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Dy Director (Data)
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Forest Resources Survey
in
Chamba, Lahaul & Spiti And Kinnaur Districts
of
Himachal Pradesh

INVENTORY RESULTS

FOREST SURVEY OF INDIA
NORTHERN ZONE
SHIMLA
1987

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P R E F A C E

The ever increasing demand of raw material for wood based industries, timber for constructional activities, fuel and fodder for common man and pressure on land for its diversification to the developmental activities is adversely affecting the forests. To monitor the change in the growing-stock and land use pattern, it is necessary to carry out surveys at regular intervals. Forest Survey of India has been carrying out survey of forest resources in the country with a view to monitor the changing situation of the land and resources and present the data to focus the attention on critical aspects for regional planning and development.

The inventory results of Chamba, Lahaul & Spiti and Kinnaur districts of Himachal Pradesh are compiled in this report. Field inventory of this region was carried out from April 1984 to October 1985.

The area covered by the report is the North Eastern corner bordering Tibet in the East and Jammu & Kashmir in the North with geographical area of 26761 km^2 of which only 11 percent (3012.79 km^2) was under forest cover in 1966 (adopted reference year). During the past 18 years, of the above forest cover, 5.4 percent area has been deforested and diverted to other uses and 9.38 percent area has been degraded to scrub and barren lands. The balance area of 2567.44 km^2 is only 9.59 percent of the geographical area which is far too less than 60 percent laid down in National Forest Policy for maintaining proper ecological balance in such hilly and rugged area.

Out of the 2567.44 km^2 which is tree covered, only 1438.73 km^2 forming 56 percent is fully accessible. 677.83 km^2 is partially accessible and 450.88 km^2 inaccessible. Out of 2116.56 km^2 (accessible and partially accessible) 26.07 percent (551.88 km^2) has a canopy cover below 30 percent, 55.85 percent (1185.09 km^2) between 30 to 70 percent and 17.37 percent (367.57 km^2) above 70 percent. Regeneration in 99.61 percent of accessible tree forest area is either absent or inadequate. The condition of Pinus excelsa is critical amongst major Conifers in view of the fact that the lower age classes are very poorly represented. If the conditions are not improved for this species, there are chances of its disappearance in the time to come. This report also gives information on the other aspects of forest such as soil depth, soil texture, soil erosion, grazing incidence, plantation potential, fire incidence, tree size classes, injury to the crops, degradation and forest types in accessible tree forest area.

Contents

As per survey it has been estimated that Fir forest type has 256.211 stems per hectare, Spruce forest type 181.250 stems per hectare, Fir-spruce type 219.053 stems per hectare, Blue pine type 99.223 stems per hectare, Deodar type 213.211 stems per hectare, Chir pine type 229.998 stems per hectare, Mixed Conifers type 237.432 stems per hectare, Hardwood mixed with Conifers type 285.718 stems per hectare, Uplandhardwood type 314.811 stems per hectare, Misc. forest type 94.416 stems per hectare, Chilgoza type 127.500 stems per hectare and Junipers forest type 48.330 stems per hectare while the volume per hectare in the above forest types is 536.588 m^3, 336.509 m^3, 337.894 m^3, 200.305 m^3, 338.700 m^3, 88.881 m^3, 299.775 m^3, 235.749 m^3, 136.808 m^3, 17.122 m^3, 234.915 m^3 and 11.326 m^3 respectively. The accessible tree forest area has a total growing stock of 13.739 million cubmic meters and 14.072 million stems.

The report has been compiled by Shri Joginder Singh, IFS Deputy Director under the guidance of Shri S.C. Joshi, IFS, Joint Director, Forest Survey of India, Northern Zone, Shimla. Both of them deserve appreciation.

It is hoped that the report will be useful to the State Forest Department and other Organisations engaged in National Planning and development of forest resources in the region.

N.K. Agrawala
DIRECTOR
FOREST SURVEY OF INDIA
DEHRADUN

Contents

TABLE OF CONTENTS

			Page
	Location map of survey area		(i)
	Summary		(ii) & (iii)
Chapter 1	THE BACKGROUND		
	1.0	Introduction	1
	1.1	General features of the Survey area	2
	1.1.1	Location and boundaries	2
	1.1.2	Area and Landuse pattern	2
	1.1.3	Population and Socio-economic conditions	3
	1.1.4	Physical features and rivers of the area	4
	1.1.5	Climate	4
Chapter 2	DESIGN & METHODOLOGY OF THE SURVEY		
	2.0	Design and methodology	7
	2.1	Definition of 'forest area'	7
	2.2	Sampling design	7
	2.3	Methodology	8-12
Chapter 3	DATA PROCESSING		
	3.0	Preparation of data for processing on electronic computer	13
	3.1	Area computation	13
	3.2	Volume estimation	13-15
	3.3	Enumerated trees volumes	15
	3.4	Plot volume	15
	3.5	Stand tables	16
	3.6	Stock tables	16
	3.7	Sampling error	16-17
Chapter 4	FOREST INVENTORY RESULTS		
	4.1	Forest area	18
	4.1.1	Distribution of forest area by landuse classes	19
	4.1.2	Distribution of accessible forest area by soil depth classes and districts	24
	4.1.3	Distribution of accessible forest area by soil texture classes and districts	25

Contents

		Page
4.1.4	Distribution of accessible forest area by soil erosion classes and districts	25
4.1.5	Distribution of accessible forest area by grazing incidence classes and districts	26
4.1.6	Distribution of accessible forest area by plantation potential and districts	27
4.1.7	Distribution of accessible forest area by fire incidence classes and districts	28
4.1.8	Distribution of accessible forest area by size classes and districts	29
4.1.9	Distribution of accessible forest area by regeneration status and districts	30
4.1.10	Distribution of accessible forest area by type of injury to crop and districts	31
4.1.11	Distribution of accessible forest area by degradation status and districts	32
4.1.12	Distribution of accessible tree forest area by forest types and districts	33
4.1.13	Distribution of accessible tree forest area by forest types, canopy density classes and districts	34
4.2	Stand and stock tables	36
4.2.1	Analysis of the growing stock in forest types and its critical aspects	36-44
4.2.2	Analysis of growing stock in districts	44
4.3	Sampling error	45
4.4	House-hold fuel consumption in the survey area	46

MAPS

1. Location map of survey area	(i)
2. Sketch showing sampling design and layout of sample plots	11
3. Forest type maps based on inventory results	140-142

Contents

Table No.		Page
IV.2.1.1 to IV.2.1.48	Forest type wise distribution of volume per hectare, stems per hectare, total volume and total number of stems in accessible tree forest area by species and diameter classes	40-95
IV.2.2.1 to IV.2.2.6	Districtwise distribution of volume per hectare and stems per hectare in accessible tree forest area in all forest types combined, by species and diameter classes	96-101
IV.2.2.7 to IV.2.2.10	Distribution of volume per hectare, total volume, stems per hectare and total stems in accessible tree forest area in the survey area in all forest types & all districts combined, by species and diameter classes	102-105
IV.4.1	House-hold fuel consumption in the survey area and districts	47

Contents

LIST OF TABLES

Table No.		Page
IV.1	Districtwise forest area as per SOI topo maps and thematic maps, No. of sample plots and weightage per plot	18
IV.1.1	Distribution of tree forest and plantation as per their accessibility and districts	21
IV.1.1.a	Distribution of forest area (tree covered shown by greenwash on topo sheets and thematic maps) and number of sample plots inventoried therein by landuse and districts	22-23
IV.1.2	Distribution of accessible forest area by soil depth classes and districts	24
IV.1.3	Distribution of accessible forest area by soil texture classes and districts	25
IV.1.4	Distribution of accessible forest area by soil erosion classes and districts	26
IV.1.5	Distribution of accessible forest area by grazing incidence classes and districts	27
IV.1.6	Distribution of accessible forest area by plantation potential and districts	27
IV.1.7	Distribution of accessible forest area by fire incidence classes and districts	28
IV.1.8	Distribution of accessible forest area by size classes and districts	29
IV.1.9	Distribution of accessible forest area by regeneration status and districts	30
IV.1.10	Distribution of accessible forest area by type of injury to crop and districts	31
IV.1.11	Distribution of accessible forest area by degradation status and districts	32
IV.1.12	Distribution of accessible tree forest area by forest types and districts	33
IV.1.13	Distribution of tree forest area by forest types, canopy density classes and districts	35

Contents

		Page
Appendix I	Statement showing year of survey and publication of SOI topo maps used for forest inventory in survey area.	106-107
Appendix II	Location of centres of Sample Plots visited for forest inventory	108-126
Appendix III	Inventory field forms (1 to 8)	131-138
	Description of codes for landuse classes	128-129
	Description of codes for forest types	130
BIBLIOGRAPHY		139

Contents

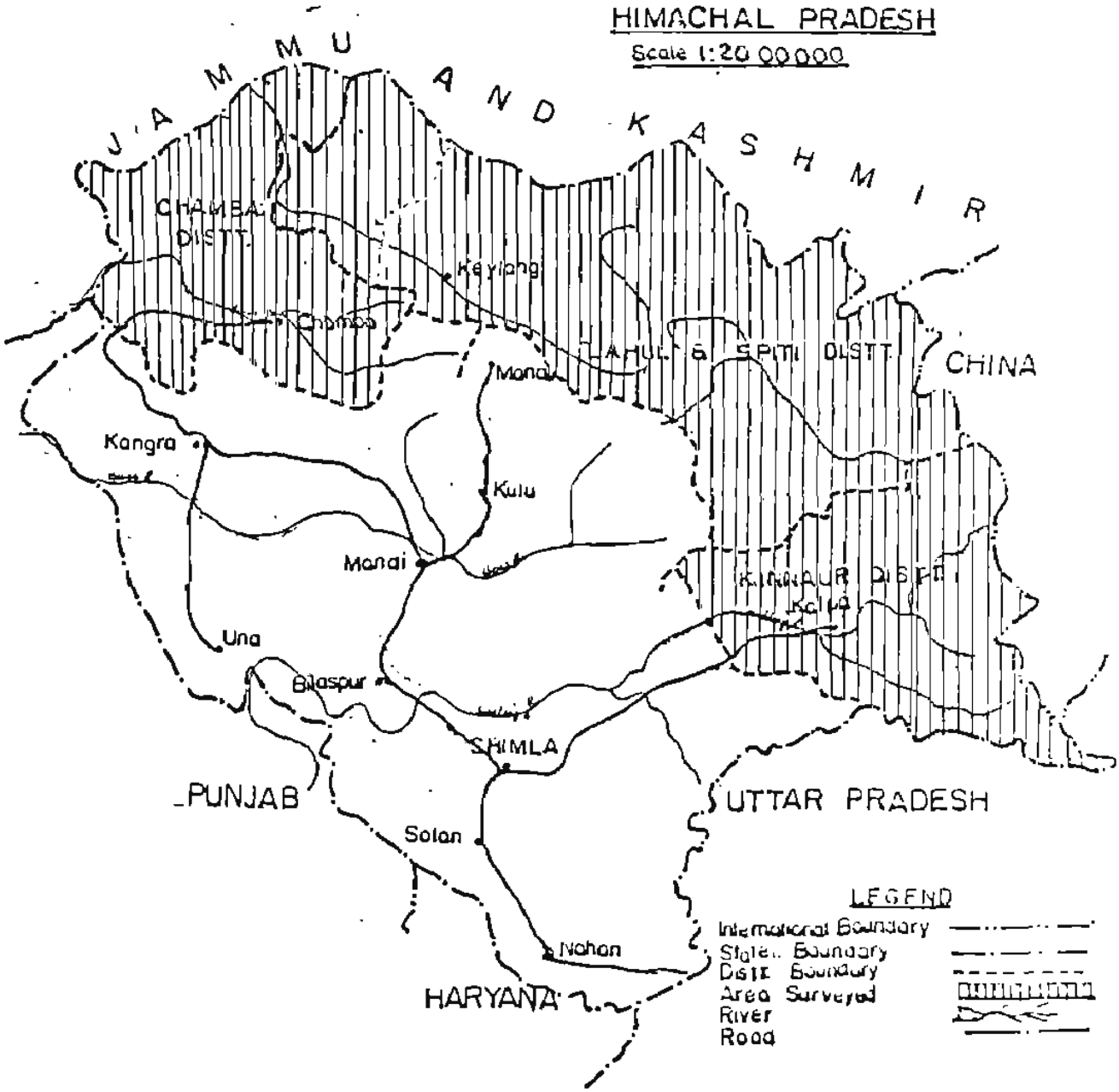
FOREST SURVEY OF INDIA
(N-Z) SHIMLA

LOCATION MAP OF SURVEY AREA

(CHAMBA LAHAUL & SPITI AND KINNAUR DISTTS.)

HIMACHAL PRADESH

Scale 1:20 00 000



Contents

SUMMARY

1. The forest inventory survey has been carried out in three districts viz Kinnaur, Lahaul & Spiti and Chamba of Himachal Pradesh during 1984-85. The objectives of survey were to monitor changes in land and forest resources to focus attention on critical aspects, thereby helping in its development planning.

2. Total geographical area covered is 26761 km^2 of which 3012.79 km^2 area was tree covered shown by greenwash on SOI topo sheets and also areas under demarcated protected forests and reserved forests whether shown by green wash or not (1634.61 km^2) and on thematic maps prepared from the aerial photographs of 1975-76, (1378.18 km^2). The areas taken from toposheets can be considered as the forest area as existed during 1966 (mid year of survey for mapping). National forest policy lays down that 60 percent of geographical area should be under forest in such hilly areas for its proper ecological balance and development. As against this there was only 11% area under forest. Thus the region was deficient in forest area by about 49 percent from National Forest Policy norms.

3. During the past 18 years (1966-1984) 5.40 percent (162.55 km^2) area has been deforested and diverted for other uses like agriculture/habitation etc. During the same period there has been degradation in 9.38 percent (282.70 km^2) of tree forest to scrub, grassland and barren land due to pressure of biotic factors on the forest resources. The forest survey reveals that now the area under tree cover is only 9.59% of the geographical area in the region.

4. Out of the remaining 2567.44 km^2, 1438.73 km^2 forming only 56 percent of the forest cover is fully accessible where plots could be laid out and all data collected. 677.83 km^2 is partially accessible which was either approached but plots could not be laid out, or its vicinity could be visited. 450.88 km^2 was totally inaccessible where no information could be collected.

5. Area under accessible tree forest (including partially accessible) is 2116.56 km^2 of which 26.07 percent (551.88 km^2) is having canopy cover below 30 percent, 55.85 percent (1182.09 km^2) has canopy cover between 30 to 70 percent and 17.37 percent (367.57 km^2) has canopy cover above 70 percent. The over all canopy cover of the area is 48 percent.

6. Regeneration over 99.61 percent of accessible tree forest area is either absent or inadequate

Contents

7. 454.72 km^2 area being 18.95 percent of total accessible tree forest, scrub, grass land and barren areas has been assessed as potentially plantable area.

8. 483.17 km^2 area being 20.13 percent of accessible tree forest, scrub, grass land and barren areas is subjected to heavy to moderate erosion.

9. Total area, per hectare estimated volume and stems in various forest types of accessible tree forest area have been found to be as follows:-

Forest type	Total area (ha.)	Vol./ha m^3	Stems/ha. (Nos.)
Fir	12978	536.588	256.211
Spruce	8202	336.509	181.250
Fir-spruce	16401	337.894	219.053
Blue pine	17620	200.305	99.223
Deodar	12160	338.700	213.211
Chir pine	14764	88.881	229.998
Mixed conifers	34840	299.775	237.432
Hardwood mixed with conifers	23644	235.749	285.718
Upland hardwood	54805	136.808	314.811
Misc. forests	8201	17.122	94.416
Chilgoza	3278	234.915	127.500
Junipers	4763	11.326	48.330

Pinus excelsa presents very deplorable condition. This type is very much understocked and within the type, lower age classes and regeneration is extremely poor. It needs special attention otherwise its existence is in danger.

Growing stock varies from maximum 536.588 m^3 in Fir forest type to minimum 11.326 m^2 in Juniper forest type and number of stems from maximum 314.811 in Upland Hardwood forest type to minimum 48.330 in Junipers forest type.

10. Accessible tree forest area has total growing stock of 13.739 million cubic meter and 14.072 million stems.

11. In the vicinity of forests rural people meet their entire energy requirements from fuelwood/agricultural waste and their per capita consumption per year is assessed at 1260 kgs.

Contents

Chapter 1
THE BACKGROUND

1.0 Introduction

Forests are essential to regulate water flow in rivers/streams, to check soil erosion, floods and droughts and to maintain the ecological balance and quality of environment for the survival of mankind. They are supplier of timber, fuelwood, fodder and minor forest products to meet day-to-day needs of local population and raw material requirements of forest based industries. Forestry activities generate vast employment opportunities particularly for rural poor. Thus, optimum planning and management of forest resources for economic development of the nation in general and the region in particular is of utmost importance.

Appreciating the potential of forest resources survey as a tool for helping in optimum planning and management , the Govt. of India created the organisation of Forest Survey of India(FSI) and entrusted it with the functions to fulfil various objectives, of which relevant to forest inventory are:-

(a) to monitor periodically (on 10 year cycle) the changing situation of land and forest resources and present the data to focus attention on its critical aspects for rational planning;

(b) to serve the data needs of development planning of forest resources; and

(c) to present data in readily useable form for the national/state level planning organisations.

To fulfil these objectives, forest inventory was carried out in Northern region of Himachal Pradesh comprising of Chamba, Lahaul Spiti & Kinnaur districts. This report presents the /inventory results of the above region. 'Survey area' wherever appearing subsequently in this report will refer to this area.

These districts were selected for survey as these had not been covered earlier under Pre-investment survey of forest resources in Himachal Pradesh region and also the decision taken in the Zonal Co-ordination Committee meeting of North Zone held on 21.8.82.

Contents

1.1 General Features of the Survey area

Land-use pattern, population and climate relating to survey area are given in table No.1.1.1 and 1.1.2. These and other features of survey area are described in the following paras.

1.1.1 Location & Boundaries

The survey area lies between 31°-0'N to 33°-15'N latitude and 75°-45' E to 79°-0' E longitude. It is bounded on the North by the international boundary between India and Tibet, on south by Gurdaspur district of Punjab and Kangra, Kullu and Shimla districts of Himachal Pradesh, on east lies the boundry of Uttar Pradesh and on the west boundry of J&K state. Districts boundaries on topo sheets were delineated as per the recent administrative delineation adopted in Himachal Pradesh.

1.1.2 Area and Land-use pattern

On the basis of H.P. Forest Statistics 1982 issued by the Department of forest farming and Conservation Himachal Pradesh total area (Table 1.1.1) under various land use is 26761 km^2 of which 24.61 percent (6586 km^2) is under forests, 0.63 percent (167 km^2) is put to non-agricultural uses, 1.95 percent (522 km^2) is net area sown, 0.16 percent (43 km^2) under fallow lands, 0.33 percent (89 km^2) under culturable waste land, 0.01 percent (2 km^2) is land under miscellaneous tree crops not included in cultivation and 72.31 percent (19352 km^2) area under permanent pasture and other grazing lands including alpine pastures, barren and un-culturable waste etc.. Thus forests and permanent pastures (other grazing lands including alpine pasture, barren and un-culturable waste etc.) form two major land uses in the area. Forest area as reported in the H.P. Forest Statistics (1982) is 6586 km^2 whereas tree covered (green wash) area as computed on Survey of India topo sheets and thematic maps prepared by Forest Survey of India is 3012.79km^2 as per district-wise detail given below:

Chamba district

Thematic maps for Survey of India (S.O.I) topo sheets No. 52 D/2,3,4,6,6,8,10,11,12,14,15 and 16 on 1:50,000 scale were available. Inventory survey on these maps was done in tree covered areas. In rest of the area covered by S.O.I. topo sheet Nos. 52 D/1, 5,9,13,52 C/4,8,12, 43 P/13,14,15,16 and 52 H/1, the inventory survey was done in areas shown by greenwash

Contents

on these sheets. Total forest area as per thematic maps (1378.18 km^2) and greenwash on S.O.I. topo sheets (852.80 km^2) aggregates to 2230.98 km^2 .

Kinnaur district.

In this district inventory survey has been done in greenwash areas only as shown on S.O.I. toposheets which is 557.26 km^2.

Lahaul & Spiti district

Forest inventory in this district has been done on the basis of S.O.I. topo sheets in greenwash as well as demarcated blanks marked on these maps. Total forest area of this district as per greenwash (138.81 km^2) and demarcated blank (85.74 km^2) aggregates to 224.55 km^2.

The variation in area figures is due to the fact that the area reported by the Department of forest farming and Conservation included blank, snow covered area and pastures alongwith tree covered areas. Where as survey area includes tree covered (green wash) area only which is legal forest area.

1.1.3 Population and Socio-economic conditions of people

The population of Chamba, Lahaul Spiti and Kinnaur is 3,09,562, 32063 and 59154 respectively which is 7.31%, 0.76% and 1.40% respectively for the whole of Himachal Pradesh as per 1981 census. Thus Chamba is the most densly populated among the three districts. The density of population per km^2 is 38, 2 and 8 for Chamba, Lahaul Spiti and Kinnaur respectively. Only 9.47% of the entire population of H.P. is living in these three districts. Bulk of the population of Kinnaur and Lahaul Spiti is confined to valleys. In other areas of these districts climate is too harsh to live. Chamba is the only town having a population of 21260, the balance population is rural mostly engaged in agriculture, which provides food only for 3 to 4 months. Rearing of sheep and goat is the other important source of income in all the three districts. Severe winter force these graziers to shift their animals to adjoining areas or even far off distances. A sizable population is engaged in this profession. As per 1977 cattle census, live stock population of Chamba, Lahaul Spiti and Kinnaur is 7,09,523, 74067 and 95331 respectivel Per person this works out to be 2.29 for Chamba, 2.31 for Lahaul Spiti and 1.61 for Kinnaur. The other

Contents

important sources of income are collection of medicinal herbs such as Sassurea lappa (Kuth), Jurinea madocephela (Dhoop), Podophyllum hexandrum (Bankakri), Carum bulbocastunum (Kala Zira), Dioscorea deltoidea, Picorniza kurroo and Hop etc. Cultivation of almonds, apple, grapes, chilgoza and other temperate fruits is also picking up. With the coming up of hydro-electric power projects large number of people are being provided employment as unskilled, skilled or technical workers either in the projects directly or in ancilliary units. Rural population is dependent upon forest for meeting their requirements of fuel-wood, small timber for construction/repair of house/agricultural implements, fodder and grazing etc. Timber and fuelwood demand of Lahaul & Spiti is being met from the adjoining areas of Kullu and Kinnaur. Timber is also being supplied at nominal rates for fruit packing cases. Large scale constructional timber required for building up of the housing colonies is being supplied by forest Corporation locally or from the adjoining forest divisions.

1.1.4 Physical features and rivers of the area

The entire area is hilly with slopes ranging from moderate to precipitous. It is cut up with narrow valleys. The valleys are wide in Chamba but extremely narrow in Pangi, Lahaul and Kinnaur areas. Altitude in the area varies from 410 m in Chamba district where Ravi leaves Himachal Pradesh and enters Punjab on eastern bank to 6950 metres at Leopargal in Kinnaur on the boundary of eastern limits of the area with Tibet. Ravi, Chenab and Satluj are the important rivers passing through the area and ultimately joining Indus river in Pakistan. These rivers are being tapped for hydro-electric power and irrigation by constructing a series of dams over the rivers. Ravi is being tapped at by constructing dams at Chamera and Thien on the main river and at Baira Suil a tributary of Ravi. Similarly Satluj is tapped both for Hydro-electric and irrigation purposes by construction of a chain of dams.

1.1.5 Climate

Climate varies with elevation and location of the area. The lower most area of Chamba district adjoining Punjab is having subtropical climate while the moderately high elevation are having temperate climate with longer winter season while large tract situated above 3000 meters is having arctic climate. Annual precipitation in the form of rainfall and snowfall varies from 165 mm in Lahaul Spiti to 1405 mm in Chamba area.

Contents

Table No. 1.1.1

Land use pattern in the districts — Unit - Hectare

Distt.	Forests	Land put to non-agricultural uses.	Net area sown	Fallow lands	Culturable waste land	Land under misc. tree crops not included in culturable	Permanent pasture & other grazing alpine pastures barren and unculturable waste etc.	Total Col. 2 to 8
1	2	3	4	5	6	7	8	9
Chamba	3928 (60.29)	141 (2.16)	408 (6.26)	25 (0.38)	54 (0.83)	1 (0.02)	1958 (30.06)	6515 100%
Lahaul & Spiti	2227 (16.27)	17 (0.12)	30 (0.22)	3 (0.02)	2 (0.01)	1 (0.01)	11413 (83.35)	13693 100%
Kinnaur	431 (6.58)	9 (0.14)	84 (1.28)	15 (0.23)	33 (0.50)	-	5981 (91.27)	6553 100%
Total:	6586 (24.61)	167 (0.63)	522 (1.95)	43 (0.16)	89 (0.33)	2 (0.01)	19352 (72.31)	26761 100%

Note: Figure in bracket represent percentage of total area.

Source: H.P. Forest statistics 1982.

Contents

Table No. 1.1.2

Item (unit)		Districts			
		Kinnaur	Lahaul & Spiti	Chamba	Total
Total population 1981 census		59,154	32,063	3,09,562	4,00,789
Live Stock: (Nos.)	Sheep/goats	70,309	59,990	4,40,196	5,70,495
	Others	25,022	14,077	2,69,327	3,08,426
	Total	95,331	74,067	7,09,523	8,78,921
Annual Rainfall in(mm)		627	166	1405	-

Contents

Chapter 2

Design and methodology of the survey

2.0 To monitor the change in forest cover, thematic maps prepared by interpretation of latest areal-photographs were to be used. Such thematic maps were to form the basis for collection of growing stock data. Thematic maps for whole of the survey area were not available due to constraints beyond control of the organisation. However, in Chamba district some thematic map sheets were available. Forest area delineated on these thematic maps formed the basis of forest inventory alongwith the forest area marked on 1:50,000 scale topographic sheets prepared by S.O.I. for rest of the area.

2.1 Definition of 'forest area'

The following are treated as 'Forest Areas' for carrying out the forest inventory:

Chamba district

All areas shown in greenwash on the survey of India topo sheets No. 52 D/1,5,9,13, 52 C/4,8,12 43 P/13,14,15,16 and 52 H/1 and all the areas shown as forested on thematic maps for survey of India topo sheets No. 52 D/2,3,4,6,7,8,10,11,12,14,15 & 16 compared with greenwash areas shown in Survey of India topo sheets.

Kinnaur district

All those areas shown in greenwash on Survey of India topo sheets.

Lahaul & Spiti district

All those areas shown in greenwash on Survey of India topo sheets and all demarcated areas shown as 'forest areas' on the Survey of India topo sheets. Unless explicitly stated otherwise 'forest area' in this report shall henceforth mean areas of the categories mentioned above.

2.2 Sampling Design

Each of the 1:50,000 Survey of India topographic sheets falling in the survey area was divided in to 36 grids of 2½x2½' of latitudes and longitudes. In each of such grid, two sample points were marked. The inventory data was collected from a square plot of 0.1 hectare laid out at each of these sample points on the ground. The method of marking the sample points on the map is described below:

Contents

One side of the square plot (which is 31.62 metres on the ground) measures 0.6 mm to the nearest first decimal of mm in the above topographic map. The length and width of each grid is measured to the first decimal in millimetres from this length 0.6 mm is deducted so as to prevent the plot centre from falling on the origin or on the peripheries of the sampled grid. Suppose the measurable length and width of a grid along its X & Y axis are 83.5 mm and 92.5 mm respectively, after deducting 0.6 mm the reduced length and width are 82.9 mm and 91.9 mm respectively. A three digit random number is selected from the random number table for each axis separately. If the selected random numbers are less than 829 and 919 respectively then they are retained as such, otherwise the next random number is considered. Suppose the random numbers selected are 144 and 161 respectively then these numbers will correspond to 14.4 mm and 16.1 mm lengths along the X & Y axis respectively. To these lengths viz 14.4 mm and 16.1 mm, 0.3 mm is added (being half the measurable side on a topographic map used). Now 14.7 mm and 16.4 mm become the co-ordinates of the sample point in the grid. Taking SW corner of this grid as origin and measuring 14.7 mm and 16.4 mm along X & Y axis respectively the centre of the first point is marked. The centre of the first plot is then joined by a straight line to the grid centre and this line is extended further beyond the grid centre. On this extended line, the second is marked at a distance equal to the distance of first point from grid centre. This point is the centre of the second plot. All sample points falling in forest areas are located on the ground and quantitative data is collected from the sample plots and qualitative data from the surrounds of the plot. The co-ordinates of the plot centres inventoried and the relevant data pertaining to these plots are given in Appendix II.

2.3 Methodology

The field data is collected by a crew consisting one Junior Technical Assistant (Crew leader) assisted by a Deputy Ranger, two to three fieldmen, a Khalasi and a labourer hired locally wherever necessary. The crew leader is provided with a list of sample plots to be surveyed by

Contents

his crew during the season alongwith a set of toposheets with sample points already marked. A set of measuring instruments viz Silva Compass, Haga/Blume leiss hypsometer, callipers, measuring tapes and ranging rods etc. are provided.

After deciding the plot and the grid number to be surveyed on a particular day from a camping spot, the crew leader reaches a prominent physical feature (also called starting reference point as near to the sample point as possible) which is depicted on the map and can also be identified on the ground. Usually the following features are selected as reference points:

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

Having located a prominent physical feature (reference point) both on the ground as well as on the map, the distance and bearing of the sample point from this physical feature is measured from the map. The bearing is measured with the help of a protractor or the Silva Compass. At this reference point the crew leader records details of the reference feature used , the bearing and distance of the sample point from the reference feature, the name of the camping spot, the time taken to complete the work etc. in plot approach form'. Information in this form is used in time and cost study for the inventory and helping to relocate at a future date. Specimen of this form is given in Appendix III. From the reference point, crew leader traverses the distance

Contents

in the direction as measured on the map to reach the sample point. A wooden peg is fixed at this location, which is the centre of the sample plot. After reaching at a sample point, a square sample plot of 0.1 ha. with diagonals measuring 44.72 metres in NE-SW and NW-SE directions is laid out on the ground by marking its four corners by thin poles. Regeneration data is collected from a plot measuring 4 m x 4 m and herb-shrub data from a plot of 2 m x 2 m size laid out around the plot centre. Sampling design and layout of the sample plot is explained in the sketch on page 11.

After laying out the plot, the crew leader with the help of other crew members collects the inventory data in the following field forms:

i) Plot description form;
ii) Plot enumeration form;
iii) Sample tree form;
iv) Herbs and shrubs data form;

The specimen of above field forms may be found in Appendix III. Their brief description is as under:

(i) Plot Description Form (PDF)

Qualitative data such as land use, crop composition of the crop and its density, erosion in the area, fire and grazing incidence, regeneration status etc. are recorded in this form. The basis of assessments is occular by examining a surrounding area of about 2 hectare around the plot centre.

(ii) Plot Enumeration Form (PEF)

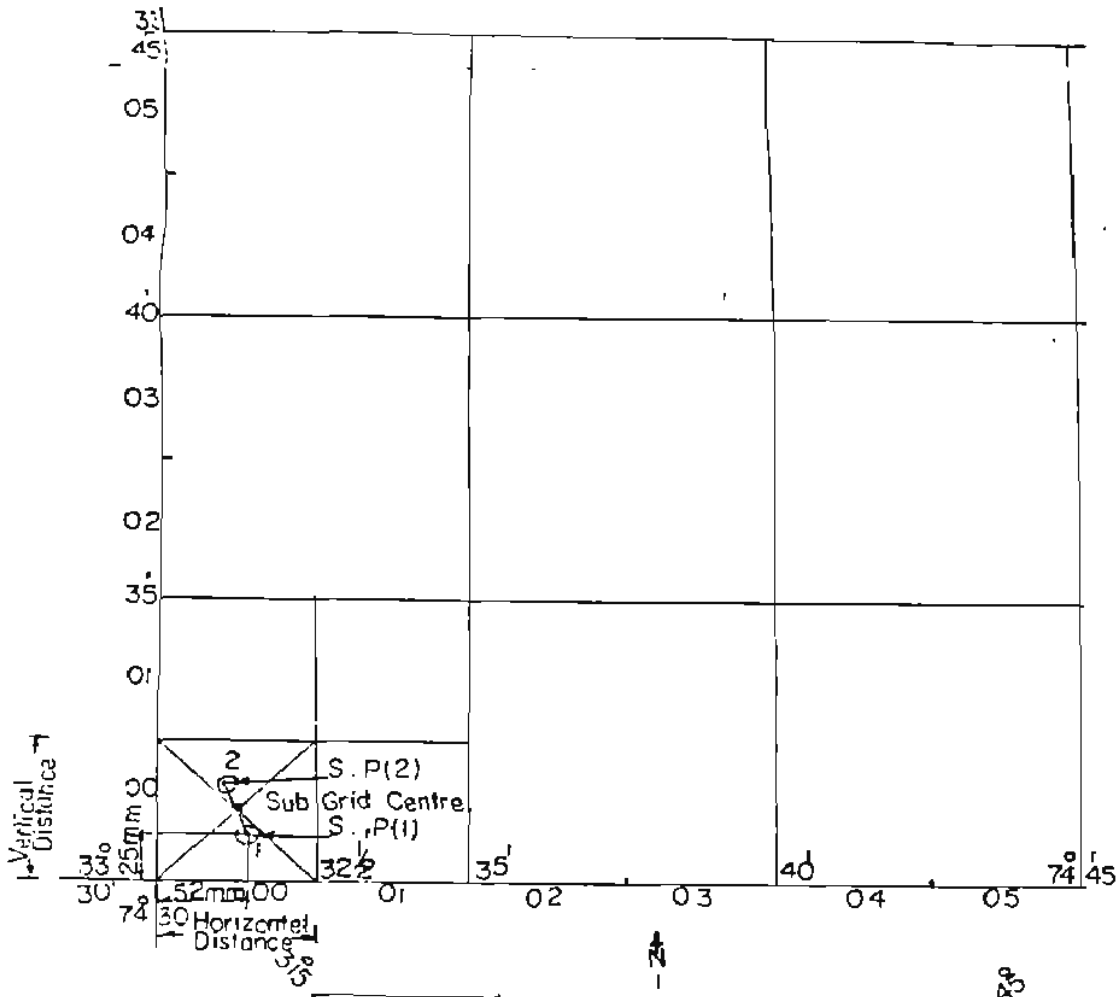
In this form trees in 0.1 hectare plot are enumerated and recorded with the name of species and diameter at breast height. Total number of bamboo clumps occuring in the plot are also recorded.

(iii) Sample tree Form (STF)

The data in this form are collected from the northern quarter of the sample plot. Name of the species diameter at breast height, twice bark thickness, dominance status, length of the clear bole and height of each tree enumerated in this

Contents

SKETCH SHOWING SAMPLING DESIGN AND LAYOUT OF PLOTS



Contents

quadrant are recorded. The data from this form helps in developing local volume equations for the species in the survey area. Under bark volume is also derived from the local volume equations with the help of bark thickness data.

(iv) Herbs and Shrubs Data Form

In this form, names and other details of all identifiable species of herbs and shrubs are recorded. In case of species that could not be identified in the field, the number of such species only are noted.

The above is a brief description of the design and survey methodology. For details 'The Manual of Instructions for field Inventory' of Forest Survey of India may be referred whose copy of which can be had from the Director, Forest Survey of India, 25-Subhash Road, Dehradun, or Joint Director, Forest Survey of India, Northern Zone, Shimla (H.P.).

Contents

Chapter 3

DATA PROCESSING

3.0 Preperation of data for processing on electronic computer

The basic field inventory data collected in various field forms of the region after completion of field work were sent to Data Processing Unit of the organisation at Dehradun. The field forms were checked there for detecting inconsistency in the data and the same rectified. Data was processed on electronic computer. For the purpose, the collected data of field forms was first transferred on to punch cards using punch machines, verified to detect punching mistakes and to correct the same with the help of card verifier, sorted and loaded on magnetic disk/tapes for processing in computer. Listing of the data loaded on tape/disk were taken out to check complete and proper sequence of data loaded. Suitable computer programmes were framed to get the results in desired form.

3.1 Area computation

The forest area was calculated from 1:50,000 topographical maps by using close spaced dot grid templates of different scales in the zone and supplied districtwise to Data Processing Unit. Further distribution of forest area under various classes such as land use, accessible tree forest, forest type, soil erosion status, grazing incidence, fire incidence, canopy density classes etc. was arrived at proportionately using ratio estimator. However, it may be noted that area tables are based on very few sample plots and therefore should be considered as indicative only and used with due caution.

3.2 Volume Estimation

Volume equation: Special volume studies by felling trees were not done in this area. Therefore general volume tables, cull, utility and bark volume could not be estimated. For deciding use of volume equation, the height diameter relation of the sample trees were compared with height diameter relation of the species for the area for which volume equations were available.

Contents

Local volume equations/volume factors developed for the following areas were used to estimate volume of the trees of the following species:

S.No.	Species	Locality
1.	Abies Pindrow	Rohru, Chopal and Shimla
2.	Picea smithiana	- do -
3.	Cedrus deodara	- do -
4.	Pinus excelsa	- do -
5.	Pinus gerardiana	Volume factors as per Kinnaur Working Plan by A.C. Karwasra
6.	Pinus roxburgnii	Chir Belt
7.	Quercus dilatata	Uttarkashi
8.	Quercus semicarpifolia	-do-
9.	Quercus incana	Chir Belt
10.	Juniperus macropoda	Volume factors as per Working Plan of Lahaul & Spiti by Sarbans Singh
11.	Rest of species	Uttarkashi

The following equations were used:-

(i) Abies pindrow (606)

$$V = 0.03728 + 8.55347\ D^2$$

(ii) Picea smithiana (427)

$$V = 0.26072 - 3.29692\ D + 14.71246\ D^2$$

(iii) Cedrus deodara (524)

$$V = 0.24210 - 2.68191\ D + 14.77955\ D^2 - 2.63126\ D^3$$

(iv) Pinus excelsa & gerardiana (630)

$$V = 0.28497 - 3.32891\ D + 16.51904\ D^2 - 3.73140\ D^3$$

(v) Pinus roxburghii

$$V = 0.167091 - 2.08594\ D + 9.92994\ D^2$$

(vi) Quercus dilatata and Quercus semicarpifolia

$$V = 0.09880 - 1.55471\ D + 10.16317\ D^2$$

(vii) Quercus incana (239)

$$V = 0.24016 + 3.82077\ D - 1.39452\ D^2$$

(viii) Rest of species

$$V = 0.38459 - 3.45596 + 10.98759\ D^2$$

Contents

For Pinus gerardiana, and Junipers Volume factors as calculated and worked out in Kinnaur & Lahaul Spiti Working Plans were used. Volume factors used are as under:

(A) Pinus gerardiana-(Working Plan of Kinnaur by Sh. A.C. Karwasra)

Diameter class in cms.	Volume in m^3
10-20 cm	0.018
20-30	0.15
30-40	0.42
40-50	0.87
50-60 & up	1.25

(B) Junipers - (Working Plan of Lahaul Spiti by Sh. Sarbans Singh)

Diameter class in cms.	Volume in m^3
10-20	0.0510
20-30	0.1133
30-40	0.2832
40-50	0.4248
50-60	0.7074
60-70	0.9911
70-80 & up	1.5574

3.3 Enumerated trees volumes

Volume of each enumerated tree was estimated from the local volume equation at the over bark breast height diameter of the tree. The volumes were calculated per hectare and stored in a tree/plot volume file created for this purpose. Species code and diameter were also stored with the corresponding volumes. In order to estimate volume in different classes, the parameter of plot description form were also stored together with per hectare stems and volume of the plot.

3.4 Plot Volume

The estimates of volume of enumerated trees in the plot were added to obtain plot volume which were converted to per hectare. The volumes were also stored in tree/plot volume file to tabulate volumes by different parameters and calculation of errors of the estimates.

Contents

3.5 Stand tables

The elements of tree/plot volume file were utilised to estimate stems per hectare and total stems by species and diameter classes for each forest type. These are given in tables of Chapter 4.

3.6 Stock tables

Estimates of volume per hectare and total volume by species and diameter classes were also derived from tree/plot volume file for each forest type. These are given in tables of Chapter 4.

Estimates of volume per hectare and total volume over all forest types were also calculated. These are given in tables of Chapter 4.

3.7 Sampling error

The sample was considered to constitute a simple random sample of clusters. Since in most cases only one plot was enumerated in a grid, ratio method of estimate described below was used to calculate standard error:

Let

n = Total no. of grids in the sample.

y_i = Total per hectare volume in the ith grid.

x_i = Number of plots in ith grid.

$$\bar{x} = \sum_{i=1}^{n} \frac{x_i}{n}$$ = Average No. of plots per grid.

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

Estimate of the variance R

$$\hat{V}\hat{R} = \frac{N-n}{Nn\bar{x}^2} \frac{\sum_{i=1}^{n} (y_i - \hat{R}x_i)^2}{(n-1)}$$

$$= \frac{1}{n(n-1)\bar{x}^2} \times \sum_{i=1}^{n} (y_i - \hat{R}x_i)^2$$

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

Contents

$$= \frac{1}{n(n-1)\,\bar{x}^2}\left(\sum_{i=1}^{n} y_i^2 - 2\hat{R}\sum_{i=1}^{n} x_i y_i + \hat{R}^2 \sum_{i=1}^{n} x_i^2\right)$$

Estimate of standard error of (SE) $\hat{R}$

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

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

(* Estimates of standard error ~~were~~ are derived for growing stock in each forest type and over all forest types at district level.) ~~These are given in tables of Chapter~~ 4.

~~Similarly standard error in the estimate~~ of area is calculated. ~~Total standard error~~ is given by the formula

$$\text{Total SE \%} = \sqrt{SE\%^2_{\text{of(volume/area)}} + SE'\%^2_{\text{of(area)}}}$$

Chapter 4

FOREST INVENTORY RESULTS

4.0 In this chapter, the results of forest inventory and the critical aspects of forest resources as evident therefrom in the survey area are presented. This is a very low intensity survey (0.01 percent). Its results are therefore, reliable and valid for the region as a whole. However, district-wise information of some attributes has also been given which may be considered as indicative only.

4.1 Forest area

Forest area has already been defined in Chapter 2. This is an essential component of forest inventory and is computed from maps. In the present survey the thematic maps as well as S.O.I. topo sheets on 1:50,000 scale formed the basis of inventory survey as such these were made use of in computing forest area and estimation of growing stock by ground surveys.

The survey area is covered by 67 topo sheets viz 43 P/13 to P/15, 52 C/4, C/8, C/11, C/12, C/15, C/16, 52 D/1 to D/16, 52 H/1 to H/3, H/5 to H/16 52 L/2, L/3, L/4, L/6, L/7, L/8, L/11, L/12, 52 E/13 to E/15, 53 I/1 to I/3 & I/5 to I/16 and 53 M/4. These topcsheets were surveyed by Survey of India during the period from 1956-57 to 1975.

The year 1966 has therefore been taken base year for monitoring the changes in the forest area as computed from the green wash on S.O.I. topo sheets and forest area from the thematic maps. Forest area in these sheets has been computed by closely spaced dot grid and the same alongwith number of sample points inventoried therein are given in table No.4.1.

Table No. 4.1

Forest area (green wash on 1:50,000 S.O.I. topo sheets and thematic maps computed by dot grid) district-wise and number of sample points inventoried therein.

Sl. No.	District	Forest area (hectare) S.O.I. map sheets	Thematic maps	Total	No. of sample plots	Weightage of area (hectare) per point
1.	Chamba	85280	137818	223098	272	820
2.	Kinnaur	55726	-	55726	68	820
3.	Lahaul & Spiti	22455	-	22455	33	680
	Total	163461	137818	301279	373	808

Contents

Distribution of area in all the tables that follow has been worked out on the basis of ratio estimator.

4.1.1 Distribution of forest area by land use classes

Total forest area surveyed is 3012.79 km^2 of which 70.25 percent (2116.56 km^2) is under accessible tree forest, followed by 14.97 percent (450.88 km^2) as inaccessible area, 5.40 percent (162.65 km^2) diverted to agriculture or habitation and 9.38 percent (282.70 km^2) is degraded to scrub, barren land, grass land and other lands. 56 sample points (representing an area of 450.88 km^2) could not be visited due to difficult terrain and have been classified as inaccessible. However, out of 56 sample plots covering an area of 450.88 km^2, 42 sample plots with area of 341.64 km^2 have been ascertained to be under tree cover and remaining 14 sample plots with an area of 109.24 km^2 are in Reserved or demarcated protected forest but bear no tree cover. This area of 341.64 km^2 also bears forest because of absence of human disturbance due to its inaccessibility. No data in respect of these points could be collected during inventory. In the remaining plots also in case of 68 plots only vicinity could be visited whereas on 15 plots even on reaching, the sample point/plot could not be laid out. As such information of only some of the attributes could be collected in respect of these plots. Though the area represented by these plots may be considered as partially accessible, but for the purpose of inventory this is being included with the accessible forest area. Forest area by plot status and thereby accessibility is given in Table No.IV.1.1 alongwith the break up of forest area by land use classes.

On further examination of data therein, following critical aspects about state of forest resources in the area are evident.

Out of 3012.79 km^2 of forest area, 1378.18 km^2 have been computed from the thematic maps prepared from the aerial photographs taken during 1975-76. This area forms part of Chamba district. Out of 1378.18 km^2 area 8.93 percent (123.04 km^2) has been diverted to agriculture during the period from 1975-76 to 1984 (the year in which forest

Contents

inventory has been done by the Forest Survey of India). During the same period 11.31 percent (155.86 km^2) of forest area has been degraded to scrub, grass land and barren land.

Out of the remaining portion comprising of 1634.61 km^2 of greenwash area of S.O.I. topo sheets 2.92 percent (47.81 km^2) has been deforested and diverted for other uses like agriculture and habitation etc. during the base year of 1966 and 1984 (year of survey), 7.26 percent (118.64 km^2) of forest area has also suffered degradation to scrub land, grass land and barren land during the same period.

The present survey reveals that the total area under tree cover including inaccessible areas is only 2567.44 km^2 which forms only 9.65 percent of total geographical area of 26761 km^2 in the region. Accessible tree covered area is however, only 2116.56 km^2 which is 7.95 percent of the geographical areas. National forest policy envisages 60% of geographical area to be under forest cover in such hilly terrain for its proper ecological balance. Thus forest area in the region is far less than laid down in National forest policy. Though there are physical constraints to grow tree cover in high altitude snow covered and arid areas there is a need to bring more areas under tree cover in the region particularly plantable waste and barren lands for its ecological balance as well as economic development of the region. Districtwise distribution of forest area and land use is given in Table No. IV.1.1.a .

Contents

Table No. IV.1.1

Distribution of tree forests and plantation as per their accessibility

S.No.	District		Sample Plot visited & all data collected (Accessible)	Plantation Accessible	Total Accessible	Sample Plot visited described but could not be laid out (Partially Accessible)	Plot could not be approached but vicinity visited (Partially Accessible)	Total Partially Accessible	Total of accessible & Partially Accessible)	Inaccessible
1.	Chamba	SP	122	1	123	15	45	60	183	33
		Area	1000.66	8.20	1008.86	123.03	369.10	492.13	1500.99	270.67
2.	Kinnaur	SP	40	-	40	-	21	21	61	7
		Area	327.80	-	327.80	-	172.10	172.10	499.90	57.36
3.	Lahaul & Spiti	SP	14	1	15	-	2	2	17	2
		Area	95.26	6.81	102.07	-	13.60	13.60	115.67	13.61
	Total	SP	176	2	178	15	68	83	261	42
		Area	1423.72	15.01	1438.73	123.03	554.80	677.83	2116.56	341.64
		%	57.92	0.61	58.53	5.00	22.57	27.57	86.10	13.90

Contents

Table No. IV.1.1.a

Distribution of forest area (Tree covered shown by greenwash on topo sheets & thematic maps) and number of sample plots inventoried therein by land use and districts.

Sl. No.	Land use	DISTRICTS: Chamba, Thematic maps: No. of sample points	Chamba, Thematic maps: Area (km^2)	Chamba, Topo sheets: No. of sample points	Chamba, Topo sheets: Area (km^2)	Kinnaur, Topo sheets: No. of sample points	Kinnaur, Topo sheets: Area (km^2)	Lahaul & Spiti, Topo sheets: No. of sample points	Lahaul & Spiti, Topo sheets: Area (km^2)
01	Tree forest	112	918.79	70	574.00	61	499.90	16	108.86
02	Plantation	-	-	1	8.20	-	-	1	6.81
03	Scrub	2	16.41	2	16.40	-	-	1	6.81
04	Govt. grass lands	4	32.81	2	16.40	-	-	5	34.02
05	Barren lands	13	106.64	3	24.60	-	-	3	20.41
06	Agricultural land with/ without tree in surround	15	123.04	3	24.60	-	-	1	6.81
07	Habitation	-	-	1	8.20	-	-	-	-
08	Other lands	-	-	1	8.20	-	-	-	-
09	Inaccessible plots	22	180.49	21	172.20	7	57.36	6	40.83
	Total	168	1378.18	104	852.80	68	557.26	33	224.55
(a)	Actual forest area (01 to 05 + 08 + 09)	153	1255.14	100	820.00	68	557.26	32	217.74
(b)	Accessible tree forest area (01 + 02)	112	918.79	71	582.20	61	499.90	17	115.67
(c)	Forest area deforested or diverted for other use (06 + 07)	15	123.04	4	32.80	-	-	1	6.81
(d)	Forest area degraded to scrub/barren land/ grass land & other lands	19	155.86	8	65.60	-	-	9	61.24

Contd.....

Contents

Table No. IV.1.1.a

Distribution of forest area (Tree covered shown by greenwash on topo sheets & thematic maps) and number of sample plots inventoried therein by land use and districts.

Sl. No.	Land use	Total of topo sheets		Total of Thematic maps		Grand Total		%
		No. of sample points	Area (km^2)	No. of sample points	Area (km^2)	No. of sample points	Area (km^2)	
01	Tree forest	147	1182.76	112	918.79	259	2101.55	69.75
02	Plantation	2	15.01	-	-	2	15.01	0.50
03	Scrub	3	23.21	2	16.41	5	39.62	1.32
04	Govt. grass lands	7	50.42	4	32.81	11	83.23	2.76
05	Barren lands	6	45.01	13	106.64	19	151.65	5.03
06	Agricultural land with/ without tree in surround	4	31.41	15	123.04	19	154.45	5.13
07	Habitation	1	8.20	-	-	1	8.20	0.27
08	Other lands	1	8.20	-	-	1	8.20	0.27
09	Inaccessible plots	34	220.39	22	180.49	56	450.88	14.97
	Total	205	1634.61	168	1378.18	373	3012.79	100
(a)	Actual Forest area (01 to 05 + 08 + 09)	200	1595.00	153	1255.14	353	2850.14	94.60
(b)	Accessible tree forest area (01 + 02)	149	1197.77	112	918.79	261	2116.56	70.25
( )	Forest area deforested or diverted for other use (06 + 07)	5	39.61	15	123.04	20	162.65	5.40
	Forest area degraded to scrub/barren land/grass land & other lands (03 + 04 + 05 + 08)	17	126.84	19	155.86	36	282.70	9.38

Contents

4.1.2 Distribution of accessible forest area by soil depth classes is given in table No. IV.1.2

Table No. IV.1.2

Distribution of accessible forest area by soil depth and districts

Total area : 2399.26 km^2
Total sample points: 297
Unit : km^2

Sl. No.	Soil depth class	District Chamba	Kinnaur	Lahaul & Spiti	Total	%
1.	No Soil	8.20	16.39	-	24.59	1.02
2.	Soil depth less than 15 cms.	139.44	32.78	-	172.22	7.18
3.	Soil depth 15 cms or more but less than 30 cms.	492.13	49.17	108.87	650.17	27.10
4.	Soil depth 30cms or more but less than 90 cms.	582.35	188.49	61.23	832.07	34.68
5.	Soil depth 90cms or more	319.88	81.95	6.81	408.64	17.03
6.	*Unrecorded	180.45	131.12	-	311.57	12.99
	Total:	1722.45	499.90	176.91	2399.26	100.00

*Unrecorded relate to those points where information could not be collected.

As may be observed from the above table that 7.18 percent of area has soil depth less than 15 cms, 27.10 percent 15 cms to 30 cms, 34.68 percent 30 cms to 90 cms followed by 17.03 percent with soil depth more than 90 cms. 1.02 percent area of the region is devoid of any soil cover. In area having soil depth of less than 30 cms more emphasis has to be given to conserve soil by undertaking soil conservation measures to improve the soil depth. At present these areas support grass or stunted growth of trees and shrubs.

Contents

4.1.3 Distribution of accessible forest area by by soil texture classes.

The area is predominantly clayey loam which forms 64.06% (1537 km^2) followed by sandy loam 11.73% (281.46 km^2) and loam 10.88% (261.03 km^2). Remaining 0.34 percent (8.2 km^2) is clayey soil. Thus region does not have any significant areas requiring specific treatment or choice of species from the point of view of soil texture. Good textural soils are encountered over major portion of the area. Districtwise distribution of area by soil texture is given in table No. IV.1.3

Table No. IV.1.3

Distribution of forest area by soil texture and districts

Total area : 2399.26 km

Total sample points: 297

Unit : km^2

S.No.	Soil texture	Districts: Chamba	Kinnaur	Lahaul & Spiti	Total	%
1.	Clayey	-	8.20	-	8.20	0.34
2.	Clayey loam	1107.29	286.82	142.89	1537.00	64.06
3.	Loam	205.05	49.17	6.81	261.03	10.88
4.	Sandy loam	229.66	24.59	27.21	281.46	11.73
5.	Sandy	-	-	-	-	-
6.	Unrecorded	180.45	131.12	-	311.57	12.99
	Total:	1722.45	499.90	176.91	2399.26	100.00

4.1.4 Distribution of accessible forest area by soil erosion classes

Soil erosion is not of much problem over most of the area. In fact 73.37 percent (1760.25 km^2) is having no erosion or only mild erosion followed by 15.64 percent (375.36 km^2) having moderate erosion i.e. where small gullies and rills are formed on top surface. Only 4.49 percent (107.81 km^2) has heavy erosion with deep gullies, ravines or land slips.

Contents

Areas with moderate erosion and heavey erosion will need special attention to avoid further degradation of site by taking up soil conservation measures. Distribution of forest area by soil erosion classes is given in Table No. IV.1.4.

Table No. IV.1.4

Distribution of forest area by soil erosion status and districts:

Total area : 2399.26 km^2
Total sample points : 297
Unit : km^2

S.No.	Erosion status	Districts: Chamba	Kinnaur	Lahaul & Spiti	Total	%
1.	Mild erosion i.e. no erosion or slight erosion where only surface erosion has taken place.	1435.37	270.44	54.44	1760.25	73.37
2.	Moderate erosion i.e. where small gullies and rills are formed on the top surface of soil.	98.43	188.48	88.45	375.36	15.64
3.	Heavy erosion i.e. areas which have deep gullies, ravines, land slips etc.	32.81	40.98	34.02	107.81	4.49
4.	Unrecorded	155.84	-	-	155.84	6.50
	Total:	1722.45	499.90	176.91	2399.26	100.00

4.1.5 Distribution of accessible forest area by grazing incidence classes:

12.93% (310.19 km^2) area is heavily grazed. Heavy grazing incidence is maximum in Kinnaur followed by Lahaul & Spiti and Chamba. 31.55 percent (756.93 km^2) area is subjected to medium grazing and rest of the area experience light grazing. Heavy grazing is deterimental to forest regeneration, growth and need

Contents

to be controlled. Districtwise distribution of forest area by grazing incidence classes is given in Table No. IV.1.5.

Table No. IV.1.5

Distribution of accessible forest by grazing incidence classes and districts.

Total area : 2399.26 km^2
Total sample points : 297
Unit : km^2

S.No.	Grazing incidence	Districts Chamba	Kinnaur	Lahaul & Spiti	Total	%
1.	Heavy grazing	188.65	114.73	6.81	310.19	12.93
2.	Medium grazing	549.54	139.32	68.04	756.93	31.55
3.	Light grazing	656.17	213.07	102.06	971.30	40.48
4.	No grazing	196.85	32.78	-	229.63	9.57
5.	Unrecorded	131.24	-	-	131.24	5.47
	Total:	1722.45	499.90	176.91	2399.26	100.00

4.1.6 Distribution of accessible forest area by plantation potential:

In 18.95 percent (454.72 km^2) area there is scope for afforestation or augumenting stocking by plantations to increase site productivity. 11.67 percent area (280.06 km^2) has been assessed as unplantable. Soil conservation measures to conserve and build up soil may be necessary.

District-wise distribution of area by plantation potential is given in Table No. IV.1.6.

Table No. IV.1.6

Distribution of accessible forest area by plantation potential and districts.

Total area : 2399.26 km^2
Total sample points : 297
Unit : km^2

S.No.	Plantation potential	Districts Chamba	Kinnaur	Lahaul & Spiti	Total	%
1.	Plantable	303.48	49.17	102.07	454.72	18.95
2.	Unplantable	213.26	32.78	34.02	280.06	11.67
3.	Not applicable	1082.68	417.95	40.82	1541.45	64.25
4.	Unrecorded	123.03	-	-	123.03	5.13
	Total:	1722.45	499.90	176.91	2399.26	

Contents

Explanatory note:

Plantation potential was assessed only at those sample plots having tree crown cover density of less than 30%. Plantable/ Unplantable potential was determined by giving due consideration to aspect, soil depth, drainage, crop in surrounding area and other biotic and climatic factors. The maximum permissible slope upto which plantation can be raised was kept as 40° and minimum soil depth 20 cms. Sample plots having crown density of 30% or more were categorised as not applicable since plantation potential of such area from the point of afforestation is not of any significance.

4.1.7 Distribution of accessible forest area by fire incidence classes

A very small portion of the area i.e. 41.01 km^2 forming 1.71 percent experienced heavy fires. Similarly 6.15 percent (147.62 km^2) has frequent fires, 35.09 percent (841.77 km^2) is having occassional fires. Uncontrolled fires damage the flora and fauna. In fire susceptible area, preventive measures to minimise fire damages need greater attention.

District-wise distribution of forest area by fire incidence classes is given in Table No.IV.1.7.

Table No. IV.1.7

Distribution of accessible forest area by fire incidence classes and districts

Total area : 2399.26 km^2

Total sample points: 297

Unit : km^2

S.No.	Fire incidence	Districts: Chamba	Kinnaur	Lahaul & Spiti	Total	%
1.	Very heavy	41.01	-	-	41.01	1.71
2.	Frequent	131.23	16.39	-	147.62	6.15
3.	Occasional	524.94	303.22	13.61	841.77	35.09
4.	No fire	844.82	180.29	149.69	1174.48	48.96
5.	Unrecorded	180.45	-	13.61	194.06	8.09
	Total:	1722.45	499.90	176.91	2399.26	100.00

Contents

4.1.8 Distribution of accessible tree forest area by tree size classes

Maximum area i.e. 56.62 percent (1198.41 km^2) has big timber followed by 16.01 percent (338.87 km^2) under mixed size class, 13.36 percent (282.82 km^2) under small timber, 9.56 percent (202.23 km^2) under pole crop and only 1.35 percent (28.61 km^2) under regeneration crop. District-wise distribution of area by size classes is given in Table No. IV.1.8.

Table No. IV.1.8

Distribution of accessible tree forest area by size class and districts

Total area : 2116.56 km^2
Total sample points : 261
Unit : km^2

Sl. No.	Size class	Districts: Chamba	Kinnaur	Lahaul & Spiti	Total	%
1.	Regeneration	8.20	-	20.41	28.61	1.35
2.	Pole crop	147.64	40.98	13.61	202.23	9.56
3.	Small timber	196.85	65.56	20.41	282.82	13.36
4.	Big timber	812.01	352.38	34.02	1198.41	56.62
5.	Mixed size class	270.67	40.98	27.22	338.87	16.01
6.	Unrecorded	65.62	-	-	65.62	3.10
	Total :	1500.99	499.90	115.67	2116.56	100.00

Explanatory note:

Regeneration: i.e. crop below 10 cms diameter predominating.

Pole crop : Crop between 10 to less than 20 cms diameter predominating.

Small timber: Crop 20 cms to under 30 cms diameter predominating

Big timber : Trees with diameter 30 cms and over predominating

Mixed size class : Tree crop with no marked domination of any size class.

Contents

4.1.9 Distribution accessible tree forest area by regeneration status

Natural regeneration is practically absent in the area. It is completely absent over 65.58 percent (1388.16 km^2) of area. Inadequate over 9.30 percent (196.81 km^2) and adequate only over 0.39 percent (8.20 km^2). Greater attention is needed to induce regeneration in such areas. Districtwise distribution of accessible tree forest by regeneration status is given in Table No.IV.1.9.

Table No. IV.1.9.

Distribution of accessible tree forest area by regeneration status and districts

Total area : 2116.56 km^2

Total sample points : 261

Area : km^2

Sl. No.	Regeneration status	Districts: Chamba	Kinnaur	Lahaul & Spiti	Total	%
1.	Adequate	-	8.20	-	8.20	0.39
2.	Inadequate	147.64	49.17	-	196.81	9.30
3.	Absent (No regeneration)	992.46	286.83	108.87	1388.16	65.58
4.	Unrecorded (regeneration plot could not be laid out because of difficult terrain	360.89	155.70	6.80	523.39	24.73
	Total:	1500.99	499.90	115.67	2116.56	100.00

Explanatory note:

Adequate regeneration: Means where 8 or more than 8 seedlings (having diameter between 2 to less than 10 cms at breast height) of economically important species were found in a regeneration plot of 16 sq. metre area.

Inadequate regeneration: Means where less than 8 seedlings (having diameter between 2 to less than 10 cms at breast height) of economically important species were found in a regeneration plot of 16 sq. metre area.

Contents

4.1.10 Distribution of accessible tree forest area by type of injury to crop:

63.39 percent (1341.74 km^2) of tree forest area is free from any injury. However, forests on 16.59 percent (351.18 km^2) area is subjected to natural injuries and 15.37 percent (325.21 km^2) area by man made injuries. Injuries to the forest crop reduce the value of timber produced, retard its growth and at times lead to mortality. These injuries also make the forest more susceptible to fungal diseases and fire hazards. More attention is needed to minimise injuries to forest crop to optimise the return from the area. Districtwise distribution of accessible tree forest area by injury type is given in Table No. IV.1.10.

Table No. IV.1.10

Distribution of accessible tree forest area by type of injury to crop and districts

Total area : 2116.56 km^2

Total sample points : 261

Unit : km^2

Sl. No.	Injury	Districts: Chamba	Kinnaur	Lahaul & Spiti	Total	%
1.	Natural	205.05	139.32	6.81	351.18	16.59
2.	Man made/Unnatural	237.86	73.75	13.60	325.21	15.37
3.	Absent	959.65	286.83	95.26	1341.74	63.39
4.	Unrecorded	98.43	-	-	98.43	4.65
	Total:	1500.99	499.90	115.67	2116.56	100.00

Explanatory note:

Injury was judged by occular estimation in 2 ha. area around the centre of plot provided the affected trees formed at least 10% of the crop.

Natural injury: Means injury by wind/snow or flood, climber, lightening, wildlife, borer, leaf defoliator or other pests and fungus attack.

Manmade/Unnatural injury: Means injury by girdling/illicit felling, scarring/fire, lopping.

Contents

4.1.11 Distribution of accessible tree forest area by degradation status of forests.

Heavy and moderate degradation of forests is of order of 1.93 percent (41.01 km^2) in each of the above categories. Rest of the area is either mildly degraded or not degraded. Production from degraded areas is low and at the same time they are susceptible to erosion, degrading them further. Such areas need greater attention for their rehabilitation. District-wise distribution of accessible tree forest area by degradation status of forest is given in the following Table No.IV.1.11.

Table No. IV.1.11

Distribution of accessible tree forest area by status of degradation of forest and districts

Total area : 2116.56 km^2
Total sample points : 261
Unit : km^2

Sl. No.	Status of forest	Districts: Chamba	Kinnaur	Lahaul & Spiti	Total	%
1.	Heavily degraded	41.01	-	-	41.01	1.93
2.	Moderately degraded	32.81	8.20	-	41.01	1.93
3.	Mildly degraded	172.24	49.17	6.80	228.21	10.79
4.	Not degraded	1033.47	393.36	108.88	1535.71	72.56
5.	Unrecorded	221.46	49.17	-	270.62	12.79
	Total	1500.99	499.90	115.67	2116.56	100.00

Explanatory note:

The status of forest crop was judged by occular estimation depending upon its health/vigour which in turn is influenced by extent of biotic adverse factors like grazing, fire, lopping, illicit felling and other natural calamities, pests affecting health/mortality in the crop.

Contents

4.1.12 Distribution of accessible tree forest area by forest types:

Upland hardwood has most extensive distribution in the survey area covering 25.89 percent (548.05 km^2) followed by 16.46 percent (348.40 km^2) under mixed conifers, 11.17 percent (236.44 km^2) under hardwood mixed with conifers, 8.32 percent (176.20 km^2) under blue pine, 7.75 percent (164.01 km^2) under fir spruce, 6.98 percent (147.64 km) under Chir pine, 6.13 percent (129.78 km^2) under fir, 5.75 percent (121.60 km^2) under deodar 3.88 percent (82.02 km^2) each under spruce and miscellaneous forest, 2.25 percent (47.63 km^2) under junipers and 1.55 percent (32.78 km^2) under Chilgoza pine. Districtwise distribution of accessible tree forest area by forest types is given in Table No. IV.1.12. Map based on field inventory showing occurance of various forest types in the region is given at Page 140 to 142.

Table No. IV.1.12

Distribution of accessible tree forest area by forest types and districts:

Total area : 2116.56 km^2
Total sample points : 261
Unit : km^2

Sl. No.	Forest types	Districts: Chamba	Kinnaur	Lahaul & Spiti	Total	%
1.	Fir	57.41	65.56	6.81	129.78	6.13
2.	Spruce	82.02	-	-	82.02	3.88
3.	Fir Spruce	131.23	32.78	-	164.01	7.75
4.	Blue pine	106.63	49.17	20.40	176.20	8.32
5.	Deodar	65.62	49.17	6.81	121.60	5.75
6.	Chir pine	147.64	-	-	147.64	6.98
7.	Mixed conifers	221.46	106.54	20.40	348.40	16.46
8.	Hardwood mixed with conifers	196.85	32.78	6.81	236.44	11.17
9.	Upland hardwood	426.51	114.73	6.81	548.05	25.89
10.	Misc. forest	65.62	16.39	-	82.01	3.37
11.	Chilgoza	-	32.78	-	32.78	1.55
12.	Junipers	-	-	47.63	47.63	2.25
	Total:	1500.99	499.90	115.67	2116.56	100.00

Contents

Explanatory Note:

Species comprising more than 50% of crop was recognised as pure forest type of that species. Hardwood mixed with conifers was the type in which conifers and broad leaved species occur in more or less in same proportions.

4.1.13 Distribution of accessible tree forest area by forest type and canopy density classes:

17.37 percent (367.57 km^2) of accessible tree forest area has canopy density greater than 70 percent. Area under this density class is maximum i.e. 11.24 percent in Chamba followed by Kinnaur 5.81 percent whereas it is negligible 0.32 percent in Lahaul & Spiti. Upland hardwood is the forest type occuring most profusely in this density class followed by mixed conifers and hardwood with conifers. 55.85 percent (1182.09 km^2) area has canopy density of 30 to 69 percent. Chamba district has maximum area of 861.23 km^2 followed by Kinnaur with 286.82 km^2 and Lahaul & Spiti 68.02 km^2. Upland hardwood is the major species in Chamba in this class of density class followed by mixed conifers and fir-spruce, while in Chamba mixed conifers is the major forest type followed by upland hardwood. 17.37 percent (367.57 km^2) has density above 70 percent, 55.85 percent (1182.09 km^2) has density between 30 percent to 69 percent. The remaining 26.07 percent (551.88 km^2) has density between 5 percent to 29 percent. Low density forests are 62.48 percent of the total forests area in Lahaul & Spiti district, 18.03 percent of the total forest area of Kinnaur and 26.33 percent of total forest area in Chamba. Forest type wise, spruce has maximum over all density of 61 percent, followed by fir with 57 percent and deodar 55 percent. Among conifers Blue pine has over all density of 37 percent and Junipers 22 percent.

Distribution of accessible tree forest area by forest type, canopy density and districts is given in Table No. IV.1.13. The table shows that the over all density is 48% for the entire area . Forest type wise, spruce, fir and their mixture have an over all density varying from 54 to 61 percent followed by deodar, mixed conifers, upland hardwood and Chilgoza pine. Chir and Juniper mostly occur in open patches. The overall density shows that at least 50% of the area needs improvement in stocking.

Contents

Table No. IV.1.13

Distribution of accessible tree forest area by forest types, canopy, density classes and districts

Total sample points : 261
Total area : 2116.56 km^2
Area unit : km^2

Sl. No.	Forest type	DISTRICTS: Chamba 70% & above	Chamba 30% to 69%	Chamba 5% to 29%	Kinnaur 70% & above	Kinnaur 30% to 69%	Kinnaur 5% to 29%	Lahaul & Spiti 70% & above	Lahaul & Spiti 30% to 69%	Lahaul & Spiti 5% to 29%	Total 70% & above	Total 30% to 69%	Total 5% to 29% [6]	Grand Total	Over-all density percentage
1.	Fir	8.20	49.21	-	24.58	32.78	8.20	-	6.81	-	32.78	88.80	8.20	129.78	57
2.	Spruce	24.60	57.42	-	-	-	-	-	-	-	24.60	57.42	-	82.02	61
3.	Fir-spruce	16.40	106.63	8.20	8.20	24.58	-	-	-	-	24.60	157.21	8.20	164.01	54
4.	Blue pine	8.20	49.21	49.22	-	32.78	16.39	-	6.81	13.59	8.20	88.80	79.20	176.20	37
5.	Deodar	16.40	41.02	8.20	16.39	32.78	-	-	-	6.81	32.79	73.80	15.01	121.60	55
6.	Chir pine	16.40	41.01	82.02	-	-	-	-	-	-	16.40	41.01	82.02	139.43	35
7.	Mixed Conifers	41.01	147.64	32.81	16.39	65.56	24.59	6.80	6.80	6.80	64.20	220.00	64.20	348.40	50
8.	Hardwood mixed with Conifers	41.01	82.02	73.82	16.39	16.39	-	-	6.81	-	57.40	105.22	73.82	236.44	43
9.	Upland hardwoods	65.62	270.67	90.22	40.98	49.17	24.58	-	-	-	106.60	319.84	114.80	541.24	50
10.	Misc. forests	-	16.40	49.21	-	8.20	8.20	-	-	-	-	24.60	57.41	82.01	27
11.	Chilgoza	-	-	-	-	24.58	8.20	-	-	-	-	24.58	8.20	32.78	42
12.	Junipers	-	-	-	-	-	-	-	6.81	40.82	-	6.81	40.82	47.63	22
	Total:	237.84	861.23	393.70	122.93	286.82	90.16	6.80	34.04	68.02	367.57	1182.09	551.88	2101.54	48
	%	11.24	40.69	18.60	5.81	13.55	4.26	0.32	1.61	3.21	17.37	55.85	26.07		

Note:-
1. Tree forest area of 6.81 km^2 of one plot of Lahaul & Spiti district falls in land use class of (plantation).
2. Tree forest area of 8.21 km^2 of one plot of Chamba district falls in land-use class of (plantation).

Contents

4.2 Stand and stock tables:

Distribution of volume per hectare (stock table) and stems per hectare (stand tables) by species and diameter classes in accessible tree forest area of the region are given forest typewise from Table No. IV.2.1 to IV.2.48. In these tables species constituting less than 1 percent of total volume have been clubbed together as rest of the species. These and other tables are given at the end of this Chapter. Gist of these tables is given below:

Sl. No.	Forest type	Total area km^2	Volume/ha. m^3	Stems/ha.
1.	Fir	129.78	536.588	256.211
2.	Spruce	82.02	336.509	181.250
3.	Fir/spruce	164.01	337.894	219.053
4.	Blue pine	176.20	200.305	99.223
5.	Deodar	121.60	338.700	213.211
6.	Chir pine	147.64	88.881	229.998
7.	Mixed conifers	348.40	299.775	237.432
8.	Hardwood mixed with conifers	236.44	235.749	285.718
9.	Upland hardwoods	548.05	136.808	314.811
10.	Misc. forests	82.01	17.122	94.416
11.	Chilgoza	32.78	234.915	127.500
12.	Junipers	47.63	11.326	48.330

4.2.1 Analysis of the growing-stock in forest types and its critical aspects:

Among the various parameters of crop, that can be measured with fair accuracy, basal area (calculable from diameter at breast height overbark) is the only parameter varying least in comparision to others such as number of stems, volume per hectare, with change in age/site qualities. Attempt has been made here to analyse the stocking in current survey area with stock figures in yield table of a species most predominant in the type. Yield tables though are applicable to fully stocked regular forests (normal) where various age gradations are situated on separate areas, nevertheless data in them when compared with that of irregular forests prevailing in current survey area where all age gradations are intermingled over entire area, can give some indications about the status of stocking position in them.

Contents

(i) Fir Forest Type

This type covers over 12978 hectare area forming 6.11 percent of accessible tree forest area with overall canopy cover of 57 percent (table No. IV.1.13). Per hectare volume as given in table No. IV.2.1.1 in the type is 536.588 m^3 of which 85.77 percent (460.210 m^3 per hectare is Abies pindrow, 4.32 percent (23.192m^3) is Picea smithiana, 4.80 percent (25.757 m^3)is Q.semecarpifolia and 3.55 percent (19.059 m^3) is Pinus excelsa. Rest of the species such as Quercus dilatata, Cedrus deodara, Maples and other associates form only 1.56 percent (8.370 m^3) each comprising less than one percent. Per hectare stems in the type are 256.211 out of which 70.52 percent (180.691 stems) are of Abies pindrow, 8.26 percent (21.157 stems) of Quercus semecarpifolia, 4.25 percent (10.896 stems) of Picea smithiana, 3.78 percent (9.676 stems) of Pinus excelsa and 13.19 percent (33.791 stems of rest of the species. Total basal area per hectare is 485915 m^2. The average crop diameter computed from this basal area and total number of stems in this forest type is 49 cms. The overall canopy of 57 percent indicates that the crop is understocked by 43 percent. The diameter distribution of the volume in this type is given in table No. IV.2.1.2. As per this table, the volume for diameter upto 30 cms, 30-50 cms and 50 cms & over is 22.886m^3/hectare, 64.937 m^3/hectare and 372.387 m^3/ha. The ratio works out to be 1:2.84:16.27 which indicate very high proportion of overmature volume and deficit younger age classes.

(ii) Spruce Forest Type

This type occurs over 8202 hectare of area forming 3.9 percent of survey area. The overall canopy density is 61 percent (Table IV.1.13). Per hectare volume as given in table No.IV.2.1.5 in the type is 336.509m^3 of which 90.99 percent (306.181 m^3) is Picea smithiana, 4.19 percent (14.102 m^3) is Cedrus deodara and 3.79 percent (12.762 m^3) is Abies pindrow. Rest of the species form 1.03 percent with volume 3.464 m^3 per hectare. Per hectare stems in the type are 181.25 of which 84.14 percent (152.50 stems) are of Picea smithiana, 6.21 percent (11.25 stems) are of Cedrus deodara, 1.38 percent (2.50 stems) are of Abies pindrow

Contents

and 4.14 percent (7.50 stems) are of Pirus excelsa. Rest of the species form only 4.13 percent (7.50 stems) table IV.2.1.7 Total basal area per hectare in the type is 260702 m^2 . The average crop diameter computed from this basal area and to-tal number of stems is 42.79 cms. The overall density of 61 percent is comparatively high as compared to the rest of the forest types occuring in the survey area. However, it also indicates understocking by 39 percent. The volume per hectare of young, middle aged and mature crop works out to be 13.37 m^3, 82.11 m^3 and 210.71 m^3. The proportion works out to be 1:6.14:15.76. This indicates low proportion of young age classes and higher proportion of overmature crop.

(iii) Fir-Spruce Forest Type

This type occupies an area of 16401 hectares which forms 7.73 percent of accessible tree forest area (Table IV.1.12) with overall canopy density of 54 percent (Table IV.1.13). Per hectare volume in this type is 337.895 m^3 of which 49.11 percent (165.937 m^3) is Abies pindrow, 38.63 percent (130.530 m^3) is Picea smithiana, 4.61 percent (15.577 m^3) is Pinus excelsa, 2.37 percent (8.000 m^3) is Quercus semecarpifolia and 1.49 percent (5.050 m^3) is Quercus dilatata. Rest of the species form 3.79 percent with volume 12.801 m^3 per hectare Table IV.2.1.9 . Per hectare stems in the type are 219.053 of which 45.93 percent (100.618 stems) are of Abies pindrow, 25.87 percent (56.678 stems) of Picea smithiana, 4.21 percent (9.220 stems) of Pinus excelsa, 2.99 percent (6.545 stems) of Quercus dilatata, 2.32 percent (5.090 stems) of Quercus semecarpifolia, 0.68 percent (1.499 stems) of Cedrus deodara and 17.99 percent (39.403 stems) are of other species commonly associated with this forest type. Total basal area per hectare is 25.7955 m^2 from which average crop diameter deduced comes to be 39 cms. It is presumed that fir/spruce forests of survey area belong to average quality-II. The overall density of 54 percent indicates the understocking of the area by 46 percent. The volume of younger middle and mature trees works out to be 36.46 m^3/ha. 51.99 m^3/hectare and 249.443 m^3/hectare. The proportion of volume of these diameter classes works out to be 1:1.43:6.84. This indicates the lower proportion of middle aged crop.

Contents

(iv) Blue Pine Forest Type

This type of forest covers an area of 17620 hectares which is 37 percent of the accessible tree forest area. The overall canopy density is 37 percent (Table No. IV.1.13). Per hectare volume in the type is 200.305 m^3 of which 96.34 percent (192.979 m^3) is Pinus excelsa, Picea smithiana and Cedrus deodara have only 1.05 percent (2.103m3) and 1.83 percent(3.666 m^3) . Rest of the species have only 0.78 percentage with 1.557m^3 per ha. volume. Per hectare stems are 99.223 out of which 94.15 percent (93.418 stems) is Pinus excelsa, 1.52 percent (1.512 stems) of Picea smithiana and 4.33 per-cent (4.293 stems) are other associated species. Basal area/hectare is 171675 cm^2 and average crop diameter as deduced therefrom is 46.9 cms based upon 99.223 stems. Quality of crop in survey area is presumed to be medium (II quality). This type of kail with full density should have 376.00 stems/ha. for 46.9 cms d.b.h. and 815.08 m^3 volume per ha. and 63.90m^2 basal area per hectare as against 99.22 stems per ha, 17.18m^2 per ha. as basal area and 200.365 m^3 per ha. as volume. This comparision shows that the forests under this type are understocked by about 75% compared to the normal stocking. Proportion of young, middle and old volume (corresponding to diameter classes 10 to 30 cms, 30 to 50 cms, and 50 cms and above) is 4.99%, 29.61% and 66.40%. The proportion works out to be 1:5.9:19.9. This indicates the extremely low percentage of lower age groups in already poorly stocked forest.

(v) Deodar Type Forests

This type occurs over an area of 12160 hectares with 5.73 percent of accessible tree forest area. This type is found in all the districts under survey. The overall canopy density is 55 percent with maximum area under 30% to 69% (Table No. IV.1.13). Per hectare volume in the type is 338.700 m^3 of which Cedrus deodara constitute 83.27 percent (282.047m^3), Pinus excelsa 11.66 percent (39.493 m^3), Picea smithiana 1.28 percent (4.335 m), and Quercus incana 1.08 percent

Contents

($3.647\ m^3$) , other associated species have 1.53 percent proportion with 5.190 m^3/ha. volume. Per hectare stems are 213 of which 71.25 percent are of Cedrus deodara, 13.60 percent are of Pinus excelsa, 2.88 percent of Abies pindrow, 5.22 percent are of Pinus gerardiana (only in Kinnaur district) and 1.01 percent of Quercus incana Other associated species are 6.04 percent ony. The type has 27.8371 m^2 basal area per hectare from which deduced average crop diameter comes to 40.77 cms basing on 213.211 stems per hectare. Deodar forests of survey area are presumed to belong to medium quality (II). Hence comparision of stocking has been made with normal forest of II quality deodar. This type of forest with average diameter of 40.77 cms should have 557 stems per hectare, 72.72 m^2 per hectare basal area and 845.92 m^3 per ha volume as against 213 stems per ha, 27.84 m^2 per ha. basal area and 338 m^3/ha. volume respectively. Thus the forests are understocked by about 60 percent when compared to normal forest. Overall canopy density of 55 percent as occularly assessed during inventory indicates understocking of about 45 percent. In normal distribution proportion of young, middle and old volume is (1:3:5 against which existing proportion is 1:2.7:7.4 (corresponding to diameter class 10 to 30 cms, 30 to 50 cms and 50 cms and above). 46.68 percent crop is overmature (over 60 cms DBH). Though the proportion deviates from normality but it is more towards it as compared to other forest types which indicates that the management of Deodar forests is superior to other conifers as far as diameter distribution is concerned. Understocking however is there which requires attention.

(vi) <u>Chir pine Forest Type</u>

This type is found only in Chamba district in the survey area. It occupies 14764 hectares which is 6.95 percent of the accessible tree forest area of all the districts covered by this report. The overall canopy density is 35% with maximum area under 5% to 29%. Accordingly the volume per hectare is also as low as 88.881 m^3/ha of which 99.64 percent (88.564 m^3/ha.) is Pinus roxburghii. Other associates are only 0.36% (0.317 m^3/ha.).

Contents

Basal area of the crop is 6.9819 m^2/ha. from which deduced average crop diameter comes to 19.6 cms based upon 229.998 stems/ha. Chir forest of survey area are presumed to belong to average quality (IInd). This type of Chir having average crop diameter of 19.6 cms has 710 stems, 155 m^3 volume and 21.553 m^3 as basal area per hectare as per yield table against which survey area with the above mentioned average crop diameter of 19.6 cms has 230 stems, 88.88 m^3 volume and 6.98m^2 basal area per hectare. Above comparision indicates that the forest are understocked by about 65%. Proportion of volume in young, middle and old classes (corresponding to diameter classes 10 to 30 cms, 30-50 cms and above 50 cms is 1;2.2:1.4 respectively as against 1:3:5 in a normal forest. Thus the forest are abnormal both in stocking as well as in volume/stem distribution. This aspect needs attention.

(vii) Mixed Conifers Forest Type

This type is distributed in all the three districts and covers 34840 hectares which is 16.41 percent of the accessible tree forest area (Table 4.1.12). The overall canopy density is 50% with maximum area falling in 30% to 69% of canopy class. Per hectare volume in the type is 299.775 m^3 of which 37.47 percent (112.349 m^3) is of Pinus excelsa, 33.34 percent (99.945 m^3) is of Picea smithiana, 13.85 percent (41.511 m^3) of Cedrus deodara, 10.51 percent (31.496 m^3) of Abies pindrow and 1.07 percent (1.196 m^3) by other associates of the type. Basal area per hectare is 26.2923 m^2 from which average crop diameter has been worked out to be 37.5 cms. based upon 237.432 stems per hectare in the type. Since none of the single species constitute more than 50 percent of volume or stems, comparision of stocking with yield table figures of any one species is not possible. However, with overall canopy density of 50 percent in the type assessed during inventory indicates that forests are understocked by about 50 percent.

Contents

(viii) Hardwood mixed with Conifers Forest Type

This type is present mainly in Chamba district with small proportion in Kinnaur and Lahaul Spiti, covering an area of 23644 hectares which is 11.14 percent of the accessible tree forest area. The overall canopy density is 43 percent with maximum area under 30% to 59% of canopy class. Per hectare volume is 235.749 m^3 of which 33.33 percent (78.574 m^3) is Quercus semecarpifolia, 21.72 percent (51.205 m^3) is Abies pindrow, 12.17 percent (28.697 m^3) is Pinus excelsa and 8.13 percent (19.176 m^3) is Picea smithiana. Other associated species form 24.65 percent (58.095 m^3). Basal area for this type of the forest works out to be 23.5190 m^2 per hectare corresponding to the crop diameter of 32.00 cms for 286 stems per hectare. 73 percent of stems and 15 percent of the volume is below 30 cms DBH. The overall canopy cover of 43 percent indicates the understocking of the crop by 57 percent as against fully stocked forests.

(ix) Upland hardwood Forest Type

This type is mainly present in Chamba and Kinnaur districts while in Lahaul & Spiti district it is found only in limited area. This type covers an area of 54805 hectare which is 50.32 percent of the accessible tree forest area. Per hectare volume in the type is 136.812 m^3 of which 50.28 percent (68.798 m^3) is of Quercus semecarpifolia, 10.68 percent (14.605 m^3) is Quercus incana, 5.44 percent (7.392 m^3) is Quercus dilatata and 3.06 percent (4.186 m^3) is Abies pindrow. Other associated species form 30.56 percent with 41.84 m^3 volume. Basal area per hectare of crop is 17.5103 m^2 which is equivalent to 26.6 cms of average crop diameter for 315 stems in the type. There are number of species mixed with no one forming more than 25% in number of stems or volume. 82 percent of the number of stems 35% of the volume is below 30 cms DBH. Overall canopy cover of 48 percent assessed during the inventory points to the understocking of crop by about 50 percent.

Contents

(x) Miscellaneous Forest Type

This type is present in Chamba and Kinnaur districts where it covers 8201 hectares which is 3.86 percent of the accessible tree forest area. Per hectare volume of this type is only 17.122 m^3 of which 22. 53 percent (3.857m^3) is Quercus incana and 18.91 percent (3.238m^3) is Pinus roxburghii and 58.56 percent (10.027 m^3) are other species associated with the forest type. The basal area of the crop is 2.7492 m^2 per hectare which correspond to average crop diameter of 19 cms for 96 stems. 93 percent of stems and 65 percent of volume is of D.B.H. classes below 30 cms. The overall canopy cover of 27 percent indicates the understocking upto 73 percent.

(xi) Chilgoza Forest Type

This type is not being managed under any silviculture system. Chilgoza trees are mainly used for seed collection by the local people. Its seeds have high commercial value as a dry fruit. Chilgoza forests occur over an area of 3278 hectares in Kinnaur district only and forms 1.54% of accessible tree forest area. The data is based only on limited sample plots. As such the volume per hectare or distribution of the species and the diameter classes as shown in table No. IV.2.14 are only indicative. Out of 127 stems per hectare Cedrus deodara has 11.8 percent, (15 stems/ha. Chilgozapine 86.6 percent (110 stems per hectare) and rest of the species only 1.6 percent (2 stems per hectare). The crop has 65 percent stems and 5 percent volume below 30 cms DBH. The overall canopy cover of 42 percent indicates the understocking of 58 percent. Chilgoza forests having high commercial value require special attention for their proper management and extension of area by plantation.

Contents

(xii) Junipers Forest Type

This type occurs over 4763 hectares area and the crop has overall canopy cover of 22 percent. As the data is based on limited number of sample plots, the diameter distribution given in Table No.IV.2.1.45 is only indicative. As per results, this type has 48 stems per ha. out of which 69 percent (33 stems per hectare) are in 10 to 20 cms DBH class. Per hectare volume of Junipers is only 11.326m^3. Since no yield tables are available for this species, comparison of stocking or diameter distribution is not possible. However, overall canopy density of 22 percent in the type occularly assessed during inventory indicates that forests are understocked by about 78 percent.

4.2.2 Analysis of growing stock in districts

Distribution of volume per hectare and stems per hectare by species and diameter classes in accessible tree forest area is given in Table No.IV.2.2.1 to IV.2.2.6 Overall volume in the districts is given below:

District	No. of sample plots	Area (ha)	Vol. m^3/ha	Stems/ha
Kinnaur	61	49990	279	271
Lahaul Spiti	18	11567	73	66
Chamba	183	150099	228	237

From the above it is observed that volume per hectare varies from 73 per hectare in Lahaul & Spiti to 279 m^3 in Kinnaur district. Number of stems varies from 66 per hectare in Lahaul & Spiti district to 271 in Kinnaur district. The entire accessible tree forest area has total growing stock of 48606585 m^3 and 49844887 number of stems. When worked per hectare it comes to 230 m^3 of volume and 235 stems. Their distribution by species and diameter are given in Table No. IV.2.2.7 to IV.2.2.10

Contents

The standard error percent of volume per hectare in various districts and the over all standard error is given as under:-

District	Total Vol. ($000m^3$)	Standard error percent	Plots
Chamba	34154.6	11.11	183
Kinnaur	13929.4	19.36	61
Lahaul & Spiti	936.2	44.22	17
Total	49020.2	9.50	261

Thus the overall standard error percent is 9.50

Contents

4.4 Household fuel consumption in the Survey area.

Information on the quantity and pattern of fuel consumption in rural households of the Survey area was also collected while doing the main forest inventory works. This information was collected by direct inquiry method from four representative households of each village near to camping places. The information so collected was compiled and is given in Table No. IV.4.1. Consumption pattern as far as extent of fuelwood removed from forest is concerned may vary depending upon distance of village from the nearest forest. The information gives indication about the rural fuelwood consumption in the vicinity of forests.

From the table, it is seen that on the average, per capita per year fuelwood/agricultural waste consumption is 1260 kgs. of which 961 kgs. comes from trees, 289 kgs. from brushwood and 10 kgs. from agricultural wastes. Survey further revealed that, of the 961 kgs. coming from trees, 89% comes from Government forests and 11% from private lands. Energy requirements of rural population are met entirely from fuelwood/agricultural waste. Kerosene oil, the only commercial fuel consumed is utilised for lighting purposes.

Contents

Table No. IV.4.1

HOUSEHOLD FUEL CONSUMPTION IN CHAMBA SURVEY AREA (CHAMBA, KINNAUR & LAHAUL & SPITI DISTRICTS)

Sl. No.	District	No. of house-hold sampled	Total family members	Nature of fuel consumed per capita per annum: From trees: Total kgs.	From trees: % from Govt. forests	From trees: % from private land	From brush wood: Total kgs.	From brush wood: % from Govt. forests	From brush wood: % from private land	Agriculure waste in kgs. 100% (from private land)	Total of cols.5,8, 11(kgs.)	K.oil in ltr.
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Chamba	132	1041	926	92	8	213	76	24	24	1163	4.7
2.	Kinnaur	96	810	1606	70	30	27	66	34	9	1642	10.3
3.	Lahaul & Spiti	111	1140	534	100	-	544	-	100	-	1078	9.0
	Per capita consumption in Survey area	-	2991	961	89	11	289	45	56	10	1260	7.9

Note: The above data was collected only in rural areas to which this consumption pattern applies. Studv has further revealed that other sources of energy viz Charcoal, mineral coal, cooking gas, electricity, cowdung are not used as fuels in these areas.

Contents

Table No. IV.2.1.1

All districts combined

Distribution of volume per hectare (m^3) by species and diameter classes in accessible tree forest area (Forest type-wise)

Forest type : Fir
Unit : m^3(r)
Area : 12978 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	4.569	18.317	34.917	30.020	51.697	82.573	100.512	137.605	460.210	85.77
2.	Picea smithiana	00.139	1.515	2.355	-	-	11.992	7.191	-	23.192	4.32
3.	Quercus dilatata	0.065	-	-	-	-	-	-	-	0.065	0.01
4.	Quercus seme-carpifolia	0.365	2.502	2.828	5.101	6.111	8.850	-	-	25.757	4.80
5.	Pinus excelsa	0.121	-	2.823	2.382	6.581	7.152	-	-	19.059	3.55
6.	Rest of species	2.867	1.190	0.675	-	-	3.573	-	-	8.305	1.55
	Total:	8.126	23.524	43.598	37.503	64.389	114.140	107.703	137.605	536.588	
	%	1.52	4.38	8.13	6.99	12.00	21.27	20.07	25.64		100.00

Contents

Table No. IV.2.1.2

All Districts combined

Distribution of total volume (000 m^3) species-wise and dia classes in accessible tree forest area (forest type wise)

Forest type : Fir
Unit : (000 m^3)
Area : 12978 hectares

Sl.No.	Species name	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	59.309	237.710	453.149	389.599	670.927	1071.632	1304.448	1785.834	5972.608	85.77
2.	Picea smithiana	1.800	19.654	30.571	-	-	155.635	93.329	-	300.989	4.32
3.	Quercus dilatata	0.841	-	-	-	-	-	-	-	0.841	0.01
4.	Quercus semecarpifolia	4.731	32.467	36.703	66.204	79.308	114.856	-	-	334.269	4.80
5.	Pinus excelsa	1.569	-	36.648	30.910	85.403	92.821	-	-	247.351	3.55
6.	Rest of species	37.206	15.445	8.756	-	-	46.375	-	-	107.782	1.55
	Total	105.456	305.276	565.827	486.713	835.638	1481.319	1397.777	1785.834	6963.840	
	%	1.52	4.38	8.13	6.99	12.00	21.27	20.07	25.64		100%
	%	1.52	5.90	14.03	21.02	33.02	54.29	74.36	100%		

Contents

Table No. IV.2.1.3

(All districts combined)

Distribution of stems per hectare by species and diameter classes in accessible tree forest area (Forest type-wise)

Forest type : Fir
Unit : No. of stems
Area : 12978 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	18.472	29.054	32.999	17.945	20.635	22.315	20.581	18.690	180.691	70.52
2.	Picea smithiana	1.106	3.475	2.526	-	-	2.526	1.263	-	10.896	4.25
3.	Quercus dilatata	1.106	-	-	-	-	-	-	-	1.106	0.43
4.	Quercus semecarpifolia	2.526	6.315	3.632	3.632	2.526	2.526	-	-	21.157	8.26
5.	Pinus excelsa	1.049	-	3.050	1.263	2.526	1.788	-	-	9.676	3.78
6.	Rest of species	23.053	7.420	1.106	-	-	1.106	-	-	32.685	12.76
	Total:	47.312	46.264	43.313	22.840	25.687	30.261	21.844	18.690	256.211	
	%	(18.47)	(18.06)	(16.90)	(8.91)	(10.02)	(11.81)	(8.52)	(7.29)		100
	Basal Area (cm^2)	8361	22710	41672	36325	61028	100415	96504	118900	485915	

Crop dia : 49 cms.

Contents

Table No. IV.2.1.4

All districts combined

Distribution of total stems (000) by species & diameter classes in accessible tree forest area (Forest type-wise)

Forest Type: Fir
Unit : No. of stems 000
Area : 12978

S.No.	Species name	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	239.738	377.060	428.267	232.893	267.800	289.605	267.103	242.563	2345.029	70.52
2.	Picea smithiana	14.353	45.095	32.780	-	-	32.780	16.390	-	141.398	4.25
3.	Quercus dilatata	14.353	-	-	-	-	-	-	-	14.353	0.43
4.	Quercus semecarpifolia	32.780	81.950	47.133	47.133	32.780	32.780	-	-	274.556	8.26
5.	Pinus excelsa	13.620	-	39.590	16.390	32.780	23.200	-	-	125.580	3.78
6.	Rest of species	299.185	96.303	14.353	-	-	14.353	-	-	424.194	12.76
	Total:	614.029	600.408	562.123	296.416	333.360	392.718	283.493	242.563	3325.110	
	%	18.47	18.06	16.91	8.91	10.02	11.81	8.52	7.30		100

Contents

Table No. IV.2.1.5

All districts combined

Distribution of volume per hectare (m^3) by species & diameter classes in accessible tree forest area (Forest type-wise)

Forest type : Spruce
Unit : m^3(r)
Area : 8202 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	-	-	-	-	-	4.991	-	7.771	12.762	3.79
2.	Picea smithiana	2.967	10.403	30.177	51.929	53.164	37.191	22.551	97.799	306.181	90.99
3.	Cedrus deodara	-	0.852	2.588	10.662	-	-	-	-	14.102	4.19
4.	Pinus excelsa	0.608	1.122	0.912	-	-	-	-	-	2.642	0.79
5.	Quercus dilatata	0.063	-	-	-	-	-	-	-	0.063	0.02
6.	Rest of species	0.759	-	-	-	-	-	-	-	0.759	0.22
	Total:	4.397	12.377	33.677	62.591	53.164	42.182	22.551	105.570	336.509	
	%	1.31	3.68	10.01	18.60	15.80	12.54	6.70	31.36	-	100

Contents

Table No. IV.2.1.6

All Districts combined

Distribution of total volume (000 m^3) by species & dia classes in accessible tree forest area (forest type wise)

Forest Type : Spruce
Unit : (000 m^3)
Area : 8202 hectares

Sl.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	-	-	-	-	-	40.932	-	63.741	104.673	3.79
2.	Picea smithiana	24.336	85.323	247.516	425.923	436.051	305.043	184.960	802.143	2511.295	90.99
3.	Cedrus deodara	-	6.986	21.227	87.454	-	-	-	-	115.667	4.19
4.	Pinus excelsa	4.991	9.201	7.477	-	-	-	-	-	21.669	0.79
5.	Quercus dilatata	0.520	-	-	-	-	-	-	-	0.520	0.02
6.	Rest of species	6.224	-	-	-	-	-	-	-	6.224	0.22
	Total:	36.071	101.510	276.220	513.377	436.051	345.975	184.960	865.884	2760.048	
	%	1.31	3.68	10.01	18.60	15.80	12.54	6.70	31.36		100
	%	1.31	4.99	15.00	33.60	49.40	61.94	68.64	100		

Contents

Table No. 1.2.1.7

All districts combined

Distribution of stems per hectare by species and diameter classes in accessible tree forest area (Forest type wise)

Forest type : Spruce
Unit : No of stems
Area : 8202 hectares

Sl. No;	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	-	-	-	-	-	1.250	-	1.250	2.500	1.38
2.	Picea smithiana	26.250	26.250	33.750	28.750	17.500	8.750	3.750	7.500	152.500	84.14
3.	Cedrus deodara	-	2.500	2.500	6.250	-	-	-	-	11.250	6.21
4.	Pinus excelsa	3.750	2.500	1.250	-	-	-	-	-	7.500	4.14
5.	Quercus dilatata	1.250	-	-	-	-	-	-	-	1.250	0.68
6.	Rest of species	6.250	-	-	-	-	-	-	-	6.250	3.45
	Total:	37.500	31.250	37.500	35.000	17.500	10.000	3.750	8.750	181.250	-
	%	(20.68)	(17.24)	(20.68)	(19.31)	(9.65)	(5.51)	(2.06)	(4.82)		100
	Basal area	6627	15339	36079	55665	41577	33183	16567	55665	260702	

Crop dia: 43 cms.

Contents

Table No. IV.2.1.8

All districts combined

Distribution of total stems (000) by species and diameter classes of accessible tree forest area (Forest type-wise)

Forest type : Spruce
Unit : 000 numbers
Area : 8202 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	0.000	0.000	0.000	0.000	0.000	10.253	0.000	10.253	20.506	1.38
2.	Picea smithiana	215.303	215.303	276.818	235.808	143.535	71.768	30.758	61.515	1250.808	84.14
3.	Cedrus deodara	0.000	20.505	20.506	51.263	0.000	0.000	0.000	0.000	92.274	6.21
4.	Pinus excelsa	30.758	20.506	10.253	0.000	0.000	0.000	0.000	0.000	61.517	4.14
5.	Quercus dilatata	10.253	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.253	0.68
6.	Rest of species	51.263	0.000	0.000	0.000	0.000	0.000	0.000	0.000	51.263	3.45
	Total:	307.577	256.314	307.577	287.071	143.535	82.021	30.758	71.768	1486.621	
	%	20.69	17.24	20.69	19.31	9.66	5.52	2.07	4.82		100

Contents

Table No. IV.2.1.9

All districts combined

Distribution of volume per hectare (m^3) by species & diameter classes in accessible tree forest area (Forest type-wise)

Forest type : Fir/Spruce
Unit : m^3(r)
Area : 16401 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	8.435	12.070	13.084	14.706	7.078	21.942	25.066	63.556	165.937	49.11
2.	Picea smithiana	2.408	5.873	6.718	6.058	9.399	19.745	13.252	67.077	130.530	38.63
3.	Pinus excelsa	0.482	0.427	2.407	2.837	2.604	-	-	6.820	15.577	4.61
4.	Quercus dilatata	0.212	0.750	0.504	-	-	-	3.584	-	5.050	1.49
5.	Quercus semecarpifolia	0.193	0.226	1.247	-	-	-	-	6.334	8.000	2.37
6.	Cedrus deodara	-	-	0.376	1.976	-	-	-	-	2.352	0.70
7.	Rest of species	3.420	1.965	1.111	0.967	-	-	2.986	-	10.449	3.09
	Total:	15.150	21.311	25.447	26.544	19.081	41.687	44.888	143.787	337.895	
	%	4.48	6.31	7.53	7.86	5.65	12.34	13.28	42.55		100

Contents

Table No. IV.2.1.10

All Districts combined

Distribution of total volume (000 m^3) species and dia classes in accessible tree forest area (forest type wise)

Forest Type : Fir & Spruce
Unit : (000m^3)
Area : 16401 hectares

Sl.No.	Species name	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	138.343	197.948	214.603	241.189	116.089	359.871	411.100	1042.383	2721.526	49.11
2.	Picea smithiana	39.493	96.326	110.181	99.350	154.155	323.832	217.339	1100.129	2140.805	38.63
3.	Pinus excelsa	7.907	6.997	39.483	46.533	42.701	-	-	111.850	255.471	4.61
4.	Quercus dilatata	3.484	12.290	8.262	-	-	-	58.784	-	82.820	1.49
5.	Quercus semecarpifolia	3.166	3.711	20.455	-	-	-	-	103.878	131.210	2.37
6.	Cedrus deodara	-	-	6.168	32.414	-	-	-	-	38.582	0.70
7.	Rest of species	56.089	32.238	18.207	15.858	-	-	48.967	-	171.359	3.09
	Total:	248.482	349.510	417.359	435.344	312.945	683.703	736.190	2358.240	5541.773	
	%	4.48	6.31	7.53	7.86	5.65	12.34	13.28	42.55		100
	%	4.48	10.79	18.32	26.18	31.83	44.17	57.45	100 %		

Contents

Table No. IV.2.1.11

All districts combined

Distribution of stems per hectare by species and diameter classes in accessible tree forest area (Forest type wise)

Forest type : Fir-spruce
Unit : No. of stems
Area : 16401 hectares

Sl. No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	39.038	20.993	12.043	8.045	2.682	5.819	4.908	7.090	100.618	45.93
2.	Picea smithiana	17.862	14.497	7.091	3.409	2.909	4.364	2.182	4.364	56.678	25.88
3.	Pinus excelsa	2.498	0.999	2.498	1.499	0.999	-	-	0.727	9.220	4.21
4.	Quercus dilatata	2.909	2.182	0.727	-	-	-	0.727	-	6.545	2.99
5.	Quercus semecarpifolia	2.182	0.727	1.454	-	-	-	-	0.727	5.090	2.32
6.	Cedrus deodara	-	-	0.500	0.999	-	-	-	-	1.499	0.68
7.	Rest of species	26.995	8.773	2.181	0.727	-	-	0.727	-	39.403	17.99
	Total:	91.484	48.171	26.494	14.679	6.590	10.183	8.544	12.908	219.053	
	%	(41.76)	(21.99)	(12.09)	(6.70)	(3.00)	(4.65)	(3.90)	(5.89)		100
	Basal area cm^2	16166	23645	25490	23345	15656	33790	37746	82117	257955	

Crop dia : 39 cms

Contents

Table No. IV.2.1.12

All districts combined

Distribution of total stems (000) by species and diameter classes in accessible tree forest (Forest type-wise)

Forest type : Fir spruce
Unit : No. of stems 000
Area : 16401 hectares

No.	Species name	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
	Abies pindrow	640.265	344.300	197.515	131.955	43.985	95.440	80.500	116.290	1650.250	45.93
	Picea smithiana	292.955	237.765	116.290	55.915	47.720	71.580	35.790	71.580	929.595	25.87
	Pinus excelsa	40.975	16.390	40.975	24.585	16.390	-	-	11.930	151.245	4.21
	Quercus dilatata	47.720	35.790	11.930	-	-	-	11.930	-	107.370	2.99
	Quercus semecarpifolia	35.790	11.930	23.860	-	-	-	-	11.930	83.510	2.32
	Cedrus deodara	-	-	8.195	16.390	-	-	-	-	24.585	0.68
	of species	442.750	143.885	35.790	11.930	-	-	11.930	-	646.285	17.99
	Total:	1500.455	790.060	434.555	240.775	108.095	167.020	140.150	211.730	3592.840	
	%	41.76	21.99	12.10	6.70	3.01	4.65	3.90	5.89		100.00

Contents

Table No. IV.2.1.13

All districts combined

Distribution of volume per hectare (m^3) by species & diameter classes in accessible tree froest area (Forest type-wise)

Forest type : Blue pine
Unit : m^3(r)
Area : 17620 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	-	-	-	0.972	-	-	-	-	0.972	0.49
2.	Picea smithiana	-	-	0.539	1.564	-	-	-	-	2.103	1.05
3.	Cedrus deodara	-	-	-	-	-	-	3.666	-	3.666	1.83
4.	Pinus excelsa	1.622	5.720	17.453	32.453	45.904	48.316	33.269	8.242	192.979	96.34
5.	Rest of species	0.270	0.315	-	-	-	-	-	-	0.585	0.29
	Total	1.892	6.035	17.992	34.989	45.904	48.316	36.935	8.242	200.305	
	%	0.94	3.01	8.98	17.47	22.92	24.12	18.44	4.12		100

Contents

Table No. IV.2.1.14

All Districts combined

Distribution of total volume (000 m^3) species and dia classes in accessible tree forest area (forest type-wise)

Forest Type : Blue pines
Unit : (000m^3)
Area : 17620

Sl.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Picea smithiana	-	-	9.494	27.563	-	-	-	-	37.057	1.05
2.	Cedrus deodara	-	-	-	-	-	-	64.599	-	64.599	1.83
3.	Pinus excelsa	28.568	100.776	307.535	571.825	808.833	851.332	586.201	145.213	3400.283	96.341
4.	Abies pindrow	-	-	-	17.135	-	-	-	-	17.135	0.49
5.	Rest of species	4.751	5.549	-	-	-	-	-	-	10.300	0.29
	Total:	33.319	106.325	317.029	616.523	808.833	851.332	650.800	145.213	3529.374	
	%	0.94	3.01	8.98	17.47	22.92	24.12	18.44	4.12		100%
	%	0.94	3.95	12.93	30.40	53.32	77.44	95.88	100%		

Contents

Table No. IV.2.1.15

All districts combined

Distribution of stems per hectare by species and diameter classes in accessible tree forest area (Forest type wise)

Forest type : Blue pine
Unit : No of stems
Area : 17620 hectares

Sl. No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Picea smithiana	-	-	0.756	0.756	-	-	-	-	1.512	1.52
2.	Cedrus deodara	-	-	-	-	-	-	0.756	-	0.756	0.76
3.	Pinus excelsa	10.759	13.319	16.346	17.393	16.521	11.808	6.051	1.221	93.418	94.15
4.	Abies pindrow	-	-	-	0.465	-	-	-	-	0.465	0.47
5.	Rest of species	1.914	1.158	-	-	-	-	-	-	3.072	3.10
	Total:	12.673	14.477	17.102	18.614	16.521	11.808	6.807	11.221	99.223	-
	%	12.77	14.59	17.23	18.75	16.65	11.90	6.86	1.23		100
	Basal area cm^2	2239	7106	16454	29604	39251	39182	30072	7767	171675	

Crop dia : 47.cms.

Contents

Table No. IV.2.1.16

All districts combined

Distribution of total stems (000) by species & diameter classes of accessible forest area
(Forest type-wise)

Forest type : Blue pine
Unit : 000 numbers
Area : 17620 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Picea smithiana	-	-	13.329	13.329	-	-	-	-	26.658	1.52
2.	Cedrus deodara	-	-	-	-	-	-	13.329	-	13.329	0.76
3.	Pinus excelsa	189.569	234.689	288.004	306.466	291.093	208.059	106.630	21.524	1646.034	94.15
4.	Abies pindrow	-	-	-	8.195	-	-	-	-	8.195	0.47
5.	Rest of species	33.729	20.400	-	-	-	-	-	-	54.129	3.10
	Total:	223.298	255.089	301.333	327.990	291.093	208.059	119.959	21.524	1748.345	
	%	12.77	14.59	17.24	18.76	16.65	11.90	6.86	1.23		100.00

Contents

Table No. IV.2.1.17

All districts combined

Distribution of volume per hectare (m^3) by species & diameter classes in accessible tree forest area (Forest type-wise)

Forest type : Deodar
Unit : $m^3(r)$
Area : 12160 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Picea smithiana	0.212	0.548	1.995	1.580	-	-	-	-	4.335	1.29
2.	Cedrus deodara	6.373	15.869	22.869	42.049	44.489	50.119	21.429	78.850	282.047	83.95
3.	Pinus excelsa	1.829	1.362	6.734	4.399	11.191	8.518	5.460	-	39.493	11.75
4.	Quercus dilatata	0.049	-	-	-	-	-	-	-	0.049	00.01
5.	Quercus incana	0.122	-	-	-	-	-	3.525	-	3.647	1.09
6.	Pinus gerardiana	0.091	0.758	0.425	-	-	-	-	-	1.274	0.38
7.	Rest of species	0.921	0.203	0.710	1.066	2.241	-	-	-	5.141	1.53
	Total	9.597	18.740	32.733	49.094	57.921	58.637	30.414	78.850	335.986	
	%	2.86	5.58	9.74	14.61	17.24	17.45	9.05	23.47		100.00

Contents

Table No. IV.2.1.18

All districts combined

Distribution of total volume (000m^3) species and diameter classes in accessible tree forest (forest type wise)

Forest type : Deodar
Unit : (000m^3)
Area : 12160 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Picea smithiana	2.581	6.662	24.252	19.218	-	-	-	-	52.713	1.29
2.	Cedrus deodara	77.486	192.968	278.095	511.312	540.985	609.450	260.576	958.815	3429.687	83.95
3.	Pinus excelsa	22.247	16.577	81.884	53.492	136.085	103.581	66.393	-	480.239	11.75
4.	Quercus dilatata	0.590	-	-	-	-	-	-	-	0.590	0.01
5.	Quercus incana	1.483	-	-	-	-	-	42.868	-	44.351	1.09
6.	Pinus gerardiana	1.106	9.219	5.163	-	-	-	-	-	15.488	0.38
7.	Rest of species	11.201	2.468	8.635	12.961	27.250	-	-	-	62.515	1.53
	Total:	116.694	227.874	398.029	596.983	704.320	713.031	369.837	958.815	4085.583	
	%	2.86	5.58	9.74	14.61	17.24	17.45	9.05	23.47		100
	%	2.86	8.44	18.17	32.79	50.03	67.48	76.53	100%		

Contents

Table No. IV.2.1.19

All districts combined

Distribution of stems per hectare by species and diameter classes in accessible tree forest area (Forest type wise)

Forest type : Deodar
Unit : No. of stems
Area : 12160 hectares

Sl. No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow (Picea smithiana)	2.090	1.011	2.022	1.011	-	-	-	-	6.134	2.88
2.	Cedrus deodara	35.738	32.295	21.775	22.118	15.916	12.746	4.112	7.213	151.913	71.25
3.	Pinus excelsa	9.714	3.237	6.407	2.159	4.248	2.159	1.079	-	29.003	13.60
4.	Quercus dilatata	1.079	-	-	-	-	-	-	-	1.079	0.51
5.	Quercus incana	1.079	-	-	-	-	-	1.079	-	2.158	1.01
6.	Pinus gerardiana	5.055	5.055	1.011	-	-	-	-	-	11.121	5.22
7.	Rest of species	7.555	1.079	1.079	1.011	1.079	-	-	-	11.803	5.53
	Total:	62.310	42.677	32.294	26.299	21.243	14.905	6.270	7.213	213.211	
	%	29.22	20.01	15.14	12.33	9.96	6.99	2.94	3.38		100
	Basal area cm^2	11011	20949	31070	41826	50469	49459	27700	45887	278371	

Crop dia : 41 cms.

Contents

Table No. IV.2.1.20

All districts combined

Distribution of total stems (000) by species & diameter classes of accessible tree forest area
(Forest type-wise)

Forest type : Deodar
Unit : 000 numbers
Area : 12160 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Picea smithiana	25.416	12.292	24.584	12.292	-	-	-	-	74.584	2.88
2.	Cedrus deodara	434.575	392.708	264.794	268.952	193.534	154.993	50.001	87.710	1847.267	71.25
3.	Pinus excelsa	118.116	39.372	77.912	26.248	51.664	26.248	13.124	-	352.684	13.60
4.	Quercus dilatata	13.124	-	-	-	-	-	-	-	13.124	0.51
5.	Quercus incana	13.124	-	-	-	-	-	13.124	-	26.248	1.01
6.	Pinus gerardiana	61.462	61.462	12.292	-	-	-	-	-	135.216	5.22
7.	Rest of species	91.868	13.124	13.124	12.292	13.124	-	-	-	143.532	5.53
	Total:	757.685	518.958	392.706	319.784	258.322	181.241	76.249	87.710	2592.655	
	%	29.22	20.02	15.15	12.33	9.96	6.99	2.95	3.38		100

Contents

Table No.IV.2.1.21

All districts combined

Distribution of Volume per hectare (m^3) by species & diameter classes in accessible tree forest area (Forest type-wise)

Forest type : Chir pine
Unit : m^3(r)
Area : 14764 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Pinus roxburghii	9.940	8.912	15.243	27.043	16.235	8.379	2.812	-	88.564	99.64
2.	Quercus incana	0.149	-	-	-	-	-	-	-	0.149	0.17
3.	Rest of species	0.168	-	-	-	-	-	-	-	0.168	0.19
	Total:	10.257	8.912	15.243	27.043	16.235	8.379	2.812	-	88.881	
	%	11.54	10.03	17.15	30.43	18.26	9.43	3.16	-		100
	%	11.54	21.57	38.72	69.15	87.41	96.84	100%			

Contents

Table No. IV.2.1.22

All districts combined

Distribution of total volume ($000m^3$) species and dia classes in accessible tree forest area (Forest type-wise)

Forest type : Chir pine
Unit : ($000m^3$)
Area : 14764 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Pinus roxburghii	146.763	131.577	225.051	399.261	239.690	123.708	41.508	-	1307.558	99.64
2.	Quercus incana	2.203	-	-	-	-	-	-	-	2.203	0.17
3.	Rest of Species	2.485	-	-	-	-	-	-	-	2.485	0.19
	Total:	151.451	131.577	225.051	399.261	239.690	123.708	41.508	-	1312.246	
	%	11.54	10.03	17.15	30.43	18.26	9.43	3.16	-	-	100
	%	11.54	21.57	38.72	69.15	87.41	96.84	100 %			

Contents

Table No. IV.2.1.23

All districts combined

Distribution of stems per hectare by species and diameter classes in accessible tree forest area (Forest type wise)

Forest type : Chir pine
Unit : No. of stems
Area : 14764 hectares

Sl. No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Pinus roxburghii	140.715	32.143	21.428	20.714	8.571	2.857	0.714	-	227.142	98.76
2.	Quercus incana	1.428	-	-	-	-	-	-	-	1.428	0.62
3.	Rest of species	1.428	-	-	-	-	-	-	-	1.428	0.62
	Total:	143.571	32.143	21.428	20.714	8.571	2.857	0.714	-	229.998	
	%	62.42	13.97	9.31	9.00	3.72	1.24	0.31	-	-	100
	Basal area cm^2	25371	6857	8957	14313	8838	4114	1369	-	69819	

Crop dia : 20 cms.

Contents

Table No. IV.2.1.24

All districts combined

Distribution of total stems (000) by species & diameter classes of accessible tree forest area
(Forest type-wise)

Forest type : Chir pine
Unit : 000 numbers
Area : 14764 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Pinus roxburghii	2077.507	474.557	316.371	305.826	126.549	42.183	10.546	-	3353.539	98.76
2.	Quercus incana	21.092	-	-	-	-	-	-	-	21.092	0.62
3.	Rest of species	21.092	-	-	-	-	-	-	-	21.092	0.62
	Total:	2119.691	474.557	316.371	305.826	126.549	42.183	10.546	-	3395.723	
	%	62.42	13.98	9.32	9.01	3.72	1.24	0.31			100

Contents

Table No. IV.2.1.25

All districts combined

Distribution of Volume per hectare (m^3) by species & diameter classes in accessible tree forest area (Forest type-wise)

Forest type : Mixed Conifers
Unit : m^3(r)
Area : 34840 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	2.901	3.132	6.388	5.406	5.370	3.292	2.055	2.952	31.496	10.57
2.	Picea smithiana	1.483	5.174	7.733	15.253	16.542	23.348	4.826	25.586	99.945	33.55
3.	Cedrus deodara	2.766	2.804	4.372	4.538	6.991	8.680	2.020	9.340	41.511	13.94
4.	Pinus excelsa	1.962	6.169	10.476	17.980	38.531	24.441	9.421	3.369	112.349	37.72
5.	Quercus semi-carpifolia	0.342	-	0.316	-	-	-	-	-	0.658	0.22
6.	Pinus gerardiana	0.234	0.229	0.160	-	-	-	-	-	0.623	0.21
7.	Rest of species	2.242	1.237	0.681	2.284	0.691	-	1.326	2.817	11.278	3.79
	Total:	11.930	18.745	30.126	45.461	68.125	59.761	19.648	44.064	297.860	
	%	4.01	6.29	10.12	15.26	22.87	20.06	6.60	14.79		100

Contents

Table No. IV.2.1.26

All districts combined

Distribution of total volume (000m^3) species and dia classes in accessible tree forest area (Forest type-wise)

Forest type : Mixed conifers
Unit : 000m^3
Area : 34840 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	101.061	109.115	222.569	188.342	187.101	114.705	71.585	102.840	1097.318	10.57
2.	Picea smithiana	51.649	180.274	269.418	531.427	576.321	813.446	168.152	891.403	3482.090	33.55
3.	Cedrus deodara	96.381	97.716	152.305	158.121	243.551	302.397	70.377	325.392	1446.240	13.94
4.	Pinus excelsa	68.380	214.897	364.973	626.438	1342.436	851.528	328.222	117.362	3914.236	37.72
5.	Quercus semecarpifolia	11.918	-	11.000	-	-	-	-	-	22.918	0.22
6.	Pinus gerardiana	8.150	7.990	5.593	-	-	-	-	-	21.733	0.21
7.	Rest of species	78.110	43.101	23.699	79.575	24.072	-	46.208	98.157	392.922	3.79
	Total:	415.649	653.093	1049.557	1583.903	2373.481	2082.076	684.544	1535.154	10377.457	
	%	4.01	6.29	10.12	15.26	22.87	20.06	6.60	14.79		100
	%	4.01	10.30	20.42	35.68	58.55	78.61	85.21	100%		

Contents

Table No. IV.2.1.27

All districts combined

Distribution of stems per hectare by species and diameter classes in accessible tree forest area (Forest type wise)

Forest type : Mixed conifers
Unit : No. of stems
Area : 34840 hectares

Sl. No.	Species name	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	12.588	5.238	6.052	3.037	2.119	0.847	0.424	0.424	30.729	12.94
2.	Picea smithiana	12.019	14.146	8.441	8.604	5.933	5.426	0.806	2.696	58.071	24.46
3.	Cedrus deodara	16.644	5.920	4.412	2.335	2.530	2.036	0.382	1.188	35.447	14.93
4.	Pinus excelsa	12.442	12.410	9.663	10.050	13.419	6.190	1.612	0.424	66.210	27.89
5.	Quercus semecarpifolia	4.237	-	0.424	-	-	-	-	-	4.661	1.96
6.	Pinus gerardiana	12.996	1.529	0.382	-	-	-	-	-	14.907	6.28
7.	Rest of species	17.512	5.559	1.188	2.002	0.382	-	0.382	0.382	27.407	11.54
	Total:	88.438	44.802	30.562	26.028	24.383	14.499	3.606	5.114	237.432	
	%	37.24	18.86	12.87	10.96	10.26	6.10	1.51	2.15		100'
	Basal area cm^2	15628	21992	29404	41395	57929	48112	15930	32533	262923	

Crop dia : 38 cms.

Contents

Table No. IV.2.1.28

All districts combined

Distribution of total stems (000) by species & diameter classes of accessible tree forest area
(Forest type-wise)

Forest type : Mixed Conifers
Unit : 000 numbers
Area : 34840 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	438.580	182.521	210.885	105.808	73.820	29.528	14.764	14.764	1070.670	12.94
2.	Picea smithiana	418.745	492.848	294.116	299.752	206.696	189.039	28.081	93.937	2023.214	24.46
3.	Cedrus deodara	579.868	206.263	153.724	81.351	88.151	70.927	13.317	41.399	1235.000	14.93
4.	Pinus excelsa	433.509	432.345	336.678	350.129	467.526	215.674	56.163	14.764	2306.788	27.89
5.	Quercus semecarpifolia	147.640	-	14.764	-	-	-	-	-	162.404	1.96
6.	Pinus gerardiana	452.795	53.270	13.317	-	-	-	-	-	519.382	6.28
7.	Rest of species	610.128	193.677	41.399	69.763	13.317	-	13.317	13.317	954.918	11.54
	Total:	3081.265	1560.924	1064.883	906.803	849.510	505.168	125.642	178.181	8272.376	
	%	37.24	18.86	12.87	10.96	10.26	6.10	1.51	2.15		100.00

Contents

Table No. IV.2.1.29

All districts combined

Distribution of Volume per hectare (m^3) by species & diameter classes in accessible tree forest area (Forest type-wise)

Forest type : Hard wood mixed with Conifers

Unit : m^3(r)

Area : 23644 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	3.259	4.210	3.076	9.666	8.603	-	4.371	18.020	51.205	21.72
2.	Picea smithiana	0.040	0.830	0.454	0.859	1.224	3.793	2.981	8.995	19.176	8.13
3.	Pinus excelsa	1.099	0.891	1.323	6.380	1.920	9.229	7.855	-	28.697	12.17
4.	Quercus dilatata	-	0.413	-	-	-	-	2.150	5.743	8.306	3.52
5.	Quercus incana	3.100	1.929	1.211	-	-	-	1.719	-	7.959	3.38
6.	Quercus semecarpifolia	1.128	2.722	7.061	11.512	17.207	8.917	14.313	15.714	78.574	33.33
7.	Rest of species	10.938	4.623	2.555	3.012	4.375	2.474	3.922	9.933	41.832	17.75
	Total:	19.564	15.618	15.680	31.429	33.329	24.413	37.311	58.405	235.749	
	%	8.30	6.62	6.65	13.33	14.14	10.36	15.83	24.77		100

Contents

Table No. IV.2.1.30

All districts combined

Distribution of total volume ($000m^3$) by species & diameter classes of accessible tree forest area (Forest type-wise)

Forest type : H.W. mixed conifer
Unit : ($000m^3$)
Area : 23644 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	77.059	99.541	72.744	228.532	203.402	-	103.337	426.063	1210.678	21.72
2.	Picea smithiana	0.957	19.630	10.724	20.312	28.938	89.676	70.484	212.683	453.404	8.13
3.	Pinus excelsa	25.970	21.081	31.283	150.853	45.399	218.212	185.719	-	678.517	12.17
4.	Quercus dilatata	-	9.759	-	-	-	-	50.848	135.777	196.384	3.52
5.	Quercus incana	73.314	45.624	28.633	-	-	-	40.639	-	188.210	3.38
6.	Quercus semecarpifolia	26.664	64.357	166.935	272.201	406.854	210.842	338.424	371.537	1857.814	33.33
7.	Rest of species	258.616	109.322	60.418	71.223	103.431	58.495	92.720	234.843	989.069	17.75
	Total:	462.580	369.314	370.737	743.121	788.024	577.225	882.171	1380.903	5574.075	
	%	8.30	6.62	6.65	13.33	14.14	10.36	15.83	24.77		100
	%	8.30	14.92	21.57	34.90	49.04	59.40	75.23	100%		

Contents

Table No. IV.2.1.31 — All districts combined

Distribution of stems per hectare by species and diameter classes in accessible tree forest area (Forest type wise)

Forest type : Hardwood mixed with conifers
Unit : No of stems
Area : 23644 hectares

Sl. No.	Species name	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	12.480	6.702	2.774	5.317	3.236	-	0.925	2.313	33.747	11.81
2.	Picea smithiana	0.463	1.850	0.463	0.463	0.463	0.925	0.463	0.925	6.015	2.10
3.	Pinus excelsa	6.938	2.312	1.444	3.001	0.750	2.137	1.386	-	17.968	6.29
4.	Quercus dilatata	-	0.926	-	-	-	-	0.463	0.463	1.852	0.65
5.	Quercus incana	43.478	7.863	2.313	-	-	-	0.463	-	54.117	18.94
6.	Quercus semecarpifolia	10.404	7.168	8.786	8.321	7.398	2.775	3.006	1.387	49.245	17.24
7.	Rest of species	87.567	21.795	4.856	3.006	2.313	0.925	0.925	1.387	122.774	42.97
	Total:	161.330	48.616	20.636	20.108	14.160	6.762	7.631	6.475	285.718	
	%	56.46	17.01	7.22	7.03	4.95	2.36	2.67	2.26		100
	Basal area cm^2	28509	23864	19854	31980	33641	22438	33712	41192	235190	

Crop dia : 32 cms.

Contents

Table No. IV.2.1.32

All districts combined

Distribution of total stems (000) by species & diameter classes of accessible tree forest area
(Forest type-wise)

Forest type : Hardwood mixed with Conifers
Unit : 000 numbers
Area : 23644 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	295.076	158.474	65.588	125.723	76.524	-	21.872	54.681	797.938	11.81
2.	Picea smithiana	10.936	43.744	10.936	10.936	10.936	21.872	10.936	21.872	142.168	2.10
3.	Pinus excelsa	164.042	54.680	34.136	70.956	17.746	50.526	32.780	-	424.866	6.29
4.	Quercus dilatata	-	21.872	-	-	-	-	10.936	10.936	43.744	0.65
5.	Quercus incana	1027.994	185.914	54.680	-	-	-	10.936	-	1279.524	18.94
6.	Quercus semecarpifolia	245.992	169.467	207.730	196.737	174.921	65.617	71.071	32.808	1164.343	17.24
7	st of species	2070.451	515.325	114.815	71.071	54.681	21.872	21.872	32.808	2902.895	42.97
	Total:	3814.491	1149.476	487.885	475.423	334.808	159.887	180.403	153.105	6755.478	
	%	56.46	17.01	7.22	7.03	4.95	2.36	2.67	2.26		100

Contents

Table No. IV.2.1.35

(All districts combined)

Distribution of Volume per hectare (m^3) by species & diameter classes in accessible tree forest area (Forest type-wise)

Forest type : Upland hardwood
Unit : m^3(r)
Area : 54805 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	1.030	0.841	0.602	1.713	-	-	-	-	4.186	3.06
2.	Pinus roxburghii	0.013	-	0.180	-	-	-	-	-	0.193	0.14
3.	Quercus dilatata	1.489	1.881	0.678	1.257	2.087	-	-	-	7.392	5.40
4.	Quercus incana	2.471	3.548	1.847	1.935	0.347	1.117	-	3.340	14.605	10.68
5.	Quercus semecarpifolia	2.952	7.907	5.932	9.279	8.370	9.025	12.545	12.779	68.789	50.28
6.	Picea smithiana	-	0.083	-	-	-	-	-	-	0.083	0.06
7.	Pinus excelsa	0.164	-	0.276	-	-	-	-	-	0.440	0.32
8.	Rest of species	13.892	4.459	5.417	3.627	5.019	2.138	5.271	1.301	41.124	30.06
	Total:	22.011	18.719	14.932	17.811	15.823	12.280	17.816	17.420	136.812	
	%	16.09	13.68	10.91	13.02	11.57	8.98	13.02	12.73		100

Contents

Table No. IV.2.1.34

(All districts combined)

Distribution of total volume (000m^3) species and diameter classes in accessible tree forest area (Forest type-wise)

Forest Type : Upland hard wood
Unit : (000 m^3)
Area : 54805 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	56.452	46.099	32.963	93.903	-	-	-	-	229.417	3.06
2.	Pinus roxburghii	0.704	-	9.850	-	-	-	-	-	10.554	0.14
3.	Quercus dilatata	81.574	103.074	37.205	68.862	114.400	-	-	-	405.115	5.40
4.	Quercus incana	135.421	194.445	101.227	106.064	19.027	61.215	-	183.050	800.449	10.68
5.	Quercus semacarpifolia	161.806	433.346	325.144	508.537	458.697	494.602	687.502	700.344	3769.978	50.28
6.	Picea smithiana	-	4.545	-	-	-	-	-	-	4.545	0.06
7.	Pinus excelsa	8.996	-	15.106	-	-	-	-	-	24.102	0.32
8.	Rest of species	761.304	244.172	296.865	193.786	275.082	117.199	288.869	71.314	2253.591	30.06
	Total:	1206.257	1025.681	818.360	976.152	867.206	673.016	976.371	954.708	7497.751	
	%	16.09	13.68	10.91	13.02	11.57	8.98	13.02	12.73		100%
	%	16.09	29.77	40.68	53.70	65.27	74.25	87.27	100%		

Contents

Table No. IV.2.1.35

All districts combined

Distribution of stems per hectare by species and diameter classes in accessible tree forest area (Forest type wise)

Forest type : Upland hardwood
Unit : No. of species
Area : 54805 hectares

Sl. No.	Species name	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	4.148	1.793	0.524	0.968	-	-	-	-	7.433	2.36
2.	Pinus roxburghii	0.222	-	0.222	-	-	-	-	-	0.444	0.14
3.	Quercus dilatata	16.454	5.336	0.889	0.889	0.889	-	-	-	24.457	7.77
4.	Quercus incana	35.472	13.982	3.414	2.158	0.222	0.444	-	0.484	56.176	17.84
5.	Quercus semecarpifolia	27.324	23.361	7.312	6.462	3.715	2.826	2.668	1.779	75.447	23.97
6.	Picea smithiana	-	0.262	-	-	-	-	-	-	0.262	0.08
7.	Pinus excelsa	1.309	-	0.262	-	-	-	-	-	1.571	0.50
8.	Rest of species	109.294	21.114	10.255	3.453	2.708	0.706	1.269	0.222	149.021	47.34
	Total	194.223	65.848	22.878	13.930	7.534	3.976	3.937	2.485	314.811	
	%	61.69	20.91	7.26	4.42	2.39	1.26	1.25	0.78		100
	Basal area cm^2	34322	32323	22011	22154	17899	13193	17393	15808	175103	

Crop dia = 27 cms.

Contents

Table No. IV.2.1.36

All districts combined

Distribution of total stems (000) by species & diameter classes of accessible tree forest area (Forest type-wise)

Forest type : Upland hard woods
Unit : 000 numbers
Area : 54805 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	227.305	98.233	28.682	53.054	-	-	-	-	407.274	2.36
2.	Pinus roxburghii	12.186	-	12.186	-	-	-	-	-	24.372	0.14
3.	Quercus dilatata	901.764	292.464	48.744	48.744	48.744	-	-	-	1340.460	7.77
4.	Quercus incana	1944.039	766.310	187.100	118.295	12.186	24.372	-	26.527	3078.829	17.84
5.	Quercus semecarpifolia	1497.468	1280.275	400.728	354.139	203.597	154.853	146.232	97.488	4134.780	23.97
6.	Picea smithiana	-	14.341	-	-	-	-	-	-	14.341	0.08
7.	Pinus excelsa	71.706	-	14.341	-	-	-	-	-	86.047	0.50
	Rest of species	5969.858	1157.168	562.047	189.256	148.387	38.713	69.551	12.186	8167.166	47.34
	Total:	10644.326	3608.791	1253.828	763.488	412.914	217.938	215.783	136.201	17253.269	
	%	61.69	20.91	7.26	4.42	2.39	1.26	1.25	0.78		100.00

Contents

Table No. IV.2.1.37

All districts combined

Distribution of Volume per hectare (m^3) species and diameter classes in accessible tree forest area (Forest type-wise)

Forest type : Misc. forest
Unit : m^3(r)
Area : 8201 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Pinus roxburghii	-	-	-	-	3.238	-	-	-	3.238	18.91
2.	Quercus incana	0.705	1.277	1.875	-	-	-	-	-	3.857	22.53
3.	Rest of species	8.162	1.219	0.646	-	-	-	-	-	10.027	58.56
	Total:	8.867	2.496	2.521	-	3.238	-	-	-	17.122	
	%	51.79	14.58	14.72	-	18.91	-	-	-	-	100

Contents

Table No. IV.2.1.38

All districts combined

Distribution of total volume ($000m^3$) species and dia classes in accessible tree forest area (Forest type-wise)

Forest type : Misc. Forest
Unit : $000m^3$
Area : 8201 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Pinus roxburghii	-	-	-	-	26.558	-	-	-	26.558	18.91
2.	Quercus incana	5.783	10.472	15.382	-	-	-	-	-	31.637	22.53
3.	Rest of species	66.935	10.000	5.300	-	-	-	-	-	82.235	58.56
	Total:	72.718	20.472	20.682	-	26.558	-	-	-	140.430	
	%	51.78	14.58	14.73		18.91					100
	≤ %	51.78	66.36	81.09	-	100%					

Contents

Table No. IV.2.1.39

All districts combined

Distribution of stems per hectare by species and diameter classes in accessible tree forest area (Forest type wise)

Forest type : Misc. forest
Unit : No. of stems
Area : 8201 hectares

Sl. No.	Species name	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Pinus roxburghii	-	-	-	-	1.600	-	-	-	1.600	1.69
2.	Quercus incana	9.602	4.801	3.200	-	-	-	-	-	17.603	18.65
3.	Rest of species	67.212	6.401	1.600	-	-	-	-	-	75.213	79.66
	Total:	76.814	11.202	4.800	-	1.600	-	-	-	94.416	
	%	81.36	11.86	5.08	-	1.70	-	-	-		100
	Basal area cm^2	13574	5499	4618	-	3801	-	-	-	27492	

Crop dia = 19 cms.

Contents

Table No. IV.2.1.40

All districts combined

Distribution of total stems (000) by species & diameter classes in accessible tree forest area
(Forest type-wise)

Forest type : Misc. forests
Unit : 000 numbers
Area : 8201 hectares

S.No.	Species name	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Pinus roxburghii	-	-	-	-	13.124	-	-	-	13.124	1.69
2.	Quercus incana	78.744	39.372	26.248	-	-	-	-	-	144.364	18.65
3.	Rest of species	551.208	52.496	13.124	-	-	-	-	-	616.828	79.66
	Total:	629.952	91.868	39.372	-	13.124	-	-	-	774.316	
	%	81.36	11.86	5.08	-	1.70	-	-	-	-	100

Contents

Table No. IV.2.1.41

All districts combined

Distribution of Volume per hectare (m^3) by species and diameter classes in accessible tree forest area (Forest type-wise)

Forest type : Chilgoza pine
Unit : m^3(r)
Area : 3278 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Cedrus deodara	-	-	-	-	-	-	-	199.559	199.559	84.95
2.	Pinus gerardiana	0.810	2.625	12.600	6.525	-	9.375	3.125	-	35.060	14.92
3.	Rest of species	0.296	-	-	-	-	-	-	-	0.296	0.13
	Total:	1.106	2.625	12.600	6.525	-	9.375	3.125	199.559	234.915	
	%	0.47	1.12	5.36	2.78	-	3.99	1.33	84.95		100

Contents

Table No. IV.2.1.42

All districts combined

Distribution of total volume ($000m^3$) species and dia classes in accessible tree forest area (Forest type-wise)

Forest type : Chilgoza
Unit : $000m^3$
Area : 3278 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Cedrus deodara	-	-	-	-	-	-	-	654.154	654.154	84.95
2.	Pinus gerardiana	2.655	8.605	41.303	21.389	-	30.721	10.244	-	114.917	14.92
3.	Rest of species	0.971	-	-	-	-	-	-	-	0.971	0.13
	Total:	3.626	8.605	41.303	21.389	-	30.721	10.244	654.154	770.042	
	%	0.47	1.12	5.36	2.78	-	3.99	1.33	84.95		100
	%	2.39	4.78	14.66	19.51	-	29.62	34.05	100 %		

Contents

Table No. IV,2.1.43

All districts combined

Distribution of stems per hectare by species and diameter classes in accessible tree forest area (Forest type wise)

Forest type : Chilgozapine
Unit : No. of stems
Area : 3278 hectares

Sl. No.	Species name	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Cedrus deodara	-	-	-	-	-	-	-	15.000	15.000	11.77
2.	Pinus gerardiana	45.000	17.500	30.000	7.500	-	7.500	2.500	-	110.000	86.27
3.	Rest of species	2.500	-	-	-	-	-	-	-	2.500	1.96
	Total:	47.500	17.500	30.000	7.500	-	7.500	2.500	15.000	127.500	
	%	37.25	13.73	23.53	5.88	-	5.88	1.96	11.76		100
	Basal area cm^2	6583	6735	2263	9352	-	19512	8659	75132	128236	

Crop dia = 36 cms.

Contents

Table No. IV.2.1.44

(All districts combined)

Distribution of total stems (000) by species & diameter classes of accessible tree forest area
(Forest type-wise)

Forest type : Chilgoza pine
Unit : 000 numbers
Area : 3278 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Cedrus deodara	-	-	-	-	-	-	-	49.170	49.170	11.77
2.	Pinus gerardiana	147.510	57.365	98.340	24.585	-	24.585	8.195	-	360.580	86.27
3.	Rest of species	8.195	-	-	-	-	-	-	-	8.195	1.96
	Total:	155.705	57.365	98.340	24.585	-	24.585	8.195	49.170	417.945	
	%	37.25	13.73	23.53	5.88	-	5.88	1.96	11.76		100.

Contents

Table No. IV.2.1.45

(All districts combined)

Distribution of Volume per hectare (m^3) by species & diameter classes in accessible tree forest area.(Forest type-wise)

Forest type : Junipers
Unit : m^3(r)
Area : 4763 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Juniperus macropoda	1.700	0.189	0.944	2.124	1.179	-	2.595	2.595	11.326	100
	Total:	1.700	0.189	0.944	2.124	1.179	-	2.595	2.595	11.326	
	%	15.00	1.67	8.33	18.75	10.41	-	22.92	22.92		100

Contents

Table No. IV.2.1.46

All districts combined

Distribution of total volume (000m^3) species and dia classes in accessible tree forest area (forest type-wise)

Forest type : Junipers
Unit : 000m^3
Area : 4763 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
	Juniperus macropoda	8.097	0.899	4.496	10.117	5.619	-	12.363	12.363	53.954	100.00
	Total:	8.097	0.899	4.496	10.117	5.619	-	12.363	12.363	53.954	
	%	15.01	1.67	8.33	18.75	10.42	-	22.91	22.91		100
	%	15.01	16.68	25.01	43.76	54.18	-	77.09	100%		

Contents

Table No. IV.2.1.47

All districts combined

Distribution of stems per hectare by species and diameter classes in accessible tree forest area (Forest type wise)

Forest type : Junipers forest
Unit : No. of stems
Area : 4763 hectares

Sl. No.	Species name	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Juniperus macropoda	33.333	1.666	3.333	5.000	1.666	-	1.666	1.666	48.330	100.00
	Total:	33.333	1.666	3.333	5.000	1.666	-	1.666	1.666	48.330	
	%	68.96	3.45	6.90	10.34	3.45	-	3.45	3.45	-	100
	Basal area cm^2	5890	818	3207	7952	3958	-	7360	10598	39783	

Crop dia = 32 cms.

Contents

Table No. IV.2.1.48

All districts combined

Distribution of total stems (000) by species & diameter classes of accessible tree forest area
(Forest type-wise)

Forest type : Junipers
Unit : 000 numbers
Area : 4763 hectares

S.No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Juniperus macropoda	158.767	7.938	15.877	23.815	7.938	-	7.938	7.938	230.211	100.00
	Total:	158.767	7.938	15.877	23.815	7.938	-	7.938	7.938	230.211	-
	%	68.96	3.45	6.90	10.34	3.45	-	3.45	3.45	-	100.00

Contents

Table No. IV.2.2.1

Distribution of volume per hectare by species and diameter classes in accessible tree forest area

Stratum:- Chamba district

Area of stratum : 150099 ha.

No. of sample plots: 183

Unit : $m^3(r)$

Sl. No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	1.320	1.894	2.942	4.092	5.495	5.448	6.971	18.413	46.575	20.47
2.	Picea smithiana	0.702	2.301	3.999	6.879	7.965	9.506	3.765	18.911	54.028	23.75
3.	Cedrus deodara	0.501	1.033	1.268	2.978	3.004	4.365	0.867	2.055	16.071	7.06
4.	Pinus excelsa	0.857	1.976	4.047	5.820	10.749	10.024	5.462	2.143	41.078	18.05
5.	Pinus roxburghii	0.982	0.877	1.565	2.660	1.774	0.824	0.277	-	8.959	3.94
6.	Quercus dilatata	0.580	0.833	0.303	0.459	0.762	-	0.730	0.905	4.572	2.01
7.	Quercus incana	1.422	1.552	0.870	0.373	0.127	0.408	0.556	0.632	5.940	2.61
8.	Quercus semecarpifolia	1.271	3.051	2.881	3.385	3.915	3.537	6.357	7.833	32.230	14.16
9.	Rest of species	5.534	1.809	2.041	1.704	2.562	1.171	1.236	2.040	18.097	7.95
	Total:	13.169	15.326	19.916	28.350	36.353	35.283	26.221	52.932	227.550	
	%	5.79	6.74	8.75	12.46	15.98	15.50	11.52	23.26		100

Contents

Table No. IV.2.2.2

Distribution of stems per hectare by species and diameter classes in accessible tree forest area

Stratum:- Chamba district

Area of stratum: 150099 ha.
No. of sample plots: 183
Unit : No. of stems

Sl. No.	Name of species	DIAMETER CLASSES (in cms) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	5.925	3.094	2.784	2.259	2.169	1.475	1.423	2.330	21.459	9.07
2.	Picea smithiana	5.698	5.939	4.431	3.821	2.724	2.183	0.615	1.524	26.935	11.38
3.	Cedrus deodara	3.126	2.245	1.328	1.577	1.060	1.082	0.176	0.273	10.867	4.59
4.	Pinus excelsa	5.283	4.218	3.798	3.154	3.602	2.484	0.995	0.267	24.001	10.14
5.	Pinus roxburghii	13.923	3.162	2.189	2.037	0.931	0.281	0.070	-	22.593	9.55
6.	Quercus dilatata	6.577	2.333	0.404	0.325	0.325	-	0.152	0.073	10.189	4.30
7.	Quercus incana	20.267	6.128	1.594	0.406	0.081	0.162	0.160	0.081	28.879	12.20
8.	Quercus semecarpifolia	11.813	8.837	3.492	2.319	1.703	1.087	1.339	0.948	31.538	13.32
9.	Rest of species	43.893	8.508	3.861	1.615	1.345	0.404	0.306	0.300	60.232	25.45
	Total:	116.505	44.464	23.881	17.513	14.140	9.158	5.236	5.796	236.693	-
	%	49.22	18.79	10.09	7.40	5.97	3.87	2.21	2.45		100

Table No. IV.2.2.3

Distribution of volume per hectare by species and diameter classes in accessible tree forest area

Stratum : Kinnaur district

Area of stratum : 49990 ha.

No. of sample plots: 61

Unit : m^3(r)

Sl. No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	4.684	8.044	10.639	10.165	6.337	14.951	16.152	12.087	83.059	29.81
2.	Picea smithiana	0.282	1.163	1.761	0.611	-	5.217	3.384	2.041	14.459	5.19
3.	Cedrus deodara	1.933	2.772	5.351	6.846	6.214	5.136	5.310	32.603	66.165	23.75
4.	Pinus excelsa	0.744	1.273	5.191	9.867	14.540	10.305	6.937	1.056	49.913	17.91
5.	Pinus gerardiana	1.851	1.397	2.381	0.962	-	2.007	0.878	-	9.476	3.40
6.	Quercus incana	0.096	0.354	0.293	1.003	-	-	-	1.763	3.509	1.26
7.	Quercus semecarpifolia	0.352	1.517	2.557	6.780	7.146	5.789	1.436	-	25.577	9.18
8.	Rest of species	8.750	3.681	2.311	2.119	0.906	0.927	5.827	1.964	26.485	9.50
	Total	18.692	20.201	30.484	38.353	35.143	44.332	39.924	51.514	278.643	
	%	6.71	7.25	10.94	13.76	12.61	15.91	14.33	18.49		100

Contents

Table No. IV.2.2.4

Distribution of stems per hectare by species and diameter classes in accessible tree forest area

Stratum : Kinnaur district

Area of stratum : 49990 ha.
No. of sample plots : 61
Unit : No. of stems

Sl. No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	19.036	13.791	9.857	5.963	2.459	3.934	3.279	1.639	59.958	22.13
2.	Picea smithiana	2.316	2.992	1.804	0.410	-	1.189	0.594	0.266	9.571	3.53
3.	Cedrus deodara	10.635	5.513	4.959	3.627	2.316	1.271	1.004	2.746	32.071	11.84
4.	Pinus excelsa	4.980	2.889	5.164	5.205	5.246	2.541	1.189	0.164	27.378	10.10
5.	Pinus gerardiana	13.238	3.443	2.480	0.492	-	0.492	0.164	-	20.309	7.50
6.	Quercus incana	0.861	1.435	0.574	1.148	-	-	-	0.287	4.305	1.59
7.	Quercus semecarpifolia	3.730	4.344	3.402	5.000	3.115	1.803	0.328	-	21.722	8.02
8.	Rest of species	69.057	17.767	4.303	1.967	0.553	0.287	1.414	0.266	95.614	35.29
	Total:	123.853	52.174	32.543	23.812	13.689	11.517	7.972	5.368	270.928	
	%	45.71	19.26	12.01	8.79	5.05	4.25	2.94	1.99		100

Contents

Table No. IV.2.2.5

Distribution of volume per hectare by species and diameter classes in accessible tree forest area.

Stratum : Lahaul & Spiti district

Area of stratum : 11567 ha.
No. of sample plots : 17
Unit : $m^3(r)$

Sl. No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	-	0.336	1.965	3.143	3.100	1.896	3.165	4.567	18.172	24.91
2.	Picea smithiana	0.112	0.767	1.200	5.251	-	-	-	5.691	13.021	17.85
3.	Cedrus deodara	0.168	0.348	-	-	1.990	-	-	-	2.506	3.43
4.	Pinus excelsa	0.241	0.798	1.505	9.785	10.428	8.454	-	-	31.211	42.78
5.	Juniperus macropoda	0.700	0.078	0.389	0.874	0.485	-	1.069	1.069	4.664	6.39
6.	Rest of species	1.371	0.581	.	1.437	-	-	-	-	3.389	4.64
	Total:	2.592	2.908	5.059	20.490	16.003	10.350	4.234	11.327	72.963	
	%	3.55	3.99	6.93	28.08	21.93	14.19	5.80	15.53		100

Contents

Table No. IV.2.2.6

Distribution of stems per hectare by species and diameter classes in accessible tree forest area

Stratum : Lahaul & Spiti district

Area of stratum : 11567 ha.
No. of sample plots : 17
Unit : No. of stems

Sl. No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	-	0.588	1.764	1.765	1.177	0.589	0.589	0.589	7.061	10.64
2.	Picea smithiana	0.588	1.764	1.176	2.939	-	-	-	0.588	7.055	10.63
3.	Cedrus deodara	1.176	0.588	-	-	-	-	-	-	1.764	2.66
4.	Pinus excelsa	1.765	1.764	1.177	5.294	3.822	2.059	-	-	15.881	23.93
5.	Juniperus macropoda	13.726	0.686	1.373	2.059	0.686	-	0.686	0.686	19.902	29.98
6.	Rest of species	11.182	2.353	-	1.176	-	-	-	-	14.711	22.16
	Total:	28.437	7.743	5.490	13.233	5.685	2.648	1.275	1.863	66.374	
	%	42.84	11.66	8.27	19.94	8.57	3.99	1.92	2.81		100

Contents

Table No. IV.2.2.7

All districts combined

Distribution of volume per hectare by species and diameter classes in accessible tree forest area

Total area : 211656 hectares

Unit : 000 m^3

Sl. No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	2.042	3.262	4.706	5.475	5.563	7.499	8.932	16.162	53.641	23.31
2.	Picea smithiana	0.571	1.949	3.317	5.310	5.648	7.973	3.469	14.204	42.441	18.45
3.	Cedrus deodara	0.822	1.406	2.163	3.729	3.707	4.308	1.869	9.158	27.162	11.80
4.	Pinus excelsa	0.797	1.744	4.179	6.993	11.627	10.004	5.512	1.769	42.625	18.53
5.	Pinus gerardiana	0.056	0.122	0.246	0.101	-	0.145	0.049	-	0.719	0.31
6.	Pinus roxburghii	0.697	0.622	1.110	1.886	1.258	0.584	0.196	-	6.353	2.76
7.	Quercus dilatata	0.411	0.591	0.215	0.325	0.540	-	0.518	0.642	3.242	1.41
8.	Quercus incana	1.031	1.184	0.686	0.501	0.090	0.289	0.395	0.865	5.041	2.19
9.	Quercus semecarpifolia	0.984	2.523	2.647	4.001	4.464	3.876	4.847	5.555	28.897	12.56
10.	Juniperus macropoda	0.038	0.004	0.021	0.048	0.027	-	0.058	0.058	0.254	0.11
11.	Rest of species	6.119	2.187	2.025	1.877	2.069	1.049	2.325	2.060	19.711	8.57
	Total:	13.568	15.594	21.315	30.246	34.993	35.727	28.170	50.473	230.086	
	%	5.90	6.78	9.26	13.15	15.21	15.53	12.24	21.93		100

Contents

Table No.IV.2.2.8

All districts combined

Distribution of total volume by species and diameter classes in accessible tree forest area

Total area : 211656 hectares

Unit : 000 m^3

Sl. No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	432.224	690.413	996.028	1158.700	1177.519	1587.140	1890.470	3420.861	11353.355	23.36
2.	Picea smithiana	120.816	412.414	702.156	1123.793	1195.465	1687.632	734.264	3006.358	8982.898	18.48
3.	Cedrus deodara	173.867	297.670	457.795	789.301	784.536	911.847	395.552	1938.361	5748.929	11.83
4.	Pinus excelsa	168.628	369.509	884.389	1480.051	2460.857	2117.474	1166.535	374.425	9021.868	18.56
5.	Pinus gerardiana	11.912	25.815	52.059	21.389	-	30.731	10.244	-	152.150	0.31
6.	Pinus roxburghii	147.467	131.577	234.901	399.261	266.248	123.708	41.508	-	1344.670	2.77
7.	Quercus dilatata	87.009	125.123	45.467	68.862	114.400	-	109.632	135.777	686.270	1.41
8.	Quercus incana	218.204	250.541	145.242	106.064	19.027	61.215	83.507	183.050	1066.850	2.20
9.	Quercus semecarpifolia	208.285	533.881	560.237	846.942	944.859	820.300	1025.926	1175.759	6116.189	12.58
10.	Juniperus macropoda	8.097	0.899	4.496	10.117	5.619	-	12.363	12.363	53.954	0.11
11.	Rest of species	1283.891	462.295	421.880	378.403	429.835	222.068	476.763	404.317	4079.452	8.39
	Total:	2860.400	3300.137	4504.650	6382.883	7398.365	7562.115	5946.764	10651.271	48606.585	
	%	5.89	6.79	9.27	13.13	15.22	15.56	12.23	21.91		100

Contents

Table No. IV.2.2.9

All districts combined

Distribution of stems per hectare by species and diameter classes in accessible tree forest area

Total area : 211656 hectares
Unit : '000' number

Sl. No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	8.698	5.483	4.398	3.107	2.183	2.007	1.815	2.072	29.763	12.64
2.	Picea smithiana	4.619	5.014	3.632	2.967	1.932	1.829	0.576	1.176	21.745	9.23
3.	Cedrus deodara	4.793	2.927	2.113	1.975	1.331	8.067	0.362	0.842	15.410	6.54
4.	Pinus excelsa	5.019	3.770	3.978	3.755	4.144	2.474	0.986	0.228	24.354	10.34
5.	Pinus gerardiana	3.127	0.813	0.586	0.116	-	0.116	0.039	-	4.797	2.04
6.	Pinus roxburghii	9.873	2.242	1.553	1.445	0.660	0.199	0.050	-	16.022	6.80
7.	Quercus dilatata	4.664	1.654	0.287	0.230	0.230	-	0.108	0.052	7.225	3.07
8.	Quercus incana	14.575	4.685	1.267	0.559	0.058	0.115	0.114	0.125	21.498	9.13
9.	Quercus semecarpifolia	9.259	7.293	3.280	2.825	1.943	1.197	1.027	0.672	27.496	11.68
10.	Juniperus macropoda	0.750	0.038	0.074	0.112	0.038	-	0.038	0.038	1.088	0.46
11.	Rest of species	48.049	10.358	3.755	1.675	1.084	0.354	0.551	0.275	66.101	28.07
	Total:	113.426	44.277	24.923	18.766	13.603	9.358	5.666	5.480	235.499	
	%	48.16	18.80	10.58	7.97	5.78	3.97	2.41	2.33		100

Contents

Table No. IV.2.2.10

All districts combined

Distribution of total stems by species and diameter classes in accessible tree forest area

Total area : 211656 hectares
Unit : 000 number

Sl. No.	Name of species	DIAMETER CLASSES (in cms.) 10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Total	%
1.	Abies pindrow	1840.964	1160.588	930.937	657.628	462.129	424.826	384.239	438.551	6299.862	12.64
2.	Picea smithiana	977.708	1061.388	768.853	628.032	408.887	387.039	121.955	248.904	4602.766	9.23
3.	Cedrus deodara	1014.443	619.476	447.219	417.956	281.685	225.920	76.647	178.279	3261.625	6.54
4.	Pinus excelsa	1062.295	797.982	841.889	794.774	877.199	523.707	208.697	48.218	5154.761	10.34
5.	Pinus gerardiana	661.767	172.097	123.949	24.585	-	24.585	8.195	-	1015.178	2.04
6.	Pinus roxburghii	2089.693	474.557	328.557	305.826	139.673	42.183	10.546	-	3391.035	6.80
7.	Quercus dilatata	987.214	350.126	60.674	48.744	48.744	-	22.866	10.936	1529.304	3.07
8.	Quercus incana	3084.993	991.594	268.028	118.295	12.186	24.372	24.060	26.527	4550.055	9.13
9.	Quercus semecarpifolia	1959.670	1543.622	694.215	598.009	411.298	253.250	217.303	142.226	5819.593	11.68
10.	Juniperus macropoda	158.767	7.938	15.877	23.815	7.938	-	7.938	7.938	230.211	0.46
11.	Rest of species	10169.727	2192.378	794.652	354.312	229.509	74.938	116.670	58.311	13990.497	28.07
	Total:	24007.241	9371.746	5274.850	3971.976	2879.248	1980.820	1199.116	1159.890	49844.887	
	%	48.16	18.80	10.58	7.97	5.78	3.97	2.41	2.33		100

Contents

Appendix - I

Year of survey and publication of survey of India topo maps used for forest inventory in Chamba survey area (Chamba, Kinnaur and Lahaul & Spiti Districts) of H.P.

Sl.No.	Map sheet No.	Year of Survey	Year of publication
1.	43 P/13	1962-63	1975
2.	43 P/14	1962-63	1973
3.	43 P/15	1956-57	1976
4.	52 C/4	1963	1965
5.	52 C/8	1963	1965
6.	52 C/11	1962-63	1965
7.	52 C/12	1963	1968
8.	52 C/15	1963	1966
9.	52 C/16	1962-63	1965
10.	52 D/1	1962-63	1964
11.	52 D/2	1962-63	1964
12.	52 D/3	1963-64	1964
13.	52 D/4	1962-63	N.A. For map at Sl. No.13 is Tracing copy from HP Forest Deptt.
14.	52 D/5	1968	1969
15.	52 D/6	1968	1969
16.	52 D/7	1964-65 & 1968	1969
17.	52 D/8	1962-63	1969
18.	52 D/9	1968	1969
19.	52 D/10	1968	1969
20.	52 D/11	1968	1969
21.	52 D/12	1964-65 & 1968	1969
22.	52 D/13	1963	1966
23.	52 D/14	1963	1975
24.	52 D/15	1963	1964
25.	52 D/16	1964-65 & 1968	1969
26.	52 H/1	1963	1975
27.	52 H/2	1963	1976
28.	52 H/3	1963	1976
29.	52 H/5	1963	1976
30.	52 H/6	1963	1976
31.	52 H/7	1963	1975
32.	52 H/8	1963	1975

Contents

Sl.No.	Map sheet No.	Year of Survey	Year of publication
33.	52 H/9	1963	1976
34.	52 H/10	N.A.	N.A.
35.	52 H/11	1962-63	1976
36.	52 H/12	N.A.	N.A.
37.	52 H/13	1963	1965
38.	52 H/14	N.A.	N.A.
39.	52 H/15	1962-63	1976
40.	52 H/16	N.A.	N.A.
41.	52 L/2	N.A.	N.A.
42.	52 L/3	1962-63	1975
43.	52 L/4	1962-63	1975
44.	52 L/6	N.A.	N.A.
45.	52 L/7	N.A.	N.A.
46.	52 L/8	1962-63	1976
47.	52 L/11	N.A.	N.A.
48.	52 L/12	N.A.	N.A.
49.	53 E/13	1962	1966
50.	53 E/14	1962	1966
51.	53 E/15	1962	1966
52.	53 I/1	N.A.	N.A.
53	53 I/2	N.A.	N.A.
54	53 I/3	1975	1978
55.	53 I/5	1962-63	1977
56.	53 I/6	1975	1978
57.	53 I/7	1962-63	1976
58.	53 I/8	N.A.	N.A.
59.	53 I/9	N.A.	N.A.
60.	53 I/10	N.A.	N.A.
61.	53 I/11	N.A.	N.A.
62.	53 I/12	1962-63	1966
63.	53 I/13	N.A.	N.A.
64.	53 I/14	N.A.	N.A.
65.	53 I/15	N.A.	N.A.
66.	53 I/16	N.A.	N.A.
67.	53 M/4	1963	1968

Compiled from various sources.

Contents

Appendix - II

LOCATION OF CENTRE OF SAMPLE PLOTS VISITED FOR FOREST INVENTORY

District : Chamba

Map Sheet Coverage : 43 P/13,14,15
52 C/4,8,12,16
52 D/1,2,3,4,5,6,7,8,9,10,11,12,13, 14,15,16

Longitude E Latitude N of Plot Centre			Forest Division Code*	Land use Code*	Forest type Code*	No. of trees enumerated in sample plot of 0.1 ha.	Vol. (m^3) in sample plot of 0.1 ha.
Degree	Minute	Second					
1			2	3	4	5	6
			Map sheet No. 43 P/13				
75 32	56 45	59 E 52 N	03	02	08	024	11.759
75 32	00 46	29 E 40 N	03	01	07	000	0.0
75 32	52 49	09 E 01 N	03	02	09	041	14.102
75 32	54 49	39 E 09 N	03	03	04	000	0.0
75 32	56 49	36 E 32 N	03	02	07	000	0.0
75 32	57 47	57 E 32 N	03	03	09	002	0.196
75 32	51 51	21 E 02 N	03	03	07	017	11.135
75 32	51 51	11 E 30 N	03	02	07	029	18.805
75 32	54 52	25 E 21 N	03	02	01	-	-
75 32	56 51	07 E 10 N	03	02	03	037	18.604
75 32	56 56	21 E 23 N	03	02	09	059	20.549
75 32	57 50	47 E 03 N	03	02	09	030	41.588
75 32	49 54	52 E 45 N	03	02	-	-	-
75 32	51 53	19 E 54 N	03	03	-	-	-

*Codes are explained at the end of the appendix.

Contents

1	2	3	4	5	6
75 51 09 E 32 53 37 N	03	02	-	-	-
75 54 25 E 32 54 02 N	03	02	09	026	30.578
75 53 01 E 32 53 30 N	03	02	-	-	-
	Map Sheet No. 43 P/14				
75 53 59 E 32 30 16 N	04	02	20	007	00.881
75 57 21 E 32 31 54 N	04	02	06	060	11.603
75 57 16 E 32 32 33 N	04	01	09	047	11.289
75 57 56 E 32 34 19 N	04	03	06	-	-
75 58 40 E 32 88 35 N	04	02	09	031	3.003
75 58 59 E 32 38 53 N	04	02	09	-	-
75 54 44 E 32 42 23 N	04	02	09	-	-
75 55 55 E 32 41 51 N	04	02	09	030	4.347
75 56 35 E 32 40 39 N	04	13	-	-	-
	Map Sheet No. 43 P/15				
75 50 11 E 32 24 38 N	04	03	20	-	--
75 55 02 E 32 26 19 N	04	13	-	-	-
75 57 26 E 32 26 21 N	04	03	20	-	-
75 58 54 E 32 25 01 N	04	07	06	-	-
75 54 36 E 32 28 58 N	04	02	06	013	14.269
75 52 47 E 32 28 26 N	04	02	20	-	-
75 57 11 E 32 28 55 N	04	02	06	015	12.967
75 55 19 E 32 28 26 N	04	15	-	-	-
75 59 13 E 32 28 53 N	04	10	-	-	-
75 58 11 E 32 28 29 N	04	03	06	006	6.206

Contents

1	2	3	4	5	6
	Map Sheet No. 52 C/8				
76 19 27 E 33 01 49 N	17	11	-	-	-
76 25 35 E 33 01 13 N	17	03	05	-	-
76 26 57 E 33 01 15 N	17	02	04	011	26.596
76 21 55 E 33 03 24 N	17	17	-	-	-
76 23 16 E 33 03 44 N	17	02	07	024	24.222
76 24 04 E 33 03 41 N	17	02	07	-	-
76 19 27 E 33 06 38 N	17	02	-	-	-
76 21 49 E 33 07 10 N	17	04	-	-	-
76 29 39 E 33 05 10 N	17	04	-	-	-
76 20 54 E 33 08 29 N	17	02	04	004	12.066
76 28 04 E 33 07 54 N	17	11	-	-	-
	Map Sheet No. 52 C/12				
76 36 57 E 33 01 02 N	17	02	04	-	-
76 39 08 E 33 04 57 N	17	03	-	-	-
	Map Sheet No. 52 D/1				
76 01 54 E 32 45 41 N	03	01	09	075	16.154
76 46 37 E 32 45 42 N	03	02	-	-	-
76 07 32 E 32 46 08 N	03	02	09	-	-
76 11 51 E 32 00 29 N	03	02	09	-	-
76 01 05 E 32 49 22 N	03	02	03	-	-
76 01 27 E 32 48 19 N	03	02	09	034	36.000
76 03 27 E 32 48 29 N	03	02	05	-	-
76 06 50 E 32 48 55 N	03	02	04	010	40.470
76 05 39 E 32 48 43 N	03	02	03	036	44.615
76 12 28 E 32 47 30 N	03	02	03	012	26.601

Contents

1	2	3	4	5	6
76 14 58 E 32 04 10 N	03	03	09	003	2.056
76 02 57 E 32 52 07 N	03	02	08	029	33.270
76 07 29 E 32 51 50 N	03	02	09	140	32.677
76 07 44 E 32 51 35 N	03	10	-	-	-
76 11 25 E 32 52 28 N	03	02	08	048	28.100
76 14 28 E 32 51 50 N	03	03	09	005	10.963
76 03 21 E 32 52 57 N	03	02	-	-	-
76 04 16 E 32 54 30 N	03	02	09	-	-
76 06 24 E 32 53 46 N	03	13	-	-	-
76 06 07 E 32 53 43 N	03	02	09	-	-
76 08 03 E 32 54 59 N	03	02	08	034	15.312
76 11 35 E 32 52 42 N	03	02	07	-	-
76 14 04 E 32 52 49 N	03	02	07	007	17.194
76 06 35 E 32 55 31 N	03	02	09	024	36.316
76 08 47 E 32 57 28 N	03	02	01	021	72.905
76 10 45 E 32 55 17 N	03	02	09	021	3.327
76 11 46 E 32 57 19 N	03	02	-	-	-
76 07 24 E 32 58 28 N	03	02	-	-	-
76 07 59 E 32 58 31 N	03	03	08	004	2.253
76 09 26 E 32 59 06 N	03	02	-	-	-
76 12 09 E 32 59 13 N	03	02	09	-	-
76 10 30 E 32 58 30 N	03	02	-	-	-
76 12 30 E 32 57 43 N	03	02	09	-	-

Contents

1	2	3	4	5	6
Map Sheet No. 52 D/2					
76 00 59 E 32 30 23 N	04	02	02	024	44.376
76 01 30 E 32 32 07 N	04	02	01	021	22.311
76 02 57 E 32 31 13 N	04	02	02	-	-
76 05 25 E 32 32 20 N	04	13	-	-	-
76 08 45 E 32 30 15 N	04	12	-	-	-
76 11 38 E 32 30 40 N	03	03	09	006	1.351
76 12 57 E 32 32 02 N	03	02	08	016	39.580
76 00 36 E 32 32 43 N	04	02	02	020	18.738
76 02 34 E 32 34 29 N	04	12	-	-	-
76 12 03 E 32 34 29 N	03	01	09	065	23.927
76 10 31 E 32 33 03 N	03	02	02	012	30.056
76 14 15 E 32 33 58 N	03	01	09	-	0.000
76 02 14 E 32 35 34 N	C4	01	06	013	5.247
76 12 08 E 32 35 17 N	03	03	20	011	2.411
76 13 42 E 32 36 44 N	03	10	-	-	-
76 03 25 E 32 38 41 N	03	02	06	006	4.991
76 11 32 E 32 39 25 N	03	02	09	002	0.910
76 13 25 E 32 38 15 N	03	01	08	-	-
76 04 52 E 32 40 54 N	03	13	-	-	-
76 12 31 E 32 41 53 N	03	01	06	063	13.406
76 08 16 E 32 41 31 N	03	03	09	-	-
76 10 59 E 32 41 05 N	03	11	-	-	-
76 12 39 E 32 40 11 N	03	11	-	-	-
76 14 52 E 32 42 23 N	03	02	08	008	21.115
76 11 28 E 32 41 34 N	03	03	03	005	7.722

Contents

1	2	3	4	5	6
76 06 15 E 32 43 53 N	03	03	06	-	-
76 06 15 E 32 43 38 N	03	03	06	003	1.684
76 09 45 E 32 44 24 N	03	02	03	013	35.039
76 07 44 E 32 43 06 N	03	13	-	-	-
76 12 05 E 32 42 39 N	03	02	03	017	40.532
76 10 27 E 32 44 50 N	03	02	03	010	41.071
76 14 16 E 32 43 10 N	03	11	-	-	-
76 13 13 E 32 44 21 N	03	01	02	-	-
	Map Sheet No. 52 D/3				
76 07 20 E 32 15 41 N	04	03	08	027	3.554
76 05 09 E 32 16 55 N	04	03	20	-	-
76 09 03 E 32 15 21 N	04	03	20	015	3.714
76 07 26 E 32 19 22 N	04	02	08	109	11.878
76 07 34 E 32 19 04 N	04	03	06	002	1.907
76 01 21 E 32 20 36 N	04	03	06	008	9.791
76 03 30 E 32 21 12 N	04	03	06	019	14.193
76 03 47 E 32 21 17 N	04	02	06	098	10.714
76 06 19 E 32 22 27 N	04	03	06	016	17.455
76 08 37 E 32 22 23 N	04	02	09	-	-
76 00 04 E 32 23 38 N	04	13	-	-	-
76 03 45 E 32 21 00 N	04	12	-	-	-
76 03 38 E 32 24 42 N	04	01	09	083	10.048
76 06 00 E 32 23 19 N	04	03	09	001	0.785

Contents

1	2	3	4	5	6
76 06 04 E 32 24 07 N	04	13	-	-	-
76 09 32 E 32 24 11 N	04	02	08	029	61.639
76 07 47 E 32 23 51 N	04	03	09	009	6.163
76 10 59 E 32 24 01 N	04	02	09	-	-
76 11 24 E 32 23 28 N	04	02	03	-	-
76 14 32 E 32 24 26 N	26	11	-	-	-
76 04 21 E 32 26 21 N	04	03	08	016	6.417
76 02 58 E 32 25 30 N	04	03	06	-	-
76 05 58 32 26 21 N	04	13	-	-	-
76 06 30 E 32 26 21 N	04	02	02	035	45.033
76 08 48 E 32 20 45 N	04	02	08	-	-
76 09 40 E 32 26 45 N	26	01	08	-	-
76 11 39 32 26 14 N	26	02	07	018	35.575
76 10 51 E 32 26 16 N	26	02	03	-	-
76 14 30 E 32 25 02 N	26	02	03	-	-
76 04 02 E 32 27 54 N	04	13	-	-	-
76 06 59 E 32 28 25 N	04	01	05	035	44.239
76 05 28 E 32 29 03 N	04	01	03	015	16.247
76 03 21 E 32 29 35 N	04	02	03	009	18.676
76 07 31 E 32 27 55 N	04	01	08	053	34.657
76 09 56 E 32 29 34 N	26	03	06	-	-

Contents

1	2	3	4	5	6
	Map Sheet No. 52 D/4				
76 07 49 E 32 14 13 N	04	03	20	026	3.695
	Map Sheet No. 52 D/5				
76 16 43 E 32 46 24 N	03	02	09	042	35.428
76 18 17 E 32 45 57 N	03	02	09	027	18.716
76 19 12 E 32 46 36 N	03	02	01	018	44.698
76 16 9 E 32 49 11 N	03	02	01	-	-
76 25 04 E 32 49 13 N	17	11	-	-	-
76 16 3 E 32 50 52 N	03	02	05	027	39.667
76 18 44 E 32 54 3 N	03	03	08	001	0.128
76 26 19 E 32 53 24 N	17	11	-	-	-
76 29 37 E 32 53 37 N	17	03	07	000	-
76 27 53 E 32 53 51 N	17	02	05	010	15.681
76 16 09 E 32 56 26 N	03	03	08	-	-
76 17 33 E 32 55 2 N	03	02	-	-	-
76 25 38 E 32 57 15 N	17	04	-	-	-
76 26 48 E 32 55 15 N	17	11	-	-	-
76 17 00 E 32 57 31 N	03	02	09	-	-
76 24 06 E 32 58 12 N	17	02	-	-	-
76 26 09 E 32 59 45 N	17	02	05	-	-
76 29 12 E 32 58 11 N	17	03	-	-	-

Contents

1	2	3	4	5	6
		Map Sheet No. 52 D/6			
76 21 11 E 32 31 15 N	26	02	09	014	10.019
76 21 28 E 32 31 00 N	26	01	09	039	37.414
76 23 45 E 32 32 04 N	26	03	-	-	-
76 26 51 E 32 30 26 N	26	01	03	021	37.554
76 25 41 E 32 32 03 N	26	02	07	-	-
76 29 52 E 32 31 08 N	26	01	02	020	37.948
76 27 38 E 32 31 23 N	26	11	-	-	-
76 15 58 E 32 33 24 N	03	02	09	-	-
76 19 44 E 32 34 45 N	03	03	-	-	-
76 17 35 E 32 32 45 N	03	11	-	-	-
76 22 28 E 32 33 55 N	26	02	-	-	-
76 24 05 E 32 33 15 N	26	02	-	-	-
76 28 45 E 32 34 31 N	26	02	07	-	-
76 28 45 E 32 33 01 N	26	02	09	-	-
76 16 14 E 32 35 51 N	03	12	-	-	-
76 16 07 E 32 36 43 N	03	03	09	002	0.231
76 18 49 E 32 36 31 N	03	01	09	015	3.347
76 18 11 E 32 36 00 N	03	01	09	018	19.427
76 20 33 E 32 36 31 N	03	02	-	-	-
76 29 28 E 32 35 03 N	26	02	07	-	-
76 16 53 E 32 38 24 N	03	01	09	-	-
76 15 36 E 32 39 08 N	03	01	08	023	57.130
76 19 28 E 32 38 34 N	03	02	09	-	-

Contents

1	2	3	4	5	6
76 18 03 E 32 39 00 N	03	03	09	-	-
76 23 00 E 32 39 58 N	03	02	01	-	-
76 15 40 E 32 42 49 N	03	01	05	011	33.124
76 17 31 E 32 40 58 N	03	02	01	-	-
76 19 56 E 32 41 32 N	03	02	-	-	-
76 22 25 E 32 40 10 N	03	02	04	-	-
76 18 00 E 32 44 58 N	03	02	09	016	7.105
	Map Sheet No. 52 D/7				
76 29 45 E 32 16 16 N	26	11	-	-	-
76 28 10 E 32 19 48 N	26	02	08	-	-
76 26 40 E 32 21 12 N	26	03	04	-	-
76 25 56 E 32 21 16 N	26	02	04	-	-
76 26 37 E 32 24 45 N	26	02	09	014	10.707
76 25 49 E 32 22 45 N	26	03	04	-	-
76 18 07 E 32 23 16 N	26	04	-	-	-
76 19 32 E 32 22 58 N	26	01	08	027	37.745
76 23 20 E 32 21 10 N	26	02	03	-	-
76 29 20 E 32 22 22 N	26	01	04	011	28.096
76 28 10 E 32 23 14 N	26	13	-	-	-
76 29 17 E 32 24 07 N	26	11	-	-	-
76 15 02 E 32 26 20 N	26	02	03	019	89.953
76 18 29 E 32 25 13 N	26	02	07	-	-
76 18 48 E 32 27 08 N	26	11	-	-	-
76 21 05 E 32 27 51 N	26	03	04	006	17.253

Contents

1	2	3	4	5	6
76 23 28 E 32 29 41 N	26	02	07	-	-
76 25 49 E 32 26 08 N	26	01	07	-	-
76 28 39 E 32 29 16 N	26	01	07	046	42.807
76 26 37 E 32 28 29 N	26	11	-	-	-
76 15 57 E 32 29 32 N	26	12	-	-	-
76 18 10 E 32 29 04 N	26	11	-	-	-
76 19 18 E 32 27 40 N	26	11	-	-	-
76 29 16 E 32 25 38 N	26	11	-	-	-
76 28 00 E 32 26 54 N	26	03	08	003	0.382
76 29 20 E 32 29 35 N	26	02	07	-	-
76 28 00 E 32 27 51 N	26	13	-	-	-
	Map Sheet No. 52 D/9				
76 33 32 E 32 56 53 N	17	03	-	-	-
76 31 11 E 32 58 40 N	17	01	02	020	24.210
76 31 20 E 32 58 47 N	17	02	02	011	35.781
76 33 32 E 32 56 53 N	17	02	-	-	-
	Map Sheet No. 52 D/10				
76 30 04 E 32 30 52 N	26	10	-	-	-
76 37 51 E 32 30 34 N	26	03	-	-	-
76 30 04 E 32 35 55 N	26	11	-	-	-
	Map Sheet No. 52 D/11				
76 33 55 E 32 16 07 N	26	11	-	-	-
76 37 02 E 32 16 33 N	26	02	07	057	73.076

Contents

1	2	3	4	5	6
76 38 05 E 32 16 40 N	26	02	07	049	64.309
76 39 18 E 32 15 49 N	26	02	07	016	5.319
76 41 23 E 32 15 22 N	26	01	07	045	109.924
76 31 17 E 32 19 32 N	26	01	07	020	54.472
76 31 22 E 32 18 03 N	26	03	08	034	6.041
76 34 12 E 32 17 51 N	26	02	07	017	14.756
76 35 19 E 32 19 18 N	26	11	-	-	-
76 37 26 E 32 18 20 N	26	03	-	-	-
76 40 27 E 32 17 34 N	26	02	04	025	51.395
76 44 37 E 32 17 32 N	26	03	-	-	-
76 42 56 E 32 19 58 N	26	03	07	019	30.712
76 30 59 E 32 21 30 N	26	02	05	034	37.773
76 31 35 E 32 21 02 N	26	02	09	061	9.965
76 34 36 E 32 21 12 N	26	03	-	-	-
76 30 37 E 32 23 07 N	26	03	09	028	5.374
76 31 56 E 32 24 27 N	26	02	02	003	33.066
76 34 56 E 32 24 57 N	26	17	-	-	-
76 30 40 E 32 25 33 N	26	03	04	-	-
76 33 15 E 32 25 16 N	26	03	08	003	9.442
76 35 04 E 32 25 45 N	26	02	-	-	-
76 37 27 E 32 26 44 N	26	03	-	-	-

Contents

1	2	3	4	5	6
76 44 58 E 32 25 24 N	26	01	01	018	79.756
76 42 33 E 32 26 05 N	26	02	-	-	-
76 34 46 E 32 29 18 N	26	03	-	-	-
76 35 34 E 32 27 38 N	26	12	-	-	-
76 38 11 E 32 29 11 N	26	11	-	-	-
76 40 08 E 32 27 54 N	26	02	-	-	-
76 43 30 E 32 28 27 N	26	11	-	-	-
	Map Sheet No. 52 D/12				
76 41 35 E 32 12 24 N	26	02	09	041	5.939
76 38 04 E 32 13 24 N	26	10	-	-	-
76 39 30 E 32 14 06 N	26	02	07	025	7.920
76 42 17 E 32 13 04 N	26	10	-	-	-
76 40 11 E 32 14 28 N	26	02	04	019	34.811
76 42 45 E 32 13 27 N	26	03	-	-	-
	Map sheet No. 52 D/15				
76 46 11 E 32 19 40 N	26	11	-	-	-
76 46 20 E 32 17 47 N	26	03	-	-	-
76 45 13 E 32 29 44 N	26	04	-	-	-

Total: 272 Points

Contents

District : Kinnaur

Map Sheet Coverage: 53 E/14,15
53 I/2,3,5,6,7

Longitude E Latitude N of plot centre (Degree, Minute, Second)	Forest Division Code	Land use Code	Forest type Code	No. of trees enumerated in sample plot of 0.1 ha.	Vol. (m^3) in sample plot of 0.1 ha.
1	2	3	4	5	6
	Map Sheet No. 53 E/14				
77 51 30 E 31 01 40 N	07	01	-	-	-
77 53 15 E 31 37 51 N	07	02	01	037	61.998
77 54 10 E 31 31 27 N	07	02	-	-	-
77 57 00 E 31 31 58 N	07	02	03	029	48.365
77 55 02 E 31 30 32 N	07	03	-	-	-
77 59 45 E 31 01 30 N	07	01	01	024	52.894
77 50 30 E 31 33 40 N	07	02	09	022	15.745
77 54 20 E 31 34 30 N	07	03	07	010	19.597
77 58 00 E 31 32 40 N	07	02	03	070	34.756
77 50 50 E 31 36 05 N	07	01	01	060	76.076
77 50 50 E 31 36 50 N	07	02	07	015	26.243
77 51 17 E 31 36 27 N	07	01	09	048	25.612
77 52 50 E 31 37 05 N	07	01	08	068	52.487
77 54 35 E 31 35 25 N	07	02	09	020	23.607
77 52 20 E 31 35 30 N	07	02	-	-	-
77 55 20 E 31 37 00 N	07	-	-	-	-

Contents

1	2	3	4	5	6
77 50 25 E 31 38 37 N	07	01	-	-	-
77 52 5 E 31 38 50 N	07	-	-	-	-
77 53 8 E 31 37 50 N	07	02	-	-	-
	Map Sheet No. 53 E/15				
77 59 50 E 31 29 30 N	07	02	-	-	-
	Map Sheet No. 53 I/2				
78 00 17 E 31 31 05 N	07	01	03	045	34.908
78 02 15 E 31 31 40 N	07	01	07	026	61.481
78 3 44 E 31 00 29 N	07	02	07	013	32.960
78 14 05 E 31 31 57 N	07	02	04	021	23.972
78 04 40 E 31 33 05 N	07	02	03	012	9.943
78 05 20 E 31 32 45 N	07	02	-	-	-
78 08 50 E 31 34 23 N	07	02	04	-	-
78 08 45 E 31 32 55 N	07	03	-	-	-
78 00 07 E 31 36 00 N	07	01	09	-	-
78 03 40 E 31 36 00 N	07	01	09	009	2.252
78 03 46 E 31 36 46 N	07	03	01	-	-
78 01 15 E 31 39 07 N	07	01	04	012	26.611
	Map Sheet No. 53 I/3				
78 14 15 E 31 23 25 N	07	01	09	-	-
78 12 00 E 31 26 50 N	07	02	05	-	-
78 13 28 E 31 26 07 N	07	02	05	008	51.996
78 02 07 E 31 27 37 N	07	02	09	021	16.564

Contents

1	2	3	4	5	6
78 00 20 E 31 29 50 N	07	02	-	-	-
78 04 50 E 31 29 19 N	07	02	01	009	28.387
78 05 50 E 31 28 30 N	07	02	-	-	-
78 06 35 E 31 29 00 N	07	02	09	025	16.602
78 09 56 E 31 29 30 N	07	01	05	047	40.609
78 11 30 E 31 28 50 N	07	02	07	-	-
78 13 00 E 31 29 10 N	07	02	-	-	-
	Map Sheet No. 53 I/5				
78 27 06 E 31 47 08 N	28	03	07	011	17.078
78 25 17 E 31 48 19 N	28	03	21	026	4.365
	Map Sheet No. 53 I/6				
78 17 12 E 31 31 09 N	07	02	- -	-	-
78 15 19 E 31 31 19 N	07	02	21	027	83.401
78 18 31 E 31 31 45 N	07	03	-	-	-
78 18 31 E 31 33 57 N	07	02	07	019	29.172
78 25 17 E 31 34 44 N	28	02	21	009	13.160
78 25 17 E 31 33 34 N	28	03	-	-	-
78 27 14 E 31 34 06 N	28	01	-	-	-
78 29 15 E 31 33 32 N	28	02	05	022	35.657
78 28 16 E 31 33 55 N	28	02	21	011	17.940
78 19 44 E 31 35 08 N	28	02	04	029	22.932
78 17 40 E 31 31 21 N	28	02	-	-	-

Contents

1	2	3	4	5	6
78 20 13 E 31 35 29 N	28	01	05	009	24.771
78 25 43 E 31 37 19 N	28	03	21	004	6.538
78 20 09 E 31 39 06 N	28	03	04	003	5.280
78 25 11 E 31 38 55 N	28	03	-	-	-
78 27 18 E 31 38 32 N	28	02	-	-	-
78 25 55 E 31 40 02 N	28	02	07	061	11.734
	Map Sheet No. 53 I/7				
78 27 27 E 31 20 37 N	07	01	09	087	11.673
78 02 10 E 31 23 35 N	07	03	09	-	-
78 15 15 E 31 23 53 N	07	02	08	009	26.524
78 21 35 E 31 23 15 N	07	03	04	001	0.348
78 19 55 E 31 25 05 N	07	01	09	078	11.384
78 15 10 E 31 29 53 N	07	02	-	-	-

Total: 68 Points

Contents

District : Lahaul & Spiti

Map Sheet Coverage : 52 D/5,6,9,10,13,14
52 H/2.3

Longitude E Latitude N of plot centre			Forest Division Code	Land use Code	Forest Type Code	No. of trees enumerated in sample plot of 0.1 ha.	Vol (m^3) in sample plot of 0.1 ha.
Degree	Minute	Second					
1			2	3	4	5	6
			Map Sheet No. 52 D/5				
76 32	25 30	40 E 55 N	12	02	01	011	31.689
76 32	25 31	52 E 41 N	12	03	-	-	-
			Map Sheet No. 52 D/6				
76 32	27 44	15 E 47 N	12	07 01	07	029	39.065
76 32	28 59	22 E 22 N	12	02	07	002	13.065
			Map Sheet No. 52 D/9				
76 32	35 45	35 E 22 N	12	02	-	-	-
76 32	38 45	10 E 24 N	12	03	07	005 vol	3.980
			Map Sheet No. 52 D/10				
76 32	42 41	22 E 35 N	12	03	25	008	12.536
76 32	42 41	30 E 35 N	12	03	25	-	-
76 32	37 44	05 E 38 N	12	04	-	-	-
76 32	35 44	27 E 17 N	12	03	05	-	-
76 32	40 44	20 E 00 N	12	11	-	-	-
			Map Sheet No. 52 D/13				
76 32	46 51	12 E 35 N	12	11	-	-	-
76 32	46 50	10 E 55 N	12	11	-	-	-
76 32	47 50	37 E 55 N	12	02	04	001	3.682
76 32	49 51	45 E 35 N	12	02	08	023	17.628

Contents

1	2	3	4	5	6
		Map Sheet No. 52 D/14			
76 45 32 E 32 38 15 N	12	10	-	-	-
76 46 55 E 32 39 16 N	12	03	04	005	3.436
76 49 54 E 32 37 55 N	12	03	04	-	-
76 47 32 E 32 49 35 N	12	02	25	- NA2	-
76 50 55 E 32 39 10 N	12	03	25	000	-
76 46 20 E 32 42 05 N	12	03	25	021	5.894
76 46 04 E 32 40 25 N	12	11	-	-	-
		Map Sheet No. 52 H/2			
77 03 40 E 32 33 55 N	12	13	-	-	-
77 05 55 E 32 33 22 N	12	10	-	-	-
77 12 07 E 32 39 05 N	12	03	25	000	-
77 10 20 E 32 38 25 N	12	03	25	000	-
77 11 50 E 32 40 56 N	12	10	-	-	-
77 10 35 E 32 41 35 N	12	10	-	-	-
77 13 40 E 32 40 55 N	12	11	-	-	-
77 13 50 E 32 40 32 N	12	10	-	-	-
		Map Sheet No. 52 H/3			
77 10 42 E 32 25 40 N	12	11	-	-	-
77 01 32 E 32 29 25 N	12	11	-	-	-
77 04 30 E 32 29 40 N	12	07	09	000	-

Total: 33 Points

Contents

Description of codes for Forest Division i.e. Col.2 of Appendix-II.

Code	Name of Forest Division
03	Chamba
04	Dalhausie
07	Kinnaur
12	Lahaul
17	Pangi
26	Upper Ravi
28	Pooh
29	Spiti

Contents

Description of codes for Land use i.e col.3 of appendix II:

Code	Item	Description
01	Dense tree forest	All lands with a forest cover of trees with canopy density 70% and above (Canopy density is defined as the relative completeness of Canopy expressed as percentage taking closed canopy as 100. Standing in a plot or in area around it observe the tree growth and assess the percentage of the space covered.)
02	Moderately Dense-tree forest	All lands with a forest cover of trees with canopy density 30% to 69%.
03	Open tree forest	All lands with a forest cover of trees with canopy density 5% to 29%.
04	Scrub forest	Inferior tree growth chiefly of small or stunted trees. With canopy density less than 5%.
05	Bamboo brakes	Areas completely covered with bamboo growth.
06	Shifting cultivation (Kumri)	Areas under current as well as last years shifting cultivation will come under this class. The agricultural crop may be standing or may have been harvested.
07	Young plantations of forestry species	This will include young plantations of forestry species in which average stems are of and above 10 cms. diameter at B.H. and the extent of such plantations is more than 0.5 ha. This will include farm forests, social forestry plantations, conversion to uniform areas, plantations raised by Forest Development Corporation etc.
08	Trees in line	This will include trees planted along canal banks, along road sides, along railway lines, wind brakes and shelter belts planted under various Social Forestry Schemes.

Contents

Code	Item	Description
09	Forest roads etc.	This class will include areas under forest roads, depots, colonies, nurseries and such other forest land used in connection with forest and its administration.
10	Govt. grass lands	This will include areas under natural or planted grass lands, pastures etc. which are owned by Government.
11	Barren lands	This will include areas with exposed surfaces like rock sheets, sand dunes, swamps and areas without any vegetation.
12	Agricultural land without trees in surround	All lands under cultivation including fallow lands will come under this category. These lands will not have any tree growth along bunds or in their vicinity of 2 ha.
13	Agricultural lands with trees in surround	This will include all lands under cultivation including fallow lands which are covered with trees along bunds and in their surround within 2 ha.
14	Non-forestry Plantations	All lands with tree growth planted primarily for purpose other than forestry such as Cashew, Coffee, gardens, parks zoos, private grass lands etc.
15	Habitation	This will include village-City sites, industrial areas, grave yards, grounds, houses, colonies etc.
16	Water bodies	Land under lakes, water courses etc.
17	Other lands	Lands which cannot be classed under any of the above categories.

Contents

Description of codes for Forest type i.e. col 4 of appendix II

Code	Crop composition (Forest type)	Description
01	Fir	When Fir constitute more than 50%
02	Spruce	Where Spruce constitute more than 50%
03	Fir-Spruce	Where Fir & Spruce both taken together constitute more than 50%
04	Blue-pine (Kail)	Where blue pine constitute more than 50%
05	Deodar	Where Deodar constitute more than 50%
06	Chir-pine	Where Chir-pine constitute more than 50%
07	Mixed conifers	Where all conifers taken together constitute more than 50%
08	Hardwoods mixed with conifers or Conifers mixed with Hardwood	Where the conifers & broad leaved species occur in more or less in same propositions.
09	Upland hardwoods	Broad leaved species constitute more than 50% in the Upper Chir zone above 1500 metre altitude.
10.	Teak	Where Teak constitute more than 50%
11.	Sal	Where Sal constitute more than 20% (If sal & Teak are both more than 20% preference to be given to Teak).
12.	Bamboo forest	Where the crop is of almost pure bamboo.
13.	Mangrove	Mangrove forests.
14.	Depterocarpus (Gurjan)	Where Gurjan constitute more than 50% in the top canopy.
15.	Hollong Mekai Hollong (Depterocarpus macrocarpus Shorea assamica (Mekai)	Where Hollong & Mekai individual or both taken together constitute more than 50%
16.	Khasi pine	Where Khasi pine constitute more than 50%
17.	Khair forest	Where Khair trees constitute more than 50%
18.	Salai forest	Where Salai constitute more than 50%
19.	Alpine pastures	Alpine pastures.
20.	Miscellaneous forests	Forests which could not be classified in any of the above cl

Contents

APPENDIX III

(Field Forms)

Contents

F. S. I

Field Form 1

PLOT APPROACH FORM

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

1 State and Code

2 Division and Code

3. District and Code

4. Map-sheet and Code

5. Grid Code

5. (a) Plot No.

6. Crew Leader (name)

7. Name of Camp

8 Time (hrs.) at which Left the camp

9. Distance covered by vehicle (km.)

10. Time taken in journey by vehicle — Hours — Minutes

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

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

13. Time at which started on foot

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

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

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

17. Description of the reference point (Describe in details)

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

19. Distance of the plot Centre from reference point (Mtr)

Contents

20	Date and time at which arrived at the Plot	1st Plot*	2nd Plot*
21	Time (hrs.) of Leaving the Plot	1st Plot*	2nd Plot*
22	Time (hrs.) at which returned to the Camp.		
23.	Compassing done by		
24.	Distance measured by		
25.	Plots laid out by		
26.	Tree Enumeration done by		
27.	Height measurements taken by		
28.	B T and other measurements taken by		
29.	Bamboo enumeration done by		
30	Bamboo Weight taken by		
31.	References in the field		
	written by		
32.	Remarks		

Dated :

Signature of the Crew Leader

Diagrams etc.

A B

N. B. *Strike out unwanted one.

Contents

PLOT DESCRIPTION FORM

Field Form 2

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

Terrain Data						Soil Data							Crop Data												Bamboo Data														
General Topography	SLOPE	Position on Slope	Altitude	Aspect	Ruckiness	Humus	Soil Colour	Soil Consistency	Soil Texture	Coarse Fragments	Soil Depth	Soil Erosion	Origin of Stand	Crop. Composition	Canopy Layer or Storey	Top Height	Size Class	Intensity of regeneration	Important species under regeneration	Injuries to Crop	Fire Incidence	Grazing Incidence	Presence of weeds	Presence of Grass	Bamboo density	Bamboo quality	Bamboo Flowering	Bamboo regeneration	Plantation Potential	Distance to road	Distance to Mule Path	Distance to River/stream	Kacha road Distance	Pucca road Distance	River distance to market outlet	Obstacles	Plot Status	Status of Forest
27	28–30	31	32 35	36	37	38	39	40	41	42	43	44	45	46–47	48–49	50 51	52	53	54–56	57	58	59	60	61	62	63	64	65	66	67	68	69	70 71	72 74	75 76	77	78	79

Dated ..... Signature of Crew Leader .....

Name of crew Leader .....

Contents

PLOT ENUMERATION FORM

Field Form No. 3

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

Total No. of bamboo clums	Total No. of trees
71—73	74—76

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

Date .....

Signature of Crew Leader.....

Name of Crew Leader.....

Contents

Field Form No. 4

SAMPLE TREE FORM

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

Total No. of trees
55–56

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

Date .....

Signature of Crew Leader.....

Name of Crew Leader.....

Contents

Field Form 5

BAMBOO EMUNERATION AND CLUMP ANALYSIS FORM

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

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

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

Date ....

Signature of Crew Leader .....

Name of Crew Leader .....

Contents

BAMBOO ENUMERATION FORM (NON CLUMP FORMING)

Field Form 6

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

Species Code	Green round culms							Green damaged culms							Dry sound culms			Dry damaged culms			Decayed culms	Average culms Ht. (in decimeter)	Total No. of culms
	Current Year's	One to two years old			Over two years old			Current year's	One to two year old			Over two years old											
		2<5 Cms	5<8 Cms	8 – Cms	2<5 Cms	5<8 Cms	8 + Cms		2<5 Cms	5<8 Cms	8 + Cms	2<5 Cms	5<8 Cms	8 + Cms	2<5 Cms	5<8 Cms	8 + Cms	2<5 Cms	5<8 Cms	8 + Cms			
17–19	20–22	23-25	26-29	29-30	31-33	34-36	37-38	39-41	42-44	45-47	48-49	50-52	53-55	56-57	58-60	61-62	63-6[illegible]	65-67	68-69	70-71	72-73	74-76	77-80

Date.....

Signature of the Crew Leader.....

Name of the Crew Leader .....

Contents

Field Form No. 7

Job Number	Card Design
1–3	4–5

BAMBOO WEIGHT FORM

Map sheet Number	Grid No.	Plot Number
6–11	12–15	16

Species Code	Sample No.	Green Weight of culm — DIAMETER CLASS															Green weight of sub-sample for co-relation with dry weight		
		2 to under 5 cm					5 to under 8 cm					8 cm and over							
		Diameter in cm	Total length in dmt	Utilizable length in dmt — Upto 1cm top dia	Utilizable length in dmt — Upto 2cm top dia	Weight in Grams	Diameter in cm	Total length in dmt	Utilizable length in dmt — Upto 1cm top dia	Utilizable length in dmt — Upto 2cm top dia	Weight in Grams	Diameter in cm	Total length in dmt	Utilizable length in dmt — Upto 1cm top dia	Utilizable length in dmt — Upto 2cm top dia	Weight in Grams	Sub sample culm 2cm & under 5cm dia	Sub-sample culm 5cm & under 8cm dia	Sub-sample culm 8cm and over
17 18 19	20	21 22	23 24 25	26 27 28	29 30 31	32 33 34 35 36	37 38	39 40 41	42 43 44	45 46 47	48 49 50 51 52	53 54	55 56 57	58 59 60	61 62 63	64 65 66 67 68	69 70 71 72	73 74 75 76	77 78 79 80

Date ....

Signature of Crew Leader........................

Name of Crew Leader........................

Contents

HERBS AND SHRUBS DATA FORM

Field Form No. 8

Map Sheet No. .....

Grid No. .....

Plot No. .....

HERBS								SHRUBS									
Name of Species	Total No.	Characteristics			Occurrence		Colour of flower if observed	Name of Spp	Total No.	Avr. Ht.	Pattern of Branching			Occurence		Information on flowers & Fruits	
		Erect	prostrate	Creeping	Gregarious	Sporadic					Opposite	Alternate	Whorling	Gregarious	Sporadic	Colour of Flowers	Size of fruit (Small med big)

Date.....

Signature of the Crew Leader.....

Name of the Crew Leader .....

Contents

BIBLIOGRAPHY

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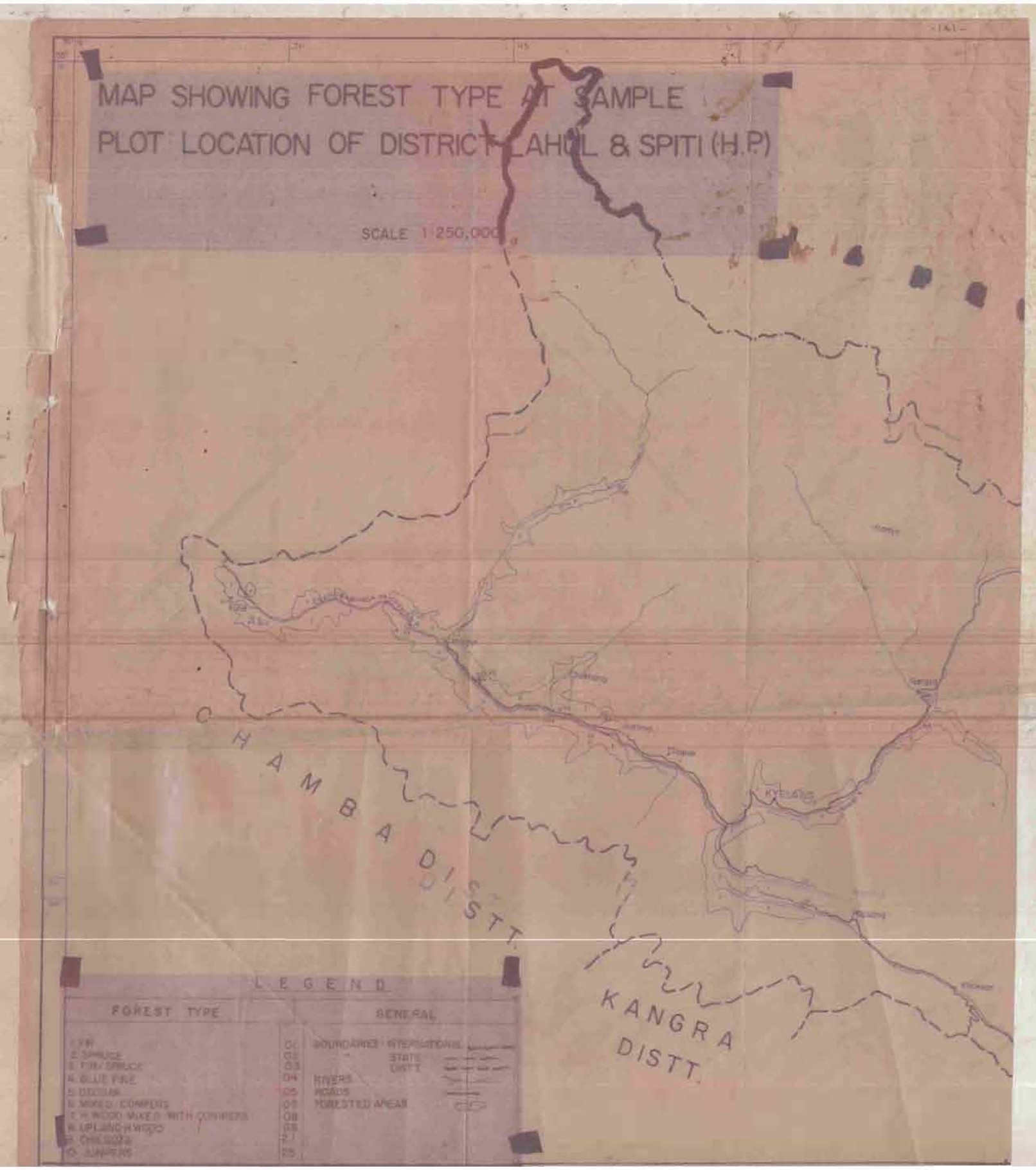
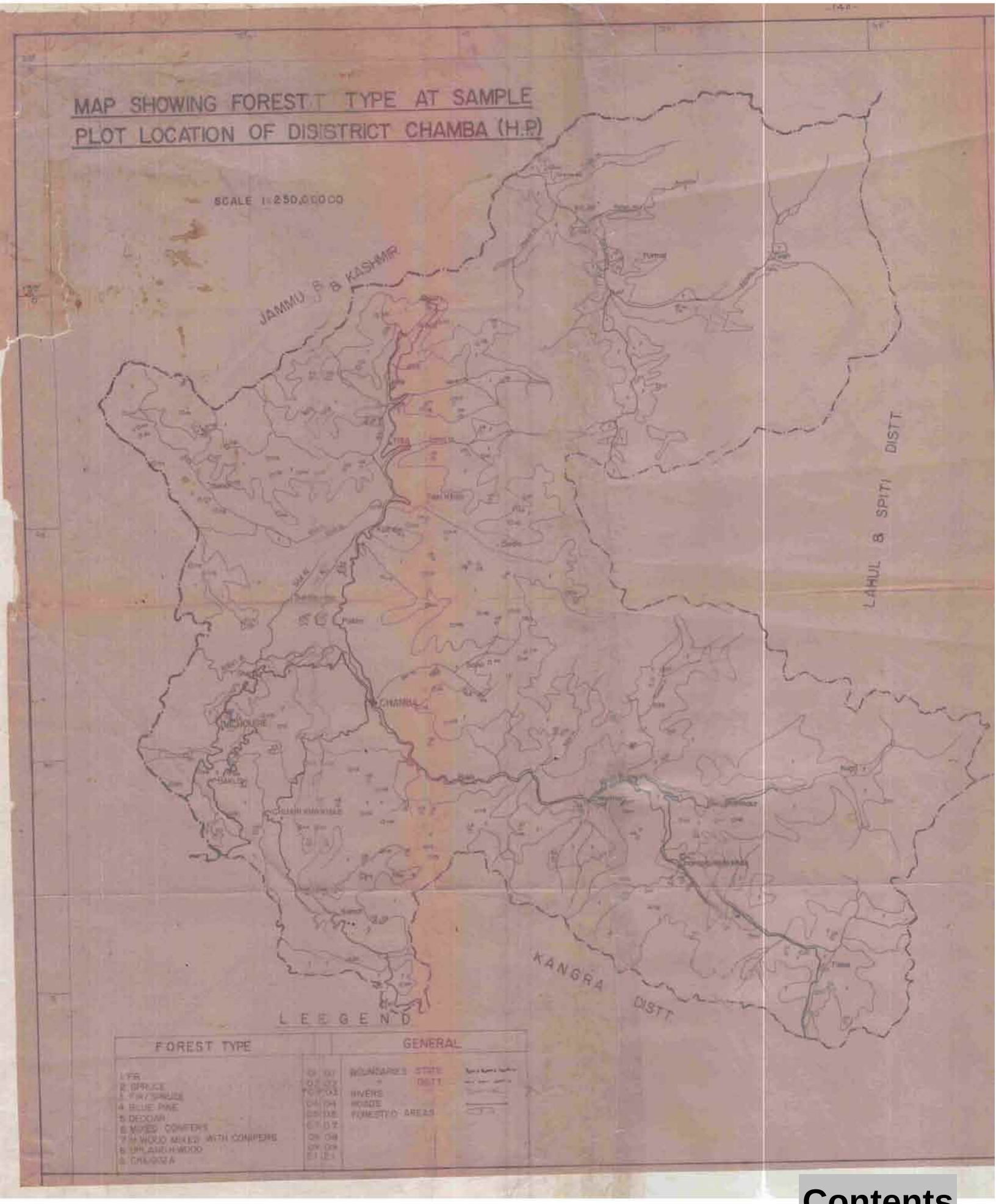
4. Directorate of Economics & Statistics H.P. Shimla — Statistical diary of H.P., 1981

5. Department of Forest Farming & Environmental Conservation, Himachal Pradesh, Shimla — H.P. Forest Statistics 1982

Contents


MAP SHOWING FOREST TYPE AT SAMPLE
PLOT LOCATION OF DISTRICT LAHUL & SPITI (H.P)
SCALE 1:250,000
CHAMBA DISTT.
KANGRA DISTT.
LEGEND
FOREST TYPE
1. FIR 01
2. SPRUCE 02
3. FIR/ SPRUCE 03
4. BLUE PINE 04
5. DEODAR 05
6. MIXED CONIFERS 06
7. HARDWOOD MIXED WITH CONIFERS 08
8. UPLAND HARDWOOD 09
9. OAK SCRUB 21
10. JUNIPERS 25
GENERAL
BOUNDARIES INTERNATIONAL
STATE
DISTT.
RIVERS
ROADS
FORESTED AREAS

Contents


MAP SHOWING FOREST TYPE AT SAMPLE
PLOT LOCATION OF DISTRICT CHAMBA (H.P)
SCALE 1:250,00000
JAMMU & KASHMIR
LAHUL & SPITI DISTT
KANGRA DISTT
CHAMBA
LEEGEND
FOREST TYPE
GENERAL
1 FIR
2 BRUCE
3 FIR/SPRUCE
4 BLUE PINE
5 DEODAR
6 MIXED CONIFERS
7 HARDWOOD MIXED WITH CONIFERS
8 UPLAND HARDWOOD
9 CHAUGRA
BOUNDARIES STATE
DISTT
RIVERS
ROADS
FORESTED AREAS

Contents