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सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT AND FORESTS
(DEPARTMENT OF ENVIRONMENT, FORESTS & WILDLIFE)

REPORT ON INVENTORY OF FORESTS OF SHIMOGA DISTRICT

(KARNATAKA)

FOREST SURVEY OF INDIA
SOUTHERN ZONE
BANGALORE
1987

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PREFACE

The Southern Zone of the Forest Survey of India was set up in June 1981 and started active functioning in September 1982, by way of taking up the inventory work. Shimoga District was one of the first to be taken up. The inventory work was completed by May 1984.

The report comes out with details regarding the area inventoried, the methodology adopted, processing of the results and the findings with regard to the forest resources. The survey reveals that 21.3% of the land area is under forests and about 9.6% of the actual tree covered forest area is made up of plantation. With an average of 196 stems per hectare the total number of stems in the forest area of the district comes to 8,25,53,367. The volumetric growing stock in the inventoried area is 3,16,27,611 M^3 per hectare. About 75% of the tree forest area is devoid of established regeneration which may be due to various biotic pressures. The extent of forest area containing bamboos is 1,93,574.4 ha with a stock of 7,16,103 tonnes of green bamboo. An average of 3.699 tonnes of green bamboo per hectare is the stock position.

A sizeable portion of bamboo stock of about 37% consists of dry and damaged culms, stressing the need for more intensive management of the bamboo growing stock.

Shri N.V. Ramachandra Chetty, the then Joint Director initiated the field work and the work was completed under the guidance and supervision of Sri Erappa and Sri C.S. Vedant. The data were processed at Data Processing Unit, Dehradun.

The cooperation extended by the Karnataka Forest Department at various levels is thankfully acknowledged. The combined efforts of the staff of Southern Zone whose collective contribution has played the main role in successful completion of this report is highly appreciable.

J.B. Lal,
Director,
Forest Survey of India.

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SUMMARY

This report deals with the inventory of forest resources of Shimoga District carried out by the Forest Survey of India, Southern Zone, Bangalore in the year 1983-84. The report is organised into two parts. The first part deals with the details of the area inventoried, the methodology of data collection and processing, and the results. The second part consists of appendices relevant to the report. The findings of the survey are summarised below:-

(1) The net area under forest in the district is 4,395.76 km^2

(2) Approximately 40,328 hectare comprising about 9.6% of the actual tree covered forest area (4,21,427.6 ha) is made up of plantations.

(3) The forests in the district predominantly have timbers of mixed size classes.

(4) More than 75% of the tree forests are devoid of established regeneration.

(5) The total number of stems in the tree forest area of the district is 8,25,53,367 with an average of 196 stems per hectare. This estimate has standard error of $\pm$ 7.6% at 95% probability.

(6) The total volumetric growing stock in the tree forests of the inventoried area is 3,16,27,611 m^3 with an average of 75 m^3 per hectare. This estimate has a standard error of $\pm$ 9.4% at 95% probability.

(7) The total green bamboo stock in the district is 7,16,103 tonnes. The total extent of forest area containing bamboos is 1,93,574.4 hectare. Thus the average green bamboo stock works out to 3.699 tonnes per hectare.

(8) The bamboo forests in the district have a potential of producing 89,553 tonnes every year.

(9) A large portion of the green bamboo stock (about 37%) consists of dry and damaged culms, underlining the need for more intensive management of bamboo growing stock.

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CHAPTER-1

BACKGROUND INFORMATION

1.0 A forest inventory is an attempt to describe the quantity and quality of forest trees and many of the characteristics of the land area upon which the trees are growing. Forest inventories must not only evaluate the characteristics of the trees but also of the land on which they grow, for, estimates of timber quantities without reference to the area on which the trees grow have little meaning. A complete forest inventory from a timber estimate point of view would include a description of the forested area and the legal ownership; estimates of the volumes of the standing trees and estimates of the growth and drain (that is, losses due to pest, disease, fire, organised/un-organised extractions etc.). In any specific inventory there may be emphasis on, or elimination of, one or more of these items depending upon the objective. But for a complete evaluation of a forest area and especially with a view to managing it on a sustained yield basis all these elements are of importance.

The scale and complexity of a forest inventory depends upon the size of the area to be assessed and the purpose for which the results of the information are destined. The inventories undertaken by the Forest Survey of India (FSI) fall under the category of NATIONAL FOREST INVENTORIES. A National Forest Inventory requires general estimates of all the elements of a forest inventory.

The FSI has been conducting inventories with the following objectives:

(a) to monitor periodically on a 10 year cycle the changing pattern of forest resources and to call attention of the planners to the critical aspects of the resource management; and

(b) to generate basic forest resources data for the development planning needs of the state/national level planners.

An inventory of the forests of Shimoga district was undertaken by the FSI, Southern Zone, Bangalore during the financial year 1983-84. The field work was completed in May 1984.

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1.1 General Features of the Survey Area

1.1.1 Location of the District and its Subdivisions

The survey area lies between 13° 27' 30' and 14° 39' 30' north latitudes and 74° 37' 30' and 76° 4' 0" east longitudes. There are three forest divisions in this district viz. Sagar, Shimoga and Bhadravati. The district comprises 11 Talukas. Bhadravati Forest Division includes a few Talukas of Chikamagalur district also, which are not included in this inventory.

1.1.2 Physical Features

The topography of the western portion of the district is hilly comprising of a belt of hilly country about 64 kms wide called the Western Ghats or the Malnad in local vernacular. The hill ranges run roughly in the north-south direction and are nearly parallel to one another. Baba Budan Giri is the loftiest of the Western Ghat hills and reaches a height of 1923 metres above MSL. The eastern part of the district comprises of an open undulating country known as the Maidan or Bailshime. The average altitude is about 600 metres above the MSL.

Numerous eastward and westward flowing streams drain the Western Ghats. The Sharavati is a well-known westward flowing river of this region. The Jog Falls is a famous waterfall on this stream. The Sharavati hydro-electric project is built over this river and has a generating capacity of 89,100 KW, constructed in the year 1965. The Bhadra and the Tunga are two eastward flowing rivers in the district. The Bhadra hydro-electric project is built across the Bhadra river and generates 32,000 KW of power. The Bhadra Dam irrigates 97,000 ha of land.

1.1.3 Forests

The forests of this area is mixed and fall under the broad classification of South Indian Tropical forests of both evergreen and deciduous types. As per the revised survey of forest types of India by Champion and Seth, they are broadly classified as follows:-

1. Southern Tropical Wet Evergreen forests 1A/C4
2. Southern Tropical Semi-evergreen forests 2A/C2
3. South Indian Tropical Moist Deciduous forest 3 B/C2
4. Southern Tropical Dry Deciduous forest 5 A/C2

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The tropical evergreen forests are characterised by luxuriant vegetation consisting of several storeys. The highest storey consisting of lofty and tall trees often with buttressed bases reaches a height of about 45 metres. Epiphytes like aroids, ferns, moss and orchids practically cover the entire branches. Climbers also grow luxuriantly. The undergrowth is generally a tangle of canes, creeping bamboos and palms which may replace high forest as cane brake along streams.

The tropical wet evergreen forest in this area is spread over Hosanagara, Sagara and Agumbe ranges consisting of important species like Alstonia scholaris, Artocarpus hirsuta, Dipterocarpus indicus, Mesua ferrea, Machilus macrantha, Hopea parviflora with reeds along the river banks.

The semi-evergreen type is an intermediary between the tropical evergreen and moist deciduous types. The presence of trees with buttressed stem continues. But overall, canopy is less denser than the true evergreen.

The moist deciduous type is formed by a mixture of trees which are deciduous during dry season. Generally the tree height reaches upto 20 to 25 metres. This type of forests become leafless during dry season, sometime during March-April. Soraba, Shikaripur, Anandpur and Thirthahalli, Shankar areas consist of Lagerstroemia lanceolata, Lannea coromandelica, Mitragyna parviflora, Adina cordifolia, Pterocarpus marsupium and Terminalia paniculata.

Another important forest type existing in the Honali, Bhadravati and Channagiri Ranges is dry deciduous type. This is generally formed by a mixture of trees which are deciduous during dry season. On an average the height of trees reaches upto 10-15 metres. Presence of shrubs as undergrowth is common. The tree species consist of Anogeissus latifolia, Dalbergia latifolia, Lagerstroemia lanceolata, Pterocarpus, Santalum, Tectona and Xylia xylocarpa. Dendrocalamus strictus and Bambusa arundinacea are found in moist and dry deciduous areas.

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1.1.4 Climate and Rainfall

The climate and rainfall of the district is typical of the Western Ghat region with an average annual rainfall of 1500 mm; the maximum rainfall occurs at Agumbe which is the second wettest place in the country and receives upto 5000 mm rainfall. June, July, August, September and October are the months which receive the bulk of the rainfall. The mean maximum and minimum temperature in an average year is 30.9°C and 20.4°C respectively. The mean maximum and minimum temperatures recorded in the coldest month of January and the hottest month of April in an average year were 30.0°C and 12.5°C; and 36.6°C and 22°C respectively. The temperature variation between the hottest and the coldest season is not very marked. The mild climate of the district is due to altitude. Little change is observed in the relative humidity of the coldest, hottest or wettest months as can be seen from the following readings recorded in an average year:

	January	April	July
08.00 hrs	82.3%	80.6%	92.2%
17.30 hrs	59.7%	36.8%	80.6%

1.1.5 Area and Population

The total area of the district is 10,553 km^2 with a population density of 157 inhabitants per km^2 as against the national population density of 216 per km^2 (1981 census). 74% of the inhabitants of the district live in rural areas. 84.46% of the population consists of Hindus, 10.63% Muslims, 2.09% Christians, 0.7% Jains and 0.07% others.

The livestock population of the district is 16,23,397 (1972 Livestock Census) forming a high density of 153 animals per km^2 as against the national average of 108 animals per km^2. To keep such a large livestock population in a well nourished and usefully productive state we would require about 4060 km^2 of land under permanent pastures and grazing lands at an optimum carrying capacity of 4 cattle-sheds per hectare. But from table 1.1.6 it will be seen that the extent of pasture and grazing lands available is far short of this requirement. It will not be incorrect to conclude that the available extent of pasture and grazing lands are overgrazed and consequently degraded. It is not an uncommon sight to see large herds of malnourished unproductive

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cattle trying to nibble away the small quantities of the less palatable species of grasses of low nutritive value that now inhabit the grasslands in the district.

1.1.6 Land Use Pattern

The following table shows the land use pattern in Shimoga District:-

Table 1.1.6

(Year 1975-76)

Sl.No	Land Use	Area (km^2)	% of total land use
1.	Area (according to village papers).	10,575.54	
2.	Forest Area	2,252.03	21.3
	Land not available for cultivation		
3.	Land put to non agricultural uses.	864.98	6.5
4.	Barren and uncultivable land	346.14	3.8
	Total	1,211.12	11.5
	Other uncultivated land excluding fallow land		
5.	Permanent pasture and other grazing lands	2,623.11	24.8
6.	Land under miscellaneous tree crops and groves not included in net area sown.	219.97	2.0
7.	Cultivable waste	449.85	4.3
	Total	3,292.93	31.1
8.	Fallow lands	821.00	7.8
9.	Net area sown	2,998.46	28.3
	Grand Total	10,575.54	100

(Source: Statistical Abstract of Karnataka 1976-77)

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1.1.7 Other Socio-economic indicators

The per capita land availability in the district for cultivation is 0.94 ha. Majority of the land holdings in the district fall under 1 to 2 ha category.

Rice is the most important foodgrain produced. The district accounted for 13.5% of the total rice output in the State during 1976-77. 6% of the sugarcane production of the State (in 1976-77) was accounted for by the district.

The chief minerals in the district are limestone, manganese ore and quartz. 1174 out of a total of 1754 towns and villages (constituting about 67%) had been electrified by 1976. Only about 81 villages in the district were not connected by any road in 1976. According to the 1971 census 36.61% of the population of the district was literate; 31.61% of the rural people and 52.78% of the urban people were literate.

Bhadravati is the only industrial town in this district. The Visveswaraya Iron and Steel Limited is established on the left bank of Bhadra. The Mysore Paper Mills has established a modern newsprint and high quality paper making plant and a sugar processing factory.

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CHAPTER-2

DESIGN AND METHODOLOGY OF THE SURVEY

2.0 The development of aerial survey technique during the present century has revolutionised the methods of examining forests. It is now possible to map remote forest tracts, to secure accurate information regarding the area and to arrive at preliminary estimates of their composition and nature directly from aerial photographs. Most forest inventories aim at providing satisfactory estimates of total values of the parameters of the forests (mainly volumes of wood) over the whole inventoried area or over parts of it. These total values are obtained through estimation of the corresponding area and the mean value per unit area of these parameters. Both mean areas and mean values of the parameters per area unit may be estimated through aerial photographs (and maps) and/or field measurements and observations, these estimates being made by complete enumeration or by sampling. The use of aerial photographs for estimation of the mean values of the parameters per unit area is limited by its application to fairly uniform temperate forests and plantations and are for the time being of little relevance for tropical forests. Difficulty of species identification from aerial photographs in the tropics, want of data on the correlation between crown characteristics and bole dimensions and the impossibility of defect estimation from aerial photographs seriously limits the applicability of photogrammetric measurements in inventories of tropical forests. Therefore aerial photographs are used mainly for estimation of area although it is not necessary that all area information should come only from aerial photographs. It is sometimes provided entirely by field measurements and observations. This inventory has therefore relied on the 1:50,000 scale topographic maps prepared by the Survey of India in which the extent of forest areas are depicted in green colour. Henceforth by "toposheet" we mean the 1:50,000 scale topographic map sheets of the Survey of India.

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2.1 'Forest Area' defined

The following categories of lands are treated as 'Forest Areas' for the purpose of the forest inventory:-

(i) All areas shown by a green colour wash on the toposheets.

(ii) All areas shown on the toposheets in which words such as thick jungle, thick forest, dense jungle, open forest, bamboos etc., are printed.

Unless explicitly stated otherwise, the term 'forest area' in this report shall henceforth mean areas of any or all the categories mentioned above.

2.2 Sampling Design

Each toposheet falling in the survey area was divided into 36 grids of $2\frac{1}{2}$ minute x $2\frac{1}{2}$ minute of latitudes and longitudes. In each of these grids, two sample points were marked. The inventory data was collected from a square plot of 0.1 hectare laid out at each of these sample points on the ground. The method of marking the sample point on the map is described in the following paragraphs.

One side of the square plot (which is 31.62 m on the ground) measures 0.6324 mm on the toposheet. The length and width of each grid is measured in millimetres to the first decimal place. The measured length is then divided by 0.6324 which gives the number of sample plots of 0.6324 mm that can be marked along each axis of the grid. The decimals are rounded off to the nearest whole number. Suppose the measurable length and width of a grid along its X & Y axes are 83.5 mm and 92.5 mm respectively. On dividing by 0.6324 and rounding off the decimals we obtain the numbers 132 and 146 respectively. A three digit random number is drawn from the random number tables for each axis separately. Suppose the random numbers are 114 and 61 respectively (less than 132 and 146), then these numbers are multiplied by 0.6324 and the decimals are rounded off so as to yield the numbers 72 and 39 respectively. 72 mm and 39 mm then become the coordinates of the first sample point in the grid. Taking SW corner of this grid as origin and measuring 72 mm and 39 mm along X & Y axes respectively the centre of the first plot is marked.

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If the random numbers drawn are 584 and 482 (greater than 132 and 146) then these random numbers are divided by 132 and 146 and the remainders 56 and 44 respectively are multiplied by 0.6324 to yield the whole numbers 35 and 28 respectively. 35 mm and 28 mm then become the coordinates of the first sample point in the grid.

The first sample point is then joined by a straight line to the grid centre and this line is extended further beyond the grid centre. On the extended portion of the line, the second point is marked at a distance equal to the distance of first point from the grid centre. This point is the centre of the second plot.

All sample points falling in the 'forest area' only are located on the ground and quantitative data is collected from the sample plots. Qualitative data such as forest type etc., is collected by observing a 2 hectare area surrounding the plot centre. The coordinates of the centres inventoried during this survey and some of the important informations collected therefrom are given in Appendix I of this report.

2.3 Methodology

The field data is collected by a crew consisting of one Junior Technical Assistant (Crew Leader), a Deputy Ranger, two or three Fieldmen and a camp khalasi; besides unskilled labourers hired locally whenever needed. The Crew Leader is provided with a set of toposheets on which the sample points to be surveyed have already been marked. The sample points marked on the toposheets are also listed so as to avoid any sample location being left unsurveyed. A set of measuring instruments such as the Silva Compass, Haga/Blume Leiss hypsometer, Callipers, measuring tapes and ranging rods etc., are provided.

The Crew Leader decides convenient camping locations from where three to four sample locations can be easily approached by foot. After deciding the plot and the grid number to be surveyed on a particular day from a camping site, the Crew Leader reaches a prominent physical feature (also called starting reference point) as near to the sample point as possible, located on the map and easy to identify on the ground. Usually the following features are selected as reference points:-

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i) Bench marks;
ii) Triangulation points;
iii) Village trijunction points;
iv) Old bridges and culverts;
v) Old temples, mosques and churches;
vi) Crossing of rail track with roads, rivers, streams;
vii) Junction of rivers or streams and roads;
viii) Prominent bends in roads, rivers, streams;
ix) Old ponds and wells;
x) Springs;
xi) Prominent topographical features in hilly region such as spurs, knolls etc.,
xii) Milestones or kilometer stones; and
xiii) Boundary pillars (of international, state, district and forest boundaries).

Having located a prominent physical feature (reference point) on the ground and confirming it with reference to the map, the distance and bearing of the sample point from this physical feature is measured from the map. The bearing is measured with the help of a protractor or the Silva Compass. At this reference point the crew leader records details of the sample point from the reference feature, the name of the camping spot, the time taken to reach the sample point and completion of the work etc., in the 'Plot Approach Form'. Information recorded in this form is useful for time and cost studies for the inventory and also helps to relocate the point at a future date. From the reference point, the crew leader traverses the distance in the direction measured on the map so as to reach the sample point. A wooden peg is fixed at this location which is the centre of the sample plot. After reaching the sample point, a square sample plot of 0.1 hectare with diagonals measuring 44.72 metres in NS-EW directions is laid out on the ground by marking its four corners by thin poles. Regeneration data is collected from a plot measuring 4 m x 4 m laid out about the plot centre. For a schematic sketch of the sampling design and lay out of the sample plot see Figure-1 on page 108.

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After laying out the plot, the crew leader and other crew members collect the inventory data in the following field forms:-

(i) Plot Description Form;

(ii) Plot Enumeration Form;

(iii) Sample Tree Form;

(iv) Bamboo Enumeration Form (clump forming);

(v) Bamboo Enumeration Form (non-clump forming); and

(vi) Bamboo Weight Form.

Specimens of the above field forms may be found in Appendix II. However, these field forms are briefly described below:-

(i) Plot Description Form (PDF)

Qualitative data such as land use, composition of the tree crop and its density, erosion status of soils in the area, intensities of fire and grazing, regeneration status etc., are recorded in this form. The basis of assessment is occular by observing an area of about 2 ha around the plot centre. The surrounding area of 2 ha is not marked.

(ii) Plot Enumeration Form (PEF)

The trees and bamboo clumps in the 0.1 ha plot are enumerated and recorded with the name of the species and the diameter at breast height.

(iii) Sample Tree Form (STF)

The data in this form is collected from the North-West quarter of the sample plot. Name of the tree species, its diameter at breast height, double bark thickness (dbt), dominance status, length of the clear bole and height of each tree enumerated in this quadrant are recorded. The data from this form helps in developing local volume equations for the species in the survey area. Under bark volume is also derived from the local volume equations with the help of bark thickness data. The area of the sample tree plot is 0.025 ha.

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(iv) & (v) Bamboo Enumeration (clump and non-clump forming) forms (BEF)

These forms are used whenever bamboo clumps are encountered in the sample plots. Data such as the number of culms in each clump, their size, maturity condition, length etc., are recorded.

(vi) Bamboo Weight Form

For determining the correlation between green and dry weight of the utilizable length of bamboo culm sample pieces of matured culms are cut and weighed at regular intervals of time till a constant air dry weight is obtained.

2.4 Intensity of the Survey

A total of 491 sample plots were marked on the toposheets in the forest areas of Shimoga District. The total extent of the forest area depicted on the Survey of India toposheets was estimated by using the dot grid. The area represented by each sample point (in short to be referred to in the subsequent portions of this report as "the area weight" of the sample point), is worked out in the following manner:-

Total forest area	= 4950.27 km^2
Total No. of Sample Points marked in the forest areas	= 491
Area Weight	= $\frac{4950.27}{491}$
	= 10.082 km^2/plot

At the time of marking the sample point locations on the ground, it was found that at 55 sample point locations, where presence of forests had been indicated by the maps, the lands were now under non-forestry use. The net forest area thus works out to:

(491 - 55) x 10.082

= 436 x 10.082

= 4395.76 km^2

At the remaining 436 plots, which were found to be in forest areas (forest areas in the subsequent portions of this report will refer to the 'net forest area' i.e. 4395.76 km^2), square plots of 0.1 ha were laid and measurements recorded. The intensity of this inventory is worked out in the following manner:

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Total extent of forest area sampled = 4395.76 km^2

= 439576 ha

Total area of the sample plots == 436 x 0.1 ha

= 43.6 ha

Intensity of the survey == $\frac{43.6}{439576}$ x 100

= 0.0099 (%)

= or 0.01%

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CHAPTER-3

DATA PROCESSING

3.0 Preparation of Data for Processing on Electronic Computer:

The basic field inventory data recorded in the field forms were sent to the Data Processing Unit (DPU) at Dehradun after a thorough checking on completion of field work. The field forms were again checked in the DPU for detecting any inconsistencies in the data and corrections were effected where necessary. The coded data from field forms were transferred on to cards using a card punching machine. A card verifier was used to detect and correct punching mistakes. The field form data on the punch cards was then loaded on to magnetic disk/tape for final processing using an electronic computer after proper sorting. A check list of data loaded on the disk/tape was taken out to check the completeness and correctness of the sequence of the loaded data. A computer programme was developed to produce the outputs desired. The output was tabulated in the desired format.

3.1. Area Computation

The extent of the forested land shown on the toposheet was estimated with the help of a dot grid in the zonal office. District-wise forest area figures were then supplied to the DPU. The area of forests under various categories such as forest type, soil erosion status, grazing incidence, fire incidence, canopy density classes etc., was estimated by multiplying the number of sample plots occurring in that class by the area weight of each sample point. However it may be noted that in such of the classes in which a small number of sample points are found the area estimate may not be very reliable. Due caution may therefore be exercised while using the area figures.

3.2 Volume Estimation

Collection of felled tree data by the FSI for developing general volume equations has been discontinued. The height-diameter data of sample trees of evergreen species recorded in the Sample Tree Form (STF) of the survey area were found to show similarities with the height-diameter data of the trees in the inventory conducted during the FAO period (1967-68) in Kerala. The volume equations

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developed for the evergreen species in the FAO aided inventory were therefore adopted for this survey also. Volume equations of teak and 'rest of the species' developed for Mahaboobnagar (Andhra Pradesh) survey has been used. The volume equations so developed are a function of the BH diameter of the tree irrespective of the height of the tree.

1. Anogeissus latifolia

$$V = 0.289 - 2.653\ D + 11.771\ D^2$$

2. Cinnamomum wightianum

$$V = 0.089 - 1.242\ D + 9.732\ D^2$$

3. Dalbergia latifolia

$$V = 0.296 - 2.829\ D + 12.207\ D^2$$

4. Lagerstroemia lanceolata

$$V = 0.070 - 1.295\ D + 9.429\ D^2$$

5. Pterocarpus marsupium

$$V = 0.070 - 1.295\ D + 9.429\ D^2$$

6. Schleichera trijuga

$$V = 0.010 - 0.912\ D + 11.396\ D^2$$

7. Tectona grandis

$$V = 0.086 + 5.641\ D^2$$

8. Terminalia tomentosa

$$V = 0.289 - 2.653\ D + 11.771\ D^2$$

9. Terminalia paniculata

$$V = 0.070 - 1.295\ D + 9.429\ D^2$$

10. Vitex altissima

$$V = 0.289 - 2.653\ D + 11.771\ D^2$$

11. Xylia xylocarpa

$$V = 0.289 - 2.653\ D + 11.771\ D^2$$

12. Rest of Species

$$V = 0.058 + 4.598\ D^3$$

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3.3 Enumerated Tree Volume and Plot Volume

By feeding the breast height over bark diameter of each tree enumerated in the plot in the volume equation for the species, the individual tree volume is found. By simple summation the total volume of all the trees in a plot is found. Once again adding the plot volume of all the plots in each strata or forest type and dividing by the total number of plots so summed in the strata we arrive at the average volume per plot. By multiplying the average volume per plot by a factor of 10 we obtain the volume per hectare. This data was stored in the tree/plot volume file. From the observed variation in the volume/ha at the sample plot locations in a strata the sampling error of the volume estimate for the strata can be calculated.

3.4 Stand Tables

The elements of the tree/plot volume file were utilised to classify the trees. Estimates of the number of stems per hectare and total number of stems by species and diameter classes were obtained for the various categories in the manner described in 3.3.

3.5 Stock Tables

Estimates of volume per hectare and the total volume of the growing stock by species and diameter class were obtained for the various categories from tree/plot volume file.

3.6 Sampling Error

The estimates obtained from the inventory will, of course, have errors associated with them. The user of the results wants to have some control over how large these errors are, or at the very least have an error estimate computed after the inventory is completed. The control over the error is generally stated in terms of a requirement involving two quantities: confidence level and allowable error. Suppose the sample is designed to estimate a population value α (to be regarded as fixed but unknown) with an estimate $\hat{\alpha}$ (to be regarded as a random variable). The accuracy requirement is then stated in the form: it is required that we be

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h% confident that the interval $(\hat{\alpha} - \frac{K}{100}\hat{\alpha}, \hat{\alpha} + \frac{K}{100}\hat{\alpha})$ contains the parameter α. So h is the confidence level and K is the allowable error. This means that if the same sample survey is performed 100 times, with a new sample taken each time, the expected number of times the interval includes α is at least h.

The sample was considered as a systematic cluster sample having two sample plots in each cluster. In order to estimate the sampling error, the sample was considered to constitute a simple random sample of unequal clusters and ratio method of estimation was used as in many grids only one plot was enumerated.

Let n = Total No. of clusters (grids) in the sample;

Yi = Sum of the per hectare volumes in the ith grid

Xi = Number of plots in ith grid.

$\bar{X} = \frac{1}{n} \sum_{i=1}^{n} Xi$ = Average number of plots per grid.

$$\hat{R} = \frac{\sum_{i=1}^{n} Yi}{\sum_{i=1}^{n} Xi}$$ = Estimate of average volume per hectare over all grids.

Estimate of variance of R

$$V(\hat{R}) = \frac{N-n}{N \times n \bar{X}^2} \sum_{i=1}^{n} \frac{(Yi - \hat{R}\,Xi)^2}{n-1}$$

$$= \frac{1}{n(n-1)\bar{X}^2} \sum_{i=1}^{n} (Y_i - \hat{R}\,X_i)$$

(Ignoring $\frac{N-n}{N}$ the finite population correction factor).

$$= \frac{1}{n(n-1)\bar{X}^2} \sum_{i=1}^{n} Y_i^2 - 2R \sum_{i=1}^{n} X_i Y_i + \hat{R}^2 \sum_{i=1}^{n} X_i^2$$

Estimate of the Standard Error (SE) of R

$$SE = \sqrt{V(\hat{R})}$$

$$SE\% = \frac{SE}{\hat{R}} \times 100$$

Standard Errors have been estimated for the growing stock in each forest type and over the entire area irrespective of the stratas.

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3.7 Bamboo

3.7.1 Area

The occurrence of bamboo was examined in an area of about 2 ha around the plot centre and its density and quality recorded in the plot description form. The area under bamboo was estimated from this information by applying the area weight of each plot. Area under each quality of bamboo was also estimated from the number of plots falling in each quality.

3.7.2 Clumps per Hectare

The bamboo clumps occurring in each sample plot were enumerated by species and diameter of the clump. This information was utilised for estimating the number of clumps per hectare by species and clump size class. Dendrocalamus strictus and Bambusa arundinacea were the only two bamboo species in the area. Therefore separate estimates were obtained for each. However, to estimate the number of clumps per hectare in each quality and clump size class, the plot description form and the plot enumeration form data were merged together.

3.7.3 Culms per Clump

Every eighth clump starting with the first clump in a sample plot was selected and the number of culms by age (current year, one to two years, and over two years) and soundness (green sound, green damaged, dry sound, dry damaged and decayed) was enumerated and recorded. The culms were further classified by culm diameter class (2 cm to under 5 cm; 5 cm to under 8 cm; 8 cm and above). This information was used for estimating the number of culms per clump in different classes.

3.7.4 Culms per Hectare

The estimates of the number of clumps per hectare and the number of culms per clump provide an estimate of the number of culms per hectare under different classes of each species.

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3.7.5 Total Number of Culms

The estimates of the number of culms per hectare and the extent of area under the specific quality classes is used to estimate the total number of bamboo culms in the inventoried area.

3.7.6 Bamboo Stock

Weight of the utilisable length of green culms of diameter 2 to 5 cm; 5 to 8 cm; 8 cm and above, were recorded by felling bamboo culms from the first clump in each plot. Average green weight of a culm was thus obtained in different diameter classes of culms of each species.

The following factors were used to obtain correlation between the green weight and the dry weight of different categories of culms:

Dry sound culm = 1/2 green sound culm
Dry damaged culm = 1/4 green sound culm
Green damaged culm = 1/2 green sound culm
Decayed culm = 0

Applying the above factors to the green weight of bamboo culms and the total number of culms, the total bamboo stock (green weight) was estimated.

3.7.7 Dry Weight Equivalent of Bamboo Stock

To estimate the bamboo weight at 10% moisture the following factors were used:

	Species	Diameter classes (cm)		
		2 to 5	5 to 8	8 and above
1.	Bambusa arundinacea	50.81% (89)	50.20% (47)	39.79% (7)
2.	Dendrocalamus strictus	57.90% (61)	58.20% (3)	-

(Figures in brackets are the number of samples)

Green tonnage was converted to dry tonnage by applying the above driage factors.

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CHAPTER-4

RESULTS OF THE INVENTORY

4.0 The results of the inventory are presented and discussed in this chapter.

4.1 Topography of the Forest Area

The general topography of the terrain around the sample point locations was assessed ocularly in the field as well as by referring to the topographic map. 44.8% (1965.99 km^2) of the forests are found to be in hilly to very rugged terrain; 36.2% (1592.96 km^2) on gently rolling and 19% (836.81 km^2) on flat terrain.

4.2 Land Use Pattern in Forest Area

The current status and manner of utilisation of forest lands and their extent is estimated on the basis of the number of sample points falling in that use category and the area weight. The following table gives only an indication of the use pattern in the forest areas.

Table 4.2.1

Land Use	No. of sample points	Area in ha.	Percentage.
Tree Forest	380	383116	77.4
Scrub Forest	13	13106	2.6
Bamboo Forest	4	4033	0.8
Young Plantations	38	38312	7.8
Barren Lands	1	1008	0.2
Agricultural Lands	48	48394	9.8
Habitation	3	3025	0.6
Water Bodies	4	4033	0.8
Total	491	495027	100.0

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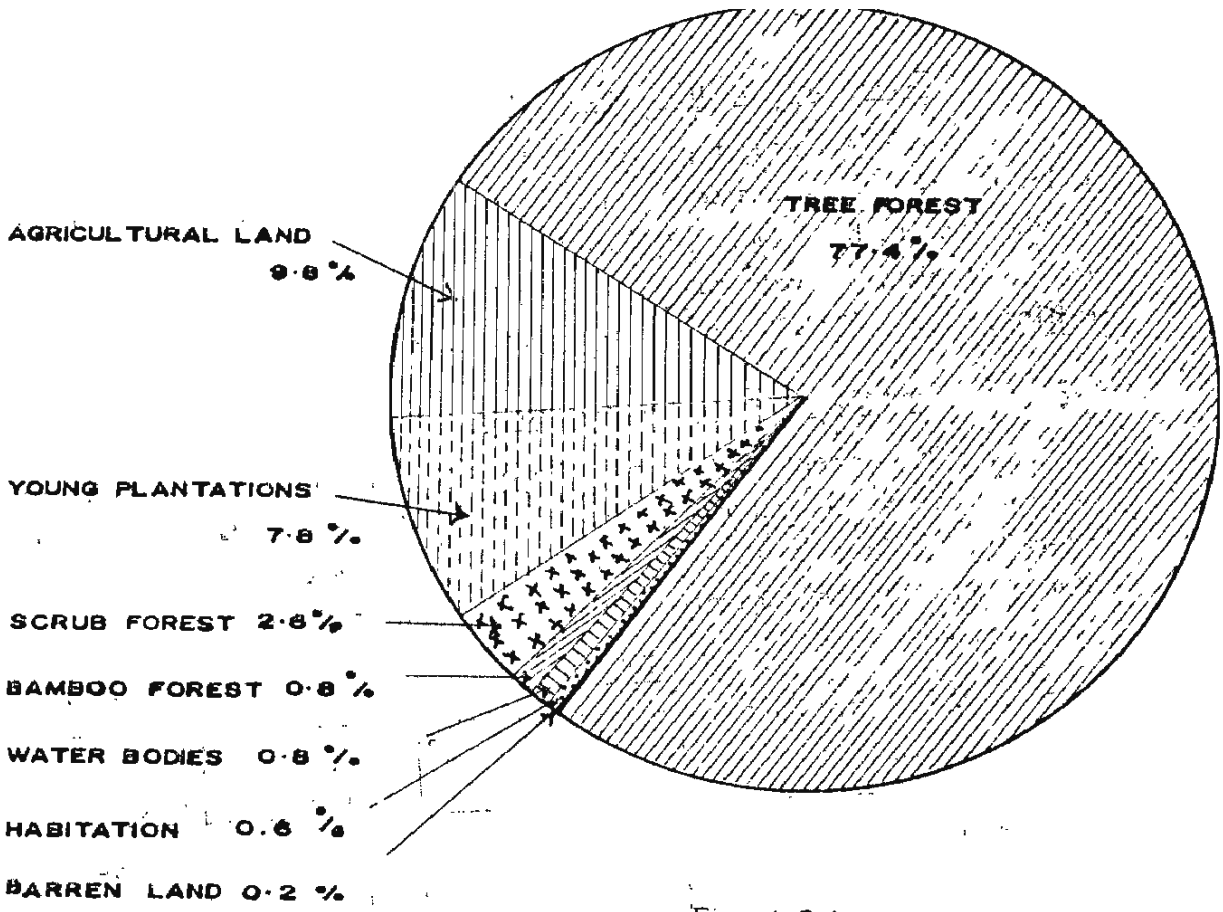

Fig. 4.2.1

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The net area that is actually under forestry use consists of serial numbers 1 to 5 of Table 4.2.1. The total number of sample points and the corresponding area are 436 and 4395.76 km^2 respectively. Out of this net forest area the areas under tree forests are those that fall under serial numbers 1 and 4. The total number of plots and the extent of this area that will be called "actual tree forest area" are 418 and 4214.28 km^2. The data regarding the terrain and soils are recorded for the net forest area whereas data such as crop composition, top height, size class, intensity of regeneration etc., are recorded for the plots falling in actual tree forest area.

4.3 State of Health of Forest Soils

The state of health of forest soils can be gauged by factors such as depth, consistency, erosion status and density of vegetal cover on the soil in the forest areas.

4.3.1 Depth of Soils

The soil depth data is collected by digging 15 cm deep pits in the sample plots and estimating the probable depth of the soil at further depths by observing fresh cuttings of earth in nearby areas or landslips etc. The following soil depth categories have been recognised:

Category	Description
1. Very shallow	Soil depth less than 15 cms.
2. Shallow	Soil depth 15 cms and more but less than 30 cms.
3. Medium	Soil depth 30 cms and more but less than 90 cms.
4. Deep	Soil depth 90 cms and more.

Accordingly it is found that 47% of the forests have deep soils, 43.8% of medium depth and 9.2% of shallow to very shallow depth. The following table gives the area figures under each category of soil depth.

Table 4.3.1

Soil Depth Class	Number of sample points.	Area (km^2)	Percentage
Very shallow	7	70.58	9.2
Shallow	33	332.71	
Medium	191	1925.66	43.8
Deep	205	2066.81	47.0
Total	436	4395.76	100.0

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4.3.2 Soil Consistency

The consistency of the soil in the surveyed areas is evaluated by observing the resistance offered by the soil to digging and rupture. Soils that crumble to even slight pressure of the fingers are classed as friable soils but those that require pick axes to dig through are classed as slightly compact, compact, or cemented depending upon the difficulty encountered in digging. The soils in the forest areas were thus found to fall under the categories shown in Table 4.3.2.

Table 4.3.2

Soil consistency	Number of sample points	Area (km^2)	Percentage
Friable	15	151.23	3.4
Slightly compact	401	4042.89	92.2
Compact	20	201.64	4.4
Total	436	4395.76	100.0

4.3.3 Erosion Status

The extent of soil erosion due to either wind or water is judged by the presence of rills and gullies or ravine formations in the surveyed area. Table 4.3.3 gives the extent of erosion encountered in the survey area. Heavy erosion is possibly non-existent in the district as can be seen from the table.

Table 4.3.3

Soil Erosion	Number of sample points	Area (km^2)	Percentage
Mild	420	4234.45	96.3
Moderate	16	161.31	3.7
Heavy	nil	nil	nil
Total	436	4395.76	100.0

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4.3.4 Density of Vegetation Cover

Density of the vegetation covering the forest areas is measured in terms of the canopy density. Canopy density is defined as the percentage of ground area covered by the crowns of trees. The classification used is given below:

Dense Tree Forest including bamboo brakes.	Where tree canopy density is 70% or more. Includes bamboo brakes which are areas completely covered with bamboos.
Moderately Dense Tree Forest	Where tree canopy density is 30% or more but less than 70%.
Open Tree Forest	Where tree canopy density is 5% or more but less than 30%.
Scrub Forests and other exposed lands	Where only inferior or stunted trees inhabit and less than 5% of the ground is covered by trees. Includes exposed and completely barren lands.

Table 4.3.4 gives an indication of the density of vegetation cover on the forest soils.

Table 4.3.4

Canopy Density	Number of sample points	Area (km^2)	Percentage
Dense Tree Forest including bamboo brakes.	84	846.89	19.3
Moderately Dense Tree Forest.	151	1522.38	34.6
Open Tree Forest	187	1885.34	42.9
Scrub Forests and other exposed lands.	14	141.15	3.2
Total	436	4395.76	100.0

From the results narrated in the preceding paragraphs it is evident that the forest soils are in normal health.

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4.4 Tree Clad Forest Areas in the Forests

From Table 4.4.1 we see that the extent of forest areas that are actually tree clad inclusive of areas under regeneration of tree species is 4,21,428 ha and forms about 95.9% of the net forest area. The stand and stock tables, that is the estimates of the growing stock, will be worked out for this area (besides area estimates of the forest by stand origin, types and size classes, intensity of regeneration, incidence of fire and grazing).

4.4.1 Origin of Stand in the Tree Forest

The forest areas in the inventoried area were grouped as natural, man made or coppice forest depending on their origin. The following table gives the distribution of the forest areas according to the origin of stand.

Table 4.4.1

Origin of Stand	Number of sample points	Area (km^2)	Percentage
Natural forest of seed origin.	377	3800.92	90.2
Natural forest Coppice origin	1	10.08	0.2
Man made forest	40	403.28	9.6
Total	418	4214.28	100.0

It can be seen that the total extent of man made forests, that is, plantations, is 40,328 ha of which 25,205 ha are in the reserved forests, 6,049 ha in protected forests and 9,074 ha in unclassed forests.

4.4.2 Composition of the Tree Forest

The forest type of the sampled location was assessed on the basis of composition of species. The basis of classification is as under:

Contents

Crop Composition	Description
Teak	Where teak constitute more than 20%.
Western Ghat Evergreen	Where evergreen species predominate in the top canopy.
Western Ghat Semievergreen	Where deciduous species constitute upto 50% of the top canopy.
Deciduous	Where deciduous species predominate in the top canopy
Miscellaneous	Forest which could not be classified in any of the above classes.

The extent of forest areas under the various crop composition categories is given in the table 4.4.2.

Table 4.4.2

Crop Composition	No. of plots	Area (km^2)	Percentage
Teak	31	312.54	7.4
Western Ghat Evergreen	93	937.63	22.3
Western Ghat Semi-evergreen	184	1855.09	44.0
Deciduous	107	1078.77	25.6
Miscellaneous	3	30.25	0.7
Total	418	4214.28	100.0

4.4.3 Timber Utility Classes

The trees occurring in the sample plots were categorised by timber utility classes. The different size classes adopted in the inventory is given below:

Contents

Class	Description
Regeneration	Crop below 10 cms diameter predominating.
Pole crop	Crop between 10-20 cms diameter predominating.
Small timber	Crop between 20 to under 30 cms and over predominating.
Big timber	Trees with diameter 30 cms and over predominating.
Mixed size class	Trees with no marked domination of any size class.

The extent of forest areas under tree crop of different classes recognised above is given in table 4.4.3.

Table 4.4.3

Size class	Number of sample points	Area (km^2)	Percentage
Regeneration	27	272.21	6.5
Pole crop	81	816.64	19.3
Small timber	89	897.30	21.3
Big timber	94	947.71	22.5
Mixed size class	127	1280.42	30.4
Total	418	4214.28	100.0

It can be seen that forests in the district prominantly have timbers of mixed size classes. Big timbers are probably restricted to unworkable (inaccessible and remote) areas.

4.4.4 Intensity of Regeneration in the Tree Forest Area

The intensity of regeneration is the count of all established saplings and seedlings of economically important tree species of 2 to 10 cm dbh in a plot of 4 m x 4 m laid at the centre of the sample plot. The various categories recognised are given below:

Contents

Status	Description
Profuse	More than 16 seedlings
Adequate	8 to 16 seedlings
Inadequate	Upto 8 seedlings
Absent	No regeneration
Damaged regeneration	Regeneration damaged by grazing or fire.

The intensity of regeneration found in the tree forests is given in table 4.4.4.

Table 4.4.4

Intensity of regeneration	Number of sample points	Area (km^2)	Percentage
Profuse	1	10.08	0.3
Adequate	9	90.74	2.0
Inadequate	92	927.55	22.0
Absent	315	3175.83	75.4
Damaged regeneration	1	10.08	0.3
Total	418	4214.28	100.0

It can be seen that more than 75% of the tree forest area has absolutely no established regeneration. We can conclude that bulk of the forests in the inventoried area are not regenerating naturally probably due to the pressure of grazing and other biotic causes. The management will, therefore, have to resort to costly methods of artificial regeneration for ensuring a sustained yield from these forests.

4.4.5 Fire Incidence in the Tree Forest Area

The incidence of fire is evaluated ocularly by observing the scars left by fires in the past and the severity of its effect on the vegetation. Enquiries were also made with the local people about the frequency of the fires in the surveyed areas. Where fires are an annual feature they are categorised under "very heavy" class. The following table gives the extent of tree forest areas under different intensities of fire occurrence:

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Table 4.4.5

Fire Incidence	Number of sample points	Area (km^2)	Percentage
Very heavy	nil	nil	nil
Frequent	31	312.54	7.5
Occasional	164	1653.45	39.2
No fire	223	2248.29	53.3
Total	418	4214.28	100.0

It is observed that a major portion of the forest area (53.3%) is free from fires. It is likely that these are the evergreen and semi-evergreen forests. Very heavy fires seem to be non-existent in the district.

4.5 Growing Stock of Timber (Stand Tables)

The total number of stems in the tree forest area is 8,25,53,367 with an average of about 196 stems per ha. Table 4.5.1 shows the total number of stems and the per hectare average for the entire area by species and diameter classes. Tables 4.5.2 to 4.5.9 give the stand tables showing the number of stems per ha in the tree forests of Sagar, Shimoga and Bhadravati Divisions; of Teak, Western Ghat, evergreen, Semi-evergreen, Deciduous and Miscellaneous types.

4.6 Growing Stock of Timber (Stock Tables)

The total volumetric growing stock in the entire tree forests of the inventoried area is 3,16,27,611 cu.m. with an average of about 75 cu.m. per ha. Table 4.6.1 gives the total volume per ha in the tree forests of the inventoried area by species and diameter classes. It is to be noted that all those species which contribute to less than 1% of the total volume of the strata have been clubbed under the 'Miscellaneous species". Tables 4.6.2 to 4.6.9 give the stock tables showing volume per ha in the tree forests of Sagar, Shimoga and Bhadravati Divisions of Teak, Miscellaneous, Evergreen, Semi-evergreen and Deciduous types

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Growing Stock of Bamboos

Dendrocalamus strictus and Bambusa arundinacea are the only two species of bamboos found in the forest tracts of the district. The total number of bamboo clumps and their respective diamaters occurring in each sample plot is recorded in the PEF. In the BEF (clump forming) the number of culms in the clumps numbered 1st, 9th, 17th, 25th, 33rd and so on, are enumerated separately for each species. A culm is a bamboo which has attained a diameter of 2 cms and above at ground level and is over 2 metres in height. Factors such as the condition of the culm, its age, soundness etc., are taken into account and the results processed and presented separately for each factor.

The quality of bamboos growing on a site is an indicator of the productive capacity of the site. Bamboo areas were therefore classified into bamboo site quality classes. The average height measurements of the tallest culms occurring in the plot is taken into account for the purposes of the classification. The standards of classification are indicated below:

Bamboo site quality class	Description
I	Average culm height 6 metres or more for Dendrocalamus strictus and 14 metres or more for Bambusa arundinacea.
II	Average culm height 4 metres or more but less than 6 metres for Dendrocalamus strictus and 10 metres or more but less than 14 metres for Bambusa arundinacea
III	Average culm height 2 metres or more but less than 4 metres for Dendrocalamus strictus and 2 metres and more but less than 10 metres for Bambusa arundinacea.

(The quality of other species of bamboo will be decided on the lines of Dendrocalamus strictus).

Table 4.7.1 gives the distribution of bamboos by species and quality class in the survey area.

Table 4.7.1

Species	Quality I		Quality II & III		Total No.of sample points	Area (km^2)
	No.of sample points	Area (km^2)	No.of sample points	Area (km^2)		
Bambusa arundinacea	51	514.182	54	544 428	105	1058.61
Dendrocalamus strictus	76	766.232	11	110.902	87	877.134
Total	127	1280.414	65	655.330	192	1935.744

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The mean number of bamboo clumps per plot by bamboo quality and clump size classes is calculated by a process of summation of the number of clumps in each quality and size class and dividing by the total number of plots in which each species of bamboos were found. This is then multiplied by 10 to give the mean number of bamboo clumps per hectare by bamboo quality and clump size class and by species. The bamboo stock in the survey area is given in tables 4.7.2 to 4.7.8.

It may be noticed from these tables that a high percentage of the culms in clumps of Dendrocalamus strictus are damaged, dry or decayed. It is therefore apparent that the incidence of injury to the Dendrocalamus bamboo on account of biotic and other natural factors is relatively high. It also appears that about 13% of the utilisable yield of Dendrocalamus culms of Quality I is not being removed. The management should address itself to the task of removal of dry and decayed bamboo culms so as to reduce the fire hazards to the growing stock.

Estimation of Bamboo Stock by Weight

Considering the weight of a green bamboo culm as a unit the weight of bamboo stock of the other categories of culms are deduced by applying the approximate correlation indicated in 3.7.6.

The average height and weight of a sound green culm in 2 cm to under 5 cm; 5 cm to under 8 cm; and 8 cm and above diameter classes was worked out from the data recorded in the BWF, and is presented below:

Table 4.7.9

Average height, green and air dry weight of bamboo culms

Species	Culm diameter class	Average height of culm (in m) (utilisable length reckoned upto 1 cm culm dia only)	Average green weight of a culm (in kg)	Average air dry weight of a culm (in kg)	Average air dry weight as a percentage of the average green weight.
Bambusa arundinacea	2 cm to under 5 cm	7.97	6.023	3.151	50.81
	5 cm to under 8 cm	12.35	17.421	8.745	50.2
	8 cm and above	18.06	49.222	19.505	39.79
Dendrocalamus strictus	2 cm to under 5 cm	7.413	5.587	3.235	57.9
	5 cm to under 8 cm	10.60	12.818	7.460	58.2

The above data has been used for estimating the bamboo stock by weight in the inventoried area. The results are presented in tables 4.7.10 and 4.7.11 respectively. From Table 4.7.10 it can be seen that about 14% of the total bamboo stock of 7,16,103 tonnes consists of dry culms. Out of the balance 6,16,393 tonnes, about 1,66,522 tonnes or 27% is damaged. This fact is indicative of the biotic pressures to which bamboo stock is subjected to in the district.

From table 4.7.10 it can also be seen that 89,553 tonnes of the 6,16,393 tonnes of the green bamboo stock, i.e.14.5%, consists of the current year culms. One assumption made here is that the weight of a current year culm is equal to the weight of a mature (i.e. over two season old) 2 to under 5 cm culm. Therefore it is felt that the survey area can yield 89,553 tonnes of bamboos per year, provided the management pays attention to careful nurturing of the green growing stock and finally, timely removal of the dry and decayed bamboo stock which poses a fire hazard.

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4.8 Sampling Error

Standard Error % (SE%) is a useful estimator of the error involved in estimating the value of a population parameter from samples of the population. It expresses the standard error as a percentage of the mean value of the parameter. The following tables indicate the size of the sampling error when the survey area is attempted to be stratified in different ways.

Table 4.8.1

SE% of Growing Stock of Tree Forest Area stratified by Legal Status

Stratum	No.of sample points	Stems/ha	SE%	Vol./ha in cu.m.	SE%	Probability level
Reserved Forest	190	235.626	5.5	83.603	6.5	95%
Protected Forest	22	146.839	15.1	77.849	18.4	95%
Unclassed Forest	206	164.549	5.5	66.807	6.5	95%
Overall Strata	418	195.890	3.8	75.045	4.7	95%

Table 4.8.2

SE% of Growing Stock of Tree Forest Area stratified by Forest Division

Stratum	No.of sample points	Stems/ha	SE%	Vol./ha in cu.m.	SE%	Probability level
Sagar	252	204.818	5.0	78.126	5.7	95%
Shimoga	121	210.267	6.9	85.806	7.7	95%
Bhadravati	45	107.775	13.6	28.808	18.4	95%
Overall strata	418	195.890	3.8	75.049	4.7	95%

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Table 4.8.3

SE% of Growing Stock of Tree Forest Area stratified by Forest Type

Stratum	No. of sample points	Stems/ha	SE%	Vol./ha in cu.m.	SE%	Probability level
Teak	31	228.072	16.3	32.760	17.7	95%
Miscellaneous	3	82.500	76.8	16.170	46.0	95%
Western Ghat Evergreen	93	323.685	6.0	127.449	7.1	95%
Western Ghat Semi-evergreen	184	177.087	5.8	76.379	6.7	95%
Deciduous forest	107	113.575	7.0	42.216	9.1	95%
Overall strata	418	195.890	3.8	75.049	4.7	95%

Table 4.8.4

SE% of the Stock of Bamboos

Species	No.of sample plots	Mean No.of culms/ha.	SE%	Probability level
Dendrocalamus strictus	87	1388.301	± 18.3	95%
Bambusa arundinacea	105	218.172	± 17.2	95%

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T A B L E S

(4.5.1 to 4.5.9; 4.6.1 to 4.6.9; 4.7.2 to 4.7.8;
4.7.10 to 4.7.11)

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Table 4.5.1

Stand Table showing total number of stems in the Tree Forest Area

(Number of Sample Plots 418; Forest Area 421428 ha.)

Species description		Diameter Classes (in cm)								
		Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1		2	3	4	5	6	7	8	9	10
052 Alstonia scholaris	Total	547040	283562	81043	81042	60782	30391	0	0	10130
	Per ha.	1.297	0.673	0.192	0.192	0.144	0.072	0.000	0.000	0.024
063 Anogeissus latifolia	Total	780042	374827	363391	121564	10130	10130	0	0	0
	Per ha.	1.850	0.889	0.625	0.258	0.024	0.024	0.000	0.000	0.000
116 Buchanania latifolia	Total	577434	405218	141826	30390	0	0	0	0	0
	Per ha.	1.369	0.961	0.336	0.072	0.000	0.000	0.000	0.000	0.000
143 Careya arborea	Total	1408131	1114350	243130	40521	10130	0	0	0	0
	Per ha.	3.341	2.644	0.577	0.096	0.024	0.000	0.000	0.000	0.000
177 Cinnamomum wightii	Total	881346	516653	141826	111434	50562	40521	10130	0	10130
	Per ha.	2.090	1.226	0.336	0.264	0.120	0.096	0.024	0.000	0.024
220 Dalbergia latifolia	Total	1023173	445740	344435	141826	30391	40521	0	10130	10130
	Per ha.	2.428	1.058	0.818	0.336	0.072	0.096	0.000	0.024	0.024
230 Dillenia pentagyna	Total	992781	384957	222870	192478	121565	40521	20260	10130	0
	Per ha.	2.355	0.914	0.529	0.456	0.288	0.096	0.048	0.024	0.000

Contd....

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1		2	3	4	5	6	7	8	9	10
240 Diospyros species	Total	840827	536914	222870	70913	0	0	10130	0	0
	Per ha.	1.995	1.274	0.529	0.168	0.000	0.000	0.024	0.000	0.000
243 Dipterocarpus	Total	435605	233000	101303	20260	60782	20260	0	0	0
	Per ha.	1.033	0.553	0.240	0.048	0.144	0.048	0.000	0.000	0.000
336 Grewia tiliaefolia	Total	790173	273522	162087	182348	121565	10130	30391	10130	0
	Per ha.	1.873	0.649	0.384	0.432	0.288	0.024	0.072	0.024	0.000
364 Hopea wightiana	Total	2015959	1053568	638219	192478	70913	30391	10130	10130	10130
	Per ha.	4.782	2.500	1.514	0.456	0.168	0.072	0.024	0.024	0.024
393 Kydia calycina	Total	567303	314044	192478	40251	10130	10130	0	0	0
	Per ha.	1.346	0.746	0.456	0.096	0.024	0.024	0.000	0.000	0.000
396 Lagerstroemia parviflora	Total	2015960	719263	314044	425479	283653	111435	111435	40521	10130
	Per ha.	4.784	1.707	0.746	1.010	0.673	0.264	0.264	0.096	0.024
437 Madhuca latifolia	Total	607824	364696	151956	70912	10130	0	0	0	10130
	Per ha.	1.442	0.866	0.360	0.168	0.024	0.000	0.000	0.000	0.024
474 Mimusops elengi	Total	577428	233000	121564	81042	20260	60782	20260	20260	20260
	Per ha.	1.369	0.553	0.288	0.192	0.048	0.144	0.048	0.048	0.048
490 Myristica species	Total	1276434	678740	314043	172217	81043	30391	0	0	0
	Per ha.	3.028	1.611	0.745	0.408	0.192	0.072	0.000	0.000	0.000
542 Poeciloneuron indicum	Total	1104217	668610	222870	91173	91174	20260	10130	0	0
	Per ha.	2.620	1.587	0.529	0.216	0.216	0.048	0.024	0.000	0.000

Contd....

1	2	3	4	5	6	7	8	9	10
567 Pterocarpus marsupium Total	668606	141826	151956	151956	151957	20260	40521	0	10130
Per ha.	1.585	0.336	0.360	0.360	0.361	0.048	0.096	0.000	0.024
596 Randia dumetorum Total	850955	658479	121565	50561	20260	0	0	0	0
Per ha.	2.019	1.563	0.288	0.120	0.048	0.000	0.000	0.000	0.000
628 Schleichera trijuga Total	2826396	1570222	628088	415349	141826	30391	20260	20260	0
Per ha.	6.707	3.726	1.490	0.986	0.337	0.072	0.048	0.048	0.000
665 Syzygium cumini Total	1316957	516654	253261	222869	141826	81043	50652	0	50652
Per ha.	3.125	1.226	0.601	0.529	0.337	0.192	0.120	0.000	0.120
673 Tectona grandis Total	4700535	3282272	1033307	253261	111435	0	10130	10130	0
Per ha.	11.153	7.788	2.452	0.601	0.264	0.000	0.024	0.024	0.000
676 Terminalia belerica Total	688886	101304	131695	172217	101304	70913	60782	10130	40521
Per ha.	1.632	0.240	0.312	0.408	0.240	0.168	0.144	0.024	0.096
681 Terminalia crenulata Total	4609359	2552878	1002916	668610	222870	91174	20260	20260	30391
Per ha.	10.937	6.058	2.380	1.586	0.529	0.216	0.048	0.048	0.072
684 Terminalia paniculata Total	5936451	3079663	1316960	678740	395088	222870	151957	60782	30391
Per ha.	14.087	7.308	3.124	1.611	0.938	0.529	0.361	0.144	0.072
710 Vitex altissima Total	709130	253261	172217	141826	91174	50652	0	0	0
Per ha.	1.681	0.601	0.408	0.336	0.216	0.120	0.000	0.000	0.000
725 Xylia xylocarpa Total	4325707	2259094	1398004	415349	172218	60782	10130	10130	0
Per ha.	10.265	5.361	3.317	0.986	0.409	0.144	0.024	0.024	0.000
736 Aporasa lindleyana Total	1975438	1165003	536914	202609	30391	30391	10130	0	0
Per ha.	4.688	2.765	1.274	0.481	0.072	0.072	0.024	0.000	0.000

Contd...

1	2	3	4	5	6	7	8	9	10
737 Tabernaemontana dichotoma									
Total	1306827	820568	303913	101303	70913	10130	0	0	0
Per ha.	3.101	1.948	0.721	0.240	0.168	0.024	0.000	0.000	0.000
811 Miscellaneous species									
Total	36196463	21040987	6665851	3677362	1945051	1124482	749654	364696	628380
Per ha.	85.890	49.928	15.817	8.726	4.615	2.618	1.779	0.865	1.491
All species total									
Total	82553367	46042965	17596602	9218700	4629613	2248951	1347342	597689	871505
Per ha.	195.890	109.259	41.748	21.868	10.983	5.333	3.196	1.417	2.068
		10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+

Table 4.5.2

Stand Table showing Stems per Hectare in Tree Forests of Sagar Division

(No. of Sample Plots 252; Area 252050 ha.)

Species Description	Diameter Classes (in cm.)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
052 Alstonia scholaris	1.200	0.600	0.160	0.280	0.080	0.080	0.000	0.000	0.000
063 Anogeissus latifolia	0.880	0.320	0.200	0.320	0.000	0.040	0.000	0.000	0.000
116 Buchanania latifolia	1.880	1.360	0.400	0.120	0.000	0.000	0.000	0.000	0.000
143 Careya arborea	3.760	3.040	0.600	0.120	0.000	0.000	0.000	0.000	0.000
177 Cinnamomum wightii	2.680	1.640	0.400	0.400	0.080	0.120	0.040	0.000	0.000
220 Dalbergia latifolia	1.120	0.080	0.600	0.360	0.040	0.040	0.000	0.000	0.000
230 Dillenia pentagyna	2.480	1.160	0.640	0.320	0.240	0.080	0.000	0.040	0.000
240 Diospyros species	3.080	2.040	0.760	0.240	0.000	0.000	0.040	0.000	0.000
243 Dipterocarpus	1.280	0.680	0.280	0.080	0.200	0.040	0.000	0.000	0.000
336 Grewia tiliaefolia	1.680	0.680	0.440	0.320	0.200	0.000	0.040	0.000	0.000
364 Hopea wightiana	4.920	2.680	1.600	0.360	0.160	0.040	0.040	0.000	0.040
393 Kydia calycina	1.120	0.480	0.520	0.080	0.000	0.040	0.000	0.000	0.000
396 Lagerstroemia parviflora	4.760	1.400	0.680	1.280	0.720	0.320	0.240	0.080	0.040
437 Madhuca latifolia	1.200	0.800	0.160	0.160	0.040	0.000	0.000	0.000	0.040
474 Mimusops elengi	1.680	0.680	0.400	0.280	0.000	0.200	0.040	0.040	0.040

Contd....

Contents

1	2	3	4	5	6	7	8	9	10
490 Myristica species	4.560	2.280	1.200	0.640	0.320	0.120	0.000	0.000	0.000
542 Poeciloneuron indicum	1.920	1.040	0.560	0.200	0.120	0.000	0.000	0.000	0.000
567 Pterocarpus marsupium	1.600	0.360	0.240	0.480	0.320	0.040	0.120	0.000	0.040
596 Randia dumetorum	2.200	1.720	0.320	0.080	0.080	0.000	0.000	0.000	0.000
628 Schleichera trijuga	8.600	5.160	1.760	1.240	0.320	0.040	0.040	0.040	0.000
665 Syzygium cumini	2.640	0.600	0.640	0.520	0.360	0.160	0.200	0.000	0.160
673 Tectona grandis	3.200	2.000	0.840	0.200	0.080	0.000	0.040	0.040	0.000
676 Terminalia belerica	1.600	0.200	0.360	0.320	0.280	0.160	0.160	0.000	0.120
681 Terminalia crenulata	13.010	6.880	3.200	2.080	0.520	0.240	0.040	0.000	0.080
684 Terminalia paniculata	15.240	7.840	3.440	2.040	0.920	0.520	0.360	0.120	0.000
710 Vitex altissima	1.640	0.560	0.320	0.320	0.240	0.200	0.000	0.000	0.000
725 Xylia xylocarpa	10.560	4.920	3.960	1.120	0.440	0.080	0.000	0.040	0.000
736 Aporasa lindleyana	6.520	3.960	1.720	0.680	0.080	0.080	0.000	0.000	0.000
737 Tabernaemontana dichotoma	4.240	2.480	1.040	0.400	0.280	0.040	0.000	0.000	0.000
811 Misc. species	93.520	54.160	16.960	9.800	5.240	2.960	1.960	0.920	1.520
All Species total	204.800	111.800	44.400	24.840	11.360	5.640	3.360	1.320	2.080

Table 4.5.3

Stand Table showing Stems per Hectare in the Tree Forests of Shimoga Division.

(No. of Sample Plots 121; Area 121992 ha.)

Species Description	Diameter Classes (in cm.)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
052 Alstonia scholaris	1.984	1.074	0.330	0.083	0.331	0.083	0.000	0.000	0.083
063 Anogeissus latifolia	1.818	0.909	0.744	0.165	0.000	0.000	0.000	0.000	0.000
116 Buchanania latifolia	0.578	0.330	0.248	0.000	0.000	0.000	0.000	0.000	0.000
143 Careya arborea	3.142	2.232	0.744	0.083	0.083	0.000	0.000	0.000	0.000
177 Cinnamomum wightii	1.654	0.827	0.330	0.083	0.248	0.083	0.000	0.000	0.083
220 Dalbergia latifolia	3.142	1.901	0.744	0.166	0.165	0.083	0.000	0.000	0.083
230 Dillenia pentagyna	2.562	0.414	0.413	0.909	0.496	0.165	0.165	0.000	0.000
240 Diospyros species	0.415	0.166	0.166	0.083	0.000	0.000	0.000	0.000	0.000
243 Dipterocarpus	0.910	0.496	0.248	0.000	0.083	0.083	0.000	0.000	0.000
336 Grewia tiliaefolia	2.811	0.744	0.413	0.827	0.496	0.083	0.165	0.083	0.000
364 Hopea wightiana	6.282	3.058	1.901	0.827	0.248	0.165	0.000	0.083	0.000
393 Kydia calycina	1.985	1.323	0.496	0.083	0.083	0.000	0.000	0.000	0.000
396 Lagerstroemia parviflora	6.362	2.896	0.992	0.826	0.826	0.248	0.413	0.165	0.000
437 Madhuca latifolia	2.398	1.240	0.910	0.248	0.000	0.000	0.000	0.000	0.000
474 Mimusops elengi	1.242	0.496	0.166	0.083	0.165	0.083	0.083	0.083	0.083

Contd...

1	2	3	4	5	6	7	8	9	10
490 Myristica species	0.992	0.826	0.083	0.083	0.000	0.000	0.000	0.000	0.000
542 Poeciloneuron indicum	5.042	3.306	0.661	0.331	0.496	0.165	0.083	0.000	0.000
567 Pterocarpus marsupium	1.654	0.248	0.413	0.248	0.579	0.083	0.083	0.000	0.000
596 Randia dumetorum	2.231	1.735	0.331	0.165	0.000	0.000	0.000	0.000	0.000
628 Schleichera trijuga	4.546	1.818	1.405	0.661	0.331	0.165	0.083	0.083	0.000
665 Syzygium cumini	5.290	2.975	0.744	0.744	0.413	0.331	0.000	0.000	0.083
673 Tectona grandis	23.801	16.777	5.454	1.157	0.413	0.000	0.000	0.000	0.000
676 Terminalia belerica	2.149	0.413	0.330	0.579	0.248	0.248	0.165	0.083	0.083
681 Terminalia crenulata	8.018	4.463	1.240	1.157	0.744	0.165	0.083	0.083	0.083
684 Terminalia paniculata	15.125	7.521	3.471	1.240	1.240	0.744	0.496	0.165	0.248
710 Vitex altissima	2.397	0.909	0.744	0.496	0.248	0.000	0.000	0.000	0.000
725 Xylia xylocarpa	12.149	7.603	3.058	0.661	0.413	0.331	0.083	0.000	0.000
736 Aporasa lindleyana	2.646	1.322	0.827	0.248	0.083	0.083	0.083	0.000	0.000
737 Tabernaemontana dichotoma	1.901	1.570	0.331	0.000	0.000	0.000	0.000	0.000	0.000
811 Misc. species	85.041	47.273	16.942	8.595	4.545	2.893	1.983	0.992	1.818
All Species Total	210.267	116.865	44.879	20.831	12.977	6.284	3.968	1.820	2.660

Table 4.5.4

Stand Table showing Stems per Hectare in the Tree Forests of Bhadravati Division

(No. of Sample Plots 45; Area 453690 ha)

Species Description	Diameter Classes (in cm.)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
063 Anogeissus latifolia	7.333	4.000	2.667	0.444	0.222	0.000	0.000	0.000	0.000
116 Buchanania latifolia	0.666	0.444	0.222	0.000	0.000	0.000	0.000	0.000	0.000
143 Careya arborea	1.555	1.555	0.000	0.000	0.000	0.000	0.000	0.000	0.000
220 Dalbergia latifolia	7.777	4.223	2.222	0.666	0.000	0.444	0.000	0.222	0.000
230 Dillenia pentagyna	1.111	0.889	0.222	0.000	0.000	0.000	0.000	0.000	0.000
240 Diospyros species	0.222	0.000	0.222	0.000	0.000	0.000	0.000	0.000	0.000
336 Grewia tiliaefolia	0.444	0.222	0.000	0.000	0.222	0.000	0.000	0.000	0.000
393 Kydia calycina	0.888	0.666	0.000	0.222	0.000	0.000	0.000	0.000	0.000
396 Lagerstroemia parviflora	0.666	0.222	0.444	0.000	0.000	0.000	0.000	0.000	0.000
437 Madhuca latifolia	0.222	0.222	0.000	0.000	0.000	0.000	0.000	0.000	0.000
567 Pterocarpus marsupium	1.333	0.444	0.889	0.000	0.000	0.000	0.000	0.000	0.000
596 Randia dumetorum	0.444	0.222	0.000	0.222	0.000	0.000	0.000	0.000	0.000
628 Schleichera trijuga	1.999	0.889	0.222	0.444	0.444	0.000	0.000	0.000	0.000
673 Tectona grandis	21.334	15.778	3.333	1.334	0.889	0.000	0.000	0.000	0.000
676 Terminalia belerica	0.444	0.000	0.000	0.444	0.000	0.000	0.000	0.000	0.000

Contd...

1	2	3	4	5	6	7	8	9	10
681 Terminalia crenulata	7.110	5.778	0.888	0.000	0.000	0.222	0.000	0.222	0.000
684 Terminalia paniculata	4.888	3.778	0.444	0.222	0.222	0.000	0.000	0.222	0.000
725 Xylia xylocarpa	3.555	1.778	0.444	1.111	0.222	0.000	0.000	0.000	0.000
811 Misc. species	45.775	33.555	6.444	3.111	1.333	0.444	0.222	0.222	0.444
All Species Total	107.775	74.665	18.663	8.220	3.554	1.110	0.222	0.888	0.444

Table 4.5.5

Stand Table showing Stem per Hectare in Teak Forests

(No. of Sample Plots 31; Area 31254 ha.)

Species Description	Diameter Classes (in cm)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
063 Anogeissus latifolia	2.581	1.290	0.645	0.645	0.000	0.000	0.000	0.000	0.000
116 Buchanania latifolia	0.323	0.323	0.000	0.000	0.000	0.000	0.000	0.000	0.000
143 Careya arborea	1.613	1.613	0.000	0.000	0.000	0.000	0.000	0.000	0.000
220 Dalbergia latifolia	11.935	6.709	2.903	0.000	0.000	0.323	0.000	0.000	0.000
230 Dillenia pentagyna	0.646	0.323	0.000	0.323	0.000	0.000	0.000	0.000	0.000
336 Grewia tiliaefolia	1.614	1.291	0.000	0.323	0.000	0.000	0.000	0.000	0.000
393 Kydia calycina	0.646	0.323	0.000	0.323	0.000	0.000	0.000	0.000	0.000
396 Lagerstroemia parviflora	9.355	7.742	1.290	0.323	0.000	0.000	0.000	0.000	0.000
437 Madhuca latifolia	0.323	0.323	0.000	0.000	0.000	0.000	0.000	0.000	0.000
567 Pterocarpus marsupium	1.613	0.323	0.968	0.000	0.000	0.000	0.323	0.000	0.000
596 Randia dumetorum	0.323	0.000	0.000	0.323	0.000	0.000	0.000	0.000	0.000
673 Tectona grandis	134.839	95.161	30.000	7.420	2.258	0.000	0.000	0.000	0.000
676 Terminalia belerica	0.323	0.000	0.000	0.323	0.000	0.000	0.000	0.000	0.000
681 Terminalia crenulata	9.356	9.033	0.323	0.000	0.000	0.000	0.000	0.000	0.000
684 Terminalia paniculata	13.226	11.613	1.613	0.000	0.000	0.000	0.000	0.000	0.000

Contd....

Contents

1	2	3	4	5	6	7	8	9	10
725 Xylia xylocarpa	10.646	9.355	1.291	0.000	0.000	0.000	0.000	0.000	0.000
737 Tabernaemontana dichotoma	0.323	0.323	0.000	0.000	0.000	0.000	0.000	0.000	0.000
811 Misc. species	28.387	21.936	4.193	1.290	0.968	0.000	0.000	0.000	0.000
All species total	228.072	169.681	43.226	11.293	3.226	0.323	0.323	0.000	0.000

Table 4.5.6

Stand Table showing Stems per Hectare in Miscellaneous Forests

(No. of Sample Plots 3; Area 3025 ha.)

Species Description	Diameter Classes (in cm)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
063 Anogeissus latifolia	2.500	2.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000
673 Tectona grandis	20.000	10.000	5.000	5.000	0.000	0.000	0.000	0.000	0.000
811 Misc. species	60.000	40.000	12.500	7.500	0.000	0.000	0.000	0.000	0.000
All Species Total	82.500	52.500	17.500	12.500	0.000	0.000	0.000	0.000	0.000

Table 4.5.7

Stand Table showing Stems per Hectare in the Western Ghat Evergreen Forests

(No. of Sample Plots 93; Area 93763 ha.)

Species Description	Diameter Classes (in cm)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
052 Alstonia scholaris	4.398	2.088	0.550	0.880	0.440	0.330	0.000	0.000	0.110
116 Buchanania latifolia	0.110	0.000	0.110	0.000	0.000	0.000	0.000	0.000	0.000
143 Careya arborea	1.430	0.880	0.440	0.110	0.000	0.000	0.000	0.000	0.000
177 Cinnamomum wightii	5.055	2.965	0.880	0.440	0.440	0.220	0.000	0.000	0.110
220 Dalbergia latifolia	0.440	0.110	0.330	0.000	0.000	0.000	0.000	0.000	0.000
230 Dillenia pentagyna	2.416	0.878	0.439	0.440	0.549	0.110	0.000	0.000	0.000
240 Diospyros species	7.143	4.396	1.978	0.659	0.000	0.000	0.110	0.000	0.000
243 Dipterocarpus	6.899	3.940	1.534	0.438	0.768	0.220	0.000	0.000	0.000
336 Grewia tiliaefolia	1.759	0.330	0.220	0.330	0.549	0.110	0.220	0.000	0.000
364 Hopea wightiana	16.043	8.791	4.725	1.538	0.659	0.110	0.000	0.110	0.110
393 Kydia calycina	0.990	0.660	0.220	0.000	0.110	0.000	0.000	0.000	0.000
396 Lagerstroemia lanceolata	5.931	0.880	1.208	1.318	1.098	0.330	0.768	0.330	0.000
437 Madhuca latifolia	2.199	1.649	0.550	0.000	0.000	0.000	0.000	0.000	0.000
474 Mimusops elengi	3.076	1.427	0.549	0.330	0.110	0.330	0.000	0.220	0.110

Contd....

1	2	3	4	5	6	7	8	9	10
490 Myristica species	11.427	6.042	2.967	1.429	0.879	0.110	0.000	0.000	0.000
542 Poeciloneuron indicum	11.978	7.252	2.418	0.989	0.989	0.220	0.110	0.000	0.000
567 Pterocarpus marsupium	0.220	0.000	0.000	0.000	0.110	0.110	0.000	0.000	0.000
596 Randia dumetorum	2.088	1.538	0.330	0.220	0.000	0.000	0.000	0.000	0.000
628 Schleichera trijuga	18.899	10.657	4.176	3.077	0.769	0.110	0.000	0.110	0.000
665 Syzygium cumini	4.945	1.318	1.209	0.879	0.440	0.659	0.220	0.000	0.220
676 Terminalia belerica	1.760	0.110	0.330	0.660	0.220	0.110	0.220	0.000	0.110
681 Terminalia crenulata	0.550	0.220	0.220	0.110	0.000	0.000	0.000	0.000	0.000
684 Terminalia paniculata	8.121	3.623	2.303	1.095	0.440	0.220	0.220	0.220	0.000
710 Vitex altissima	4.067	1.538	1.209	0.880	0.330	0.110	0.000	0.000	0.000
725 Xylia xylocarpa	1.869	0.550	0.549	0.440	0.220	0.000	0.110	0.000	0.000
736 Aporasa lindleyana	5.496	3.407	1.429	0.330	0.110	0.110	0.110	0.000	0.000
737 Tabernaemontana dichotoma	7.363	4.725	1.648	0.550	0.440	0.000	0.000	0.000	0.000
811 Misc. species	187.013	103.512	35.706	20.546	11.647	6.702	3.846	1.648	3.407
All species total	323.685	173.485	68.226	37.688	21.316	10.221	5.934	2.638	4.177

Table 4.5.8

Stand Table showing Stems per Hectare in the Western Ghat Semi-evergreen Forests.

(No. of Plots Area 185509 ha)

Species Description	Diameter Classes (in cm)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
052 Alstonia scholaris	0.761	0.489	0.163	0.000	0.109	0.000	0.000	0.000	0.000
116 Buchanania latifolia	1.739	1.196	0.435	0.108	0.000	0.000	0.000	0.000	0.000
143 Careya arborea	5.434	4.239	0.978	0.163	0.054	0.000	0.000	0.000	0.000
177 Cinnamomum wightii	2.227	1.304	0.326	0.380	0.054	0.109	0.054	0.000	0.000
220 Dalbergia latifolia	1.738	0.434	0.652	0.435	0.109	0.054	0.000	0.000	0.054
230 Dillenia pentagyna	3.206	1.087	0.815	0.652	0.380	0.163	0.109	0.000	0.000
240 Diospyros species	0.869	0.706	0.109	0.054	0.000	0.000	0.000	0.000	0.000
336 Grewia tiliaefolia	1.846	0.489	0.489	0.543	0.217	0.000	0.054	0.054	0.000
364 Hopea wightiana	2.881	1.305	1.087	0.272	0.054	0.109	0.054	0.000	0.000
393 Kydia calycina	0.706	0.435	0.217	0.054	0.000	0.000	0.000	0.000	0.000
396 Lagerstroemia lanceolata	4.454	1.121	0.760	0.978	0.924	0.326	0.217	0.054	0.054
437 Madhuca latifolia	1.956	1.033	0.544	0.271	0.054	0.000	0.000	0.000	0.054
474 Mimusops elengi	1.413	0.489	0.272	0.272	0.054	0.163	0.109	0.000	0.054
490 Myristica species	1.196	0.652	0.217	0.218	0.000	0.109	0.000	0.000	0.000
57 Pterocarpus marsupium	2.337	0.434	0.544	0.489	0.707	0.000	0.109	0.000	0.054

Contd...

Contents

1	2	3	4	5	6	7	8	9	10
596 Randia dumetorum	2.173	1.848	0.217	0.108	0.000	0.000	0.000	0.000	0.000
628 Schleichera trijuga	5.056	2.772	1.196	0.544	0.272	0.109	0.109	0.054	0.000
665 Syzygium cumini	4.186	2.065	0.598	0.707	0.435	0.109	0.109	0.000	0.163
673 Tectona grandis	0.271	0.271	0.054	0.000	0.000	0.000	0.000	0.000	0.000
676 Terminalia belerica	2.010	0.217	0.381	0.380	0.326	0.326	0.163	0.054	0.163
681 Terminalia crenulata	15.761	8.512	3.370	2.500	1.087	0.326	0.109	0.054	0.163
684 Terminalia paniculata	18.914	9.239	4.457	2.120	1.467	0.870	0.489	0.109	0.163
710 Vitex altissima	1.738	0.597	0.272	0.326	0.326	0.217	0.000	0.000	0.000
725 Xylia xylocarpa	11.956	5.869	4.239	0.870	0.598	0.326	0.000	0.054	0.000
736 Aporosa lindleyana	7.826	4.565	2.174	0.924	0.109	0.054	0.000	0.000	0.000
737 Tabernaemontana dichotoma	3.260	1.956	0.815	0.272	0.163	0.054	0.000	0.000	0.000
311 Misc. species	71.197	40.598	13.098	7.392	3.804	2.446	1.575	0.924	1.359
All species total	177.111	93.528	38.479	21.032	11.303	5.870	3.261	1.357	2.281

Contents

Table 4.5.9

Stand Table showing Stems per Hectare in the Deciduous Forests

(No. of Sample Plots 107; Area 107877 ha)

Species Description	Diameter Classes (in cm)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
063 Anogeissus latifolia	6.414	3.019	2.264	0.943	0.094	0.094	0.000	0.000	0.000
116 Buchanania latifolia	2.168	1.603	0.471	0.094	0.000	0.000	0.000	0.000	0.000
143 Careya arborea	1.981	1.792	0.189	0.000	0.000	0.000	0.000	0.000	0.000
220 Dalbergia latifolia	2.642	0.755	0.944	0.566	0.094	0.189	0.000	0.094	0.000
230 Dillenia pentagyna	1.414	0.849	0.283	0.188	0.000	0.000	0.000	0.094	0.000
240 Diospyros species	0.188	0.000	0.188	0.000	0.000	0.000	0.000	0.000	0.000
336 Grewia tiliaefolia	2.171	1.038	0.472	0.378	0.283	0.000	0.000	0.000	0.000
393 Kydia calycina	3.020	1.510	1.227	0.189	0.000	0.094	0.000	0.000	0.000
396 Lagerstroemia parviflora	3.208	1.698	0.189	1.038	0.094	0.189	0.000	0.000	0.000
437 Madhuca latifolia	0.282	0.094	0.000	0.188	0.000	0.000	0.000	0.000	0.000
474 Mimusops elengi	0.283	0.094	0.189	0.000	0.000	0.000	0.000	0.000	0.000
567 Pterocarpus marsupium	1.508	0.472	0.188	0.566	0.094	0.094	0.094	0.000	0.000
596 Randia dumetorum	2.264	1.604	0.471	0.000	0.189	0.000	0.000	0.000	0.000
628 Schleichera trijuga	1.320	0.660	0.188	0.283	0.189	0.000	0.000	0.000	0.000

Contd...

1	2	3	4	5	6	7	8	9	10
665 Syzygium cumini	0.754	0.094	0.283	0.094	0.189	0.000	0.094	0.000	0.000
673 Tectona grandis	3.112	1.981	0.566	0.000	0.377	0.000	0.094	0.094	0.000
676 Terminalia belerica	1.321	0.472	0.283	0.283	0.189	0.000	0.094	0.000	0.000
681 Terminalia crenulata	12.358	6.792	3.207	1.793	0.189	0.283	0.000	0.094	0.000
684 Terminalia paniculata	11.603	6.132	2.075	1.698	0.755	0.377	0.377	0.189	0.000
710 Vitex altissima	0.094	0.000	0.094	0.000	0.000	0.000	0.000	0.000	0.000
725 Xylia xylocarpa	14.811	7.642	4.811	1.981	0.377	0.000	0.000	0.000	0.000
736 Aporosa lindleyana	0.094	0.000	0.000	0.000	0.000	0.094	0.000	0.000	0.000
737 Tabernaemontana dichotoma	0.094	0.094	0.000	0.000	0.000	0.000	0.000	0.000	0.000
811 Misc. Species	40.471	27.453	6.603	2.925	1.132	0.472	0.943	0.377	0.566
All species total	113.575	65.848	25.185	13.207	4.245	1.886	1.696	0.942	0.566

Table 4.6.1

Stock Table showing Total Volume in the Tree Forests

(Number of Sample Plots 418; Forest Area 421428 ha.)

Species Description	Diameter Classes (in cm)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
177 Cinnamomum wightii									
Total	562744	56639	62718	102120	73211	101306	36728	0	130022
Per ha	1.336	0.135	0.148	0.243	0.174	0.240	0.087	0.000	0.309
220 Dalbergia latifolia									
Total	598941	70866	130890	131477	53375	106426	0	44988	60919
Per ha	1.423	0.168	0.311	0.312	0.127	0.253	0.000	0.107	0.145
230 Dillenia pentagyna									
Total	622861	34758	66501	150369	173478	89802	60712	47241	0
Per ha	1.478	0.082	0.158	0.357	0.412	0.213	0.144	0.112	0.000
336 Grewia tiliaefolia									
Total	560069	28859	58670	140305	169979	18863	100086	43307	0
Per ha	1.328	0.068	0.139	0.333	0.403	0.045	0.237	0.103	0.000
364 Hopea wightiana									
Total	343658	78509	85034	50328	35321	26005	11691	24438	32332
Per ha	0.816	0.186	0.202	0.119	0.084	0.062	0.028	0.058	0.077
396 Lagerstroemia parviflora									
Total	1741529	58851	112549	342026	408062	227546	356511	175911	60073
Per ha	4.132	0.140	0.267	0.811	0.968	0.540	0.846	0.417	0.143
567 Pterocarpus marsupium									
Total	657979	15128	54023	122281	209873	45935	129399	0	81340
Per ha	1.561	0.036	0.128	0.290	0.498	0.109	0.307	0.000	0.193

Contd....

Contents

1	2	3	4	5	6	7	8	9	10
628 Schleichera trijuga									
Total	1527112	186735	320303	452121	285396	89850	84486	108221	0
Per ha	3.623	0.443	0.760	1.073	0.677	0.213	0.200	0.257	0.000
665 Syzygium cumini									
Total	526296	38040	36610	62453	68468	68612	69969	0	182144
Per ha	1.248	0.090	0.087	0.148	0.162	0.163	0.166	0.000	0.432
673 Tectona grandis									
Total	678681	84851	266432	149365	120523	0	21809	35701	0
Per ha	1.611	0.201	0.632	0.355	0.286	0.000	0.052	0.085	0.000
676 Terminalia belerica									
Total	456462	7779	18906	46209	50931	62871	74182	24438	171146
Per ha	1.083	0.018	0.045	0.100	0.121	0.149	0.176	0.058	0.406
681 Terminalia crenulata									
Total	2225252	408049	390888	539367	312200	203090	70409	95192	206057
Per ha	5.280	0.968	0.927	1.180	0.741	0.482	0.167	0.226	0.489
684 Terminalia paniculata									
Total	3235851	256545	477021	510222	581065	493224	476548	263915	177311
Per ha	7.679	0.609	1.132	1.211	1.379	1.170	1.131	0.626	0.421
710 Vitex altissima									
Total	494325	42608	67480	119354	142287	122596	0	0	0
Per ha	1.174	0.101	0.161	0.283	0.338	0.291	0.000	0.000	0.000
725 Xylia xylocarpa									
Total	1693613	363989	514795	333175	250245	140723	34570	56116	0
Per ha	4.018	0.864	1.221	0.790	0.594	0.334	0.082	0.133	0.000
811 Misc. species Total	15702238	2215290	1458546	1461119	1374986	1383345	1400171	921624	5487157
Per ha	37.260	5.256	3.464	3.464	3.263	3.283	3.322	2.187	13.020
All species total									
Total	31627611	3947496	4121366	4712291	4309400	3180194	2927271	1841092	6588501
Per ha	75.049	9.365	9.782	11.179	10.227	7.547	6.945	4.369	15.634

Contents

Table 4.6.2

Stock Table showing Volume/ha in the Tree Forests of Sagar Division

(No. of Sample Plots 252; Area 252050 ha)

Species Description	Diameter Classes (in cm)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
177 Cinnamomum wightii	1.318	0.188	0.186	0.378	0.123	0.298	0.145	0.000	0.000
230 Dillenia pentagyna	1.243	0.119	0.187	0.253	0.316	0.181	0.000	0.187	0.000
336 Grewia tiliaefolia	0.872	0.074	0.159	0.254	0.269	0.000	0.116	0.000	0.000
396 Lagerstroemia parviflora	4.364	0.113	0.239	1.032	1.003	0.655	0.733	0.352	0.327
567 Pterocarpus marsupium	1.725	0.046	0.081	0.391	0.430	0.078	0.378	0.000	0.321
628 Schleichera trijuga	4.012	0.586	0.892	1.376	0.640	0.114	0.181	0.223	0.000
665 Syzygium cumini	1.392	0.043	0.098	0.146	0.180	0.145	0.276	0.000	0.504
676 Terminalia belerica	1.017	0.015	0.052	0.085	0.143	0.142	0.201	0.000	0.379
681 Terminalia crenulata	6.006	1.128	1.249	1.653	0.720	0.562	0.142	0.000	0.552
684 Terminalia paniculata	7.500	0.640	1.231	1.553	1.360	1.108	1.105	0.503	0.000
710 Vitex altissima	1.375	0.091	0.145	0.259	0.396	0.484	0.000	0.000	0.000
725 Xylia xylocarpa	4.193	0.815	1.461	0.858	0.637	0.200	0.000	0.222	0.000
811 Misc. species	43.109	6.030	4.354	4.658	3.881	3.989	3.495	2.348	14.354
All species total	78.126	9.888	10.334	12.896	10.098	7.956	6.772	3.835	15.917

Table 4.6.3

Stock Table showing Volume/Ha in the Tree Forests of Shimoga Division

(No. of Sample Plots 121; Area 121992 ha)

Species Description	Diameter Classes (in cm)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
052 Alstonia scholaris	1.922	0.078	0.042	0.016	0.171	0.083	0.000	0.000	1.532
177 Cinnamomum wightii	1.867	0.073	0.127	0.053	0.343	0.210	0.000	0.000	1.061
220 Dalbergia latifolia	1.745	0.295	0.278	0.153	0.312	0.210	0.000	0.000	0.497
230 Dillenia pentagyna	2.480	0.025	0.135	0.704	0.762	0.359	0.495	0.000	0.000
336 Grewia tiliaefolia	2.640	0.071	0.150	0.619	0.715	0.154	0.578	0.353	0.000
364 Hopea wightiana	1.129	0.223	0.239	0.215	0.124	0.129	0.000	0.199	0.000
396 Lagerstroemia parviflora	5.099	0.238	0.340	0.659	1.257	0.504	1.394	0.707	0.000
567 Pterocarpus marsupium	1.647	0.012	0.131	0.190	0.825	0.214	0.275	0.000	0.000
628 Schleichera trijuga	3.554	0.270	0.726	0.664	0.658	0.498	0.316	0.422	0.000
665 Syzygium cumini	1.417	0.222	0.096	0.207	0.187	0.260	0.000	0.000	0.445
673 Tectona grandis	2.891	0.363	1.439	0.637	0.452	0.000	0.000	0.000	0.000
676 Terminalia belerica	1.576	0.032	0.045	0.157	0.120	0.219	0.191	0.199	0.613
681 Terminalia crenulata	4.739	0.674	0.474	0.985	1.060	0.330	0.282	0.394	0.540
34 Terminalia paniculata	10.081	0.673	1.301	0.880	1.802	1.734	1.605	0.739	1.447

Contd...

1	2	3	4	5	6	7	8	9	10
710 Vitex altissima	1.191	0.159	0.250	0.440	0.342	0.000	0.000	0.000	0.000
725 Xylia xylocarpa	4.538	1.171	1.122	0.601	0.627	0.735	0.282	0.000	0.000
811 Misc. species	36.694	4.841	3.414	2.890	3.054	2.913	4.269	2.812	12.501
All species Total	85.806	9.519	10.432	10.130	12.855	8.631	9.778	5.825	18.636

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Table 4.6.4

Stock Table showing Volume/ha in the Tree Forest of Bhadravati Division

(No. of Sample Plots 45; Area 453690 ha)

Species Description	Diameter Classes (in cm)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
063 Anogeissus latifolia	2.378	0.699	0.954	0.396	0.329	0.000	0.000	0.000	0.000
220 Dalbergia latifolia	4.306	0.675	0.798	0.616	0.000	1.230	0.000	0.987	0.000
336 Grewia tiliaefolia	0.337	0.027	0.000	0.000	0.310	0.000	0.000	0.000	0.000
567 Pterocarpus marsupium	0.426	0.043	0.383	0.000	0.000	0.000	0.000	0.000	0.000
628 Schleichera trijuga	1.662	0.113	0.121	0.491	0.937	0.000	0.000	0.000	0.000
673 Tectona grandis	3.040	0.448	0.847	0.845	0.900	0.000	0.000	0.000	0.000
681 Terminalia crenulata	2.710	0.873	0.365	0.000	0.000	0.444	0.000	1.028	0.000
684 Terminalia paniculata	1.943	0.267	0.130	0.196	0.343	0.000	0.000	1.007	0.000
725 Xylia xylocarpa	1.661	0.309	0.160	0.930	0.262	0.000	0.000	0.000	0.000
811 Misc. species	10.345	2.624	1.176	1.027	0.783	0.678	0.307	0.394	3.356
All species total	28.808	6.078	4.934	4.501	3.864	2.352	0.307	3.416	3.356

Table 4.6.5

Stock Table showing Volume/ha in the Tree Forests

(No. of Sample Plots 31; Area 31254 ha)

Species Description	Diameter Classes (in cm)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
063 Anogeissus latifolia	0.870	0.182	0.255	0.433	0.000	0.000	0.000	0.000	0.000
220 Dalbergia latifolia	3.176	1.362	0.995	0.000	0.000	0.819	0.000	0.000	0.000
230 Dillenia pentagyna	0.331	0.028	0.000	0.303	0.000	0.000	0.000	0.000	0.000
336 Grewia tiliaefolia	0.474	0.152	0.000	0.322	0.000	0.000	0.000	0.000	0.000
396 Lagerstroemia parviflora	1.357	0.580	0.493	0.284	0.000	0.000	0.000	0.000	0.000
567 Pterocarpus marsupium	1.323	0.039	0.384	0.000	0.000	0.000	0.900	0.000	0.000
673 Tectona grandis	16.906	2.465	7.719	4.339	2.383	0.000	0.000	0.000	0.000
681 Terminalia crenulata	1.462	1.298	0.164	0.000	0.000	0.000	0.000	0.000	0.000
684 Terminalia paniculata	1.426	0.839	0.587	0.000	0.000	0.000	0.000	0.000	0.000
725 Xylia xylocarpa	1.831	1.385	0.446	0.000	0.000	0.000	0.000	0.000	0.000
811 Misc. species	3.604	1.961	0.599	0.581	0.463	0.000	0.000	0.000	0.000
All species total	32.760	10.291	11.642	6.262	2.846	0.819	0.900	0.000	0.000

Contents

Table [illegible].6

Stock Table showing Volume/ha in the Miscellaneous Forests

(No. of Sample Plots 3; Area 3025 ha)

Species Description	Diameter Classes (in cm)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
673 Tectona grandis	5.462	0.855	1.378	3.229	0.000	0.000	0.000	0.000	0.000
811 Misc. species	10.708	4.080	2.889	3.739	0.000	0.000	0.000	0.000	0.000
All species total	16.170	4.935	4.267	6.968	0.000	0.000	0.000	0.000	0.000

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Table 4.6.7

Stock Table showing Volume/ha in the Western Ghat Evergreen Forests

(No. of Sample Plots 93; Area 93763 ha)

Species Description	Diameter Classes (in cm)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
052 Alstonia scholaris	2.998	0.151	0.075	0.229	0.207	0.299	0.000	0.000	2.037
177 Cinnamomum wightii	3.816	0.306	0.352	0.414	0.637	0.517	0.000	0.000	1.410
230 Dillenia pentagyna	1.644	0.073	0.151	0.322	0.835	0.263	0.000	0.000	0.000
336 Grewia tiliaefolia	2.072	0.044	0.060	0.222	0.820	0.205	0.721	0.000	0.000
364 Hopea wightiana	2.679	0.648	0.607	0.405	0.317	0.086	0.000	0.265	0.351
396 Lagerstroemia lanceolata	7.920	0.094	0.452	1.094	1.660	0.661	2.521	1.438	0.000
474 Mimusops elengi	1.628	0.097	0.059	0.083	0.062	0.305	0.000	0.414	0.608
490 Myristica species	1.667	0.419	0.371	0.400	0.391	0.086	0.000	0.000	0.000
542 Poeciloneuron indicum	1.876	0.529	0.340	0.244	0.445	0.173	0.145	0.000	0.000
628 Schleichera trijuga	9.203	1.282	2.188	3.317	1.530	0.325	0.000	0.561	0.000
665 Syzygium cumini	2.605	0.102	0.166	0.247	0.193	0.572	0.359	0.000	0.966
684 Terminalia paniculata	4.749	0.336	0.792	0.817	0.647	0.527	0.647	0.983	0.000
710 Vitex altissima	2.187	0.249	0.430	0.762	0.516	0.230	0.000	0.000	0.000
811 Misc. spefies	82.585	9.682	6.861	7.431	7.844	7.237	7.697	4.091	31.742
All species total	127.449	14.012	12.004	15.987	16.104	11.486	12.090	7.752	37.114

Table 4.6.8

Stock Table showing Volume/ha in the Western Ghat Semi-evergreen Forests

(No. of Sample Plots 184; Area 185509 ha)

Species Description	Diameter Classes (in cm)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
177 Cinnamomum wightii	1.218	0.149	0.163	0.343	0.078	0.288	0.197	0.000	0.000
220 Dalbergia latifolia	1.384	0.075	0.238	0.401	0.205	0.138	0.000	0.000	0.327
230 Dillenia pentagyna	2.062	0.116	0.244	0.506	0.518	0.352	0.326	0.000	0.000
336 Grewia tiliaefolia	1.351	0.056	0.185	0.399	0.298	0.000	0.181	0.232	0.000
396 Lagerstroemia lanceolata	4.281	0.104	0.270	0.772	1.286	0.654	0.641	0.232	0.322
567 Pterocarpus marsupium	2.363	0.048	0.180	0.388	0.968	0.000	0.343	0.000	0.436
628 Schleichera trijuga	3.103	0.296	0.583	0.602	0.545	0.321	0.453	0.303	0.000
665 Syzygium cumini	1.347	0.149	0.087	0.194	0.210	0.085	0.123	0.000	0.499
676 Terminalia belerica	1.712	0.017	0.054	0.105	0.167	0.295	0.204	0.131	0.739
681 Terminalia crenulata	8.705	1.343	1.278	2.092	1.513	0.737	0.378	0.259	1.105
684 Terminalia paniculata	11.066	0.767	1.654	1.597	2.168	1.905	1.573	0.451	0.951
710 Vitex altissima	1.544	0.106	0.122	0.264	0.508	0.544	0.000	0.000	0.000
725 Xylia xylocarpa	5.195	0.955	1.605	0.712	0.867	0.755	0.000	0.301	0.000
736 Aporosa lindleyana	0.935	0.366	0.290	0.222	0.049	0.038	0.000	0.000	0.000
311 Misc. species	30.113	4.174	2.683	2.602	2.640	3.081	3.045	2.101	9.787
All species Total	76.379	8.691	9.636	11.199	12.020	9.193	7.464	4.010	14.166

Contents

Table 4.6.9

Stock Table showing Volume/ha in Deciduous Forests

(No. of Sample Plots 107; Area 107877 ha)

Species Description	Diameter Classes (in cm)								
	Total	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+
1	2	3	4	5	6	7	8	9	10
063 Anogeissus latifolia	2.425	0.500	0.804	0.793	0.140	0.188	0.000	0.000	0.000
220 Dalbergia latifolia	2.132	0.117	0.414	0.529	0.141	0.512	0.000	0.419	0.000
230 Dillenia pentagyna	0.724	0.044	0.083	0.157	0.000	0.000	0.000	0.440	0.000
336 Grewia tiliaefolia	0.954	0.088	0.174	0.329	0.363	0.000	0.000	0.000	0.000
396 Lagerstroemia parviflora	1.511	0.117	0.049	0.822	0.106	0.417	0.000	0.000	0.000
567 Pterocarpus marsupium	1.226	0.046	0.079	0.465	0.106	0.184	0.346	0.000	0.000
628 Schleichera trijuga	0.924	0.115	0.093	0.318	0.398	0.000	0.000	0.000	0.000
673 Tectona grandis	1.157	0.047	0.149	0.000	0.426	0.000	0.203	0.332	0.000
681 Terminalia crenulata	5.027	1.057	1.311	1.331	0.281	0.611	0.000	0.436	0.000
684 Terminalia paniculata	6.442	0.505	0.704	1.323	1.093	0.835	1.151	0.831	0.000
725 Xylia xylocarpa	5.045	1.242	1.749	1.546	0.508	0.000	0.000	0.000	0.000
811 Misc. species	14.649	2.565	1.408	1.071	1.012	0.809	1.918	1.068	4.798
All species Total	42.216	6.443	7.017	8.684	4.574	3.556	3.618	3.526	4.798

Contents

Table 4.7.2

Mean Number of Bamboo Culms per Hectare by Quality and Clump Size Classes

Species	Quality	Clump Size Classes			Total
		Small	Medium	Large	
Dendrocalamus strictus	I	53.026	32.237	5.395	90.658
	II & III	90.000	20.909	-	110.909
Bambusa arundinacea	I	17.647	8.824	2.549	29.020
	II & III	16.852	4.444	0.741	22.037

Table 4.7.3

Mean Number of Bamboo Culms per Clump by Quality of Clump and its Soundness

Species	Quality class	Clump size class	Soundness					Total
			Green Sound	Green damaged	Dry Sound	Dry Damaged	Decayed	
Bambusa arundinacea		Small	2.901	2.227	0.045	0.545	0.091	4.991
		Medium	7.800	3.367	0.200	1.333	0.533	13.733
		Large	9.600	15.400	-	1.600	0.400	27.000
		Total	19.491	20.994	0.245	3.478	1.024	45.724
	II & III	Small	2.853	2.407	0.111	0.556	0.037	5.864
		Medium	3.429	5.286	0.286	1.143	0.571	10.715
		Large	14.000	1.000	-	3.000	-	18.000
		Total	20.282	8.693	0.397	4.699	0.608	34.579
Dendrocalamus strictus		Small	2.783	3.633	0.617	1.533	1.567	9.733
		Medium	10.979	6.170	1.532	4.575	2.574	25.830
		Large	19.714	7.000	8.000	8.286	0.571	44.571
		Total	33.476	16.803	10.149	14.394	4.392	80.134
	II & III	Small	4.769	0.770	0.538	2.000	1.308	9.385
		Medium	7.250	3.500	-	1.750	1.000	13.500
		Total	12.019	4.270	0.538	3.750	2.308	22.885

Contents

Table 4.7.4

Mean Number of Bamboo Culms/Clump by Age of Culm

Species	Bamboo quality	Clump size	Age of Culm						Total
			Current year	One to two seasons old	Over two seasons old	Dry Sound	Dry damaged	Decayed	
Bambusa arundinacea	I	Small	0.409	1.681	2.228	0.045	0.545	0.091	4.999
		Medium	3.000	4.200	4.467	0.200	1.333	0.533	13.733
		Large	0.200	0.800	24.000	-	1.600	0.400	27.000
	II & III	Small	0.852	2.630	1.778	0.111	0.556	0.037	5.964
		Medium	1.571	3.429	3.715	0.286	1.143	0.571	10.715
		Large	4.000	4.000	7.000	-	3.000	-	18.000
Dendrocalamus strictus		Small	1.166	1.850	3.400	0.617	1.533	1.167	9.733
		Medium	2.213	3.426	11.510	1.532	4.575	2.574	25.830
		Large	4.000	4.142	18.572	8.000	8.286	1.571	44.571
	II & III	Small	1.308	1.462	2.769	0.538	2.000	1.308	9.385
		Medium	1.000	4.750	5.000	-	1.750	1.000	13.500

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Table 4.7.5

Mean Number of Bamboo Culms per Hectare by Soundness

Species	Bamboo Quality	Clump size class	Soundness					Total
			Green Sound	Green damaged	Dry sound	Dry damaged	Decayed	
Bambusa arundinacea	I	Small	36.900	39.300	0.794	9.618	1.606	88.218
		Medium	68.827	34.122	1.765	11.762	4.703	121.179
		Large	24.470	39.255	-	4.078	1.020	68.823
	II & III	Small	48.079	40.563	1.871	9.370	0.624	100.507
		Medium	15.238	23.491	1.271	5.079	2.538	47.617
		Large	10.374	0.741	-	2.223	-	13.338
Dendrocalamus strictus	I	Small	147.571	192.643	32.717	81.289	61.881	510.101
		Medium	353.930	198.902	49.387	147.484	82.978	832.681
		Large	106.357	37.765	43.160	44.703	8.476	240.461
	II & III	Small	429.210	69.300	48.420	180.000	117.720	844.650
		Medium	151.590	73.182	-	36.591	20.909	282.272

Contents

Table 4.7.6

Mean Number of Bamboo Culms per Hectare by Age of Culm

Species	Bamboo Quality	Clump Size Class	Age of Culm						Total
			Current season's	One to two seasons old	Over two seasons old	Dry Sound	Dry Damaged	Decayed	
Bambusa arundinacea	I	Small	7.217	29.665	39.318	0.794	9.618	1.606	88.218
		Medium	24.472	37.060	39.417	1.765	11.762	4.703	121.179
		Large	0.510	2.039	61.176	-	4.078	1.020	68.823
	II & III	Small	14.358	44.321	29.963	1.871	9.370	0.624	100.507
		Medium	6.982	15.238	16.509	1.271	5.079	2.538	47.617
		Large	2.964	2.964	5.187	-	2.223	-	13.338
Dendrocalamus strictus	I	Small	61.828	98.098	180.288	32.717	81.289	61.881	516.101
		Medium	71.340	110.444	371.048	49.381	147.484	82.978	832.681
		Large	21.580	22.346	100.196	43.160	44.703	8.476	240.461
	II & III	Small	117.720	131.580	249.210	48.420	180.000	117.720	844.650
		Medium	20.909	99.318	104.545	-	36.591	20.909	282.272

Contents

Table 4.7.7

Total Number of Culms in the Bamboo Area by Soundness Classes (in thousands of culms)

Species	Quality classes	Clump size class	Soundness					Total
			Green Sound	Green Damaged	Dry Sound	Dry Damaged	Decayed	
Bambusa arundinacea	I	Small	1897.324	2020.727	49.826	494.538	82.577	4535.993
		Medium	3538.947	1754.485	90.753	604.779	241.819	6230.782
		Large	1258.198	2018.414	-	209.683	52.446	3538.741
	II & III	Small	2617.565	2208.371	101.863	410.131	33.972	5471.903
		Medium	829.602	1278.921	69.197	276.516	138.176	2592.412
		Large	564.792	40.342	-	121.026	-	726.161
Dendrocalamus strictus	I	Small	11307.333	14760.885	2506.875	6228.607	4741.508	39545.207
		Medium	27119.178	15240.468	3784.180	11300.667	6358.023	63802.516
		Large	8149.392	2893.668	3307.049	3425.278	649.451	18424.843
	II & III	Small	4759.939	768.537	536.978	1996.200	1305.505	9367.169
		Medium	1681.133	811.588	-	405.794	231.881	3130.396

Contents

Table 4.7.8

Total Number of Culms by Age Class (in thousands of culms)

Species	Quality class	Clump size class	Current year's	One to two seasons old	Over two seasons old	Dry Culms	Total
Bambusa arundinacea	I	Small	371.084	1525.315	2021.653	617.942	4535.993
		Medium	1361.137	1905.551	2026.743	937.350	6230.782
		Large	26.223	104.841	3145.548	262.129	3538.741
	II & III	Small	781.693	2412.968	1631.276	645.966	5471.903
		Medium	380.121	829.602	898.799	483.889	2592.412
		Large	161.369	161.369	282.396	121.027	726.161
Dendrocalamus strictus	I	Small	4737.447	7516.563	1381.421	13476.990	39545.207
		Medium	5466.285	8462.557	28430.810	21427.545	63802.516
		Large	1653.524	1712.218	7677.318	7381.783	18424.843
	II & III	Small	1305.515	1459.222	2763.739	3838.693	9367.169
		Medium	231.825	1101.437	1159.404	637.675	3130.396

Table 4.7.10

Bamboo Stock (in thousands of Tonnes)

Species	Bamboo quality	Clump size class	Current year			One to two season old			Over two season old			Dry sound	Dry damaged	Total
			Sound	Damaged	Total	Sound	Damaged	Total	Sound	Damaged	Total			
Bambusa arundinacea	I	Small	2.049	0.127	2.176	4.803	3.021	7.824	5.376	4.510	9.886	0.129	0.779	20.794
		Medium	7.318	0.563	7.881	14.692	1.220	15.912	8.600	11.213	19.813	0.286	1.198	45.090
		Large	-	0.457	0.457	0.914	1.454	2.368	21.698	22.711	44.409	-	1.061	48.295
	II & III	Small	3.378	0.738	4.116	10.416	2.848	13.264	3.589	3.460	7.049	0.321	0.804	25.554
		Medium	0.858	0.751	1.609	2.534	1.889	4.423	2.146	1.717	3.863	0.218	0.436	10.549
		Large	1.002	-	1.002	2.357	-	2.357	1.503	0.125	1.628	-	0.191	5.178
Dendrocalamus strictus	I	Small	14.366	6.048	20.414	12.484	14.752	27.236	36.312	20.462	56.774	8.108	10.055	122.587
		Medium	24.960	2.787	27.747	28.478	9.396	37.874	102.598	30.382	132.980	12.329	18.498	229.338
		Large	9.236	-	9,236	3.628	2.968	6.596	33.084	5.113	38.197	11.213	5.549	70.791
	II & III	Small	6.869	0.215	7.084	6.010	1.074	7.084	13.732	0.860	14.592	1.741	22.342	52.843
		Medium	6.712	1.119	7.831	24.610	8.949	33.559	33.559	5.593	39.152	-	4.542	85.084
G.Total			76.748	12.805	89.553	110.926	47.571	158.497	262.197	106.146	368.343	34.255	65.455	716.103

Table 4.7.11

Dry Weight Equivalent of Bamboo Stock (in thousands of Tonnes)

Species	Bamboo Quality	Clump size class	Current year			One to two season old			Over two season old			Dry sound	Dry damaged	Total
			Sound	Damaged	Total	Sound	Damaged	Total	Sound	Damaged	Total			
Bambusa arundinacea	I	Small	1.045	0.065	1.110	2.450	1.541	3.991	2.742	2.300	5.042	0.129	0.779	11.051
		Medium	3.732	0.287	4.019	4.852	0.622	5.474	4.221	4.982	9.203	0.286	1.198	20.180
		Large	-	0.233	0.233	0.466	0.599	1.065	10.498	10.092	20.590	-	1.061	22.949
	II & III	Small	1.723	0.376	2.009	5.318	1.452	6.770	1.830	1.765	3.595	0.321	0.804	13.589
		Medium	0.438	0.383	0.821	1.292	0.963	2.255	1.094	0.876	1.970	0.218	0.436	5.700
		Large	0.511	-	0.511	1.202	-	1.202	0.767	0.064	0.831	-	0.191	2.735
Dendrocalamus strictus	I	Small	8.332	3.508	11.840	7.241	8.556	15.979	21.061	11.868	32.429	8.108	10.055	78.729
		Medium	14.477	1.616	16.093	16.517	5.450	21.967	59.507	17.622	77.129	12.239	18.498	145.926
		Large	5.357	-	5.357	2.104	1.721	3.825	19.189	2.966	22.155	11.213	5.549	48.099
	II & III	Small	3.984	0.125	4.109	3.486	0.623	4.109	7.965	0.499	8.464	1.741	22.342	40.765
		Medium	3.893	0.649	4.542	14.274	5.190	19.464	19.464	3.244	22.708	-	4.542	51.256
G.Total			43.492	7.242	50.734	59.202	26.717	85.919	148.338	56.278	204.616	34.255	65.455	440.979

A P P E N D I C E S

Contents

APPENDIX - I

MAP SHEET COVERAGE OF SHIMOGA SURVEY AREA

48 J/12, 14, 15, 16
48 K/9, 13, 14
48 N/2, 3, 4, 7, 8, 11, 12
48 O/1, 2, 3, 5, 6, 9, 10
48 O/13
57 C/1

Sl. No.	Longitude E Latitude N of Plot Centre			Forest Division code	Land Use Code	Forest Type code	No.of trees enumerated in the sample plot of .1 ha.	Volume (M^3) in sample plot of .1 ha.
	Degree	Minute	Second					
1	2	3	4	5*	6*	7*	8	9
				Map Sheet No.48 J/12				
1.	74 14	41 01	33 25	16	02	22	027	16.922
2.	74 14	40 01	56 05	16	01	22	061	13.338
3.	74 14	42 02	40 07	16	02	23	018	2.898
4.	74 14	42 04	16 00	16	01	22	034	36.044
5.	74 14	43 03	34 43	16	02	23	069	8.027
6.	74 14	44 03	03 47	16	02	23	031	10.609
7.	74 14	39 06	00 05	16	01	22	051	11.509
8.	74 14	40 05	13 20	16	02	23	030	5.847
9.	74 14	42 07	16 09	16	01	22	062	20.072
10.	74 14	43 07	10 01	16	04	23	000	0.000
11.	74 14	38 09	20 01	16	01	22	000	0.000
12.	74 14	39 08	10 28	16	01	22	038	4.933
13.	74 14	41 08	35 03	16	01	22	020	10.050
14.	74 14	40 09	53 24	16	02	22	038	7.516
15.	74 14	42 07	56 59	16	03	23	020	1.458

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Contents

1	2	3	4	5	6	7	8	9
16.	74 14	44 11	20 54	16	02	23	000	0.000
			Map Sheet No.48 J/14					
17.	74 14	54 30	28 05	16	03	23	002	2.565
18.	74 14	55 30	44 13	16	03	23	015	2.113
			Map Sheet No.48 J/15					
19.	74 14	59 15	28 10	16	03	23	010	3.182
20.	74 14	54 17	35 42	16	13	-	000	0.000
21.	74 14	55 18	57 11	16	03	23	016	3.910
22.	74 14	56 27	39 03	16	13	-	-	0.000
23.	74 14	55 25	49 24	16	02	24	026	6.341
24.	74 14	59 26	40 42	16	03	24	000	0.000
25.	74 14	54 29	49 09	16	02	23	022	11.936
26.	74 14	55 29	19 26	16	13	-	-	0.000
27.	74 14	57 28	10 01	16	02	23	016	29.733
28.	74 14	57 28	56 55	16	13	-	-	0.000
			Map Sheet No. 48 J/16					
29.	74 14	46 01	48 13	16	02	24	022	2.094
30.	74 14	45 01	41 19	16	03	23	068	7.997
31.	74 14	47 01	50 37	16	03	23	005	0.303
32.	74 14	50 01	15 35	16	03	23	001	0.155
33.	74 14	53 00	43 41	16	07	23	004	1.425
34.	74 14	53 01	42 50	16	02	23	000	0.000
35.	74 14	59 00	49 08	16	16	-	-	0.000

Contd...

Contents

1	2	3	4	5	6	7	8	9
36.	74 14	57 02	38 23	16	03	24	011	1.410
37.	74 14	48 03	42 01	16	02	23	011	1.629
38.	74 14	48 04	14 27	16	04	23	002	0.145
39.	74 14	52 04	24 30	16	02	22	029	14.587
40.	74 14	50 02	06 59	16	02	22	031	16.485
41.	74 14	57 03	00 37	16	03	24	002	0.230
42.	74 14	57 03	54 37	16	01	23	064	18.825
43.	74 14	46 05	20 27	16	02	24	016	2.094
44.	74 14	46 07	10 03	16	03	24	000	0.000
45.	74 14	55 05	38 14	16	07	24	000	0.000
46.	74 14	45 08	49 42	16	01	22	040	15.232
47.	74 14	46 08	41 47	16	03	23	026	12.095
48.	74 14	48 08	22 10	16	03	23	010	1.388
49.	74 14	49 09	09 20	16	02	23	035	11.658
50.	74 14	50 08	14 12	16	03	23	000	0.000
51.	74 14	56 07	34 42	16	14	-	-	0.000
52.	74 14	55 09	57 48	16	03	23	004	2.839
53.	74 14	57 08	57 13	16	02	23	033	12.320
54.	74 14	52 11	17 06	16	07	23	051	3.686
55.	74 14	50 11	12 25	16	03	23	011	1.272
56.	74 14	56 10	03 12	16	02	22	044	16.477
57.	74 14	45 12	18 51	16	02	14	059	17.502
58.	74 14	49 13	58 06	16	02	22	000	0.000

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Contents

	1	2	3	4	5	6	7	8
				Map sheet No.48 K/9				
59.	74 13	41 57	30 14	16	01	22	067	11.782
60.	74 13	44 55	57 24	16	02	22	045	11.005
61.	74 13	42 57	33 06	16	01	22	079	16.261
62.	74 13	43 58	56 35	16	03	23	004	0.435
				Map sheet No.48 K/13				
63.	74 13	56 46	56 08	16	01	22	053	16.662
64.	74 13	58 47	36 07	16	02	23	060	9.128
65.	74 13	58 45	53 24	16	01	23	054	8.006
66.	74 13	56 48	25 29	16	01	22	045	8.405
67.	74 13	56 49	03 02	16	01	22	013	2.907
68.	74 13	58 48	03 16	16	01	22	050	35.810
69.	74 13	59 49	27 14	16	01	22	050	39.003
70.	74 13	52 51	11 46	16	01	22	021	4.945
71.	74 13	54 52	00 13	16	01	22	047	14.591
72.	74 13	57 50	11 41	16	02	22	049	11.233
73.	74 13	55 51	19 48	16	02	22	021	8.693
74.	74 13	59 52	57 11	16	01	22	028	9.004
75.	74 13	57 50	33 19	16	03	22	000	0.000
76.	74 13	53 54	07 43	16	01	23	061	17.807
77.	74 13	54 52	26 46	16	03	23	047	10.194
78.	74 13	57 53	27 49	16	02	23	020	27.006

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Contents

1	2	3	4	5	6	7	8	9
79.	74 13	45 56	21 31	16	03	23	023	3.226
80.	74 13	46 56	53 00	16	13	-	-	0.000
81.	74 13	49 56	16 00	16	02	23	022	4.429
82.	74 13	48 56	13 31	16	01	23	025	16.894
83.	74 13	50 57	02 19	16	01	23	027	10.478
84.	74 13	52 55	28 11	16	02	23	052	14.150
85.	74 13	52 55	33 10	16	02	23	043	17.968
86.	74 13	45 58	36 52	16	01	22	043	9.672
87.	74 13	49 58	12 14	16	01	23	021	5.928
88.	74 13	50 59	33 52	16	02	23	034	8.016
89.	74 13	53 59	18 23	16	16	-	-	0.000
				Map sheet No.48 K/14				
90.	74 13	59 44	07 47	16	01	22	075	30.580
				Map sheet No.48 N/2				
91.	75 14	08 31	04 48	16	03	23	002	0.183
92.	75 14	09 30	25 42	16	03	23	001	0.066
93.	75 14	11 33	28 39	16	04	24	000	0.000
94.	75 14	11 33	00 52	16	12	-	-	0.000
95.	75 14	04 36	53 53	16	07	10	007	0.937
96.	75 14	02 35	37 36	16	03	24	003	0.574
97.	75 14	04 38	42 53	16	03	24	001	0.955
				Map sheet No. 48 N/3				
98.	75 14	00 17	17 12	16	03	23	013	2.328
99.	75 14	06 16	51 23	16	02	23	018	29.355

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Contents

1	2	3	4	5	6	7	8	9
100.	75 14	05 16	37 06	16	03	24	018	6.299
101.	75 14	08 15	55 51	16	01	23	023	5.789
102.	75 14	10 16	58 39	16	01	23	038	24.488
103.	75 14	11 15	28 51	16	03	23	010	7.193
104.	75 14	12 16	42 13	16	01	23	018	20.880
105.	75 14	01 19	10 12	16	03	24	001	0.170
106.	75 14	03 18	15 21	16	03	24	010	2.875
107.	75 14	04 19	13 12	16	02	23	019	11.493
108.	75 14	06 19	46 31	16	02	23	004	0.696
109.	75 14	05 18	42 02	16	03	23	023	2.245
110.	75 14	08 19	48 22	16	03	23	012	4.554
111.	75 14	12 17	05 59	16	03	23	021	24.968
112.	75 14	13 18	06 50	16	03	24	021	1.788
113.	75 14	00 20	07 55	16	02	24	021	10.184
114.	75 14	02 21	23 36	16	03	24	000	0.000
115.	75 14	03 20	02 53	16	02	23	028	15.035
116.	75 14	06 20	00 15	16	03	24	024	4.990
117.	75 14	06 22	27 17	16	07	24	014	1.063
118.	75 14	09 21	48 00	16	03	23	011	6.634
119.	75 14	08 21	43 31	16	03	23	001	0.264
120.	75 14	12 20	40 48	16	13	-	-	0.000
121.	75 14	01 24	50 21	16	02	23	005	0.847
122.	75 14	00 23	40 07	16	03	23	008	4.373

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Contents

1	2	3	4	5	6	7	8	9
123.	75 14	04 22	06 54	16	02	23	034	6.389
124.	75 14	03 24	23 34	16	01	23	019	11.024
125.	75 14	06 24	41 05	16	02	24	012	3.840
126.	75 14	08 22	54 46	16	02	24	021	13.800
127.	75 14	10 24	17 37	16	12	-	-	0.000
128.	75 14	12 22	09 50	16	03	23	006	0.657
129.	75 14	03 25	41 24	16	02	23	022	11.572
130.	75 14	03 27	46 04	16	01	23	033	12.767
131.	75 14	05 26	51 25	16	02	23	040	37.429
132.	75 14	10 26	25 42	16	13	-	-	0.000
133.	75 14	14 25	06 24	16	03	24	001	1.154
134.	75 14	03 28	05 00	16	07	24	002	12.748
				Map sheet No. 48 N/4				
135.	75 14	01 00	18 52	16	02	23	028	13.494
136.	75 14	01 01	11 39	16	03	23	000	0.000
137.	75 14	02 00	58 52	16	01	23	039	8.639
138.	75 14	09 02	38 16	16	03	23	012	13.295
139.	75 14	07 00	52 16	16	02	22	019	15.702
140.	75 14	11 00	38 05	16	03	24	012	9.954
141.	75 14	10 02	52 25	16	02	24	010	3.555
142.	75 14	13 00	20 36	16	02	24	001	7.051
143.	75 14	14 01	10 57	16	13	-	-	0.000
144.	75 14	00 03	27 32	16	03	23	016	1.665

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Contents

1	2	3	4	5	6	7	8	9
145.	75 14	02 03	03 51	16	03	23	008	2.643
146.	75 14	04 03	35 19	16	03	23	001	0.318
147.	75 14	02 04	57 13	16	03	23	001	0.073
148.	75 14	07 04	04 13	16	03	23	009	7.406
149.	75 14	05 03	25 17	16	03	23	017	7.492
150.	75 14	08 03	11 16	16	13	-	-	0.000
151.	75 14	11 04	48 21	16	02	24	011	1.016
152.	75 14	10 03	42 08	16	02	24	017	11.595
153.	75 14	01 05	24 18	16	13	-	-	0.000
154.	75 14	01 07	07 10	16	03	23	005	0.639
155.	75 14	04 06	11 56	16	03	23	001	0.066
156.	75 14	03 05	19 34	16	02	23	023	18.242
157.	75 14	05 07	51 15	16	03	24	018	8.026
158.	75 14	06 05	39 15	16	03	24	020	3.944
159.	75 14	09 06	42 10	16	03	24	005	0.565
160.	75 14	11 05	26 51	16	03	23	003	3.211
161.	75 14	11 06	06 38	16	03	23	002	0.726
162.	75 14	13 05	30 46	16	03	23	005	0.374
163.	75 14	13 06	58 43	16	03	23	009	3.050
164.	75 14	01 07	55 42	16	15	-	-	0.000
165.	75 14	04 09	56 37	16	03	24	011	3.237
166.	75 14	05 08	12 56	16	07	10	000	0.000
167.	75 14	07 08	18 30	16	07	10	000	0.000

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Contents

1	2	3	4	5	6	7	8	9
168.	75 14	07 08	55 29	16	03	24	011	6.129
169.	75 14	12 08	17 21	16	01	24	020	9.023
170.	75 14	10 09	10 07	16	02	24	023	9.994
171.	75 14	14 08	57 30	16	02	24	020	7.444
172.	75 14	12 09	32 00	16	03	23	020	8.327
173.	75 14	04 10	17 22	16	03	23	013	4.927
174.	75 14	03 12	16 07	16	12	-	-	0.000
175.	75 14	06 12	39 07	16	02	23	011	4.519
176.	75 14	05 10	49 21	16	03	23	007	1.390
177.	75 14	12 10	20 41	16	02	24	025	10.697
178.	75 14	13 10	34 26	16	02	24	029	12.501
179.	75 14	13 12	53 04	16	02	24	000	0.000
180.	75 14	01 14	00 01	16	03	23	005	0.990
181.	75 14	01 13	30 30	16	03	23	002	2.099
182.	75 14	04 13	37 30	16	03	23	013	8.040
183.	75 14	02 14	54 01	16	03	23	009	5.615
184.	75 14	05 12	53 45	16	01	22	021	16.251
185.	75 14	06 14	35 35	16	03	22	002	17.855
186.	75 14	09 14	42 54	16	02	23	015	7.509
187.	75 14	07 12	47 35	16	02	23	018	18.915
188.	75 14	10 13	57 55	16	01	23	035	14.386
189.	75 14	11 13	33 34	16	03	23	025	15.124
190.	75 14	14 13	54 38	16	03	23	005	15.596

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Contents

1	2	3	4	5	6	7	8	9
					Map sheet No. 48 N/7			
191.	75 14	19 17	03 17	16	03	24	002	0.134
192.	75 14	18 17	04 48	16	07	24	000	0.000
193.	75 14	19 19	25 42	16	16	-	-	0.000
194.	75 14	20 18	07 48	16	13	-	-	0.000
195.	75 14	16 20	28 41	16	07	24	000	0.000
196.	75 14	21 20	05 17	16	03	24	001	0.070
197.	75 14	21 22	25 14	16	03	24	005	0.395
198.	75 14	24 21	18 05	16	04	24	000	0.000
199.	75 14	20 22	50 42	16	03	24	017	2.297
200.	75 14	17 25	48 42	16	03	24	004	0.463
					Map sheet No. 48 N/8			
201.	75 14	19 00	58 51	17	07	10	049	12.103
202.	75 14	20 00	34 48	17	01	10	072	9.181
203.	75 14	17 03	09 28	16	02	24	018	7.009
204.	75 14	17 03	45 35	16	02	24	029	7.661
205.	75 14	19 03	44 57	16	13	-	-	0.000
206.	75 14	22 02	28 44	17	02	24	021	11.061
207.	75 14	20 04	02 46	16	07	10	040	6.602
208.	75 14	23 04	52 46	17	07	10	013	0.895
209.	75 14	15 06	30 55	16	02	23	026	7.624
210.	75 14	17 05	00 35	16	02	23	016	13.044
211.	75 14	17 06	57 23	16	02	24	029	14.431

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Contents

1	2	3	4	5	6	7	8	9
212.	75 14	19 06	30 06	16	02	24	024	12.419
213.	75 14	20 06	06 25	16	02	24	017	11.428
214.	75 14	22 06	22 05	17	02	10	019	4.821
215.	75 14	24 05	32 41	17	02	24	012	2.752
216.	75 14	22 06	55 51	16	07	10	015	7.233
217.	75 14	25 05	36 53	17	02	24	016	3.096
218.	75 14	28 05	28 43	17	03	10	009	1.110
219.	75 14	17 09	00 54	16	02	24	017	7.050
220.	75 14	15 07	27 32	16	02	24	021	10.139
221.	75 14	19 08	27 40	16	02	24	015	7.733
222.	75 14	18 08	02 49	16	02	24	019	10.192
223.	75 14	20 07	34 59	16	07	10	045	2.876
224.	75 14	29 09	39 14	17	03	24	008	0.441
225.	75 14	15 12	34 22	16	02	24	013	23.808
226.	75 14	16 10	52 05	16	02	24	021	8.538
227.	75 14	18 12	41 05	16	07	24	013	6.830
228.	75 14	26 10	03 58	16	03	24	006	0.660
229.	75 14	26 11	25 32	16	02	24	034	7.110
230.	75 14	27 12	53 08	16	05	12	004	0.365
231.	75 14	29 10	35 21	17	04	24	000	0.000
232.	75 14	17 14	21 03	16	03	24	002	0.594
233.	75 14	15 13	09 26	16	13	-	-	0.000
234.	75 14	24 13	28 30	16	04	24	000	0.000

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Contents

1	2	3	4	5	6	7	8	9
235.	75 14	26 13	50 30	16	03	24	002	0.404
236.	75 14	25 13	39 58	16	13	-	-	0.000
237.	75 14	29 12	58 40	16	12	-	-	0.000
				Map sheet No. 48 N/11				
238.	75 14	30 18	05 56	16	04	24	000	0.000
239.	75 14	40 18	29 50	18	07	24	000	0.000
240.	75 14	42 18	00 41	18	04	17	000	0.000
241.	75 14	42 17	50 56	18	03	24	000	0.000
242.	75 14	39 20	27 36	18	11	-	-	0.000
				Map sheet No. 48 N/12				
243.	75 14	31 00	34 32	17	07	10	000	0.000
244.	75 14	33 02	16 19	17	07	24	000	0.000
245.	75 14	31 02	23 51	17	07	24	001	0.275
246.	75 14	34 03	13 24	17	04	17	000	0.000
247.	75 14	35 02	35 53	17	02	18	013	1.659
248.	75 14	36 04	56 38	17	07	24	000	0.000
249.	75 14	39 04	48 24	17	04	24	000	0.000
250.	75 14	37 03	42 08	17	12	-	-	0.000
251.	75 14	34 05	12 44	17	04	24	000	0.000
				Map sheet No. 48 O/1				
252.	75 13	02 45	08 52	16	16	-	-	0.000
253.	75 13	44 46	02 21	16	03	22	032	2.964
254.	75 13	03 46	26 10	16	02	22	013	2.509
255.	75 13	05 47	11 00	16	03	23	007	2.952

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Contents

1	2	3	4	5	6	7	8	9
256.	75 13	07 46	17 30	16	03	23	014	6.965
257.	75 13	07 46	46 45	16	03	22	004	2.263
258.	75 13	10 45	19 26	17	13	-	-	0.000
259.	75 13	12 47	10 03	17	14	23	001	0.085
260.	75 13	14 46	26 24	17	12	-	-	0.000
261.	75 13	13 46	02 07	17	03	22	022	9.389
262.	75 13	01 47	33 46	16	03	23	017	2.180
263.	75 13	02 48	43 31	16	02	22	014	8.239
264.	75 13	06 48	03 49	16	02	22	048	12.302
265.	75 13	07 48	24 42	16	01	22	040	7.981
266.	75 13	07 48	34 55	16	01	23	045	11.614
267.	75 13	11 48	13 25	17	12	-	-	0.000
268.	75 13	11 49	15 04	17	04	24	005	0.467
269.	75 13	14 47	04 33	17	03	23	007	0.890
270.	75 13	13 49	23 57	17	03	23	001	0.062
271.	75 13	01 51	30 05	16	02	22	027	3.143
272.	75 13	00 52	59 25	16	02	22	019	8.493
273.	75 13	06 50	48 29	16	02	22	024	6.873
274.	75 13	08 50	01 19	16	04	23	003	0.318
275.	75 13	09 52	26 12	16	01	23	056	13.097
276.	75 13	10 51	08 27	16	03	23	034	9.944
277.	75 13	13 52	02 15	16	07	23	006	0.575
278.	75 13	14 50	18 13	17	13	-	-	0.000

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Contents

1	2	3	4	5	6	7	8	9
279.	75 13	04 53	04 03	16	12	-	-	0.000
280.	75 13	05 53	26 00	16	03	22	009	2.047
281.	75 13	07 54	01 27	16	03	22	009	0.873
282.	75 13	07 54	36 32	16	03	23	000	0.000
283.	75 13	09 52	51 56	16	02	23	031	18.089
284.	75 13	11 53	51 33	16	07	23	006	1.749
285.	75 13	10 54	24 03	16	02	23	026	13.797
286.	75 13	14 53	47 10	17	03	23	009	2.069
287.	75 13	12 54	39 17	16	15	-	-	0.000
288.	75 13	00 56	42 01	16	03	23	003	0.195
289.	75 13	01 56	47 33	16	02	23	034	9.122
290.	75 13	04 56	11 55	16	02	23	010	4.060
291.	75 13	03 55	16 30	16	03	23	000	0.000
292.	75 13	05 55	40 30	16	03	23	002	0.360
293.	75 13	06 56	49 57	16	02	23	024	6.286
294.	75 13	09 56	01 10	16	03	23	003	0.611
295.	75 13	08 56	28 18	16	03	23	009	1.890
296.	75 13	11 56	01 36	16	13	-	-	0.000
297.	75 13	11 55	32 56	16	03	23	017	3.911
298.	75 13	13 56	19 11	16	02	22	031	12.497
299.	75 13	02 58	24 27	16	14	-	-	0.000
300.	75 13	03 58	51 04	16	02	23	016	6.670

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1	2	3	4	5	6	7	8	9
301.	75 13	04 59	36 24	16	01	23	031	28.744
302.	75 13	05 59	30 09	16	02	23	011	9.692
303.	75 13	07 58	00 19	16	02	23	032	12.822
304.	75 13	09 57	34 36	16	02	23	026	8.223
305.	75 13	05 59	54 51	16	02	23	010	8.030
306.	75 13	10 58	34 54	16	02	23	020	8.090
307.	75 13	11 58	53 42	16	02	23	020	5.209
308.	75 13	12 58	56 46	16	07	10	000	0.000
309.	75 13	14 58	32 40	16	03	23	005	0.499
				Map sheet No. 48 0/2				
310.	75 13	04 32	14 18	17	01	22	029	13.027
311.	75 13	06 30	04 14	17	03	22	009	0.705
312.	75 13	08 30	54 52	17	03	22	017	6.630
313.	75 13	10 30	33 20	17	03	22	051	7.126
314.	75 13	12 31	40 29	17	03	22	006	1.370
315.	75 13	03 33	27 18	17	01	22	060	14.238
316.	75 13	04 34	02 10	17	01	22	052	27.688
317.	75 13	06 34	08 43	17	01	22	027	13.789
318.	75 13	06 32	21 46	17	02	22	035	8.048
319.	75 13	09 34	22 14	17	13	-	-	0.000
320.	75 13	08 33	06 14	17	03	22	015	3.987
321.	75 13	10 13	33 18	17	02	23	024	6.294
322.	75 13	12 32	56 47	17	03	23	010	6.505

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Contents

1	2	3	4	5	6	7	8	9
323.	75 13	03 35	54 32	17	01	22	059	8.033
324.	75 13	03 36	35 56	17	01	22	037	102.387
325.	75 13	07 35	03 35	17	01	22	017	9.607
326.	75 13	09 37	40 18	17	14	-	-	0.000
327.	75 13	07 35	49 10	17	01	22	065	14.672
328.	75 13	11 35	46 55	17	02	23	016	6.618
329.	75 13	14 36	26 10	17	14	-	-	0.000
330.	75 13	13 36	02 20	17	03	23	007	2.805
331.	75 13	01 39	37 05	16	01	23	052	19.322
332.	75 13	03 37	30 42	16	01	22	048	16.089
333.	75 13	05 38	33 59	16	02	22	019	33.108
334.	75 13	06 38	56 28	17	03	22	023	23.067
335.	75 13	09 38	57 14	17	03	23	011	4.037
336.	75 13	07 38	32 14	17	03	23	002	0.262
337.	75 13	10 39	38 01	17	03	22	012	15.204
338.	75 13	11 38	52 27	17	02	22	026	5.437
339.	75 13	12 39	34 33	17	13	-	-	0.000
340.	75 13	01 41	08 22	16	01	22	061	10.930
341.	75 13	01 41	22 22	16	02	22	041	7.874
342.	75 13	03 41	14 19	16	03	23	019	1.475
343.	75 13	03 41	14 19	16	03	23	002	0.177
344.	75 13	06 40	08 55	16	03	22	000	0.000
345.	75 13	06 41	22 35	16	02	22	036	10.171

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Contents

1	2	3	4	5	6	7	8	9
346.	75 13	07 40	41 07	17	13	-	-	0.000
347.	75 13	09 42	48 21	17	03	23	011	5.077
348.	75 13	11 41	46 16	17	02	22	022	2.396
349.	75 13	10 41	43 11	17	03	22	016	3.690
350.	75 13	01 43	49 55	16	03	22	009	2.794
351.	75 13	03 44	33 12	16	13	-	-	0.000
352.	75 13	04 43	07 21	16	02	23	002	0.294
353.	75 13	07 42	26 54	17	01	22	038	9.486
354.	75 13	05 44	02 34	16	01	22	038	141.864
355.	75 13	09 42	04 47	17	01	22	023	10.894
356.	75 13	08 44	23 40	17	02	22	021	10.436
357.	75 13	11 42	41 34	17	03	23	002	9.177
358.	75 13	10 44	45 54	17	03	23	020	3.102
				Map sheet No. 48 0/3				
359.	75 13	06 28	24 58	17	01	22	063	12.702
360.	75 13	08 29	03 21	17	02	22	005	0.266
				Map sheet No. 48 0/5				
361.	75 13	16 45	09 54	17	03	23	012	10.694
362.	75 13	17 47	38 16	17	01	23	028	12.517
363.	75 13	19 45	51 12	17	02	23	010	2.645
364.	75 13	21 46	27 42	17	02	23	029	11.499
365.	75 13	23 45	18 56	17	13	-	-	0.000
366.	75 13	26 46	23 28	17	03	23	001	0.089

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Contents

1	2	3	4	5	6	7	8	9
367.	75 13	28 47	31 26	17	01	23	022	1.834
368.	75 13	19 48	24 47	17	02	23	020	14.552
369.	75 13	17 49	38 43	17	03	23	012	1.626
370.	75 13	22 48	11 06	17	02	23	018	7.286
371.	75 13	20 49	16 25	17	02	23	032	19.263
372.	75 13	24 48	49 51	17	02	23	013	6.004
373.	75 13	22 48	32 38	17	01	23	021	18.998
374.	75 13	25 47	29 43	17	01	22	031	21.808
375.	75 13	26 49	59 48	17	02	22	019	5.520
376.	75 13	29 48	27 49	17	07	10	054	0.494
377.	75 13	27 48	41 40	17	01	23	020	12.787
378.	75 13	16 51	21 45	17	03	23	012	6.217
379.	75 13	18 50	52 10	17	02	23	011	6.618
380.	75 13	18 52	38 20	17	02	23	022	9.398
381.	75 13	22 51	10 42	17	01	22	016	30.713
382.	75 13	22 51	44 03	17	01	22	032	24.871
383.	75 13	24 51	14 23	17	02	22	015	14.200
384.	75 13	25 52	56 09	17	03	23	000	0.000
385.	75 13	26 52	32 20	17	01	23	015	3.172
386.	75 13	27 51	46 32	17	07	10	061	5.665
387.	75 13	29 50	11 59	17	02	23	011	7.996
388.	75 13	15 54	33 22	17	13	-	-	0.000
389.	75 13	16 53	49 01	17	02	23	023	14.224

Contd...

Contents

1	2	3	4	5	6	7	8	9
390.	75 13	18 53	30 14	17	01	23	016	22.705
391.	75 13	18 54	57 12	17	01	23	036	9.507
392.	75 13	22 52	18 37	17	01	22	042	17.132
393.	75 13	20 54	09 50	17	02	22	025	19.039
394.	75 13	22 53	55 38	17	01	22	034	18.338
395.	75 13	24 53	33 48	17	02	22	030	22.408
396.	75 13	25 53	08 59	17	01	22	046	29.579
397.	75 13	27 53	20 28	17	07	10	046	10.035
398.	75 13	29 54	26 18	17	07	10	001	0.141
399.	75 13	28 53	03 09	17	02	23	008	30.006
400.	75 13	16 57	31 22	17	13	-	-	0.000
401.	75 13	15 55	58 03	17	13	-	-	0.000
402.	75 13	18 56	38 23	17	01	22	024	5.085
403.	75 13	18 56	51 03	17	01	22	023	22.209
404.	75 13	21 55	08 59	17	01	23	035	12.763
405.	75 13	21 56	31 28	17	03	23	016	8.697
406.	75 13	24 56	02 58	17	01	10	031	1.321
407.	75 13	23 55	25 30	17	07	10	047	4.035
408.	75 13	26 56	37 42	17	03	23	011	4.007
409.	75 13	27 56	42 29	17	02	24	030	4.859
410.	75 13	15 57	24 47	17	13	-	-	0.000
411.	75 13	18 58	52 31	17	01	23	027	25.953

Contd...

Contents

1	2	3	4	5	6	7	8	9
412.	75 13	18 58	38 53	17	02	23	019	5.178
413.	75 13	21 59	32 43	17	03	23	015	6.197
414.	75 13	23 57	46 41	17	03	23	009	8.557
415.	75 13	27 59	02 39	17	02	24	006	0.579
416.	75 13	29 58	31 53	17	02	24	002	0.415
417.	75 13	27 58	58 33	17	02	24	024	4.795
				Map sheet No. 48 0/6				
418.	75 13	16 35	13 32	17	13	-	-	0.000
419.	75 13	19 37	42 28	17	02	22	009	18.601
420.	75 13	17 35	44 01	17	01	22	059	15.180
421.	75 13	21 36	29 16	17	14	-	-	0.000
422.	75 13	21 36	01 12	17	03	23	011	4.800
423.	75 13	16 37	56 38	17	03	23	000	0.000
424.	75 13	15 39	32 51	17	03	23	000	0.000
425.	75 13	19 39	51 29	17	02	03	023	25.241
426.	75 13	17 38	36 00	17	03	23	009	2.122
427.	75 13	21 38	08 09	17	01	22	022	17.902
428.	75 13	21 39	20 18	17	13	-	-	0.000
429.	75 13	24 38	41 58	17	01	23	026	15.303
430.	75 13	16 41	37 49	17	03	23	051	3.816
431.	75 13	17 41	59 13	17	13	-	-	0.000
432.	75 13	19 41	27 10	17	13	-	-	0.000
433.	75 13	20 42	55 04	17	03	23	008	8.768

Contd...

Contents

1	2	3	4	5	6	7	8	9
434.	75 13	21 40	32 23	17	02	23	006	0.966
435.	75 13	23 40	29 51	17	02	23	017	9.801
436.	75 13	15 43	11 29	17	14	24	000	0.000
437.	75 13	19 44	46 15	17	15	-	-	0.000
438.	75 13	24 43	29 35	17	02	23	013	5.626
439.	75 13	25 44	57 43	17	13	-	-	0.000
				Map sheet No. 48 0/9				
440.	75 13	39 46	19 23	18	07	24	012	4.123
441.	75 13	31 46	11 07	18	07	24	015	0.963
442.	75 13	32 47	39 27	18	02	24	020	20.241
443.	75 13	35 46	47 41	18	02	24	018	1.157
444.	75 13	36 45	43 49	18	02	24	007	0.557
445.	75 13	38 47	20 22	18	03	24	003	0.194
446.	75 13	32 47	19 39	18	02	24	021	15.078
447.	75 13	30 49	10 54	17	02	10	009	5.729
448.	75 13	34 48	20 13	18	07	10	054	5.822
449.	75 13	33 49	18 18	18	01	10	015	1.220
450.	75 13	35 48	02 49	18	02	24	013	1.804
451.	75 13	39 48	58 41	18	03	24	000	0.000
452.	75 13	38 48	10 15	18	03	24	001	0.331
453.	75 13	30 51	25 08	17	07	10	026	2.906
454.	75 13	36 59	37 46	18	12	-	-	0.000

Contd...

Contents

1	2	3	4	5	6	7	8	9
					Map sheet No.48 0/10			
455.	75 13	31 44	43 26	18	02	24	013	1.607
456.	75 13	38 44	17 34	18	07	24	000	0.000
					Map sheet No.48 0/13			
457.	75 13	47 49	14 09	18	07	24	006	0.393
458.	75 13	48 49	28 05	18	03	10	012	0.998
459.	75 13	49 48	02 27	18	03	10	008	1.340
460.	75 13	50 49	19 45	18	02	24	012	7.047
461.	75 13	54 48	43 51	18	02	24	040	3.412
462.	75 13	52 48	46 40	18	02	24	009	6.983
463.	75 13	46 50	54 42	18	05	12	000	0.000
464.	75 13	48 51	57 13	18	02	10	006	0.587
465.	75 13	48 51	31 26	18	05	12	001	0.073
466.	75 13	41 50	15 50	18	01	10	018	2.606
467.	75 13	51 51	14 41	18	01	10	013	2.227
468.	75 13	53 51	56 54	18	02	24	014	1.621
469.	75 13	53 50	33 35	18	07	10	017	0.642
470.	75 13	47 53	15 40	18	05	12	000	0.000
471.	75 13	47 54	39 45	18	03	24	005	0.452
472.	75 13	49 52	51 43	18	02	10	020	10.021
473.	75 13	51 53	23 18	18	03	24	002	0.137
474.	75 13	51 54	08 10	18	02	24	010	10.121
475.	75 13	53 52	00 53	18	02	24	007	5.290

Contd...

Contents

1	2	3	4	5	6	7	8	9
476.	75 13	54 54	32 33	18	03	24	017	5.145
477.	75 13	56 54	56 27	18	01	18	018	2.883
478.	75 13	47 55	26 28	18	03	24	000	0.000
479.	75 13	48 55	17 24	18	03	24	003	1.492
480.	75 13	50 57	33 15	18	02	24	013	6.199
481.	75 13	51 55	56 12	18	02	24	020	3.446
482.	75 13	53 55	15 50	18	02	24	015	2.251
483.	75 13	54 56	14 37	17	02	24	008	1.144
484.	75 13	57 56	07 24	18	03	18	002	0.309
485.	75 13	55 56	21 01	17	07	24	006	0.225
486.	75 13	46 58	47 48	18	07	24	000	0.000
487.	75 13	49 59	42 39	18	03	24	002	0.324
488.	75 13	50 59	13 20	18	02	10	000	0.000
489.	75 13	52 58	16 05	18	02	24	000	0.000
490.	75 13	53 58	01 23	18	03	24	004	0.597
				Map sheet No. 57 C/1				
491.	76 13	02 57	22 07	18	12	-	-	0.000

* See Note on next page

Contents

Forest Division (Col.5)

Code	Name of Division
16	Sagar
17	Shimoga
18	Bhadravati

Land Use (Col.6)

Code	Particulars
01	Dense Tree Forest
02	Moderately dense tree forest
03	Open tree forest
04	Scrub forest
05	Bamboo brakes
06	Shifting Cultivation
07	Young plantation of forestry species
08	Tree in line
09	Forest roads
10	Govt. grass land
11	Barren lands
12	Agricultural land without trees in surround
13	Agricultural land with trees in surround
14	Non forestry plantations
15	Habitation
16	Water bodies
17	Other lands

Crop Compositions (Col.7)

Code	Particulars
22	Western Ghat Evergreen Forest
23	Western Ghat Semi-evergreen Forest
24	Deciduous forest
10	Teak
20	Miscellaneous forest

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Contents

FSI S Z Bangalore

Field Form-1

PLOT APPROACH FORM

1. Plot approach Form must be filled in while the journey is in progress.
2. While recording date, it is essential to record month and year also.
3. If a plot is visited on more than one day, a separate form for each visit shall be filled up.

8. State and Code

2. Division and Code

3 District and Code

4. Map-sheet and Code

5 Grid Code

6 Crew Leader (Name)

7 Name of camp

8. Time (hrs) at which left the c

9. Distance covered by vehicle (km)

10 Time taken in journey by vehicle Hours Minutes

11. Name of the place up to which journey was performed by vehicle (describe in brief)

12. Conspicuous features observed during the journey by vehicle (describe in brief)

13. Time at which started on foot

14 Direction and distance covered on foot up to the reference point (km)

15. Conspicuous features observed during the journey on foot (describe in brief)

16. Time (hrs) at which arrived at the reference point

17 Description of the reference point (Describe in details)

18. Compass bearing from reference point to the plot approached for commencing survey (please give the plot No also) if any

Contents

19 Distance of the plot from reference point (mtr)

20. Date and Time at which arrived at the plot — plot 1 — plot 2

21. Time (hrs) of Leaving the plot — plot 1 — plot 2

22. Time (hrs) at which returned to the Camp

Name & Signature

23. Compassing done by

24. Distance measured by

25. plots laid out by

26. Tree Enumeration done by

27. Height measurements taken by

28. B. T and other measurements taken by

29. Bamboo enumeration done by

30. Bamboo weight taken by

31. References in the field written by

32. Remarks

Date :

Signature of the Crew Leader

Diagrams etc.

Contents

Field Form – 2

Plot Description Form

Job No.	Card design	Zone	State	District	Forest Division	Map Sheet No.	Grid No.	Plot No.	Legal Status	Land Use
1–3	4–5	6	7–8	9–10	11–12	13–18	19–22	23	24	25–26

Terrain Data						Soil Data						Crop Data															Bamboo Data																	
General Topography	SLOPE	Position on Slope	Altitude	Aspect	Rockiness	Humus	Soil colour	Soil consistency	Soil texture	Coarse Fragments	Soil Depth	Soil Erosion	Origin of stand	Crop composition	Canopy layer or storey	Top height	Size class	Intensity of regeneration	Important Species	Injuries to crop	Fire incidence	Grazing incidence	Presence of weeds	Presence of grass	Bamboo density	Bamboo quality	Bamboo flowering	Bamboo regeneration	Plantation potential	Accessibility: Distance to Road	Accessibility: Distance to Mule path	Accessibility: Distance to river/stream	Rd. distance to Market: Kacha Road distance	Rd. distance to Market: Pucca Road distance	River distance to Market outlet	Obstacles	Plot status	Degraded Forest
27	28-30	31	32-35	36	37	38	39	40	41	42	43	44	45	46-47	48-49	50-51	52	53	54-56	57	58	59	60	61	62	63	64	65	66	67	68	69	70-71	72-74	75-76	77	78	79-80

PLOT ENUMERATION FORM

Field Form No. 3

Job No	Card Design	Map Sheet No.	Grid No.	Plot No.
1-3	4-5	6-11	12-15	16

Total No. of bamboo clumps	Total No. of trees
71-73	74-76

Species		Species		Species		Species		Species		Species		Species		Species		Species	
Code	Dia	Code	Dia	Code	Dia	Code	Dia	Code	Dia	Code	Dia	Code	Dia	Code	Dia	Code	Dia
17-19	20-22	23-25	26-28	29-31	32-34	35-37	38-40	41-43	44-46	47-49	50-52	53-55	56-58	59-61	62-64	65-67	68-70

Date:-_____

Signature of the Crew Leader_____

Name of the Crew leader

SAMPLE TREE FORM

Field Form No 4

Job No.	Card Design	Map Sheet No	Grid No	Plot No.
1-3	4-5	6-11	12-15	16

Total No of Trees
55-56

SPECIES	Tree Serial No	Species Code	Dominance	DBH OB (cm)	DBT (mm)	Tree Height (m)	Clear Bole (m)	Condition	Form: Longitudinal	Form: Sectional	SPECIES	Tree Serial No.	Species Code	Dominance	DBH OB (cm)	DBT (mm)	Tree Height (m)	Clear Bole (m)	Condition	Form: Longitudinal	Form: Sectional
	17-18	19-21	22	23-25	26-28	29-30	31-32	33	34	35		36-37	38-40	41	42-44	45-47	48-49	50-51	52	53	54

Date_____

Signature of the Crew Leader

Name of the Crew Leader

FSI-SZ-BANGALORE

Field Form 5

BAMBOO ENUMERATION FORM

Job No.	Card Design	Map Sheet No.	Grid No./ Inter Sectional No	Plot No.
1—3	4—5	6—11	12—15	18

Average culm height (in dcm)		Bamboo quality
Upto 1 cm. top dia. 72-74	Upto 2 cm. top dia. 75-77	78

Species	Species Code	Clump Serial No.	Clump diameter (in Cms.)	Clump size class	Green sound culms							Green damaged culms							Dry sound culms			Dry damaged culms			Decayed culms	Total No. of culms
					Current year's	One to two seasons old			Over two seasons old			Current year's	One to two seasons old			Over two seasons old										
						2<5 Cms	5<8 Cms	8+ Cms	2<5 Cms	5<8 Cms	8 Cms		2<5 Cms	5<8 Cms	8+ Cms	2<5 Cms	5<8 Cms	8 Cms	2<5 Cms	5<8 Cms	8+ Cms	2<5 Cms	5<8 Cms	8+ Cms		
	17-19	20-22	23-25	26	27-28	29-30	31-32	33-34	35-36	37-38	39-40	41-42	43-44	45-46	47-48	49-50	51 52	53 54	55-56	57 58	59 60	61-62	63-64	65-66	67-68	69-71

Date ....

Signature of Crew Leader

Name of Crew Leader

FSI-SZ-BANGALORE

Field Form No 8

BAMBOO ENUMERATION FORM (NON CLUMP FORMING)

Job No.	Card Design	Map Sheet No.	Grid No.	Plot No.
1—3	4—5	6—11	12—15	16

Species Code	Green sound culms							Green damaged culms							Dry sound culms			Dry damaged culms				Decayed culms	Average culm Ht in decimeter	Total No of culms
	Current year	One to two years old			Over two years old			Current year	One to two years old			Over two years old												
		2<5 Cms	5<8 Cms	8+ Cms	2<5 Cms	5<8 Cms	8+ Cms		2<5 Cms	5<8 Cms	8+ Cms	2<5 Cms	5<8 Cms	8+ Cms	2<5 Cms	5<8 Cms	8+ Cms	2<5 Cms	5<8 Cms	8+ Cms				
17-19	20-22	23-25	26-28	29-30	31-33	34-36	37-38	39-41	42-44	45-47	48 49	50 52	53-55	56-57	58 60	61 62	63-64	65-67	68 69	70 71		72-73	74-76	77-80

Signature of Crew Leader

Name of Crew Leader

Contents

R. S. I. S. Z. Bangalore.

Field Form 7

Job Number	Card Design
1—3	4—5

BAMBOO WEIGHT FORM

Map sheet Number	Grid No./ Inter Sectional No.	Plot Number
6—11	12—15	16

Species	Sample No.	Green Weight of Culm																	
		DIAMETER CLASS															Green weight of sub sample for co-relation with dry weight		
		2 to under 5 cm.					5 to under 8 cm.					8 cm. and over							
		Diameter in cm.	Total length in dmt.	Utilizable length in dmt.		Weight in Grams	Diameter in cm.	Total length in dmt.	Utilizable length in dmt.		Grams Weight in	Diameter in cm	Total length in dmt.	Utilizable length in dmt.		Weight in Grams	Sub-sample culm 2 cm. & uuder 5 cm. diam.	Sub-sample culm 5cm. & under 8 cm. diam.	Sub sample culm 8 cm. and over
				Upto 1 cm top di.a	Upto 2 cm top dia				Upto 1 cm top dia	Upto 2 cm top dia				Upto 1 cm top dia.	Upto 2 cm top dia				

17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

Date :__________

Signature of the Crew Leader

Name of the Crew leader

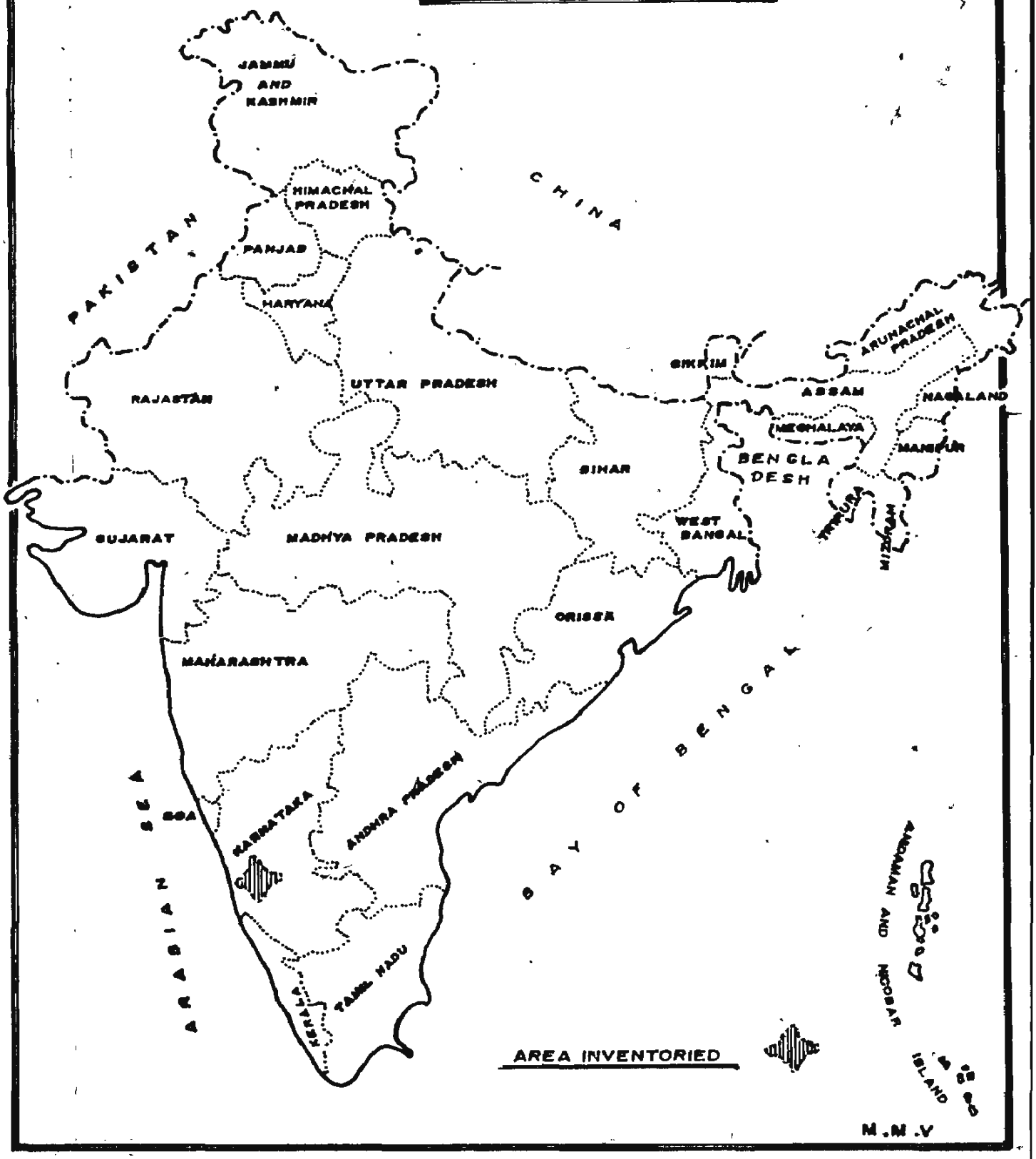
Contents

MAPS & FIGURES

Contents

LOCATION MAP OF THE INVENTORIED DISTRICT

SCALE 1:15,000,000

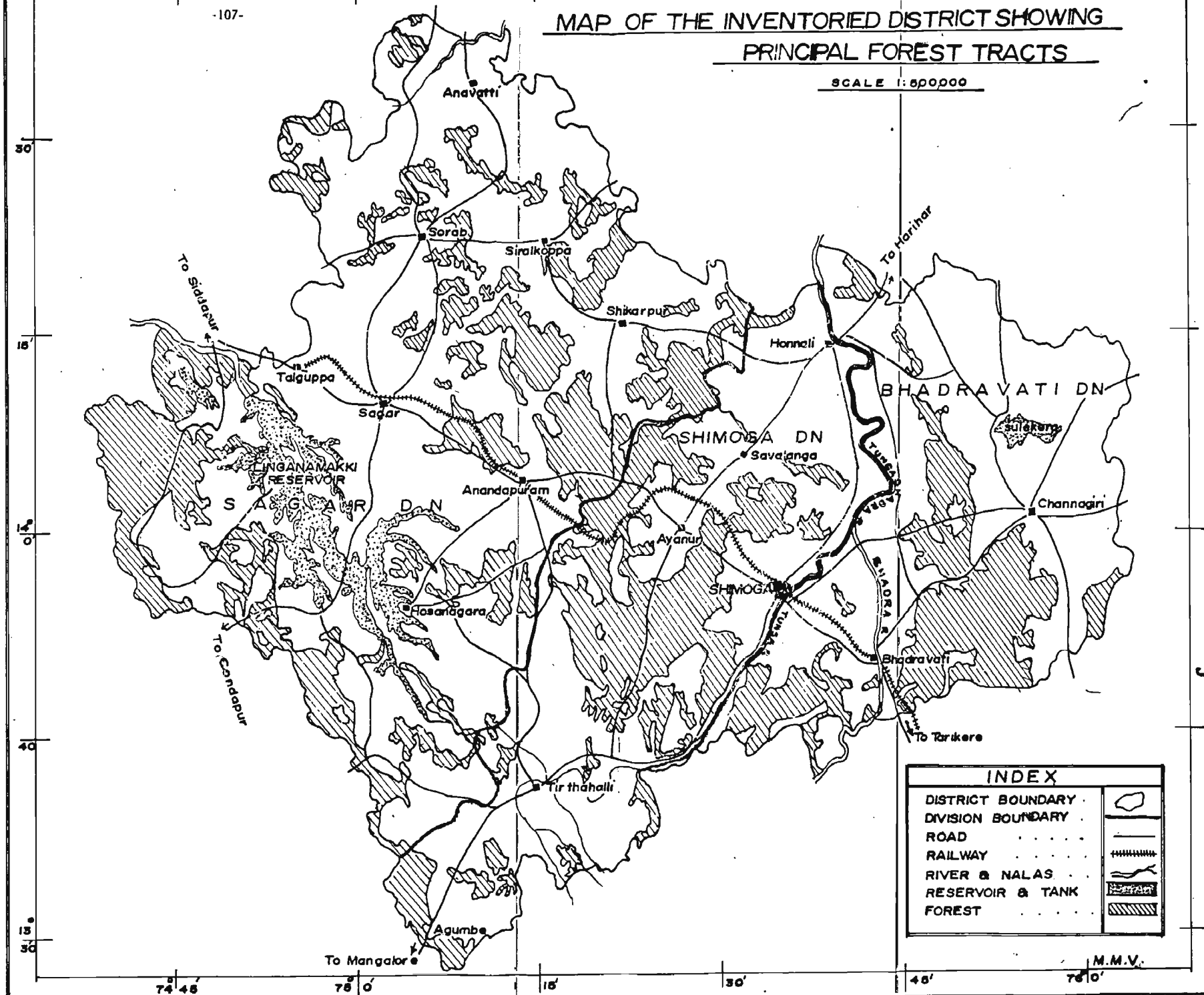


Contents

MAP-2

MAP OF THE INVENTORIED DISTRICT SHOWING PRINCIPAL FOREST TRACTS

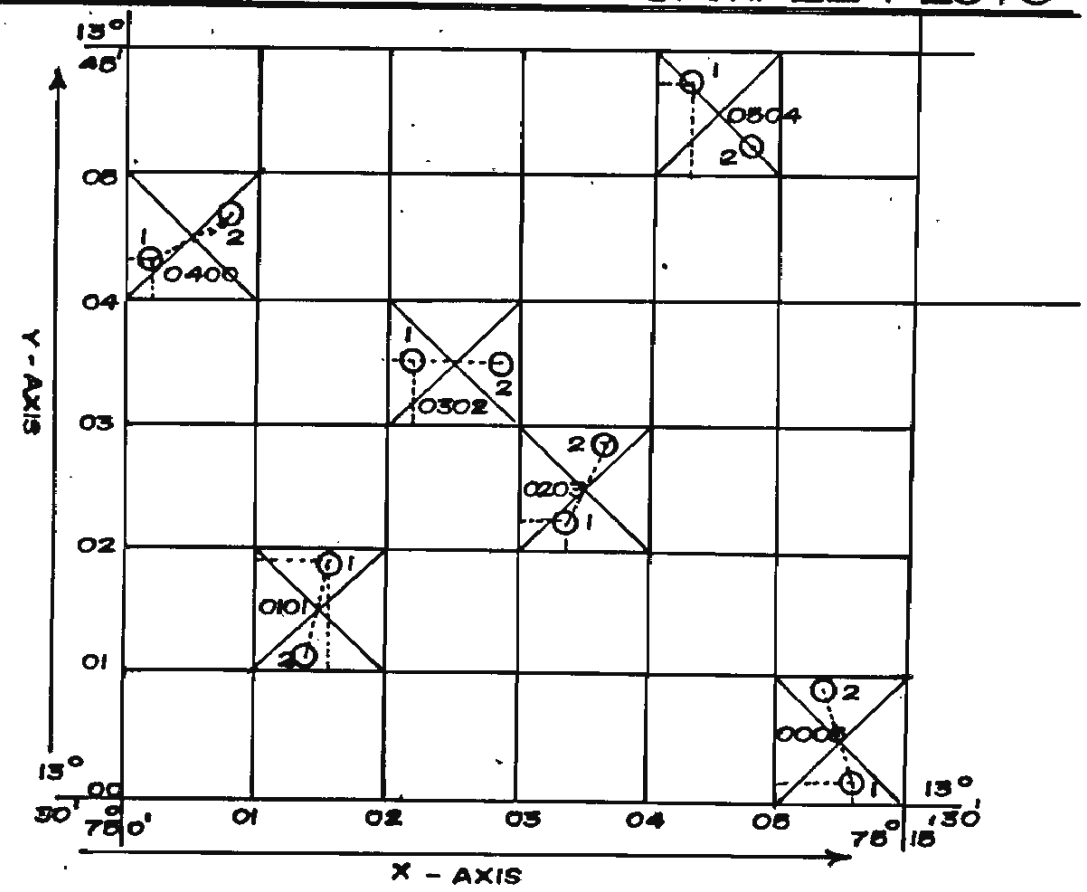
SCALE 1:600000



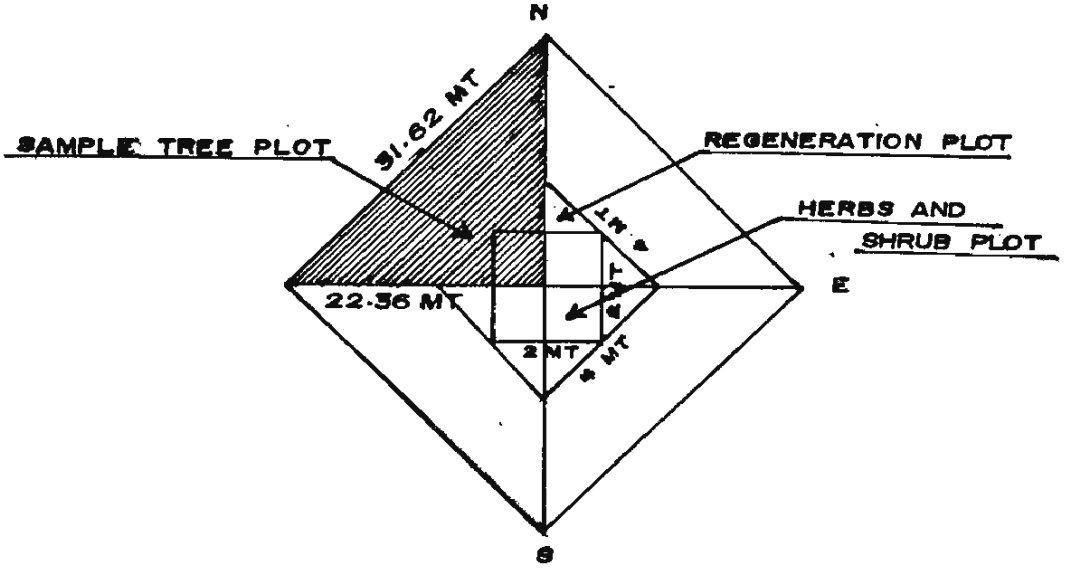
Contents

FIGURE - 1.

LAY OUT SKETCH OF SAMPLE PLOTS



MARKING OF SAMPLING LOCATIONS ON THE TOPOGRAPHIC MAP SHEETS



LAY OUT OF SAMPLE PLOT AT THE SAMPLING LOCATIONS

M.M.V

Contents

Bibliography & Notes

1. Anon — Ecology in Action. An Exhibit Programme on Man and the Biosphere; UNESCO.

2. Anon — Manual of Forest Inventory, FAO Forestry Paper No.27.

3. Anon — Statistical Outlines of India (1984): Tata Services Limited, Bombay.

4. Anon — Results of Resources Survey undertaken by the Vegetation Mapping Section of the State Forest Department: MY FOREST 13(2), 1977

5. Anon — Forest Resources Survey Report of the Pre-investment Study under the UNDP-FAO, 1970.

6. Anon — Draft Compilation of Results of the Inventory of Forest Resources of Jammu & Kashmir, Forest Survey of India, Northern Zone, Shimla 1985.

7. Abell T.M.B. — Single and Double entry Volume Table for Meranti in Jambi Province, Sumatra: The Malaysian Forester 42(3), 1979.

8. Bandhu D. — A Study of the Productive Structure of Tropical Dry Deciduous Forest at Varanasi: Ph.D. Thesis, 1971.

9. Black H.L. & Harper K.T. — The Adaptive Value of Buttresses of Tropical Trees, Additional Hypotheses: Biotropica, II(3).

10. Brown, Sandra and Lugo Ariel E. — Biomass of Tropical Forests - A New Estimate Based on Forest Volumes: Science 223, PP 1290-1293, 1984.

11. Chaturvedi A.N. & Misra C.M. — Ecological Survey of Grasslands at Dudhwa National Park. Plant Ecologist, Forest Research Laboratory, Kanpur 24. Indian Forester III(8), 1985.

12. Crow T.R. — Common regressions to Estimate Tree Biomass in Tropical Stands: Forest Science 24(1), 1978. This paper indicates that regressions developed for estimating forest biomass for one region (such as Thailand)could be applicable to other regions (such as tropical rain forests of Puerto Rico).

Contents

13. Fernando D.F.S. — Computation of Girth Increment Rates for Dry Zone Species - Satin, Ebony, Milla and Palu: Institute of Tropical Forestry, Puerto Rico.
In this paper rates of girth increment in respect of four common species of dry zones have been computed.

14. Fitter A.H.et.al. — Methods of calculating fine root production in forests: Ecological Interactions in Soil 4, 1985.
The best probable method for estimating root production and mortality is suggested in this paper.

15. Grubb P.J. — Control of Forest Growth and Distribution on Wet Tropical Mountains with special reference to Mineral Nutrition: Annual Review of Ecological Systems 8, 1977.
The environmental factors leading (i) to changes in the forest form associated with increase in altitude and the manner in which the species adopt to these factors:; (ii) altitudinal zonation of forest types and the mechanisms involved in 'Massenerhebung' effect in the tropics are considered.

16. Higuchi N(1) & Ramm W (11) — Developing Bole Wood Volume Equations for a group of Tree Species of Central Amazon (Brazil): Commonwealth Forestry Review 64(1), 1985.
Schumacher-Hall's volume equations with and without intercept coefficient was found to be the best for estimating tree volumes of tropical species in the dry land area of Manaus, Amazonas State, Brazil.

17. Jambulingan R. et.al. — Growth characteristics of Bambusa arundinacea under mixed forming conditions South India: Horticulture, 32(5), 1984.
A high degree of correlation was found to exist between circumference and height of clumps, diameter of culms and height of clumps, diameter of culms and height of clumps, diameter of culms and circumference of clumps. These were not, however, influenced by cultural operation regimes.

18. Kandya A.K. — Notes on Net Primary Production in Teak (Tectona grandis LINN.F): The Journal of the Indian Botanical Society 52 (1 & 2), 1973.
The maximum dry matter production in Teak trees is found to occur between 33 and 50 years of age.

19. Keay R.W.J. — Increment in the Okomu Forest Reserve Benin. Nigerian Forestry information Bulletin No.II.

Contents

20. Kira, Tatuo et.al. — Structure of Forest Canopies as related to their primary productivity: Plant and Cell Physiology 10, 1969.

21. Lakshman A.C. — Exploitation details of Sharavathy Submersion area: MYFOREST. 9(1), 1972.

22. Legris P. & Meher Homji V.M. — Vegetation Maps of India: Proceedings of Symposium on Recent Advances in Tropical Ecology, 1968.

23. Little, Elbert L. & Woodbury. — Trees of the Carribbean National Forest Puerto Rico:US Department of Agriculture, 1976.

24. Malhotra K.C. et.al. — Hunting Strategies among three non Pastoral Nomatic Groups of Maharashtra: Man in India, 63 (i) 1983.

25. Meher-Homji V.M. — Application of Pluviothermic Quotient and Xerothermic Hydrothermic Indices to the Indian Sub Continent: The Indian Forester 94 (5), 1968.
The paper considers the applicability of Pluviothermic quotient and Xerothermic Hydrothermic Indices to vegetation types of the Indian Sub continent.

26. Meher-Homji V.M. — Analogous Bioclimates and Introduction of Economic Exotics: Journal of the Bombay Natural History Society 67 (3), 1971.

27. Meher-Homji V.M. — The term Sub Tropical in Phytogeography; Facts and Fallacies: Environmental Physiology and Ecology of Plants, 1978.

28. Meher-Homji V.M. — Variability and the Concept of a Probable Climatic Year in Bioclimatology with reference to the Indian Sub Continent: Arch.Met.Geoph. Bioll.Ser.B, 22, 1974.

29. Meher-Homji V.M. — On the Origin of the Tropical Dry Evergreen Forest of South India: International Journal of Ecological and Environmental Science 1, 1974.

30. Mervart J. — Growth Studies in the Natural T H F for Forest Management Purposes.

31. Misra D.N. — Current Management Concepts in Forestry: Socio-economic Effects and Constraints in Tropical Forest Management, John Wiley & Sons, 1982.

32. Misra G.P. & Kandya A.K. — A Study of the Aerial Biomass of some Forest Trees of Sagar: Madhya Bharati, Journal of the University of Sagar 19-21, 1971-73.

Contents

33. Misra R. et.al. — Determination of Age of Trees in Natural Tropical Deciduous Forests of Chakia: Tropical Ecology 15 (1 & 2) 1974.

34. Murphy, Peter G. — Rates of Primary Productivity in Tropical Grassland Savanna and Forest. Geo-Eco.Trop.1(2) 1971.
This is a very important paper as the researches of different workers have been consolidated. From this paper we obtain the NPP of tropical deciduous forests.

35. Murphy, Peter G. — Net Primary Productivity in Tropical Terrestral Ecosystems: Primary Productivity of the Biosphere pp.217-231.

36. Murphy, Peter G. — Tree Growth of El Verde and the Effects of Ionizing Radiation: A Tropical Rain Forest. pp.141-171.

37. Nicholson DI — A Study of Virgin Forest near Sandakan North Borneo. Proc. of Symp. on Ecological Research in Humid Tropics Vegetation, Kuching, Sarawak, July 1963.

38. Osmaston H.A. — Determination of Age/Girth and Similar Relationship in Tropical Forestry. Research Notes - Empire Forestry Review.

39. Palmer J.R. — Towards more Reasonable Objectives in Tropical High Forest Management for Timber Production: Commonwealth Forestry Review 54 (3/4)

40. Richards P.W. — Tropical Forests and Woodlands - An Overview: Agro-Ecosystems 3, 1977.

41. Schneider — Energy from Forest Biomass: The Forestry Chronicle 53(4), 1977.

42. Seth S.K. et.al. — Potential Productivity of Indian Forests: International Symposium on Tropical Ecology, 1971.

43. Shukla R.O. & Ramakrishnan P.S. — Productivity of Tropical Trees related to Successional Status: Forest Ecology and Management 9, 1984.

44. Singh, Gopal — A Geography of India

45. Singh, Jasbir — Effect of Habitat Conditions on the Regeneration of Tree Species at Idukki, Kerala: Environment & Ecology, 3(1), 1985.

46. Singh K.P. & Pandey O.N. — Cycling of Nitrogen in a Tropical Deciduous Forest: Proc. of Reg.Workshop on Nitrogen Cycling in South East Asian Wet Monsoonal Ecosystems, 1981.

Contents

47. Singh R.P. — Biomass, Nutrient and Productivity Structure of a Stand of Dry Deciduous Forest of Varanasi: Tropical Ecology 16(2), 1975.

48. Tanner E.V.J. — Four Montane Rain Forests of Jamaica. A Quantitative Characterisation of the Floristics. The Soils and the Foliar Mineral Levels and a Discussion of the Interrelations: Journal of Ecology 65, 1977.

49. Taylor, George(F)(II) — The Development of Forestry in India. A Re-examination of Forest Policy.

50. Unnikrishnan K.P. & Singh, Ravindra. — Construction of Volume Table - A General Approach : The Indian Forester 110(6), 1984. A different method for construction of volume equations using the computer programme VOLTAB is described.

51. Verma B.K.V.S.M. (Retd.) — Gang Rape in Kerala (The Disappearing Forest in Kerala), unpublished.

52. Wadsworth, H.Frank — Growth in the Lower Montane Rain Forest of Puerto Rico.

53. Weaver, Peter L. — The Growth in Several Tropical Forest of Puerto Rico: U.S. Department of Agriculture, Forest Service Research Paper No.152.

54. Wenger, Karl F. — Forestry Handbook, Second Edition. John Wiley & Sons.

55. Whittaker, Robert H. etc. — The Primary Production of the Biosphere: Symposium given at the second congress of the American Institute of Biological Sciences, Miami, Florida 1971.

56. Whittaker, R.H. — Forest Dimensions and Production in the Great Smoky Mountains: Ecology, 47 (1), 1966.

57. Whittaker, R.H. — Branch Dimensions and Estimation of Branch Productions: Ecology 46(3), 1965.

58. Wiersum, K.F. — Strategies and Designs for Afforestation, Reforestation and Tree planting: Pudoc Wageningen 1984.

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Contents