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INVENTORY SURVEY

(NON- FOREST AREA)
OF
HISAR DISTRICT

HARYANA STATE

INVENTORY RESULTS

Forest Survey Of India

Northern Zone

SHIMLA

1997

Contents

P R E F A C E

Forest Survey of India has taken up inventory surveys in the rural areas with the primary objective of assessing the distribution of trees and the Growing Stock in the rural areas and to have an overview of the various social forestry schemes implemented by the State Forest Departments. The inventory survey was carried out by stratified random sampling. One of the important points in this survey was to categorise various types of trees in a village. The categories were farm forestry, roadside plantations, village woodlots, block plantations, plantations done along canals, railway lines, ponds etc. This report pertains to Hisar district of Haryana state.

The geographical area of Hisar district is 6234.64 sq km. The survey was carried out during 1994-95 in the rural areas of the district covering an area of 387.92 sq.km.

Out of the total species inventoried,21 species have been presented separately on the basis of their predominance and commercial importance . Other species have been grouped together as miscellaneous .

The total number of trees in the district have been assessed at 50.82 lakhs i.e. 8.15 trees/ha and the corresponding volume has been assessed at 11.31 lakh cubic metres i.e. 1.814 cum /ha. Acacia nilotica have been found to have the largest representation with 16.13 lakh trees (31.93 %) while Acacia tortilis has the lowest representation amongst important species of the State.

It is hoped that this report will be of use, not only to the State Forest Department of Haryana but also to others.

The inventory survey and data processing work was carried out by Forest Survey of India, North Zone, Shimla. The work of the field staff and officers who were associated in carrying out the inventory survey, data processing and writing of this report, is appreciated.

(P.B.Gangopadhyaya)
Director
Forest Survey of India

Dehradun

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SUMMARY

1. To assess the availability of forest resources for the production of timber, fuelwood and raw material for paper pulp, matchwood, packing cases and essential oils etc. in areas outside the traditional Reserved Forests and those forest areas which could not be covered during the course of regular Inventory Survey of the district, it was proposed to carry out the inventory of such areas. The Inventory Survey has been carried out in the Hisar district during 1994-95.

2. As per 1981 Census, Hisar district had a total of 510 villages having a total area of 6234.64 Sq. km. out of which 33 villages having an area of 387.92 Sq. km. were randomly selected and surveyed.

3. In the entire rural area of Hisar district 50.82 lakh trees (8.15 trees/ha.) have been estimated. The analysis shows that when all the species are combined the maximum number of the estimated trees occur in 10-20 cm. dia-class i.e. 28.23 lakh trees (55.55%) and the minimum in 40 cms. and above dia-class i.e. 2.89 lakh trees (5.69%).

4. The specieswise distribution of total number of estimated trees shows that Acacia nilotica (Babul) has the largest representation i.e. 16.23 lakh trees (31.93%) followed by Dalbergia sissoo 12.88 lakh trees (25.34%), Eucalyptus spp. 7.50 lakh trees (14.75%), Prosopis cineraria 2.59 lakh trees (5.09%), Azadirachta indica 2.08 lakh trees (4.09%), Morus spp. 1.99 lakh trees (3.92%), Zizyphus spp. 1.62 lakh trees (3.19%), Psidium guyava 0.98 lakh trees (1.92%), Salvadora spp. 0.89 lakh trees (1.75%), Melia azedarch 0.70 lakh trees (1.37%), Acacia tochilis 0.60 lakh trees (1.18%). The representation of the rest of the species is less than 1% each.

5. The distribution of total number of trees categorywise and dia-classwise, when all the species are combined, shows that the representation of trees is maximum in the category-I - Farm forestry i.e 27.60 lakh trees (54.30%) and minimum in the category-VI - Railway lines i.e. 0.17 lakh trees (0.34%) for the combined dia-classes.

6. In the entire rural area of Hisar district, total estimated volume of all the species and dia-classes combined comes to 11.31 lakh cubic meter i.e. 1.814 cum./ha.

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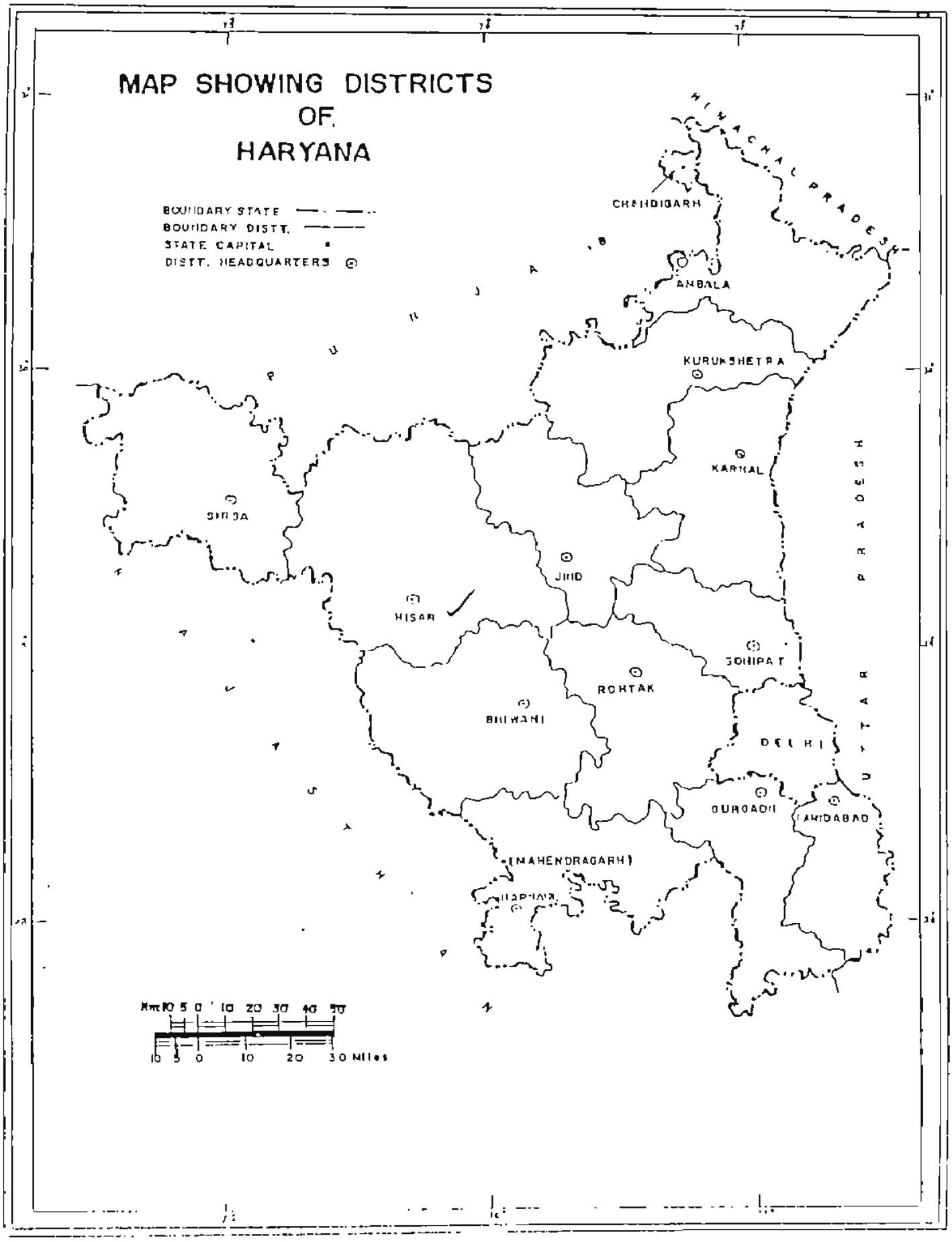
MAP SHOWING DISTRICTS
OF
HARYANA
BOUNDARY STATE
BOUNDARY DISTT.
STATE CAPITAL
DISTT. HEADQUARTERS
CHANDIGARH
ANBALA
KURUKSHETRA
KARNAL
SIRSA
JIND
HISAR
SONIPAT
ROHTAK
BHIWANI
DELHI
GURGAON
FARIDABAD
(MAHENDRAGARH)
UTTAR PRADESH
10 5 0 10 20 30 40 50
10 5 0 10 20 30 Miles

Contents

CHAPTER 1

1.1 Introduction

The aim of carrying out the inventory survey was to assess the availability of forest resources for the production of timber, fuelwood and raw material for paper pulp, packing cases, matchwood and essential oils etc. in areas outside the traditional Reserved Forests and those forest areas which could not be covered during the course of regular Inventory Survey of Haryana State.

1.2 Description of the District

Hisar district is a part of the Western Haryana Plain. The district has four tahsils namely Fatehabad, Iohana, Hansi and Hisar. The district derives its name from its headquarters town, called Hisar, which is an abbreviation of Hisar-e-Feroza, the name acquired by the original town of Warais, as a result of construction of a fort (Hisar) by Feroz Shah Tughlaq about A.D. 1354.

1.3 Location, Area, Population etc.

The district lies between 28° 53' 45" and 29° 49' 15" North latitudes and 75° 13' 15" and 76° 19' 10" East longitudes. On its North are the districts of Bathinda and Sangrur of Punjab state. To its east lies the district of Jind. Rohtak district lies on its south-east. On its south is the Bhiwani district. On its south west is Ganga nagar district of Rajasthan. Sirsa lies on its west. In its physical features, the district is dotted with sand dunes of various shapes and size particularly in south western part where steppe type of vegetation is available.

As per 1981 Census, the geographical area of district was 6234.64 sq. km. having a population of 1,496,534 of which 801,771 persons are male and 694,763 persons are female.

1.4 Physical Features
Soil, geology and topography

The district can be sub divided into three sub-micro regions on the basis of soils, topography, climate and national vegetation.

Contents

(a) Ghagger Flood Plain

The region spreads over the northern parts of the district, covering parts of Tohana and Fatehabad tahsils along the Ghagger river.The physiography of the region reveals that the northern part is relatively higher with the maximum height of 223 metres above mean sea level at village Bhurthi in Tohana tahsil whereas the southern is lower with the minimum height of 208 metres above mean sea level near village Manakpur in Fatehabad tahsil.

The soils are poorly permeable and their power of holding the moisture is less.Soils as classified by NBSS & LUP (ICAR), Nagpur are Usalfs-Ochrepts types of soils.

The soil found in the region is loam (Bhanger and Nardak). The soils, as classified by the NBSS & LUP (ICAR), Nagpur, are of Ochrepts and Orthids-Fluvents types.

Ustalfs: High base status-red loamy, red sandy & alluvial soils.

Ochrepts : Shallow black,brown & alluvial soils of northern region.

The region is largely cleared off natural vegetation for cultivation due to long occupancy.

As far as means of communications and transportation are concerned, all kinds of roads are found in the region. Maham and Kalanaur are two towns in the region. Main roads connecting Rohtak to Bhiwani, to Jind. to Hansi pass through the region. Two Railway lines Rohtak to Jind and Rewari to Fazilka also pass through the region.

(b) Hisar Plain

Except the Ghagger Flood Plain in the north and Dagar area and undulating plain with sand dunes in the south -west, the whole of remaining Hisar district is a plain area. It includes the southern parts of Tohana tahsil, central parts of Fatehabad tahsil, eastern parts of Hisar tahsil and whole of Hansi tahsil.

The loam and relatively sandy loam are the main soils found in the region. The soils as classified by the NBSS &LUP (ICAR), Nagpur Orthids-Fluvents,Psamments-Fluvents orthids, Ochrepts & Aquepts types of soils.

Contents

Orthids: Soils of arid region with some development
Fluvents: Alluvial soils (Recent alluvium)
Psamments: Sandy Soils(Recent)
Aquepts : Brown soils(Hydromorphic)
Ochrepts : Shallow black, brown and alluvial soils of northern region.

As far as means of communications are concerned this region is well developed

(c) Hisar Bagar

The region extends over the south-western parts of the district, covering the parts of Fatehabad and Hisar tahsils. It makes its boundaries with Hisar Plain in the north and east, Balsmand Undulating Plain with sand dunes in the south and state of Rajasthan and Sirsa district in the west.

The sand dunes are found in large scale in the region. The sand dunes are moving in their nature and their strikes may be parallel to wind direction.

(d) Balsmand Undulating Plain with sand dunes

The region spreads over south-western parts of Hisar district, covering a few villages lying under Hisar tahsil. It makes its limits with Rajasthan state in west , district Bhiwani in the south and east and Hisar Bagar and Hisar Plain in the north. The soils of the region is mostly sandy and loamy sand. Sandy soil allows water to flow through almost unimpeded. This characteristic causes the crops to suffer in the period of drought. These soils are suitable only to inferior food cereals. Soils as classified by the NBSS & LUP(ICAR), Nagpur, are Psamments-Fluvents-Orthids types of soils.

Psamments: Sandy soils(Recent)
Fluvents: Alluvial soils(Recent)
Orthids: Soils of arid region with some development.

Scattered bushes and scrubs are found as natural vegetation in the whole region. In view point of communication facilities the region has a railway from Siwani to Hisar. It also has the service of State Highway 19.

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1.5 Climate

This district lies in the Western Haryana Plain and has a hot and dry climate.

1.6 Rain

The rainfall is meagre and unreliable which is mainly concentrated during monsoon. Monsoon brings rain in the district from July to September. From October to June, the weather remains generally dry except a few showers received from the western cyclones. The rainfall varies from year to year. The rainfall during 1979-80 was only 217 mm against 578 mm during 1977-78 and 495 mm during 1978-79.

1.7 Temperature

Due to its distance from the sea and closeness to the Arid and Semi-arid areas of Haryana and Rajasthan. there is a great difference between the maximum and minimum temperatures of the day and night as well as during winter and summer.

The maximum temperature during summer months may reach more than 45 C during May-June. Hot dry winds blow during the day in summer due to its proximity to the arid areas of Haryana and Rajasthan. The minimum temperature during winter falls as low as 5 C during December-January.

1.8 Socio-economic conditions

The economy of the district is primarily agricultural. At the time of 1981 Census, about 69% of the total main workers were cultivators and agricultural labourers.Till the beginning of this century,the pattern of industrialisation remained mainly agriculture-oriented and need based. Above 15 factories had come up there for cleaning and processing of cotton by 1901 A.D. Subsequently this number increased. In fact, the real industrial development took place after the country became independent. After the inception of Haryana in 1966, the industrial horizon of the district was further expanded.

There were 196 registered working factories in the district during the year 1979 and estimated number of

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workers employed in them was 7323. 103 of these factories manufacture cotton textiles and 31 food products.The large and medium scale units are engaged in producing cotton and synthetic yarn, steel ingots/billets, hot rolled strips.bloom glass, plates, oxygen, ERW steel tubes,pipes and tubes etc.Hisar Textile Mills, Haryana Concast Limited, Jindal Strips Limited, Haryana-Tube Manufacturing Company (Pvt.) Limited,Nav Bharat Steels (Pvt) Limited , Jindal Industries Limited, Ravindra Tubes Limited at Hissar and Hansi Cooperative Spinning Mills at Hansi are some such units. Besides, there are many small scale units in the district and these are dominated by agro-based units like dal mills, cotton ginning factories, oil mills etc. Besides agro-based product, these units are engaged in the manufacture of furniture, wire drawing, air guns, surgical cotton, cycle tubes, nuts and bolts, steel re-rolling,fire bricks etc. The main cottage industries in the district are shoe making,carpentry, black smithy, tanning,pottery and weaving.

Irrigation in the district mostly depends upon canals. Area under canal irrigation during 1979-80 was 360 thousand hectares. Area under cultivation of foodgrains and cotton was 42.1 and 148.9 thousand hectares respectively during the year 1979-80. Among the foodgrains, mostly wheat, gram and bajra and grown. In 1977,the number of livestock in Haryana was 6,904,800 which includes cattle,buffaloes, horses and ponies, donkeys, sheep, goats, camels, and pigs etc. Hisar district contributed 812,600 animals to this figure and these mainly include cattle, buffaloes, sheep and goats. During 1979-80, the number of different types of motor vehicles on road was 93,583 in the State out of which 12,895 came from Hisar District.

Out of the total population of the district, 80.71% is the rural population and 19.29% is urban. 29.97% of the total population are literates. Literacy percentage among urban and rural population is 59.65% and 38.32% respectively while among male and female population is 41.46% and 16.71% respectively. Out of total population 29.97% are main workers, 2.74% are marginal workers, while 67.29% are non-workers.

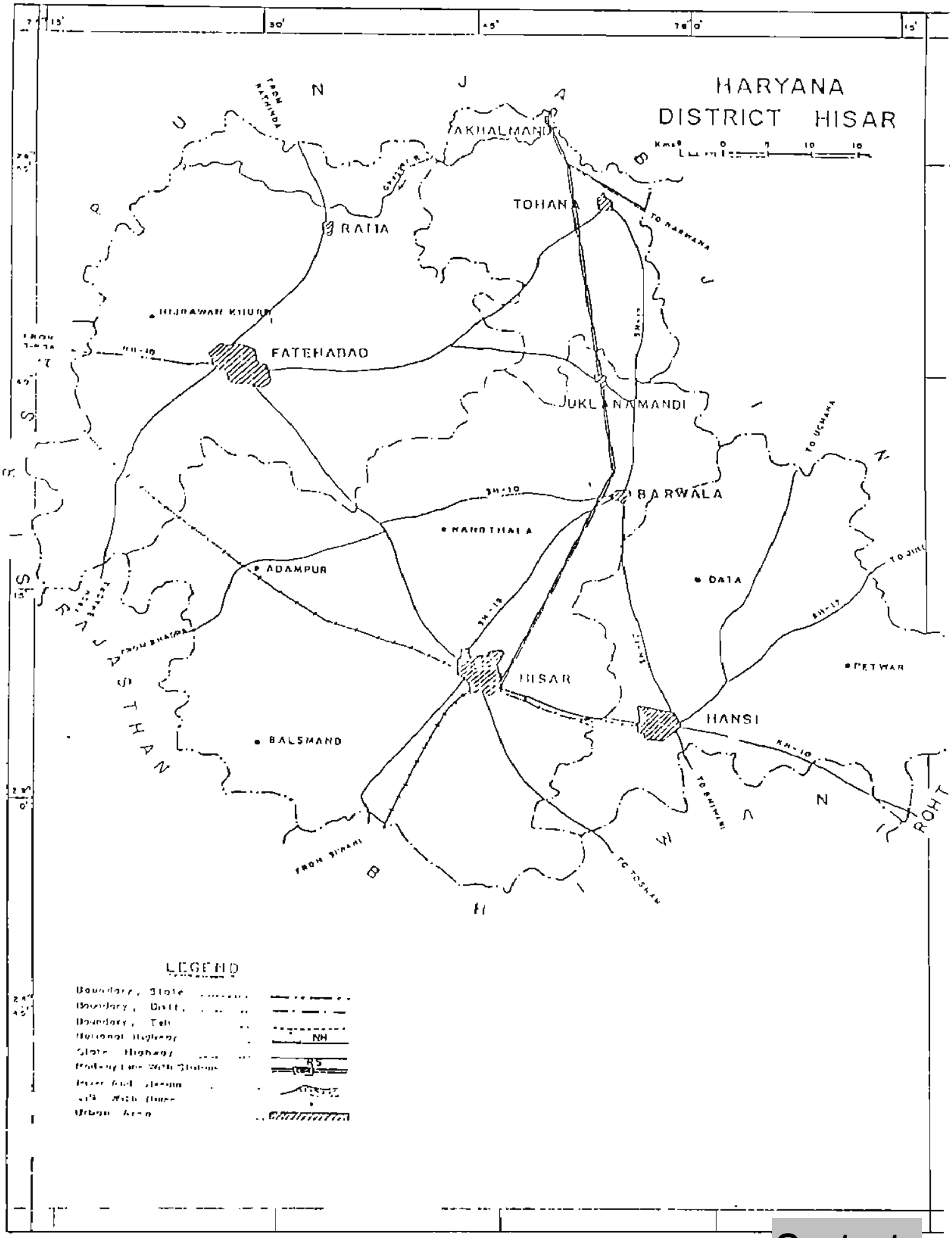
1.9 Uses

The trees provide mainly timber,fuelwood,fodder, fruit and shade. Timber is obtained mainly from *Dalbergia sissoo*, *Eucalyptus* spp., *Melia azedarch*, *Syzygium*

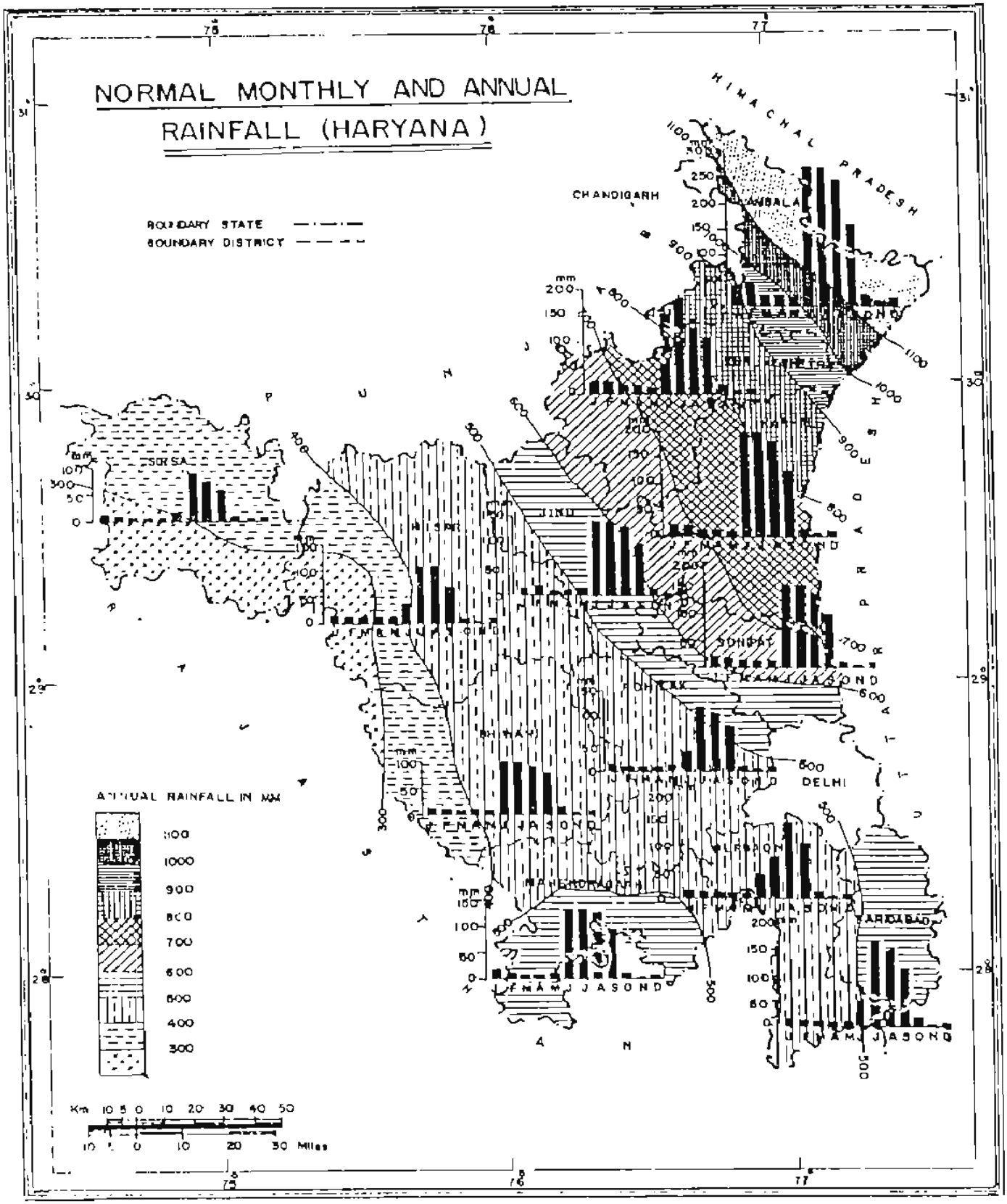
Contents

cumini, Morus alba, Mangifera indica, Azadirachta indica, Albizia spp. etc. Small timber is mainly obtained from Acacia nilotica, Acacia spp., Morus alba, Prosopis spp. etc. All the above mentioned tree spp.provide fuelwood also. Trees of Acacia nilotica, Albizia spp., Morus alba, Prosopis spp. etc. also provide fodder in the form of leaves or pods. Morus spp. provides wood for manufacturing hockey sticks and other spots goods. Populus spp. provide matchwood and Eucalyptus spp. paper pulpwood. Fruits are obtained from Zizyphus spp. and Syzygium cumini. Katha is extracted from Acacia catechu. Neem oil is obtained from Azadirachta indica.

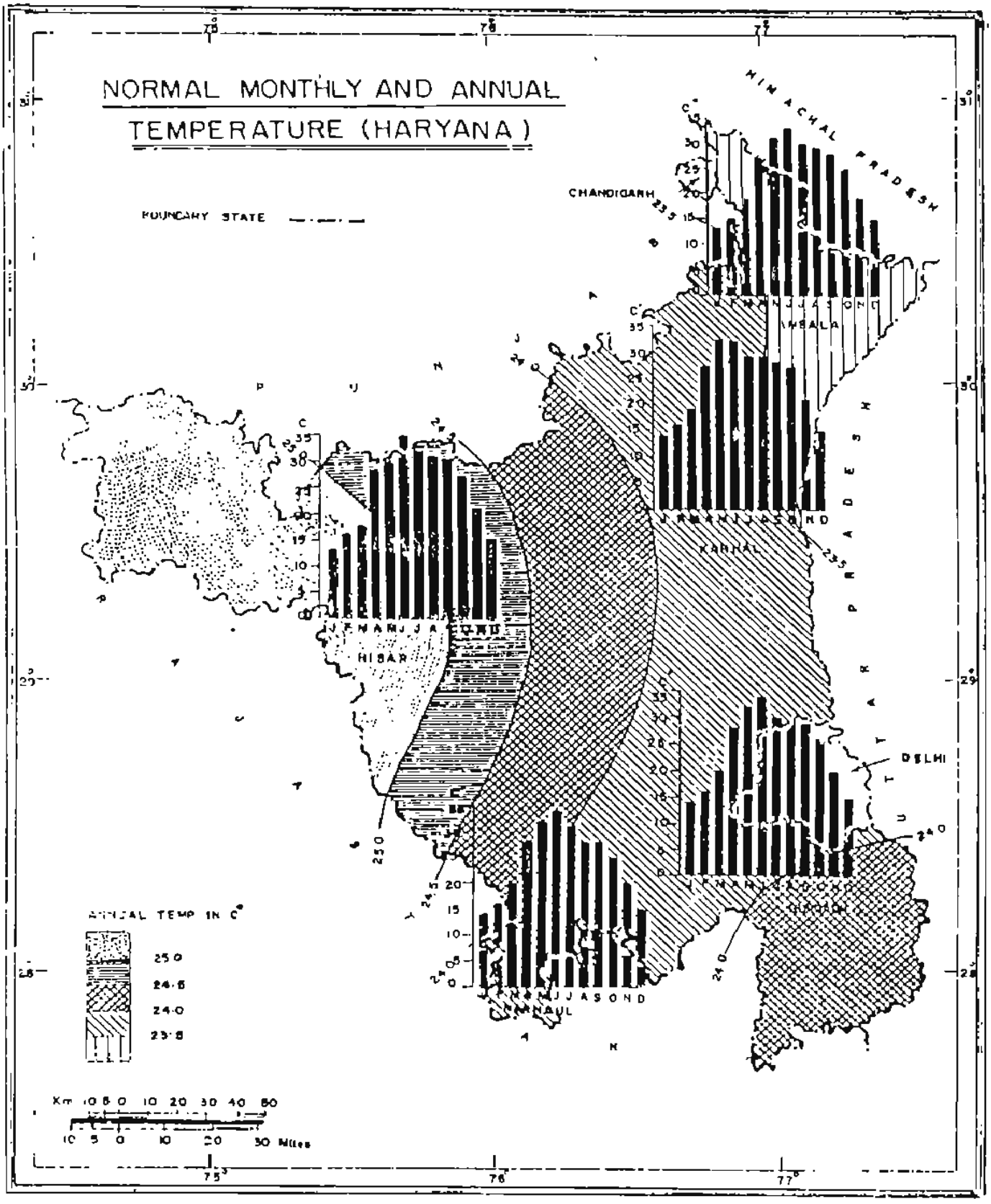
It has been seen that ban on felling green trees in Himachal Pradesh, packing cases for apple and other fruits/vegetables are being supplied from wood of Eucalytus spp. Eucalpytus wood is also used for making cheap furniture and as a fuelwood.


HARYANA
DISTRICT HISAR
AKHALMANDI
TOHANA
RATIA
FATEHABAD
JUKLANAMANDI
BARWALA
NARNOTHALA
ADAMPUR
DATA
HISAR
HANSI
BALSMAND
PETWAR
TO HARYANA
TO UCHANA
TO JIND
TO BHIWANI
TO TOSHAN
FROM SIRSA
FROM BHATINDA
NH-10
SH-10
SH-12
SH-17
LEGEND
Boundary, State
Boundary, Distt.
Boundary, Teh
National Highway
NH
State Highway
SH
Railway Line With Stations
Rivers And Streams
Urban Area

Contents


NORMAL MONTHLY AND ANNUAL RAINFALL (HARYANA)
BOUNDARY STATE
BOUNDARY DISTRICT
HIMACHAL PRADESH
CHANDIGARH
AMBALA
SIRSA
JIND
SONIPAT
DELHI
FARIDABAD
ANNUAL RAINFALL IN MM
1100
1000
900
800
700
600
500
400
300
Km 10 5 0 10 20 30 40 50
10 5 0 10 20 30 Miles

Contents


NORMAL MONTHLY AND ANNUAL
TEMPERATURE (HARYANA)
BOUNDARY STATE
HIMACHAL PRADESH
CHANDIGARH
AMBALA
KARNAL
HISAR
DELHI
GURGAON
KARNAUL
ANNUAL TEMP IN C°
25.0
24.5
24.0
23.5
Km 10 5 0 10 20 30 40 50
10 5 0 10 20 30 Miles

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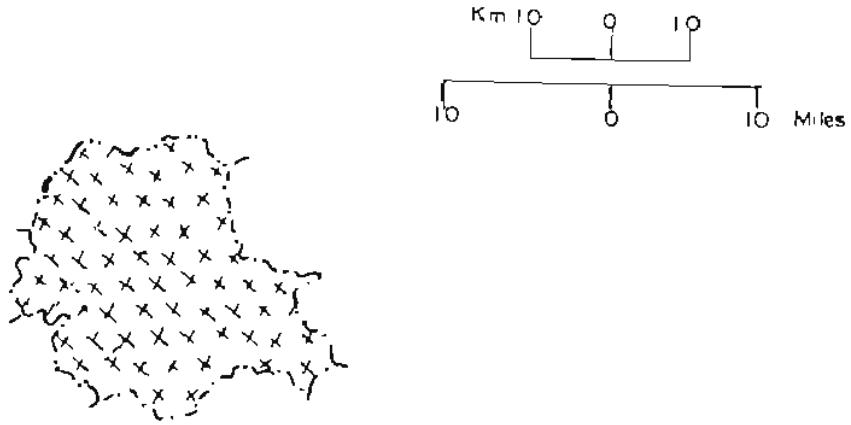
HARYANA

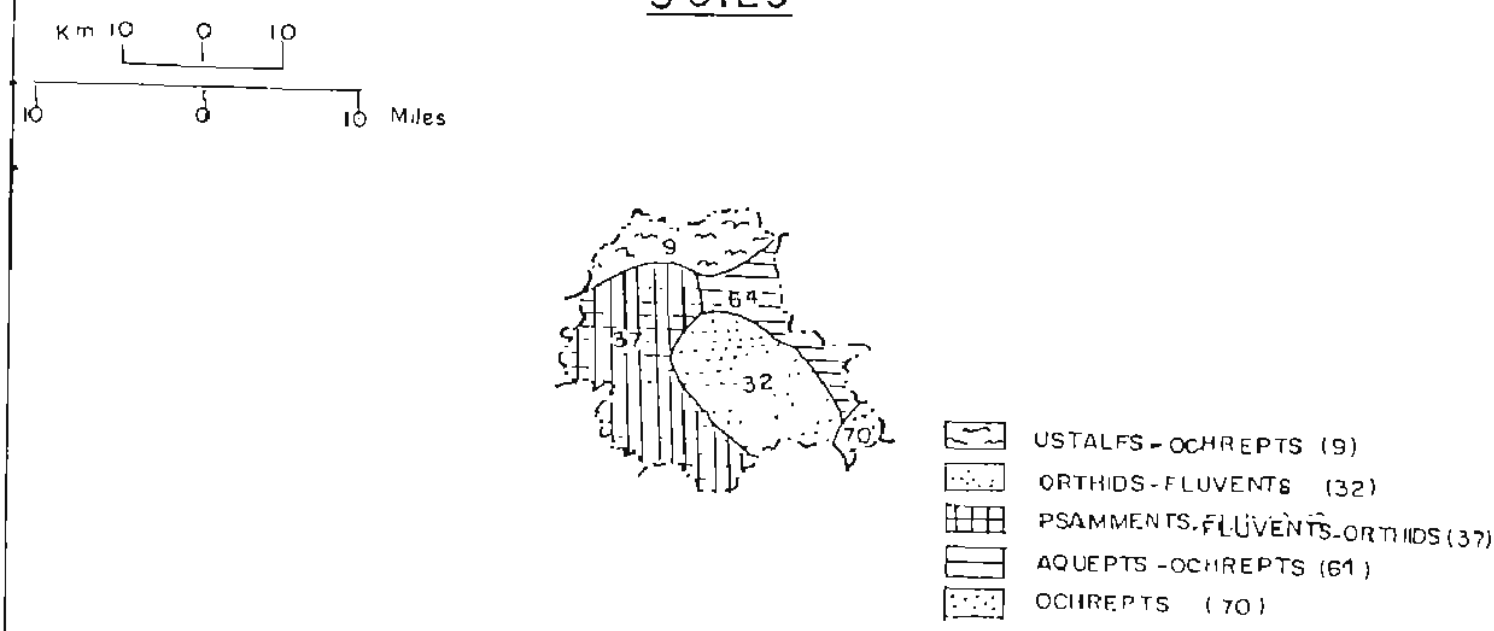
DISTRICT HISAR

GEOLOGY



ALLUVIUM RECENT

SOILS



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CHAPTER 2

2.1 Design and Methodology of Non-Forest Inventory Survey

District Census Books of Census Survey 1981 were used as basis of Inventory of Non-Forest Areas. A list of villages in the district was prepared and each village was given a serial number.

2.2 Definition of Non-Forest Area

For the purpose of this survey

(1) All those areas were taken which were outside the traditional Reserved Forest Areas.

(2) All those areas which satisfied the following conditions were also excluded:-

(a) All places within the Municipality, Corporation, Cantonment Board or a notified area Committee etc.

(b) All other places which satisfied the following criteria:-

(i) A minimum population of 5,000;

(ii) At least 75% of the male working population engaged in non-agricultural persuits and

(iii) A density of population of at least 400 per Sq.Km. (1,000 per Sq.mile).

In addition to all municipal areas/Cantonment Board, four villages namely (1) Babiyal in Ambala district, (2) Smalakha in Karnal district, (3) Gurgaon (rural) and (4) Jharsa in Gurgaon district satisfying the above criteria had been treated as Census towns (non-municipal) in 1981 Census. Panchkula Urban Estate in Ambala district had also been treated as a town. The Faridabad Complex Administration consisting of Faridabad, Faridabad Township and Ballabgarh towns of 1971 and some surrounding villages in Faridabad district had been treated as towns.

2.3 Sampling Design and Method of Selection of Sample Villages

The inventory survey was undertaken in the rural area (non-forest area only) of the state. The design followed in the field inventory was random sampling with the villages as sampling units. A list of villages of Hisar district was prepared according to 1981 Census and each

Contents

village was given a serial number.

Firstly, the number of sample villages to be surveyed in the state was decided by taking a pilot survey such that the results of the survey at State level would be at the precision level of ±10% at 95% probability.

For carrying out pilot survey, 2 to 3 villages were taken from each district of Haryana State. Total 31 villages were selected for pilot survey in Haryana State. A list of the villages selected for pilot survey is given in Appendix-I.

The villages selected for pilot survey were taken up one by one for carrying out complete enumeration of all the trees of 10 cms. and above diameter at B.Ht(DB). Each of these selected villages, with its area and boundaries as per the revenue records, was treated as a sampling unit.

After completing the pilot survey the data was processed for obtaining number of trees/Ha. in each village for calculation of sample size by using the formula

$$n = \frac{\left(\frac{2 * c.v.}{10}\right)^2}{1 + \frac{1}{N}\left(\frac{2 * c.v.}{10}\right)^2}$$

where $c.v. = \frac{s}{\bar{x}} * 100$ and

N = total no. of villages in the State.

For large N, it will be equal to

$$n = \left(\frac{2 * c.v.}{10}\right)^2$$

The method used was ratio method of estimation. The sample size obtained from pilot survey was 241 villages.

These 241 villages were distributed over all the dis-

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tricts proportional to the rural area of the district. A list of number of villages selected for each district is given in the Appendix-II.

These randomly selected villages in each district were taken up one by one for carrying out complete enumeration of all the trees of 10 cms. and above diameter. Each of these randomly selected villages, with its area and boundaries as per the revenue records, was treated as a sampling unit.

2.4 Field Methodology

The field data is collected by a Crew, consisting of one Junior Technical Assistant (Crew Leader), a Deputy Ranger, two Fieldmen, a Khalasi and unskilled labourers engaged locally wherever necessary for showing the boundary of the village as well as helping in the survey work.

Each Crew Leader is provided with a list of villages to be tackled alongwith a set of 1:50,000 scale maps with location of villages duly marked. The Crew Leader is required to find the nearest convenient route so that they can reach the village with minimum traverse by jeep or on fool. After reaching the village the next job is to determine the boundary of the village. For this purpose, the maps of the Revenue department are referred and in addition the help of village level authorities are obtained. The unit of sampling is the whole of sample village. To begin the data collection it is necessary to select the starting/reference point preferrably centre of the village. This reference point/centre is not necessarily to be the centre of the area. The details of the location of the reference point/centre and its description are recorded in the village description form. This is very important to enable the checking crew to reach this point and commence checking.

After fixing the starting/reference point, the enumeration work is started from the reference point by dividing the entire village into suitable sized angular quadrants with the help of compass in such a way that enumeration within each angular quadrant could be completed in one working day. The size of each angular quadrant is decided by the Crew Leader accordingly. Enumeration of trees/bamboo is commenced from the line marking due North from the centre/reference point and is proceeded in clockwise direction (i.e. North to East).

This procedure is important to avoid duplication/ommission of trees when the enumeration work is continued on the next day. Further, all the enumerated trees are suitably marked with chalk to achieve this objective. The informations regarding number of angular quadrants, the size of each angular quadrant and number of trees enumerated in each quadrant are recorded in the prescribed Field forms given below:

(1) Village Description Form
(2) Village Tree Enumeration Form
(3) District Tree Form

Samples of the above field forms may be seen in the Appendix-VI. The field forms are briefly described below:

(1) Village Description Form

The information regarding the conspicuous features of the point selected as the Centre for starting the enumeration, number of angular quadrant, Size of each angular quadrant and number of trees enumerated in each quadrant are recorded in this form.

(2) Village Tree Enumeration Form

In this form the data of all trees of 10 cms. and above diameter at breast height over bark [DBH(OB)] in a sampled village are recorded. The dead trees having utility less than 70% and all trees of less than 10 cms. diameter are ignored.

(3) District Tree Form

This form has to be filled in for each sampled village selected in the district.

While carrying out the survey, i.e. enumeration and measurement of trees, the category of each tree - indicating the type of plantation it belongs to is also recorded in the columns of Village Tree Enumeration Form. The definitions used for this classification are as under:

Farm Forestry: Trees along the farm bunds and in small patches up to 0.1 ha. in area.

Road side Plantation: Trees planted along the road side.

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Village Woodlot: Naturally growing trees on community/ private land.

Block Plantation: Patches covering an area of more than 0.1 ha. and not falling in any of the above.

Ponds: Trees planted in and around water ponds.

Railway Lines: Trees planted along the railway lines.

Canals: Trees planted along the canals.

Rest: Trees not falling in any of the above categories.

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CHAPTER 3

Data Processing

3.1 Processing of the Data

After completion of field work, the field forms of the villages surveyed were consolidated and checked for inconsistencies and Coding mistakes, if any. Forms for each village were then processed manually and information was filled in the tables. The species found in sample villages of Hisar district during survey are given in Appendix-III. Since many of the species in the region were having a very small number of trees, they were clubbed together under Miscellaneous species. Twenty main species were selected for calculating the number of stems on the basis of their numerical occurrance, commercial importance and regional importance. After manual processing of the data the tabulated data was then transferred to the data files in the Personal Computer (PC) using suitable softwares. The data files were then processed for making various tables in desired formats required to be incorporated in the Report.

3.2 Area Computation

Rural area of the district was calculated by adding up the areas of the villages given in the Census Book of 1981 of that district.

3.3 Procurement of Volume factors

Collection of felled tree data has been discontinued by zones, for developing volume equations. The volume factors have been obtained from the Logging Divisions and Territorial Forest Divisions of the State Forest Department of Haryana.

The volume factors used for different tree species have been given in the volume table at the end of this chapter.

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3.4 Estimation Procedure

The estimation procedure is given below:

Let

x_i = area of the ith village

y_i = volume/no. of trees for the ith village

n = no. of sample villages in the district/state

N = total no. of villages in the district/state

$\bar{x} = \sum^{n} x_i/n$ = average area per village in the sample

$\bar{X} = \sum^{N} x_i/N$ = average area per village in the population (District/State)

$\bar{y} = \sum^{n} y_i/n$ = average volume/no. of trees in the sample

$\bar{Y} = \sum^{N} y_i/N$ = average volume/no. of trees in the population (District/State)

$A = \sum^{N} x_i$ = total area of all villages in the population (District/State)

Then the mean volume/no. of trees per unit area for the population (District/State) is given by

$$\hat{R} = \frac{\bar{Y}}{\bar{X}}$$

The estimate of R is the sample ratio

$$\hat{R} = \frac{\sum^{n} y_i}{\sum^{n} x_i} = \frac{\bar{y}}{\bar{x}}$$

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The estimate of total volume/no. of trees in the population (District/State) is given by

$$\hat{T} = \frac{A * \bar{y}}{\bar{x}} = A * \hat{R}$$

$(y_i^2 - \hat{R}^2 x_i^2)$

Estimated variance of $\hat{R}$ is given by

$$\hat{V}(\hat{R}) = \frac{N - n}{N\, n\, \bar{x}^2} * \frac{1}{(n-1)} \left[\sum^{n} y_i^2 - 2\hat{R} \sum^{n} y_i x_i + \hat{R}^2 \sum^{n} x_i^2 \right]$$

When N is large, then

$$\hat{V}(\hat{R}) = \frac{1}{n(n-1)\bar{x}^2} \left[\sum^{n} y_i^2 - 2\hat{R} \sum^{n} y_i x_i + \hat{R}^2 \sum^{n} x_i^2 \right]$$

Estimated variance of $\hat{T}$ is given by

$$\hat{V}(\hat{T}) = A^2 * \hat{V}(\hat{R})$$

$$\text{S.E. of } \hat{R} = \sqrt{\hat{V}(\hat{R})} \quad \text{and} \quad \text{S.E.\%} = \frac{\text{S.E.}}{\hat{R}} * 100$$

$$\text{S.E. of } \hat{T} = \sqrt{\hat{V}(\hat{T})} \quad \text{and} \quad \text{S.E.\%} = \frac{\text{S.E.}}{\hat{T}} * 100$$

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Volume Table - specieswise and dia-classwise

S.No.	Name of Species	10-20	20-30	30-40	40+
1	*Acacia catechu*	0.10	0.21	0.51	1.13
2	*Acacia nilotica*	0.06	0.14	0.57	1.13
3	*Acacia* spp.	0.06	0.14	0.57	1.13
4	*Acacia tortilis*	0.06	0.14	0.57	1.13
5	*Albizia* spp.	0.06	0.14	0.57	1.13
6	*Azadirachta indica*	0.06	0.14	0.57	1.13
7	*Dalbergia sissoo*	0.06	0.14	0.57	1.13
8	*Eucalyptus* spp.	0.10	0.41	0.95	1.71
9	*Ficus* spp.	0.06	0.14	0.57	1.13
10	*Mangifera indica*	0.06	0.14	0.57	1.13
11	*Melia azedarach*	0.06	0.14	0.57	1.13
12	*Morus* spp.	0.06	0.14	0.57	1.13
13	*Populus* spp.	0.07	0.35	0.73	1.26
14	*Prosopis cineraria*	0.06	0.14	0.57	1.13
15	*Prosopis juliflora*	0.06	0.14	0.57	1.13
16	*Psidium guyava*	0.06	0.14	0.57	1.13
17	*Salvadora* spp.	0.06	0.14	0.57	1.13
18	*Syzygium cumini*	0.06	0.14	0.57	1.13
19	*Tamarix articulata*	0.06	0.14	0.57	1.13
20	*Zizyphus* spp.	0.06	0.14	0.57	1.13
21	Misc. spp.	0.06	0.14	0.57	1.13

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CHAPTER 4

Stand and Stock Tables

As per 1981 Census Hisar district has a total of 510 villages having an area of 6234.64 Sq. Km. Out of these, 33 villages having an area of 387.92 Sq. km. were randomly selected and surveyed (see Appendix-IV).

During the course of inventory, data have been collected for trees having 10 cms. and above diameter only. The data collected from 33 villages have been statistically analysed for variability in respect of stand and stock parameters of trees and "number of trees/ha.' and "volume/ha.' The analysis shows that the estimated number of trees/ha. is 8.15 and the corresponding volume is 1.814 cum./ha. for the entire district of Hisar.

The distribution of total number of stems and stems/ha. as well as corresponding total volume and volume/ha. which have been estimated on the basis of survey for the entire district have been included as table nos. 1 to 6.

In the entire rural area of Hisar district 50.82 lakh trees having volume of 11.31 lakh cubic meters have been estimated and the distribution thereof is discussed below:

1. The distribution of total number of trees (estimated), specieswise and dia-classwise (all categories combined), is given in table no. 1. The specieswise distribution of total number of trees in the State has been estimated by ratio estimation method.

The analysis shows that, when all species are combined, the maximum number of the estimated trees occur in 10-20 cms. dia-class i.e. 28.23 lakh trees (55.55%) followed by 14.07 lakh trees (27.68%) in 20-30 cms. dia-class, 5.63 lakh trees (11.08%) in 30-40 cms. dia-class and 2.89 lakh trees (5.68%) in 40 cms. and above dia-class.

It also shows that in the rural area of Hisar district, when all the dia-classes are combined, *Acacia nilotica* (Babul) has the largest representation i.e. 16.23 lakh trees (31.93%), followed by *Dalbergia sissoo* 12.88 lakh trees (25.34%), *Eucalyptus spp.* 7.50 lakh

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trees (14.75%). Prosopis cineraria 2.59 lakh trees (5.09%). Azadirachta indica 2.08 lakh trees (4.09%) Morus spp. 1.99 lakh trees (3.92%). Zizyphus spp. 1.62 lakh trees (3.19%). Psidium guyava 0.98 lakh trees (1.92%). Salvadora spp 0.89 lakh trees (1.75%). Melia azedarach 0.70 lakh trees (1.37%). and Acacia tortilis 0.60 lakh trees (1.18%). The representation of the rest of the species is less than 1% each.

2. The distribution of total number of trees (estimated), categorywise and dia-classwise (all species combined), is given in table no. 2.

It shows that, when all the dia-classes are combined, the representation of trees in Category-I - Farm Forestry is the highest i.e. 27.60 lakh trees (54.30%) followed by Category-VII - Canals 9.09 lakh trees (17.88%), Category-IV - Block plantations 5.60 lakh trees (11.01%), Category-III- Village woodlots 4.78 lakh trees (9.41%) and Category-II- Roadside plantation 3.25 lakh trees (6.39%). The representation of trees in Category-V - Ponds and Category-VI - Railway lines is found to be very poor while Category-VIII- Rest has been found to be absent.

The dia-classwise distribution of total number of stems and percentage thereof, for combined categories, are the same as in table no. 1 i.e. dia-classwise total number of trees for all species combined as already described above in para 1.

Though the overall distribution of stems per hectare is 8.15, the dia-classwise distribution of stems per hectare is maximum in dia-class 10-20 cms. i.e.4.53 followed by 2.26 in 20-30 cms dia-class, 0.90 in 30-40 cms. dia-class and 0.46 in 40 cms. and above dia-class.

3. The distribution of total number of estimated trees, specieswise and categorywise (all dia-classes combined), has been presented in table no. 3.

The specieswise total number of trees (all categotries combined) and the percentage thereof are the same as in table no. 1 i.e. specieswise distribution of total number of trees for combined dia-classes as already described above in para 1.

Similarly, categorywise total number of trees, estimated (all species combined) and the percentage thereof

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are also same as in table no. 2 i.e. categorywise total number of trees for combined dia-classes as described in para 2 above.

The analysis shows that the specieswise total number of estimated trees (in order of decreasing number) in the various prescribed categories are as under:

Category-I - Farm Forestry

As per the estimate, this category has a total number of 27.60 lakh trees (54.30%) which is the highest amongst all the categories. It is mainly comprised of Dalbergia sissoo 10.89 lakh trees, Acacia nilotica 7.55 lakh trees, Eucalyptus spp. 2.40 lakh trees, Azadirachta indica 1.94 lakh trees, Morus spp. 1.93 lakh trees, Melia azedarach 0.65 lakh trees, Prosopis juliflora 0.36 lakh trees, Ficus spp. 0.33 lakh trees, Psidium guyava 0.32 lakh trees, Syzygium cumini 0.27 lakh trees, Mangifera indica 0.22 lakh trees, Populas spp. 0.20 lakh trees, Albizia spp. 0.09 lakh trees and Acacia tortilis 0.04 lakh trees. The remaining species are represented very poorly.

Category-II - Roadside Plantation

As per the estimation there are 3.25 lakh trees (6.39%) in all in this category. It is mainly represented by Acacia nilotica 1.96 lakh trees, Eucalyptus spp. 0.57 lakh trees, Acacia tortilis 0.30 lakh trees, Dalbergia sissoo 0.16 lakh trees, Prosopis cineraria 0.07 lakh trees, Prosopis juliflora 0.04 lakh trees, Melia azedarach 0.04 lakh trees, Albizia spp. 0.02 lakh trees, Azadirachta indica 0.02 lakh trees, Zizyphus spp. 0.02 lakh trees and Ficus spp. 0.01 lakh trees. The representation of the remaining species is very poor and hence not presented here.

Category-III - Village Woodlots

In this category the total number of trees, as per the estimation, is 4.78 lakh trees (9.41%). The predominent species in this category are Prosopis cineraria 2.36 lakh trees, Zizyphus spp. 1.32 lakh trees, Salvadora spp. 0.81 lakh trees, Ficus spp. 0.05 lakh trees, Prosopis juliflora 0.02 lakh trees and Acacia nilotica 0.01 lakh trees. The remaining species have a poor representation.

Category-IV - Block Plantations

There are 5.60 lakh trees (11.01%) in all in this

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category. The main species forming bulk of the crop are Acacia nilotica 2.85 lakh trees, Zizyphus spp. 0.26 lakh trees, Acacia tortilis 0.22 lakh trees, Dalbergia sissoo 0.21 lakh trees, Populas spp. 0.06 lakh trees, Prosopis cineraria 0.05 lakh trees, Azadirachta indica 0.05 lakh trees and Albizia spp. 0.04 lakh trees. The representation of the remaining species being very poor are not mentioned here.

Category-V - Ponds

As per the estimate, there are only 0.34 lakh trees (0.67%) in this category. Acacia nilotica has 0.16 lakh trees, Salvadora spp. 0.06 lakh trees, Ficus spp. 0.03 lakh trees, Prosopis cineraria 0.03 lakh trees and Azadirachta indica 0.02 lakh trees. Other species are either absent or have a very poor representation.

Category-VI - Railway Lines

This category has 0.17 lakh trees (0.34%) in all. Acacia nilotica having 0.15 lakh trees is the only predominant spp. in this category while the rest of the main spp. are either very poorly represented or are found to be absent in this district.

Category-VII - Canals

It is estimated that this category in total has 9.09 lakh trees (17.88%). The main species in this category are Eucalyptus spp. 3.64 lakh trees, Acacia nilotica 3.55 lakh trees, Prosopis cineraria 0.08 lakh trees, Azadirachta indica 0.05 lakh trees, Morus spp. 0.04 lakh trees and Acacia tortilis 0.04 lakh trees. The representation of the rest of the spp. is very poor.

Category-VIII - Rest

This category is found to be altogether absent.

Analysis of Volume (Stock)

As per the estimate the entire rural area of Hisar district has a total volume (all species and dia-classes combined) of 11.31 lakh cubic metres corresponding to the estimated total of 50.82 lakh trees. The distribution of this stock is discussed below:

1. An assessment of dia-classwise and specieswise distribution of volume (all categories combined) has been presented in table no. 4. The dia-classwise total

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estimated volume of trees and percentage thereof (in decreasing order) of all species is as given below :

Dia-class 30-40 cms. having a volume of 3.45 lakh cubic metres (30.50%) followed by dia-class 40 cms. and above 3.31 lakh cubic metres (29.25%), 20-30 cms. having a volume of 2.69 lakh cubic metres (23.78%), and dia-class 10-20 cms. 1.86 lakh cubic metres (16.47%).

It also shows that the total volume per hectare contributed by trees of all species of all dia-classes combined is 1.814 cubic metres The volume per hectare for different dia-classes (in decreasing order) are as below:

30-40 cms. dia-class (0.553 cum.), 40 cms. and above dia-class (0.531 cum), 20-30 cms.dia-class (0.431 cum.), and 10-20 cms. dia-class (0.299 cum.).

It may also be seen from the said table that the bulk of the volume, for combined dia-classes, is mainly contributed by the following species (in decreasing order):

Acacia nilotica 3.13 lakh cubic metres (27.64%), Dalbergia sissoo 3.05 lakh cubic metres (26.98%), Eucalyptus spp. 2.22 lakh cubic metres (19.61%), Prosopis cineraria 0.61 lakh cubic metres (5.37%), Azadirachta indica 0.41 lakh cubic metres (3.60%), Morus spp. 0.39 lakh cubic metres (3.42%), Salvadora spp. 0.33 lakh cubic metres (2.94%), Zizyphus spp. 0.28 lakh cubic metres (2.51%) and Ficus spp. 0.22 lakh cubic metres (1.95%). The volume contributed by the rest of the species is very less.

2. The distribution of total volume (estimated), categorywise and dia-classwise (all species combined), is given in table no. 5.

It shows that, when all dia-classes are combined, category-I has the maximum volume of 6.14 lakh cubic metres (54.31%) followed by category-VII having 2.40 lakh cubic metres (21.22%), category-III having 1.19 lakh cubic metres (10.52%), category-II having 0.88 lakh cubic metres (7.76%) and category-IV having 0.55 lakh cubic metres (4.90%) and category-V having 0.12 lakh cubic metres (1.03%). Categories VI has less than 1% contribution, while category VIII has been found to be absent.

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It also shows that the dia-classwise total volume of all categories combined and the percentage thereof are the same as in table no. 4 i.e. dia-classwise total volume of all species combined as described in para 1 above.

3. The distribution of total estimated volume, specieswise and categorywise (all dia-classes combined), is given in table no. 6.

The specieswise total volume of trees (all categories combined) and the percentage thereof are the same as in table no. 4 i.e. specieswise distribution of total volume of trees for combined dia-classes as described above in para 1.

Similarly, the categorywise total volume of trees (all species combined) and the percentage thereof are also same as in table no. 5 i.e. categorywise total volume of trees for combined dia-classes as described in para 2 above.

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Table No. 1

Distribution of total number of stems - specieswise and dia-classwise
(All categories combined)

Rural area of HISAR DISTT. : 623464 Hectare

S.No.	Name of Species	10-20	20-30	30-40	40+	Total	% age
1	Acacia catechu	0	0	0	0	0	0.00
2	Acacia nilotica	917774	441095	183333	80777	1622979	31.93
3	Acacia spp.	14818	418	48	64	15348	0.30
4	Acacia tortilis	41032	14834	3520	595	59981	1.18
5	Albizia spp.	9113	4340	1463	1044	15960	0.31
6	Azadirachta indica	120539	53745	21439	12151	207874	4.09
7	Dalbergia sissoo	641996	368546	175376	101800	1287718	25.34
8	Eucalyptus spp.	416795	262488	62712	7538	749533	14.75
9	Ficus spp.	16538	9595	6365	14240	46738	0.92
10	Mangifera indica	9772	6477	3680	3086	23015	0.45
11	Melia azedarach	45725	17582	4790	1414	69511	1.37
12	Morus spp.	118723	48360	20636	11507	199226	3.92
13	Populus spp.	19768	5545	1045	129	26487	0.52
14.	Prosopis cineraria	121183	80424	39505	17406	258518	5.09
15	Prosopis juliflora	37073	5979	2218	788	46078	0.91
16	Psidium guvava	91481	5497	514	161	97653	1.92
17	Salvadora spp.	39151	19190	11427	19206	88974	1.75
18	Syzygium cumini	14512	8190	3133	2973	28798	0.57
19	Tamarix aphylla	160	112	128	176	576	0.01
20	Zizyphus spp.	102684	37624	14241	7779	162328	3.19
21	Misc. spp.	44552	16925	7538	6059	75074	1.48
	Total	2823409	1406956	563111	289893	5082369	100.00
	% age	55.55	27.68	11.08	5.68	100.00	

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Table No. 2

Distribution of total number of stems - categorywise and dia-classwise
(All species combined)

Rural area of HISAR DISTT. : 623454 hect

S.No.	Category	10-20	20-30	30-40	40+	Total	% age
1	I	1488972	774477	324540	171664	2759653	54.30
2	II	121037	133975	52154	17839	325005	6.39
3	III	239665	139617	63372	44408	478062	9.41
4	IV	493430	61862	9562	4757	559611	11.01
5	V	15202	8180	4532	6204	34118	0.67
6	VI	9160	5721	1687	513	17081	0.34
7	VII	465943	292124	107264	43508	908839	17.88
8	VIII	0	0	0	0	0	0.00
	Total	2823409	1406956	563111	288893	5082369	100.00
	% age	55.55	27.68	11.08	5.68	100.00	
	Stems/ha.	4.53	2.26	0.90	0.46	8.15	

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Table No. 3

Distribution of total number of stems - speciesWise and categorywise
(All dia-classes combined)

Rural area of HISAR DISTT. : 623464 Hectare

S.No.	Name of Species	I	II	III	IV	V	VI	VII	VIII	Total	% age
1	Acacia catechu	0	0	0	0	0	0	0	0	0	0.00
2	Acacia nilotica	754997	196303	1030	284891	15670	14657	355431	0	1622979	31.93
3	Acacia spp.	755	64	48	14481	0	0	0	0	15348	0.30
4	Acacia tortilis	4163	29637	0	21520	0	1141	3520	0	59981	1.18
5	Albizia spp.	8808	2250	241	3665	224	80	692	0	15960	0.31
6	Azadirachta indica	193908	2250	0	4742	1928	498	4548	0	207874	4.09
7	Dalbergia sissoo	1088892	16168	0	21424	659	273	160302	0	1287718	25.34
8	Eucalyptus spp.	240131	56686	0	88766	64	0	363886	0	749533	14.75
9	Ficus spp.	32754	1367	5224	2314	2861	80	2138	0	46738	0.92
10	Mangifera indica	21617	96	0	1254	0	0	48	0	23015	0.45
11	Melia azedarach	64642	4130	16	402	48	64	209	0	69511	1.37
12	Morus spp.	193056	401	48	1141	401	0	4179	0	199226	3.92
13	Populus spp.	20220	48	0	6139	0	0	80	0	26487	0.52
14	Prosopis cineraria	16	7184	235663	5385	2636	128	7506	0	258518	5.09
15	Prosopis juliflora	35584	4452	1671	2861	16	96	1398	0	46078	0.91
16	Psidium guvava	32209	0	0	65412	0	0	32	0	97653	1.92
17	Salvadora spp.	80	225	81469	804	5979	48	369	0	88974	1.75
18	Syzygium cumini	27161	96	0	1140	0	0	401	0	28798	0.57
19	Tamarix aphylla	336	32	192	16	0	0	0	0	576	0.01
20	Zizyphus spp.	0	1591	131903	26021	257	0	2556	0	162328	3.19
21	Misc. spp.	40324	2025	20557	7233	3375	16	1544	0	75074	1.48
	Total	2759653	325005	478062	559611	34118	17081	908839	0	5082369	100.00
	% age	54.30	6.39	9.41	11.01	0.67	0.34	17.88	0	100.00	

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Table No. 4

Distribution of total volume (cum.) - specieswise and dia-classwise
(All categories combined)

Rural area of HISAR DISTT. : 623464 Hectare

S.No.	Name of Species	10-20	20-30	30-40	40+	Total	% age	Vol./ha.
1	Acacia catechu	0.000	0.000	0.000	0.000	0.00	0.00	0.000
2	Acacia nilotica	55066.440	61753.300	104499.810	91278.010	312597.56	27.64	0.501
3	Acacia spp.	889.080	58.520	27.360	72.320	1047.28	0.09	0.002
4	Acacia tortilis	2461.920	2076.760	2006.400	672.350	7217.43	0.64	0.012
5	Albizia spp.	546.780	607.600	833.910	1179.720	3168.01	0.28	0.005
6	Azadirachta indica	7232.340	7524.300	12220.230	13730.630	40707.50	3.60	0.065
7	Dalbergia sissoo	38519.760	51596.440	99964.320	115034.000	305114.52	26.98	0.489
8	Eucalyptus spp.	41679.500	107620.080	59576.400	12889.980	221765.96	19.61	0.356
9	Ficus spp.	992.280	1343.300	3628.050	16091.200	22054.83	1.95	0.035
10	Mangifera indica	586.320	906.780	2097.600	3487.180	7077.88	0.63	0.011
11	Melia azedarach	2743.500	2461.480	2730.300	1597.820	9533.10	0.84	0.015
12	Morus spp.	7123.380	6770.400	11762.520	13002.910	38659.21	3.42	0.062
13	Populus spp.	1383.760	1940.750	762.850	162.540	4249.90	0.38	0.007
14	Prosopis cineraria	7270.980	11259.360	22517.850	19668.780	60716.97	5.37	0.097
15	Prosopis juliflora	2225.580	837.060	1264.260	890.440	5217.34	0.46	0.008
16	Psidium guvava	5488.860	769.580	292.980	181.930	6733.35	0.60	0.011
17	Salvadora spp.	2349.060	2686.600	6513.390	21702.780	33251.83	2.94	0.053
18	Syzygium cumini	870.720	1145.200	1785.810	3359.490	7161.22	0.63	0.011
19	Tamarix aphylla	9.600	15.680	72.960	198.880	297.12	0.03	0.000
20	Zizyphus spp.	6161.040	5267.360	8117.370	8790.270	28336.04	2.51	0.045
21	Misc. spp.	2673.120	2369.500	4296.660	6846.670	16185.95	1.43	0.026
	Total	186274.02	269010.05	344971.03	330837.90	1131093.00	100.00	1.814
	% age	16.47	23.78	30.50	29.25	100.00		
	Vol./ha.	0.299	0.431	0.553	0.531	1.814		

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Table No. 5

Distribution of total volume (cum.) - categorywise and dia-classwise
(All species combined)

Rural area of HISAR DISTT. : 623464 Hectare

S.No.	Category	10-20	20-30	30-40	40+	Total	% age
1	I	94912.570	132613.890	191463.760	195309.290	614299.51	54.31
2	II	7985.300	27435.380	32140.020	20232.890	87793.59	7.76
3	III	14379.900	18286.380	36122.040	50181.040	118969.36	10.52
4	IV	32073.150	11967.370	5896.080	5489.430	55426.03	4.90
5	V	914.680	1145.200	2583.240	7010.520	11653.64	1.03
6	VI	549.600	800.940	961.590	579.690	2891.82	0.26
7	VII	35458.820	76760.890	75804.300	52035.040	240059.05	21.22
8	VIII	0.000	0.000	0.000	0.000	0.000	0.00
	Total	186274.02	269010.05	344971.03	330837.90	1131093.00	100.00
	% age	16.47	23.78	30.50	29.25	100.00	

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Table No. 6

Distribution of total volume (cum.) - specieswise and categorywise
(All dia-classes combined)

Rural area of HISAR DISTT. 623464 Hectare

S.No	Name of Species	I	II	III	IV	V	VI	VII	VIII	Total	% age
1	Acacia catechu	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
2	Acacia nilotica	142987.430	51306.530	322.590	24709.270	4173.750	2429.020	86668.980	0.000	312597.560	27.64
3	Acacia spp.	99.220	14.560	28.160	905.340	0.000	0.000	0.000	0.000	1047.280	0.09
4	Acacia tortilis	452.290	4466.400	0.000	1404.000	0.000	72.300	822.440	0.000	7217.430	0.64
5	Albizia spp.	1930.930	404.310	18.300	399.290	52.480	57.440	305.260	0.000	3168.010	0.28
6	Azadirachta indica	37898.290	449.660	0.000	654.020	846.010	93.320	767.210	0.000	40707.500	3.60
7	Dalbergia sissoo	269073.730	4063.040	0.000	3060.190	218.770	122.140	28576.650	0.000	305114.520	26.98
8	Eucalyptus spp.	68214.200	21236.730	0.000	13980.950	6.400	0.000	118327.680	0.000	221765.960	19.61
9	Ficus spp.	15461.190	785.820	2548.330	596.660	1625.790	7.360	1029.680	0.000	22054.830	1.95
10	Mangifera indica	6566.820	74.720	0.000	433.460	0.000	0.000	2.880	0.000	7077.880	0.63
11	Melia azedarach	7975.600	1499.080	2.240	29.240	2.880	6.400	17.660	0.000	9533.100	0.84
12	Morus spp.	37579.720	81.820	11.040	133.180	53.660	0.000	799.790	0.000	38659.210	3.42
13	Populus spp.	3783.210	3.360	0.000	448.770	0.000	0.000	14.560	0.000	4249.900	0.38
14	Prosopis cineraria	9.120	880.860	56559.020	956.980	854.920	60.800	1396.270	0.000	60716.970	5.37
15	Prosopis juliflora	2915.960	1845.820	104.100	172.940	2.240	5.760	170.520	0.000	5217.340	0.46
16	Psidium guyava	2526.310	0.000	0.000	4188.800	0.000	0.000	18.240	0.000	6733.350	0.60
17	Salvadora spp.	47.200	100.380	29993.030	379.180	2637.100	36.320	58.620	0.000	33251.830	2.94
18	Syzygium cumini	6881.320	20.320	0.000	195.680	0.000	0.000	63.900	0.000	7161.220	0.63
19	Tamarix aphylla	144.000	36.160	116.000	0.960	0.000	0.000	0.000	0.000	297.120	0.03
20	Zizyphus spp.	0.000	225.010	25266.730	2144.550	36.380	0.000	663.370	0.000	28336.040	2.51
21	Misc. spp.	9752.980	300.010	4000.830	632.570	1143.260	0.960	355.340	0.000	16185.950	1.43
	Total	614299.510	87793.590	118969.360	55426.030	11653.640	2891.820	240059.050	0.000	1131093.000	100.00
	% age	54.31	7.76	10.52	4.90	1.03	0.26	21.22	0.00	100.00	

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Appendix-I

List of villages selected for Pilot Survey in Haryana State.

S.No.	Name of the village	Area of Village (Ha.)
1.	Badhana	1479.51
2.	Baidwala	1416.39
3.	Bhandari	677.00
4.	Bhatoo	583.00
5.	Bandhalan	2353.00
6.	B. Rusna	248.00
7.	B. Jaura	184.99
8.	Dechaur	2731.00
9.	Dighal	7211.00
10.	Dohki	2996.00
11.	Gorakhpur	4370.00
12.	Gurukhi	1720.00
13.	Hajraki	480.00
14.	Kalmour	2762.00
15.	Khandolheri	7324.00
16.	Khartihara	979.00
17.	Kona	766.28
18.	Kucamanwali	1479.00
19.	Kalathasingh	140.00
20.	Latheri	267.09
21.	Hammonmaira	199.51
22.	Mohammedpur	1731.00
23.	Nandgaon	825.14
24.	Nathusari	1741.00
25.	Phadani	208.00
26.	Gaipur	130.00
27.	Saundhad	2753.00
28.	Shampura	1017.00
29.	Shoadapur	316.05
30.	Siwara	1126.00
31.	Sulehra	972.00
	Total	40182.90

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Appendix - II

Districtwise number of the villages selected for Inventory Survey in Haryana State.

S.No.	Name of the District	Total no. of villages in the District	No. of villages selected for survey
1.	Ambala	1306	39
2.	Bhiwani	428	23
3.	Faridabad	505	11
4.	Gurgaon	721	14
5.	Hisar	510	33
6.	Jind	354	16
7.	Kurukshetra	743	20
8.	Karnal	634	18
9.	Mohindergarh	743	16
10.	Rohtak	458	19
11.	Sirsa	323	21
12.	Sonipat	348	11
	Total	7075	241

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Appendix - III

List of species found in Sample villages in Hisar District.

S.No.	Botanical name	Common name
1	2	3
1.	Acacia lenticularis	Safed babul, Amiar. Kanti, Gohira
2.	Acacia nilotica	Babul, Kikar, Bawar, Baval
3.	Acacia tortilis	Israeli Kikar
4.	Ailanthus excelsa	Maharukh, Ardusa, Butazod, Arru, Mahalimla
5.	Albizia lebbek	Kala siris, Kalbage, Koko, Siris, Dhander, Sarsaoda
6.	Albizia procera	Safed siris/siras. Karha, Karhar, Karhai
7.	Azadirachta indica	Neem, Nimbo, Nibbaro, Vepa
8.	Bombax ceiba	Semal, Savar, Semer, Shimola, Simul, Elavu, Buruga
9.	Butea monosperma	Palas, Dhak, Palasin, Kakhar
10.	Cassia fistula	Amaltas, Bahra, Bhawa, Sonari
11.	Cassia siamea	Minjiri. Nellatangedu
12.	Cassia spp.	
13.	Cordia spp.	Lassora, Bairula, Borala
14.	Dalbergia sissoo	Sisoo. Shisham, Tahli
15.	Delonix regia	Gulmohar, Krishnachura, Golmohan
16.	Emblica offininalis	Amla. Amlaki. Aonla Nellimara
17.	Eucalyptus spp.	Nilgiri, Safeda
18.	Ficus bengalensis Ficus elastica	Bargat. Bad. Fig Ved, Vadlo
19.	Ficus religiosa	Pipal, Pipli, Papada, Pripara
20.	Ficus spp.	Anjar, Akhar, Budita
21.	Kigelia africana	
22.	Mangifera indica	Am. Amb, Ambo, Mavu, Moru
23.	Melia azedarach	Bijain, Baknia, Betain. Bakain
24.	Mitragyna parvifolia	Phaldu, Mundi. Kaiz, Paltaganum
25.	Moringa spp.	Sajna, Sohjna, Sanjna, Sajna

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26.	Morus spp.	Tut, Fimu, Shahtoot
27.	Phoenix sylvestris	Khajur, Betha
28.	Populus spp.	Banpipal, Godhpipal, Pahari Pipal
29.	Prosopis cineraria	Jand, Jant
30.	Prosopis juliflora	Juliflora
31.	Prunus spp.	Aru, Aria, Gont, Khurmani
32.	Psidium guyava	Amrud
33.	Salvadora spp.	Jal, Jhal
34.	Syzygium cumini	Jamun, Jamoon, Jamak
35.	Tamarindus indica	Imli, Amli, Ambli, Chinch
36.	Tamarix aphylla	France, Farash
37.	Tectona grandis	Sagwan, Teak, Sagun, Thelu
38.	Tecomella undulata	Rohera
39.	Zizyphus mauratiana	Ber
40.	Zizyphus spp.	

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Appendix-IV

List of the villages Surveyed in Hisar District.

S.No.	Name of the village	Name of Tehsil	Area (Ha)	Map sheet No.
1.	Mohamadpur	Fatehabad	1731	44 O/11
2.	Bhatoo	Tohana	583	44 O/14
3.	Dhobi	Hisar	2896	44 O/12
4.	Gorakhpur	Fatehabad	4370	44 O/11
5.	Khandakheri	Hansi	2324	53 C/4
6.	Akhanwali	Tohana	1160	44 O/14
7.	Kheriroj	Hansi	264	53 C/3
8.	Bhoda Hoshnak	Fatehabad	395	44 O/11
9.	Mohla	Hansi	789	53 C/8
10.	Karnoli	Fatehabad	1015	44 O/6
11.	Shekhpur	Hansi	1316	53 C/4
12.	Sirdhan	Fatehabad	418	44 O/7
13.	Badhai khera	Tohana	472	44 O/14
14.	Neoli kalan	Hisar	1334	44 O/12
15.	Babanpur	Fatehabad	1139	44 O/9
16.	Chandu kalan	Fatehabad	437	44 O/9
17.	Teliwara	Fatehabad	542	44 O/9
18.	Khanora	Tohana	322	44 O/14
19.	Kulana	Hansi	618	44 O/16
20.	Bhudhanpura	Tohana	221	44 O/14
21.	Dora.	Fatehabad	307	44 O/6
22.	Chuli kalan	Hisar	1141	44 O/7
23.	Taliwari	Tohana	356	44 O/13
24.	Bandaheri	Hisar	1806	44 O/8
25.	Kothi kalan	Hansi	3033	53 C/3
26.	Nangal	Fatehabad	1217	44 O/9
27.	Dhiranwas	Hisar	469	44 O/12
28.	Rasulpur	Tohana	305	44 O/10
29.	Chankothi	Fatehabad	3250	44 O/6
30.	Kharkhara	Hansi	1072	53 C/4
31.	Malwa	Fatehabad	243	44 O/6
32.	Banchhapur	Hansi	925	53 C/8
33.	Kharak	Hansi	2322	53 C/3
	Total		38792	

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Appendix - V

Definitions of Categories

Code No.	Category	Definition
1.	Farm forestry	Trees along the farm bunds and in small patches upto 0.1 ha. in area.
2.	Roadside plantation	Trees planted along the roadside.
3.	Village woodlot	Naturally growing trees on private/community land.
4.	Block Plantation	Block plantation having an area of more than 0.1 ha. and not falling in any of the above categories.
5.	Ponds	Trees planted in and around water ponds.
6.	Railway lines	Trees planted along the railway lines.
7.	Canals	Trees planted along the canals.
8.	Rest	Trees not falling in any of the above categories.

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APPENDIX-VI

FIELD FORMS

Contents

DISTRICT TREE FORM

(ABSTRACT OF ENUMERATION IN SAMPLE VILLAGES)

JOB NO.	CARD DESIGN NO.	STATE	DISTRICT	NO. OF VILLAGES IN THE DISTRICT	NO OF SAMPLE VILLAGES IN THE DISTT.	TOTAL AREA OF THE VILLAGES IN THE DISTT. (Km^2)	SAMPLE VILLAGE	GEOGRAPHICAL AREA OF THE SAMPLE VILL. (Hect.)	CATEGORY OF THE SAMPLE VILLAGE
1- 3	4- 6	7-8	9- 10	11- 15	16-17	18 - 22	23- 27	28- 31	32

Number Of Trees In The Sample Village According To Category Of The Plantation / Trees

FARM FORESTY	ROAD SIDE PLANTATION	VILLAGE WOODLOT	BLOCK PLANTATION	PONDS	RAILWAY LINES	CANALS	REST	TOTAL
33- 36	37 - 40	41 — 44	45 — 48	49 - 52	53- 56	57- 60	61 — 64	65- 70

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Sign. Of Crew Leader .....
Name Of Crew Leader .....

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VILLAGE DESCRIPTION FORM

1. State and code
2. Division and code
3. District and code
4. Mapsheet and code
5. Name of the Village
6. Area of the Village
7. Crew Leader (Name)
8. Date of commencement of survey
9. Date of completion of survey
10. Conspicuous feature selected as the centre for starting the survey
11. Description of this centre and approach to this point
12. Number of angular quadrants into which the area of village has been divided (give size of quadrants in degrees)
13. Compassing done by
14. Tree enumeration done by
15. Height measurements taken by

P.T.O.

Contents

16. B. T. and other measurements
Taken by

17. Quadrant-wise summary of enumerations

QUADRANT No.	DATE OF SURVEY	TOTAL No. OF TREES

Dated :

Signature of
Crew Leader

Diagram etc. of village

Contents

गाँव वृक्ष गणना फार्म/VILLAGE TREE ENUMERATION FORM

जॉब नम्बर Job No.	कार्ड रूप रेखा Card design	राज्य State	जिला District	प्रतिदर्श गाँव Sample Vill	Geographical area of the Sample Village (Hect.)	प्रतिदर्श गाँव का भौगोलिक क्षेत्र हैक्ट.
1-3	4-6	7-8	9-10	11-15	16-19	

वृक्षों की कुल संख्या Total No. of Trees
42.47

स्पीशीज/जाति SPECIES नाम Name	कोड Code	डी बी एच (सी एम) DBH OB (CM)	वृक्ष की ऊँचाई (मी.) Tree Height (Mt.)	क्लीयर बोल/ स्पष्ट प्रस्तम (मी.) Clear Bole (Mt.)	पौध रोपण/वृक्षों की वर्ग Category of Plantation/Trees	स्पीशीज/जाति SPECIES नाम Name	कोड Code	डी बी एच (सी एम) DBH OB (Cm)	वृक्ष की ऊँचाई (मी.) Tree Height (Mt.)	क्लीयर बोल/ स्पष्ट प्रस्तम (मी.) Clear Bole (Mt.)	पौध रोपण/वृक्षों की वर्ग Category of Plantation/Trees
	20-22	23-25	26-27	28-29			31-33	34-36	37-38	39-40	14

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