WORKING PLAN

FOR

RAMNAGAR FOREST DIVISION

(2013-14 TO 1923-24

INTRODUCTION

This Plan is the revision of the Working Plan written by ***Sh. B.L. Zadoo***. It covers the Ramnagar Forest Division as it exists now. There is a change in the method of treatment prescribed. In this plan the India Selection System has been applied in the major Working Circles. These changes have been made keeping in view the latest developments in the field of forestry.

Some other changes have also been made with regards to the allotment of certain compartments to the newly introduced Working Circles. This includes the creation of *Eco-Tourism Working Circle* and *The Forest Protection Working Circle* for the first time. Further, the *Protection Working Circle* has been renamed as *Ecological Conservation Working Circle.*

The field work for the preparation of the new plan was started in the year 2008-09 and completed by 2012-13. Forest Inventory was prepared by *stratified random point sampling technique* and the results obtained from the field were put to various statistical tests.

The Stock Maps showing compartment boundary and other important information about the crop have been prepared. For this purpose the satellite imagery i.e. LISS-III (Geo-Coded) on a scale of 1:50,000 was used. The Stock Maps for the individual compartments were prepared on a scale of 1:15,000.

The writer is thankful to ***Sh. Vinod Ranjan, IFS***, Ex-Principal Chief Conservator of Forests, for providing the opportunity to take up the revision of this Working Plan, as well as, for according the approval to the Preliminary Working Plan Report. The writers thanks are also due to ***Sh. Abhay Kumar, IFS***, the present Principal Chief Conservator of Forests, for providing all expedient help during the final stage of the preparation of this Working Plan Report.

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The writer admiringly acknowledges the valuable technical guidance provided by ***Sh. Vasu Yadav, IFS***, Conservator of Forests Working Plan and Research Circle. It was under his adept guidance that the field work as well as the compilation of the final Working Plan Report was carried out. His expertise in Working Plan as well as his helpful suggestions helped me to improve the final Working Plan Draft and present it in the current format.

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Finally, the writer thankfully acknowledges the hard work put in by ***Sh. Arjun Singh***, Computer Operator, engaged for feeding, editing and formatting the draft in the shortest possible time.

Sd/-
(Farooq Iqbal)
Divisional Forest Officer,
Working Plan Divn.-II Ramnagar

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List of Important Plants and Trees Found in Ramnagar Forest Division

(Sorted according to Common name)

(Common name)	*(Botanical name)*
Aam	*Megnifera indica*
Akhrot	*Juglans regia*
Allu	*Impatience glandulifera*
Amla	*Emblica officinalis*
Arhew	*Cornus macrophylla*
Arkhal	*Rhus wallichii*
Arkhor	*Rhus succedanea*
Ash/Hum/Sum	*Fraxinus excelsior*
Atis	*Aconitum heterophyllum*
Babain	*Ischaemum angustifolium*
Baheda	*Terminalia belerica*
Bakru	*Lonicera quinquelocularis*
Bana	*Vitex negundo*
Banj	*Quercus leucotrichophora*
Bankakri	*Podophyllum hexandrum*
Bankhar/Basuti	*Adhatoda vasica*
Bankhor	*Aesculus indica*
Bans	*Dendrocelamus strictus*
Bansangla	*Litsaea umbrosa*
Bansangli	*Sarcococca saligna*
Bauhina	*Bauhinis vablii*
Bed	*Salix species*
Belladona	*Aatropa belladons*
Beri	*Zizyphus species*
Bhang	*Cannabis sativa*
bharel	*Prunus padus*
Bhurj/Bhojpatra/Birch	*Betula utilis*
Bhutiabadam	*Corylus colurna*
Bichchubuti	*Girardinia heterophylla*
Brahmi	*Taxus baccata*
Brainkhal	*Sageretia filiformis*
Bran/Manu	*Ulmus villosa*
Brari/Kain	*Ulmus wallichiana*
Brithal	*Cotoneaster microphyllus*
Budloo/Fir/Raan	*Abies pindrow*
Bunafsha	*Viola canescens*
Champ	*Alnus nepalensis*
Chandra	*Machilus odoratissima*
Chikhri	*Boxus wallichiana*
Chir	*Pinus roxburghii*
Chitta-chirwa	*Clematis montana*
Chitti-suali	*Colebrooki aoppositifolia*

Choru	*Angelica glauca*
Daru	*Punica granatum*
Deodar	*Cedrus deodara*
Dhai	*Woodfordia floribunda*
Dhakk	*Spirea canescens*
Dhaman	*Grewia optiva*
Dharu bini	*Thalictrum alpinum*
Dhoop	*Jurinea dolomiaea*
Dhuri	*Buddle jacrispa*
Drub	*Cynodon dactylon*
Flai	*Acacia modesta*
Garna	*Carissa opaca*
Ghayanh	*Elaeagnus umbellate*
Guchh/Teolda	*Viburnum grandiflorum*
Gul-ai-lal	*Potentilla nepalensis*
Gul-ai-sanobar / Suchaphull	*Geranium wallichianum*
Gurkathi	*Desmodium tillaefolium*
Harar	*Terminalia chebula*
Hill toon/Dadri	*Toona serrata*
Jamun	*Syzygium cumini*
Jhojru	*Myrsine africana*
Kaamal	*Mallotus philippinensis*
Kail	*Pinus wallichiana*
Kaimal	*Berberis lyceum*
Kainth	*Pyrus pashia*
Kakar	*Pistacia integerrima*
Kali terni	*Cryptolepis buchanani*
Kansari	*Daphne cannabina*
Kapasi	*Gerbera gossypiana*
Karir	*Rosa moschata*
Karnaidu	*Hedera helix*
Kathi	*Indogofera heterantha*
Kau	*Olea cuspidate*
Kaur	*Picrorhiza kurrooa*
Khaidi	*Rubus ellipticus*
Khair	*Acacia catechu*
Khareu	*Ilex dipyrena*
Kharsu	*Quercus semecarpifolia*
Khirak	*Celtis australis*
Kikar	*Acacia nilotica*
Killer	*Parrotia jacquemontiana*
Kimbasimla	*Lannea grandis*
Kinas	*Dioscorea deltoidea*
Knzal/Trikanna	*Acer species*
Krangal	*Cassia fistula*
Kuth	*Saussurea lappa*
Lalkaner	*Nerium indicum*

makkhan	*Sapium sebiferum*
Mandal	*Rhododendron arboretum*
Moru	*Quercus dilatata*
Mushkbala	*Valeriana jatamansi*
Padam/Pajja	*Prunus carasoides*
Paharipeepul	*Populus ciliata*
Palash	*Butea monosperma*
Peelichameli	*Jasminum humile*
Peepal	*Ficus bengalensis*
Phokda/Fig	*Ficus palmate*
Raal	*Mimosa rubicaulis*
Red clover	*Trifolium pretense*
Rupinji	*Epilobium latifolium*
Saintha	*Dodonea viscosa*
Salai	*Plectranthus rugosus*
Sanglidhoop	*Skimmia anquetilia*
Sapdotri	*Bergenia ciliate*
Sapp kukkari	*Arisaema tortuosum*
Shader	*Utric dioca*
Simbal	*Bombax ceiba*
Tali/Shisham	*Dalbergia sissoo*
Timru	*Zanthoxylum alatum*
Toon	*Cedrela toona*
Toon	*Toona ciliata*
Tosh	*Picea smithiana*
Tut	*Morus serrate*
White clover	*Trifolium repens*

List of Important Plants and Trees Found in Ramnagar Forest Division

(Sorted according to botanical name)

(Botanical Name)	**(Common Name)**
Aatropa belladons	Belladona
Abies pindrow	Budloo/Fir/Raan
Acacia catechu	Khair
Acacia modesta	Flai
Acacia nilotica	Kikar
Acer species	Knzal/Trikanna
Aconitum heterophyllum	Atis
Adhatoda vasica	Bankhar/Basuti
Aesculus indica	Bankhor
Alnus nepalensis	Champ
Angelica glauca	Choru
Arisaema tortuosum	Sapp kukkari
Bauhinis vablii	Bauhina
Berberis lyceum	Kaimal
Bergenia ciliate	Sapdotri
Betula utilis	Bhurj/Bhojpatra/Birch
Bombax ceiba	Simbal
Boxus wallichiana	Chikhri
Buddleja crispa	Dhuri
Butea monosperma	Palash
Cannabis sativa	Bhang
Carissa opaca	Garna
Cassia fistula	Krangal
Cedrela toona	Toon
Cedrus deodara	Deodar
Celtis australis	Khirak
Clematis Montana	Chitta-chirwa
Colebrookia oppositifolia	Chitti-suali
Cornus macrophylla	Arhew
Corylus colurna	Bhutia badam
Cotoneaster microphyllus	Brithal
Cryptolepis buchanani	Kali terni
Cynodon dactylon	Drub
Dalbergia sissoo	Tali/Shisham
Daphne cannabina	Kansari
Dendrocelamus strictus	Bans
Desmodium tillaefolium	Gurkathi
Dioscorea deltoidea	Kinas
Dodonea viscosa	Saintha
Elaeagnus umbellate	Ghayanh
Emblica officinalis	Amla
Epilobium latifolium	Rupinji

Ficus bengalensis	Peepal
Ficus palmate	Phokda/Fig
Fraxinus excelsior	Ash/Hum/Sum
Geranium wallichianum	Gul-ai-sanobar / Suchaphull
Gerbera gossypiana	Kapasi
Girardinia heterophylla	Bichchu buti
Grewia optiva	Dhaman
Hedera helix	Karnaidu
Ilex dipyrena	Khareu
Impatience glandulifera	Allu
Indogofera heterantha	Kathi
Ischaemum angustifolium	Babain
Jasminum humile	Peeli chameli
Juglans regia	Akhrot
Jurinea dolomiaea	Dhoop
Lannea grandis	Kimbasimla
Litsaea umbrosa	Bansangla
Lonicera quinquelocularis	Bakru
Machilus odoratissima	Chandra
Mallotus philippinensis	Kamila
Megnifera indica	Aam
Mimosa rubicaulis	Raal
Morus serrate	Tut
Myrsine africana	Jhojru
Nerium indicum	Lal kaner
Olea cuspidate	Kau
Parrotia jacquemontiana	Killer
Picea smithiana	Tosh
Picrorhiza kurrooa	Kaur
Pinus roxburghii	Chir
Pinus wallichiana	Kail
Pistacia integerrima	Kakar
Plectranthus rugosus	Salai
Podophyllum hexandrum	Bankakri
Populus ciliata	Paharipeepul
Potentilla nepalensis	Gul-ai-lal
Prunus carasoides	Padam/Pajja
Prunus padus	Bharel
Punica granatum	Daru (Anardana)
Pyrus pashia	Kainth
Quercus dilatata	Moru
Quercus leucotrichophora	Banj
Quercus semecarpifolia	Kharsu
Rhododendron arboretum	Mandal
Rhus succedanea	Arkhor
Rhus wallichii	Arkhal
Rosa moschata	Karir

Rubus ellipticus	Khaidi
Sageretia filiformis	Brainkhal
Salix species	Bed
Sapium sebiferum	Makkhan
Sarcococca saligna	Bansangli
Saussurea lappa	Kuth
Skimmia anquetilia	Sanglidhoop
Spirea canescens	Dhakk
Syzygium cumini	Jamun
Taxus baccata	Brahmi
Terminalia belerica	Baheda
Terminalia chebula	Harar
Thalictrum alpinum	Dharubini
Toona ciliata	Toon
Toona serrata	Hill toon/Dadri
Trifolium pretense	Red clover
Trifolium repens	White clover
Ulmus villosa	Bran/Manu
Ulmus wallichiana	Brari/Kain
Utric dioca	Shader
Valeriana jatamansi	Mushkbala
Viburnum grandiflorum	Guchh/Teolda
Viola canescens	Bunafsha
Vitex negundo	Bana
Woodfordia floribunda	Dhai
Zanthoxylum alatum	Timru
Zizyphus species	Beri

GLOSSARY OF VERNACULAR TERMS

Anardana	Dried pomegranate seeds.
Bakerwals	Nomadic graziers who raise goats and sheep.
Banesri	Broad leaved species.
Barfani	High altitude, snow clad areas.
Behak	Summer grazing grounds.
Bhisti	Water carrier
Chaks	Cultivation areas inside the demarcated forests.
Dhwar	Summer abode near grazing grounds.
Gaddis	Nomadic graziers who rear sheep and goats.
Ghat	River bank, place of launching.
Guchchi	Edible fungi (Morchella aesculenta).
Gujjars	Nomadic graziers who rear buffaloes, cows and deal in dairy products.
Illagua	Tract of the area.
Jagir	Estate.
Kandi	Dry, Outer Shivalik tract.
Keri	A Small spur.
Khad	A stony stream.
Kotha	Temporary hut.
Lachhi	Torch wood.
Lamberdar	Village headman.
Maidan	Grassy blank.
Nalla	Stream, seasonal or perennial.
Pathru	Dry slide.
Rasount	Extract from Berberis roots, used in medicine.
Shali	Rice Crop.
Tehsil	Revenue administrative unit.
Zila	District.
Zamindar	landed cultivator.

Glossary of Animals and Birds

Common name	Zoological name
Bandar	*Macaca mulatta*
Chitra	*Panther apardus*
Chukor	*Alectrois graeca*
Jungle Murg	*Gallus gallus*
Kakar	*Muntiacus muntjak*
Kala Bhalu	*Selenarctos thibetanus*
LalBhalu	*Ursus arctos*
Monal	*Lophophorus impejanus*
Langur	*Prescytis entellus*
Pijar	*Nemorhaedus goral*

Abbreviations

HPL	*High Pasture Land*
OBA	*Other Blank Area*
RSW	*Rocky & Stony Wasteland*
BL	*Broad Leaved*
d.b.h.	*Diameter at breast height*
g.b.h.	*Girth at breast height*

Units

(unless specified otherwise)

Diameter	*Centimeters*
Volume	*Cubic meters*
Area	*Hectares*
Dates	*Common Era (C.E.)*

PART-I

SUMMARY OF FACTS

ON WHICH THE

PROPOSALS

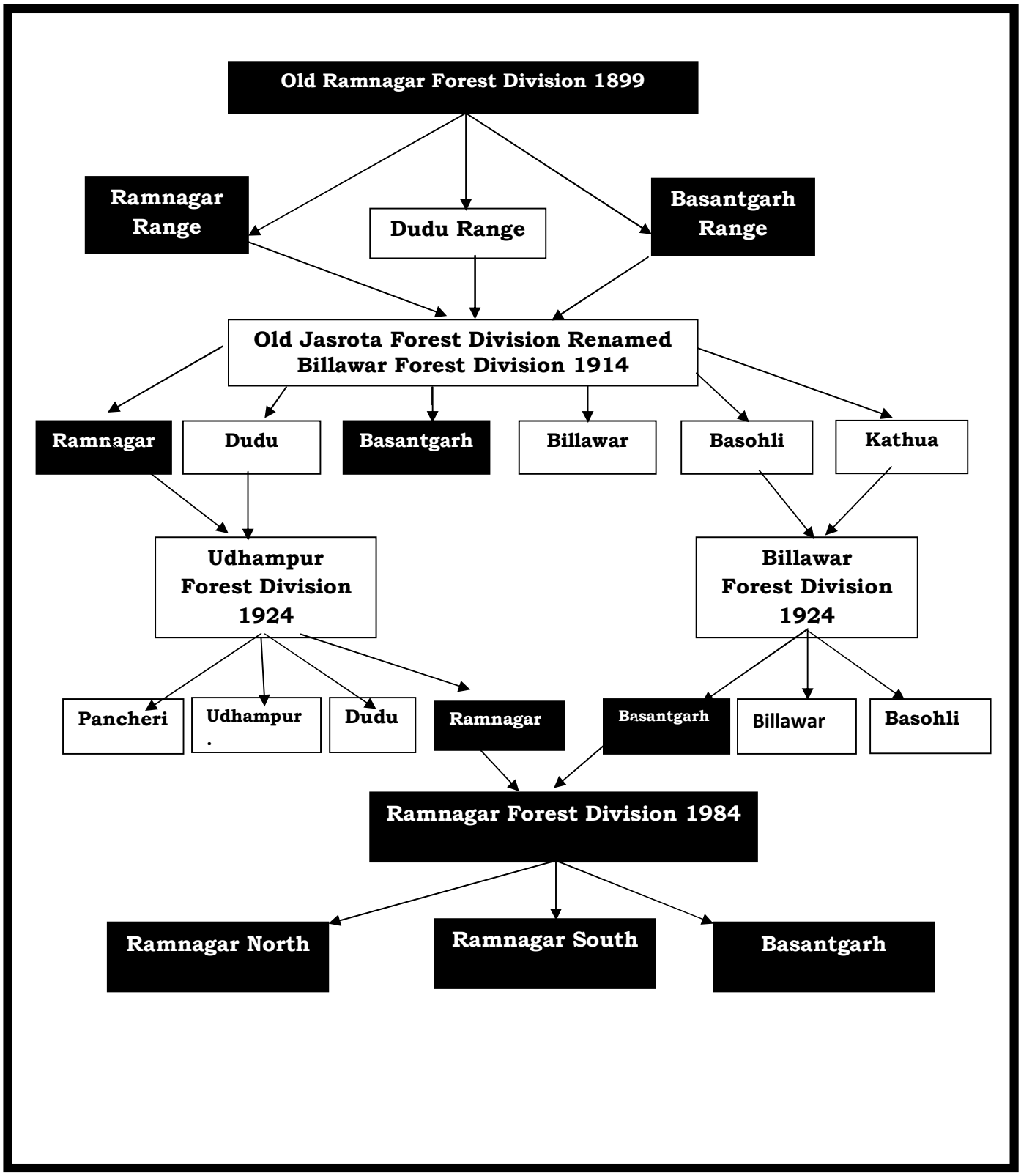
ARE

BASED

CHAPTER-I

The Tract Dealt With

Flow Chart of Ramnagar Forest Division



CHAPTER-I

The Tract Dealt With

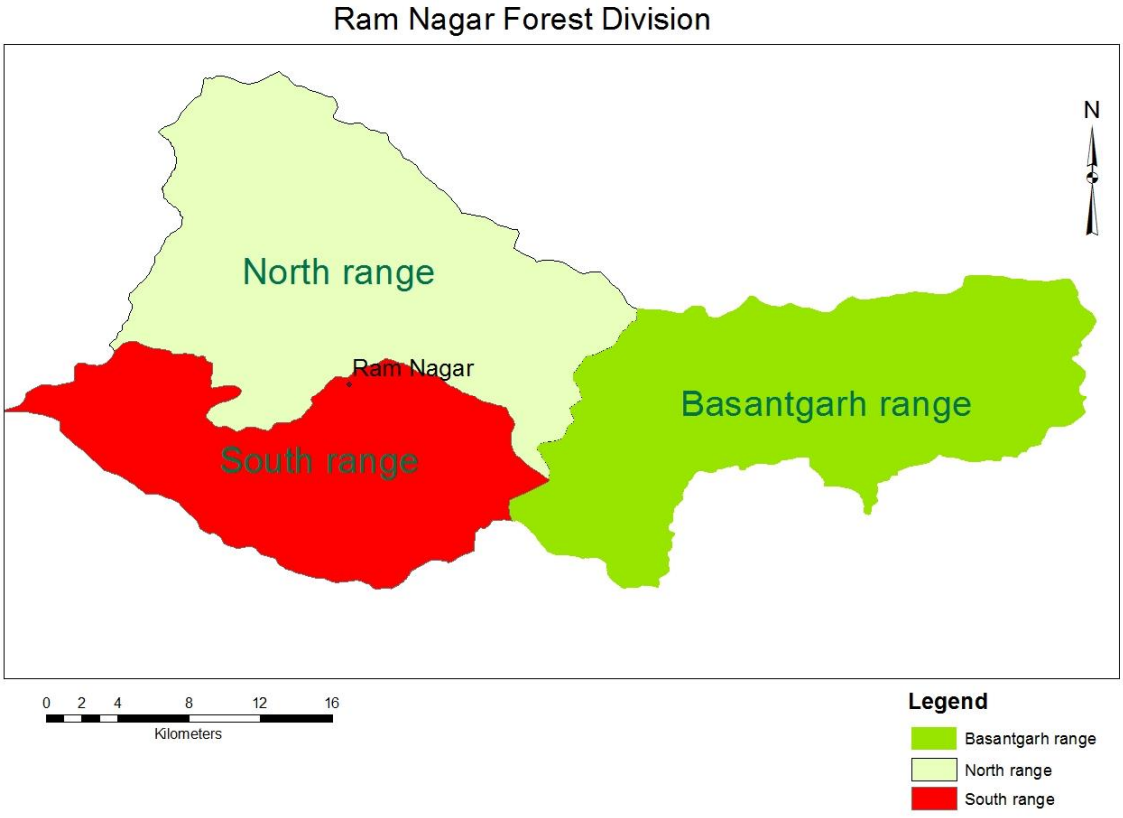
1.1 Name and Situation

1.1.1 The Ramnagar Forest Division was constituted in 1984 vide Govt. Order No. FST/2/54 of 1984 dated:- 23-05-1984. This division was formed by transferring Ramnagar Range from erstwhile Udhampur Forest Division and Basantgarh Range from erstwhile Billawar Forest Division. The Ramnagar Range was divided into two Ranges i.e. Ramnagar North and Ramnagar South.

1.1.2 The history of Ramnagar Forest Division in elation to administrative jurisdiction of various divisions over Ramnagar North, Ramnagar South & Basantgarh Ranges over a period of time is depicted in table no. 1.1 (flow chart).

1.1.3 The Ramnagar Forest Division falls in entire territorial jurisdiction of Ramnagar Tehsil and some portion of its Basantgarh Range falls in Chenani Tehsil Distt. Udhampurof Ramnagar Division. This Division falls in three N.E.S. Blocks i.e. Ramnagar, Ghordi and Dudu.

1.1.4 The Forest Division is situated between 75^0.9'E to 75^0.42'E Longitude (meridian) and $32^{0.}$40' N to 32^0.58' N Latitude (Parallel). This division is covered by Survey of India GT Sheet Nos. 43/P1, P2, P5, P6, P9 and P10.



1.1.5. The Ramnagar Forest Division is bounded on its North by Jugdahar which extends towards South East to the highest peak (Kaplas) (4341m) from the mean sea level. On the Eastern side, ridge of the Ujh catchment separates Basantgarh and Billawar Ranges. On the western side River Tawi, Champal Khad (partly), Berman Khad (partly) and Nardan Nallahh forms the boundary.

1.1.6. The division comprises of three territorial Ranges and one Soil Conservation Range with overlapping jurisdiction viz.,

I. Ramnagar North
II. Ramnagar South
III. Basantgarh
IV. Soil Conservation Range (Overlapping)

1.1.7. The Headquarter of this Division is situated at Ramnagar which is also the Tehsil Headquarter. The Ramnagar town is located on the eastern side of Udhampur connected by a metalled road about 38kms. long. The nearest Railway Station is Ramnagar which is 29kms away from Divisional Headquarter.

1.2. Configuration of the Ground

1.2.1. The tract is extremely hilly and rugged in nature having varied range of aspects and is cut up by numerous nallahs and khadswhich makes is difficult to traverse. The hilly slopes range from precipitous to gentle. The altitude varies from 500 meters (near Baddar) to 4341 meters(near Kaplas peak).There are two main rivers i.e. river Tawi and river Ujh;Besidesthese, small nallahs / khads such as SulohNallahs,BerminKhad and SangarNallahdrain the area.Ramnagar North and Ramnagar South Ranges are part of Tawi river catchment and the Basantgarh Range falls in Ujh river catchment. The RamnagarKhad passes through the middle of Ramnagar Valley thus dividing the entire valley into two parts and this khad drains off into river Tawi.

1.3. Geology, Rock and Soil

1.3.1. No fresh detailed survey has been conducted regarding geology, rock and soil. However, the description has been borrowed from the previous working plan, which is based on the survey done by Geology / Mineral Survey Department. Accordingly, the tract of Ramnagar Forest Division on its NorthEastern side is bounded by high mountains of Himalayan range.The major portion of this division consist of low hills of the Siwalik system.

1.3.2. The detail of rock formation in order of their geological age and super imposition is as under:-

*Recent:*Consist of alluvial gravel and glacial morraines.

*Upper Siwaliks:*It consists of coarse boulder-conglomerate, coarse grits, sand grits and clays.

*Middle Siwaliks:*It consists of brown sandstone, gravel beds or clays and drabs, hales, hard gray sandstone with interbedded clays.

Lower Siwaliks: Consists of dark grey, buff brown shales and sand stone, hard red sand stone, purple shales and pseudo-conglomerate.

*Murrees:*Purple, Grey hard and compact bedded, massive undulated sandstones interbedded with purple and red clays.

1.4. Distribution of Formation

1.4.1. The Eocene formation runs from Ramban to Batote and then runs towards South / East into the area not surveyed by the Mineral Department. The junction between the Eocene and Murrees (No. 4 & 5) is one of thrust faulting. The formation No. 5 (murrees) occupies the area to the South of formation No. 4 (i.e. Eocene) and extend as far as Leren(about 2 ½ miles North of Udhampur) and then runs into Ramnagar Tehsil in the south direction. Basantgarh areas lies on the Murrees. The zones of formations of lower Siwalik and middle Siwalik (i.e. No. 6 &7) lies to South of formation No. 5 (i.e. Murrees).

1.4.2. The village Jagano lies on the formation No. 8 (i.e. Upper Siwalik). Towards south of Jagano the formation No. 7 (i.e., Middle Siwalik) occupies the tract with the exception of a small strip where the formation No. 6 (Lower Siwaliks) is exposed, running from Roun to as far as Panji, (a village 3 ½ miles South – East of Ramchand peak (2204m) and then arrives a strip of area where it forms the axis of an anticlinal fold which exhibits pitching towards the south east. Towards the South this anticlinal fold is followed by a syncline where the formation No. 7 (Middle Siwaliks) is generally found exposed. Outlines along formation No. 8 (Upper Siwaliks) are also found here and there along formation No. 7 (Middle Siwaliks). This is followed towards the south by another anticline north of Mansar and Surinsar lakes, at the axis of which the formation No. 6(Lower Siwaliks) is exposed. The formation No. 9 (recent) is found along the river bed and low lying areas under cultivation.

1.4.3. The hills of Ramnagar, particularly those of Ramnagar South Range and the southern part of Ramnagar North Range present a typical development of dip slope and escarpment slope-topography due to their moderate amount of dip. The rock sequences have a region strike North-West to South – East with local variations. The range of dip of these rocks is 25^0 to 40^0 South-West. The dip slope is mostly facing north while the escarpment slope is mostly facing the south. The dip slope is moderate to steep while the escarpment slope is precipitous and almost vertical at some places due to erosion. This has affected the soil formation. Soil of appreciable depth is found at the base of the dip slopes allowing cultivation at places, however, as we move higher along the dip slope the soil depth gets generally reduced. Wherever there exists a good forest cover the soil is deep enough to sustain vegetation. Wherever vegetation has been removed the soil along with the overburden has been washed away, resulting in the exposure of the bed rock of sand stone (e.g. Co. 32 and Co. 33 opposite Dehari). In general the dip slopes bear a healthy vegetation mostly of Chir Pine wherever the sufficient depth of the soil is available.

1.4.4. The escarpment slopes are steep to precipitous. The alternate bands of sand stone erosion susceptible clay are clearly visible. Erosion is rampant. At the base of each escarpment the slope is usually a khad or a Nallah which is continuously eating into the hill slope, the exposed clay layer providing the most susceptible spot for the water to cause erosion. Thus, the Nallah beds with the passage of time have been inching northwards and at the same time becoming deeper and deeper. The escarpment slopes usually bear a poor crop of broad leaved miscellaneous species with mixture of Chir Pine here and there (the crop though poor in growth is rich in variety). Some of these slopes have acted as an important habitat for wildlife in this Division e.g. GuradhRakh and DalsarRakh (Co. 32c, 33c and Co. 23c respectively).

1.4.5. Another feature of the tract is that the succession of low hills first get out from the ridge at a low angle and when leaving a high shoulder the slope becomes more steep. Lower down it again changes to various degrees of steepness which allows the ground to be terraced in place for cultivation.

1.4.6. Between every pair of ridge is a ravine, each of which forms the bed of a perennial stream or khad but of no great volume. Rocks project here and there and cliffs are a common feature. So far as a succession of ridges is concerned the Dalsar-Kaughahridge which is aligned in on east to west direction, is succeeded by Tarmin-Jalot-N Bandil ridge towards the South. RamnagarNallah flows in between the two. The next ridge in succession present towards the South. RamnagarNallah flows in between the two. The next ridge in succession present towards the south is the Dhiran-Targen ridge. The SangarNallah flows in between the two. The next ridge in succession present towards the South is the Kharai Dhar. The Solah Nallah flows in between the two. SangarNallah confluences with SolahNallah near Targan and the SolahNallah proceeds westwards to meet the RamnagarNallah near Dug village at the base of Co. 57. Further about 4kms downstream the RamnagarNallah is joined by BerminNallah coming from the north, near Kugot at the base of Co. 59. About 4 kms downstream from this point the RamnagarNallah drains into the river Tawi near Sarni Village.

1.4.7. The hills along the Jug Dhar in the Ramnagar North Range are comparatively more stable with round peaks and spurs with moderate to steep slopes. In case of Basantgarh Range, high hills (highest peak 4341m),which are more or less stable exist in the northern part and low hills susceptible to erosion exist in this southern part. The river Ujh flows through the picturesque Basantgarh Valley.

1.5. Climate and Rainfall

1.5.1. Climate of the tract varies with altitude, aspect and topography. A Sub-Tropical climate prevails over most parts of the Division as its tract consists of low lying hills. Most parts of Ramnagar North and Basantgarh ranges experience a moist climate. Snow fall is a regular feature at higher reaches of the Division during winters. It melts early in the Ramnagar North Range but lasts for a pretty long time in higher elevations of Basantgarh Range.

1.5.2. The tract receives full advantage from both summer and winter monsoons. The entire tract receives a good rainfall during monsoon, which starts in the first week of July and lasts till the end of September. Winter precipitations are received in the form of rainfall at lower elevations whereas in the form of snow at higher reaches.

1.5.3. Extremes of temperate are met with only on highest and lowest elevations. Except when heavy snow is on ground, forest operations can be conducted at all times over most of the area.

1.6. Water Supply

1.6.1. The status of water supply is variable throughout the division and also varies with season at any given place. Generally speaking, water is scarce in the low lying Chir bearing areas. Water supply in and around the temperate forests, which are also better stocked, is better. A noticeable decrease in the water flow has been recorded in the past decades. Many springs and streams that were earlier perennial have either gone dry or have become seasonal. With increased biotic interference in the catchment areas, the situation is further likely to worsen. In any given year, the adequacy of water supply also depends on the quality, amount and distribution of precipitation. If there is adequate snowfall in winter coupled with frequent showers at regular intervals during summers, the water supply remains satisfactory. However, if snowfall in winters is deficient, then the perennial supply of water is adversely affected. To some extent, the paucity of water at certain places and at certain times of the year can also be linked to inadequacy of water storage capacity and faulty system of water supply. Very often in the forests, one comes across breached pipelines wherefrom precious water leaks and flown away in large quantities. Proper maintenance of pipe lines alone can ease the problem of water scarcity to a significant extent.

Rainfall data for period of 1995 to 2013 received from Metrological Section 39 Wing Air Force C/O 56-APO, Udhampur is as under:

Table No. 1.1

Months / Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total annual rainfall (mm)
1995	113.6	172	73.4	50.4	17.4	57.7	51.3	247.8	172.1	29	15.4	9.4	1581.2
1996	87	139.9	137.7	28.6	73.5	182.55	219.9	1154.7	75.7	59.1	0.6	0	2273.2
1997	83.1	47.5	143.2	169.1	77.5	86.9	227.2	695.8	81	161.2	156.9	22.1	2077.5
1998	17.1	255.1	134.5	70.6	35.7	51.4	371.6	225.1	110.5	75.2	0	0	1434.8
1999	147.4	23.8	47.8	1	74.6	37.2	347.2	421.8	150.3	0	37.7	0	1392.8
2000	183	141.4	64.9	12.6	40.5	140.4	421.1	243.2	147.8	0	4	2.9	1490.8
2001	6.2	15.4	96.2	91.5	52.9	304.9	542.5	354.5	34.4	4.2	38.4	14.3	1555.4
2002	36.2	44.1	51.8	43.6	9.2	100.8	188.8	334.1	213.6	17.6	0	7.6	1047.4
2003	26.6	191.7	120.1	18.6	4.5	71	346	357.3	254.6	3	52.4	79.1	1524.9
2004	180	40.2	0.001	47.6	47.2	75.4	257.6	162.5	99.4	79.4	0.001	20.4	1009.702
2005	143.9	301.4	172	27.3	27	45.4	621.9	255.3	103.7	1.2	0.001	0	1699.101
2006	145.8	20.4	111.5	30.6	100.3	135	409	367.4	266.2	60.6	32.1	77	1755.9
2007	1.2	127.4	245.9	0.001	77	212.8	223.9	380.6	68	0	2.4	23	1362.201
2008	124.4	66.6	4.2	53.6	12	227.5	308.8	332.6	52.8	22.1	0.001	34	1238.601
2009	76.6	61.6	25.6	44.5	35.4	53.8	235.3	157	135	1.6	12.6	0.4	839.4
2010	19.1	61	11.4	45.4	85.9	118.4	481.6	542.2	214.6	23.2	24.8	67.2	1694.8
2011	12	147.2	115	68.2	58.6	59.9	155.3	363.1	101.4	11.2	1.8	29	1122.7
2012	162.5	59.3	38.9	64.6	58.6	35.6	349.8	601.3	220.4	4	5.7	77	1679
2013	62.8	222.4	67	32.4	93.6	171.2	294.2	644.4	68.4	0	0	0	1656.4
Total	**1628.5**	**2138.4**	**1661.10**	**900.20**	**981.4**	**2167.85**	**6053**	**7840.7**	**2569.9**	**552.6**	**384.803**	**463.4**	**28435.80**
Avg.	**85.71**	**112.54**	**87.42**	**47.37**	**51.65**	**114.09**	**318.57**	**412.66**	**135.25**	**29.08**	**20.25**	**24.38**	**1496.62**

Temperature data for period of 2001 to 2013 received from Metrological Section 39 Wing Air Force C/O 56-APO, Udhampur is as under:

Table No. 1.2

Months / Years	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
2001	20.0	2.0	24.2	5.2	27.9	10.4	31.4	16.0	37.0	21.8	33.2	22.1	31.4	23.2	32.3	22.3	32.2	18.0	31.2	13.4	26.0	7.5	20.9	4.0
2002	19.4	2.5	21.5	5.9	27.1	10.8	33.1	17.1	39.4	22.5	37.9	22.6	35.6	21.8	31.8	22.1	31.1	17.0	29.5	11.8	26.6	6.7	21.6	4.4
2003	20.4	1.8	20.0	6.8	24.8	10.7	31.5	15.9	35.8	20.5	38.4	23.7	32.7	23.6	32.1	22.9	31.4	20.8	30.2	12.5	25	7.5	21.3	5.8
2004	18.5	5.7	24.2	7.0	31.6	12.0	34.5	18.3	36.7	20.5	36.0	22.8	33.6	22.3	32.2	22.3	33.2	20.3	28.8	11.4	26.7	7.6	22.3	5.2
2005	17.7	3.9	16.8	7.0	24.6	11.5	31.2	14.3	33.9	19.5	39.2	24.7	32.4	22.8	31.7	23.0	32.1	21.5	31.2	13.6	27	6.5	22.5	1.3
2006	19.5	5.4	26.8	10.1	25.7	10.9	32.8	15.4	37.7	22.1	36.5	22.4	31.9	23.9	31.3	22.8	32.3	20.1	30.4	15.9	25.1	10.4	20.7	6.4
2007	20.0	2.3	20.8	7.6	23.9	9.7	34.1	16.8	35.0	20.2	35.3	22.5	33	23.0	32.1	22.7	31.9	20.2	30.6	11.2	26.1	6.2	20.4	3.0
2008	16.7	2.8	19.7	3.8	29.3	11.0	30.3	15.8	35.6	20.6	33.9	23.5	32.2	23.9	31.8	23.1	31.5	19.3	30.4	14.9	27.5	7.2	23.4	6.8
2009	20.8	6.9	23.0	8.3	27.3	11.0	31.7	16.1	36.8	20.4	38.5	23.5	34.9	23.6	32.3	23.4	32.1	20.9	31.3	13.1	26.1	7.5	21.1	4.1
2010	21.5	3.3	22.4	7.5	30.8	13.2	35.6	19.4	37.0	22.8	37.4	23.0	32.7	23.7	31.5	23.7	31.4	20.7	31.4	15.5	26.0	8.8	21.0	2.8
2011	18.8	2.6	19.6	6.6	26.2	10.0	29.2	13.9	36.8	19.7	35.5	21.8	35.0	20.0	31.3	21.8	31.7	20.8	30.7	14.2	26.9	8.8	21.6	2.9
2012	16.7	3.0	18.6	5.6	25.6	9.5	30.7	15.7	35.5	20.7	39.5	24.4	34.2	23.8	31.0	20.7	31.1	20.6	28.8	12.8	24.4	7.6	20.4	5.0
2013	18.5	3.7	19.3	6.6	26.7	10.5	29.9	13.3	36.9	18.9	34.2	23.2	32.6	23.8	30.7	22.7	32.1	19.3	0	0	0	0	0	**0**

1.7. Distribution and Area

1.7.1. The total forest area of this division is 372.52 square kilometers (27252 hectares) but according to the area statement of previous plan under revision the area shown was 370.65 square km (37065 hectares). However, after calculating the area compartmentwise and Working Circlewise it has been observed that due to typographic mistake the area falling under theChir Working Circle has an actual area of 5983 hectares, but it was written as 5893 hectares. The revised range wise abstract of the area is as under:-

Table No. 1.3 (Area in Hectare)

Range	Conifer					Broad Leaved				G.Total
						Broad Leaved				
	Deodar	Kail	Fir	Chir	Total	Banj Oak	Scrub & Other B.L.	Blank	Total	
Ramnagar North	0	134	179	4487	4800	2658	1175	1606	5439	10239
Ramnagar South	0	0	0	4557	4557	900	2338	956	4194	8751
Basantgarh	2929	235	4150	3088	10402	4265	2448	1154	7860	18262
Total	**2929**	**369**	**4329**	**12132**	**19759**	**7823**	**5961**	**3716**	**17493**	**37252**

The range wise detail of number of compartments of Ramnagar Forest Division in given in below Table No. 1.4

Table No. 1.4

S.No.	*Name of Range*	*Total No. of Compartments / Sub Compartments*	*Area in Hectares as per plan under revision*	*Area in Hectares*
1	Ramnagar North	52	10143	10239
2	Ramnagar South	41	8660	8751
3	Basantgarh	93	18262	18,262
Total		**186**	**37065**	**37252**

1.7.2. The non-wooded area which according to current working plan is 3371 hectares has now increased to 3717 hectares. This creation of fresh blanks may be attributed to various reasons in the intervening plan period. This has resulted in the decrease of commercial and non-commercial forest areas excluding the area diverted for non-forestry purpose.

1.8. State of Boundaries

1.8.1. The old conventional boundary pillars delineate the forest area from the adjoining private land / chaks.These old pillars have been seen at a few places only and rest of the forest is without boundary pillars. Their absence has made it extremely difficult for the field staff as well as working plan parties to access the extent of encroachment. The population explosion during the last 40-50 years and the poor socio-economic condition of the local inhabitants has increased the incidences of encroachments. It is an admitted fact that the present status of

demarcation is alarming so some immediate preventive measures on a war footing should be taken.

1.8.2. (In order to overcome the problem of encroachment on forest land the RCC boundary pillars with their geo references is the need of the hour. The forest departments have already introduced new RCC Boundary pillars under CAMPA Scheme and it is feasible to introduce these boundary pillars in this division as well).

Statement Showing Detail of Demarcation Line

Table No. 1.5

S.No.	Name of the Forest	No.of Chaks	No. of Boundary Pillars	
			Main line	Chaks
1	Ramnagar North	87	2280	1009
2	Ramnagar South	150	4263	1675
3	Basantgarh	27	5400	1582
	Total	**264**	**11943**	**4266**

1.9. Legal Position

1.9.1. The forests are owned by the Government of J&K and are mainly administrated under J&K Forest Act of Samvat 1987 (1930 AD) as amended to date. The Forest department, on behalf of the State Government is responsible for the management of these forests on scientific lines. Grazing in the forest areas is regulated by the department under Kahcharai Act. The Department of Wildlife Protection is responsible for protection and management of wildlife in areas declared as wildlife sanctuaries and National Parks. In rest of the areas, it is the responsibility of the territorial DFO to protect wildlife.

1.9.2. For protection and management of these forests, the Forest Department is equipped with following Acts:-

a. The Forest Act of Samvat 1987 (1930 AD) as amended to date.
b. Kuth Act Samvat 1978 (1921 AD) as amended to date.
c. Cattle Trespass Act Samvat 1877 (1920 AD).
d. The J&K Soil Conservation and Land Improvement Scheme Act 1972 AD.
e. The J&K Kahcharai Act Samvat 2011 (1954 AD).
f. The J&K Game Preservation Act 1948 AD.
g. The J&K Wildlife Protection Act 1978 AD.
h. J&K Public Premises (Eviction of unauthorized occupant) Act 1959 AD.
i. The J&K State Forest Corporation Act 1978 AD.
j. The J&K specified Tree Act – 1969 AD.
k. J&K Forest Conservation Act 1990.
l. J&K Forest Protection Act – 1997.

1.10. Rights and Concession

1.10.1. No rights are recognized in the demarcated forest for the local inhabitants but they enjoy some liberal concession under Ramnagar Forest Notice. This includes timber for house construction, buildings and repairs. Previously timber dry standing / green fallen except deodar was granted to the local inhabitants @ 1/6thof the standard price (a maximum of one

tree per house hold was sanctioned after 3 years). Now, the concept of timber sale depots in concession zone (A Zone) has been introduced by the department and timber of all species is supplied to the local inhabitants for their bonafide use. Besides this the timber is also supplied to inhabitants residing in (Municipal Communities) towns. The rate is fixed by the Government.

1.10.2. When a house is destroyed by fire or by any natural calamity, a free grant of timber may be made for rebuilding. Dead fallen tree of any size and species, except Deodar over three feet in girth at base and naturally broken can be removed free of charge without any permit, at any time of the year. In addition, the forests in which fellings have been made, concessionists may remove without any permit such felling refuse,which is left over after the work has been completed. Standing dead trees except Deodar are given to villagers on permit at half the ordinary concession rates. The detail of timber issued on concession rates directly from the forest during the last 18 years is given below in Table No. 1.6.

Table No. 1.6

S.No.	Year	Total	
		No. of Trees	Volume (in m^3)
1	1995-1996	89	275
2	1996-1997	37	220
3	1997-1998	136	465
4	1998-1999	82	322
5	1999-2000	83	387
6	2000-2001	116	419
7	2001-2002	86	366
8	2002-2003	54	200
9	2003-2004	58	197
10	2004-2005	64	263
11	2005-2006	101	304
12	2006-2007	73	212
13	2007-2008	48	130
14	2008-2009	43	140
15	2009-2010	66	202
16	2010-2011	12	38
17	2011-2012	0	0
18	2012-2013	0	0
Total		**1148**	**4140**

1.10.3. **Grazing:** The entire division is prone to heavy grazing duringthe entire year due to large variation in altitude. There is no restriction on grazing in forest land except specifically closed areas. The practice of grazing has been going on in an unscientific manner as well as beyond the carrying capacity of the forests, which has resulted in the failure of regeneration of main crop. This has consequently degraded the forests over time. Besides local inhabitants, migratory nomads such as Gujjars, Bakerwals and Gaddis migrate to summer behaks twice in a calendar year with their live stocks (such as sheep, goats, horses, buffaloes, cattle),causing extensive damage to forest along route of migrations. Some their local inhabitants and nomads stay on higher reaches of Ramnagar North and Basantgarh

Ranges during summer months. During winter season the nomads graze their live stocks in Behaks.

1.10.4. The livestock data of Ramnagar Division as per census of 2011 is as under:-

Table No. 1.7

S.No.	Description	Number of Heads
1	Cattle	95334
2	Buffaloes	51110
3	Sheep	123500
4	Goats	78500
5	Others	1637
Total		**350081**

Source :Distt. Sheep Husbandry & Distt.AnimalHusbandry Officers, Udhampur.

The detail of grazing fee recovered w.e.f in Ramnagar Forest Division is given in below Table No. 1.8:-

Table No. 1.8

S.No.	Year	Amount Recovered as Grazing Revenue
1	1995-96	4128.00
2	1996-97	3363.00
3	1997-98	3465.00
4	1998-99	4442.00
5	1999-2000	1780.00
6	2000-2001	3697.00
7	2001-2002	3267.00
8	2002-2003	2428.00
9	2003-2004	2774 .00
10	2004-2005	1378.00
11	2005-2006	1544.00
12	2006-2007	3007.00
13	2007-2008	3473.00
14	2008-2009	8775.00
15	2009-2010	9389.00
16	2010-2011	8434.00
17	2011-2012	9632.00
18	2012-2013	9440.00
	G. Total	**84416.00**

CHAPTER-II

The Forest Flora and Fauna

CHAPTER-II

Flora and Fauna

Part-A
Forest Flora

2.1 Occurances and Distribution of Species

2.1.1 The composition and condition of the crop depends upon the locality factors. The altitude ranges from 500 m. to 4341 m. with varied aspects, topography and edaphic conditions. A vast variety of flora exists in this division, ranging from dry deciduous scrub to high alpine pastures. The forests of this division are predominantly coniferous. The coniferous forests mostly occur as pure and as admixture with their broad leaved associates. In temperate zone of Basantgarh Range coniferous species such as Deodar, Kail and Fir/. Spruce exist which constitutes about 20% of the total area of Division. In Ramnagar North Range all conifer species except Deodar exists and in Ramnagar South only Chir Pine exists. The Chir constitutes about 33% area of the total area of the division. The broad leaved includes *Quercus species* (Oak) and *Boxus sempervirens* (Chikri) which constitutes about 37% area of the division. The high altitudes pastures, devoid of tree cover occupy the alpine and aubalpine belt above the tree line. These are covered by miscellenous grasses and legumes. Due to heavy grazing the platable grasses are being replaces by the unplatable varieties. The detail of range wise area distribution of each species is given in Table no. 1.3 Chapter-I, however ramgewise distribution and percentage of wooded area under different species is given in below Table No. 2.1

Table No. 2.1

Range	Wooded Area					Total
	Deodar	Kail	Fir	Chir	Broad leaved	
Ramnagar North	0	134	179	4487	3833	8633
Ramnagar South	0	0	0	4557	3238	7795
Basantgarh	2929	235	4150	3088	6713	17115
Total	**2929**	**369**	**4329**	**12132**	**13784**	**33543**
Percentage of Total	**7.86%**	**0.99%**	**11.62%**	**32.56%**	**37.00%**	**100%**

2.2 Composition and Condition of the Crop

2.2.1 The total number of trees principal conifers and broad leaved species in different diameter classes as summarized in below Table No. 2.2.

Table No. 2.2

Total Tree count over the entire commercial area of Ramnagar Forest Division

Species	Diameter class (In Cms.)									
	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Tatal
Deodar	66492	202961	190469	124531	54778	18191	9190	3217	3253	673082
Kail	3256	16846	16806	8665	1482	211	408	0	0	47674
Fir	72467	179444	154203	72508	37162	16134	5272	2857	4178	720756
Chir	356229	1032496	674635	136491	45772	19250	11410	970	543	2277796
B/L	173695	299950	165397	28612	10531	4724	413	0	0	683322
Total	672139	1731697	1201510	370807	149725	58510	26693	7044	7974	4402630

Table No. 2.3

Diameter Classs wise Percentage distribution of stems over the entire commercial area of Ramnagar Forest Division

Species	Diameter class (In Cms.)									
	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Tatal
Deodar	9.87	30.15	28.29	18.52	8.14	2.70	1.36	0.48	0.49	100
Kail	6.82	35.33	35.25	18.21	3.1	0.44	0.85	0	0	100
Fir	13.32	32.97	28.33	13.31	6.87	2.96	0.96	0.52	0.76	100
Chir	15.64	45.33	29.63	5.99	2.00	0.85	0.5	0.04	0.02	100
B/L	25.40	43.88	24.18	4.18	1.54	0.69	0.13	0	0	100
Total	**71.05**	**187.66**	**145.68**	**60.21**	**21.65**	**7.64**	**3.8**	**1.04**	**1.27**	**500**
Avg	**14.21**	**37.54**	**29.14**	**12.04**	**4.33**	**1.53**	**0.76**	**0.2**	**0.25**	**100**

On the whole there is a preponderance of middle aged and mature growing stock. The dimeter distribution reflects an acture deficiency of stems below 30 cm dbh on all conifers. The specie wise percentage of stems is given in below Table:

Species	Number of Stems (%)
Deodar	15.29
Kail	1.09
Fir	16.37
Chir	51.73
Broad Leaved	15.52

2.2.2 Chir forests occupy the sub-tropical zone in all Ranges of this Division. In most places, the canopy density of the Chir crop is below 0.4 and the crop is open) A perusal of Table 1.2.2 indicates that here is preponderance of mature and over mature trees and the regeneration ofChir is conspicuous by its absence. The lack of regeneration can be attributed primarily to heavy grazing by local and migratory livestock,frequent fires and neglect of subsidiary silvicultural operations that assist the establishment of natural regeneration. To make the

matters worse, these forests have been tapped indiscriminately over the past few years with complete disregard to working plan prescriptions. Unscientific and heavy tapping coupled with frequent fires has rendered the trees very weak from the base. Such trees are susceptible to wind-throw which results in creation of large gaps in the canopy.

2.2.3 In comparison to Chir, the health of Deodar-Kail forests of this Division, which constitute around 9% of the wooded area, is considerably better. The aberrations in diameter class istribution are not very pronounced with all the classes finding representation. Nevertheless, the representation of lower diameter classes falls short of the desired distribution. Around heavily populated areas, the crop is open and scattered. Because relatively of lower biotic pressure from grazing animals and lesser incidence of fire, the status of regeneration in these forests is comparatively better than that in Chir forests. One comes across patches of adequate and established egeneration frequently in these forests. However, because of non-removal of over-wood and lack of thinning, the regeneration is stagnating at many places. In its natural zone, Kail crop has come up very well in land slip areas on freshly exposed soils. ln certain areas, the blanks in the forests have been rapidly invaded by weeds including a few varieties of ferns. In such cases heavy carpet of weeds results in mortality of seedlings).

2.2.4 The Fir forests of this Division are confined to Basantgarh range, however fee patches of Fir found in Ramnagar North range. The canopy density of Fir crop is very poor and the diameter distribution is highly skewed in favour of mature and over mature trees. These trees are dying and decaying in considerable numbers. Since the regeneration is practically absent, large gaps have been created in the canopy.)

2.2.5 There are many factors that have contributed to decline of Fir forests in this Division, the most important being excessive grazing. Over grazing has not only destroyed the regeneration of Fir/Spruce but has also resulted in compaction of soil which makes it difficult for the regeneration to establish. Secondly, many gaps have been created in the canopy either as a result of removal of trees, or natural death and decay of over-mature trees. These gaps have been invaded by a thick carpet of weeds which further reduces the chances of survival of Fir/Spruce seedlings. Things are also made difficult by the fact that a good seed year in Fir comes after an interval of about 10 years. Lower seed production coupled with high mortality of seedlings provides a recipe for disaster so far as regeneration of Fir forests is concerned.

2.2.6 Pure broad leaved forests are found in all ranges of this division and constitutes about 37% of the wooded area. Generally, broad leaved species are found mixed with conifers. The broad leaved species around habitation, especially Oaks, suffer heavily on account of lopping for fuel and fodder. Fairly large sized mature trees of broad leaved species are found only deep inside the forests. Excessive lopping results in attenuated crowns and lower seed production. As a result, the regeneration of broad leaved species like Oaks is highly inadequate. Seedlings of angiosperms are also more susceptible to grazing and browsing. However, good regeneration of several species like Dalbergia sissoo, Alnus nepalensis and populous ciliate can be seen on freshly exposed sites nallas at many places.

2.3 General description of the growing stock

2.3.1 For the purpose of general description the forest of this divisiin can be divide into following plant communities. Due to large variation in altitudinal zone avariety of plant communities which exist in this division are as under:-

1. Alpine Forest
2. Fir Forest
3. Deodar-Kail Forest
4. Chir Forest
5. Oak Forest
6. Scrub Forest

2.3.2 Alpine Forest

This constitutes 12% area of the division. The alpine forest exist only in Basantgarh Range of this Division. This forest occurs just above the Fir forest. The alpine pasture lands known as Behaks exist side by side with this type of forest. The grazing period is very limited. Only few plants species exist in this forest due to extreme climatic conditions. However, these are rich in herbaceous flora. The main Broad Leaved species present are *Rhododendron campanulatum, Betula utilis* with *Viburnum* and *Euhorbia species.*

2.3.3 **Fir Forest**

This constitute 12% area of the division. The Fir Forest exist at an elevation of 2100 mt. to 3700 mt. Most of the Fir of Ramnagar Division is present in Basantgarh Range. It is also found in some compartments of Ramnagar North Range. However, its completely absent in Ramnagar South range. The main associates of Fir are Spruce, (which is found mostly on Northern and North Eastern aspects), and Kail (which is found on exposed sides). The Broad Leaved species which are associated with Fir are Kharsu Oak *(Quercus semecarpifolia*) walnut *(juglans regia),*Horse chest-nut / Bankhor (*Aesculus indica) and* Bhojputar (*Betula utilis)*. The main ground flora i.e. shrubs which are found associated with Fir are Kulmanch/Tendu *(Viburnum nervosum*) Rubus species (S*kimmia laureola) and Rhododendron campanulatum.* Fir crop is mostly middle aged to mature. The status of new regeneration is very low. The natural regeneration of the Fir is adversely effected by excessive grazing.

2.3.4 Deodar-Kail Forest

This constitute 8.68% area of the division Like Fir forest, the Deodar-Kail Forest are also found in Basantgarh and some compartments of Ramnagar North Range. These forests occur below fir forest at an elevation ranging from 1700 m. to 2500 m. These are the most valuable commercial forests of the division. As far as the distribution of Deodar and Kail is concerned, Deodar comes on comperately cooler aspects and easier slopes with well drained soil of fairly good depth. Whereas Kail being a good colonizer occupies hotter aspects, open area, slips, fresh alluvial deposits and eroded areas. The natural regeneration of Deodar occur in Kail Forest when the locality factors improve with the passage of time. In Basantgarh Range Deodar and Kail are found as admixture with more percentage of Deodar. In some compartments Deodar occurs mostly pure in pure form with scattered Kail trees. Deodar is mostly middle aged to mature and over-mature. Kail occurs in almost pure patches in Ramnagar North Range. Natural regeneration is completely absent due to excessive biotic pressure at some places and in some

compartments its presence is sufficient. The climatic and edaphic factors are very conducive for natural regeneration except biotic.

The broad leaved associates of Deodar and Kail Forest are Banj Oak *(Quercus leucotrichophora, Quercus incana)* in the lower elevations, *Quercus dilatata (Moru) Cedrela serrata (hill tainderi) Prunus padus (Bharel) Aesculus indica (Bankhor), Juglans regia (Walnut) and Machilus species (sangla).* The under growth consists of *Berberis lyceum, Desmodium tiliaefolium, Rubus species, Sarcococca saligna, Parrotia jacquemontiana* and *Daphne cannabina.*

2.3.5 Chir Forest

This constitutes 32.66% area of the division with an average density of crop ranging from 0.4 to 0.5. Chir is the main crop of the division and occurs at an elevation of 1500 m. to 1700 m. The Chir crop is predominantly found in Ramnagar South and Ramnagar North Ranges. It is also found in Basantgarh Range. The distribution within its altitudinal zone depends upon the aspect, for example in Ramnagar North Range at Jugdahar, Chir is seen touching the Fir forest. The growth of Chir trees of this division varies from tall well flourished trees to short stunted malformed and crooked ones, depending upon edaphic and biotic factors. The Chir crop comprises of young to middle aged trees with less number of mature and overmature trees. Like other conifers there is a deficiency of natural regeneration and main cause of its absence is excessive grazing / browsing, cutting of grasses and forest fires. It has been noticed during the field visits that the areas which were closed have a good number of the naturally regenerated trees. This indicates that all locality factors except biotic are conducive for natural regeneration of the Chir forest. Though the germination capacity of the Chir seed is good but the seed production capacity has come down drastically, which perhaps is due to excessive resin tapping and fires. This is also one of the factors for less natural regeneration. Moreover, the local Chir seed for artificial regeneration is not easily available.

There are a wide range of associates of Chir, depending upon altitude, aspect and site quality etc. At the upper altitudinal zone Chew (*Rhododendron arboreum), Pieris ovalifolia*, Banj Oak *(Quercus leucotrichophora),* and Kail are found. At the lower limit *Rohini, Mallotus philippinensis, Euphorbia royleana, Emblica officinalis, Cassia fistula, Acacia modesta (Kainth), Pyrus pashia, and shrubs woodfordia floribunda, Dodonaea viscose (Santha), Carissa spinarum (Garna), Berberies lyceum, Zizyphus jujuba, Rubus species* are commonly found.

2.3.6 Oak Forests

The three Oak species found are:-

I. Kharsu Oak (*Quercus semecarpifolia*).
II. Banj Oak (*Quercus leucotrichophora*).
III. Moru Oak (*Quercus dilatata*).

The Oak forests occur in all altitudinal zones of the division. The Kharsu Oak occurs in pure patches in Fir zone of Basantgarh Range. The Banj and Moru Oak occur in Deodar-Kail zone. The Banj Oak is the most important species of the division among the Oaks. The Banj Oak also occurs in patches. At lower elevations the Banj Oak occurs at cooler aspects. The crop is mostly middle aged, malformed and heavily lopped near habitations. The Oak crop is heavily damaged by the local inhabitants as all the three species of Oak are good for fodder, fuel & for agricultural implements. The main associates of Oaks of this division besides, conifers are *Rhododendron arboretum*, P*ieris ovalifolia Machilus species, Pyrus pashia* etc.

2.3.7 Scrub Forest

This constitute 17.29% area of the Division. The Two types of Scrub forest i.e. Deciduous Alpine Scrub Forests and Sub-tropical Scrub are found in this Division.

a. **Deciduous Alpine Scrub Forest:** The Deciduous Alpine Forest is found in Basantgarh Range.
b. **Sub-Tropical Scrub Forests:** This type of forests are found at an elevation upto 1700 m. A variety of broad leaved plant species are present in these forests. The present condition of the most of the forests which are located adjacent to habitations is dilapidated as the basic requirements of fuel, fodder and timber for agricultural & constructions of houses are fulfilled from these forests. The plant species found in the sub-tropical scrub forests are:*Dalbergia sissoo, Acacia modesta, Acacia catechu, Bombax ceiba, Cassia fistula, Cedrela toona, Ficus bengalensis, Ehretia laevis, Syzygium cumini, Emblica officinalis, Pistacia integerrima, Butea monosperrna, Lannea grandis, Mangifera indica, Olea cuspidate, Terminalia belerica, Terminalia chebula, Dendrocalamus strictus, Phoenix species.Adhatoda vasica, Berberis lycium, Carissa spinarum, Dodonea viscosa, Daphne cannabina, Flacourtia ramontchi, Murraya koenigii, Myrsine Africana, Nerium indicum, Punica granatum, Rhus cotinus, Rubus ellipticus, Vitex negundo, woodfordia fruticosa, Xanthoxylum alatum, Bauhinia vahlii etc.*
   One species namely *Buxus Wallichiana* locally called as Chikri is one of the most important species which is found in some compartments of Ramnagar South and Basantgarh Range. The timber is used for manufacturing mathematical instruments and small utility goods such as combs and ties etc. Almost all age classes of Chikri are found and regeneration is coming up nicely.

2.4 Forest Types

2.4.1 The forests of Ramnagar Forest Division can be grouped into the following groups / forests types in accordance with the revised classification of forest of India (1968) propounded by Champion and Seth:-

Mountain sub-Tropical Pine Forests (Group 9) Himalayan sub-Tropical Pine Forests (Type 9/C1a)Its two sub-types found in the Ramnagar Division are:-

2.4.2. **Lower Sivalik Chir Pine Forest (9/C1a)**

This sub type occurs on steep dry slopes below 1000 m on Sivalik hills of Ramnagar Forest Division. This type is prevalent in all the three ranges on Sivalik rock types including the sand stone. The overwood consists of the pure *Pinus roxburghii*, Chir pine. Its main associates forming the middle storey are *Mallotus philippinensis, Pyrus pashia, Acacia modesta*. Broad Leaved species occur mostly along nallas, depressions and on cooler aspects. It is a climatic climax.

***Floristics*:**

Pinus roxburghii.
Mallotus philippinensis, Acacia modesta, Acacia catechu, Syzygium cumini, Butea monosperma, Emblica officinalis, Ficus corromandelica, Cassia fistula, Pistacia integerrima, Terminalia belerica, Terminalia chebula.

Carissa spinarum, Dodonaea viscosa, Flacourtia ramontchi, woodfordia fruticosa, Berberis lyceum, Rubus ellipticus, colebrookia oppositifolia, pyrsine africana, Xanthoxylum eletum, Punica granatum, Vitex negundo, Nerium indicum, Berberis vulgaris.
Plantaco lanceolatus, Rumex hastatus, Salvia, Teraxium officinalis, cynodon dactylon.

2.4.3 **Upper Or Himalayan Chir Pine Forests (9/C1b)**

This sub type is more preponderant in Ramnagar North Range and Basantgarh Range than in Ramnagar South Range, between 1200m to 1800m, sometimes ascending upto 2300m on Southern aspects. Overwood almost consists of pure crop of Chir pine. Its main associates towards its upper zone of distribution are *Quercus leucotrichophora and Rhododendron arboretum, while Dalbergia sisso and coriaria nepalensis* occur on lower elevations. It is a climatic climax.

Floristics:

Pinus roxburghii
Quercus leucotrichophora, Lyonia overlifolia, Rhododendron arboreum, Pyrus pashia, Olea cuspidata, Emblica officinalis, Crataegus crenulata, Ficus roxburghii, Pinus palmate.Berberis lyceum, Rubus species, woodfordia fruticosa, prinsepia, utilis, Myrsine Africana.Cynodondectylon, Taraxicum officinalis, colebrookia oppositifolia, Rosa moschata.

2.4.4 **Himalayan Sub tropical Scrub (9/C1/DS1)**

This forest sub type has developed as a result of retrogression due to interference by man and his cattle. Over an appreciable area in the Shiwalik Chir belt, the over wood has been destroyed or is unable to develop due to the soil being shallow. Vegetation consists of an open type of forest mostly consisting of broad leaved scrub with a few scattered trees here and there. Main species found are *Dalbergia sissoo, Acacia modesta, Punica granatum, Carissa spinarum, Berberis*. These forests are found near the foot hills and areas close to habitations.

Floristics:

Dalbergia sissoo, Acacia modesta,Carissa spinarum, Punica granatum, Berberies, woodfordia floribunda, Adhatoda vasica, colebrookia oppositifolia.

2.4.5 **Himalayan Sub tropical Euphorbia Scrub (9/C1/DS2)**

This is also a retrograde sub-type in which almost pure patches of *Euphorbia royleana* are found. This sub-type occurs on dry and rocky areas extending to adjacent areas due to biotic pressure in lower parts of Ramnagar South Range.

Floristics:

Euphorbia royleana, Carissa spinarum, Dodonaea viscose, Nerium indicum, Cynodon dactylon.

2.4.6 **Himalayan Sub-Tropical dry evergreen forests (10/C1)**

This type of forests of evergreen broad leaved species consists of mainly *Olea cuspidate,* and thorny shrubs associated with it. It is found on hot, dry and exposed hill slopes along the River Tawi and its tributaries in Ramnagar North and South Range. Where soil depth is quite shallow and the area is prone to slips, these forests can increase in density if protected from biotic interference.

Floristics:

Olea cuspidate, Euphorbia royleana, Acacia modesta, Punica granatum, Dodonaea viscose, Nerium indicum, Adhatoda vasica.

2.4.7 **Banj Oak Forests (12/C1a)**

Banj Oak {*Quercus leucotrichophora.* Syn. *Q.incana* is the main species composing this sub-type. Banj Oak occupies the top canopy in shady places, and where the areas are free from biotic pressure it forms a forest of close canopy (e.g. in Basantgarh Range and Part of Ramnagar North Range). Oak forests are of open type with individual trees sometimes crooked, short boled and branchy wherever they have been lopped and damaged. *Rhododendron arboretum* (Chew) is an important associate of Oak in this sub-type. It mostly occurs on moisture and cooler aspects above chir zone.

Floristics:

Quercus leucotrichophora, Rhododendron arboreum, Lyonia ovalifolia, Pyrus pashia, Pistacia integerrima, Machilus duthiei, Ilex species, Buxus wallichiana, Prinsepia utilis, Berberies aristata, Rubus lasiocarpus, viburnum species, Desmodium tiliaefolium, Rubus ellipticus, Myrsine Africana, Indigofera, Rhus cotinus, Rumex hastatus, Vitis himalayana.

This type is found in Basantgarh and Ramnagar North Ranges over an appreciable track and to a limited extent in Ramnagar South Range.

2.4.8 **Moru Oak Quercus Dilatata Forests (12C1b)**

This sub-type occurs in a narrow belt above Banj oak and is associated with Deodar. It avoids dry localities and grows well in rich, moist and deep soils.

Floristics:

Quercus dilatata, Cedrus deodara, Quercus leucotrichophora, pinus wallichiana, Rhododendron arboretum, Pyrus, Celtis, Aesculus.

2.4.9 **Moist Deodar Forests (12C1C)**

This sub-type consists of almost pure Deodar crop with a mixture of Kail to a limited extent. Winter snowfall is necessary, although it avoids high monsoon humidity. In Ramnagar Division it is mostly restricted to the Basantgarh Range where it occupies the

zone ranging from 1700 feet to 2500 feet above mean sea level. They constitute one of the most valuable commercial forests of this Division.

Floristics:

Cedrus deodar, Pinus wallichiana, Qurcus dilatata, Quercus leucotrichophora, Pyrus pashia Crataegus, Berberies lyceum, Rosa macrophylla, Strobilanthes wallichii, Prunus. Species, Fracaria vescam, Viola canescensa, Hedara helix, Clematis, Vitis himalayana, Cynodan dactylon.

2.4.10 **Western Mixed Coniferous Forests (12/C1d)**

Fir is the most predominant species of this sub-type occurring with a mixture of Kail, Spruce and sometimes Deodar. It occurs above the Deodar Kail zone in Basantgarh Range above an altitude of 2400m and grows up to 3000m. This sub-type comprises the Fir Forests of Basantgarh Range and some patches on top of Ramnagar North Range (e.g. Co. 5 R.N.). Fir Forests contain some alpine pastures and beautiful meadows wherever there are blanks occur in their canopy.

Floristics:

Abies pindrow, Picea smithiana, Pinus wallichiana, Juglans rigia, Acer caesium, Populus ciliate, Celtis australis, Aesculus indica, Ulmus wallichiana, Pyrus pashia, Taxus baccata, Prunus padus, Machilus duthiei, Quercus semecarpifolia, Viburnum foetens, Plectranthus rugosus, Prinsepia utilis, Berberis aristata, Rubus lasiocarpus, Rubus ellipticus, Cotoneaster species, Sarcococca saligna, Rumex species, Primula species, Plantico lanceolatus, Podophyllum emodi, Aatropa belladons, Calcium species, Urtic diocca, Iris species, Fragaria vesca, Cynodon dectylon.
Rosa moschata, Hedera helix, Vitis species, clematis species.

2.4.11 **Moist Temperate Deciduous Forests (12/C1e)**

The sub-type occurs from 1800m to 2750m in moist localities and depressions, often as strips along the hills stream. Main species in the overwood consist of *Aesculus indica, Acer carpinus, Ulimus, Betula, Fraxinus, Juglans, Prunus, Quercus*etc. It is found in the Basantgarh Range along the hill streams.

Floristics :

Aerculus indica, Acer pictuna, carpinus, Ulimus, Belule, Fraxinus, Juglana, Prunus, Quercus semecarpifolia, Viburnum hoetens, Rubus species, Strobilanthes wallichii, Aconitum, Vitis semicordata, Clematis connate.

2.4.12 **Low Level Blue Pine Forest 12 c/f)**

This sub-type is found in the Ban Oak zone as an almost pure Blue Pine forests on more exposed and dried aspects e.g in Co. 16 & Co. 18 Ramnagar North Range. It is completely absent from Ramnagar South Range.

Floristics:

Pinus wallichiana, Quercus leucotrichophora, Rubus fruiticosus, Rosa moschata, Berberis, Teraxicum, Fracaria vesca, Rannunculus species.

2.4.13 **Kharsu Oak (Quercus semecarpifolia) Forests (12C2a)**

This sub-type occurs along the outer and moister ranges between 2500m and 3300m particularly in Southern aspects along and above the upper limits of Fir Forests in Ramnagar Forest Division.

Floristics:

Quercus semecarpifolia, Betula alnoides, Quercus dilata abies pindrow Rhododendron arboretum, Euphorbia species, Androsac species.

2.4.14 **Himalayan Temperate Park Lands (12DS2)**

It is a retrograde sub-type and consists of the alpine meadows present along the places wherever a break occurs in the Fir Forests. These areas have developed into beautiful meadows and good pasture lands. Mostly confined to the Basantgarh Range and some parts of Ramnagar North Range.

Floristics:

Viburnum hoetens, Cynodon dectylon, other grasses

2.4.15 **Deciduous Alpine Scrub (15c2)**

This sub-type is found in the area near the tree line in the alpine zone. Vegetation consists of a thick growth of shrubs associated with *Rhododendron campanulatum* and other herbs are *Cotoneaster microphylla, Janiperus recurva, Anemona, Aconites, Corydalis, Primula, Senecio, Sedum etc.*

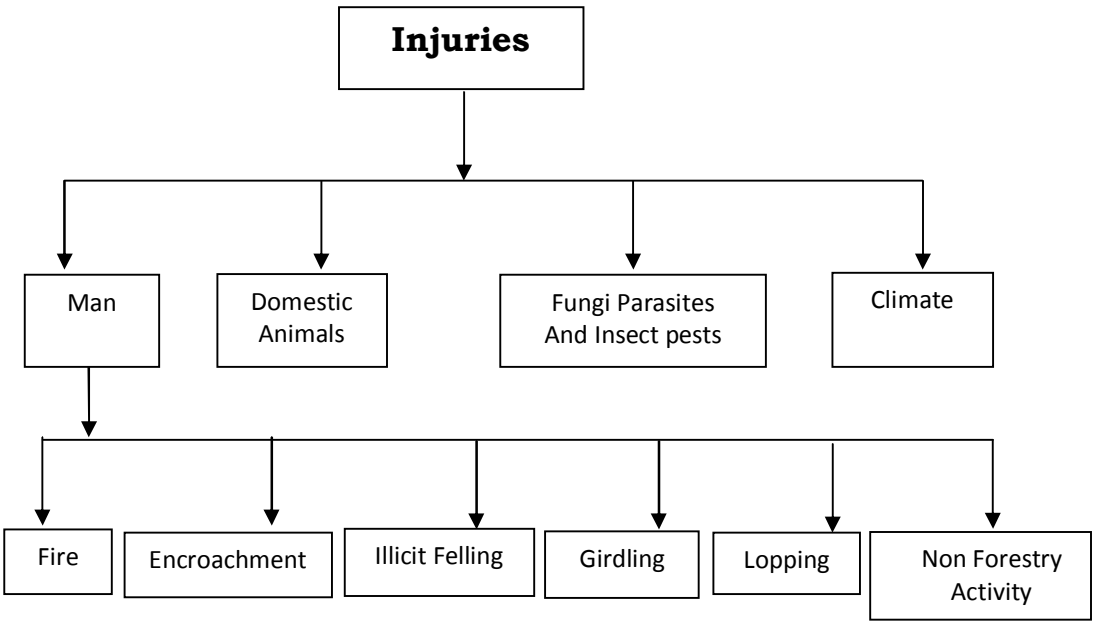
2.4.16 **Alpine Pastures (15C3)**

This type consists of merophytic herbs with grass species. Common herbs are *Primula, Anemone, Fretillaria, Iris, Rannunculus, Anderosac species, Cynodon.*

2.5 Injuries to Which Crop is Liable

2.5.1 Ramnagar Forest Divisions is spread over a vast geographical area ranging from sub-tropical to alpine forest. There are so many agencies which are directly or indirectly harmful for the forests. The agencies that cause injury to these forests can be categorized into the following main agencies:-

- Man (Fire, Encroachment, Illicit felling etc.)
- Domesticated Animals
- Wild Animals
- Fungi parasites and Insect pests.
- Climatic Factors



The brief description of the Injurious to which the crop is liable is as under:-

2.5.2 Man

The human being is one of the major agency which causes injury to the forest in one or the other way depending upon his intentions / needs of the human beings.

i. **Forest Fires*:*** The forest fire is one of the commonest agency which causes huge damage to forests of almost all altitudinal zones. However, it is most frequent in Chir Forests, especially during summer months. However, the mature and over-mature Chir pine trees without resin have less effect of forest fire due to its thick bark. The trees with blazes catch fire easily which penetrate deep into tissues resulting into ultimate death of the tree and these become prone to wind fall. The most affected ones are seedlings, saplings and poles. Even a forest fire of low intensity causes extensive damage to seedling and saplings of Chir. The intensity of forest fires is very high in Chir pine, followed by Deodar-Kail and least in Fir forest. Usually in Deodar-Kail and fir forest the fire occur in autumn season as the dry leaf litter and dry grasses are in abundance during this season.The main causes of forest fires are:

a. High temperature and accumulation of Chir pine needles on the forest floor which are very inflammable.
b. Resin tapping, deposition of resin at the base of tree of old blazes.
c. Dense ground-flora.
d. Deliberate attempt of human beings to boost the growth of new grass for the next season and extend their area of encroachment.

The forest fires cause enormous damage to the forest and consequently reduce the overall growth of the crop. The soil is exposed resulting into its erosion, reduction in moisture absorption capacity, loss of wildlife & their habitats and loss of aesthetic beauty of the area.

The detailed statements of fire incidence of Ramnagar Forest Division from 2000 to 2011-12 is as under:-

Table No. 2.2

Year	Total number of Cases				Total Area Burnt in Hac.			
	Ramnagar North	Ramnagar South	Basantgarh	Total	Ramnagar North	Ramnagar South	Basantgarh	
1994-95	8	N/A	1	9	7.90	N/A	0.5	8.4
1995-96	10	N/A	3	13	15.75	N/A	3.5	19.25
1996-97	7	N/A	0	7	12.75	N/A	0	12.75
1997-98	2	N/A	1	3	29	N/A	0.25	29.25
1998-99	11	N/A	5	16	10.5	N/A	4.25	14.75
1999-2000	21	N/A	1	22	29.40	N/A	6.00	35.4
2000-01	6	N/A	2	8	8.05	N/A	2.75	10.8
2001-02	0	N/A	0	0	0	N/A	0	0
2002-03	14	N/A	4	18	111.6	N/A	1.7	113.3
2003-04	5	N/A	2	7	6.4	N/A	6.5	12.9
2004-05	3	N/A	3	6	3.75	N/A	3.25	7
2005-06	3	10	0	13	3	8.6	0	11.6
2006-07	3	8	1	7	5.80	7.8	0.5	7.95
2007-08	8	6	9	23	14.04	2.65	15.9	32.59
2008-09	15	2	3	20	16.36	1.25	0.75	18.36
2009-10	39	29	14	82	181.88	29.60.	30.55	212.43
2010-11	9	2	4	15	92.60	2.25	1.67	96.52
2011-12	0	0	0	0	0	0	0	0
Total	**164**	**52**	**53**	**269**	**548.78**	**46**	**78.07**	**643.25**

ii. Encroachment

It is one of the biggest problems of injuries to which the forest is liable and is not confined to a particular area. Due to population explosion of both human beings and their domestic animals the pressure on the land resources has increased. The only available land resource left is the forest land. The dilapidated condition of the boundary pillars or their absence makes it easier to encroach upon the forest land. The recorded encroached forest area in Ramnagar Forest Division is 235.10 hectares.

iii. Illicit Damage

There are various causes of illicit fellings which vary from one location to the other, depending upon the overall socio-economic conditions of the inhabitants residing within catchment area of each forest and road connectivity etc. The winter season in most parts of Basantgarh range and some parts of Ramnagar North Range is very severe. The requirement of fuel wood is fulfilled from coniferous forest (although some people have broad leaved species in their Proprietory land). The people residing below this altitudinal zone also utilize illicit firewood as very less fallen material is available in the forest, that too far away from habitation. The following are the main causes of illicit Felling.

- Usually timber (Kail) is supplied to local inhabitants residing within concession zone of a given forest at concessional rate @ One kail tree per household after every three years for construction of a new house, but at present the living standard of even the remotest areas has changed and timber of a single tree is not sufficient to meet his bonafide needs.
- Deodar is considered to be the royal one among all the conifer species. Every individual wants to use Deodar timber for the construction of houses. Since it is not provided at

the concession rate to the local inhabitants residing in concession zones, so it becomes an easy target to be removed illicitly.

- There is a big difference between extraction cost and the sale rate of timber and presence of unscrupulous elements in every society, they opt for smuggling of timber as as their means of livelihood. Further, the construction of motorable roads has aggravated the problem, which in large benefits the smugglers.
- Migration from far-flung areas to Ramnagar town and small hamlets adjoining to roadside has added fuel to the fire.

Table No. 2.3

The range wise number of damage cases registered for breach of J&K Forest Act

Year	Ranges			Total
	Ramnagar North	Ramnagar South	Basantgarh	
1995-96	55	0	15	70
1996-97	54	22	18	94
1997-98	29	35	9	73
1998-99	29	9	5	43
1999-2000	33	8	5	46
2000-2001	19	8	2	29
2001-02	8	6	4	18
2002-03	17	13	0	30
2003-04	19	1	10	30
2004-05	5	5	11	21
2005-06	12	2	3	17
2006-07	5	28	12	45
2007-08	11	10	14	35
2008-09	10	16	17	43
2009-10	0	30	17	47
2010-11	1	9	27	37

iv. Girdling

The Girdling is a tool adopted by the inhabitants living in vicinity of the forest area with an intention of encroachment. After being girdled the tree dries and eventually dies as if it is a natural death.

v. Lopping

The lopping is done of those trees which have a fodder value and Oak trees of this division which are located near inhabitations are heavily lopped. Moreover, Pine trees have been also been lopped to obtain firewood, especially in Ramnagar North and Ramnagar South.

vi. Non-Forestry Activity

The land diverted for non-forestry activities such as construction of roads, laying of transmission lines, construction of hydro electric projects, railways etc. decrease the vegetal cover (though the ownership of the land diverted remains with forest department).

2.6 Domestic Animals

2.6.1. The grazing of domestic animals in forest land is an old age practice. Previously there was very less human population and proportionally there was lesser number of

domestic animals. These domestic animals used to graze in adjoining forest areas and on high pasture lands which was incidentally within the carrying capacity of the forest.

2.6.2 At present, due to enormous increase in domestic animals of both locals and nomads the unrestricted, unregulated & unscientific grazing has adversely affected the forest. Overgrazing has resulted in depletion of more palatable grasses and all types of species have been adversely affected. The regeneration of Fir species has been adversely affected by grazing animals of nomads. The young seedlings are trampled, grazed and browsed resulting in failure of natural regeneration.

2.7 Insects

2.7.1 Insect attacks on appreciable scale have not been noticed in these forests. However, dry or dead trees of Deodar are attacked by insects belonging to family *Scolytidae*. *Euzophora cedrella* has been reported to damage the cones of Deodar. In the forest nurseries, cockchafer grubs and cut worms are reported to affect the young seedlings.

2.8 Plant parasites including fungi

2.8.1 Kail is reported to be attacked by Armi (*Arceuthobium minutissium*). However, Kail forests are found in a very limited extent in this Division. *Fomes pini* causes heart rot in Kail and collar (or ring) rot in Deodar. However the damage is not appreciable in this division.

2.9 Climate

2.9.1 The climatic factors such as snow, frost, wind, landslides and drought have an adverse affect on the crop. The upper reaches of Basantgarh and Ramnagar North Range experience heavy snow fall during winter resulting in uprooting and breaking of trees at ground level. During the current year in the month of January, snow was also experienced in Ramnagar town, which has caused extensive damage to Chir crop and artificially raised Eucalyptus plantations. High velocity winds uprooted trees from the ground level, especially the Chir trees which were damaged due to forest fire. The drought has an adverse affect on the regeneration as well.

CHAPTER-II

Part- B
Forests Fauna

2.10 General Description

2.10.1 Although, wildlife in its strict sense includes plants as well as animals, yet in this chapter it is the forest fauna that will be dealt with in detail. A variety of fauna is found in the Ramnagar Forest Division because of the varied climatic and topographic conditions. Three prominent game reserves existed in the Maharaja's time namely Dalsar Rakh, Ramnagar Rakh (Rakh Mar) and Ghord Rakh. The first two rakh areas have been degraded to such an extent that they carry very little wildlife at present. However, Ghord Rakh is still well stocked with vegetation and still attracts wild animals and birds. The indiscriminate killing of animals and encroachment of their habitat has led to the dwindling of their population and even complete elimination from certain areas where they used to roam freely in the past. Following species of animals and birds have been sighted in the Forest Division:-

2.11 Class Mammalia

2.11.1 **Carnivores**

1. Leopard or Panther (*Panthera pardus*) "Chitra" occurs in alpine and sub-alpine belt. Included in schedule I of J&K Wild Life Protection Act and its killing is totally banned.
2. Jungle Cat (*Felis chaus*) :- Occurs in the lower scrub forests.
3. Mongoose (*Herpestevs aurpunctatus*) : Found in forest areas in an around cultivated fields.
4. Jackal (*Canisa ureus*) : Common in lower belt .Occurs mostly in broad leaved scrub forests.Declared as vermin in J&K Wild Life Protection Act 1978.
5. Brown Blar (*Ursus arctos*): Occupies the region near the tree line or above it. Included in schedule II of the J&K Wild life Protection Act 1978.
6. Black Bear (*Selenaroctos thibetanus*) : Occupies the Deodar Kail and Fir zone and in winter descends down. It is fond of maize and damages the maize fields. It is omnivorous.
7. The Jackal (Canisaureus): Occupies the lower regions of the Division. Found in Broad Leaved and scrubs near villages or cultivations.
8. The Red fox (*Vulpes vulpes*): Found in the upper sub- temperate and Temperate zone of the tract. It is generally red in colour. Included in schedule IV of J&K Wildlife Protection Act 1978.
9. The Indian Fox (*Vulpes bengalensis*): Found in the Sub Tropical belt in Broad Leaved Scrub.
10. Common otter (*Lutra lutra*): Found in streams valued for its fur; included in Schedule IV of J&K Wildlife Protection Act.
11. The Himalayan Weasel (*Mustela siberica*): Found in alpine zone and near tree line. Included in Schedule IV of Wild Life Protection Act.

2.11.2 **Rodents**

1. The Indian Porcupine (*Hystiux indica*):- Found in the sub-tropical belt. Damages young plantations and nursery plants. Included in Schedule II of J&K Wild Life Protection Act.
2. The Indian Field Mouse (*Mus booduqa*):- Found mostly in sub-tropical region. Included in Schedule II.
3. Squirrel (*Funambulus penanti*):- Found adjacent to human dwellings in sub-tropical belt.
4. Red flying squirrel (*Pelaurista phillipens altrvente*):- Associated with Deodar-Kail and Fir Forests. Included in Schedule II of Wildlife Protection Act 1978.

2.11.3 **Goat Group**

1. The Himalayam Tahr (*Hemitragus jemlabicus*):- It occupies dense scrub and forests below the tree line. Included in Schedule II of J&K Wildlife Protection Act.
2. The Goral (*Naemorhedus goral*):- Locally called Pijjar occupies the zone from 1000m to 2700m. It is included in schedule II of J&K Wildlife Protection Act.

2.11.4 **Deer Group**

1. Barking deer (Muntiacus muntijak):-"Kakar" occurs in sub-tropical zone upto 2000 m elevation in the Division.It has been reduced to a very small number. Included in Schedule III of J&K Wildlife Protection Act 1978.
2. Musk deer (*Muschus moschiferus*):- "Kastura" is almost extinct in the Division. Included in Schedule I of J&K Wildlife Protection Act 1978.

2.11.5 **Pigs**

1. The Indian Wild Boar (*Sus scrofa*):- "Jungli Sur" found in sub-tropical scrub forests and is omnivorous. Included in Schedule III of J&K Wildlife Protection Act 1978.

2.11.6 **Primater**

1. Common monkey (*Macaca mulatta*): Occurs mostly in sub-tropical belt in Broad Leaved and Chir Forests.
2. Common Langus (*Presbytis entellus*): Occurs both in sub-tropical and temperate belt in the Division but in a limited number.

2.12 Class Aves (Birds)

2.12.1 Important birds sighted in this division are as under:-

1. White crested Kaleej Pheasent (*Gennacus ramiltoni*)
2. Red Jungle fowl (*Gallus gallus*)
3. Black palridge (*Francolimus francolinus*)
4. Grey-Brown patridge (*Alectoris grade*)
5. Ram Chakor (*Tetragalles himalayensi*)
6. Grey Quail (*Cutornix coturnix*)
7. Blue Rock Piageon (*Columbia livia*)

8. Ring Dove (*Streptopeli achinensis*)
9. Vulture (*Pseudogyps bengalensis*)
10. Fulvus vulture (*Gyps fulvus*)
11. Jungle Crow (*Corvus macrorhynchos*)
12. House crow (*Corvus splendens*)
13. Koel (*Eudynamys scolopacea*)
14. Muna (*Acridotheres tristis*)
15. Woodpecker (*Picus chlorolphus*)
16. Golden Backed Woodpecker (*Dinopium benghalensis*)
17. Indian Robin (*Saxicolides fulicate*)

2.13 Reptiles

2.13.1 It includes various species of lizards, which are common in the sub-tropical belt of Ramnagar Division. Besides a variety of snakes poisonous and non-poisonous including vipers and cobra are found in this division.

2.14 Fishes

2.14.1 Different species of fishes are found in the fresh water streams and rivers of this Division.

2.15 Injuries to which Fauna is Liable

2.15.1 The fauna of the tract is liable to injuries by man, wildlife epidemics, atmospheric influences and fires.

2.15.2 **Injuries by Man**

Man poses the biggest threat to the fauna. Hunting (both legal as well as illegal) of wild animals and birds has always been a sport for man. Wild animals and birds are killed for their valuable skin, horns and flesh. Even the slightest damage by the wild animals to the crops is not tolerated, and this results in the of killing the wild animals and birds. Also ever since the portions of this division have been affected by militancy, the threat to the wild animals has increased considerably. In the recent past issuance of gun licenses on the large scale to the local inhabitants under the garb of self-protection has mainly been responsible for large scale killing of wild animals and birds. Man is responsible for creating a ecological imbalance in the biological pyramid by killing certain forms of wild life. Large scale destruction of forests, encroachments, excessive telling and frequent fires are also responsible for destroying the habitat of the wild life.

2.15.3 **Injuries by Epidemics**

Epidemic is rare among the wild animals and birds. No attempt has so far been to study this aspect of the wildlife. However sometimes contagious diseases do spread among the wild animals mainly through the domestic animals grazing inside the forests.

2.15.4 **Injuries by Fire**

Fire is responsible for large scale destruction of small animals, birds and micro-fauna. At times wild animals also get trapped and killed in the forest fires.

2.15.5 **Injuries by Atmospheric Influences**

Though the wildlife has an in built capability to withstand and survive the vagaries of nature, yet unlikely atmospheric influences do effect the young ones of the wild animals and the birds. Birds suffer tram heavy snowfall, rain, storms and drought as their young ones and eggs are destroyed by the atmospheric influences.

CHAPTER-III

Utilization of the Produce

CHAPTER-III

Utilization OF Produce

3.1 Argicultural Customs and wants of the population

3.1.1 Most of the population depends upon agriculture which is rain fed. No irrigation facility is available in the division due to its tough terrain. The concept of horticulture is almost non-existent. However some silk worm rearing, Sericulture and Traditional Apiculture is being practiced. Modern techniques have also been noticed at few places. 95% of population reside in villages whose socio-economic conditions are generally poor. The houses are generally flat-toped covered with mud and consume large quantity of timber. Now these mud houses are being replaced by houses with a roofing of CGI sheets.

3.2 Market and Marketable Produce

3.2.1 Timber is the main forest product of the division. The main timber yielding species of this division are Deodar-Kail, Chir and Fir. Due to ban on green felling the extraction of timber is done from only dry standing and fallen trees. The extraction is done departmentally or through state forest corporation. The timber extracted by state Forest Corporation is sold usually at Ramnagar through open auction.The timber extracted departmentally feed the timber sale depots of the division. The detail of timber extracted by State Forest Corporation and departmentally is given in Appendices No.XII and XIX respectively.

3.2.2 The forest department has established timber sale depots at Ramnagar, Basantgarh and Kulwanta. The Depot wise detail of timber sold detail of timber sold from these depots is given in below table no. 17

Table No. 3.1

S.No.	Year	Name of Timber Sale Depot	Volume	Amount
1	2009-10	Basantgarh	Nil	Nil
	2010-11	--do--	253.31 CT.	N/A
	2011-12	--do--	173.50 CT.	N/A
	2012-13 upto 12/2012	--do--	27.76 CT.	N/A
2	2011-12	Kulwanta	Nil	Nil
		--do--	352.71 CT.	N/A
	Total			

Source:- Divisional Forest Officer, Ramnagar Forest Division

3.2.3 Non- Timber Forest Produce (Minor Forest Produce): There are numerous species in this division which have medicinal or other value and their exploitation is economically suitable for local peoples and business class as well. However, there is complete ban on extraction of plants medicinal value though collection of Gucchii etc. is not prohibited. The detail of species existing in this division are:-

Table No. 3.2

S.No.	Common Name	Botanical Name
1	Amla	*Emblica officinalis*
2	Banaksha	*Viola canescence*
3	Baeheda	*Terminalia belerica*
4	Bankakri	*Podophylum emodi*
5	Bamboo products	*Dendrocalaus strictus*
6	Dhoop	*Jurineam acrocephala*
7	Gucchii	*Morcheela esulanta*
8	Harra	*Terminalia chebula*
9	Kaur	*Picrorhiza kurooa*
10	Kamila	*Mallotus philippinensis*
11	Kakarsinghi	*Pistacia integerrima*
12	Katha	*Acacia cacthu*
13	Muskbala	*Veleriana wallichi*
14	Patis	*Aconitum species*
15	Rasount	*Berberis lyceum*
16	Resin	*Pinus roxiburghii*

3.3 Line of Export

3.3.1 The river Ujh in Basantgarh and Ramnagar nalla which drain Basantgarh valley and Ramnagar valley respectively constitute the main water bodies for transport of timber through water. The timber was floated down through these water bodies or their tributaries to transit depots down below where from they are transported by road to Ramnagar. Ramnagar – Majori road, Ramnagar-Udhampur road, Ghordi-Udhampur road and Ramnagar-Basantgarh road are used for transportation of timber by trucks. Previously in Basantgarh area timber floated in Ujh used to be caught near the point where Ramnagar-Pathankot road crosses. After the construction of Dhar road, timber started to be collected as Mandali on Dhar-Udhampur road. However, there is an increasing trend of transporting the timber by trucks wherever roads available.

3.4 Methodsof Harvesting and their cost

3.4.1 The markings are done in advance and all marked trees are serially numbered and classified into diameter classesforvolume estimation. Besides, these are branded with hammer marks at the base and breast height on the trees. Trees are felled by employing saws and axes as near to the ground as possible. The bole of the tree is then cross cut into logs of standard sizes by cross cut saw and converted into sleepers and scantings by hand sawing. Extraction of timber in log form is not possible due to remoteness of the interior catchment from the road sides. Gravity rope ways, pry slides and wet slides are generally used for bringing down the converted stuff either to the banks of the stream/river or to the road sides. The J&K State Forest Corporation makes its own arrangements for extraction and export of the out turn. Crude resin is extracted from the Chir forests through the contractors, and received in tins at various transit depots fixed for the purpose on road sides. The areas selected for resin tapping are first enumerated and grouped into lots depending upon the number of blazes. The lots are

put to open auction for extraction of resin and its transportation up to and delivery at transit depot. The contractors make their own arrangements for extraction and carriage of resin up to the transit depot. Crude resin filled tins extracted from the Chir forests are delivered by the contractors to various transit depots located along road sides. The stock position of each depot is intimated to the office: of the Chief Conservator of forests, Ramnagar. The stocks are then auctioned, in-situ, at a centralized auction. The purchaser, after obtaining the release order, then transports the resin stocks by road. Other NTFP are generally auctioned off to contractors who extract and transport the material employing their own means.

3.5 Cost of Extraction

3.5.1 At present, State Forest Corporation is the major agency responsible for extraction of timber all over the State of Ramnagar and Kashmir. The cost of extraction varies from year to year, and from one place of working to another depending upon the remoteness, terrain ofthe area and availability of the labour,and volume of work involved. The schedule of rates of State Forest Corporation is given in tabular form below:

Table No. 3.3

Schedule of Rates of State forest Corporation

S.No.	Activity	Category			
	SAWN FORM	**D**	**C**	**B**	**A**
(a)	**Extraction (on FMM)**				
1	Felling (per cft)	2.63	2.21	1.99	1.57
2	a. Hand sawing-under/odd size (per cft)	34.83	31.83	29.47	26.81
	b. Hand Sawing-standard size (per cft)	39.81	36.37	33.68	30.64
	10/12x10x5;10/12x10x5 Psl; 8/9x10x5;10/12x8/7x5 &Psl; 10/12x10x4				
(b)	**Off – Road Transportation (on DMM)**				
3	Pathroo (per cft) / km of 33 chain)	5.82	5.66	5.52	5.37
4	PacciNali (per cft/km of 33 chain)	2.18	1.96	1.96	1.88
5	Tarspan (per span/cft)	4.91	4.67	4.67	4.67
6	S.N. Mahan (per cft per km of 33 chain)	1.53	1.44	1.44	1.33
7	Main Nallah Mahan (Cft/km)	1.33	1.33	1.33	1.33
8	Head carriage (forests) (prcft/chain)	0.43	0.43	0.43	0.43
9	Crane (per cft/km)	7.36	6.99	6.99	6.99
10	H/C after nikkasi (per cft/chain)	0.45	0.45	0.45	0.45
(c)	**Minor-Related Activity (on DMM)**				
11	Launching (S.N. Mahaning) / cft	0.32			
12	Nikassi (per cft)	0.64			
13	Stacking (per cft)	0.61			
	LOG FORM	5.90			
(d)	**A. EXTRACTION (A1+A3)**	3.93			
14	**A1.1**Debranching& Debarking/cft	0.80			
15	**A1.2** Sawing & Log making/cft	3.13			

16	**A3** Felling (per cft)	1.97
17	Loading Logs (per cft)	3.55
18	UnLoading Logs (per cft)	0.04

(e) Log Rolling

S.No.	Log rolling uptoKutcha Loading Point (per cft per chain)	Norm rate in rupees
1	Category A (0-20 degrees)	0.73
2	Category B (20-30 degrees)	0.53
3	Category C (30-40 degrees)	0.38
4	Category D (> 40 degrees)	0.18

(f) Kutcha Road-Transportation (Log Form)

(Figures in Rupees)

Volume Slab cft	Distance Slab			
	0-5 km	**6-10 km**	**11-20 km**	**Above 21 km**
Upto 5000	2.69	2.06	1.61	1.26
5001-10000	2.24	1.91	1.35	0.93
10001-20000	2.51	1.86	1.32	0.91
20001-40000	2.39	1.76	1.25	0.86
40001-80000	2.26	1.63	1.14	0.76
Above 80001	2.13	1.53	1.07	0.71

(g) Pucca Road Transportation (Log Form)

(Figures in Rupees)

S.No.	Distance Slab in km	Rate in Rs/Cft/km	Rate with 15% Contractor's profit (Rs/cft/km)
1	0-20	0.27	0.31
2	20-40	0.24	0.27
3	40-70	0.22	0.25
4	Above 70	0.19	0.22

(h) Pucca Road Transportation (Sawn-Form) – National Highways

(Figures in Rupees)

S.No.	Distance Slab in km	Rate in Rs/Cft/km	Rate with 15% Contractor's profit (Rs/cft/km)
1	0-50	0.14	0.16
2	51-100	0.13	0.15
3	101-150	0.12	0.13
4	Above 151	0.11	0.12

(i) Road Transportation (Sawn-Form)

Other than National Highways = **Rs. 0.17 / Cft / Km**

(j) Loading charges (Sawn-timber) = **Rs. 1.14 /Cft**

(k) Extraction in log form on old NPC procedure

Activity	Rate
Extraction including felling, conversion, rolling etc. (all operations) upto KLP	At the average rate of Rs. 191 per labour per day as per NPC Procedure

Source:- J&K State Forest Corporation

3.6 Past and Current Prices

3.6.1 The rates charged from The J&K State Forest Corporation from the year 1985-86 onwards, as approved by the Department of Finance, Government of Ramnagar and Kashmir, for Ramnagar Province are reproduced Table no.

Table No. 3.4

Year	*Deodar*		*Kail*		*Fir*		*Chir*	
	Rs/Cft	*Rs/m^3*	*Rs/Cft*	*Rs/m^3*	*Rs/Cft*	*Rs/m^3*	*Rs/Cft*	*Rs/m^3*
1985-86	64.78	2287.64	43.03	1519.56	33.41	1179.85	18.87	666.36
1986-87	87.78	3099.86	56.92 .	2010.07	39.84	1406.91	36.99	1306.26
1987-88	91.37	3226.64	43.31	1529.45	33.32	1176.66	36.99	1306.26
1988-89	87.22	3080.17	33.18	1171.72	29.90	1055.88	36.99	1306.26
1989-90	94.23	3327.64	44.77	1581.00	35.02	1236.70	36.99	1306.26
1990-91 to 1999-2K	94.23	3327.64	44.77	1581.00	35.02	1236.70	36.99	1306.26

The royalty chargeable from J&K State Forest Corporation has been calculated on the above approved rates. The payment of the royalty in full has never been made by the] &K State Forest Corporation. It is generally paid in small amounts and piece meals. This has resulted into accumulation of huge outstanding dues against the Corporation. Timber is also sold by the Forest Department through timber sale depots of respective divisions.

The species wise rates charged at departmental timber sale depots of Ramnagar Forest Division are tabulated as under.

Table No. 3.5

Year	Zone	Type	Sale rate in Rs/Cft.			Remarks
			Deodar	Kail	Fir	
1994-95 w.e.f July 95	A	Log	60	38	22	
		Sawn	75	45	30	
	B	Log	105	68	52	
		Sawn	120	82	58	
	C	Log	145	83	57	
		Sawn	176	114	64	
1998-99 w.e.f Aug 98	A	Log	90	57	33	
		Sawn	13	68	45	
	B	Log	158	102	78	
		Sawn	180	123	87	
	C	Log	218	125	86	
		Sawn	264	171	96	
13/05/2010 Onwards	A	Log	210.98	148.55	182.60	This includes VAT @ 13.50% and development fund @ Rs. 1 per cft.
		Sawn	245.03	182.60	84.99	
	B	Log	392.58	279.08	157.63	
		Sawn	426.63	313.13	191.68	
	C	Log	583.26	409.60	233.68	
		Sawn	617.31	443.65	267.73	

Firewood sale rates:

1. For religious purpose @ Rs. 190 per quintal.
2. Commercial @ Rs. 450 per quintal + extraction charges as per actual.

CHAPTER-IV

Activities of Forest Development Corporation in Harvesting and Marketing of Forest Produce

CHAPTER-IV

Activities of Forest Development Corporations in Harvesting and Marketing of Forest Produce

4.1 Introduction

4.1.1 The socio economic survey explores the factors determining the dependence of local population on the forests of this division. The house hold data for this study has been taken from census report of 2011 and some other sources. The interaction between the forests and the people is of great significance from the view point of welfare of population and management of forests on a sustainable basis. The relation between forests and the people assume importance in the development of social policies because of the fact that the people who depend on forests for the livelihood suffer from geographical isolation. The NTFP's play an important role in the development of these communities.

4.2 Objects of Study

1. To impute income generated from NTFP's and other sources.
2. To examine the dependence of the people on the forests.

4.3 Data Collection

4.3.1 The Ramnagar Forest Division occupies 1.35% forests of State of Ramnagar and Kashmir supports a human population of 7.24%. The total population of this division as per 2011 census is 167010. The population comprise of mostly Hindus, the Muslum are confined to some pockets of Basantgarh and Ramnagar. The data related to population caste etc. is given in the tables below:

Table No.

Human Population

(Source Office of the DDC, Udhampur)

Table No. 4.1

S.No.	Population		
	Male	Female	Total
1	86755	80255	167010

Table No. 4.2

Category	Population		
	Male	Female	Total
Urban	3237	3055	6292
Rural	83518	77200	160718

Table No. 4.3

Category	Population		
	Male	Female	Total
Schedule Caste	28802	26790	55592
Schedule Tribe	8347	7726	16073

The detail of number of families based on poverty is given in below table:

Table No. 4.4

No. of Families				
Above Poverty Line (APL)	**below Poverty Line (BPL)**	**Anatodeya Anna Yojna (AAY)**	**Anna Purna Scheme (APS)**	**Total**
11825	6547	2919	113	21404

Literacy Rate	Male	52.06%
	Female	47.94%

Agriculture Farming Families	19205

Liquified Petroleum Gas (LPG) Connections	4970

4.3.2 The Ramnagar town is the main commercial hub of the division and the business is in the control of Mahajans. Besides Ramnagar, Ghordi and Basantgarh are the important Business Centres. These fall in Ramnagar South, Ramnagar North and Basantgarh respectively. Since the terrain of the entire Division is hilly with a few flat places, the Bench Terracing technique has been adopted by the locals to raise agricultural crops. Private land holdings in the division are small and fragmented, Cultivation is mainly dependent on rainfall. Irrigation facilities are scarce. Resultantly, crop yield is very poor. Only few large farmers produce sufficient food grains to meet their year rounds requirements. Majority of fanners produce food grains, which can hardly meet three to four months requirement. Agriculture is unable to meet even subsistence needs of the village communities. There is heavy reliance on forests to bridge the gap. This is manifested in large holdings of goats and sheep to supplement household income, because

there is negligible cost involved in their upkeep. Goats, sheep as well as cattle are left to open grazing on forestlands and village common lands. Similarly, demand for timber, fuel wood, small timber and other forest produce is increasing, day by day with the growth in population. The other activities taken up for imcome generation include the following.

1. Animal Husbandry
2. Horticulture
3. Sericulture
4. Apiculture
5. Production of cheese kalari

1. **Animal Husbandry:** The animal rearing is an old tradition and it is directly related to agriculture. Since the rural population of this division is 96% of the total population. The detail of live stock data of Ramnagar division as per census of 2011 is given in Table no. 1.8 Chapter-I.
2. **Horticulture:** The Horticulture department had played an important role in the upliftment of Socio-economic condition of the rural inhabitants by introducing different horticultural activities in the area. About 25kinds of fruit plants grow in geographical area of Ramnagar Forest Division. The Horticultural Departmnt have planted about 2,47000 plants of various kinds such as Walnut, Apple, Olive, Lime (K), Galgal, Guava, Strawberry, Walnut (G), Musammi, Malta, Mango (G), LitchiAonla, Peach, Plum, Apricot , Lime (I), Guava (L), Pear, Kinnu, Loquat, Almond , Kiwi, Alovera, Peacannutw.e.f 2002-03 to 2011-12 NES Block (Ramnagar and Ghordi).
3. **Sericulture:** The area of the tract is suitable for cultivation of mulberry trees and about 550000 plants have been planted departmentally / distributed to farmer's w.e.f. 2000-2012 in Ramnagar Forest Division (NES Blocks Dudu, Ghordi &Ramnagar).
4. **Apiculture:** Though the Bee keeping is an old profession of the local inhabitants on old traditional methods. Now the Apiculture Development departments have introduced the concepts of Bee keeping on modesn techniques in this division (NES Blocks Ghordi and Ramnagar). From 2002-03 to 2011-12 2539 numbers of Bee colonies have been established which have produced 149.27 quintals of honey. The Apiculture Development Department has provided the information.
5. **Production of cheese kalari:** Kalari is a product born out of the inability of farmers in the remote areas of Ramnagar to sell milk due to production and marketing constrants. On an average the daily milk yield is 3 to 4 ltrs. Per animal and after personal consumption the milk which is left is coagulated to prepare kalari. The recovery percentage is roughly 10-12% which means for every litre of milk 2 to 3 kalariries (100-120gm). In tehsil Ramnagar in a village called Ritti the village development committee (VDC) started an ambitious dairy project with credt linkage from Bank. But the project was not able to give a big push to income generation activities like dairying and forage production (IWDP 2007). VDC Ritti is one rare success story pertaining to daily activity in the division.

4.4 Implementation of participatory Forest Management in Sustaining people's interest for Protecting and Managing the Forests:

4.4.1 Participatory Forest Management plays an important role for Rehabilitation of degraded forests which results in upliftment of socio-economic conditions of the people who reside around forests. The participatory gives both environmental and socio-economic. The environmental benefits are conservation of soil, enrichment of moisture regime, increase in vegetal cover, production of palatable grasses, fuel wood and small timber as well. The socio-economic benefits are employment on account of development works carried out for rehabilitation of these forests and entry point activities. In Ramnagar Forest Division the participatory afforestation programme in 2002-03 and all compartments of this division bearing degraded forests have been identified and allocated to Reboisement Working Circle. At the time of inception of this programme nineteen village forest committees were constituted for rehabilitation of these degraded forest areas. During 2010-11 twenty more village forest committees were constituted resulting in total number of 39 village forest committees for the entire division. The range wise detail of village forest committees is given in below Table No. 4.1.

Table No. 4.1

Range wise detail of Village Forest Commmittees

North Range		South Range		Basantgarh Range	
S.No.	**Name of VFC**	**S.No.**	**Name of VFC**	**S.No.**	**Name of VFC**
1	Barmen	17	Jandrari	30	Rasli Thakri
2	Satyalta	18	Sunetar	31	Joffer
3	Bindle	19	Amroh	32	Lerh
4	Nalla Goran	20	Baryalta	33	Balota Upperla
5	Nalla Mallian	21	Dhan walt	34	Basantgarh
6	Jandrore	22	Bulandh	35	Mong
7	Rassaian	23	Udhaak	36	Ponara
8	Katwalt	24	Rang	37	Kudhwah
9	Sullan Prey	25	Thellay	38	Sia Mehri
10	Kela	26	Pinger	39	Balota Chogla
11	Ladana	27	Bainsta		
12	Bari	28	Kogar marh		
13	Badhole	29	Rasli Gaderan		
14	Panj Grain				
15	Mahani				
16	Ser Balla				

4.4.2. The following measures have been taken to regain the trust of people

a. To ensure sustained economic stake of the people in protection of closures management actions have been taken to ensure continued availability of fodder grass are any other valuable produce from the closures. In order the meet the multiple needs of the people the following multi product forestry have been practiced.

   i. Silvi-pastoral model have been evolved in the rehabilitation of degraded

forest areas and spacing of trees have been increased to maintain the fodder grass output canopy manipulation or thinning have been under taken.

ii. Non-timber Forest Produce (NTFP) yielding species have been planted along the main species of the tract.

b. It is imperative to extend the provisions of the JFM rules to the core forest areas also which are predominantly conifers. Since it will not be wise on the part of department to alter the composition of forests and plant fuel, fodder species in conifers forests, effective arrangement will have to be evolved to make JFM attractive to the people. Only vested interest in the area stands can assure its protection and growth. Economic returns from forest must yield sufficient income to sustain peoples interest over time. Mechanism should be evolved for sharing the yield from thinning and timber extraction. However, following measures can be taken by department without any difficulty.

i. Simplification of the procedure for obtaining timber to generate good will among people.

ii. Raining of NTFP yielding species forming ground flora in these forests.

iii. Development of appropriate linkages with other departments engaged in rural development e.g. Horticulture, Agricultural, Animal Husbandry, Soil Conservation and District Industries Department.

c. For success of JFM equity and openness have been maintained.

d. It has been ensured that genuine involvement of all sections of the user community membership for the executive committee and Chairmanship be rotated. Regularity in meetings of executive committee and the general body has been maintained where all relevant information are presented and ensured that involvement of people and openness in transaction of business.

4.5 Conclusion

4.5.1 Even though forests provide adequate resources to the people living in their vicinity, there is process in transforming it into a reasonable revenue flow. Further the practical difficulties needs to be sorted out before working out a viable frame work in the form of JFM. The JFM has potentional to generate livelihood in rural communities, however the success depends on the nature of power sharing and benefits sharing. The success in the management of forests very much depends on the benefits of communities. Providing compensation to the local people for their effort in maintaining the ecological stability would result in a win-win situation for both the department and the people. The existing mechanism for the collection and marketing of NTFP's has many weaknesses. The measure one being the presence of various intermediate contractors who often pays less against the actual value of the product in the market. Higher marketing margin by these middle man result in higher consumer prices and low collection price received by the gathers. Hence, eliminating the cost of intermediance will improve the community benefits from the collecton of NTFP's. This will also serve as an incentive for the gatherers to cooperate willingly in managing the products sustainability.

4.5.2 As per the study on the production of Kalari it has been found that there is an opportunity for value addition and significant improvement in the livelihood and incomes of small dairy farmers, especially the women folk by enabling and promoting kalari value chains. The govennent can play a significant role by enabling an active coilators of stake holders in each cluster of hills and

villages that are not well connected to road network. These coilators added by proper) business plan and linkage to organized market are essential to provide economics of small scale and bargaining capacity to the small farmers. (Source a report on sustsinable livelihood for hills-policy.

CHAPTER-V

Staff and Labour Supply

CHAPTER-V

Staff and Labour Supply

5.1. The detail of Sanctioned Strength and actually working as on date is as under:

Table No. 5.1

S.No.	Category of Post	Sanction Strength	Actual working
1	Deputy Conservator of Forest	1	0
2	Assistant Conservator of Forests	1	1
3	Range Officers Grade-I Range Officers Grade-II	4 1	1 1
4	Foresters	22	13
5	Deputy Foresters	8	8
6	Forest Guards	85	38
7	Senior Assistants	1	1
8	Junior Assistants	4	2
9	Chowkidars	3	2
10	Mallis	1	0
11	Frash	1	0
12	Orderlies/Peon	2	2
13	Junior Drivers	1	2
14	Watches	0	1 (Adhoc)
15	Helpers	22	22

5.2 Labour Supply

The local labour is available for developmental works. The local skilled labour is available for timber extraction on small scale. The labour is usually imported for extraction of timber on large scale by state forest corporation.

CHAPTER-VI

Past System of Management

CHAPTER VI

Past System of Management

6.1 General History of the Forests

6.1.1 There is no authentic record available about management of the forests. However, it is an established fact the before the Dogra rulers, the forests were controlled by Revenue department. The trees were sold by girth. There was no proper management technique. Previously major portion of these forests was included in the jagir granted to Late Raja Sir Ram Singh Ji in 1933 (1876 A.D.) After the death of Raja Ji the Jagir along with forests was reverted to state in 1891. During these years the forests were managed systemically and sale of trees by girth continued till 1889 A.D.

6.1.2 The chronology of events which occurred in the Ramnagar Forest Division is given in Flow chart of Ramnagar Forest Division at page no. 1. It is worthwhile to mention here that all the ranges of the Ramnagar Forest Division were transferred from one division to another and have been covered under various working plans.

6.1.3 The State Forest Department which had been created in S-1948 (1891 AD) took their control. These forests remained in the old Ramnagar Forest Division which consisted of Ramnagar Range, Dudu Range and Basantgarh Range at that time from S-1956 (1899 AD) to S-1971 (1941 AD). In S-1971 (1914 AD) Dudu, Basantgarh and Ramnagar Ranges were tagged with told Jasrota Forest Division (comprising of Billawar, Basohli, Kathua and Jasrota Range and renamed as Billawar Forest Division; and Ramnagar Division was abolished. In S-1981 (1924 AD) both Ramnagar and Dudu Ranges were transferred to newly created Udhampur Forest Division while Basantgarh Range continued in the Billawar Division. Ramnagar Range was bifurcated into Ramnagar North and Ramnagar South Ranges in April 1984 AD.

6.1.4 The present Ramnagar Forest Division has been created in 1984 vide Govt. Order No. FST/2/54/1984 dated 23-05-1984 by transferring Ramnagar Range from Udhampur Forest Division and Basantgarh Range from Billawar Forest Division. The Ramnagar range was further splitted into Ramnagar North and Ramnagar South Ranges vide Govt. Order No. 123 of 1984-85 dated 19-04-1984.

6.2 Result of Working Plan up to S-1967 (1910 A.D.)

6.2.1 At the time when the forests were taken over by the State their condition was deteriorating. In order to conserve the forests the exploitation of timber was stopped and only removal of dead Deodar was allowed from 1899 to 1905.

6.2.2 **Past system of Management and their Results**

W.H. Lovegrove (IFS)The then CF prepared systematic forest working plan at Dudu - Basantgarh in 1967 (1919 AD) in which all low lying areas in Ramnagar Range were brought under resin tapping.A systematic improvement felling with a 15 years circle was introduced. After the first cycle the repetition of such improvement felling was recommended for another 15 years. In 1930 AD due to slump in timber market the felling was suspended due to which second felling was not recommended. The yield was

prescribed by area and not by volume which has resulted in variation in volume actually removed. The annual yield (in standing volume) worked out is as under:-

1.	Deodar	=	30500 Cft.	(864 m^3)
2.	Kail	=	26300 Cft.	745 m^3)
3.	Fir	=	63900 CT.	1800 m^3)

6.2.3 ***Result of Plan:*** This Silvicultural system adopted had resulted in appearance and establishment of regeneration of young crop. Some areas were closed for grazing in 1920 AD resulting in profuse regeneration but no artificial regeneration was attempted.

6.3. Sh. S.D. Dhars Plan (1998-2007) (1942-43 to 1956-57 AD)

6.3.1 This was the first working of Kathua Forest Division which was prepared on modern scientific techniques, i.e. proper compartmentation of forests area.Mapping of forests areas stock maps were prepared.Enumeration was carried out in Deodar Kail Working Circle. The following Working Circles were constituted

1. Deodar Working Circle.
2. Fir Working Circle.
3. Un-regulated Working Circle

6.3.2 **Deodar Kail Working Circle**

All the easily accessible well stocked Deodar forests were allotted to this Working Circle. The selection cum improvement system was prescribed on a 20 years felling circle. Exploitable diameter was fixed 30 cm dbh and rotation at 150 years.

The prescribed yield (10% less than calculated yield) is given below.

Deodar	1582.9 cm
Kail	130.3 cm
Fir	2395.6 cm

The prescription of the plan left a satisfactory impact on the young regeneration and the pole crop. No thinning was carried out due to economic reasons. The openings created helped the regeneration to come up.

6.3.3 **Fir / Spruce Working Circle**

In Fir Working Circle all such areas possessing well stocked Fir/Spruce crop were allotted to this Working Circle. The Selection system was applied for the management of these forests. Exploitable size of 30 cm at dbh was fixed with a rotation of 180 years. Felling cycle of 30 years was adopted. The enumeration was not carried out but the yield was regulated by areas. The size of annual coupe was fixed to 142 hectares. Due to economic considerations no yield was realized during the plan period.

6.3.4 **Un-regulated Working Circle**

This Working Circle was constituted by allotting all those forests of Deodar, Kail, Fir and Chir and the broadleaved species which were poorly stocked and were inaccessible. In

this circle all silvicultural operations except improvement felling for meeting up the demand of locals were prescribed. The lopping and heavy grazing was prohibited.

6.4. Fotedars Plan 1957-58 to 1973-74

6.4.1 For old Billawar Forest Division. Sh. Dhar's plan was revised by S. Fotedar. Though this plan was originally written for 1954-55 to 1973-74, but due to extraction of Dhar's plan for 5 more years it became operational in 1957-58.

The old Billawar Forest Division had 5 ranges viz.

a. Basohli
b. Billawar
c. Kathua
d. Jasrote
e. Basantgarh

The following Working Circle were constituted by Mr. Fotedar.

i. Deodar Working Circle
ii. Fir Working Circle
iii. Un-regulated Working Circle

6.4.2 **Deodar Working Circle:** All easily accessible well stocked pure Deodar forests and associated Kail and fir were included in this Working Circle. The system adopted by Mr. Fotedar was selection cum improvement. The exploitable diameter was fixed out 75 cm. dbh corresponding to an average age of 150 years. Thus a technical rotation of 150 years was fixed. Felling series of 30 years was adopted with single series. The assessment of growing stock was done by increment method. Due to paucity of funds initially, the enumeration was carried out in 6.6% of total areas. No standard statistical design of partial enumeration was adopted as initially total enumeration was proper for this Working Circle.

After calculation to a reasonable degree of accuracy, the CAI of these forests worked out to be 1.25% per annum for the entire growing stock of the Working Circle. However, to be on the safe side removal of only 1% increment was considered safe and justified, and as such prescribed. Thus, the final yield for the old Billawar Forest Division prescribed is given below:-

D	=	2,80,000Cft	=	7928.76 m^3
K	=	9,000 Cft	=	254.853 m^3
F	=	85,000 Cft	=	2406.9450 m^3

The yield calculated by Von Mantle's formula is as under:

D	=	10675.509 m^3
K	=	339.804 m^3
F	=	31999.821 m^3

The yield calculated by Von Mantle's formula was more than the yield calculated by increment method so the increment formula was adopted all the trees of 30 cm dbh (ob) and above were calculated towards the yield.

The Working Plan Officer prescribed round marking rules for major felling thinning, cleaning and subsidiary silvicultural operations, however the prescriptions of plan were not followed strictly. The silvi-culturally operations such as thinning, cleaning and subsidiary operations were carried out. Artificial regeneration of Deodar was not taken up, although prescribed.

6.4.3 **Fir Working Circle:** All the easily accessible well stocked Fir forests were included in this Working Circle. Mainly mature and over-mature crop was present in these forests in which young crop was deficient. The silvicultural system adopted was Indian selection system. The exploitable diameter of 75 cm dbh (ob) was fixed corresponding to an average age of 150 years. The felling circle of 30 years was adopted.The yield was calculated taking into consideration the coupe of 160 hectare in which all full green trees above 30 cm dbh (ob) above were counted.

6.4.4 **Un-Regulated Working Circle :** In this Working Circle all those forests of D,K,F which were poorly stocked, accessible were allotted. Besides Deodar, Kail and Fir forests, the forests of Chir and broadleaved which could not be exploited economically were also allotted to this Working Circle.

6.5 Jamwals Plan (1974-75 to 1983-84)

6.5.1 This plan was revised for old Billawar Division and Basantgarh Range was part of it. The Jamwal's Plan was assumed to have been extended upto 1989-90. The Working Circle constituted by Jamwal for Billawar Forest Division are as under:-

1. Deodar-Kail Working Circle.
2. Fir Selection Working Circle.
3. Chir Interim Working Circle.
4. Bamboo Working Circle.
5. Protection cum Improvement Working Circle.
6. Khair Overlapping Working Circle.

6.5.2 **Deodar-Kail Working Circle:**

- This Working Circle comprised of all the easily accessible well stocked Deodar forests which were spread over to Basohli, Basantgarh and Billawar Ranges. The Deodar forests in Basantgarh Range were described at that time as predominately Deodar yet with appreciable portion of Kail.
- Silvi-cultural System: The method of treatment adopted was conversion to uniform crop under shelterwood compartment system. It was clarified that no attempt should be made to produce theoretical uniform crop as this will involve huge loss to advance growth in the form of pole crop. It was suggested to remove the over-wood in series of operations called regeneration fellings and retain the advance growth. The Deodar forests were grouped in two main blocks i.e Regeneration Block and Unallotted block. The Deodar forests were grouped into two main blocks viz. Regeneration Block and Unallotted Block. Depending up on the crop condition those forests bearing mature crop

with sufficient advance growth or established young regeneration were allotted to the Regeneration Block while the rest were allotted to unallotted block. The regeneration block was further divided into conversion block and converted block. Compartments or sub-compartments were allotted to various floating P.Bs., keeping the condition of crop and regeneration in view. A technical rotation of 150 years was adopted.During this period of 150 years, on an average, a crop dia of 70 cm dbh is attained. Exploitation period was fixed at 30 years. The average diameter of the advance growth was estimated to be 40 cm dbh corresponding to an average age of 65 years. Thus, out of the total conversion period of 150 years, 65 years were stated to have elapsed and 85 years left. However, due to presence of appreciable proportion of advance growth averages 50 cm dbh the conversion period was fixed at 80 years.

- Assessment of Growing Stock was carried out by partial enumeration. About 63% of the commercial area was enumerated and the figures applied to the whole area by adopting the method of ratio and proportion. Following figures were arrived at:-

Deodar	=	17,42,365 m^3
Kail	=	1,08,298m^3
Fir	=	6,15,072 m^3

Only one felling series was constituted in the Working Circle. Yield for the entire Working Circle was calculated by the following formula:-

Total Growing Stock of the Working Circle Above 30 cm Dbh

Conversion period (i.e. 80)

Which worked out to			Rounded off to
Deodar	=	21,780 m^3	21,780 m^3
Kail	=	1,354 m^3	1,350 m^3
Fir	=	7,688 m^3	7,690 m^3
Total	**=**	**30,822 m^3**	**30, 820 m^3**

(=1.2% of G.S.)

Yield for the regeneration block was calculated by the formula

$$\frac{\text{Growing stock in the Regeneration Block above 50 cm dbh}}{\text{Exploitation period (i.e. 30 years}} \times f$$

Where f is the Silvicultural availability factor taken as 80% for Deodar & Kail and 50% for Fir.

The annual yield prescribed for the regeneration block worked out to:-

Deodar	=	12020 m^3
Kail	=	440 m^3
Fir	=	2540 m^3
Total	**=**	**15000 m^3**

- The yield for the unallotted block was calculated by subtracting the yield of regeneration block from total yield of the Working Circle. A thinning cycle of 30 years was prescribed for the unallotted block within an area of 134 hectares to be gone over annually for thinnings and improvement fellings.
- The annual yield prescribed for the unallotted block was:-

Deodar	=	9760 m^3
Kail	=	910 m^3
Fir	=	5150 m^3
Total	**=**	**15820 m^3**

- The annual yield per hectare prescribed for unallotted block averages to 118 m^3 per hectare, which is quite high. The reason for its higher estimation is that for purposes of yield calculation growing stock was taken to include everything above 30 cm dbh in the unallotted block. While it had been prescribed that everything upto 45 cm dbh should be treated as regeneration and as such has to form the part of the future crop. Thus an anomaly was introduced in the yield calculation in unallotted block.
- Following compartments were allotted for working during the periodof the plan.

Table No. 6.1

	Seawia Block		Basantgarh Range		
Block	Compartment	Commercial Area (Hectare)	Compartment	Commercial Area (Hectare)	Total
Conversion	8,10,11,12b,14,17b	636	6,10,44a,45	667	1303
Converted	1,2,5,6a,12a,15a,16,20,22,23,24b,45a,70	665	14a,14b,15,16,61	486	1151
unallotted	13,21,29a,29b,33	538	9a,13,17a,28,46a,46b, 46c,47,48	795	1333

- It is seen that the area worked out for conversion in the plan was 66 hectare annually with a total of 660 hectare, during the plan period but actually 1303 hectare, area was allotted for conversion during plan.
- The yield realized from 1974-75 to 1986-87 for a period of 13 years in this Working Circle is as under:-

Table No. 6.2

Regeneration Block	Deodar	Kail	Fir/Spr.	Total
Total prescribed yield for 13 years (in m^3)	156260	5720	33020	195000
Actually realized during 13 years (m^3)	89384	6556	41424	137364
Excess or deficit realized in (m^3)	-66876	+ 836	+ 8404	- 57636
Unallotted Block				
Total prescribed yield for 13 years (in m^3)	126880	11830	66950	205660
Actually realized during 13 years (m^3)	11223	2623	5589	19435
Excess or deficit realized in (m^3)	- 115657	- 9207	- 61361	- 186225

- It is evident from above that the average yield realized is only 70% with an deficit of 30% in the regeneration block. Similarly in unallotted block the average yield realized is only around 9% with a deficit of 91%. Thus huge deficit is definitely because of the erroneously high yield prescribed for the unallotted block by Mr. Jamwal in his Plan.
- **Exploitation Period**
    a. The ratio of the commercial area in conversion unit (conversion and converted blocks) to the commercial area of the entire Working Circle multiplied by 80 (i.e. the remaining conversion period).

    Or

    b. The ratio of the volume of Deodar-Kail above 50 cm dbh in the conversion unit, to the volume of Deodar-Kail in the entire Working Circle (above 30 cm) multiplied by 80, (i.e. the remaining conversion period). Hence the exploitation period is

    a. 2454/6455 x 80 = 30 approximately
    b. 467271/1850663 x 80 = 27 say 30 years

Thus exploitation period was taken as 30 years at the beginning of Jamwal's Plan.

- ***Results***
    1. The pace of conversion proceeded faster than envisaged in the plan.
    2. The yield prescribed from unallotted block was quite high and could not be attained.
    3. Thinnings and improvement fellings were not carried out to the desired extent.
    4. Subsidiary Silvicultural operations though prescribed were not carried out.

6.5.3 Fir Selection Working Circle

- This Working Circle comprised of well stocked and accessible Fir/Spruce forests consisting of either a pure crop of Fir/Spruce or sometimes mixed with Deodar and Kail. The crop in this Working Circle was mostly mature to overmature with deficiency of younger age classes.
- Silviculture system prescribed was the Selection system. Exploitable diameter was fixed as 70cm dbh for Fir and Deodar and 60cm dbh for Kail, 70cm dbh in case of Fir corresponds to a technical rotation of 180 years. Fellings of selection cum improvement type were prescribed.
- Growing stock was assessed by enumerating approximately 70% of the commercial area in the Working Circle. Simple ratio proportion method was used to calculate the growing stock in the entire Working Circle. Growing stock above exploitable diameter in the 70% area enumerated was worked out to be:-

Deodar	=	9835 Nos.
Kail	=	677 Nos.
Fir	=	91515 Nos.

- Annual yield was calculated by Brandi's method. Total availability was worked out as 20% added for 30% are not enumerated.

Table No. 6.3

Species	Surplus +	Recruitment		Total
Fir	= 687	+ 606	= 1293 trees IV Class + 258	= 1551 Nos.
Deodar	= 64	+ 146	= 210 trees IV Class + 42	= 252 Nos.
Kail	= 4	+ 12	= 16 trees V Class + 3	= 19 Nos.

- In term of volume, annual yield comes to:-

  Fir = $7600m^3$
  Deodar = $800m^3$
  Kail = $40m^3$
  Total = $8440m^3$

- For calculating the rate of annual recruitment from approach class to the exploitable class following disappearance percentage species wise was used:

  Deodar = 15%
  Kail = 15%
  Fir = 30%

- The period of plan being 10 years and felling cycle being 30 years only $1/3^{rd}$ of the total commercial area of the Working Circle was to be gone over during the plan period. Following compartment were prescribed for working during the period of plan:-

Table No. 6.4

Range	Compartment allotted	Commercial Area
Basohli (Seawa)	51, 52, 59, 60, 62, 63	1010 hectares
Basantgarg	21, 29, 38, 41, 42, 53, 54, 55, 56	1141 hectares
		2151 hectares

Annual Area = $\frac{2151}{10}$ = 215 ha

The annual yield per hectare works out to $39m^3$.

$\frac{8440}{215} = \frac{\text{(Annual Yield)}}{\text{(Annual Area)}} = 39m^3$

- All green fit standing trees of 30cm dbh and above marked for whatever purpose in the Working Circle were to count towards yield. The yield realized from 1974-75 to 1986-87 for a period of 13 years in this Working Circle is as under.

Table No. 6.5

	Deodar	Kail	Fir/Spruce	Total
Total prescribed yield for 13 years (m^3)	10400	520	98800	109720
Actually realized during 13 years	8109	434	72057	80600
Excess or deficit realized in m^3	-2291	-86	-26743	-29120

Thus in Fir Selection Working Circle the average yield realized is 73% of the total prescribed with a deficit of 27%.

- Marking rules were provided for the guidance of the marking officers those included the following:-
    1. All exploitable sized trees standing over or interfering with good regeneration or advance growth were to be marked.
    2. In groups of trees of exploitable size with insufficient regeneration underneath, the intensity of marking was prescribed like that of preparatory fellings under the uniform system.
    3. Improvement fellings in lower diameter classes were prescribed. Beside these supplementary markings and subsidiary silvicultural operations were also prescribed.
- ***Results:*** The silvicultural system adopted is ideally suited to the Fir/Spruce forests of this area keeping in view the nature of terrain and the conditions of crop. About 73% of the prescribed yield was actually realized thus fellings have been carried out on a conservative side. Rotational grazing, though prescribed, was not adopted in the field to the desired extent. Closure to grazing on rotational basis was strongly recommended to help natural regeneration to come up.

6.5.4 Chir Interim Working Circle

- This Working Circle covered almost all the well stocked Chir forests of Basantgarh, Billawar, Basohli,Jasrota and Kathua Ranges. The crop was said to be generally straight boled in the upper zone of quality and that in the lower zone with malformed and twisted boled quality. Crop was generally deficient in mature and over mature classes and rich in younger age classes. However, regeneration of Chir was found to be deficient due to frequent fires and grazing damage.
- An interim management was prescribed which consisted of thinnings cum improvement fellings with gradual removal of malformed, mature and over mature trees. This was necessitated by the condition of the crop. An exploitable diameter of 60cm dbh corresponding to an average age of 120 years (Rotation age) was adopted.
- Growing stock was assessed by carrying out total enumerations in 10% area. The results were applied to the whole Working Circle by simple method of ratio and proportion.
- For yield calculations Brandi's method was used. Annual yield prescribed for this circle was 16,985 m^3. During the period of the plan (10 years) as area of 6420 hectare was prescribed to be gone over. Thus, 642 hectare was to be covered annually. No annual coupes were defined by the working plan office and allotment was left to the discretion of territorial Divisional Forest Officer.
- The yield realized from 1974-75 to 1986-87 for a period of 13 years in this Working Circle is as under:-

  Total prescribed yield for 13 years = 2,20,85 m^3
  Actually realized during 13 years = 75,684 m^3
  Excess or deficit realized = -1,45,121 m^3

  Thus the average yield realized is 34% of the total prescribed yield with deficit of 66%.

6.5.5 Resin Tapping

- The French "Cup and Lip" method of resin tapping was prevalent in the Division during the plan period. Both light continuous tapping and heavy tapping were resorted to. Trees having girth of 100 cm to 180 cm at breast height were given one blaze and those above 180 cm were given two blazes at a time, with 10cm interspace provided between two successive channels. Prior to Jamwal's Plan resin tapping was being conducted as per the scheme prepared by Late Des Raj Malhotra since 1994-95 (i.e. 1937-38 AD). For organizing tapping resin blocks were constituted which would comprised of 3 to 4 compartments so that each such block could be easily controlled by one Forest Guard known as the Resin Block Officer.
- Enumeration of Chir crop above 30 cm dbh was carried out in 10cm dia classes to get an idea of the number of blazes in the block. Each block was subdivided into a number of coupes, each coupe having about 500 channels which could be conveniently looked after by a tapper. Setting up of crop was started on 15th of February and completed by 18th of March. Tapping continued up to end of October (i.e. hardly for 7 months), only in rare cases it extended upto 15th of November (8 months).
- Control burning atleast one in five years and providing fire-fighting equipment including construction of watch-towers was recommended. Besides this closure to grazing was also advocated.
- ***Results :*** Though the prescriptions of Sh. Jamwal's plan were good yet they were not implemented to the desired extent. The regeneration activities and cultural operations prescribed by Working Plan Officer were not paid due attention during plan period. The Cup and Lip method of resin tapping was misused by resin contractors by resorting to marking of deep cuts on the base of the stem. Deep channels resulted in drying of Chir trees in some areas. Fire conservancy measures were not taken and watch towers for fire fighting and early warning were not erected. Fire continued to create loss of valuable timber and damage to young regeneration.

6.5.6 Protection-Cum-Improvement Working Circle

- It comprised of all the forest areas coming under the heads of catchment of important rivers and streams and inaccessible areas or areas which needed protection or improvement by way of taking of soil and water conservation measures and helping the vegetal cover to establish. Bamboo and Khair Working Circles did not cover any area of Basantgarh Range and as such are not discussed here.

6.5.7 Past Management of Forests of Ramnagar Ranges

- The forest areas of present day Ramnagar North Range and Ramnagar South Range constituted a single range namely Ramnagar Range, prior to April 1984. Ramnagar Range along with Basantgarh Range and Dudu Range constituted the old Ramnagar Forest Division in 1899 AD. When Lovegrove's Plan was introduced in Dudu Basantgarh the Chir bearing areas of Ramnagar were slowly brought under resin tapping. In 1914 Ramnagar Range was transferred to Billawar Division but became a part of Udhanmpur Division in 1924.

6.5.8 General History of Resin Tapping

- The only commercial value of the low lying Chir forests of Udhampur and Ramnagar Ranges, that had come to be better understood, was to exploit these forests for resin tapping. Before 1970 (1913 AD) the scanty market demand of Amritsar for crude resin was being met with from the Ramnagar province forests. The quantity of resin then sold is not known but the method employed consisted of giving a single deep first and final cut into trunk of the tree after fixing the pot. The system was however injurious and was given up.
- It was W.H. Lovergrove the then Conservator of Forests, J&K who in 1971 issued a Circular No. 42 dated 06-08-1912 concerned with resin tapping. This was extended later to old Reasi Division (now Udhampur Division) where it flourished in Udhampur Range. Lala Mulk Raj drew up a scheme in 1976 which was followed by a more exhaustive scheme in 1978.
- Initially, Chir trees were tapped for five years followed by a rest of 10 years. In 1978 Lala Mulk Raj provided 5 years tapping followed by a rest of 5 years. Light continuous tapping was introduced in November 1924 AD. During 1971 (1924 AD) only 3000 Chir trees were tapped but in 1985 (1928 AD) the number went up to 5 lakh.
- As regards the area brought under resin tapping a beginning was made in Krahi-Dhar forests in Udhampur Range. In 1924 AD Udhampur Division was constituted and all Chir trees for resin, were transferred to it. Similarly two Ranges of Dudu and Ramnagar were detached from the Billawar Division and added to Udhampur Division with further extension. Garh Panjain beat of Basantgarh Range (Billawar Division) was taken control of by Udhampur Division for resin tapping but subsequently returned in 1931 when demand decreased. In the beginning the number of resin channels to be made in tree are given as under:-

Table No. 6.6

Girth at breast height	No. of Channels
3'-7" to 4'-6"	One Channel
4'-7" to 6"	Two Channels
Over 6'	Three Channels

These rules were again revised as under Vide No. 544/A dt: 11-11-1925.

Table No. 6.7

Girth at breast height	No. of Channels
3'-7" to 6'	One Channel
6' and above	Two Channels

However tappers have caused much harm to trees by resorting to blazes deeper then provided under rules. Lack of attention to specifications in the past has resulted in wastage of tappable space.

6.6. G.R. Sofi's Plan (1959-60 to 1973-74)

6.6.1 G.R. Sofi's Plan was the first consolidated plan of Udhampur Forest Division after its constitution and Ramnagar Range was part of it. The erstwhile Ramnagar Range was covered under the following Working Circles.

- Chir Regulated Working Circle.
- Resin TappingWorking Circle.
- Broad-leavedWorking Circle.
- Un-regulated Working Circle.

6.6.2 **Chir Regulated Working Circle:** All the low lying, easily successible well stocked forests were allotted to this Working Circle. The shelterwood compartment system was adopted for this Working Circle and the whole crop converted into 90 years period. The regeneration period was fixed 30 years and exploitable diameter was fixed 60cm dbh.The two periodic blocks i.e., Regeneration Block and Un-allotted block were recognized.The regeneration block comprised all the compartments in which regeneration felling was carried out and remaining compartments of this Working Circle were allotted to un-allotted block.

6.6.3 **Resin Tapping Working Circle:** All such compartments of Chir forests which were not fit for timber extraction were included in this Working Circle. The Chir trees were grouped in 2 classes between 13'' to 23'' dbh and 2nd treeabove 23'' dbh. One resin channel was prescribed for trees below 23'' dbh and two channels for trees above 23'' dbh. Comprehensive guidelines were laid down for extraction of resin. The French Cup and lip method was used for resin tapping. The detail of enumeration of Ramnagar Range is given below.

Table No. 6.8

Range	No. of trees		Corresponding No. of Blazes		
	13''-23''	Above 23''	13''-23''	Above 23''	Total
Ramnagar	185880	35782	185880	71564	257444

- **Results:** The activities of resin tapping were extended to other Chir forests even beyond the boundaries of the Working Circle. The rules for resin taping and prescriptions of the working plan were not followed during the course of resin tapping which resulted in reducing the tappable life of Chir trees.The main object of the wagemates is well as department was to obtain the maximum possible yield irrespective of health of the trees.

6.6.4 **Broad-Leaved Working Circle:** The Working Circle comprised all low lying scrub forests of Ramnagar Range. The forests were meant for meeting the domestic requirement of firewood agricultural implements, raw material for wood based industries and college industries, besides they provide habitat for wild animals. No proper treatment was prescribed for these forests however for extraction of firewood, two felling series were constituted i.e. scrub series and Rakh series.

- The main aim of management of these forests were protection of game and vegetation and providing grazing area to locals as well as nomads.
- **Result:** Since the prescriptions of the plan were not followed properly, result was in heavy lopping of Banj Oak for fodder and fuel purposes and uncontrolled grazing that resulted in depletion of palatable grasses.

6.6.5 **Unregulated Working Circle:** The poorly stocked inaccessible forests areas which are situated far-flung areas away from roads and nallas and are located at the head of catchments of side are allotted to this Working Circle. The prescriptions for this Working Circle were Protection from Grazing and Adoption of Fire Conservancy Measures.

- **Result:** Due to excessive uncontrolled grazing, illicit damage and frequent forest fires, the forests of this Working Circle were adversely affected.

6.7. S.P. Sharma's plan for Udhampur Forest Division

6.7.1 G.R. Sofi's Plan for erstwhile Udhampur Forest Division when Ramnagar Range was part of it, was revised by Mr. S.P. Sharma. The following Working Circles were constituted for Ramnagar Range.

1. Chir Regular Working Circle.
2. Improvement –cum-rehabilitation Working Circle.
3. Broad-Leaved Working Circle.
4. Resin Overlapping Working Circle.
5. Protection Working Circle.

6.7.2 **Chir Regular Working Circle:** All easily accessible Chir pine forest which were compact and well stocked were allotted to this Working Circle. Only one felling series was constituted for Ramnagar Range. The details of area are as under:-

Table No. 6.9

S.No	Felling Series	Range	Commercial (Area in Hectare.)				Total	Un Commercial (Area in Hectare.)	
			Chir	Kail	D	F		Blank	Grand Total
1	Ramnagar	Ramnagar	4944	-	-	-	4944	613	5557
Total			16517	233	21	-	16766	1615	18381

Table No. 6.10

The summary of treatment prescribed by Sh. S.P. Sharma is as under:

1	Silviculture system	Shelterwood compartment system adopted
2	Rotation method	120 years Technical Rotation corresponding to an average dbh of 60cm.
3	Conversion Period	80 years from start of S.P. Sharma's Plan i.e. 1985.
4	**Periodic Blocks** a. Converted PB b. Conversion PB	 Regeneration Block Regeneration Block

	c. Unallotted PB	Rest of the area.
5	Advance Growth	All growth of Chir up to dbh of 50 cm was considered as advance growth besides, part of 50 cm to 60 cm crop in groups and mixing with the advance growth was also treated as part of future crop.
6	Regeneration Period	30 years
7	Felling Series	Two 1. Udhampur Felling Series 2. Ramnagar Felling Series.
8	Treatment in Converted Block	Removal of residual overwood thinningin ongested pole crop. Artificial regeneration in areas where natural regeneration has failed.
9	Treatment in Conversion Block	Judicious removal of overwood to induce natural regeneration and remove suppression of young crop. Protection to young regeneration from grazing and fire damage.
10	Treatment in Unallotted Block	Thinnings in congested pole crop and improvement cum hygienic fellings.

- **Annual Conversion Area:** At the beginning of Sofi's Plan the annual conversion area of Ramnagar felling series was 54.93 hectare. However during the 25 years prior to Sharma's Plan, actual area covered was 286 hectare and balance area left for conversion i.e. 4558 hectare.Thus, there was a shortfall of 1087.25 hectare, in Ramngar Felling Series, which was intended to be spread over remaining conversion period.
- Thus, the annual conversion area (Annual coupe) prescribed forRamnagar felling series 4558/80 = 56.97 hectare.

Area allotted to Conversion Block by S.P. Sharma for
Ramnagar Felling Series = 316 hectare

- **Exploitation Period :** Ramnagar Felling Series = 6 years
- **Assessment of Growing Stock:** The growing stock was accessed by point sampling method by stratified Random sampling.

Table No. 6.11

Felling Series	Range	Converted Block		Conversion Block		Unallotted Block	
		Comptt.	Area (hec.)	Comptt.	Area (hec.)	Comptt.	Area (hec.)
Ramnagar F.S.	Ramnagar	57,58	286	52,53	316	1,2,3a,8,9,9b, 10a, 10b,11,12, 17a, 17b, 20, 22a, 23a, 28b, 33a, 41, 42, 44 to 51, 54,56	4342
G.Total			**1750**		**1153**		**13863**

The growing stock in terms of volume per hectare in Ramnagar felling series was worked out by Shri Sharma as follows:-

S.No.	Species	Ramnagar Felling Series	Whole Working Circle
1	Chir	160.45	175.34

- **Calculation of Yield:** All fit trees above 60cm dbh in the Conversion block and standing over established regeneration or advanced growth were treated as due for felling. Trees up to 50 cm dbh were considered as regeneration and were recommended to be retained as part of the future crop. The trees of 50-60 cm dia class were classified as advance growth or over wood depending upon whether they were mixing up uniformly with the retained future crop or not. It was estimated that about 30% of the volume of this dia class would be available for felling and thus, included in yield calculations. Due to considerations of silviculture availability, a part of overwood in 60cm dbh over class would not be available for felling. On the basis of past experience the silvicultural availability of Chir was assessed as 80% and 50% in case of Deodar and Kail in the Conversion Block.
- Yield from Chir Regular Working Circle:The volume available for felling during the remaining conversion period as calculated by Mr. Sharma was as under:-

Species	Ramnagar Felling Series
Chir	69747.54 + 236776.77 = 306524.31m^3

A further reduction of 10% as fire insurance was made so the figures worked out as:-

Species	Ramnagar Felling Series
Chir	275871.87m^3

Annual yield available worked out as under:-

Species	Ramnagar Felling Series
Chir	$\frac{275871.87}{80} = 3448.39m^3$

The annual yield per hectare in the Ramnagar felling series was worked out as under:-

Species	Ramnagar Felling Series
Chir	0.69

Yield from Conversion Block: The volume available for felling is:

Species	Ramnagar Felling Series
Chir	21699.65 m^3

Allowing for 10% reduction (2x S.E%) as a safeguard, the figure worked out was 19529.68 m^3

Considering the period of exploitation as 10 years, the annual yield of the Ramnagar felling series was worked out as:

Species	Ramnagar Felling Series
Chir	19529.68 +10 x 0.80 = 1562.37 m^3

The annual yield finally adopted for the conversion block after rounding off was as under:-

(No yield in case of Deodarwas prescribed)

Species	Ramnagar Felling Series
Chir	1560 m^3

Yield from Unalloted Block and Converted Block: It was calculated by subtracting the yield prescribed for conversion block from that of the Ramnagar felling series.

Felling series	Species	Conversion Block	Unallotted block + Converted block	Total in the felling series
Ramnagar	Chir	1560 m^3	1880 m^3	3440 m^3

The yield from converted block was to be realized by way of removal of residual overwood and thinning in young crop. In the unallotted block the yield was to be obtained by light thinning and improvement fellings.

6.7.3 **Improvement Cum Rehalibitation Working Circle:** This Working Circle comprised of all such areas which were poorly stocked, potentially productive yet not found fit for any systematic working because of the degraded site and crop conditions. Most of these areas became degraded due to heavy biotic pressure. Maltreatment of the crop due to illicit felling, lopping encroachment and grazing resulted in their degradation. Fire damage and soil erosion led to further aggravation of the condition.

Range	Commercial Area (Ha)					Un-Commercial Area (Ha)				Total
	D	K	F	C	Total	B.L.	Blanks	Alpine Blanks	Total	
Ramnagar Range	0	0	0	2058	2058	743	805	71	1619	3677

6.7.4 **Broad Leaved:** This Working Circle comprised of all the broad leaved forests mainly consisting of two types of forests viz Oak Forests (mainly Ban Oak) and Scrub forests (Banseri forests). The former occur in the transit zone above Chir belt and the later occupy the lower areas below Chir belt mostly in Ramnagar Ranges of erstwhile

Ramnagar Division. About 75%area was reported to be under the Banj Oak and its associates like *Rhododendron arboreum, Machilus species, Pieris ovalifolia etc.*These forests were not having any commercial use at that time but were catering to the needs of locals for fuel, fodder and small sized timber for agricultural purposes and also for furniture and building.

5.7.5 **Protection Working Circle:** This Working Circle consisted of all the remaining areas of the Division which had not been covered by any other Working Circle. It comprised of mainly the inaccessible areas forming head of catchments, steep precipitous slopes, alpine and sub-alpine pasture lands, blanks and areas with open, stunted, or malformed crop.

6.8. B.L. Zadoo's plan for Ramnagar Forest Division

6.8.1 This was the first working plan revision of Ramnagar Forest Division after its creation in 1984. Prior to this the Ramnagar Range was part of Udhampur Forest Division and Basantgarh Range was part of Billawar Forest Division. Ramnagar Range was bifurcated into two Ranges i.e. Ramnagar North Range and Ramnagar South Range.

6.8.2 The field work for Basantgarh Range was carried out by Mr. Slathia. The inventory method adapted for assessment of growing stocks was Dr. Walter Bitterlich's techniques of point sampling. The sampling unit was random stratified technique. The wedge prism was used for assessment of growing stocks. No plot sampling was carried out.

6.8.3 Consequently the following Working Circles were constituted for the Division.

1. Deodar-Kail Conversion Working Circle.
2. FIR Selection Working Circle.
3. Chir Working Circle.
4. Reboisement-cum rehalibitation Working Circle.
5. Resin (Overlapping) Working Circle.
6. Broad-Leaved Working Circle.
7. Protection Working Circle.
8. M.F.P. (Overlapping) Working Circle.

6.8.4 **Deodar-Kail Conversion Working Circle:** All the well stocked Deodar-Kail forests occupying easy and accessible slopes which were fit for working were allotted to this Deodar-Kail Conversion Working Circle.

- **Silvicultural System Adopted:** The method of treatment adopted was conversion to uniform crop under shelterwood compartment system. It was proposed to confine the regeneration felling to regeneration block which contained mature to over-mature trees. i.e. seeding felling, secondary felling and final felling. Light crown thinning was prescribed for the congested pole crop. Cultural operations such as removal of dense scrub growth, debris cleaning, fire protection measures and closure of area for grazing were prescribed.
- **Rotation:** A rotation of 150 years for Deodar was fixed when it reaches an exploitable diameter of 70 cm.

- **Regeneration Period:** A regeneration period of 30 years was adopted based on the past experience in the region.
- **Felling Series:** There was only one felling series for the whole Working Circle.
- **Periodic Blocks*:*** The Working Circle was divided into two periodic blocks i.e.- Regeneration block corresponding to floating periodic block and Unallotted Blocks. The regeneration block was further sub divided into Conversion and Converted block.
- **Conversion Block*:*** In this floating periodic blocks all those compartment were included which possessed a lot of mature and over-mature crop. Regeneration felling i.e. seeding felling, secondary felling and final felling were to be carried in the compartments 57,63 and 64 depending upon the ground conditions. Two distinct units were recognized in this P.B.This comprises of all freshly allotted compartments with middle aged to mature crop and adequately established regeneration. Here regeneration fellings have not been carried out as yet.

Table No. 6.12

Periodic Block	Type	Comptt. Allotted	Commercial area (In hectare)	Total
Conversion Block	A-Type	57, 63, 64	436 hectare	1144
	B-Type	6, 10, 44a, 45	708 hectare	
Converted Block		14a, 16, 14b, 15, 61	472 hectare	472
Unallotted Block		5b, 7, 8, 9a, 9b, 13, 17a, 28, 46a, 46b, 46c, 47, 48, 50a, 51, 52, 58, 60, 62, 67	1647 hectare	1647
		Total		**3263 hectare**

- **Size of Annual Coupe:** The size of annual coupe worked out was 43 hectares.
- **Exploitation period:** The exploitation period worked out was 32 years.
- **Growing Stock:** The technique of point sampling was used for assessment of growing stock. The growing stock was assessed by Brandis method and species wise growing stock estimated at Lowest Confidence Limit is as under;-

Deodar	=	822015m^3
Kail	=	18599m^3
Fir	=	248454m^3
Total	**=**	**1099068m^3**

- **Calculation of Yield:** Calculation of yield was confined to commercial area of the Working Circle. The trees above 50 cms diameter were taken towards yield and calculated at lower confidence limit and silvicultural availability factors.The block-wise detail of annual yield prescribed for the Working Circle is given below:-

Table No. 6.13

Species	Conversion Block	Converted or unalloted	Total
Deodar	3100 m^3	2040 m^3	5140 m^3
Kail	0 m^3	100 m^3	100 m^3
Fir	880 m^3	720 m^3	1600 m^3
Total	**3980 m^3**	**2860 m^3**	**6840 m^3**

- **Regeneration:** It was prescribed that regeneration areas be closed so that natural regeneration gets established, besides this planting of nursery raised poly bagged plants were prescribed for refractory areas.
- **Sequence of felling:** The detail of compartments allotted to working during the two successive five year periods of the plan were as under:-

Table No. 6.14

Block	1st Five Years	2nd Five Year
Conversion (Type A)	Co. 57, 64	Co., 63
Conversion (Type B)	Co. 10, 06	Co. 44a, 45
Converted Block	Co. 14a, 14b, 15	Co. 16, 61
Unallotted Block	Co. 48, 50a, 51, 52	Co. 58, 60, 62, 67

- **Realization of the Yield:** All fit trees 30 cm dbh and above have been counted towards yield.The yield from conversion block, converted block and unallotted block have been controlled separately. It was prescribed that the prescribed yield be adhered to.
- **Application of Prescription and Results:** Since the felling of green trees was banned by Government of Ramnagar and Kashmir in January 1990, so the removal of trees has been restricted to dry standing/fallen trees and trees marked in connection with developmental projects under Forest Conversion Act only.The abstract of timber extracted from 1995-96 to 2011-12 and the yield prescribed for ten years is given below:-

Table No. 6.15

Species	Yield prescribed for 10 yrs. (m^3)	Volume marked for 15 years (m^3)	Volume exploited (m^3)	Average Sawn out turn (m^3)	Actual Volume extracted (m^3)
Deodar	51400	22034	17706	13325	15173
Kail	1000	3255	2273	1363	1760
Fir	16000	10082	8937	4468	2796
Total	**68400**	**35371**	**28916**	**19156**	**19729**

About 51% of the prescribed volume for the plan period was marked during last 15 years. The extracted volume in case of Deodar and Kail is more than the expected average volume but is less in case of Fir. The artificial regeneration measures adopted

have not proved sufficient, and the areas proposed for regeneration were subjected to heavy and continuous grazing. Though artificial regeneration of conifer species has been done but more stress has been given to fast growing exotics like *Robinia pseudo acacia* and *Ailanthus species* etc.

6.8.5 **Fir Selection Working Circle:**

- This Working Circle was constituted by including well stocked easily accessible Fir forests of Basantgarh Range. The silvicultural system adopted in this Working Circle was Indian selection system, keeping in view the sivicultural requirement of the species and need of soil and moisture conservation on higher reaches in which removal of silviculturally available mature and over mature trees was recommended.
- **Exploitable size:** The exploitable size of Fir and spruce was fixed at 80 cm dbh (ob) and for Deodar- Kail at 70 cm dbh (ob) in view of the more conservative policy adopted by government.
- **Rotation:** Corresponding to a diameter of 80 cm dbh (ob) the rotation of 230 years for Fir /Spruce and 70 cm dbh (ob) for Deodar/Kail with a rotation of 150 years was fixed.
- **Felling Cycle:** A felling cycle of 30 years was recommended.
- **Felling Series:** Only one felling series was recommended for entire Working Circle.
- **Analysis and Valuation of Crop:** The growing stock was accessed by point sampling technique developed by Bitterlich. The total growing stock estimated at lower confidence limit for the commercial area of the Working Circle, is detailed species wise as under:-

  Fir = 268115m^3
  Deodar = 11582m^3
  Kail = Nil

- **Annual Yield:** The yield was calculated by Brandis method detailed species wise as under:-

  Fir = 990m^3
  Deodar = 70 m^3
  Kail = Nil
  Total = 1060 m^3

- **Size of Annual Coupe:** 78.96 hectare

- **Applications of Prescription and Results:** The species wise detail of yield prescribed and volume of timber extracted is given below:

Table No. 6.16

Species	Yield prescribed for 10 yrs. (m^3)	Volume marked for 15 years (m^3)	Average Sawn out turn (m^3)	Actual Volume extracted (m^3)
Deodar	700	530	371	184
Kail	0	417	250	113
Fir	9900	1512	756	230
Total	**10600**	**2459**	**1377**	**527**

About 23% of the yield was actually marked. The volume extracted was 850 m^3 less than the expected out turn of the marked volume. Other prescriptions relating to cultural operations, artificial regeneration and grazing control were ignored as a result of which status of regeneration in Fir areas is pathetic.

- **Regeneration:** It was prescribed that areas which were deficient in regeneration be closed for grazing, but measures adopted were insufficient which has resulted in poor status of natural regeneration of Fir. Other prescriptions such as rotational grazing, development of pasture land in collaboration with Agrostology wing of Forest Department and stall feeding of Cattles were ignored.

6.8.6 **Working Plan For Chir Working Circle:**

- All well stocked easily accessible Chir forest were allotted to this Working Circle. The silvicultural system prescribed for the management of these forests was shelter wood compartment system.
- **Silvicultural System Adopted:** The silvicultural system adopted for management of Chir Forests since 1959 was shelter-wood compartment system. No felling was prescribed by B.L. Zadoo in his working plan in the circle except the hygienic marking. Though floating periodic block system was adopted and following periodic blocks were constituted.
    1. **Conversion Block:** The compartments which possessed adequate mature crop and established regeneration were allotted to this block.
    2. **Converted Block:**The compartments in which mature crop has already been removed and area regenerated.
    3. **Un-allotted Block:** The compartments which possessed deficient regeneration with predominance of middle aged crop.
- **Rotation:** A rotation of 120 years was fixed for Chir in this Working Circle and the average exploitable diameter for the site qualities of this division was fixed as 60cm dbh (ob).
- **Conversion Period***:* A conversion period of 80 years was fixed
- **Regeneration Period:** Keeping in view the frequent incidence of fire and excessive biotic pressure of this forest a regeneration period of 30 years was fixed.
- **Felling Series:** There was only one felling series in this Working Circle
- **Size of Annual Coupe***:* The size of annual coupe worked out was 173 hectares.
- **Growing Stock:** The species-wise growing stock was calculated at the lowest confidence limit of commercial area of the Working Circle is as under:-

Deodar	=	Nil
Kail	=	Nil
Chir	=	898412 m^3

- **Calculation of Yield:** No felling of trees below 50cm dbh (ob) was prescribed as these were considered as advance growth. 30% of trees in approach class i.e. 50-60 dbh (ob) was considered to be available for felling. Trees of 60cm and above dbh (ob) were treated as over-wood and it was assumed that 80% trees of these classes would be available for felling. The annual yield calculated but not prescribed for the entire Chir Working Circle calculated at the lowest confidence limit worked out was 3730 m^3.

- *Applications of Prescription and Results:* The detail of yield calculated for ten years (but not prescribed) and volume of timber extracted from 1995-96 to 2011-12 and the yield prescribed is given below:-

Species	Yield prescribed for 10 yrs. (m^3)	Volume marked for 15 years (m^3)	Average Sawn out turn (m^3)	Actual Volume extracted (m^3)
Chir	37300	14640	5856	1690

The volume marked for felling is quite less than prescribed for the period.The prescriptions with respect to securing natural and artificial regeneration of the Chir an the volume extracted by State Forest Corporation is about 4150 m^3 than the expected average out turn in this Working Circle. Other subsidiary silvicultural operations were ignored largely, though some attempts made in establishment of closures for securing natural and artificial regeneration have proved beneficial in a very small area.

6.8.7 **Reboisement Cum Rehabilitation Working Circle:**

- All such forests which were poorly stocked, situated near habitations and were subjected to heavy biotic pressure were allotted to this Working Circle.For the purpose of treatment the Working Circle was classified into four categories.

Category 1: In this category, the areas which possess Chir pine crop but have degraded due to various reasons such as excessive biotic pressure, forest fires etc. are included. The treatments prescribed in this category were.

i. Establishment of closures
ii. Artificial regeneration both by patch sowing and nursery raised poly bagged Chir plants.
iii. Soil and Moisture conservation works especially water harvesting structures.

Category 2: These were basically potential oak forest; due to over exploitation for fodder purpose these have become stunted. The treatments prescribed in this category were:-

i. Establishment of closures
ii. Artificial regeneration both by patch sowing and nursery raised poly bagged Oak plants.
iii. Since Ban Oak is a good coppicer so it was prescribed to cut back the heavily lopped crop in closed area to boost singled out coppice.
iv. Construction of Soil and Moisture conservation works especially water harvesting structures.

Category 3: This area occur towards the lower limits of the zone which possess low density of broad leaved species other than Oak. These areas too were over exploited. The treatments prescribed in this category were:-

i. Establishment of closures
ii. Artificial regeneration both by patch sowing and nursery raised poly bagged / Naked root plants.
iii. To improve the crop composition by planting more valuable species such as Khair, Beheda, Reed, Jamun etc and also fast growing species like Bamboo, poplars & Sissoo etc.

iv. Construction of Soil and Moisture conservation works especially water harvesting structures.

Category 4: This includes the areas bearing scrub forest. The intensive treatments have been prescribed for this category as there is no natural source of tree seed available.

i. Establishment of closures
ii. Artificial regeneration both by patch sowing and nursery raised poly bagged / Naked root plants, associated with management of existing shrub.
iii. Planting of fodder grasses.
iv. Construction of Soil and Moisture conservation works especially water harvesting structures.

Afforestation Measures Prescribed:- Involvement of sister departments (Agro-stology Wing, MFP Project, Soil Conservation and Social Forestry) in development of these areas on micro watershed management basis was envisaged. It was prescribed that an area of 205 hectare should be treated annually.

- **Applications of Prescription and Results:** The prescriptions with respect to conifers were not implemented to a significant extent. Plantations have been limited to raising of fast growing exotics like *Robina* and *Ailanthus*.

6.8.8 **Working Plan for Resin Development Working Circle:**

- All Chir areas of the division are included in this Working Circle. The rill method of extraction of resin was prescribed. The minimum diameter for laying out of blaze was fixed as 40cm dbh (ob). Total annual number of blazes fixed for the entire Chir area of the Division were 3,20,000 blazes. The year wise and Range wise and compartment wise detail of blazes tapped from 1995-96 to 2011-12 is given in Annexures Nos. 14-A to 14-C. However year and range wise abstract is given in below Table No. 6.17.

Table No. 6.17

Year	Range			Total
	Ramnagar North	Ramnagar South	Basantgarh	
1995-96	117457	98084	0	215541
1996-97	125405	345500	105936	576841
1997-98	60321	23600	0	83921
1998-99	92800	74700	74200	241700
1999-2000	92800	74700	72700	240200
2000-2001	91100	77700	91500	260300
2001-02	97300	77700	91500	266500
2002-03	83800	77700	91500	253000
2003-04	80400	60300	85000	225700
2004-05	58800	23500	57600	139900
2005-06	68900	38000	72600	179500

2006-07	47500	34500	50000	132000
2007-08	19100	19000	35200	73300
2008-09	37100	0	22400	59500
2009-10	40700	0	12800	53500
2010-11	0	0	31200	31200
2011-12	0	0	32500	32500
2012-13	0	0	0	0
Total	**1113483**	**1024984**	**926636**	**3065103**

- **Applications of Prescription and Results:** Although detailed procedure, regulations and a set of dos and don't have been provided but various irregularities have been noticed while setting of crop and resin extraction such as marking of blazes, cutting of rills and grooves and spray of highly concentrated acids. This has resulted in drying of trees as a result they are being uprooted from base due to heavy winds. Excessive tapping also renders trees susceptible to insect and fungal attack.

6.8.9 **Working Plan for Broad-Leaved Working Circle:**

- The compartments which possessed broad leaved forest over appreciable areas were included in this Working Circle. For purpose of management two distinct categories were made:-
    1. *Ban Oak Forests.*
    2. *Broad Leaved Scrub Forests.*

    1. **Ban Oak Forest:** These forests are distributed over large stretches in Ramnagar North and Basantgarh Range and to a small extent in Ramnagar South Range. The Ban Oak (*Quercus leucotrichophora*) was subjected to heavy lopping for fuel and fodder. No management systems or improvement techniques have been applied in the past for improvement of the Oak Forests. Sh. B.L. Zadoo in his working plan has prescribed that proper attention should be given to these forests in order to bring these forests back to their old glory. The following treatments were prescribed by him.
        a. Establishment of closures
        b. To induce the coppicing
        c. To plant nursery raised poly-bagged plants
        d. Patch sowing
    2. **Broad Leaved Scrub Forests:** The broad leaved scrub occur mostly in Chir zone and are found on moist places. Like Ban Oak these forests were also subjected to heavy lopping for fuel and fodder. The treatments prescribed for effective management of these forests are as under:-
        a. Establishment of closures
        b. To induce the coppicing
        c. To plant nursery raised poly-bagged plants
        d. Patch sowing

- **Applications of Prescription and Results:** The prescriptions with respect to Broad Leaved species were not implemented to a significant extent. Though the measures adopted for artificial regeneration were confined to only few species.

6.8.10 **Protection Working Circle:**

- All other demarcated forests, which were not included in any of the above Working Circles, were allotted to this Working Circle. The forests allotted to this Working Circle bear open crop and are located mainly near the heads of the catchment. The object of the management was to give complete protection for conservation of soil and water. No felling of whatsoever nature was prescribed. These forests were to be protected against biotic interferences. Artificial regeneration in blanks were also recommended.
- **Applications of Prescription and Results:** The treatments such as artificial regeneration and control on grazing were not implemented strictly. Plantations were restricted to only few Broad Leaved species.

6.8.11 M.F.P. (Overlapping) Working Circle:-

- This Working Circle was kept as an overlapping Working Circle, keeping in view the vast potential of development and exploitation of the MFP's and to boost the socio-economic condition of the poor inhabitants residing on forest fringes. The treatment prescribed were conservation, development, propagation and cultivation of various MFP yielding species with active participation of local people.
- *Applications of Prescription and Results:* The prescription with respect to management of Non-Timer Forest Produce were ignored largely.

6.9. Past Yield

6.9.1. The compartment wise detail of volume of timber marked and extracted has been provided under Appendix-XII & XIX. The working circle wise abstract of timber harvested during the period from 1995-96 to 2011-12 from Ramnagar Forest Division is tabulated as under:

Working Circle	Volume Harvested (m^3)				Total (m^3)
	Deodar	Kail	Fir	Chir	
Deodar Kail Working Circle	15173	1760	2796	0	0
Fir Working Circle	184	113	230	0	527
Chir Working Circle	0	0	0	1690	1690
Total	**15357**	**1873**	**3026**	**1690**	**2217**

6.10 Past Revenue and Expenditure

6.10.1 The revenue and expenditure statement of Ramnagar Forest Division is given in Tabular form below:

Past Revenue and Expenditure

Year	Revenue (Rs.)	Expenditure (Rs.)	Surplus (Rs.)
2005-06	18795916	16840000	1955916
2006-07	5827800	18466000	-12638200
2007-08	3644288	14626000	-10981712
2008-09	8540835	19409665	-10868830
2009-10	7558711	24542694	-16983983
2010-11	15888334	26656311	-10767977
2011-12	9084552	33615335	-24530783
2012-13	5599207	35671735	-30072528
Ending Sept.,2013	3442389	15024491	-11582102
Total	**78382032**	**204852231**	**-126470199**

6.10.2 The revenue receipts and also the revenue surplus, registered a sharp decline because ban on green fellings. Since then the revenue receipts have been decreasing, primarily because of erratic payment of royality by the State Forest Corporation.

There has been a steady rise in the actual expenditure, but the increment is definitely not in proportion to the rise in salaries, wages, inflation and cost of living. In real terms, therefore, the allotments have actually decreased over the years. The biggest casuality in this regard has been the forest conservancy related operations like fire protection, subsidiary silvicultural operations, buildings and paths, nurseries etc. Similarly the volume of work in terms of plantation and soil conservation activities has also declined. The shrinkage of funds for normal maintenance and developmental activities has started taking its toll on the forests of Ramnagar Forest Division and the effects will become more pronounced in the year to come.

CHAPTER-VII

Statistics of Growth and Yield

CHAPTER - VII

Statistics of Growth and Yield

7.1 Inventory Method Adopted

a. Stratified Random Sampling
b. Plot Sampling

7.2 Stratified Random Sampling

7.2.1 The Bitterlichs method of point sampling has been adopted for assessment of growing stock. This technique is quite simple and preferable to total or partial enumeration as it involves less time and expenditure and gives accuracy to desired extent. It is more convenient to carry out in conifers forest and eliminates personal bias. As the forest of this Division are heterogeneous in nature so the stratification was done to make more or less homogeneous units, the following strata and sub-strata were identified are:-

1. Deodar-Kail Selection Working Circle
2. Fir Selection Working Circle
3. Chir Selection Working Circle
4. Broad Leaved Working Circle
5. Reboisement Working Circle
6. Ecological Conservation Working Circle
7. Ecological Tourism Working Circle

7.2.2 To assess the number of points to be sampled in the entire Division a thumb rule of 1 point per hundred hectare (1Square kilometer) area was used. Since Ramnagar Forest Division is 372 Square Kilometers so a total of 380 sample points were randomly selected. The working circle wise detail of points is given in Table below:-

Table No. 7.1

S.No.	Working Circle	Number of Points
1	Deodar-Kail Selection Working Circle	36
2	Fir Selection Working Circle	25
3	Chir Selection Working Circle	81
4	Reboisement Working Circle	73
5	Broad Leaved Working Circle	57
6	Ecological Conservation Working Circle	81
7	Ecological Tourism Working Circle	27
	Total	**380**

7.2.3 For fixing the position of sample points, a sample frame was prepared on transparent graph sheet. The sample points were then delineated at random on the co-ordinates by using table of random numbers. These points were then marked on sample frame and were subsequently transferred on base map and G.T. Map of the area to mark their precise location on map. On the basis of their position on base map and G.T. map of the area these points were objectively located on ground. At each sample point, the stems all around the point were viewed through the wedge prism of suitable basal area factor by making a complete sweep of 360^0. The number of trees whose trunk at breast height subtended an angle larger than the critical angle of the wedge prism were numbered and their details regarding dbh (ob) and height were recorded in tally sheet designed for the purpose. The wedge prism was suitably selected so that, at each point, at least 8-10 trees tally. The full tallied tree is counted as one, while half tallied tree (borderline tree) is counted as half. Thus, two half tallied trees make one full tallied tree.

7.3. Data Computation

7.3.1 The data of point sampling of each stratum were computed to obtain fairly accurate estimate of the growing stock. The details of variables computed is as under:-

1. No. of Trees per hectare
2. Volume per hectare
3. Basal area per hectare

7.3.2 The growing stock was ultimately calculated species wise in each diameter class in each stratum. The Kulu Volume Table was used for computing volume

7.4. Plot Sampling

7.4.1 In areas where point sampling exercise was not possible because of dense shrubs and broad-leaved trees, sample plots of 0.1 ha were laid and total enumeration of growing stock was carried out in these plots.

Table No. 7.2

7.5. Kulu Volume Table

Dia meter class in centimeters	Deodar (Vol.m^3)	Kail (Vol.m^3)	Fir (Vol.m^3)	Chir (Vol.m^3)
20-30	-	-	-	-
30-40	0.76	0.78	0.84	0.48
40-50	1.33	1.35	1.50	1.13
50-60	2.10	2.27	2.97	2.21
60-70	3.14	3.34	4.90	3.54
70-80	4.30	4.42	6.85	4.87
80-90	5.60	5.35	8.30	6.20
90-100	5.85	6.14	9.40	6.95
100 & over	7.56	6.74	10.19	7.48