENT FOREST BASED INDUSTRIES IN INDIA (1978)

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Product Line</th>
<th>No of Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Paper and Board Mills</td>
<td>81</td>
</tr>
<tr>
<td>2</td>
<td>Newsprint</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Rayon Grade Pulp</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Veneer, Plywood and their products</td>
<td>322</td>
</tr>
<tr>
<td>5</td>
<td>Sawing and Planing of wood</td>
<td>15404</td>
</tr>
<tr>
<td>6</td>
<td>Particle Board</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>Fibre Board</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>Packing Cases, Baskets, Drums, Crates, etc</td>
<td>118530</td>
</tr>
<tr>
<td>9</td>
<td>Structural wooden goods: Door, Window, Beams</td>
<td>21462</td>
</tr>
<tr>
<td>10</td>
<td>Wooden Industrial Goods: Bobbins, Shuttles, Tool Handles etc</td>
<td>61212</td>
</tr>
<tr>
<td>11</td>
<td>Cork and Cork Products</td>
<td>122</td>
</tr>
<tr>
<td>12</td>
<td>Wooden Furniture &amp; Fixtures</td>
<td>85745</td>
</tr>
<tr>
<td>13</td>
<td>Bamboo and Cane Furniture &amp; Fixtures</td>
<td>10098</td>
</tr>
<tr>
<td>14</td>
<td>Others: Wood, Bamboo &amp; Cane Products</td>
<td>51957</td>
</tr>
<tr>
<td>15</td>
<td>Sports Goods</td>
<td>491</td>
</tr>
<tr>
<td>16</td>
<td>Match Industry</td>
<td>5 Mechanized units, together producing 14.5 mill match boxes (1975-76)</td>
</tr>
<tr>
<td>17</td>
<td>Wood Preservation Plants</td>
<td>170</td>
</tr>
<tr>
<td>18</td>
<td>Wood Seasoning Plants</td>
<td>165</td>
</tr>
</tbody>
</table>


2/A Note on Marketing Forest Products in India: AR Maslekar IIFM/IIMA 1979
5 Employment in Forestry

Following personnel were employed in forestry in 1974. The NCA's projection of employment in forestry is also given in the Table below:

Table EMPLOYMENT IN FORESTRY

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Higher Professional Staff</td>
<td>2267</td>
<td>3400</td>
<td>11000</td>
</tr>
<tr>
<td>2</td>
<td>Forest Rangers and Dy Rangers</td>
<td>6968</td>
<td>10450</td>
<td>33550</td>
</tr>
<tr>
<td>3</td>
<td>Forester</td>
<td>18189</td>
<td>24350</td>
<td>87700</td>
</tr>
<tr>
<td>4</td>
<td>Forest Guards</td>
<td>53942</td>
<td>66300</td>
<td>119850</td>
</tr>
<tr>
<td>5</td>
<td>Game Keepers &amp; others</td>
<td>12444</td>
<td>18700</td>
<td>60000</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>93800</strong></td>
<td><strong>126200</strong></td>
<td><strong>312100</strong></td>
</tr>
</tbody>
</table>

Pant (1978)\(^{10/}\) considers following employment in forestry as more factual:

1 Direct employed 527 million mandays
2 Secondary employed 448 million mandays
3 Self-employment 3537 million mandays

6 Achievements during Five Year Plans

Between 1951 and 1978, following developmental works in forestry were achieved in successive Five Year Plans.\(^{11/}\)

1 Plantations of quick-growing species 8,38,000 ha
2 Plantations of Industrial and quick-growing species 16,45,000 ha
3 Farm-Forestry and Fuelwood Plantations 3,15,000 ha
4 Rehabilitation of Degraded Forests 6,05,000 ha
5 Construction of Forest Roads 66,000 ha

\(^{10/}\) Forestry for Employment Promotion: MM Pant - Indian Journal of Forestry: 1(2) 1978

\(^{11/}\) Records of Project Economist (Forestry) Govt of India: 1978
One of the important activities started in 1965 was the inventory of India's forests. The Pre-Investment Survey of Forest Resources Organization of Govt of India, covered nearly 3 million hectares of interior forests during 1965-68 and subsequently 5.7 million ha in different parts of the country. These surveys, using modern techniques like Remote Sensing, Electronic Data Processing and latest Mapping Technology, indicated surplus wood resources and helped establish a few forest based industries, particularly for pulp and paper.

Investments in forestry in successive Five Year Plans were however insignificant as will be clear from the following Table:

<table>
<thead>
<tr>
<th>Plan Period</th>
<th>Outlay in Mill Rs</th>
<th>% of forestry outlay to agriculture sector</th>
<th>% of forestry outlay to total plan outlay in Public Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>I 1951-56</td>
<td>105.1</td>
<td>4.1</td>
<td>0.4</td>
</tr>
<tr>
<td>II 1956-61</td>
<td>233.2</td>
<td>7.6</td>
<td>0.5</td>
</tr>
<tr>
<td>III 1961-66</td>
<td>398.6</td>
<td>4.2</td>
<td>0.6</td>
</tr>
<tr>
<td>Post III 1966-69</td>
<td>473.5</td>
<td>3.6</td>
<td>0.6</td>
</tr>
<tr>
<td>IV 1969-74</td>
<td>939.4</td>
<td>3.6</td>
<td>0.6</td>
</tr>
<tr>
<td>V 1974-79</td>
<td>2042.0</td>
<td>5.9</td>
<td>0.5</td>
</tr>
</tbody>
</table>

(Source: Nautiyal & Chaudhary; Ibid Table-16)
7 Wood Requirements in Future

Hari Kant estimates following requirements of round wood in coming decades:

Table
(In million cu m round)

<table>
<thead>
<tr>
<th>Item</th>
<th>Coniferous wood</th>
<th>Hard Wood</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawn wood</td>
<td>2.020 4.020</td>
<td>12.080 25.630</td>
<td>14.100 29.650</td>
</tr>
<tr>
<td>Plywood &amp; Veneer</td>
<td>0.120 0.430</td>
<td>0.430 0.725</td>
<td>0.600 2.155</td>
</tr>
<tr>
<td>Fibre Board</td>
<td>0.020 0.040</td>
<td>0.075 0.160</td>
<td>0.095 0.200</td>
</tr>
<tr>
<td>Pulp &amp; Paper</td>
<td>1.000 5.975</td>
<td>3.075 11.720</td>
<td>4.175 17.695</td>
</tr>
<tr>
<td>Match wood</td>
<td>-</td>
<td>0.535 1.415</td>
<td>0.535 1.415</td>
</tr>
<tr>
<td>Round wood</td>
<td>0.480 2.065</td>
<td>5.910 10.670</td>
<td>7.390 13.335</td>
</tr>
<tr>
<td></td>
<td>4.740</td>
<td>13.130 22.155</td>
<td>26.895 64.450</td>
</tr>
<tr>
<td>Fuel wood</td>
<td>-</td>
<td>-</td>
<td>184.000225.000</td>
</tr>
<tr>
<td>Bamboo</td>
<td>-</td>
<td>-</td>
<td>1907000 1936000 (Tons)</td>
</tr>
</tbody>
</table>

Berry studied India's small scale forest-based industries and estimated 17044 such small scale industries during 6th Five Year Plan period. Such industries alone would require 10.23 million m³ round wood in 1980–81 and 11.93 million m³ in 1982–83.

\[12^h\] Hari Kant ib id 1980

\[12^h\] Pre-Investment Survey of Forest Resources: Wood Requirements of Forest Based Small Scale Industries: Anil Berry-1978
Demands on India's Forests:

Forests have strong forward and backward linkages. Forests are expected to satisfy multifarious demands in the nation's economy, especially when they are publicly owned as in India. They offer many products, both tangible and intangibles. There are many products of forests which cannot be measured in money terms. The public forests also pose a difficult question as to what to maximise. At times timber production is not the sole purpose of growing forests. The managers of public forests while managing them, have necessarily to keep such considerations in mind as economics, people's well-being, tribal way of life, industrial development, wild life preservation, environment, and so on.

Following diagram explains these demands at a glance:

```
<table>
<thead>
<tr>
<th>Energy</th>
<th>Defence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>Employment</td>
</tr>
<tr>
<td>Tribal Population</td>
<td>Support to Agriculture</td>
</tr>
<tr>
<td>Transportaion: Roads, Bridges, Railways, Shipping, Carts, Trucks, Air Crafts</td>
<td></td>
</tr>
<tr>
<td>Wild Life Preservation</td>
<td></td>
</tr>
<tr>
<td>Recreation &amp; Tourism</td>
<td></td>
</tr>
<tr>
<td>Education, Culture &amp; Quality of Life</td>
<td></td>
</tr>
<tr>
<td>Industries: Big &amp; Small Scale: Manufacture &amp; Packaging</td>
<td></td>
</tr>
</tbody>
</table>
```
Some Important Features of the Forests in India:

India's forests show some unique physical features which affect their management. Forests show a great variety in composition. Virtually every forest type in the world is represented in India. There are lofty conifers and lush-green tropical forests as well as desert scrub and alpine flora. There are forests made up of only a few species or there can be over five hundred species occurring on an unit area as in Andaman Islands. India's forests are comparatively slow-growing and give poor yields. Over and above, they are spatially unevenly distributed. There are extensive forest areas in the North Eastern region, Western Ghat, Central India and in the Himalayas. On the other hand there are treeless expanses in many parts. Majority (94%) of the forests are made of mixed miscellaneous broad-leaved trees. Conifers make up only 6% and occur mostly in the Himalayas. Qualitywise, the broad leaved miscellaneous forests exhibited following pattern of volume distribution, which affect the wood utilization.¹⁴/

| Special size timber for veneers, plywood | 2.5% |
| Saw Milling Material | 20-25% |
| Poles | 8-35% |
| Fuelwood, Pulpwood | 70-75% |

Bamboos, an important raw material, occur along with other forests, and occupy approximately 13% of the total forest area. There are over fifty species of bamboos found in India.

Forest lands in India are categorised legally into Reserved Forests (51%), Protected Forests (32%) and Unclassed Forests (17%).

The latter two categories of forests also bear the burden of people's rights and privileges. Reserved Forests do not entertain any rights or privileges. However, forest grazing and removal of dry and fallen wood in headloads is allowed. 95% of the forests are state owned, out of which 92.5% are with the Forest Department. Forests come under the Concurrent List of the Constitution. They are for all purposes managed by the States. Central Government looks after the forest policy, forest education and has an advisory role. It also administers the forests belonging to the Union Territories. Per capita forest area is only 0.14 hectares, and forests account for only 1.5% of the country's Gross National Product.

**Peculiarities of Timber Growing Process:**

Forests exhibit certain characteristics so far as timber production is concerned. Timber growing has its own peculiarities which need consideration in forestry management. Such peculiarities are explained by Gregory\(^\text{15}\) as follows:

1. **Immobility of Standing Timber:** Forest as a production unit is fixed in space and time and is immobile. Once seedlings are placed in the ground to become forest, it is a fixed capital. Tree is at the same time a pro-

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\(^{15}\)G. Robinson Gregory; Forest Resources Economics; John Wiley & Sons; 1972 p 300
duction unit and the product. Stumpage must be where it stands. This fact has significant effect on prices of final product.

2 The Time Factor: The production on the stumpage in the forests requires longer time periods. Because of the long time factor in production it is difficult to change output significantly, but the production can be reduced to zero by cutting forests in almost no time.

Some enterprising farmers who have taken to forest farming with Eucalyptus have succeeded in reducing this time factor considerably by using irrigation and fertilization - Author

3 Standing timber when grown to a certain size can be sold for a variety of purposes. This brings in a unique marketing flexibility. It also brings in time flexibility in a sense that small delay in harvesting at a particular time in tree's life has little financial penalty involved.

4 Forest products are bulky in nature and involve loss of weight in processing. Hence primary timber processing plants tend to be raw-material-oriented and get located near the sources of raw material. Similarly, secondary wood processing plants or reprocessing units are market-oriented and are located near the market.
5 Forestry involves multiple-product management. A tree while grown for timber also produces many other products as well, tangible as well as intangible or even unseen.

6 Demand for forest products is a derived demand. Price offered for a round timber log will be dependent upon to what ultimate use it is put to by the customer. Demand for most primary wood products is fairly elastic. If sawn wood is considered as a specific commodity, demand for it is inelastic.

7 Standing timber has only 'potential' value. Actual value is determined by the end products manufactured in conversion plants. Timber thus is a producer's good.

8 Wood production involves risks of different kinds. Fire, insect damage or decay reduce its utility. Long time in production involves financial risks. Technological developments may affect the future of anticipated product use drastically.

9 Wood is very versatile raw material. It can be used as it is or in any other modified or converted/processed form.
10 **Aggregative nature of forests:** A lonely tree or a group of trees standing anywhere cannot be termed as forests. Trees growing in community are forests. Their individual entities are not counted in existence. A tree becomes a part of forests when it is influenced by the environment of other trees and get influenced also by host of other conditions. This aggregative nature of forests means that the management takes cognizance of ecological factors and forces.

11 **Externalities:** Timber production processes involve many externalities because forests are spatial. They produce both products and services apart from wood. Timber harvesting always involves costs which the harvester does not bear. Forests contain public utility in them.

12 Timber is an **unusual form** of capital, for the same tree can be either capital or output. If cut it is output, if allowed to stand and grow, it is capital.

13 **Processing of wood** is a capital **intensive activity,** particularly in the secondary manufacturing stage.

**Forestry Environment:**

Every organism has its own environment in which it works and grows. All physical, social and cultural factors and conditions influencing the existence and/or development of an
organism or an assemblage of organisms, make the environment of that organism. An organization also has its environment. The organization and its environment have a symbiotic relationship, where the organization draws its inputs needed for its operations and in return exports its outputs of goods and services needed by the environment. Organization's environment is also a source of many kinds of pressures, which can be in form of constraints, contingencies, opportunities or problems. These pressures affect the functioning of the organization. The degree of such effect depends on the kind and the quality of information regarding the environment that reaches the decision makers in the organization and their interpretation of same and the use to what it is put. Components of the environment can be economic, political, sociological, educational and technological. Similarly the environment could be benevolent or hostile; stable or turbulent; homogeneous or heterogeneous; simple or complex; controllable or dominating; conducive or constraining. Environment for forestry in India has its own characteristics, which will be discussed in some details under two broad categories viz external and internal.

External environment for forestry in India is complex. Forests have been recognized as the essential component of the country's geographic features and an important natural renewable resource. They have very strong backward and forward
linkages. India's National Forest Policy is hailed as one of the most comprehensive written documents on forest policy in the world. However, the implementation of the policy was not effective because of various reasons. Forests always received the first axe whenever the land was required to meet the demands of increasing population and other developmental activities. Forest area of the country which was only 26%, was further reduced by some 4% since Independence eventhough the Forest Policy stipulated to maintain 33% land area under forests. Grazing by cattle, shifting cultivation and large scale pilferage of timber and firewood, reduced the forests qualitatively and it is now believed that only about a half of the total forest area of 75 million hectares is effectively tree-covered and can qualify to be termed as forests. Large scale encroachment on forest lands occurred and were regularised. It was in 1952 that the nationwide programme of tree planting - "Vanamahotsava" - was launched. It was a timely realization of importance of trees and forests and an attempt to mobilize public opinion. But the programme did not achieve the desired goals. Funds were always inadequate for forestry development. Allocations were also subject to the vagaries of annual budgets. Need for a longer investment and sustained effort in forestry was not always appreciated. The Preamble to The National Forest Policy 1952 very strongly states that, "Forestry is a long-range enterprise and it becomes incumbent upon the State
Government to secure for it freedom from the vagaries of the annual budget. A steady flow of funds is indispensable for sustained forest operations such as replacement of what is removed annually, improvement of remaining crops, development of communications for opening up remote areas and for protective measures; they have to be based on phased schemes which should not be set aside lightly.\textsuperscript{16} Even earlier, the Secretary of State of Her Majesty's Government, in his Despatch No 14, dated 24 April 1863, to the Viceroy of India, said "There is no reason, if the forests are properly managed and a judicious outlay is bestowed on them, why a proportionate profit should not be obtained from them."\textsuperscript{17} However, shortage of funds was one of the handicaps in forestry development till the end of sixties.

Legally speaking almost all the forests are owned by the government. The management of forests vests in the State Governments under the Constitution. Inspite of having a common National Forest Policy and a uniform Indian Forest Act, forest management by the States showed an individualistic approach where short-term benefits always prevailed over long-term interests.

\textsuperscript{17} NCA - Interim Report: Man-Made Forestry: 1972
Forests have a separate department under State Government. Technically the conventional forest management has been competent and second to none in the world. But foresters worked in isolation throughout. This resulted on one hand in losing contact with social changes and people and on the other hand public never came to appreciate what the scientific forestry was. So much so that in today's changed circumstances people accuse the foresters of having caused devastation of forests by their activities. 'Chipko' movement of the Himalayas is a classic example in this respect. In Garhwal Himalayas, the trees have been cut for various reasons. But principal cause of the land slides and floods have been the road building activities by other departments in the wake of Chinese aggression in 1962. Where only 80 miles of forest roads existed, 1500 miles of new roads were built cutting large forest areas. The geological formation of The Himalayas is fragile for such activities. Forest Department is blamed for the loss of tree cover in the region and for landslides. Whereas data have proved that the scientific forestry over many decades had improved the growing stock considerably within the reserved forests.

The case of wild life preservation is not different. Large forest tracts in the country have been cut to extend agriculture. Habitats of wildlife have been drastically reduced and wild animals extend their activities into habitations and fields. The foresters also failed to educate people and
publicise their achievements. As a government department, there are also limitations in this respect. Forestry as a subject is not taught in schools and colleges. Economic necessities made people indifferent towards the forests and their benefits. The forests were never treated as a resource to the true extent of their potential. When the shift from conservatism to commercial progressive exploitation came in the late sixties the timing became inappropriate. The extensive clearance of forests and their replacement by economically more important monocultures have created ill-feelings. Environmentalists for example, were severe in criticism. Press also criticised foresters for disturbing nature in general and tribal life in particular. The Bastar Project of Pine Plantations and activities of almost all Forest Development Corporations are increasingly under heavy pressure. Public awareness, though belated, also is beneficial as is evidenced in case of 'Silent Valley' Project of Kerala. One can site many more examples. But to sum up one finds that the forestry environment in India offers a mixed bag of benevolence and hostility, concern and indifference, over-exposure and total lack of awareness, and so on. Over and above, what Indian forestry did not get, and particularly after Independence, is the sustained political support for its cause and political will in implementation of the forest policy.
Internally, the forest administration faces many problems. Man-power planning for trained personnel is one such problem. With adoption of production forestry and social forestry on large scale the departments are faced with shortage of trained forestry personnel. This affects the use of trained man-power also. Forestry education still remains traditional. Subjects like economics were introduced very recently. Business Management is still not a part of forestry curriculum. Foresters are not yet trained in effective communication and people remain unaware of foresters and forests. There are many Cadres in Forest Service, and except in case of Indian Forest Service, the Status and emoluments of forestry personnel differ from state to state. Foresters also need to understand their role in the society. So far they were administrators of government forests. They have to learn to become managers and develop different skills to approach forestry from all its related linkages. They have to project their profession favourably and convince the people. Unfortunately, today the image of foresters is at the lowest scale of public appreciation.

Wood and the Energy Crisis:

Energy crisis has brought a new dimension to forestry and new demands on wood. Fuel wood forms a major portion of non-commercial fuels used in India, and particularly in rural areas today. Non-availability of diesel, petrol and kerosin
has diverted many users back to wood. The point is very well described by Rao who said that, "India will not die for want of food but for want of wood to cook the food". Swaminathan feels that forestry development cannot be achieved unless the rural population is first assured of "Five F's", which are: Food, Fuel, Fodder, Fibre and Fertilizer. The Report of the Asian Development Bank, 1969 had also pointed out that the major effort of forestry in the South East Asia including India would be towards growing firewood for many decades to come.

The entire situation of forestry environment can be summed up in the words of Clawson who had this to say about US Forest Service and Forestry: The early dedication to standards of value (sustained yield, multiple use, etc) and conduct has tended to make the Service less flexible to meet new problems or to attempt new solutions to old problems. The high professionalism of the Forest Service had always been an asset but it has made difficult the accommodation to the views of outsiders.

The lack of clear legislative directive for national forest management directly reflects the lack of clear national consensus for these lands and forests. Various groups in the total population want different things from the National Forests.

18/ GVK Rao: Key Note Address at Forestry Management Workshop: IIM A May 1978
19/ MS Swaminathan: Member, Planning Commission: In a speech on the occasion of World Forestry Day: 21 March 1979
and each naturally enough tries to get what it wants. The
divergent views or objectives have not been resolved in the
Legislative or political arena. Instead, the problems have
been bucked down to the Forest Service, which has no clear signal,
no solid basis for its decisions. Partly as a result of the
foregoing, and partly as a result of other factors, the Forest
Service in recent years at all levels, has all too often seemed
confused and uncertain as to its own course, as to the best way
to deal with the cross-currents which have buffeted it". Indian foresters also feel apprehensive and cornered. They also
find their technical training and discipline quite inadequate
in today's milieu. Old faiths and convictions are questioned.
New solutions are hard to find. Therefore the foresters in
India find themselves in an alien and complex environment.
Following diagram illustrates it at a glance: (See page 27)

The Changing Scene in Indian Forestry:

There are some significant changes occurring in forest-
ry's environment of late. First and foremost is the general
awakening about the benefits of forestry in public minds and
some political support at the highest levels. For example,
during the election of 1980, three important national political
parties had separate mention on forestry and the nature in
their manifestos. Prime Minister has been emphasising the
FORESTRY SYSTEM

EXTERNAL ENVIRONMENT

PEOPLE'S IGNORANCE
HENCE INDIFFERENCE

INTERNAL ENVIRONMENT

CONFLICTS OF:
- Long-term Y/S Short-term Interests
- Scientific Forestry Y/S Environmentalism
- Nature Conservation Y/S Economic Use of Resource
- Nature and Wildlife Conservation Y/S Tourism
- Tribal Development Y/S Forest Development

LOW PRIORITY IN PLANNING
- Non-Coordinated Industrial Development
- Lack of Integrated Planning in Rural Areas
- Technological Advances in Wood Use and Wood Substitutes
- Population Growth and Land Hunger
- Cattle Population and Grazing
- Shifting Cultivation and Other Harmful Customs and Traditions

EXTERNAL FORCES
- External Environment
- Non-Coordination
- Lack of Planning
- Industrial Development
- Technological Advances
- Population Growth
- Cattle Population
- Shifting Cultivation

INTERNAL FORCES
- Conservation
- Tradition
- Working in Isolation
- Lack of Unity of View
- Diverse Service Cadres
- Ad-Hoc Planning
- Lack of Communication with Other Services
- Research Not Reconciled with Reality

NON-INVOLVEMENT OF PEOPLE
- Emphasis on Forests Instead of on Forest Lands as a System
- Budgetary Constraints
- Poor Management
- Narrow Specialization

ENERGY CRISIS
importance of environment and forests. Funds for forestry development have been forthcoming liberally and many international agencies are getting interested in giving aid for this cause. Foresters on their part are becoming more open minded and have done some self-criticism in recent years. They are inclined to approach people with a renewed vision. Women's role in forestry is being realised. There are now, 11 women Forest Guards in one State and three women have joined Indian Forest Service. A good number of foresters are being exposed to modern management concepts. More and more studies are taken up on Forestry Management, Forestry Personnel and their behaviour, Forestry Organization, and related topics. In short, there is a conscientious beginning for change, both from the foresters as well as from the public. The constraints and difficulties faced by the foresters today, could as well become blessings in disguise in future. Developed countries have proved two important aspects of development. Firstly, many such countries have achieved their developments through the use of forest resources. Secondly, wood use increased as these countries developed more and more. Thus forestry has a vast potential and an important role to play in coming decades in India's development also.
Orientation towards modern management in forestry:

It is not a well known fact that the foresters were the first to adopt to the planning and written management plans for managing the forests. Such document is the Working Plan which forms the basis of the conventional Forest Management. A Working Plan is a written scheme of management aiming at continuity of policy and action and for controlling the treatment of a forest. Manipulation of the forest crop towards the ideal (Foresters call it a "Normal Forest") by various yield regulation and regeneration methods, is done through a Working Plan. Such a Plan is revised periodically (10 years is the normal period), and such revisions take into account the effects of past treatment and also consider the demands for the produce in making future prescriptions. Primary objective mentioned in the Working Plan is to meet the demands of the people. However, in today's circumstances Working Plan is found inadequate to fill the role of a management plan due to various reasons. Firstly, the Working Plans are prepared for small areas like Forest Divisions or part of them and hence are 'local' in character. Secondly, once the Working Plan was accepted - it is sanctioned by the State Government before it can be implemented - it remains fixed or rigid till its period is over. It, therefore, tends to be conservative in approach as it is not flexible enough to respond to the existing situation in the market. Under the "Sustained Yield" principle adopted
for regulation of the cut, harvests are approximately same throughout, year after year, without regard to the market situation. Over exploitation is not allowed to fulfil demands except in case of war or calamities. Improvement of crops and maintenance of forest site quality in perpetuity are the fundamentals in so called 'Conservative Forestry'. It is however to the credit of foresters that the old practices and concepts are continuously challenged and discussed. Out of this attitude, many new approaches have emerged.

It has been realised that the forests in India need to be made more productive. It is also necessary to improve their quality. Forestry also needs a longer term planning and increased inputs. Wood harvesting practices need modernization and mechanization to reduce wastage. Maharashtra, for example, formulated its 'Perspective Plan' of 15 years for forest development of the State in 1964. The State was again a pioneer in forming in 1969 a Forest Development Board (FDB) to accelerate the crop improvement by replacing poor-low yielding slow-growth by extensive plantations of desired species. This Forest Development Board was adopted as the model by the NCA when it recommended the creation of Forest Development Corporations in its Interim Report (1972), to undertake the production forestry programme. Institutional financing was resorted to for augmenting funds for such activities. Large number of foresters were sent abroad for training and for
broadening their vision. Electronic Data Processing, Air Photo Interpretation, Pre-Investment Survey of Forest Resources, Modern Logging Methods in forest exploitation, assured labour supply through establishment of Forest Villages (with facilities like schools, hospital, water), Establishment of Preservation and Seasoning Units to utilize and popularise secondary timbers, Field Telephones, Skyline Cranes and Gravity ropeways, are some of the modern tools and techniques adopted by Indian forest departments in recent times. Foresters also kept themselves abreast of developments in other countries. Introduction of exotics like Eucalyptus, Pines, Poplars and Ku-Babul are noteworthy in improvement of indigenous forests. Social Forestry schemes showed their concern for rural population and their needs. It is also accepted that forestry should be treated as a business. This has led to the government's decision to establish an Indian Institute of Forest Management.

Marketing:

Marketing of forest produce is one of the most important concerns of today's forest managers. Marketing is a human activity directed at satisfying needs and wants through exchange. It means attempting to actualize potential exchanges for the purpose of satisfying human needs and wants. The Market is the set of all actual and potential buyers of a product. A product is something that is viewed as capable
of satisfying a need or want. Marketing exists when people decide to satisfy needs and want in a certain way, which can be either self-production, coercion, supplication or exchange. Marketing concerns with the exchange process.

An organization secures resources from one set of markets, converts them into useful products and trades them in another set of markets. Marketing management occurs in an organization in connection with any of these markets. The task of marketing management is of regulating the level, timing and character of demand in a way that will help the organization achieve its objectives. Kotler calls the marketing management as demand management. Drucker explains it as the whole business seen from the point of view of its final result, that is, from the customers' point of view. Selling has been a very old subject. Marketing is relatively a new one, which is a high order integration of many separate functions of organization such as selling, advertising, market research, new product development, customer service, physical distribution etc.

At any given time, organization may face certain state of actual level of demand which is different than what it desires. Forests can be said to face an overfull demand in India as far as wood is concerned.

24/ Kotler distinguishes eight such levels of demand states which call for specific marketing tasks: T 2.7 p 23 ib id
Marketing Concepts:

Marketing Management is better understood with reference to related concepts, viz. production concept, product concept, selling concept and marketing concept. The Production Concept is a management orientation that assumes that consumers favour products that are available and can be afforded by them and hence the primary task of the organization is to improve its production and distribute it efficiently at a reasonable price. This concept is applicable in two situations. Firstly, where the demand for a product exceeds supply and consumers are ready to buy any version of the product that is available. Such is the case in developing countries for most of the products. Secondly, it is applied where product's cost is high and therefore bringing down the price helps in expanding the organization's market. In Product Concept the management assumes that the consumers prefer products that offer the highest quality for a given price. Hence the organization endeavours to improve the product quality. From this concept is born the product myopia and the organization's marketing effort limits itself to convincing customers that it's products are the best. Non-profit organizations such as departments of government and public institutions normally show such orientation. However, organization's effort on quality of its product and its immutability eventually harms the organization in the end. The Selling Concept is adopted by management which presupposes that
consumers buy only if they are persuaded to buy through the organizational efforts. Companies having 'selling' orientation believe that their products are 'sold' and not bought by consumers. Consumer satisfaction becomes a secondary aim in selling concept. The Marketing Concept is the management orientation that believes that the primary or key task of the organization is to find out the needs and wants of its target markets and suitably adapt itself to deliver the desired satisfactions effectively and efficiently, more than its competitors. Thus the selling concerns the needs of the seller, and efforts are made to convert seller's needs into cash by selling the product. Marketing, on the other hand, focuses its efforts on the satisfaction of the needs of the customer by means of its products, and associated activities of creating, delivering and consuming of the product. In short, consumer sovereignty gets the total commitment of the organization.

Relevance of Marketing in Forestry:

Foresters who manage India's forests are engaged in production of forest goods and services. So far the foresters were more concerned in conserving forests and maintaining level of production of forest goods. Changing technology and population growth, to name only two of the forces, have brought great pressures on forests and their managers. On one hand they have to meet increasing demands for their products. On the other, there is a pressure to conserve this resource.
Foresters also have to keep certain societal obligations in mind when this resource is put to use. Forestry therefore cannot entirely be said to be a business, whereas it cannot also be called as a non-business type of activity. For judiciously utilising their produce foresters have to be conversant with the business aspects of management.

Marketing should therefore become an important concern of foresters. Creating a favourable image for themselves and to help conserve this national asset calls for the knowledge of dealing with people. This brings in the social marketing into the forestry sphere. Social Marketing is the design, implementation, and control of programmes seeking to increase the acceptability of a social idea, cause, or practice in a target group(s). Many states have established departmental units to manufacture structural timbers from certain miscellaneous tree species, which were not accepted in the trade. These species came under the category of secondary timbers. Teak, Deodar, Sal, Rosewood, are the primary timbers that are traditionally popular. Such valuable timbers are becoming scarce and costly in the market. Popularization of secondary timbers in place of a few scarce but renowned timbers and adoption of large scale social forestry programmes to create forests on public and privately owned lands both call for adoption of social marketing. Marketing and Social Marketing are thus important in today's forestry.
Marketing opportunities for wood:

Wood is a versatile raw material. Wood is also a producer's good. The value of timber product is almost entirely set by the market. Starting from the felling of trees in the forest primary aim should be to produce a product to satisfy market specifications. The cutting operations should maximise the value of raw material. Virtually no part of a tree is unsaleable today. This indicates that complete extraction of wood should be attempted from forests. Technological innovations have opened new opportunities for almost all of the tree species growing in Indian forests. Many hitherto unsaleable species have now become a source of pulpwood. Use of logging and conversion wastes like chips, barks, saw dust and poels and shavings, can be profitably used for making reconstituted woods like chipboards, particle boards, pulp, etc. Leaves can now be compressed into "firewood". Rising standards of living bring more demands for wood products for housing, furniture, panelling etc. There is also a big export market for construction timber in the Middle East. Mining activities have increased and need lot of wooden sleepers and pit props. Lastly, there is enhanced political support as well as increasing public awareness about forests and forestry. Judicious use of wood is needed. Marketing therefore has a great opportunity in Indian forestry both in case of selling the produce of forests and for effective communication with
the people. It will also help foresters in building a favor­able image for the forestry in general and for themselves in particular.

Conclusion:

Forestry is recognized as an important activity and forests are regarded as the valuable assets. Scientific forestry is in operation since over a hundred and twenty four years in the country. Foresters in India have a high tradition of competence and professionalism. They have so far worked in isolation away from the people. Changes in the outside world have now overtaken the foresters and they, along with their forests are under a tremendous pressure to deliver goods. Forestry needs to be treated as a business activity, and modern management needs to be adopted in forestry. Foresters have been administrators. They have to become managers of country's valuable assets. Marketing is considered as the most important activity of any business. Similarly, Marketing has an important role to play in Indian Forestry.