For Official Use Only

INVENTORY SURVEY

(Non - Forest Area)

OF

ROHTAK DISTRICT

(HARYANA STATE)

INVENTORY RESULTS

FOREST SURVEY OF INDIA
NORTHERN ZONE
SHIMLA-1
1995

Contents

For Official Use Only

INVENTORY SURVEY

(NON- FOREST AREA)

OF

ROHTAK DISTRICT

HARYANA STATE

INVENTORY RESULTS

FOREST SURVEY OF INDIA

NORTHERN ZONE

SHIMLA - 1

1995

Contents

P R E F A C E

Forest Survey of India, for the first time took 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 according to stratified random sampling methodology. One of the important point in this survey was to categorise various types of trees in a village.The categories were farm forestry, road side plantations, village woodlots, block plantations, plantations done along canals, railway lines, ponds and others. This report pertains to district ~~Sonipat~~ Rohtak of Haryana State.

The geographical area of Rohtak district is 3841 sq. kms. The survey was carried out during 1992-93 in the rural area of the district covering an area of 3788.08 sq. kms.

Out of the total species inventoried, 20 species on the basis of their predominance and commercial importance have been presented seprarately. Other species have been grouped together as miscellaneous.

The total number of trees in the district have been assessed at 47.34 lakh i.e.12.50 trees/ha. and the corresponding volume has been assessed at 8.82lakh cum.i.e.2.327cum./ha.Acacia nilotica(Babul) have been found to have the largest representation with 7.43 lakh trees(17.64%) while Poplar has the lowest representation.

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.

(Dr.S.N. Pal)
Director
Forest Survey of India,
Dehradun - 248 195

Contents

C O N T E N T S

		Page
	Summary	(i)
Chapter 1		
1.1	Introduction	2
1.2	Discription of the District	2
1.3	Location	2-3
1.4	Physical Features	3-5
1.5	Climate	5
1.6	Rain	5-6
1.7	Temperature	6
1.8	Socio-Economic conditions	6-7
1.9	Uses	7
Chapter 2		
2.1	Design and Methodology of Non-forest Inventory Survey	12
2.2	Defination of Non-Forest Area	12
2.3	Sampling Design and Method of Selection of Sample Villages	12-14
2.4	Field Methodology	14-16
Chapter 3		
3.1	Processing of the Data	17
3.2	Area computation	17
3.3	Procurement of Volume factors	17
3.4	Estimation Procedure	17-19
	Volume table	20
Chapter 4		
	Stand and Stock tables'	21-25

LIST OF TABLES

Table No. 1	Distribution of total number of stems specieswise and dia-classwise (All categories combined)	26
Table No. 2	Distribution of total number of stems categorywise and dia-classwise (All species combined)	27
Table No. 3	Distribution of total number of stems specieswise and categorywise (All dia-classes combined)	28

Contents

Table No. 4	Distribution of total volume (in cum.) by species and in dia-classes (All categories combined)	29
Table No. 5	Distribution of total volume (in cum.) dia-classwise and categorywise (All species combined)	30
Table No. 6	Distribution of total volume (in cum.) specieswise and categorywise (All dia-classes combined)	31

MAPS

1. State map of Haryana 1
2. Location map of district Rohtak (Haryana) 8
3. Normal Monthly and Annual Rainfall (Haryana) 9
4. Normal Monthly and Annual Temperature (Haryana) 10
5. Type of Soils and Geology. district Rohtak (Haryana) 11

APPENDICES

Appendix-I	List of the villages selected for pilot survey in Haryana State	32
Appendix-II	Districtwise number of villages selected for Inventory Survey in Haryana State	33
Appendix-III	List of species found in Sample Villages in Rohtak district	34-35
Appendix-IV	List of the villages surveyed in Rohtak district	36
Appendix-V	Definitions of categories	37
Appendix-VI	Field Forms	38-41

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 Rohtak district during 1992-93.

2. As per 1981 Census, Rohtak district had a total of 458 villages having a total area of 3788.08 Sq. km. out of which 19 villages having an area of 198.79 Sq. km. were randomly selected and surveyed.

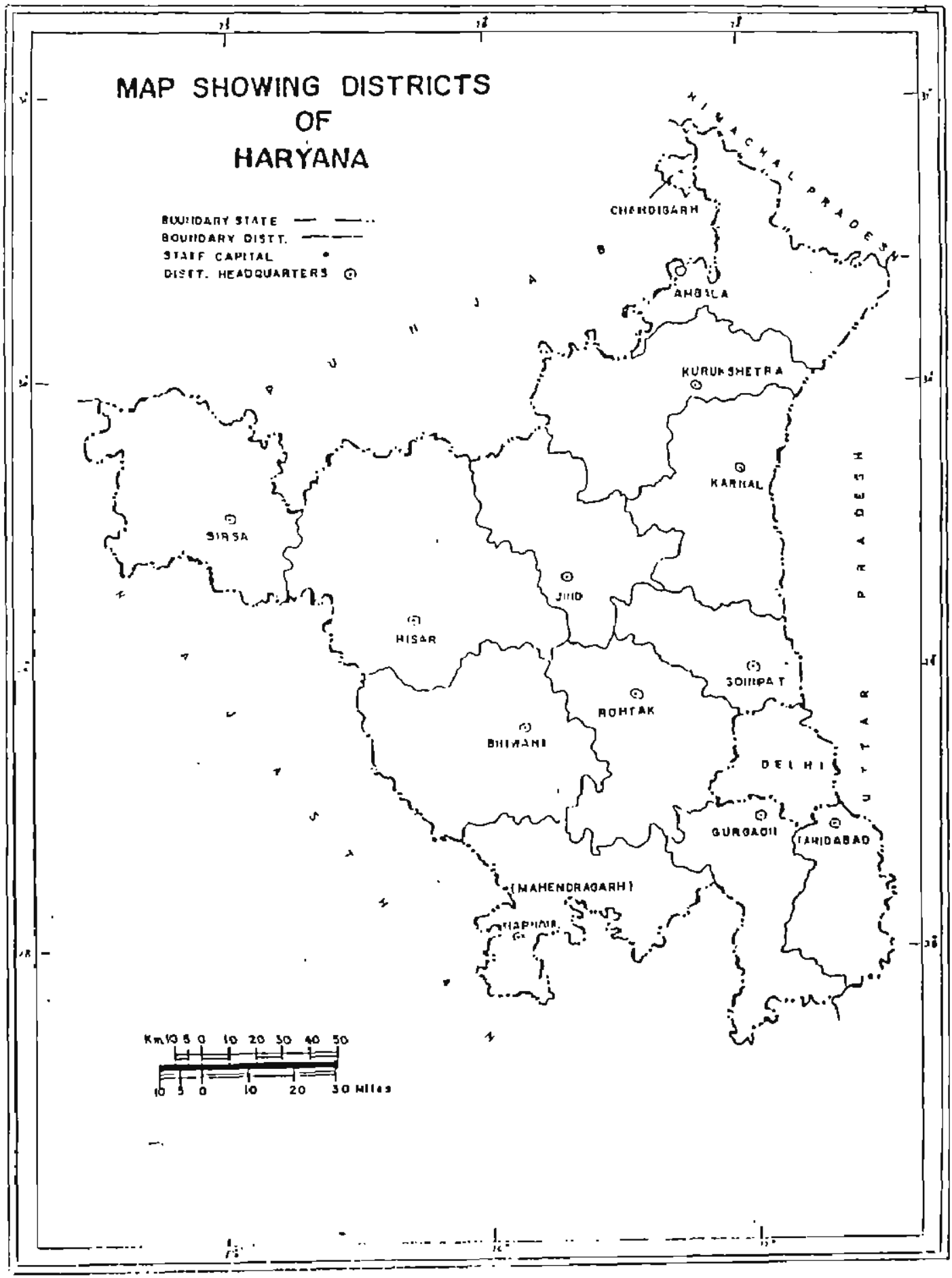
3. In the entire rural area of Rohtak district 47.34 lakh trees (12.50 trees/ha.) have been estimated. The analysis shows that when all the species are combined the maximum number of the estimated trees occur in 10-20 cm. dia-class i.e. 29.00 lakh trees (61.28%) and the minimum in 40 cms. and above dia-class i.e. 1.71 lakh trees (3.61%).

4. The specieswise distribution of total number of estimated trees shows that Acacia nilotica (Babul) has the largest representation i.e. 17.64 lakh trees (37.25%) followed by Eucalyptus spp. 7.41 lakh trees (15.65%), Dalbergia sissoo 6.57 lakh trees (13.87%), Prosopis cineraria 3.96 lakh trees (8.36%), Prosopis juliflora 3.10 lakh trees (6.55%), Acacia tortilis 1.58 lakh trees (3.33%), Salvadora spp. 1.40 lakh trees (2.95%), Azadirachta indica 1.30 lakh trees (2.74%), Zizyphus spp. 1.10 lakh trees (2.33%), and Morus spp. 0.96 lakh trees (2.03%). 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 20.98 lakh trees (44.33%) and minimum in the category-V - Ponds i.e. 0.33 lakh trees (0.69%) for the combined dia-classes.

6. In the entire rural area of Rohtak district, total estimated volume of all the species and dia-classes combined comes to 8.82 lakh cubic meter i.e. 2.327 cum./ha.

Contents


MAP SHOWING DISTRICTS
OF
HARYANA
BOUNDARY STATE
BOUNDARY DISTT.
STATE CAPITAL
DISTT. HEADQUARTERS
CHANDIGARH
AMBALA
KURUKSHETRA
KARNAL
SIRSA
JIND
HISAR
SONIPAT
ROHTAK
BHIWANI
DELHI
GURGAON
FARIDABAD
MAHENDRAGARH
U T T A R P R A D E S H
Km 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 paperpulp, 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

Rohtak district is a part of the Eastern Harvana Plain. The district has four tehsils namely Maham, Rohtak, Jhajjar and Bahadurgarh. The district derives its name from its headquarters town Rohtak which is said to be a corruption of Rohtasgarh, a name still applied to the ruined sites (also called Khokrakot) of two old cities, one lying immediately north of the present town and the other about 5 kilometers to the east. Traditionally, it is named after Raja Rohtas in whose days the city is said to have been built. It is also said that the town derives its name from Roherra (Tecoma undulata) tree called Rohitak in Sanskrit. It is said that before the town came into existence, it was a site of a forest of Rohitak trees and hence its name Rohtak. The name Rohitaka is however well known to early literature. It is mentioned in Buddhist literature among the towns visited by the Buddha and in the Mahabharata in connection with the campaign of Nakula, the Pandava prince, who had to face the stiff resistence of the Mattamayuraka Yaudheya warriors. The district has been described as Bahudhanyaka or rich in grains and was a part of the kingdom of the Yaudheyas.

1.3 Location, Area, Population etc.

The district lies between 28° 19' 30" and 29° 06' 30" North latitudes and 76° 12' 45" and 76° 58' 15" East longitudes. On its North are the districts of Jind and Sonipat. To its East lies the state of Delhi. Gurgaon district lies on its South-east. To its South is the district of Mahendergarh. To its West are the districts of-Bhiwani and Hisar.

As per 1981 Census, the geographical area of district was 3841 sq. km. and its population was 1,341,953 i.e. 350 persons/sq. km.

1.4 Physical Features

Soil, geology and topography

The geological structure of the district consists of Alluvium (Recent). The district can be sub-divided into three sub-micro regions on the basis of soils, topography and climate.

(a) Maham Plain

The region covers the whole of Maham tehsil and some western parts of Rohtak and Jhajjar tehsils.

From relief point of view, the maximum height of the region is 249 metres above m.s.l. near village Bawa (175) while the minimum height is 217 metres above m.s.l. near village Kalanaur Kalan (101) in Jhajjar and Rohtak tehsils respectively. The region is entirely plain land. Due to the intensive network of canals in the region, the area is under cultivation with high crop yields. A few patches of scrub are found near villages Seman (4), Bhaini Bharon (10) and Madina Gindhran (27) in Maham tehsil and village Kharari (108) of Rohtak tehsil.

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

Ochrepts: Shallow black, brown and alluvial soils of northern region.
Orthids : Soils of arid region with some development
Fluvents: Alluvial soils (Recent alluviam)

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.

Contents

(b) Rohtak Plain

The region extends over parts of Rohtak, Jhajjar and Bahadurgarh tehsils of the district.

From relief point of view, the region has its maximum height 222 metres above m.s.l. near village Dhamar (19) in Rohtak tehsil and the minimum height is 215 metres near village Sarai Aurangabad (24) in Bahadurgarh tehsil. A large patch of scrub land is seen near village Maroudi Jatan (87) and other patches of scrubs are also found near villages Makrouli Kalan (14) and Bohar (17) in Rohtak tehsil. Lalpur dense forest (Protected Forests) exists in the North-west of Rohtak town.

The soils found in the region are loam (Bhangar and Nardak). The soils, as classified by the NBSS and LUP (ICAR), Nagpur, are of Ochrepts type as described in the case of Maham Plain.

As far as means of communications and transportation are concerned, the region is well developed and all kinds of roads are found in the region. Rohtak and Bahadurgarh are important educational and industrial centres respectively. A network of roads exists in the region. Railway line from Delhi to Jind passes through the region. Main roads in the region are Rohtak-Delhi, Rohtak-Jhajjar, Rohtak-Bhiwani, Rohtak-Gohana and Jhajjar-Kharkhoda. Canals are important source of irrigation in the region.

(c) Jhajjar Low Land

The region spreads over Jhajjar tehsil (except a few villages of western and northern parts) and thirteen villages in south-eastern part of Bahadurgarh tehsil. From relief point of view, the maximum height of the region is 228 metres above m.s.l. near village Karoda (229) while the minimum height is 214 metres above m.s.l. near village Jahangirpur (60). Both the heights are in Jhajjar tehsil. In fact the variable slope tendencies and topographical difference are responsible for the formation of a soucer like depression in the eastern margin of the region.

The region has coarse loam (Dahar & Chaeknote), relatively sandy loam and loam (Bhangar & Nardak) soils. The soils, as classified by the NBSS & LUP

Contents

(ICAR). Nagpur, are of Orthids-Fluvents and Ochrepts types as already mentioned above in the case of Maham Plain.

With regard to means of communication and transportation facilities, the region is well developed. All kinds of roads are found in the region. Jhajjar is a commercial town and tehsil headquarters. Beri is another town. These towns are connected with each other and other towns by roads. The villages are also inter linked with major and minor roads.

1.5 Climate

Hot summer, cool winter and meagre rainfall are the main characteristics of Rohtak district.

1.6 Rain

Monsoon brings rain in the district from July to Semptember. 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 256 mm against 1001 mm during 1977-78 and 428 mm during 1978-79. The rainfall also varies from place to place. The rainfall in the district varies from 400 mm to 550 mm. Most parts of the district receive rainfall between 400 to 500 mm whereas the north-eastern parts of the district adjoining Sonipat district receive between 500 to 550 mm of rainfall. The climate in the district is attributed to short wet months and long spells of dry months. Humidity is very high during rainy season and very low during dry summer months i.e. May-June.

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. During winter,

Contents

chilly winds blow in the district due to snowfall in the hills of Himachal Pradesh and Uttar Pradesh. The minimum temperature during winter falls as low as 5 C during December-January.

1.8 Frost, Fog and Hails

Ground frost occurs in the district when there is snowfall in the hills of Himachal Pradesh and Uttar Pradesh. Foggy weather condition prevails after rains in winter during the months of January and February. Occasional spells of hailstorms also occur during the period from February to April. During May-June dust storms also occurs in the district.

1.9 Socio-economic conditions

The economy of the district is primarily agricultural. At the time of 1981 Census, about 59% of the total main workers were cultivators and agricultural labourers. The industrial base of the district is mainly agro-based. The large and medium scale units are engaged in manufacturing cotton yarn, sanitary ware, plaster of paris, ceramic glazed tiles, sugar, glass bottles, steel pipes and tubes, ghee and milk powder, cattle feed, agricultural implements etc. The district has many small scale units also which are engaged in manufacturing electric fans, ceramics, machine tools, sewing machines and parts, auto parts, rubber goods, pharmaceuticals, saw blades, furnitures, chemicals, engineering goods, soaps and tooth pastes etc.

Irrigation in the district is generally done by canals and tubewells. Area under cultivation of food grains and sugarcane in the district during 1979-80 was 335.2 thousand hectares and 23.6 thousand hectares respectively. Out of the total geographchical area of the district, 88.73% area is cultivable and out of which 62.02% area is under irrigation. Among the food grains, mostly wheat, bajra, gram and jowar are grown. Mustard is also grown over a considerable area. A very small area of 2 sq. kms. is under the Reserved Forests. In the year 1977, the district had 643.9 thousand livestock which mostly included cattle, buffaloes, sheep, goats and pigs. During 1979-80 the district had 9944 motor vehicles of various types on the road.

-The North-eastern part of the district adjoining

Delhi is more densely populated than South-western part. The people of the district are hardworking and enterprising. The per capita milk consumption in the district is higher than the All India average.

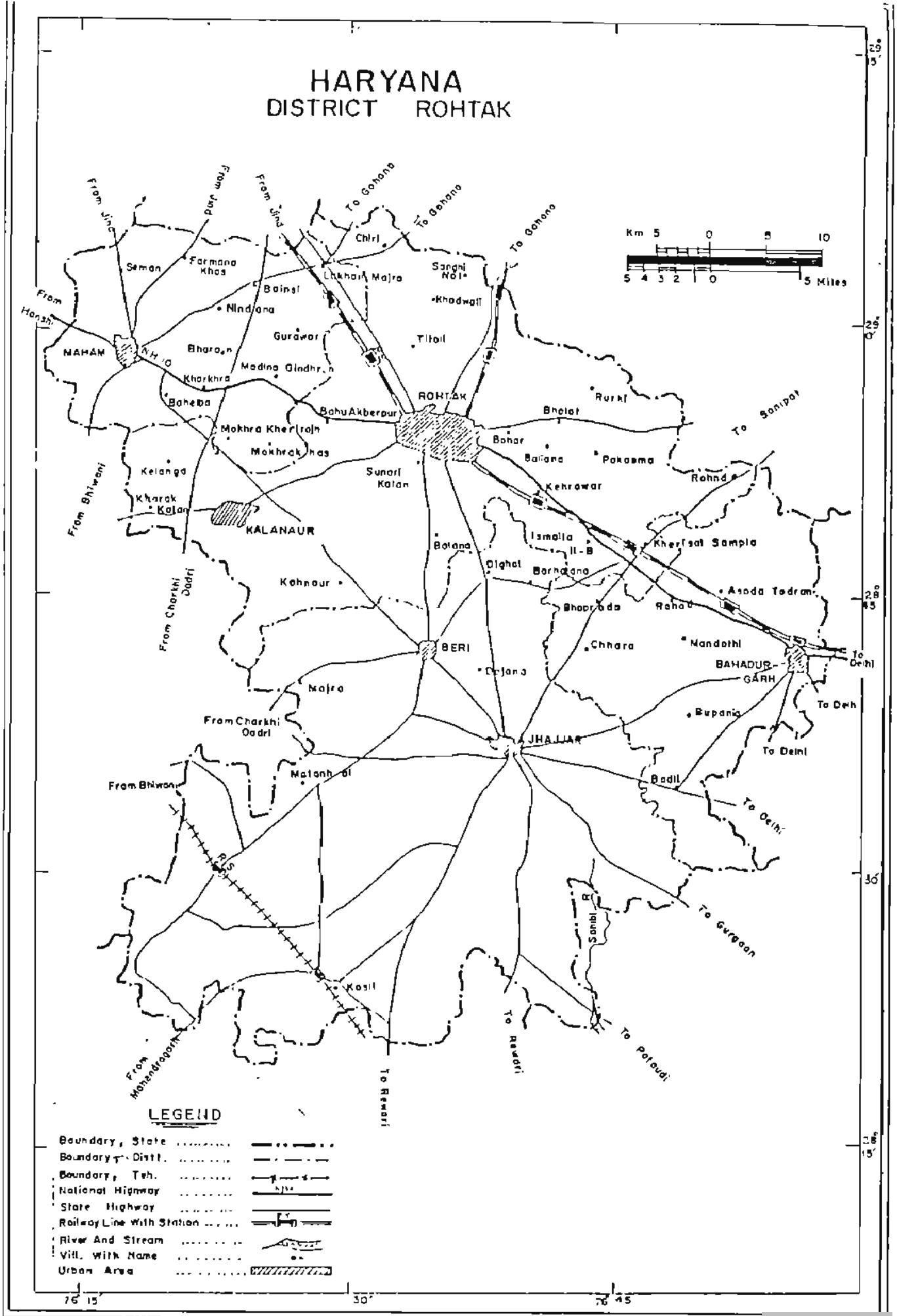
Out of the total population of the district, 80.17% is the rural population and 19.83% is urban. 42.55% of the total population are literates. Literacy percentage among urban and rural popalation is 59.65% and 38.32% respectively while among male and female population is 56.44% and 26.82% respectively. Out of total population 26.71% are main workers, 4.62% are maroinal workers, while 68.67% are non-workers.

1.10 Uses

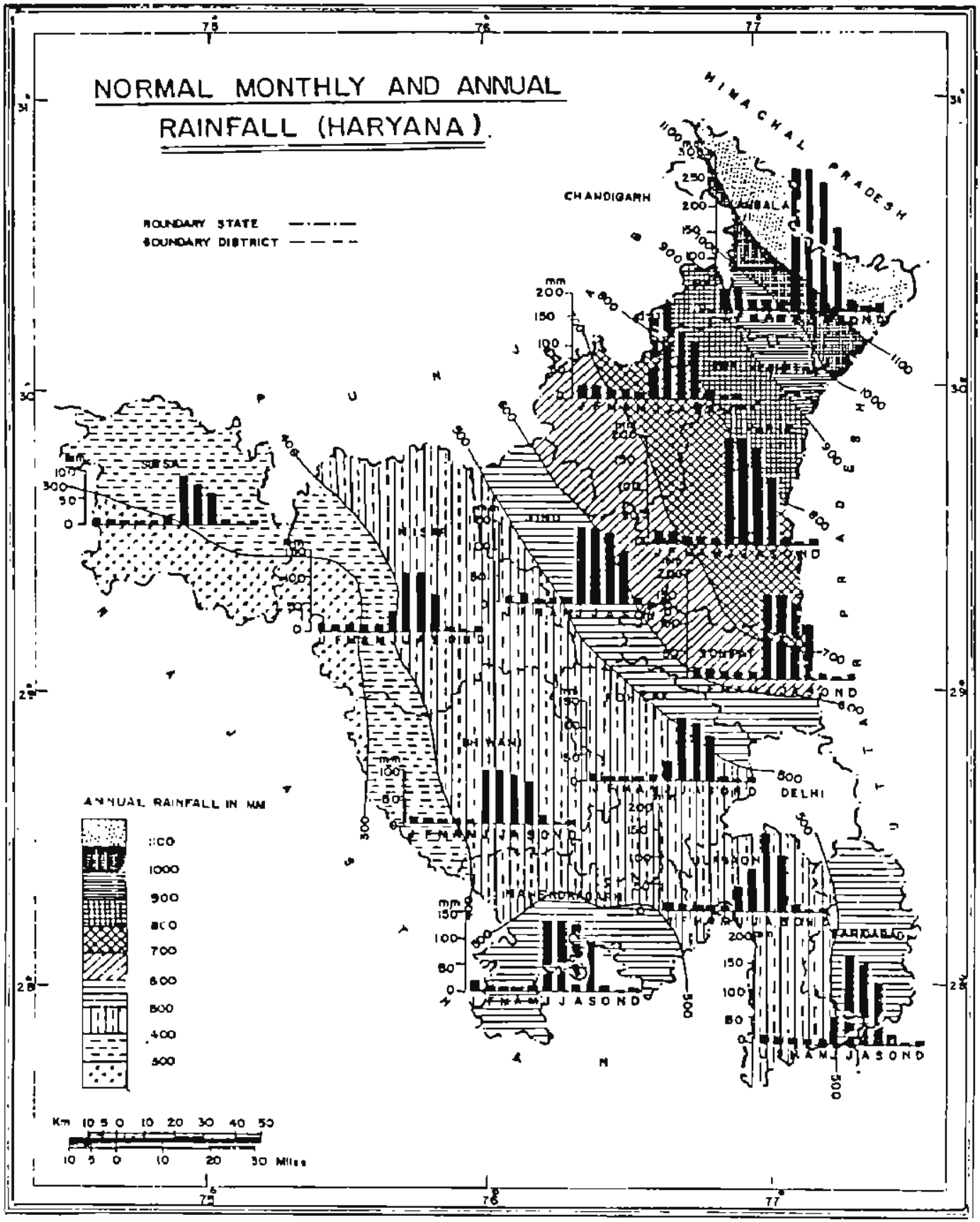
The trees provide mainly timber, fuelwood, fodder, fruit and shade. Timber is obtained mainly from Dalbergia sissoo, Eucalyptus spp., Melia azedarch, Syzygium cumini, Morus alba, Mangifera indica, Azadirachta indica, Albizia spp. etc. Small timber is mainly obtained from Acacia nilotica, Acacia spp., 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.

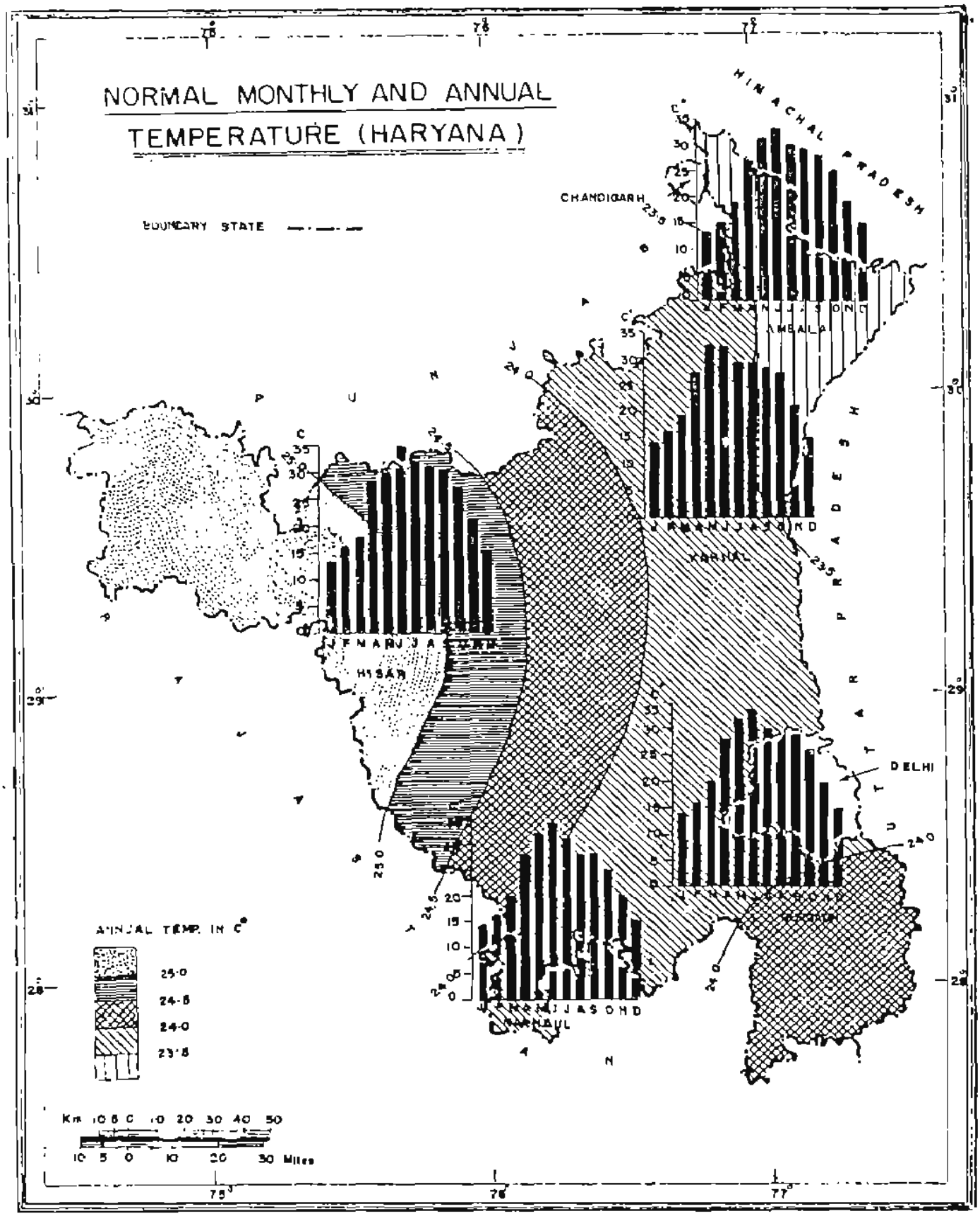
Contents


HARYANA
DISTRICT ROHTAK
Km 5 0 5 10
5 4 3 2 1 0 5 Miles
From Jind
From Jind
To Gohana
To Gohana
To Gohana
Chiri
Seman
Farmana Khas
Lakhan Majra
Sanghi Nai
Khadwali
Baingi
Nindana
From Hansi
MAHAM
NH 10
Bharoan
Gurawar
Titoli
Madina Gindhran
Kharkhra
Baheda
ROHTAK
Bahu Akberpur
Rurki
Bhalot
To Sonipat
Mokhra Kheriraja
Mokhra Khas
Bahar
Ballana
Pakasma
Rohna
Kelanga
Sunari Kalan
Kehrawar
From Bhiwani
Kharak Kalan
KALANAUR
Ismalia
Kherisat Sampla
Balana
Dighal
Barhana
Kohnaur
Asoda Todran
Bhaproda
Rohad
From Charkhi Dadri
BERI
Chhara
Mandothi
To Delhi
BAHADUR-GARH
Dujana
Majra
To Delhi
From Charkhi Dadri
Bupania
JHAJJAR
To Delhi
From Bhiwani
Matanhail
Badli
To Delhi
R.S.
To Gurgaon
Sahbi
Kasli
To Rewari
To Rewari
From Mahendragarh
To Palwal
LEGEND
Boundary, State
Boundary, Distt.
Boundary, Teh.
National Highway
State Highway
Railway Line With Station
River And Stream
Vill. With Name
Urban Area
76° 15'
30°
76° 45'
29° 30'
29° 15'
28° 45'
28° 30'

Contents


NORMAL MONTHLY AND ANNUAL RAINFALL (HARYANA).
BOUNDARY STATE
BOUNDARY DISTRICT
CHANDIGARH
HIMACHAL PRADESH
UTTAR PRADESH
RAJASTHAN
DELHI
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

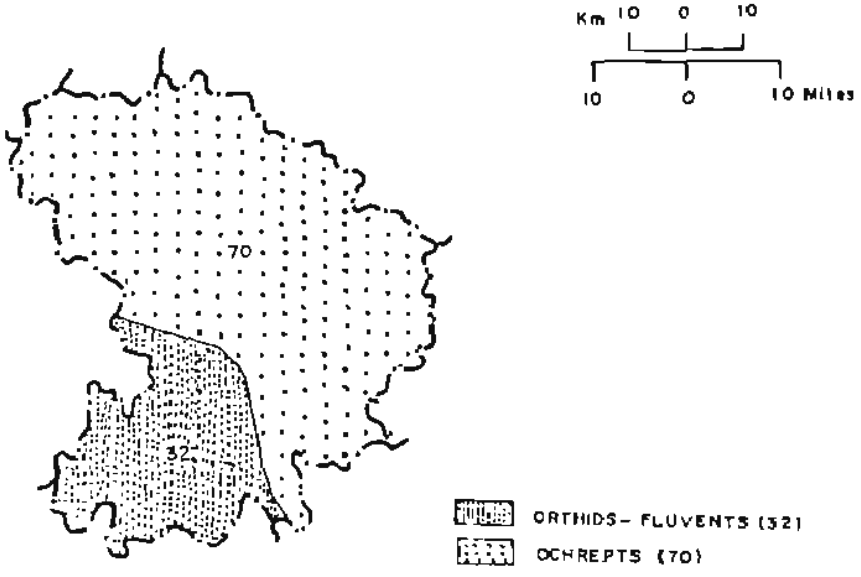
Contents


NORMAL MONTHLY AND ANNUAL
TEMPERATURE (HARYANA)
BOUNDARY STATE
HIMACHAL PRADESH
CHANDIGARH
AMBALA
KARNAL
HISAR
DELHI
UTTAR PRADESH
RAJASTHAN
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
75°
76°
77°
29°
28°

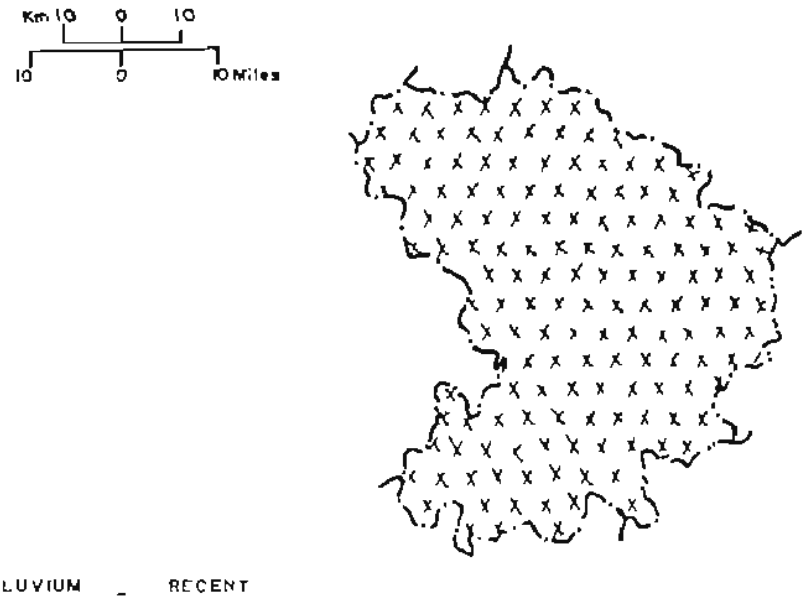
Contents

HARYANA
DISTRICT ROHTAK

SOILS



GEOLOGY



Contents

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 Rohtak district was prepared according to 1981 Census and each village was given a serial number.

Contents

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(OB). 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 219 villages.

These 219 villages were distributed over all the districts proportional to the rural area of the district. A list of number of villages selected for each district is given in the Appendix-II.

Contents

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 foot. 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

Contents

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: For trees planted along the road side.

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: For trees planted in and around water ponds.

Railway Lines: For trees planted along the railway lines.

Canals: Trees planted along the canals.

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

Contents

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 Bhiwani 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.

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

Contents

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

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

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

$\bar{v} = \sum_{i}^{n} v_i/n$ = average volume/no. of trees in the sample

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

$A = \sum_{i}^{N} x_i$ = 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

$$\hat{R} = \frac{\sum_{i}^{n} v_i}{\sum_{i}^{n} x_i} = \frac{\bar{v}}{\bar{x}}$$

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

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

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

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

Contents

When N is large, then

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

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

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

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

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

Contents

Volume table - speciesswise and diameterwise

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 tortilis	0.06	0.14	0.57	1.13
4	Acacia spp.	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 aphylla	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

Contents

CHAPTER 4

Stand and Stock Tables

As per 1981 Census Rohtak district has a total of 458 villages having an area of 3788.08 Sq. km. Out of these, 19 villages having an area of 198.79 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 19 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 12.50 and the corresponding volume is 2.327 cum./ha. for the entire district of Rohtak.

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 Rohtak district 47.34 lakh trees having volume of 8.82 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. 29.00 lakh trees (61.28%) followed by 12.31 lakh trees (26.01%) in 20-30 cms. dia-class, 4.31 lakh trees (9.10%) in 30-40 cms. dia-class and 1.71 lakh trees (3.61%) in 40 cms. and above dia-class.

It also shows that in the rural area of Rohtak district, when all the dia-classes are combined, Acacia nilotica (Babul) 17.64 lakh trees (37.25%), followed by Eucalyptus spp. 7.41 lakh trees (15.65%), Dalbergia sissoo 6.57 lakh trees (13.87%) Prosopis cineraria 3.96lakh trees (8.36%), Prosopis juliflora 3.10 lakh trees (6.55%), Acacia tortilis 1.58

Contents

1.58 lakh trees (3.33%), Salvadora spp 1.40 lakh trees (2.95), Azadirachta indica 1.30 lakh trees (2.74%), Zizyphus spp. 1.10 lakh trees (2.33%) and Morus spp. 0.96 lakh trees (2.03%). 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. 20.98 lakh trees (44.33%) followed by Category-II - Roadside Plantations 8.25 lakh trees (17.43%), Category-III - Village Woodlot 6.45 lakh trees (13.63%), Category-IV- Block Plantations 5.91 lakh trees (12.48%) and Category-VII- Canals 4.99 lakh trees (10.54%). 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.

The distribution of stems per hectare is maximum in dia-class 10-20 cms. i.e. 7.66 followed by 3.25 in 20-30 cms dia-class, 1.14 in 30-40 cms. dia-class and 0.45 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 categories 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 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

Contents

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 20.99 lakh trees (44.33%) which is the highest amongst all the categories. It is mainly comprised of *Acacia nilotica* 6.40 lakh trees, *Dalbergia sissoo* 6.07 lakh trees, *Eucalyptus* spp. 2.96 lakh trees, *Prosopis juliflora* 2.03 lakh trees, *Azadirachta indica* 1.02 lakh trees, *Morus spp.* 0.82 lakh trees, *Syzygium cumini* 0.39 lakh trees, *Ficus spp.* 0.31 lakh trees, *Mangifera indica* 0.20 lakh trees, *Acacia spp.* 0.15 lakh trees, *Tamarix aphylla* 0.13 lakh trees and *Psidium guyava* 0.12 lakh trees. The remaining species are represented very poorly.

Category-II - Roadside Plantation

As per the estimation there are 8.25 lakh trees (17.43%) in all in this category. It is mainly represented by *Acacia nilotica* 4.66 lakh trees, *Eucalyptus* spp. 2.17 lakh trees, *Acacia tortilis* 0.43 lakh trees *Prosopis cineraria* 0.30 lakh trees*Prosopis juliflora* 0.23 lakh trees and *Dalbergia sissoo* 0.20 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 6.45 lakh trees (13.63%). The predominent species in this category are *Prosopis cineraria* 3.44 lakh trees *Salvadora spp.* 1.14 lakh trees *Zizyphus* spp. 0.81 lakh trees *Acacia nilotica.* 0.47 lakh trees and *Prosopis juliflora* 0.11 lakh trees. The remaining species have a poor representation.

Category-IV - Block Plantations

There are 5.91 lakh trees (12.48%) in all in this category. The main species forming bulk of the crop are *Acacia nilotica* 2.82 lakh trees. *Eucalyptus* spp. 1.05 lakh trees, *Prosopis juliflora* 0.65 lakh trees, *Acacia tortilis* 0.63 lakh trees, *Salvadora spp.* 0.22 lakh trees. and *Zizyphus spp.* 0.15 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 0.33 lakh trees (0.69%) in this category. *Acacia nilotica* has 0.2. lakh trees. Other spp. are either absent or have a very poor representation.

Contents

Category-VI - Railway Lines

This category has 0.43 lakh trees (0.90%) in all. Acacia nilotica having 0.37 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 4.99 lakh trees (10.54%). The main species in this category are Acacia nilotica 2.71 lakh treesEucalyptus spp. 1.21 lakh trees, Acacia tortilis 0.47 lakh trees, Dalbergia sissoo 0.18 lakh trees and Prosopis cineraria 0.15 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 Rohtak district has a total volume (all species and dia-classes combined) of 8.82 lakh cubic meters corresponding to the estimated total of 47.34 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 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 2.59 lakh cubic meters (29.42%) followed by dia-class 20-30 cms. having a volume of 2.39 lakh cubic meters (26.53%). dia-class 40cms.and above having 1.95 lakh cubic meters (22.15%) and 10-20 cms dia-class having 1.93 lakh cubic meters (21.90%).

It also shows that the total volume per hectare contributed by trees of all species of all dia-classes combined is 2.327 cum. The volume per hectare for different dia-classes (in decreasing order) are as below:

30-40 cms. dia-class (0.685 cum.), 20-30 cms. dia-class (0.617 cum.), 40 cms. and above dia-class (0.515 cum.) and 10-20 cms. dia-class (0.510 cum.).

Contents

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 2.35 lakh cubic meters (26.67%), Eucalyptus spp. 1.81 lakh cubic meters (20.49%), Dalbergia sissoo 1.50 lakh cubic meters (16.98%), Prosopis cineraria 0.98 lakh cubic meters (11.12%), Salvadora spp. 0.60 lakh cubic meters (6.79%), Azadirachta indica 0.29 lakh cubic meters (3.29%), Prosopis juliflora 0.23 lakh cubic meters (2.58%), Ficus spp. 0.20 lakh cubic meters (2.29%), Acacia tortilis, 0.16 lakh cubic meters (1.84%) Morus spp. 0.15 lakh cubic meters (1.73%) Zizyphus spp. 0.14 lakh cubic meters (1.58%), Syzygium cumini 0.10 lakh cubic meters (1.16%). 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 3.76 lakh cubic metres (42.63%) followed by category-III having 1.70 lakh cubic metres (19.34%), category-II having 1.58 lakh cubic metres (17.96%), category-VII having 1.10 lakh cubic metres (12.53%) and category-IV having 0.55 lakh cubic metres (6.28%). Categories V and VI have less than 1% contribution each, while category VIII has been found to be absent.

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.

Contents

Table No. 1

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

Rural area of ROHTAK DISTT. : 3788.07 Sq. km.

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	1144024	464436	131709	23374	1763543	37.25
3	Acacia tortilis	119896	30241	6516	952	157605	3.33
4	Acacia spp.	16845	5926	2496	850	26117	0.55
5	Albizia spp.	6479	3049	1715	1651	12894	0.27
6	Azadirachta indica	75154	29746	13643	11104	129647	2.74
7	Dalbergia sissoo	336326	180454	96192	43753	656725	13.87
8	Eucalyptus spp.	473848	227368	36205	3296	740717	15.65
9	Ficus spp.	16998	9222	5946	12808	44974	0.95
10	Mangifera indica	8765	5011	3239	3415	20430	0.43
11	Melia azedarach	4706	2858	476	251	8291	0.18
12	Morus spp.	61357	23513	7946	3336	96152	2.03
13	Populus spp.	2420	515	229	343	3507	0.07
14	Prosopis cineraria	163342	133692	75058	23628	395720	8.36
15	Prosopis juliflora	278150	28927	2858	327	310262	6.55
16	Psidium guvava	15529	362	19	19	15929	0.34
17	Salvadora spp.	44570	35042	27630	32318	139560	2.95
18	Syzygium cumini	22105	10919	5621	3663	42308	0.89
19	Tamarix aphylla	7412	4020	1715	1388	14535	0.31
20	Zizyphus spp.	74812	27364	6592	1621	110389	2.33
21	Misc. spp.	28106	8595	5087	2980	44768	0.95
	Total	2900844	1231260	430892	171077	4734073	100.00
	% age	61.28	26.01	9.10	3.61	100.00	

Contents

Table No. 2

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

Rural area of ROHTAK DISTT. : 3788.07 Sq. km.

S.No.	Category	10-20	20-30	30-40	40+	Total	% age
1	I	1342600	501005	178053	76853	2098511	44.33
2	II	454432	282037	70410	18368	825247	17.43
3	III	284020	195584	108994	56556	645154	13.63
4	IV	525583	51945	8555	4841	590924	12.48
5	V	22808	5965	1733	2267	32773	0.69
6	VI	30334	9127	2686	514	42661	0.90
7	VII	241067	185597	60461	11678	498803	10.54
8	VIII	0	0	0	0	0	0.00
	Total	2900844	1231260	430892	171077	4734073	100.00
	% age	61.28	26.01	9.10	3.61	100.00	
	Stems/ha.	7.66	3.25	1.14	0.45	12.50	

Contents

Table No. 3

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

Rural area of ROHTAK DISTT. : 3788.07 Sq. Km.

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	639508	466436	47029	282381	20180	37119	270890	0	1763543	37.25
3	Acacia tortilis	5583	42760	0	62520	0	0	46742	0	157605	3.33
4	Acacia spp.	14532	3525	19	5964	0	0	2077	0	26117	0.55
5	*Albizia spp.*	*9521*	*953*	*991*	*514*	*19*	*0*	*896*	*0*	*12894*	*0.27*
6	Azadirachta indica	101868	9108	7451	3297	1182	399	6402	0	129647	2.74
7	Balberoia sissoo	606801	20142	171	9299	323	1677	18312	0	656725	13.87
8	Eucalyptus spp.	296005	217287	0	105110	1105	209	121001	0	740717	15.65
9	Ficus spp.	30873	2135	8213	972	1124	57	1600	0	44974	0.95
10	*Mangifera indica*	*19784*	*0*	*19*	*513*	*0*	*0*	*114*	*0*	*20430*	*0.43*
11	Melia azedarach	5358	1600	1086	19	0	0	228	0	8291	0.18
12	Morus spp.	82245	1486	6344	724	95	514	4744	0	96152	2.03
13	Populus spp.	877	19	0	1601	0	0	1010	0	3507	0.07
14	Prosopis cineraria	419	29516	343567	4784	1334	1448	14652	0	395720	8.36
15	Prosopis juliflora	203038	22504	10843	65869	2687	1124	4897	0	310262	6.55
16	Psidium guvava	11528	19	19	4287	0	0	76	0	15929	0.34
17	Salvadora spp.	0	1430	113855	22142	1791	0	342	0	139560	2.95
18	Syzygium cumini	38745	572	915	1029	495	57	495	0	42308	0.89
19	Tamarix aphylla	12593	57	1581	76	209	0	19	0	14535	0.31
20	Zizyphus spp.	7147	3792	89738	14401	76	38	3697	0	110389	2.33
21	Misc. spp.	12146	1906	22313	5622	2153	19	609	0	44768	0.95
	Total	2098511	825247	645154	580924	32773	42661	498803	0	4734073	100.00
	% age	44.33	17.43	13.63	12.48	0.69	0.90	10.54	0.00	100.00	

Contents

Table No. 4

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

Rural area of ROHTAK DISTT. : 3708.07 Sq. km.

S.No.	Name of Species	10-20	20-30	30-40	40+	Total	% age	Vol./ha.
1	Acacia catechu	0	0	0	0	0.00	0.00	0.000
2	Acacia nilotica	68641.44	65021.04	75074.13	26412.62	235149.23	26.67	0.621
3	Acacia tortilis	7193.76	4233.74	3714.12	1075.76	16217.38	1.84	0.043
4	Acacia spp.	1010.7	829.64	1422.72	960.5	4223.56	0.48	0.011
5	*Albizia spp.*	*388.74*	*426.86*	*977.55*	*1865.63*	*3658.78*	*0.42*	*0.010*
6	Azadirachta indica	4509.24	4164.44	7776.51	12547.52	28997.71	3.29	0.077
7	Dalbergia sissoo	20179.56	25263.56	54829.44	49440.89	149713.45	16.98	0.395
8	Eucalyptus spp.	47384.8	93220.88	34394.75	5636.16	180636.59	20.49	0.477
9	Ficus spp.	1019.88	1291.08	3389.22	14473.04	20173.22	2.29	0.053
10	*Mangifera indica*	525.9	*701.54*	*1846.23*	*3858.95*	*6932.62*	*0.79*	*0.018*
11	Melia azedarach	282.36	400.12	271.32	283.63	1237.43	0.14	0.003
12	Morus spp.	3681.42	3291.82	4529.22	3769.68	15272.14	1.73	0.040
13	Populus spp.	169.4	180.25	167.17	432.18	949.00	0.11	0.003
14	Prosopis cineraria	9800.52	18716.88	42783.06	26699.64	98000.10	11.12	0.259
15	Prosopis juliflora	16689	4049.78	1629.06	369.51	22737.35	2.58	0.060
16	Psidium guvava	931.74	50.68	10.83	21.47	1014.72	0.12	0.003
17	Salvadora spp.	*2674.2*	*4905.88*	*15749.1*	*36519.34*	*59848.52*	*6.79*	*0.158*
18	Syzygium cumini	1326.3	1528.66	3203.97	4139.19	10198.12	1.16	0.027
19	Tamarix aphylla	444.72	562.8	977.55	1568.44	3553.51	0.40	0.009
20	Ziziphus spp.	4488.72	3830.96	3757.44	1831.73	13908.85	1.58	0.037
21	Misc. spp.	1686.36	1203.3	2899.59	3367.4	9156.65	1.04	0.024
	Total	193028.76	233873.91	259402.98	195273.28	881578.93	100.00	2.327
	% age	21.90	26.53	29.42	22.15	100.00		
	Vol./ha.	0.510	0.617	0.685	0.515	2.327		

Contents

Table No. 5

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

Rural area of ROHTAK DISTT. : 3788.07 Sq. km.

S.No.	Category	10-20	20-30	30-40	40+	Total	% age
1	I	88399.75	93338.17	106384.99	87675.18	375798.09	42.63
2	II	32433.72	59606.93	44770.84	21551.60	158363.09	17.96
3	III	17041.20	27381.76	62126.58	63908.28	170457.82	19.34
4	IV	35420.75	9381.81	5086.49	5470.33	55359.38	6.28
5	V	1397.44	927.71	1002.25	2561.71	5889.11	0.67
6	VI	1526.12	1293.17	1531.02	880.82	5231.13	0.59
7	VII	16509.78	41944.36	38500.81	13525.36	110480.31	12.53
8	VIII	0.00	0.00	0.00	0.00	0.00	0.00
	Total	193028.76	233873.91	259402.98	195273.28	881578.93	100.00
	% age	21.90	26.53	29.42	22.15	100.00	

Contents

Table No. 6

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

Rural area of ROHTAK DISTT. : 3788.07 Sq. km.

S.No.	Name of Species	I	II	III	IV	V	VI	VII	VIII	Total	% age
1	Acacia catechu	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00
2	Acacia nilotica	77599.26	72264.12	6956.08	19751.55	2168.52	4348.76	52060.94	0.00	235149.23	26.67
3	Acacia tortilis	471.94	7277.09	0.00	3884.44	0.00	0.00	4583.91	0.00	16217.38	1.84
4	Acacia spp.	3238.15	369.41	2.66	381.78	0.00	0.00	231.56	0.00	4223.56	0.48
5	Albizia spp.	2360.21	330.79	369.36	36.92	21.47	0.00	540.03	0.00	3658.78	0.42
6	Azadirachta indica	22794.26	2363.59	1802.74	619.52	468.92	145.16	803.52	0.00	28997.71	3.29
7	Dalbergia sissoo	133728.68	8779.42	27.55	1160.71	85.50	302.23	5629.36	0.00	149713.45	16.98
8	Eucalyptus spp.	69438.12	57406.12	0.00	13403.08	249.13	38.57	40101.57	0.00	180636.59	20.49
9	Ficus spp.	13943.43	994.65	3467.22	551.24	470.17	14.63	731.88	0.00	20173.22	2.29
10	Mangifera indica	6630.90	0.00	1.14	238.83	0.00	0.00	61.75	0.00	6932.62	0.79
11	Melia azedarach	903.32	201.23	96.21	1.14	0.00	0.00	35.53	0.00	1237.43	0.14
12	Morus spp.	13232.20	144.72	846.97	63.77	8.74	102.66	873.08	0.00	15272.14	1.73
13	Populus spp.	137.48	13.87	0.00	112.07	0.00	0.00	685.58	0.00	949.00	0.11
14	Prosopis cineraria	36.35	5158.37	88685.84	695.76	223.95	180.90	3018.93	0.00	98000.10	11.12
15	Prosopis juliflora	15267.12	1689.62	816.96	4282.85	178.02	68.96	433.82	0.00	22737.35	2.58
16	Psidium guvava	749.14	1.14	1.14	259.74	0.00	0.00	4.56	0.00	1014.72	0.12
17	Salvadora spp.	0.00	552.77	51195.21	6750.79	1144.55	0.00	205.2	0.00	59848.52	6.79
18	Zizygium cumini	9254.56	130.54	311.99	197.10	205.64	14.63	83.66	0.00	10198.12	1.16
19	Tamarix aphylla	3175.09	44.08	245.99	7.60	78.09	0.00	2.66	0.00	3553.51	0.40
20	Zizyphus spp.	637.50	410.65	10375.36	2192.57	9.12	3.80	279.85	0.00	13908.85	1.58
21	Misc. spp.	2200.38	230.91	5255.40	768.92	577.29	10.83	112.92	0.00	9156.65	1.04
	Total	375798.09	158363.09	170457.82	55359.38	5889.11	5231.13	110480.31	0.00	881578.93	100.00
	% age	42.63	17.96	19.34	6.28	0.67	0.59	12.53	0.00	100.00	

Contents

Appendix-I

List of villages selected for Pilot Survey in Haryana State.

S.No.	Name of the village	Area of Village (Ha.)
1.	Baghana	1479.51
2.	Baidwala	1416.38
3.	Bhandari	677.00
4.	Dhatoo	583.00
5.	Dondkalan	2353.00
6.	B. Rusna	248.00
7.	B. Tauru	184.94
8.	Dachaur	2728.00
9.	Dighal	2211.00
10.	Dohli	2896.00
11.	Gorakhpur	4370.00
12.	Gurauthi	1720.00
13.	Haliaki	480.00
14.	Kalnaur	2762.00
15.	Khandalhari	2324.00
16.	Kharkhara	979.00
17.	Kona	766.28
18.	Kurungawali	1479.00
19.	Lalbagingh	140.00
20.	Lalheri	267.09
21.	Mammonmaira	199.51
22.	Mohammedpur	1731.00
23.	Nandgaon	825.14
24.	Nathusari	1741.00
25.	Phadani	208.00
26.	Ratpur	130.00
27.	Saundhad	2753.00
28.	Shampura	1017.00
29.	Shoadapur	316.05
30.	Siwana	1126.00
31.	Sulehra	572.00
	Total	40182.90

Contents

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	7073	241

Contents

Appendix - III

List of species found in Sample villages in Rohtak 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.	Acacia spp.	
5.	Aegle marmelos	Bel, Belpara, Bil, Billi
6.	Albizia lebbek	Kala siris, Kalbage, Koko, Siris, Bhander, Sarsaoda
7.	Albizia procera	Safed siris/siras, Karha, Karhar, Karhai
9.	Azadirachta indica	Neem, Nimbo, Nibbaro, Vepa
10.	Bauhinia spp.	Kachnar, Papri, Jhinoora
11.	Butea monosperma	Pelas, Dhak, Palasin, Kakhar
12.	Cassia fistula	Amaltas, Bahra, Bhawa, Sonari
13.	Cordia spp.	Lassora, Bairula, Borala
14.	Dalbergia sissoo	Sisoo, Shisham, Tahli
15.	Delonix regia	Gulmohar, Krishnachura, Golmohan
16.	Erythrina suberosa	Dhaul, Gararu, Mander, Panora
17.	Eucalyptus spp.	Nilgiri, Safeda
18.	Ficus benoalensis Ficus elastica	Bargat, Bad, Fig Ved, Vadlo
19.	Ficus religiosa	Pipal, Pipli, Papada, Pripari
20.	Ficus spp.	Anjar, Akhar, Budita
21.	Grevillea robusta	Silver oak
22.	Mangifera indica	Am, Amb, Ambo, Mavu, Moru
23.	Melia azedarach	Bijain, Baknia, Betain, Bakain
24.	Mitragyna parvifolia	Phaldu, Mundi, Kaiz, Battaganum
25.	Moringa spp.	Sajna, Sohjna, Sanjna, Saijna
26.	Morus spp.	Tut, Kimu, Shahtoot
27.	Phoenix sylvestris	Khajur, Betha
28.	Populus spp.	Banpipal, Godhpipal, Pahari Pipal

Contents

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.	Zizyphus spp.	

- * * * -

Contents

Appendix-IV

List of the villages surveyed in Rohtak District.

S.No.	Name of the village	Name of Tehsil	Area (Ha.)	Map sheet No.
1.	Kheri Jasaur	Bahadurgarh	1028.00	53 D/13
2.	Babra	Jhajjar	442.72	53 D/10
3.	Bisoha	-do-	651.13	53 D/ 7
4.	Dhor	-do-	1072.81	53 D/10
5.	Dighal	-do-	2211.00	53 D/ 9
6.	Ganoten	-do-	460.93	53 D/ 9
7.	Gawalison	-do-	672.00	53 D/10
8.	Gudiani	-do-	1018.00	53 D/11
9.	Gurawar	-do-	683.91	53 D/10
10.	Khatiwas	-do-	587.19	53 D/10
11.	Machhrauli	-do-	1087.37	53 D/11
12.	Patasni	-do-	323.34	53 D/10
13.	Sunderethi	-do-	1211.00	53 D/ 6
14.	Banivani	Rohtak	1544.00	53 D/ 9
15.	Guranauthi	-do-	910.00	53 D/ 9
16.	Gurauthi	-do-	1720.00	53 C/12
17.	Kahnaur	-do-	2762.00	53 D/ 5
18.	Sampla	-do-	806.93	53 D/13
19.	Sunderpur	-do-	687.00	53 D/ 9
	Total		19879.33	

Contents

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.

Contents

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 FORESTT	ROAD SIDE PLANTATION	VILLAGE WOODLOT	BLOCK PLANTATION	PONDS	RAILWAY LINES	CANALS	REST	TOTAL
33- 36	37 - 40	41 — 44	45 — 48	49 – 52	53- 58	57- 60	61 — 64	65- 70

DATE ..... 199..

Page No. .....
Total No. Of Pages .....

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

Contents

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

ग्राँव वृक्ष गणना पत्रक/VILLAGE TREE ENUMERATION FORM

कार्य संख्या Job No.	कार्ड रूप रेखा Card design	राज्य State	जिला District	प्रतिदर्श गाव Sample Village	Geographical Area of the Sample Village (Hect.)	प्रतिदर्श गाव का भौगोलिक क्षेत्र हैक्टे.
1-3	4-6	7-8	9-10	11-15	16-19	

वृक्षों की संख्या Total No. of Trees
42.47

स्पीशीज/जाति SPECIES		कोड Code	वृक्ष की छाल की मोटाई (मि.मी.) Bark Thickness (mm)	वृक्ष की ऊंचाई (मी.) Tree Height (Mtr.)	वृक्ष का तना/शाखा पर घेरा (मी.) Girth at Breast Height (Mtr.)	वृक्ष रोपण/वृक्षारोपण की श्रेणी Category of Plantations/Trees	प्रतिदर्श गाव का भौगोलिक क्षेत्र हैक्टे. Geographical Area of the Sample Village (Hect.)			
क्रम संख्या Sr. No.	नाम Name	Code	Bark Thickness (mm)	Tree Height (Mtr.)	Girth at Breast Height (Mtr.)	Category of Plantations/Trees				
		20-22	23-25	26-27	28-29					