I

INTRODUCTION

The present working plan is the revision of the fifth plan for the period of 1989-90 to 1998-99 for the Billawar Forest Division, prepared by Sh. H. S. Salathia.

The first part of the plan has been prepared on the standard lines and brought up to date. All the information which could be available have been collected, consolidated and incorporated in this plan.

There are not many differences in respect of management prescribed for these forests in this plan as compared to the past plan. The working circles constituted in the last plan have been more or less continued and accordingly the allotment to different working with necessary modifications has been suitably rationalized. The yield calculations and prescriptions are based on practical considerations and past working. The latest and modern concepts in forestry have been very well kept in view while compiling the various aspects of the plan.

The forests of this division have been classified as per standard "Forest Types" in conformity with mode of classification adopted by "Champion and Seth" in the "Survey of Forest Types of India". The fauna found in this tract have been described in detailed and a chapter on wildlife management is included.

Over the years, the forests of the division have suffered a lot. This can be attributed to relentless pressure for fuelwood, timber and fodder, inadequacy of protection measures resulting in illicit fellings and encroachments, and tendency to look upon these forests as revenue earning sources. In the present plan stress has been laid on preservation, maintenance, sustainable utilization, restoration and enhancement of natural environment.

The growing stock assessment has been made by adopting Point Sampling Techniques or Plotless Sampling or Probability Proportional to Size (PPS) or Bitterlisch Method of Point Sampling as against in partial enumeration carried out in the past plan . This method has been found most suitable to hilly terrain of the tract. It costs less and gives reliable results to a reasonable level of statistical significance.

In the Deodar Working Circle, the management remains unchanged with a few modifications in the areas which are in better stocked in Improvement-Cum-Protection Working Circle and Fir Selection Working Circle have been transferred to this Working Circle.

In case of Fir Selection Working Circle, the management is also almost same except a few modifications. In this working circle, the area has been increased as the better stocked areas of Fir have been included from the other working circles.

The condition of the Chir Working Circle is nearly same as it was 10 years back. There is increase in areas as well as proportion of younger diameter classes. yet it does not commensurate with area under this working circle. There is paucity of the mature and over mature trees. The green fellings of Chir have been prescribed to remain suspended during the plan. Only removal of dead and diseased trees has been prescribed. Light continuous resin tapping has been proposed to be carried out on the scientific lines as proposed by Forest Research Institute, Dehra Dun.

The area which are inaccessible and require protection on account of their importance in maintaining the perennial flow of water down streams have been jumped up to constitute the Protection Working Circle. No fellings any kinds except the removal of dead, fallen trees only, to meet the local requirements have been recommended.

The areas of the Commercial Working circles which have failed in regeneration during the past, and are not likely to do so. If they are continued remain there, have been put into Rehabilitation Working Circle with prescriptions of intensive measures to protect and rehabilitate these areas through artificial sowing and planting to be supplemented with soil and moisture conservation measures.

The Grazing (Overlapping) Working Circle has been introduced for the first time in this working plan. In this working Circle, the development of pasture lands, character of the vegetation, carrying capacity of these pasture lands and forests has also been incorporated in the plan. Some suggestions for their treatment especially of Berunline Forests have also been enlisted. The solution to handle over / excessive grazing problem has been briefly recommended in this working circle.

The Non – Timber Forest Products (Overlapping) Working Circle has been included for the first time in this working Plan. The areas have been identified for NTFPs and some suggestions have been enlisted for cultivation, harvesting and post harvesting technologies. This working circle constitutes very important part of his plan and all efforts should be made to implement this working circle.

The field work for Billawar Forest Division was taken up in February, 1998 and was completed by the end of the October, 1999. The field work consisted of laying out compartments and sub compartments, stock mapping, sample points and collection of various data including field data.

The writer is greatly indebted to Sh. P. Patnaik, IFS, Principal Chief Conservator of Forests, Jammu & Kashmir, of the time for providing an opportunity to prepare this working plan and Sh. R. L. Bharti, IFS, the then Chief Conservator of Forests, Jammu for his valuable guidance from time to time and providing all the help in execution of the plan.

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Sincere thanks are also due to the field staff of Billawar Forest Division, Billawar for there help and cooperation during the field work of this plan.

Dated: - 25-05-2000

(N. P. Singh) IFS
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IV

GLOSSARY OF SOME PLANT SPECIES

S. No.	Botanical Name	Common / Local Name	English Name	Form
1.	*Abies pindrow*	Talisha / Badar	Himalayan Silver Fir	Tree
2.	*Acacia auriculiformis*	--	Australian Wattle	Tree
3.	*Acacia catechu*	Khair	Black Cutch	Tree
4.	*Acacia nilotica*	Kikar	Gum Tree	Tree
5.	*Acer caesium*	Mandari / Kinar	Maple	Tree
6.	*Aegle marmelos*	Bel	Wood Apple	Tree
7.	*Albizia lebbeck*	Siris	Lebback Tree	Tree
8.	*Alnus nitida*	Chaamp	Alder	Tree
9.	*Azadinachta indica*	Neem	Margosa	Tree
10.	*Bauhinia vahlii*	Malugarh	Camelôs Foot	Climber
11.	*Bauhinia variegate*	Kakrad	Mountain Ebony	Tree
12.	*Betula utilis*	Bhoj Patra / Bharj	Birch	Tree
13.	*Butea monosperma*	Palas	Flame of the Forest / Parrot Tree	Tree
14.	*Cassia fistula*	Amaltas / Karangal	Golden Shower / Purging Cassia	Tree
15.	*Cedrella toona*	Toon	--	Tree
16.	*Celtis australis*	Kharak	Nettle Tree	Tree
17.	*Carissa opaca*	Karonda / Garana	--	Shrub
18.	*Cedrus deodara*	Deodar / Dear	Himalayan Cedar	Tree
19.	*Dalbergia sissoo*	Sissoo / Tali	--	Tree
20.	*Dendrocalamus strictus*	Bans	Solid Bamboo	Grass
21.	*Daphne oleoides*	Kansan	Olive Leaved Daphne	Shrub

22.	*Dodonaea viscose*	Santha	Jamaica Switch Sorrel	Bush
23.	*Emblica officinalis*	Amla	--	Tree
24.	*Euphorbia royleana*	Thor	--	Shrub
25.	*Fiscus bengalensis*	Bargad / Bod	--	Tree
26.	*Flacourtia indica*	Kakoa	Medagasker Plum	Tree
27.	*Grevillea robusta*	--	Silver Oak	Tree
28.	*Grewia optiva*	Dhamman	--	Tree
29.	*Ilex dipyrena*	Khareii	Himalayan Holly	Tree
30.	*Indigofera heterantha*	Katai	--	Shrub
31.	*Jacaranda mimisifolia*	Nili Gulmohar	Mimosa Leaved Ebony	Tree
32.	*Juglans regia*	Akhrot (Khod)	Walnut	Tree
33.	*Juniperus indica*	--	--	Tree
34.	*Lannea coromandelica*	Kembal / Jhingar	--	Tree
35.	*Lantana camara*	Jadi / Panchfuli	Yellow Sage	Shrub
36.	*Lantana sillowiana*	Jadi / Panchfuli	Weeping Lantana	Shrub
37.	*Lawsonia inermis*	Mehandi	Henna	Shrub
38.	*Machilus durhiei*	Chandra	--	Tree
39.	*Mallotus philippensis*	Kamila / Sinduri	Monkey Face Tree	Tree
40.	*Melia azadarach*	Drank / Bakain	Persian Lilac	Tree
41.	*Morus alba*	Shahtut / Tut	White Mulberry	Tree
42.	*Murraya koenigii*	Baronkal	Curry Leaf Tree	Shrub
43.	*Nerium indicum*	Kanner / Lal Gandila	Red Oleander	Shrub
44.	*Olea ferruginea*	Kau	Indian Olive	Tree
45.	*Parkinsonia aculeate*	Bilaiti Kikar	Jerusalem Thorn	Tree
46.	*Parrotiopsis jacquemortiana*	Dhou	Witch Hazel	Tree

47.	*Phoenix sylvestris*	Khajur	Wild Date Palm	Tree
48.	*Picea smithiana*	Padtal	Spruce	Tree
49.	*Pinus roxburghii*	Chir	Chir Pine	Tree
50.	*Pinus wallichiana*	Kail	Blue Pine	Tree
51.	*Pistacia chinensis sub- spp. Integerrima*	Kakkarsinghi	East Indian Mastiche	Tree
52.	*Populus caspica*	Safeda	White Poplar	Tree
53.	*Populus ciliate*	Safeda	Poplar	Tree
54.	*Prinsepia utilis*	Rawadi / Tartang	--	Shrub
55.	*Pyrus pashia*	Kainth	--	Tree
56.	*Quercus floribunda*	Maru	Green Oak	Tree
57.	*Quercus glauca*	Banji / Reh	Blue Japanese Oak	Tree
58.	*Quercus leucotrichophora*	Banj	White Oak	Tree
59.	*Quercus semicarpifolia*	Kharsu	Brown Oak	Tree
60.	*Rhododendron arboreum*	Burans / Mandal	Rose Tree	Tree
61.	*Rhododendron campanulatum*	Sargandh	Rose Tree	Tree
62.	*Robinia psuedoacacia*	Robin	False Acacia	Tree
63.	*Rosa brunonii*	Karir	Himalayan Musk Rose	Climber
64.	*Rubus ellipticus*	Khareyhan	Himalayan Yellow Raspberry	Shrub
65.	*Salix alba*	Chitta banddha	White Willow	Tree
66.	*Salix babylonica*	Rondu banddha	Weeping Willow	Tree
67.	*Sarcococa saligna*	Daun	--	Shrub
68.	*Taxus wallichiana*	Barni	Himalayan Yew	Tree
69.	*Tectona grandis*	Sagwan / Sagaun	Teak	Tree
70.	*Termenalia arjuna*	Arjun	--	Tree

71.	*Termenalia bellerica*	Behada	Belleric Myrobalan	Tree
72.	*Thuja orientalis*	Morpankhi	Chinese Thuja	Tree
73.	*Toona ciliate*	Tun / Toon	Red Cedar	Tree
74.	*Ulmus wallichiana*	Moral	Himalayan Elm	Tree
75.	*Viburnum grandiflorum*	Telanji	Chinese Chaste Tree	Shrub
76.	*Vitex negundo*	Bana	--	Shrub
77.	*Wendlandia hayei*	Pansar	--	Tree
78.	*Woodfordia fructicosa*	Dhoi / Dhoh	Fire Flame Bush	Shrub
79.	*Ziziphus maurtiana*	Beri	Jujuba	Shrub
80.	*Ziziphus nummularia*	Jherberi	Wild Jujuba	Shrub

VIII

LIST OF IMPORTANT MEDICINAL PLANTS FOUND

IN BILLAWAR FOREST DIVISION

S. No.	Botanical Name	Common / Local Name	English Name	Form
1.	*Aconitum chasmanthum*	Patis	Aconite	Herb
2.	*Aconitum heterophyllum*	Patis	Aconite	Tree
3.	*Acorus calamus*	Buch / Bareyan	--	Herb
4.	*Adhatoda vasaca*	Adusa / Beyhkad	--	Shrub
5.	*Adiantum venustum*	Hans Raj / Hanspadi	Maiden Hair Fern	Fern
6.	*Aloe barbadensis*	Ghrut Kumari	Barbados Aloe	Herb
7.	*Anemone obtusiloba*	Rattanjot	--	Herb
8.	*Artemisia maritime*	Seskiu	Santonin / Wormwood	Shrub
9.	*Atropa belladonna*	Bantamiku	Dwale / Deadly Nightshade	Herb
10.	*Berberis aristata*	Rasaunt	Indian Barberry	Shrub
11.	*B. lyceum*	Rasaunt	Indian Barberry	Shrub
12.	*Canabis sativa*	Bhang	Hemp	Shrub
13.	*Catharanthus roseus*	Sadabahar	Madagasker Periwinkle	Herb
14.	*Centella asiatica*	Brahm Booti	Asiatic Pennywart	Herb
15.	*Dioscorea belophylla*	Tarad Bel	Yam	Herb
16.	*D. deltoidea*	Tarad Bel	Yam	Herb
17.	*Gentiana kuppoo*	Neel Kanthu	Himalayan Gentian	Herb
18.	*Geranjum nepalanse*	Bhanda	Nepal Geranium	Herb

19.	*Jurinea macrocephala*	Dhoop	--	Herb
20.	*Meconopsis aculeate*	Kandeli	Blue Rope Poppy	Herb
21.	*Mentha arvensis*	Jungli Pudina	Mint	Herb
22.	*Morchella spp.*	Guchhi	Morels	Fungi
23.	*Picorhiza kurroa*	Kour	--	Herb
24.	*Plantago major*	Ishabgol	Psyllium	Herb
25.	*Podophyllum hexandrum*	Bankakri	Duckôs Foot	Herb
26.	*Pyrethrum cinnerifolium*	--	Pyrethrum	Herb
27.	*Saussurea costus*	Kuth	Costus	Shrub
28.	*Saxifraga ligulata*	Silphata	London Pride	Herb
29.	*Skimmia laureola*	Katurcharu	--	Bush
30.	*Swertia chirayita*	Asal Chireta	Chiretta	Herb
31.	*Swertia angustifolia*	Chiretta	Chiretta	Herb
32.	*Taxus wallichiana*	Barmi	Himalayan Yew	Tree
33.	*Taraxcum officinale*	Dulal	Common Dandelion	Herb
34.	*Tinospora cordifolia*	Giloy / Galol	--	Climber
35.	*Thymus serphyllum*	Bal Ajwain	--	Herb
36.	*T. linearis*	Nan ajwain	--	Herb
37.	*Valeriana jatamansi*	Jatamanshi / Musk Bala	Indian Valerian	Herb
38.	*V. Hardwickii*	Muskwala	Indian Valerian	Herb
39.	*Viola spp.*	Banjsha	Violet	Herb
40.	*Withania somnifera*	Ashwagandha / Sagunna	--	Shrub

X

Grasses

S. No.	Botanical Name	Common / Local Name	English Name
1.	*Cenchrus ciliaris*	Anjan Ghass	Buffol Grass
2.	*Cenchrus setigerus*	Dhaman Grass / Kalanjan	--
3.	*Chrysopogon fulvus*	Dahalu Ghas	--
4.	*Chrysopogon echinodatus*	Beeran Ghas	--
5.	*Cynodon dactylon*	Dub / Khabbal Ghass	Bermuda Grass
6.	*Dactylis glomerata*	Trikkad Ghas	Cockôs Foot Grass
7.	*Dactyloctenium aegyptium*	Trikkad Ghas	Cockôs Foot Grass
8.	*Dendrocalamus strictus*	Bans	Solid Bamboo
9.	*Heteropogon Contortus*	Lamb Ghas	Spear Grass
10.	*Poa alpine*	--	Alpine Meadow Grass
11.	*Poa bulbosa*	--	Bulbous Meadow Grass
12.	*Poa nepalensis*	--	--
13.	*Saccharum benghalense*	Moonj	Thatch Grass
14.	*S. spontaneum*	Kai / Kanna	Thatch Grass
15.	*Sateria verticillata*	Khagod Ghas	--
16.	*Themeda anathera*	Gumari Ghas	--

PART-I

SUMMARY OF FACTS

ON

WHICH PROPOSALS ARE BASED

CHAPTER – I

The Tract Dealt With

1.1 Name and Situation:

1.1.1 This working plan covers the demarcated forests of Billawar Forest Division of Jammu – East Circle.

1.1.2 The area of the Division falls under the civil jurisdiction of Kathua District and part of Udhampur District.

1.1.3 The tract lies between north latitudes 32° - 18' and 32° – 53' and east longitude 75° - 17' and 75° - 56'. The entire area is covered by survey of India G.T. sheet nos. – 43 P/5, 43 P/6, 43 P/9, 43 P/10, 43 P/11, 43 P/13, 43 P/14 and 43 P/15

1.1.4 The Division is bounded on the:-

(a) North by Bhaderwah and Ram Nagar Forest Division:-

(b) South by Kathua Forest Division.

(c) West by Jammu Forest Division.

(d) East by Ravi River separating it from Chamba District of Himachal Pradesh.

1.1.5 The maximum aerial length of the Division from north to south is 47.5 km. and maximum arial width from east to west is 60 km.

1.1.6 The total geographical area of the Division is 1, 52,300 hectares (1523 sq. km.) whereas the total geographical area of Kathua District is 2651 sq. km. Thus, Billawar Forest Division constitutes approximately 57 percent of the total area of Kathua District (because upper half area of Ramkot Range falls in Udhampur District).

1.1.7 The Division comprises of four territorial Ranges namely Billawar, Basohli, Bani and Ramkot with Divisional Headquarter at Billawar.

1.2. Configuration of the Ground:

1.2.1 The tract by and large, is hilly mountainous consisting of steep hills and deep valleys. Bani range among all the ranges is highly mountainous, rugged with very steep hills and deep valleys. The flat area are almost absent in this Division. The Basohli Range is comparatively easier and at most of the places with moderate slope.

1.2.2 The elevation varies from about 531 meters in Basohli Range (the area below 531 meters has come under “SAILAAB”(submergence) area of Thein Dam (Ranjeet Singh Sagar) to 4341 meters at Kaplas in Bani Range which is the highest peak of the Division. The other important peaks of the Division are Nukunwal (3821 M), Sunbain (3783 M), Kalethu (3633 M), Bihindra (3565 M), Tringilot (2618 M) in Bani Range; Samnabanj (2201 M) in Ramkot Range and Sichar (2053 M) in Billawar Range.

1.2.3 The main ridges which flank the Division are situated in the:

(a) South – West, Sudrikot Dhar Ridge of Bani Range.

(b) North – East, Pirthijor, Kalethu Ridge of Bani Range.

(c) North, Sunbain – Chhatar, Kuretha – Dhar, Samnabanj – Garhser Ridges of Bani Range.

(d) Bani Range is separated from Billawar Range by Arthu – Mandhar Ridge. Bani Range is separated from Basohli Range by Ramrachan – Banjal – Chamur Ridge.

1.2.4 Prominent peaks / ridges are negotiable by means of Saddles or Passes commonly known as "GALAS" or "GALIS". Prominent Passes in the Division are situated between:-

(a) Bani Range and Bhaderwah Forest Division - Chhattar – Gala (2153 M).

(b) Bani Range and Billawar Range – Kamlogh Gala (2668 M) and Deri Gala (2153 M)

(c) Bani Range and Basohli – Banjal Gala, (1980 M)

(d) Billawar Range and Ramnagar Forest Division - Chochru Gala (2363 M)

(e) Ramkot Range and Ramnagar Division – Oang Gala or Oang Pass (1974 M).

(f) Ramkot Range and Kathua Forest Division - Galak Pass (846 M).

1.2.5 Drainage of different Ranges of the Division is by the western bank tributaries of River Ravi. The Principal ones are – SEAWA, UJH, BHINI, TALAINI and NAJ. Besides, there are numerous streams and feeders. Both Ujh and Seawa carry plenty of water during the spring when they are quite suitable for the floatation of timber. The Bhini and Bhiani are rather erratic in their water potential and are, therefore, non-dependable for the floatation of timber.

1.3. Geology, Rocks and Soils

1.3.1 On the basis of geological characters, four distinct longitudinal belts are recognized in the Jammu and Kashmir state, that is, Shiwaliks, Lesser Himalayas, Central Crystalline and Tethyan. Billawar Forest Division constitutes a part of Shiwaliks and Lesser Himalayas. Shiwaliks belt is characterized by broad open folds. Geologically, the area has part taken the Himalayan Orogenic movement and exposes a normal sequence of geological formation from Precambrian to recent and a few river traces of recent origin. The upper part of the Division in regional geological history of the area is, therefore, not much different from that of Himalayan Range. The lower part of the tract, geologically it is occupied by sedimentary of Shiwaliks, group of tertiary age which is the predominant formation.

1.3.2 The Various geological formations found in the tract and their Lithological description is tabulated as given below in table no. 1:

Table 1: Lethological Description

S. No.	Region / Group	Formation	Equivalent	Lithological Description	Age
1.	-	Newer Alluvium	-	Grey, Micacious Sand and	Recent to middle

		and Soils		/ Cobble Pebble beds with thin interlayer Clay	Pleistocene
2.	-	Older Alluvium and Soils	-	Find to Coarse Sand and Clay	Recent to middle Pleistocene
3.	Upper Shiwaliks	Boulder Bed	Boulder Conglomerate	Boulders, Pebbles, Quartzite with Clay and Sand Stone	Lower Pleistocene
4.	Middle Shiwaliks	Utterbani Formation	Pinjore Stage	Reddish Clay, Sand Stone or Silt Stone with or without Pebbles	Lower Pleistocene to Middle Miocene
5.	Lower Shiwaliks	Targer Formation	Lower Chingi Stage	Silt, Stone, Clay in Sand Stone, Hard fine Grey Sand Stone with Purple and Dirty Brown Clay and Silt	Middle Miocene
6.	-	Murree	-	Red, Brown, Grey and Green Sandstone, Purple Shales. Occassional Lenticular Conglomerate	Lower Miocene to Upper Eocene
7.	Panjal Group	Panjal Group i.Trap Member ii.Agglomeratic Slate Member	Pir Panjal Pir Panjal	Schistose Panjal Trap associated with Light Pink and Greenish Lime. Stone agglomeratic slates with Ash Beds, Grey Quartzite and Lime Stone Beds	Pre-Carbonifereous Pre-Carboniferous
8.	-	Dogra Slates	-	Dark Grey Phyllite interbedded with Green Cloritised, Amygloidal Trap, a product of Contemporaneous Volcanic action	Late – Precambrian to earliest Cambrian

1.3.3 **Sub – Recent and Recent Deposits**: – It is characterized by river alluvium and terrace deposits, transported boulders and gravels of various rocks in a loose sandy and silt matrix.

1.3.4 The upper Shiwaliks is dominated by massive conglomerate / boulder beds with thin impersistent bands of triable sandstone and occasional clay bands, Middle Shiwaliks is characterized by sandstone with thin bands of clays, while lower Shiwaliks is dominated by clay, mudstone and sandstone alternations.

1.3.5 **Murree Formation: -** Murrees comprises red, brown, maroon, greyish – green and purple sandstone, clay and shale alternations. This formation exhibits plant impressions, ripple marks, rain prints on shales and sandstones. Murree sandstones, after proper dressing is utilized in the construction activities. Similarly the riverine sand and boulders are extensively used as building materials.

1.3.6 **Panjal Formation: -** It is characterized by shale, slate and phyllite with bands of limestone and greyish – white quartzites.

1.3.7 **Volcanic Formation: -**Basic effusions and flows, occasionally phyllitized, schistose, amygdaloidal and verticulars.

1.3.8 Dirty white to greyish-white, bluish and pink orhtoquartzite with purple and grey shale partings.

1.3.9 **Sunbain Quartzite: -** It is dominated by quartzite and quartzitic slate, gritty, pebbly, conglomerate at various places.

1.3.10 **Kapla Granite: -** It is characterized by medium to coarse grained streaky and porphyro-blastic granite with xenolith of slate, quartzite and schist.

1.3.11 **Bhaderwah Formation:** - It comprises slate and phyllite with thin bands of artzites.

1.3.12 **Bani Formation: -** It is characterized by streaky banded gneissoae quartzite, phyllite, slaty phyllite, phyllitic slate with thin bands of phylliozited and schistose quartzite.

1.3.13 **Mineral Resources: -**Important minerals found in the area are gold, limestone, gypsum, bentonite, china clay, glass sand, quartzite, iron ores and building materials.

1.3.14 **Gold: -** Stream and terrace deposits and Shiwaliks sediments of the district contain minute flakes of gold.

1.3.15 **Limestone: -** Thick bands of limestone associated with carbonaceous shales occur in Siara – Banjal – Gala, Ramcharan Gala area and again in Deri – Gala, Mular – Chochru Gala area.

1.3.16 **Gypsum: -** A small band of gypsum occurs within slate – quartzite sequence near Sander in Bani Range.

1.3.17 **Bentonite:** - A thin band of bentonite and bentonitic clay of white, pink and greyish colour occurs within the Upper Shiwaliks at Kashm, Rattanpur – Sorara and Sokriyara.

1.3.18 **China Clay: -** Small pockets of china clay occur at several places within the Shiwaliks in Basohli areas. These pockets are extensively quarried by local people for white washing and pot making.

1.3.19 **Glass Sand: -** The foot hill region of the district is traversed by stream and nallas which are full of quartzite boulders. Some of which are suitable for manufacture of glass.

1.3.20 **Slate: -** Fairly good quality roofing and paying slates occur within the Bani – Dhaggar area. These are used locally for roofing purposes.

1.3.21 **Quartzite: -** Quartzite deposits occur near Bhoond to Ramcharan in Tehsil Basohli. In addition to this, boulders of quartzites are quite pre-dominant in all nallas beds of Kathua district.

1.3.22 **Iron Ores: -** Small pockets of iron ores are found in Lohai-Malhar areas.

1.3.23 **Building Materials: -** The Kathua district abounds in various type of building materials such as sandstone, slabs, sand, gravel, boulders, clay etc. which are used extensively in road and building constructions.

1.4. Soils:

1.4.1 The soils of the tract have so far not been classified. By and large, soils are sandy, shallow and immature containing large proportion of un-decomposed organic materials. Chir bearing areas of the division have loose porous soils with good drainage. The soils depth is moderate to low. These soils are sandy, porous and fair in soil humus except those areas which having luxuriant tree growth. Generally soils are acidic in nature.

1.5 Climate:

1.5.1 The elevation of the tract as already mentioned varies from about 531 meter at submerged area of Ranjeet Singh Sagar in Basohli Range to 4341 meter at Kaplas in Bani Range from Mean Sea Level. The climate is sub-tropical with fairly severe summers and extreme cold winters with experiences snowfall. The lower part of the Division is called Kandi area which is characterized by severe summers.

1.6. Rainfall:

1.6.1 Due to the fact that the tract is bounded by high mountains of outer Himalayan Range in North, it receives full advantage of both the summer and winter monsoons. The higher reaches down to an altitude of about 1500 meter experience snowfall from late December to March. The summer rainy season lasts from July to September. Since the tract is subjected to the summer and winter rains, the upper coniferous zone receives heavier precipitation than the coniferous zone of Chenab and Kashmir valleys.

1.6.2 The rainfall data from 1986 to 1999 supplied by the Executive Engineer, Ranjeet Singh Sagar (Thein Dam), Basohli of District Kathua is reproduced in the following table no. 2.

Table 2: Rainfall Data of Ranjeet Singh Sagar (thein Dam), Basohli Kahtua.

S. No.	Month	RF/Rd	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
1.	Jan.	RF	42	38	109	24	10	228	NA	NA	129	80	46	15
		RD	4	5	5	4	2	7	NA	NA	13	5	5	3
2	Feb	RF	79	84	29	228	153	194	NA	NA	23	74	84	343
		RD	6	3	3	8	8	4	NA	NA	7	5	4	10
3	Mar	RF	34	287	99	187	87	234	NA	NA	121	119	94	153
		RD	2	6	7	9	7	8	NA	NA	5	6	5	7
4	Apr	RF	71	12	44	230	141	140	NA	NA	20	7	120	139
		RD	4	1	4	3	10	4	NA	NA	3	5	9	6
5.	May	RF	153	5	33	--	16	140	NA	NA	55	5	47	45
.		RD	9	1	3	--	4	4	NA	NA	2	1	6	5
6.	June	RF	30	97	47	259	120	51	NA	NA	179	30	115	107
		RD	4	5	5	9	5	4	NA	NA	6	2	11	5
7.	July	RF	103	794	465	458	128	797	883	792	174	147	435	429
		RD	6	18	12	21	13	22	16	23	21	15	22	21
8.	Aug.	RF	476	465	204	551	308	868	381	552	468	411	434	360
		RD	16	17	14	19	16	22	17	22	25	22	19	18
9.	Sep.	RF	263	995	29	119	164	140	NA	30	370	84	304	267
		RD	9	11	8	15	12	8	NA	7	6	8	20	14
10.	Oct.	RF	80	--	9	29	94	NA	NA	32	--	57	156	--
		RD	3	--	1	2	7	NA	NA	2	--	3	7	--
11.	Nov.	RF	--	--	21	--	16	NA	NA	--	15	10	161	5
		RD	--	--	2	--	1	NA	NA	--	2	1	5	1
12.	Dec.	RF	--	118	46	183	38	NA	NA	68	5	2	46	--
		RD	--	7	6	7	4	NA	NA	4	1	1	5	--

RF: Rainfall RD: Rainy Days **SOURCE: XEN, Thien Dam, Basohli (Kathua)**

1.7 Water Supply:

1.7.1 Water supply in the tract is just satisfactory, in spite of the large number of streams and springs are found in the area. In temperate zone it is adequate due to many perennial streams and springs. But in the lower sub-tropical zone in Chir and other broad leaved species bearing areas, water supply is deficient. It is because of the erratic precipitation, poor infiltration, retentiveness of the soils and largely attributed to excessive biotic interference in the watershed.

1.7.2 There is scarcity of water in low lying areas, the people travel long distances to bring drinking water. Though vigorous efforts are being made by Public Health Engineering Department to supply water to public at many places, the distribution of water is not sufficient as yet.

1.7.3 On the whole, there are no areas far from sources of water supply suitable for consumption both by human and cattle population. Monsoon and winter rains supply plenty of water for agriculture and forests.

1.8 Distribution and Area:

1.8.1 The forest area of the tract is spread over an unbroken strip slightly tapering from east to west. The presence of large number of "CHAKS" (private lands) inside the demarcated forests is a prominent feature of this division. The lower portion of the tract is honey combed with human habitation and are under heavy biotic pressure. With the increase in population there is corresponding increase land hunger among the people and the incidents of encroachment are very high and alarming.

1.8.2 The area under jurisdiction of Billawar Forest Division is spread in Kathua District and partly over Ramnagar Tehsil in Udhampur District. The geographical area of the division has been calculated from 1:50,000 scale topo-sheets by applying graphical method using a dot grid. The Range wise distribution of area is as follows in table no.3:

Table 3: Range wise distribution of Area:

S. No.	RANGE	GEOGRAPHICAL AREA (in ha)	FOREST AREA (in ha)	TOTAL NUMBER OF COMPARTMENTS / SUB-COMPARTMENTS	% OF FOREST AREA TO GEOGRAPHIC AREA
1.	Billawar	50,700	19,817	62	39%
2.	Bani	44,400	31,062	101	70%
3.	Basohli	33,800	9,358	41	28%
4.	Ramkot	23,400	8,010	43	34%
Total =		**1,52,300**	**68,247**	**247**	**45%**

Areas of the Ranges are compiled from individual stock maps are given below in Table No.4:

Table 4: Species wise distribution of Area: (Area – in ha)

S.NO.	RANGE	DEODAR	FIR / SPRUCE	KAIL	CHIR	BROAD LEAVED	BLANKS / SCRUBS	TOTAL
1.	Billawar	695	367	-	10,684	6671	1400	**19.817**
2.	Bani	2,458	7423	50	676	12244	8211	**31.062**
3.	Basohli	-	-	-	3,243	5,296	819	**9,358**
4.	Ramkot	-	-	-	6391	1291	328	**8,010**
	Total =	**3,153**	**7090**	**50**	**20994**	**25,502**	**10758**	**68,247**

1.8.3 The above table indicates that 30.76 % of the area of the division is under Chir species, 10.39% of the area is under Fir and Spruce species, 4.62% of the area is under Deodar species, 37.36% of the area found under Broad Leaved species and 15.76% of the area is under blanks / scrub.

1.8.4 The "Berunline Forests" which were demarcated are included in the forest area of the Division. However, there are still many "Berunline Forests" which though transferred to the Forest Department, have been not demarcated are still to be transferred. According to a report of the Billawar Forest Division, the following "Berunline Forest" awaits proper demarcation and formal mutation in favor of the Forest Department:

Table 5: Range wise distribution of Berunline Forest Areas:

S. No.	Range	BERULINE FORESTS	
1.	Billawar	1141.49 ha	(22,829 kanal ï 16 marlah)
2.	Bani	4565.34 ha	(91,346 kanal ï 16 marlah)
3.	Basohli	5712.56 ha	(1,34,251 kanal ï 05 marlah)
4.	Ramkot	483.20 ha	(9,604 kanal ï 00 marlah)
	Total	**11,904.59 ha**	**(2,38,091 kanal – 18 marlah)**

1.8.5 No efforts so far have been made for handing and taking over of the "Berunline Forests" area by the Revenue and Forest Departments, despite of a Government decision in this regard.

1.8.6 The area figures are based on the computation of the area from stock maps of individual compartments using a dot grid method of area calculation. The stock maps as usual were prepared on a scale of 1:50,000 and the area under different tree species or blanks are based on ocular estimation.

1.9. State of Boundaries-

1.9.1 Absence of boundary pillars on ground has resulted in lot of difficulties in preparation of stock maps and layout of the compartments. These forests had been demarcated by means boundary pillars made of loose stones / rubbles. The conditions of these boundary pillars are quite unsatisfactory. The pillars being of temporary nature are generally dismantled / displaced by the local people in order to encroach upon the forest land. This practice in the near past seems to have been going on at large scale to grab forest land. Most of the encroachments are too old to be ejected. Thus, in order to check the menace of encroachments there is prime need of replacing the old loose stone boundary pillars with the more permanent concrete pillars.

1.10 Legal Position:

1.10.1 All demarcated forests are the property of the Government of Jammu and Kashmir and their management and administration vests with the Forest Department. Thus, the Forest Department is responsible for the protection, management and improvement of fauna and flora in these forests.

1.10.2 The control of fluctuating grazing is also with the Forest Department. The department is competent to close an area up to half of the total area of the any forest subject to the maximum of one fourth of the total area of a territorial range at a time with prior sanction of the Minister in charge to the Forest Department under the _____

1.10.3 In discharging the obligations and responsibilities, the Forest Department is guided by the following acts, rules and notifications that came into being from time to time. There is no usual distinction between "PROTECTED" and "RESERVED" forests. The management is restricted to demarcated forests.

(i) The Jammu and Kashmir Forest Act 1987 (1930 AD) Act II of 1987.

(ii) The Jammu and Kashmir (Sale of Timber) Act 1987 (1931 AD) Act III of 1987.

(iii) The Kuth Act 1987 (1921 AD) Act No. I of 1978.

(iv) The Cattle Tresspass Act (1977 AD) Act No. VIII to 1977.

(v) The Jammu and Kashmir Land Improvement Scheme Act 1972 Act No. XXIV to 1972.

(vi) The Jammu and Kashmir Game Preservation Act 1998 (1942 AD) Act XXIV to 1998.

(vii) The Jammu and Kashmir Kahcharai Act 2011 (1954 AD), Act No. XVIII of 2011.

(viii) The Jammu and Kashmir Wildlife (Protection) Act 1978, Act No. VIII of 1978.

(ix) The Jammu and Kashmir Forest Corporation Act 1978, Act No. XII of 1978.

(x) The Jammu and Kashmir Public Premises (Eviction of Unauthorized Occupants) Act 1959, Act No. XIII of 1959.

(xi) The Jammu and Kashmir Preservation of Specified Trees Act 1969. Act No. V of 1969.

(xii) The Jammu Forest Notice and Kashmir Forest Notice.

(xiii) The Saw Mills (Registration and Control) Rules, 1968.

(xiv) The Jammu and Kashmir Nationalization of Forest Working Ordinance, 1986, Ordinance V of 1969.

(xv) The Jammu and Kashmir Extraction of Resin Act, 1986. (Governor's Act No. VIII of 1986. (Governor's Act No. VIII of 1986).

(xvi) Govt. Order No. 24 FST of 1990 dated : 15.01-1990. Restriction on Commercial Fellings.

(xvii) The Jammu and Kashmir Forest (Conservation) Act, 1990, Govt. Act No. XXVI of 1990.

(xviii) The Jammu and Kashmir Rehabilitation of Degraded Forests Village Plantation Rules, 1992, dated: 29-03-1992.

1.11 Rights and Concessions:

1.11.1 No rights have been recognized by the state. However, the villagers living in the vicinity of forest areas, as classified in Jammu Forest Notice, enjoy a number of liberal concessions from these forests in lieu of obligatory discharge of certain duties as mentioned in said notice. Depending upon the distance from the boundary of demarcated forests, the concessionists have been categorized into A and B classes for the purpose of granting major concessions like timber etc. The trees of Deodar, Kail, Fir and Chir are granted from the demarcated forests at a highly concession rate to villagers residing in and around within radius of 5 km. from demarcated forests for their bonafide domestic requirements. The timber may be granted as free of cost in case of fire and other natural calamities.

1.11.2 Other concessions enjoyed by the local inhabitants are briefly described as follows:-

1.11.3 Collection of dead fallen material for bonafide domestic use such as firewood and small timber.

1.11.4 Collection of felling debris / refuse from the vacated coupes.

1.11.5 Lopping of trees with certain restrictions except in case of Coniferous trees and Special Class Broad leaved trees such as Acer, Prunus, Walnut, Ash, Padus, Tun etc.

1.11.6 Collection of minor forest products (Non – Timber Forest Products) not prohibited under the Kuth Act or any other Order / Act as free of charge.

1.11.7 Grass cutting and grazing allowed in all the forests except those are closed for the purpose of conservation by Forest Department.

1.11.8 In case of fire and natural calamities, the timber may be granted free of cost to concessioners.

1.11.9 The following tabular statement shows the volume of timber issued to the concessionists over a period of last 13 years:

Table 6 Statement of Timber issued to the Concessioners from Billawar Forest Division.

Year	Volume of Timber issued (in cum)			Total (in cu m)
	Free Grants	Concessional	Standard Rate / Illicit Damage	
1988-89	--	628	168	
1989-90	--	530	84	
1990-91	21	593	105	
1991-92	--	315	95	
1992-93	--	200	178	
1993-94	--	205	56	
1994-95	--	75	105	
1995-96	--	115	63	
1996-97	--	138	80	

Note: - (i) Volume of conifer timber has been worked out using "Kullu Volume Table" on average basis.

(ii) Volume of timber excluding broad-leaved species and Billawar Range (Compartment history is not available)

1.11.10 In addition to the above figures, the timber is also removed by local inhabitants from the forest illicitly, which remains mostly undetected / unaccounted. The damage cases when come to the notice are generally compounded / settled departmentally after the recovery of cost and compensation, much lower than the prevailing rates in the open market.

1.12 Grazing:

1.12.1 The unrestricted, uncontrolled and unscientific grazing in the forests have largely been responsible for degradation of Deodar, Fir and Chir forests. Over grazing is responsible for failure of regeneration in the tract.

1.12.2 The pressure of grazing on the forests in increasing day by day with a rapid increase in livestock population resulting disappearance of ground flora in many areas. Most of grazing grounds comprising Kahcharai / Samlat / common lands have either been encroached upon or put to other use than grazing.

1.12.3 The department has a system of allotting forest areas to nomadic grazers for grazing purposes. However, the same areas allotted by the department are further sublet to the grazers illegally by the allottees resulting in excessive grazing pressure and encroachment in forest areas.

1.12.4 The permanent livestock population of Billawar Forest Division as per census conducted in 1992 is given below in table no. 7:

Table 7: Tabular Statement of Livestock Population, Billawar Forest Division (In lacs.)

S. No.	Animals	Blocks					Kathua District	Percentage
		Basohli	Billawar	Bani	Lohai Malhar	Total		
1.	Cattle	0.34	0.38	0.23	0.10	1.05	2.06	50.97
2.	Buffaloes	0.11	0.06	0.09	0.05	0.31	0.75	41.33
3.	Sheep	0.47	0.26	0.60	0.44	1.77	2.78	63.67
4.	Goats	0.77	0.37	0.61	0.66	2.41	3.94	61.17
5.	Others	0.01	0.01	0.02	0.01	0.05	0.10	50.00
	Total :	**1.70**	**1.08**	**1.55**	**1.26**	**5.59**	**9.63**	**58.05**

Source: Livestock Census, 1992 (Block Plans of Kathua District Vol. II, 1996-97)

1.12.5 The grazing details of Billawar Forest Division indicating numbers of live stocks under various categories are given below in Table No. 8. However, the actual number of livestock may be much more.

Table 8: Total Numbers of Animal Grazed in Billawar Forest Division.

S.No.	Year	"C" Rate	"B" Rate	Total
1.	1989-90	13,657	27,441	41,098
2.	1990-91	11,524	35,683	47,207
3.	1991-92	8,747	45,428	54,175
4.	1992-93	13,177	41,678	54,855
5.	1993-94	N.A.	N.A.	N.A.
6.	1994-95	N.A.	N.A.	N.A.
7.	1995-96	18,308	45,383	61,691
8.	1996-97	25,316	25,318	50,634
9.	1997-98	25,356	19,715	45,071

Source: -D.F.O., Billawar Forest Division.

1.12.6 This Division falls on the routes adopted by the migratory grazers (Gujjar, Bakerwal and Gaddies) during their seasonal movement for grazing pastures outside the jurisdiction of this Division. The details of animals that cross the last 10 years are given in table no. 9.

Table 9: Statement of Migratory Animals in Billawar Forest Division.

S. No.	Year	Buffaloes	Sheet	Goats	Horses	Ponies, Mules	Camels	Others	Total
1.	1988-89	1688	18422	16292	18	--	02	453	36941
2.	1989-90	1823	21279	17484	76	412	01	23	41098
3.	1990-91	1848	25392	19621	12	281	--	53	47207
4.	1991-92	2025	28260	24343	34	182	--	61	54905
5.	1992-93	1702	28518	23780	01	169	04	01	54175
6.	1993-94	NA	NA	NA	NA	NA	NA	NA	NA
7.	1994-95	NA	NA	NA	NA	NA	NA	NA	NA
8.	1995-96	1432	41096	18654	27	473	09	--	61691
9.	1996-97	2127	32159	16030	10	283	08	17	50634
10.	1997-98	1694	28870	12235	96	444	02	46	45071
	Total=	**14439**	**148439**	**223996**	**274**	**2244**	**27**	**654**	**391672**
	Average=	**1792**	**18555**	**28000**	**34**	**281**	**03**	**82**	**49959**

Source: - D.F.O., Billawar Forest Division

1.12.7 The forest department controls only the fluctuating grazing under Kacharai Act and Rules laid down by Govt. of J&K from time to time.

CHAPTER – II

The Forest Flora and Fauna

Part A- The Flora

2.1 Composition and Condition of the Crop:

2.1.1 Billawar Forest Division has diverse flora ranging from sub-tropical in the south to the alpine meadows on the highest peaks in the north due to varied altitude and topography of the tract. Deodar (*Cedrus deodara*), Fir *(Abies pindrow*), Spruce (*Picea smithiana*), Chir Pine (*Pinus roxburghii*) etc. and a variety of broad leaved species constitute the growing stock of this division. The percentage of composition of different species in relation to the total forest area of the division is as under:-

1-	Board Leaved	:	37.37 %
2-	Chir	:	30.76 %
3-	Fir / Spruce	:	11.41 %
4-	Deodar	:	4.62 %
5-	Kail	:	0.07 %
6-	Blanks / Scrub	:	15.77 %
	Total:		**100.00 %**

2.2 Occurrence and Distribution of Species:

2.2.1 Almost complete absence of Kail (*Pinus wallichiana*) is one of the characteristic feature of this Division.

2.2.2 Fir forest occurs beyond 2400 meters elevation above Mean Sea Level up to limit of tree line. Fir is found in pure forms in some patches at places and in the lower fringe mixed with Deodar and Oak. Spruce is very rarely found in pure patches. It is mostly inter-mixed with Fir and Oak in sprinkled form.

2.2.3 Deodar forests are mainly confined to Bani Range and in few compartment of Billawar Range. It generally occupies the basins of small valleys exposed to the northern aspect. Deodar is either found in pure form or mixed with Fir / Spruce and Oak. In some places Deodar is present below Chir in compartment no. 84 of Bani Range.

2.2.4. In this division, Chir forests are found between 600 meters to 1500 meters elevation over the low lying sub – tropical areas in Billawar, Basohli and Ramkot Ranges and a small area in Bani Range. Chir grows pure as well as mixed with broad leaved species.

2.2.5 Yew (*Taxus wallichiana*) is also encountered sprinkled over a very small area in Bani Range is negligible proportion. It is absent in Billawar, Basohli and Ramkot Ranges.

2.2.6 The broad leaved forests constitute about 38 % of total forest area of the Division. Broad leaved species ranging from sub-tropical miscellaneous type to Oak; (some of them are very important) in accessible for exploitation, these are not considered commercial at present but constitute a potential growing stock reserve, occupy sizeable area in all the four Ranges.

2.2.7 The high level pasture lands, devoid of tree cover are met along the alpine and sub-alpine belt beyond tree line which is mostly covered with herbaceous and miscellaneous grassy vegetation. These pasture lands have been grazed beyond their carrying capacity with the result the unwanted varieties of grasses are replacing the better ones.

2.2.8 Low lying broad leaved forests are found in the low lying hills and valleys of Basohli, Billawar and Ramkot Ranges. They are mostly composed a brushwood and varying proportion of miscellaneous broad leaved species with scattered stray trees of Chir at places in the upper limits. The chief tree species found in these forests are:-

Acacia, catechu, Acacia *nilotica, Acacia modesta, Dalbergia sissoo, Aegle marmelos, Syzygium cumini, Bombax ceiba, Anogeissus latifolia, Lannea coromandelica, Toona ciliata, Mitragyna parviflora, Zyziphus maurtiana, Punica granatum, Mallotus phillippinesis, Dendrocalamus strictus, Cassia fistula, Butea monosperma, etc. and the principal brushwood species are Carissa opaca, Dodonaea viscosa, Adhatoda vasica, Murraya koenigii, Colobrookia oppositifolia, Woodfordia fruticosa* etc.

2.3 Oak Forests:

All the three principal Himalayan Oaks viz., *Quercus leucotrichophora* (Banj), *Quercus floribunda* (Moru), and *Quercus semicarpifolia* (Kharshu) are well represented. At present these forests are not exploited for commercial purposes but the local people meet their requirements of fuel, fodder and agricultural implements from these forests. The three species of Oak are described as under:

2.3.1 **Banj Forests (*Quercus leucotrichophora*):**

Banj forests occupy the maximum area of the Oak forests in the Division. First it appears in the Chir zone followed by a almost pure crop and finally extend up to Deodar zone, where it is replaced by Moru Oak. The main broad-leaved associates are *Rhododendron abroreum* and *Lyonia ovilifolia*.

2.3.2. **Moru Forests (*Quercus floribunda*):**

Maru forests are restricted to Deodar zone. In lower areas these are mixed with Banj and in upper limits with Kharshu. These forests are heavily lopped for fodder and firewood. The chief associates being Rhododendron arboreum, Machalis, Aseculus spp. etc.

2.3.3 **Kharshu Forests (*Quercus semicarpifolia*):**

Kharshu are found mixed with Fir / Spruce zone and constitute almost a pure belt in the Fir / Spruce zone. Their main broad-leaved species associated is *Betula utilis*.

2.3.4 The area covered by Oak forests has been estimated from the stock maps of the compartments are given in Table No. 10:

Table-10: Area Statement of Oak Forests in Billawar Forest Division

S. No.	Range	Banj Oak Forests	Maru Oak Forests	Kharshu Oak Forests	Total Area
1.	Billawar	3200	300	500	4000
2.	Bani	4600	1700	5000	11300
3.	Basohli	1100	--	--	1100
4.	Ramkot	100	--	--	100
	Total=	**9000**	**2000**	**5500**	**16500**

2.3.5 Thus, Oak forests constitute 64.63% of the total broad-leaved area and 24.18% of the total forest area in the Division.

2.4 General Description of Growing Stock:

2.4.1 For the purpose of general description, these forests can be divided into five distinct categories:-

(i) Fir and Spruce Forests

(ii) Deodar Forests

(iii) Chir Forests

(iv) Broad – Leaved Forests

(v) Scrub Forests

2.4.2. Fir and Spruce Forests:

Fir and Spruce Forests are found above Deodar zone in the upper catchment of Seawa River in Bani Range. Bulk of the Fir and Spruce Forests are found in the Western catchment of Seawa River. Mararh and Chhandale Forest near Sukad in Billawar Range also held few patches of Fir and Spruce.

2.4.3 Fir and Spruce crop is mostly middle to mature with younger age class rather deficient.

2.4.4 The main associates are Fir / Spruce and Quercus semicarpifolia. The latter forms almost pure patches, above the Fir and Spruce zone. Spruce is found in the exposed places in the lower Fir zone and it is also seen in the upper Deodar belt chiefly on northern and northeastern aspects. Other Broad-leaved associates are *Aesculus indica, Junglans regia, Acer species* etc. The main shrubs found in the zone are *Vibernum foetans, Skimmia laureola, Cotoneaster, Spireae species* etc.

2.4.5 Deodar Forests:

Deodar forests are mainly found in Bani Range within the altitudanal limits of 1520 meters to 2590 meters. The bulk of Deodar forests in Bani Range are confined to the eastern

catchment of Seawa River. Some Deodar forests are also found at Kared, Urola and Chew in Billawar Range.

2.4.6 Deodar crop is young to middle age with scattered mature stems.

2.4.7 Kail, the chief associate of Deodar, is the least represented in the Division and whatever little present is negligible. The other principal associates are *Quercus leucotricophora, Q. floribunda, Aesculus indica, Rhodedendron arboreum, Lyonia ovilifolia*, etc. The main shrubs found in these forests are *Berberis species, Vibernum foetans, Indigofera pulchella, Desmodium tilliafolium, Sarcococca saligna, Spicaea canescens* and *Parrotiapsis jacquemontiana* (Pohu) which is found in very few compartments.

2.4.8 Chir Forests:

2.4.9 The Chir is maximum represented species in the Division amongst conifers. In Bani Range, Chir is very much deficient and is confined only along Seawa River from Bani to downwards. In all the other three Ranges, Chir is the pre-dominant species.

2.4.10 Chir crop is mostly young to middle age with scattered mature stems. Density of the crop is generally is low and regeneration is very much deficient. On the whole, Chir crop is malformed, crooked with bole twisted at many places.

2.4.11 The chief associates of Chir are *Dalbergia sissoo, Acacia catechu, Lannea coromandelica*, etc. in the lower limits and *Quercus leucotricophora, Rhododendron arboreum*, etc. in the upper limit.

2.4.12 Broad – Leaved Forests:

2.4.13 These Forests are found in certain places in the Division and scattered all over the Division. The general condition of these forests in not good due to the pressure of local and neighboring habitation.

2.4.14 The main species found in these forests are *Quercus, Acer Aesculus, Rhododendron, Lyonia species* etc. in the upper parts and *Acacia, Ficus, Albizzia spp. Mallotus phillipinesis, Dalbergia sissoo* etc. in the lower parts.

2.4.15 Scrub Forests:

2.4.16 These forests occupy a small area of the forests of the Division. The main species are *Vibernum, Cotoneaster, Dodonaea viscosa, Carissa spiranum, Woodfordia fruticosa* etc. and Broad-leaves tree species are *Quercus, Rhododendron spp. Alunus nitida, Dalbergia sissoo, Mallotus phillipenensis, Acacia catechu* etc.

General Description of the Forest types

2.5 Forest Types:

2.5.1 The forests of this division can be classified into the following “Forest Types” in accordance with the mode of classification followed in the “Revised Survey of Forest Types of India” by Champion and Seth:-

2.5.2 Northern Mixed Dry Deciduous Forests – (5b/C2):

This forests type covered about 11% of the total area of this Division. This type covers the low lying areas of Billawar, Basohli and Ramkot Ranges. The annual fires and excessive grazing prevent the development of the shrubs which would otherwise form the under growth.

The general floristic is as under:-

(i) *Acacia catechu, Acacia nilotica, A. modesta, Dalbergia sissoo, Aegle marmelos, Anogeissus latifolia, Bombax ceiba, Lannea coromandelica, Syzygium cumini, Toona ciliata, Cassia fistula, Emblica officinalis.*

(ii) *Flacourita ramontehi, Mallotus phylippinense, Punica granatum, Zyzyphus maurtiana.*

(iii) *Carissa opaca, Dodonaea viscosa, Adhatoda vasica, Woodfordia fructcosa, Murraya Koenigii, Colebrookia oppositifolia :*

(iv) (a) *Cassia tora, Xanthium stremarium.*

(b) *Cymbopogon spp., Cenchrus ciliaris.*

(v) *Climbers like Bauhinia vahlii, Acacia piunata, Clematis gouriana*.

2.5.3 Dry Decidous Scrub - (5b / Ds I):

There are several patches in the above mentioned type 5B / C2 which have been totally degraded due to unrestricted felling for firewood, lopping and grazing. These forests are badly eroded and are fast depleting. This type constitutes about 1% area of the Division.

The general floristic are as under:-

Flacourita, indica, Mallotus phillippinensis, Wendlandia heynei, Nyctanthes arbortristis, Punica granatum, Zyzyphus maurtiana, Cassia fistula, Dodonaea viscosa, Adhatoda vasica, Woodfordia frcticosa, Murraya koenigii, Colebrookia oppositifolia.

2.5.4 Pure Sissoo Forests - (5b / Si2):

This type of forests shows the primary reverine succession. Pure sissoo forests occupy islands in the bed of Ujh River near Godu Falal and on the ground grasses form the main under growth.

2.5.5 Lower or Shiwalik Chir Pine Forest - (9/Cia):

This forests type covers about 27% of the total forest area of the Division. The fires and excessive grazing prevent development of shrubs. These two factors are equally found inimical for the development and establishment of the Chir seedlings.

The general floristic is as under:-

(i) *Pinus roxburghii.*

(ii) *Acacia catechu, Acacia modesta, Dalbergia sissoo, Lannia coromandelia, Bombax ceiba, Syzygium cumini, Pistacia integerrima, Emblica officinalis, Flacourtia indica, Mallotus philippinensis, Punica granatum, Zyzyphus maurtiana.*

(iii) *Carissa opaca, Dodonaea viscosa, Adhatoda vasica, Woodfordia fructicoa, Murraya koenigii, Colobrookia oppositifolia, Rubus ellipticus, Myrsine africana.*

(iv)-(a) *Rumex hastatus, Plantago tibetica, Taraxacum officinale.*

(iv)-(b) *Cymbopogon spp., Cenchrus ciliaris.*

(iv) *Bauhinia vahlii, Peuraria tuberosa, Clematis gouriana.*

2.5.6 Upper or Himalayan Chir Pine Forest - (9/Cib):

This forest type covers about 4% of the total forest area of the Division.

The general floristic is as under:-

(i) *Pinus roxburghii.*

ii) *Quercus leucotrichophora, Rhododendron arboreum, Ficus romburghe, Pyrus pashia, Pistacia chinensis subsp. integerrim, Olea cuspidata, Lyonia ovalifolia, Syzygium cumini.*

(iii) *Woodfordia fructicosa, Colebrookia oppositifolia, Prinsepia utilis, Rubus ellipticus, Berberis spp., Myrsine africana.*

(iv)-(a) *Rumex hastatus, Taraxacum officinale, Plantago tibetica, Viola canescens.*

(iv)-(b) *Cymbopogon spp., Cenchrus ciliaris, Cynodon dactylon.*

(v) *Rosa moschata.*

2.5.7 Himalayan Sub-Tropical Scrub - (9/Ci/Dsi):

There are several patches in the Chir zone where over wood is almost absent and has either been destroyed or has not been able to develop due to excessively dry and shallow soils. This forest type constitutes about 2% of the total forest area of the Division. The predominant shrubby growth consists of *Carissa opaca, Dodonaea viscosa, Adhatoda vasica, Woodforida floribunda, Berberis spp.* etc.

2.5.8 Sub – Tropical Euphorbia Scrub - (9/Ci/Ds_2):

Euphorbia royleana forms consociations in small patches on dry and rocky sites and those areas which are subjected to heavy biotic pressure. They indicate xerophytic conditions. This type occupies negligibly small patches in the lower tracts of the Division. Some patches can be seen along Basohli-Bhund Road.

2.5.9 Banj Oak (*Quercus Leucotricophora*) Forests:

This forests type covers about 13% of the total forest area of the Division. The forests are open, short boled and low branched trees. This occupies the lowest portion of temperate

belt extending long way down towards the sub-tropical zone of the moist localities. In some places this is highly exposed to damage through human agencies. Lopping is extremely prevalent and combined with fuel demands.

General floristic are as under:-

(i) *Quercus leucotrichophora, Pinus roxburghii.*

(ii) *Rhododendron arboreum, Lyonia ovalifolia, Pyrus pashia, Pistacia chinensis subsp. integerrim,*

(iii) *Berberis spp., Vivernum spp., Rubus ellipticus, Desomodium tilliaefolium, Myrsine africana. Prinsepia utilis, Plectranthus rugosus.*

(iv)-(a) *Rumex hastatus, Plantago tibetica, Taraxacum officinale, Viola canescens.*

(iv)-(b) *Cynodon dactylon.*

(v) *Vitis himallayana, Hedera nepalensis, Rosa moschata, Smilax parvifolia.*

2.5.10 Moru Oak (*Quercus Floribunda*) Forests - (12/C1b):

This type forms a finest moist temperate broad leaved forest and constitute about 3% o the total forest area of the Division. It is adopted of cooler and moist localities. *Quercus floribunda* is most appreciated of the Oaks for leaf fodder.

General floristic is as under:-

(i) *Quercus floribunda, Quercus leucotricophora, Quercus semicarpifolia, Cedrus deodara, Picea smithiana,Rhododendron arboreum, Lyonia ovalifolia, Machilus spp.*

(ii) *Vibernum foetens, Berberis aristata, Sarcococca saligna, Deutzia compacta.*

(iii) *Taraxacum officinale, Skimmia laureola, Viola canescence, Boenninghausenia albiflora, Aquilegia pubiflora, Aralia cachemirica.*

Pyrus pashia, Pistacia chinensis subsp. Integerrim,

(iv) *Cynodon dactylon.*

2.5.11 Moist Deodar Forest - (12/C1c):

Cedrus deodara is a typical species of this type which occur mostly. A little Fir and Spruce are commonly present. The canopy is complete and dense in young crops (The under storey is generally absent from the area having dense Deodar crop). This type does not appear to be truly in climax condition as most of Deodar seems to have been considerably influenced directly or indirectly by biotic interference. This forest type covers about 4.6% of the total area of the Division.

General floristic are as under:-

(i) *Cedrus deodara, Picea smithiana, Pinus wallichiana, Quercus leucotricophora, Quercus floribunda, Rhododendron arboreum, Lyonia ovalifolia :*

(ii) Vibernum foetens, Sarcococca saligna, Deutzia compacta. Berberis spp., Skimmia laureola, Lonicera angustifolia, Spiraea canescens.

(iii) Taraxacum officinale, Viola canescence, Aralia cachemirica, Aquilegia pubiflora,

(iv) Cynodon dactylon.

(v) Hedera nepalensis, Clematis montana, Vitis himalayana, Jasminum officinale.

2.5.12 Western Mixed Confierous Forest - (12/C1d):

This type comprises varying mixture of conifers like Kail, Deodar, Fir, Spruce and varying inter mixture of evergreen and deciduous broad leaved trees in strips / patches. This is found in Bani and Billawar (upper portion) ranges, occupying mostly northern slopes. It constitutes about 11% of the total forest area of the Division.

General Floristic are as under:-

(i) Abies pindrow, Picea smithiana, Pinus wallichiana, Cedrus deodara.

(ii) Quercus semicarpifolia, Quercus floribunda, Aesculus indica, Juglans regia, Acer caesium, Taxus wallichiana, Machilus duthiei, Ulmus wallichiana, Corylus colurna.

(iii) Vibernum foetens, Sarcococca saligna, Daphne cannabina, Spiraea canescens, Skimmia laureola, Cotoneaster spp.

(iv)-(a) Taraxacum officinale, Urtica dioica, Fragaria vesca, Arisaema spp., Iris spp., Aralia cachemirica, Aquilegia pubiflora, Atropa belladonna, Podophyllum haxandrum, Potentilla nepalensis, Primula denticulata, Inapatiens spp.

(iv)-(b) Cynodon dactylon.

(v) Hedera nepalensis, Vitis jacquemontii.

2.5.13 Moist Temperate Deciduous Forest (12/C1e and 12/C2e):

This type covers about 1% of the total forest area of the Division and is found between 1800 M to 2750 M on the moist nalla banks and depressions often as strips along the hill streams and also on many of the gentle slopes.

General Floristic is as under:-

Aesculus indica, Junglans regia, Acer caesium, Acer pictum, Abies pindrow, Coylus colurna, Taxus wallichiana.

Vibernum inetens, Spiraea canescens, Rubus spp., Berberis spp., Sarcococca saligna, laureola, Cotoneaster spp. Daphne cannabina,

2.5.14 Oak Scrub - (12/C1/Ds1):

This forests type cover about 1% of the total forest area of Division. It includes heavily grazed and lopped Oak forests where the Oaks and the associated species have been reduced to low stunted unsound trees except for *Rhododendron arboreum* and *Lyonia*

ovalifolia, which both are useless for the villagers. The thorny bushes like *Berberis spp., Prinsepia utilis* also cover the soil.

2.5.15 Himalayan Temperate Secondary Scrub - (12/C1/Ds2):

This sub type occurs along the sites of cultivation. On burnt areas especially on southern slopes, excessively grazed and lopped sites near villages and other similar sites.

2.5.16 Kharshu Oak (*Quercus Semicapifolia*) Forests - (12/C2a):

This sub type consists of *Quercus semicrpifolia* occurring in typically gregarious nature and forming pure crops in its optimum zone. But it is frequently mixed with *Abies pindrow* and *Quercus floribunda*. This type crops mixed with coniferous forest at many places and merges with alpine zone above. This type met about 8% of the total forest area in the Division.

General floristic is as under:-

(i) *Quercus semicarpifolia, Quercus floribunda, Betula spp., Acer caesiam, Abies pindrow.*

(ii) *Rhododendron arboreum, Pyunus padus, Taxus wallichiana.*

(ii) *Vibernum foetens, Skimmia laureola Cotoneaster acuminata, Salix elegans.*

(iv)-(a) *Taraxacum officinale, Fragaria vasica, Impartiens spp., Primular denticulata, Potentilla nepalensis.*

(iv)-(b) *Grasses*

(v) *Hedera nepalensis.*

2.5.17 Himalayan Temperate Parklands - (12/Ds2):

These parklands which are also called as "BEHAKS" are used as seasonal pastures by the nomadic grazers' viz. Gujjars, Bakarwals and Guddies and are found in the higher altitude of Bani Range. There is Open Park like lands with scattered and moribund temperate deciduous broad leave species with or without conifer trees over a grassy turf; full of flowers in spring season and often with browsed clumps of *Berberis spp., Lonicera spp. Cotoneaster spp.*, patches of *Vibernum foetens, Iris spp.*, etc. These lands are over grazed by the buffaloes, sheep and goats and cattle during the peak months of summer.

General Floristic is as under:-

Aesculus indica, Prunus padus, Junglans regia, Vibernum foetens, Rumex nepalensis, Iris spp., grasses.

2.5.18 Alder Forest - (12/1s1):

This forest type is confined typically nearly pure forms, along the stream sides, exposed unstable hill side and on land slip areas. This is limited to sites with permanent water supply. The characteristics species of this type is *Alnus nitida* present is few patches or strips. This is an example of primary succession of temperate zone.

General Floristic are as under:-

(i) *Alnus nitida, Populus ciliata, Celtis australis.*

(ii) *Sarcococca saligna, Crateque spp.,*

(iii) *Berberis spp.,*

2.5.19 Low Level Blue Pine Forest - (12/2s1):

There are very small and few patches of Pinus wallichiana, found in a very few compartments of Bani Range.

2.5.20 Deciduous Sub-Alpine Scrub - (14/1s2):

This type of the forest above the sub-alpine pastures. It is met in the remote and interior areas of Bani Range. This constitutes irregular forests consisting of *Betula utilis* and *Rhododendron* in a varying proportion. This is heavily grazed lands.

2.5.21 Sub-Alpine Pastures - (14/Ds1):

This sub type consists of the area where grazing has taken place in the alpine forests. This type is heavily grazed beyond its carrying capacity during the summer months. It grows a variety of palatable and non-palatable grasses.

2.6.22 Deciduous Alpine Scrub - (15/S2):

This sub type is restricted to the uppermost area of alpine catchment consisting of *Betula utilis, dwarf Junipers* with *Berberis spp.* as a ground flora.

2.5.23 Alpine Pastures - (15/C3):

These are continuous with those lower down and differ only in having shorter snow free period.

The meadows are comprised mostly of perennial mesophitic herbs with little grasses, conspicuous among the herbs are *Primula spp., Anemone spp., Gentiana spp., Iris spp.* etc. with other many plant species of families *Rannanculaceae, Cruciferae, Compositae, Caryophyllaceae*.

This type is well developed in the top reaches of Bani Range. These pastures are also overgrazed by the buffaloes, sheep and goats and cattle during the peak months of summer.

All above four sub-types (Para 2.5.20 to 2.5.23) covers about 10% of the total forest area of the division.

2.6 Injuries to Which the Crop is Liable:

2.6.1 The various agents causing injuries to the crop of these forests directly of indirectly are enlisted below:-

(i) Man and his animals

(ii) Forest fires

(iii) Wild animals

(iv) Insects, fungi and parasites

(v) Natural and climatic causes (Physical causes)

2.7 Man and His Animals:

Most extensive damages to the crop of these forests are caused by man and his animals. The uncontrollable increase in human and bovine population has resulted in excessive biotic pressure in these areas. Some of the major injuries that are caused by man and his animals are girdling of trees, lopping of trees, extraction of torchwood, forest fire whether intentionally or accidently, grazing, grass cutting, illicit damages, encroachments and ill management of forests.

Encroachments in forest areas for cultivation and other purposes has been biggest menace in the division. Absence of demarcation pillars in most of the areas coupled with greed of the people to bring more and more land under cultivation has resulted in encroachment in forest areas. People resort to girdling of green trees resulting in their premature deaths and subsequent destruction of vegetative cover in forest areas which later are converted into agricultural fields. This menace has taken alarming proportion in recent past.

This forest Division is under heavy pressure of grazing by nomadic and permanent livestock population. Grazing in forest areas has been unscientific, uncontrolled and unregulated which causes considerable damage to the upcoming regeneration of Chir, Deodar and Fir species.

The torchwood extraction is also done by the villages from the standing Chir trees. As a result, these trees get damaged and weakened at the base and ultimately get broken due to strong wind.

Lopping for firewood and fodder is generally confined to broad leaved species especially Oaks with the result some of Oak forests have turned into Oak scrub.

With rapid rate of urbanization and increase in population, there has been corresponding increase for the demand of timber and firewood, as a result of which, the illicit damage have shown a pronounced increase in the recent times. The numbers of damage cases registered in the division during the past eleven years are given in table no. 11:

Table –11: Details Of Damage Cases of Billawar Forest Division From 1988-89 To 1998-99

Years	Department				Police				Court			
	OB	Rec.	Dis.	N. Bal.	OB	Rec.	Dis.	N. Bal.	OB	Rec.	Dis.	N. Bal.

1988-89	154	124	159	119	11	--	01	10	05	--	--	05
1989-90	119	266	265	120	10	01	--	11	05	--	--	05
1990-91	120	262	247	135	11	--	--	11	05	--	01	04
1991-92	135	197	225	147	11	--	--	11	04	02	--	06
1992-93	147	246	220	133	11	03	--	14	06	01	--	07
1993-94	133	192	217	108	14	02	--	16	07	--	--	07
1994-95	108	188	159	137	16	04	--	20	07	--	--	07
1995-96	137	218	172	183	20	01	--	21	07	--	--	07
1996-97	183	155	162	176	21	03	04	20	07	01	01	07
1997-98	176	157	177	156	20	01	02	19	07	--	--	07
1998-99	156	NA	NA	219	19	01	--	20	07	--	--	07

Note: - OB = Opening balance **Source: -** D.F.O., Billawar Forest Division.

Rec. = Receipts

Dis. = Disposal

N. Bal. = Net Balance

N.A. = Not Available

Excessive and improper extraction of resin tapping from Chir areas during past two decades has also made the crop vulnerable to fires and natural calamities.

Collection of grasses from forest areas by unscientific method of grass cutting also damages ground flora and young crop which are also cut and trampled along with the grasses.

2.8 Forest Fires:

The forests of this area especially under Chir have been experiencing damage due to fire. Although Chir is a fire hardy species but the crop becomes vulnerable due to accumulation of inflammable material on ground and faulty and excessive tapping of resin. The forests face danger of uncontrolled fire especially during summer months. These phenomena have been responsible for extensive damage to standing and young crops. In adequate fire protection measures have resulted in considerable area being damaged by fire each year.

The details of forest area burnt in each Range due to fire over past 12 years are given below in Table No. 12.

Table –12: Statement Of Forest Area Burnt Due To Fire (Area- In Ha)

S. No.	Year	Total Area
1.	1987-88	184
2.	1988-89	14
3.	1989-90	61
4.	1990-91	29
5.	1991-92	39
6.	1992-93	163
7.	1993-94	347
8.	1994-95	NA
9.	1995-96	NA
10.	1996-97	60
11.	1997-98	NA
12.	1998-99	NA

Source : D.F.O., Billawar Forest Division

2.9 Wild Animals:

The injuries caused to the forests by wild animals are much less as compared to injuries caused by man and his animals. Some of injuries caused by wild animals to forest crop are debarking young Deodar poles by bears which ultimately dry up. Porcupines uproot and chew the seedlings of Chir. Monkeys and Apes (Langurs) also cause some damage and a miniscule damage to seeds by birds.

2.10 Insects, Fungi and Parasites:

The attack on conifers by fungi and parasites is not very common in this Division. However, some Kail trees are observed to have been attacked by a parasite *Arceuthobium minutissimum* (Armi) which first causes "Witch's Broom" ultimately killing the tree by lowering its vitality. Kail is also liable to attach by *Trametes pini* (Fomes) but is not wide spread. The conifers are not very liable to attach by insects / pests.

2.11 Natural and Climatic Causes (Physical Causes):

The health and growth of forest crop is also affected by various climatic and natural causes like floods leads to landslides and thus erosion of soil may lead to uprooting of trees. Strong winds and storms damage the Chir forests especially Chir trees under resin tapping. As a result of heavy snow fall, many trees are broken. The trees struck by lightning dry up eventually.

PART – II

Forest Fauna

2.12 General Description:

A variety of fauna is found in this division because of varied climatic conditions from sub-tropical in the south to alpine in the north of the division. The forest of the tract must have been teeming with wildlife in the past. However there has been a significant decline in the wildlife due to wanton killing of game animals and birds and due to destruction of their habitat.

The faunal species especially the animals and birds as described below are on constant decline and are represented by a few numbers at present.

2.13 Animals Class – Mammalia

2.13.1 Carnivora:-

(i) The Leopard Or Panther (*Panthera pardus*):

It is commonly known as "Chita" or "Chitra" by the local people. It is a sleek short haired animal with bright fulvous cost marked with close set black hollow rosettes. In the absence of wild preys it descends near the vicinity of villages and kills domestic animals. Its number is on sharp decline. The size of the full grown male leopard is about 2.15 meters or so. It has been declared as special Game as per the Jammu and Kashmir Wildlife Protection Act, 1978.

(ii) The Snow Leopard (*Panthera uncia*):

It is slightly smaller than *Panthera pardus* in size inhabits high altitudinal zone of about 3500 m to 4000 m. It is probably found in Sarthal and Loang Blocks of Bani Range. It is creamy grey in color and very beautiful animal. It has since been included in Schedule I of the Jammu and Kashmir Wildlife Protection Act 1978; its killing is totally banned.

(iii) The Jungal Cat (*Felis chaus*):

A Small number of this species is generally found in lower scrub forests. It is commonly called "Jangli Billi." It has comparatively long legs and short tail. Its pale green eyes make it look very cruel. It preys upon small mammals, birds and when near villages on poultry also.

(iv) Mangoose or the Small Indian Mangoose (*Herpsters aurpunctatus*):

It is small in size and shorter tailed with its olive – brown gold flecked and short silky fur of the animal is distinctive. This animal lives in holes borrowed by it. It is mostly found in low lying areas of this Division in and around cultivated fields. It feeds on rates, mice, snakes, scorpions, centipedes, wasps and insects and all other kinds.

(v) The Jackal (*Canis aureus*):

This animal commonly found in the Division up to elevation of 1300 meters above mean sea level, mostly in low land around town, villages and cultivation, sheltering in holes in the ground dense grass and scrub. It is nocturnal in habit. It sometime attacks small domestic animals like goats, sheep and their young ones and birds. It is one of the most common

nature scavengers. This animal has been declared as Vermin as per the J & K Wildlife Protection Act, 1978.

(vi) The Red Fox (*Vulpes vulpes*):

It mostly found in the upper sub-temperate and temperate zone of the tract. It is generally red in color. It has been included in Schedule IV of the J & K Wildlife Protection Act, 1978.

(vii) The Indian Fox (*Vulpes bengalensis*):

The fox is frequently found in the sub-tropical zone of the Division. It lives in the burrow dug by itself in upon ground and in scrub. It feeds on small mammals, reptiles and insects. It has been declared as Vermin as per the J & K Wildlife Protection Act, 1978.

(viii) Common or Hill Fox (*Vulpes alopex montanu*):

The common fox or "Lomri" is commonly found in the tract in the brushwood upto 1700 meters and upward.

(ix) Brown Bear (*Ursus arctos*):

It is commonly known as "Lal Bhalu" because of reddish brown color of its coat. It is heavier in built than black bear, found in open peaks high above the tree line area. It is commonly omnivorous prefers grasses, ants, termites, honey, variety of fruits and flowers. Many a times it attacks sheep and goats when hungry. It has been included in Schedule II of the J & K Wildlife Protection Act. 1978.

(x) The Himalayan Black Bear (*Selenaractors thibetanus*):

Its common name is "Bhalu". It has coarse shiny coat of black hairs with a very characteristic feature V-shaped breast mark which may be white, yellow or buff. In summer it is found near the tree line (3000 meters to 3500 meters) whereas it descends to low lying areas during the winter months. It lives largely on variety of wild fruits, berries, insects, termites and larvae. It raids the maize fields and sometimes causes huge damage to the crop. It has been found that the most carnivorous of the bears and kills sheep, goats and even large domestic animals. Many a times even human beings are molded or killed by this animal in its defense. Fruits of *Vibernum foetens* are very much relished by the bear. A few decades back this bear was quit common now its number is on sharp decline because of its wanton killing by poachers. It is now found in the interior steep forests area of Bani Range. Hardly a few numbers are believed to the surviving. It is included in Schedule III or the J & K Wildlife Protection Act 1978.

(xi) The Common Otter (*Lutra lutra*):

This animal is rarely found in the streams and springs throughout the Division. It generally thrives on fish and other aquatic animals. Its fur is much valued. It has been included in Schedule IV of the J & K Wildlife Protection Act 1978.

2.13.2 (Rodents (Rodentia):

(i) The Red Flying Squirrel (*Pectaurista philippens altervente*):

It inhabits the Deodar, Kail and Fir forest. It is rarely seen in sub-tropical belt. It has thick fur covering and a tail longer than the length of the body and head. It produces sound like that of a falling parachute while leaping one tree to other. It feeds on fruits and nuts of various trees, barks, gums, resin and sometimes on small insects and their larvae. It has been included in Schedule II of the J & K Wildlife Protection Act, 1978.

(ii) Fire Striped Palm Squirrel (*Funambulus penanti*):

It is quite common in sub-tropical belt of this Division. It is more commonly found in villages and agricultural fields rather than in forests. It feeds on fruits, nuts, birds, young shoots, bark etc. It has been included in Schedule II of the J & K Forest Protection Act, 1978.

(iii) The Indian Field Mouse (*Mus boodnga*):

It is declared as vermin in Schedule V of the J & K Forest Protection Act 1978. This mouse is commonly found in agriculture fields, compounds and inside the houses. It lives in burrows on grasses, fruits, roots and nuts etc. It causes damages to agricultural crops and nursery plantations.

(iv) The Indian Porcupine (*Hustrix indica*):

Locally this is called "Sahi". This is a small sized, robust and stocky animal and is characterized by sharp quills (spine like structure) on its back. The quills are profuse, ornamental with deep brown or black and white rings and weighing about 10 Kg when mature. It causes great damages to the nurseries. It has been included in Schedule II of the J & K Wildlife Forest Protection Act. 1978.

(v) The Indian Hare (*Lepus negricolis*):

Locally it is known as "Khargosh". This is a small sized animal, brown in color is found in scrub forests up to an elevation of 2500 meters of this Division. A full grown animal weighs 2 kg. It runs fast and does damage to agricultural crops in Kandi belt. It has been included in Schedule II of the J & K Forest Protection Act, 1978.

2.13.3 Goat Group

(I) The Grey Himalayan Goral (*Nemorchaedus goral*):

It is stocking goat like animal and locally called "Pijjar". It has small horns about 10 cm to 12 cm long, conical and curved backwards, shorter than the distance a part at the base. The colour of the animal is greyish or dull rusty brown. It weighs about 25 kg to 30 kg and is found an altitude ranging from 1000 meters to 3000 meters. It is important big game in the state. It is usually associated itself in small groups of two to eight or so and frequents rugged grassy hills or rocky ground in the midst of the forest. The gorals which were very common in the tract once now are very much reduced in number. It has been included in the Schedule III of the J & K Forest Protection Act. 1978.

2.13.4 Deer Group

(i) The Barking Deer (*Muntiacus mountjak*):

Commonly called as “Kakkarh”, it is a small deer, the average length of the male about one meter, height 65 cm to 75 cm, horns 20 cm long and weighs about 25 kg. The female is still smaller with no horns. The color of the animal is bright grey. Barking deer is found in the thick forest up to an elevation of about 2500 meters. The male is distinguished by sharp exposed canine teeth and small upright antlers. It is diurnal in habit. Its food consists of leaves, grasses and wild fruits. It is once believed to have been existed in large herd, now reduce to small number. It has been included in the Schedule III of the J & K Wildlife Protection Act, 1978.

(ii) The Musk Deer (*Moscus moschiferus*):

It is locally called as “Kastura”. It has no antlers unlike the other deer. It is a small hornless deer, not more than 50 cm height at the shoulder. The food consists of grasses, lichens, leaves and flowers. The male of this species secret called “Musk”. This deer has mercilessly been killed for its “Musk Pod”, and is threatened with extinction. The males have peculiar tusk, which are elongated upper canine teeth. The musk is secreted in glandular sac under the skin of the abdomen of the male. It has a strong odor and is largely used in high class perfumery. It, therefore, needs special protection. It has been included in the Schedule I of the J & K Wildlife Protection Act, 1978. It may probably be existing in Loang and Sarthal Block of Bani Range.

(iii) The Hog Deer (*Axis pornicus*):

It is locally known as “Para”. This animal is characterized by small antlers set upon on long bony pedicels and while running it keeps its head low down and move without grassy area. They are found all over the tract and small in number. This animal has been included in Schedule IV of the J & K Wild Life Protection Act, 1978.

2.13.5 Pigs:-

(i) The Indian Wild Boar (*Sus scrofa*):

It is commonly known as “Jungalee ‘Suar”. This animal is found in lower scrub forests of the Divisions. A well grown male measures about one meter in height at the shoulders and weight may exceed 200 kg. The animal is black with grey rusty brown and white hair. The younger are brown while and old boars are grey. Upper and lower tusks project outwards from the mouth. It also causes damages to forest crops by uprooting young seedlings as it turn to soft soils with its snout to find food. It is omnivorous and can eat anything like agricultural crops, fruits, roots, tubers, insects, snakes, etc. It also has acute sense of smell. This animal has been included in the Schedule III of the Forest Protection Act, 1978.

2.13.6 Primates:

(i) The Indian Langur (*Presbytis entellus*):

This is locally known as “Langur”. This long limbed, long tailed, black faced monkey and inhabits altitude up to 3500 meters. It is more arboreal in habit than macaques. Langurs are pure vegetarian feeds on wild fruit, flowers, buds, shoots, leaves and anything offered to them. They live in large group of all ages and both sexes in a relaxed and peaceful life.

(ii) The Rhesus Macaque (*Macaca mulatta*):

Locally known as “Bunder”, is found all over the tract up to an altitude of 2500 meters. They live in groups and feed on fruits, flowers, buds, shoots and leaves. They cause damage to young seedlings of Chir by uprooting and chewing them.

2.14. Class - Aves (Birds):

(A) Land Birds:

2.14.1 Pheasants And Fowl Group:

(i) The Red Jungle Fowl (*Gallus gallus*):

This bird of the size of a village hen is found almost all over the tract in Chir areas. It is included in the Schedule IV of the J & K Wildlife Protection Act, 1978.

(ii) Common Pea Fowl (*Pavo cristatus*):

A long tailed bird with beautiful crest rarely found in lower sub-tropical areas, including in the schedule I of the J & K Wildlife Protection, Act. 1978.

(iii) The Monal Pheasant (*Lophophorus impejanus*):

A beautiful large bird with brilliant metallic green head crest of wire – like spetulatipped feathers, white patch on back and cinnamon colored, broad and square cut tail. It is found in high level Fir and sub-alpine zone of Bani Range in summer and descents down in winter.

(iv) The Koklas Pheasant (*Ceriornis macrolophus*):

Size: - Domestic fowl, the cock is grey above, streak blackish, chestnut below; chest is brown, lying down between two long metallic green horn like tuffs, jutting out behind its metallic green head. A white patch or either side on the head is characteristic feature. It is mainly found in upper parts of Billawar and Bani Ranges.

(v) White Crested Kaleej Pheasant (*Gennacus ramiltoni*):

Size: - Domestic fowl. Male back above glossed with steel blue with a whitish rump, long white lying down crest and bare scarlet patch round the eyes. Upper parts chiefly brownish grey found mostly in Oak forest up to 3,000 meters elevation.

(vi) Cheer Pheasant (*Catreus wallichii*):

Cheer pheasant is a long tailed, buffy white, and rust brown, barred above and mottled below with long pointed tail; narrow pointed lying down crest and bright scarlet patch around the eyes. They keep on small conveys on broken hill sides of ravines, covered with tall grass, scrub and Oak forests. They are ground birds, and seldom perch on trees.

2.14.2 Partridges And Quail Group:-

(i) The Black Partridge (*Francolinus francolinus*):

Size that of half grown domestic hen. Very commonly found in entire sub-tropical zone of the Division.

(ii) The Chukor (*Alectoris graca*):

It is a beautiful grey – brown partridge larger than that of the partridge mainly found in the Oak forest of this Division.

(iii) The Grey Partridge (*Francolinus pondicerionus*):

Size that of a half grown domestic hen. Very commonly found all over the sub – tropical zone of the Division.

(iv) The Ram Chakur or The Himalayan Snow Cock (*Teragallus himalayensis*):

It is mainly found in the top – most portion of Bani Range.

(v) Common Or Grey Quail (*Conturnix conturnix*):

Size that of Dove and an almost tailless bird, mainly found in the lower portion of the Division.

2.14.3 Dove And Pigeon Group:

(i) The Blue – Rock Pigeon (*Columba livia*):

Size is as house crow and a slated grey bird with metallic green, purple and magenta sheen on neck and upper breast. Found rocky hills of the division.

(ii) The Ring Dove (*Streptopelia decocto*):

A pigeon size dove with a narrow black half ring on the hind neck. Found all over the areas seasonally.

(iii) The Spotted Dove (*Stretopelia chinesis*):

Size is between Myna and Pigeon. A dove with white spotted pinkish brown and grey upper parts, white and black chess board on hind neck, found in the lower open Chir bearing areas.

(iv) The Rufous Turtle Dove (*Streptopelia orientalis*):

A dove slightly smaller than the blue – rock pigeon with a grey spotted black patches on either side of hind neck. Found all over in the upper portions of the Division especially in summer.

2.14.4 Vultures:-

(i) The White Backed Bengal Vultures (*Psuedogyps bengalensis*):

Sized as almost as Peacock, blackish brown vulture with naked head and neck and white back.

Found in the lower areas of the Division.

(iii) The Himalayan Griffon Vulture (*Gyps himalayan*):

It is an enormous sized bird, found in Himalayas with long, naked neck and unfeathered bald head, sandy white or Khaki color. Found in the higher zone of the Division.

(iii) The Fulvous or Indian Griffon Vulture (*Gyps fulvus*):

Smaller than the above, the adult is rick fulvous or Cinnamon brown but often quite pale, found in the higher zone.

2.14.4 The Birds Found In This Division Are:

(I) The Jungle Crow (*Corvous marcorhynchos*):

House crow is a glossy jet black crow, found almost all over in the Division.

(ii) The House Crow (*Corvous splendens*):

This is common crow found all over, especially along habitations.

(Iii) The Roller or Blue Jay (*Coracias bengelensis*):

Size is as a pigeon and mostly found to the lower portion of the Division and generally found perched slightly around cultivation.

(iv) The Koel (*Eudynamys scolopacea*):

Sized: Almost as that of House Crow. Found in the sub-tropical and lower temperate zone Remain silent in winter and becomes increasingly noisy with advance of hot weather.

(v) The Common Hawk Cuckoo Or Brainfever Bird Or Papiha (*Cuculus varius*):

Size: -Pigeon. It is ash grey above and whitesh below. Makes loud screaming voice called brain fever. In Hindi the call is rendered as – Pee-kahan, pee-kahan (where is my love).

(vi) The Red Wattled Lapwing (*Vanellus indicus*):

Size: that of Partridge. It is bronze brown above, white below with black breast, head and neck and crimson fleshy wattle in front of each eye. It can be seen easily near Naj Bridge at Billawar.

(vii) The Himalayan Tree Pie (*Dendrocitta formosae*):

Size: - Myna. A long tailed (30 cm) greyish bird with black crown, ashy under parts and white spot in wing. Found almost all over the tract.

(viii) The Red Billed Blue Magpie (*Urocissa erythrorhyncha*):

Size: -Pigeon. A long tailed (38 cm to 44 cm) blue bird, black head neck and breast, greyish white under parts, crimson bill and legs. Found normally between 1500 meters to 3000 meters elevation.

(ix) The Indian Myna (*Acridotheres tristis*):

This bird of the size of a Bulbul is found all over the sub-tropical tract. It is a dark brown bird with bright yellow bill, legs and has bare skin around the eyes.

(x) The Brahminy Or Black Headed Myna (*Sturnus pagodarum*):

Size: -Smaller than the above, grey above reddish below with glossy black crown. Seasonally found in the area of the Division.

(xi) The Jungle Myna (*Acredotheres fuscus*):

Similar to Indian Myna but more greyish brown overall, devoid of yellow skin around the eyes. Found in the upper portion of the Division.

(xii) The Small Yellow Naped Wood Pecker (*Picus chlorolphus*):

It is a yellowish green wood Pecker with golden yellow nuchal crest. Found in the sub-tropical portion of the Division.

(xiii) The Golden Baked Wood Pecker Or Kathphora (Dinopium bengalensis Syn. *Brachypternus bengalensis*):

Size: -As Myna. It is a wood pecker with upper plumage golden yellow and black crimson crown and occipital crest. Found mostly in the sub-tropical zone.

(xiv) The West Himalayan Pied Wood Pecker (*Dryobates himalayansis*):

Size: -Myna. Black and white streaked, spotted and barred wood-pecker with red patch under tail and on the head, black back and white shoulders, found mostly in Oak and Fir forests of the Division.

(xv) The Rose Ringed Parakeet or Tota (*Psittacula krameri*):

Size: -Myna. A greasy green bird with a long pointed tail, red beak and red ring on the hind neck, found all over the sub-tropical zone of the Division.

(xv) The Common Pariah Kite or Cheel (*Milvus migrans*):

It is a large brown hawk with forked tail. Found all over up to elevation of 2500 meters.

(xvii) The Common Peafowl or Mor (*Pavo cristatus*):

It is a large tailed bird with beautiful crest. Found in the sub-tropical areas up to an elevation of 1500 meters in the Division.

(xviii) The Indian Robin (*Saxicolaides fulicata*):

Size: -Sparrow. It is a blackish bird with a white patch on wings rusty, red under root of cooled tail (hen ashy brown). Found all over the sub-tropical zone.

(xix) The Tailor Bird (*Orthotomous sustorius*):

Size: -Sparrow. It is a small restless olive green bird, with whitish under parts, rust colored crown and two long pointed feathers in the cooled tail. Found mostly in the sub-tropical zone.

(xx) The Paradise Flycatcher (*Terpsiphon paradisi*):

A bulbul sized silvery (male) bird with metallic black crested head and two very long, narrow, ribbon like curved feathers in tail, found seasonally in the lower tract of the Division.

(xxi) The White Spotted Fantail Flycatche (*Rhipidura albicollis*):

A sparrow sized, cherry, restless smoke brown bird with white eye-brous, white spotted breast and flanks, whitish abdomen and fanned out tail drooping wings found all over the tract.

(xxii) The White Breasted Kingfisher (*Halcyon amyrnenesis*):

Size: -Like a Myna, with deep chocolate brown head, neck and under parts, white breast and long red bill. Found in the lower tract near ponds, streams and can be seen near the Naj Bridge at Billawar.

(xxiii) The Baya or Weever Bird (*Ploceus philippenus*):

Size: -Sparrow. Found in the lower reaches and builds a swinging retort shaped nest.

(xxiv) The House Sparrow (*Passer domesticus*):

This is common sparrow associated with human habitation and is found all over the tract up to an altitude of about 2000 meters.

(xxv) The Hoopoe (*Upupa epops*):

Size: -Myna. A fawn colored bird with black and white zebra marking on back wings and tails. A conspicuous fan shaped crest. Found up to elevation 2000 meters.

(xxvi) The Grey Tit (*Parus major*):

A sparrow sized bird with glossy black head, white cheek patches, grey backs and whitish under parts, found all over the tract up to 2000 meters elevation.

(xxvii)The Himalayan Barred Owlet (*Glaucidium cuculoides*):

Size: -Pigeon. A dark brown owlet barred whitish and with a white patch on throat, found in Oak and Horse chestnut forest up to an altitude 2500 meters.

(xxviii)The White Cheeked Bulbul (*Pycnonotus leucogenys*)

Size: -Myna. A brownish bulbul with back head, white cheeks and yellow under root of tail, found all over the tract up to about 3000 meters elevation.

(xxix) The Himalayan Nut Cracker (*Nucifraga caryocatacets*):

Size: -Like a House Crow and it is a chocolate brown and umber brown bird, spotted white above and below and a wedge – shaped bill. Found in coniferous forest between 1000 meters to 3700 meters elevation and feeds larger on the seed of Spruce and Pinus species.

(xxx) The Golden Oriola (*Oriolus oriolus*):

Size: -Myna. Bright golden yellow with black wings and tail and a conspicuous black streak through the eyes, found throughout the tract up to an altitude 1800 meters.

2.14.5 Aquatic Birds:

Apart from these birds, a number of species of migratory ducks are encountered seasonally along the rivers, streams, pounds etc.

2.15 Reptiles:

The entire tract is infested with larger number of verities of poisonous and non-poisonous snakes. Among poisonous snakes Indian Cobra, Vipers, Kraits, Pit Vipers, Rat snake are commonly found. Python are also spotted occasionally. A variety of lizards are commonly found in the tract.

2.16 Fishes:

Local variety of fishes are found in Ravi, Seawa, Naj, Bhini, Biyani, Uja etc. rivers and their tributaries.

2.17 Injuries to Which The Fauna is Liable:

The Wildlife of the tract is liable to injuries by man, injuries by wild animals, wildlife epidemics, atmospheric influences and fires. The details of the damages caused to the wild animals of the area are given below: -

2.18 Injuries by Man:

The biggest threat to the existence and development of the wild animals has been found by the man and his domestic animals, whether directly or indirectly. Hunting of animals and birds, whether for their valuable skins, horn and flesh or in garb of self protection or simply for hunting pleasures has been directly responsible for the depletion of wild life. The destruction of habitat by encroachments, excessive felling and uncontrolled grazing has indirectly resulted in ecological imbalance of the area resulting in reduction of variety and number of wild animals of the area.

2.19 Injuries by Wild Animals:

In an ideal situation, the number of the variety of wild animals of an area is kept in check by themselves. However, in case of unusual reduction in any of the links of the food chain in the ecological pyramids, the other wild life species dependent on this link for their existence also decrease.

2.20 Injuries by Epidemics:

The epidemics are rare among wild animals and birds. No attempt has so far been to study this aspect of the wild life. However, sometime contagious diseases do spread among the wild animals mainly through the domesticated animals grazing inside the forests.

2.21 Injuries by Fire:

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

2.22 Injuries by Atmospheric Influences:

Though the wildlife has capability to withstand and survive in the various nature though atmospheric influences effected the young once of the wild animals and the birds. The birds do suffer from heavy snowfall, rains, storms, and droughts as their young once and eggs are destroyed by the atmospheric influences.

CHAPTER – III

Utilization of the Produce Agriculture Customs and Wants of the Population:

3.1.1 The tract is thinly populated and it is part of Kathua district. This tract comprises of two towns and 141 villages inhabited in Kathua district and the few villages inhabited in Udhampur district.

3.1.2 The population of the tract as estimated in 1994 was 1, 90,467 in Kathua district and about 6,800 in Udhampur district. The population of the Division has increased considerably during the past decade.

3.1.3 The rural / urban, male / female and literacy percentage, distribution of the population of the tract of Billawar Forest Division is given in table no. 13 as under:

Table –13: Population of Kathua District and Billawar, Basohli, Bani and Lohai-Malhar Blocks of Kathua District

S. No.	Particulars	Billawar Block	Basohli Block	Bani Block	Lohai-Malhar Block	Total	Kathua Dist.
1.	Number of Villages						
i.	Inhabited	50	44	32	15	141	555
ii.	Unhabited	--	--	02	--	02	32
	Total	**50**	**44**	**34**	**15**	**134**	**587**
2.	No. of Towns	01	01	--	--	02	06
3.	Population						
i	Male	40405	28379	16460	15318	100562	253960
ii	Female	35571	25795	14659	13880	89905	224814
	Total	**75976**	**54174**	**31119**	**29198**	**190467**	**478774**
4.	Population						
i.	Urban	3578	4646	--	--	8224	49143
ii.	Rural	72398	49528	31119	29198	190467	478774
5.	Literacy (%)						

i.	Male	33	34	42	20	--	45
ii.	Female	20	20	15	07	--	21
	Total	**39.45**	**35.52**	**20.00**	**10.53**	**26.00**	**41.00**

Population: – Ramkot Range **Source: -** Block Plans of Kathua, Vol. II, 1996-97

(Udhampur District= 6800 Person) (Population Reference Period - 1994)

3.1.4 The decadal increase in population of the tract as compared to 1981 census was 36% in all the four blocks of Kathua District.

3.1.5 The Scheduled Caste population of the tract as estimated in 1994 was 31,276 which is about 16.42% of the total population of the tract and 6.5% of the total population of the all four blocks of Kathua district. The block – wise distribution of is given in table no. 14.

Table -14: Blockwise SC Population

S. No.	Block	Population	Scheduled Caste Population	% age of SC Population	% age of SC Population of Kathua District
1.	Basohli	75,976	6,686	6.35	6.00
2.	Billawar	54,811	15,811	21.00	15.00
3.	Bani	33,119	4,738	7.00	4.00
4.	Lohai-Malhar	29,198	4,041	14.00	4.00
	Total	**1,90,467**	**31,276**	**16.42**	**6.50**

3.1.6 The rural population of the tract is mainly engaged in agricultural practices whereas the urban population is engaged in various services and business. The occupation of the rural population is being primarily agriculturists, rear large number of cattle. Gujjars, Bakerwals and Gaddis are professional grazers and rear herds of buffaloes, sheep and goats. Billawar and Basohli are two towns in the tract attract milk vendors from neighboring villages. Thus, sale of milk and milk products is also a side business of the agriculturists as well as graziers of the locality.

3.1.7 The rural population of the tract lives in flat roofed mud houses, though past decades have also seen construction of modern houses in rural areas. The villages depend upon adjoining forests for supply of timber for house construction and extraction of fuel wood.

3.1.8 The tract also has large number of saw mills engaged in furniture making and other small scale wood based industries.

3.1.9 The development works of the area have increased and special attention is being paid towards general progress of this area. Most of the areas have been interconnected by a network of roads. A large number of schools, health centers and animal husbandry units are spread all over the tract. Most of the villages have been electrified and connected with water supply. In agriculture, horticulture and animal husbandry, emphasis is laid on new technologies like high yielding varieties of seeds and plants with proper dosage of fertilizers and plant protection measures. Also high yielding animals have been introduced for qualitative and quantitative production of milk, wool etc. products.

Table -15: Statement of Crop Cultivation Area, Electrification and P. H. E. Works in Billawar Forest Division (Area - In Ha)

S. No.	Block	Area on Village Paper	Irrigated Area	Cropped Area	Electrified Villages	PHE covered Villages
1.	Basohli	38,508	2442	16050	49	48
2.	Billawar	46,811	206	5146	32	32
3.	Bani	43,266	45	7585	44	44
4.	Lohai-Malhar	28,370	80	5482	16	16

Source: - Block Plans of Kathua, Vol. II, 1996-97

3.1.10 Timber and fuel wood requirements of rural people of the division are estimated as under to provide an idea of the extent to which these forests are under pressure in order to meet the bonafide requirements of the rural population.

3.2 Timber Requirement:

Assuming that 10 cum of standing timber volume is required for constructing an average house in the rural and assuming again that these rural household require complete renovation after 25 years. Thus, the annual requirement of timber of this account is calculated in table no. 16:

Table – 16: Timber Requirement in Billawar Forest Division

Total Population	No. of House Holds of Six Members	Need of Timber 10 cum per H / Hold of every 25 Years	Or say in cum per Annum
1,97,267	32,878	13,115	13,500

3.3 Fuelwood Requirement:

3.3.1 As already mentioned, the consumption of fuelwood energy is very high in this region due to the predominance of harsh climatic condition. The Pre-investment Survey of India has

estimated on average the requirement of fuel wood at the rate of 4.5 kg per person per day for Chenab valley. For existing population of this Division, the annual fuel wood requirement is calculated in Table no. 17.

Table –17 Fuelwood Requirement in Billawar Forest Division

Total Population	Annual Fuelwood Requirement @ 4.5 Kg / day / person	Total Fuelwood Requirement
1,97,267	8,877	32,40,105

3.3.2 The above figures are on the conservative side as the fuel wood is not only used for cooking purposes, but also used keeping the house warm throughout day and night especially during the winter months in higher altitudes.

3.3.3 In addition to the requirement of the local population, timber and firewood from this division is supplied to Srinagar, Jammu, other towns and Army.

3.3.4 Apart from the above needs of the local population, this division also fullfils the requirement of fodder and grazing.

3.4 Markets and Marketable Products:

3.4.1 The main marketable timber of the Division is Deodar, Fir / spruce and Chir. The timber was extracted by the State Forest Corporation and major portion of the timber, after meeting the local demands, is exported in the form of sleepers, scants and even smaller sizes from various depots. Broad leaved species are mainly consumed as fuel wood and also used for making agricultural implements, furniture etc. A large quantity of fuel wood has been extracted from submerge area of Thein Dam by the State Forest Corporation and it is transported to the Corporation depots at Jammu and Srinagar for further sale and supply.

3.4.2. Among the Non-Timber Forest Products (N.T.F.Ps.) Chir-Pine Resin in the most important marketable product as about 31% of the total area of the Division is under Chir-Pine crop. Other salable NTFPs are Khair wood for Katha production, Dhoop, Anardana, Guchhi, Rasaunt etc. The yearwise revenue from these NTFPs extracted from the forests of the Division are given as under in table no 18.

Table-18 Statement Showing the N.T.F.Ps. Collection During 1988-99 To 1998-99 in Billawar Forest Division

(Revenue- in thousands)

NTFPs	1988-99	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
Dhoop	1.0	1.8	2.3	3.4	--	--	--	--	7.0	--	--
Kamila	0.3	0.8	--	--	--	--	--	--	--	--	--
Resaunt	130	55	0.4	30	10	--	70	5	--	--	--
Banafsha	0.8	--	--	--	10.3	6.5	9.0	7	54	13.1	3.0
Kakarsinghi	2.7	19.9	--	2.2	8.8	2.0	8.6	18.7	3.7	3.0	3.4

Barian	**34.8**	**35.5**	**29.1**	**--**	**27.8**	**43**	**36.1**	**3.2**	**38.3**	**6.1**	**7.0**
Guchhi	**--**	**4.2**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**1.0**	**0.5**
Anardana	**--**	**0.2**	**10.1**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
Shekera	**--**	**--**	**1.3**	**1.4**	**1.1**	**1.3**	**1.7**	**0.4**	**1.5**	**--**	**5.0**
Brahmi	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**57.9**	**3.8**
Total =	**39.4**	**24.9**	**31.1**	**20.1**	**93.0**	**26.7**	**40.9**	**30.6**	**29.9**	**27.4**	**44.0**

Source: - D.F.O., Billawar Forest Division

3.5 Line of Exports:

3.5.1 The rivers Seawa and Ujh which later on joins Ravi River remain important and cheap line of exports. The timber which is floated through Ujh is caught at Ladera (Mandali) and that which is floated through Seawa is caught at Khairi. Timber floating is not smooth through Seawa and Ujh as they follow a meandering coorese and are stream with boulders. Besides these rivers, the division is interconnected with many roads particularly in the lower chir and broad leaved areas which also surve as good live of export in the lower belt.

3.5.2. Crude Chir-Pine Resin extracted from the Chir Forests of the division and resin filled tins are delivered by the contractors in various transit depots fixed on the roads sides. From these depots the department arranges carriage to Jammu or direct supply to the users. Other NTFPs are also transported by roads.

3.5.3 The Division is fairly good connected with a network of road. The main roads covering the division are:

(i) Billawar to Kathua via Parnalla, Thein Dam.

(ii) Billawar to Dayalachak via Nagrota Gujroo.

(iii) Billawar to Katli

(iv) Billawar to Machhedi

(v) Billawar to Seri Munda

(vi) Billawar to Dharmpur

(vii) Billawar to Kishanpur

(viii) Billawar to Mansar

(ix) Billawar to Sananghat

(x) Billawar to Mahanpur

(xi) Billawar to Kathua

(xii) Billawar to Bhadarwah via Bani, Sarthal

3.6 Methods of Exploitation:

3.6.1 The main source of revenue in the Division is crude resin, which is extracted from forests and brought to resin depots. All operations for resin tapping of Chir Pine trees i.e. setting up of crop, fixing of blazes etc. are carried out by the laborers engaged by contractors.

3.6.2 As mentioned earlier, the commercial exploitation of timber has not taken place in this division for the last 15 years due to ban on green fellings. However, dead, dry, fallen trees etc. are extracted from the Division and converted in the form of sleepers, scants etc. stocked and transported to the other places after fulfill the local demands.

3.6.3 Other Non-Timber Forest Products are generally extracted departmentally.

3.7 Cost of Extraction:

3.7.1 At present State Forest Corporation is the major agency responsible for extraction of timber all over the State of Jammu and Kashmir. The reliable data regarding cost of extraction are available from the Jammu and Kashmir State Forest Corporation. The detailed breakup of the cost of extraction for the year 1999-2000 of the Jammu Region is reproduced as under:-

Table–19: Norms Rates of Jammu Region for Working Season of 1999-2000 (Cost - In Rs. Per Cubic Foot of Volume and Year –1999-2000)

Extraction	Category "A"	Category "B"	Category "C"	Category "D"
Felling	0.75	0.95	1.05	1.25
Hand Sawing	13.59	14.95	16.30	17.66

3.7.2 These rates are relevant for sawn stocks only. For non sawn-stocks 60 % of rates shall apply. However, felling / sawing shall be paid on F.M.M.

Table -20: Off – Road Transportation: (To be allowed on D.M.M. only.)

S. No.	Extraction	Categories			
		"A"	"B"	"C"	"D"
1.	Pathroo (per cft per km of 33rd dimension chain)	1.75	1.80	1.85	1.90
2.	Pacci Nalli (per cft per km of 33 chain)	0.82	0.85	0.85	0.95
3.	Rope Span (Contractors) (per Span)	2.18	2.18	2.18	2.30
4.	Rope Span (Departmental) (per Span)	1.75	1.75	1.75	1.85

(Considering the nature of operations involved only two slab rates are composed and reasonable difference between the two maintained)

5.	Side Nalla Mahan (per cft per km of 33 chains)	0.65	0.70	0.70	0.74
6.	Head Carriage (per cft per chains)	0.127	0.127	0.127	0.127

The volume consideration for allowing Head Carriage (H. C.) as defined in existing norms will continue to apply. For details regarding allowance of H.C., for explanation appended to existing norms.

S. No.	Extraction	Categories			
		"A"	"B"	"C"	"D"
1.	Crane (Department) (per cft / km)	1.70	1.90	2.15	2.30
2.	Crane (Contractors) (per cft / km)	1.90	2.15	2.48	2.60

River Mahan

Float Volume	**(Rate- in Rs. per cft per km)**
0.00 to 0.50 lakh cft	0.16
0.50 To 1.00 lakh cft	0.14
1.00 To 1.50 lakh cft	0.12
1.50 To 2.00 lakh cft	0.10
2.00 lakh cft and down	0.08

Launching Nikasi and Staking at H.F.L. and Uphill Head Carriage after Nikasi
(Rate – in Rs. per cft per km)

Particulars	Launching	Nikasi	Staking
Side Nalla Mahan	0.15	0.30	0.30
River Mahan	0.20	0.40	0.30

Source: - The Jammu and Kashmir State Forest Corporation

The cost of extraction varies from year to year, and from once place of working to another depending upon the remoteness, terrain of the area and available of the laborers.

3.7.3 The current prices of timber for the year 1999-2000 as supplied by the D.M. (Sales and Marketing), State Forest Corporation, Jammu are given as under:-

(Rate – Rs. Per cft excluding the Taxes)

Particulars	Deodar	Kail	Fir	Chir
Average Cost	329.75	163.57	85.45	64.47

CHAPTER – IV

Staff and Labour Supply

4.1.1 There has hardly been any change in the overall establishment since the inception of last plan. The present staff strength is just about adequate to cope with ever increasing work load on account of forest protection and management.

4.1.2 The following establishment remained on the pay roll of the Division during 1999-2000.

Table – 21: Statement Showing List of Staff Working in Billawar Forest Division During 1998-99

S. No.	Categories of Post	Sanctioned Strength	Actually Working	Pay scale
		A-Executive		
(i)	D. C. F.	1	1	10000-15200
(ii)	A.C.F.	1	2	8000-12500
(iii)	Range Officers	7	5	6500-10500 (one ad-hoc)
(iv)	Foresters	18	18	4500-7000
(v)	Deputy Foresters	1	0	3050-4500
(vi)	Forest Guards	114	108	3050-4500
(vii)	Mallies	8	8	2550-3200
		B- Ministerial		
(i)	Junior Accountant	1	0	4000-6000
(ii)	Head Clerk	1	1	5000-8000
(iii)	Junior Assistant	7	6	3050-4500
(iv)	Orderlies	5	4	2550-3200
(v)	Chowkidars	8	8	2550-3200
(vi)	Jeep Driver	1	1	3050-4500
(vii)	Truck Driver	1	1	3050-4500
(viii)	Truck Cleaner	1	1	2550-3200

(ix)	Sweeper	1	1	2500 p.m.
(x)	Watcher	4	4	N.A.

4.1.3 The total salary paid during the financial year 1999-2000 was of the order of Rs. 1, 31, 82,766.00.

4.2 Labour Supply:

4.2.1 In the past there has been shortage of labor employed for forest working. At present labor are employed for forest working [local as well as outsiders from Bhadarwah, Poonch, Kashmir Valley and Kullu, Kangra and Hoshiarpur from H.P.]

4.2.2 The availability of local labor is almost rare during the sowing and harvesting season of agricultural crops in the tract.

CHAPTER – V

Past System of Management

5.1 General History of the Forests:

5.1.1. A little is known about the ancient history of these forests. However, it is certain that prior to sixteenth century A.D. this Division formed a part of small territories, ruled by Chieftains. Prior to the establishment of Dogra rule by Maharaja Gulab Singh in Jammu and Kashmir State, this area was ruled by the local Rajput Chieftains like Mankotia, Rajas of Ramkot and Billoria Rajas of Bhaddu and Billawar. These petty chieftains were at constant enmity with each other and the country, under their control, changed hands several times. In those days of warfare, the people lived mostly on the tops of the hills for their safety. This has been proved by the fact that the places of warship and other stone monuments are found even now on the summits of the hills.

5.1.2 The country was subjugated by late Maharaja Sh. Gulab Singh in the year 1849 A.D. and the hagemony of Maharaja on the local Chieftains was fully established. Peace and amity was ensured in the area, with the result, many of the squatters gave up their holdings in the forests and settled down in plains of the "Kandi."

5.1.3 In the old times the administration of the forests was under the control of Civil Authorities, the "Wazir-i-Wazrat" being in charge of the District while the Tehsildar under him used to manage the affairs of a "Tehsil", one "Moharrir" with "Wazir-i-Wazarat", constituted all office establishment. The field used to be looked after by a "GIRDAWAR" or "KUMBEDAN" most often illiterate, in each "Illaqa" with few "Rakhas" or "Chaorassis" under him. The "Girdawar" used to collect "Rasum" or forest dues initially as a whole for the various forests produce consumed and utilized by them. The "Rasum" used to be collected at the will of the administration and no protection of forests was ever thought; the forests were burnt at will and there was no control over the quantity of forest produce consumed by the local so long "Rasum" were paid. Thus, the forests were only worked with an object of getting some revenue from them.

5.1.4 In the beginning, the control of forests was with the Revenue Department. During this period the forests were managed unscientifically and there was unrestricted removal of valuable Deodar trees from the easily accessible forests. There are no records available to show the extent to which these forests were worked for timber. It is stated that the fellings for export of timber began about 1855 AD (Svt. 1912) originally by the traders from Punjab and afterwards by the local contractors. The "Pattas" (written permits) were issued to the traders on payment of fixed sum per tree in advance granting permissions to fell certain number of trees anywhere they wished.

5.1.5 The year 1891 AD (Svt. 1948) was a turning point in the history of State Forests when the State Forest Department was properly organized under the charge of Mr J. Macdonell, IFS Conservator of Forests. The control of forests of Basholi Tehsil which formed part of the Jagir of Raja Amar Singh from 1885 to 1890 AD (Svt. 1942 to 1947) was also vested with the Forest Department in the year 1891 AD (Svt. 1948) when it first came into being Forest areas

were demarcated and attention was drawn towards conservancy. The oganization of forests was undertaken and forest areas were divided into various Divisions, Ranges and Beats.

5.1.6 Prior to 1914 AD Basholi, Billawar, Kathua and Jasrota Ranges comprised the old Jasrota Division, in 1914 A.D. the Jasrota Division was renamed as Billawar Forest Division and three more Ranges viz., Basantgarh, Dudu and Ramnagar Ranges were transferred to it making the total as seven Ranges. However, Dudu and Ramnagar Ranges were transferred back to Udhampur Forest Division was renamed as Kathua Forest Division with headquarter at Kathua. But in 1955 A.D., Kathua Forest Division. The Division was again renamed as Billawar Forest Division with headquarter at Billawar.

5.1.7 There was another major reorganization in 1981-82 when Kathua Range with compartments 1 to 7 and Jasrota Range with compartments 1 to 12 were transferred to Kathua Forest Division and Basantgarh Range with compartments 77 to 101 was transferred to newly created Ramnagar Forest Division. Besides, Basohli Range was split into Basohli and Bani Ranges and a new Ramkot Range was carved out from the twelve compartments to Jasrota Range (compartments no. 1 to 12) and twenty five compartments of Basnantgarh Range (compartment no. 77 to 101). The seven compartments of Kathua Range (compartments no. 1 to 7) were merged with Billawar Range. Thus, the present Billawar Forest Division comprises four territorial Ranges viz., Billawar, Basohli, Bani and Ramkot.

5.2 Past System of Management and their Results

Result of the Work upto 1910-11:

5.2.1 The brief general history as discussed above clearly indicates that the prior to taken over by the Forest Department the easily accessible and well stocked Deodar forests were subjected to very heavy and ruthless working by the Punjab timber traders and immense damage was caused to these forests. Local people, too, axed down many valuable and easily accessible trees without any hindrance. But after the inception of the Forest Department in 1891, the condition of the forests ameliorated to a great extent.

5.2.2 Thus, there was no working plan for this Division, up to 1910-11. The marking was left at the discretion of the Marking Officer, who used to be usually Forest Guard or Forester. This resulted in heavy and hazard fellings. The first regular working plan of this Division was prepared by Mr. S.W. Steane for the period from 1910-11 to 1942-43.

5.3 Mr. S.W. Steane's Plan 1910-11 to 1942-43:

5.3.1 The coniferous forests of the present Billawar Forest Division were for the first time brought under the working plan of old Jasrota Forest Division. This plan was prepared for period of 15 years from 1910-11 to 1925-26. However, on the expiry of its period its prescriptions were ordered to be continued for a further period of 15 years. But further operations under this extension were stopped in 1930-31 due to slump in the timber market.

Results of the First Plan:

5.3.2 The plan prescribed a system and improvement felling on a 15 years felling cycle. Most of the accessible conifer forests were gone over once and few coupes even twice during the extended period of the plan. Though, the more valuable, healthy Deodar trees must have

borne the chief brunt, as was the practice those days yet this appears to have done lot of good to Deodar regeneration and young Deodar pole crop was saved for future.

5.3.3 The plan prescribed yield by area with several anomalies. The yield varied considerably from year to year both in compositions by species and in quantity. There was also a definite allotment of area to different working circles in the plan. Sporadic attempt at helping and augmenting natural regeneration were made without any peculiar results.

5.4 Dhar's Plan 1942-43 to 1956-57:

5.4.1 This working Plan was for the old Kathua Forest Division comprising of five Ranges viz., Basohli, Billawar, Basantgarh, Kathua and Jasrota. The field work of this plan was conducted in 1933 AD. But the plan came into operation in the year 1941-42. The plan originally, was prepared for a period of ten years but subsequently it was extended by five years till 1956-57. This was first plan drawn on modern scientific lines and it was under this plan that compartments were properly formed, assigned to definite working circles, described on the papers and were delineated on the ground. Stock maps were prepared and enumerations were carried out in Deodar Working Circle only. The following three Working Circles were constituted: -

5.4.2 **Deodar Working Cirlce:**

The Deodar Working Circle comprised all the easily accessible and better stocked Deodar forests. The silvicultural system introduced was Selection-Cum-Improvement System. The technical rotation of 150 years was adopted to get a diameter of 30" at breast height for Deodar. The felling cycle was of 30 years and there was only one felling cycle. The yield was calculated by the following formula:

G Y = --- 40 where as "G" = Growing stock 30" and above at breast height.

40 is the number of years in which a 24" d.b.h. tree attained the exploitable size of 30" d.b.h.

The final yield worked out as under:

Deodar = 55,900 cft

Kail = 4,600 cft

Fir = 84,600 cft

The yield prescribed was to be realized on purely silvicultural considerations and indications were given that in actual practice it might not be possible to adhere to the given proportion by species. The adjustment of any deficit in Deodar by excess marking in Kail was permitted, but in no case any deficit to Fir was to be made up by excess marking in Deodar and Kail. Thus, the total combined yield of Deodar and Kail was to be rigidly controlled. All Fir trees 18" d.b.h. and over whatever purpose were to be counted towards the prescribed yield. Applying a conservative system and other marking rules were befitting prescription for the condition of crop at that time and proved quite conductive for the improvement of the forests. But no sustained attempts were made for raising Deodar artificially in the upper reaches of the Division as prescribed.

5.4.3 **Fir Working Circle:**

The Fir Working Circle comprised of all the easily accessible Fir / Spruce forests of fair density and Selection System was prescribed with an exploitable diameter of 30" d.b.h. The technical rotation of 180 years and a felling cycle of 30 years were adopted. The yield was regulated by area. The sizes of the annual coupes were fixed at 355 acres of commercial area which corresponded to a gross area of 544 acres including uncommercial area. Due to economic consideration it was not possible to sell out these forests with the result no yield was realized practically during period of this plan.

5.4.4 **Unregulated Working Circle:**

This working Circle comprised of all the poorly stocked and inaccessible Deodar, Kail, Fir and all the broad leaved forests. No operations were prescribed except carrying out of improvement felling to meet the local requirements and departmental demands. Heavy grazing and lopping were prohibited. These forests as such were given complete rest.

5.5 Fotedar's Plan 1857-58 to 1973-74:

This plan was originally written for the period 1954-55 to 1973-74 as the plan was extend for 5 years more and was for old Billawar Forest Division comprising five Ranges viz. Basohli, Billawar, Basantgarh, Kathua and Jasrota. The following working circles were constituted:-

5.5.1 **Deodar Working Circle:**

The Deodar Working Circle covered all the easily accessible and well stocked Deodar forests. The silvicultural system adopted was Selection-Cum-Improvement System. The feasibility of the application of some systems of concentrated regeneration was rules out due to difficult terrain, poor line of communication, crop composition and the market. The technical rotation of 150 yrs. with felling cycle of 30 years and with exploitable diameter of 30" d.b.h. was adopted. Growing stock was assessed by 1% increment method which was added for a period of 16 years. Removal of this increment annually was considered safe and justified and the final yield was prescribed as under:

(i)	Deodar	:	2, 80,000 cft
(ii)	Kail	:	9,000 cft
(iii)	Fir	:	85,000 cft.

5.5.2 **Fir Selection Working Circle:**

Fir Working Circle covered of all the easily accessible and better stocked Fir and Spruce forests. The system was adopted the Indian Selection System due to mature to over mature crop with deficiency of younger age classes. A technical rotation of 180 years with an exploitable diameter of 30" d.b.h. and a felling cycle of 30 years was adopted. The actual growing stock was not assessed by the increment method. The yield was regulated on area basis with size of the annual coupe being 400 acres of commercial area. All green Fir trees 12" d.b.h and over marked for whatever purpose were to count towards yield.

5.5.3 Unregulated Working Circle:

This working circle covered of all the poorly stocked and inaccessible conifer forests and all the broad leaved species bearing areas, exploitation of which was not economic.

5.6 Results of the Fotedar's Plan (IIIrd Plan):

The prescriptions of the plan were quite sound but the same were not adopted rigidly. The operations prescribed in the plan like Thinnings, cleaning and other subsidiary silvicultural operations and artificial regeneration of Deodar were totally ignored with the result desired results could not be obtained.

5.7 Jamwal's Plan 1974-75 to 1983-84:

This working plan was also for the old Billawar Forest Division covering all of the five Ranges viz., Billawar, Basohli, Basantgarh, Kathua and Jasrota. This plan was extended up to 1988-89. The following circles were constituted:-

5.7.1 Deodar-Kail Regular Working Circle:

- Deodar-Kail Regular Working Circle covered all the easily accessible and well stocked Deodar forests. Deodar crop was stated to be young to middle aged with a few mature scattered trees. The forests in Seawa catchment were stated to be more or less pure Deodar forests with a negligible tinge of Kail whereas in Basantgarh Range had appreciable proportion of Kail.
- The Selection –Cum-Improvement System of the previous two plans was changed to the system of concentrated regeneration vis-à-vis the Shelterwood Compartment System keeping in view the improved lines of communications, market demand and the position of the crop.
- Unlike the theoretical Uniform System with absolute uniformity as the aim, the Shelterwood Compartment System adopted here envisaged the removal of the over wood in order to free and nurse the advance growth whatever present. Thus, the retention of advance growth prevented the sacrifice of younger growing stock which otherwise also was neither necessary nor desirable in the forest rotation.
- Forests divided into two main blocks viz. Regeneration Blocks (comprising Conversion Block and Converted Block) and Unallotted Block. Compartments or sub-compartments were allotted the different blocks depending upon the position of regeneration and the crop at that time. Rotation was kept 150 years corresponding to a crop diameter of 70 cm and the exploitation period of 30 years was adopted. The average diameter of the advance growth of 30 cm to 45 cm d.b.h. with a sizeable area of pole crop averaging 50 cm dia was estimated to 40 cm d.b.h. corresponding to an age of 65 years. Thus, out a total conversion period of 150 years 65 years were stated to have lapsed and 85 years left. But due to certain reasons the conversion period was fixed at 80 years.
- Growing stock was assessed by partial enumeration method and yield was calculated by the following formula:

$$a = \frac{\text{Total Growing Stock in W. C. above 30 cm dbh}}{\text{Conversion Period (80)}}$$

b Yield for Regeneration Block =

Growing Stock in the Regeneration Block

(Conversion and Converted Blocks) and above 50 cm dbh) Silvicultural

---------- -- × Availability

Exploitation Period (30) Factor

The Silvicultural Availability Factor was taken 80 % for Deodar and Kail and 50 % for Fir.

Total Yield for Unallotted Block:-

Annual Yield = Annual Yield of Entire Working Circle - Yield of Regeneration Block

Table 22: Annual Yield of Deodar-Kail Working Circle

S. No.	Crop	Annual Yield		Total Annual Yield (in cum)
		Growing Stock of Regeneration Block (in cum)	Growing Stock of Unallotted Block (in cum)	
1.	Deodar	12020	9,760	21,780
2.	Kail	440	910	1,350
3.	Fir	2540	5150	7690
Total		**15,000**	**15,820**	**30,820**

5.7.2 The compartments of Basohli Range (Seawa Block) and Basantgarh Range were allotted for working during the period of the plan i.e. 13 years.

Table- 23: Compartments and Commercial are Allotments in Blocks:

Block	Basohli Range (Seawa Block)	Comm. Area	Basantgarh Range	Comm. Area	Total Comm. Area

		(in ha)		(in ha)	(in ha)
Conversion	8, 10, 11, 12b, 14, 17b	631	6, 10, 44a, 45	667	1303
Converted	1, 2, 5, 6a, 12a, 15a, 16, 20, 22, 23, 24b, 45, 70	665	14, 14b, 15, 16, 61	486	1151
Unallotted	13, 21, 29a, 29b, 33	538	9a, 13, 17a, 28, 46a, 46b, 46c, 47, 48	795	1333

5.7.3 The yield realized from 1974-75 to 1986-87 for a period of 13 years in this Working Circle is as under:

Table- 24: Total Prescribed Yield and Actual Yield Realize for the Plan Period of 1974-75 to 1986-87:

S. No.	Details	Regeneration Block				Unallotted Block			
		Deodar	Kail	Fir / Spruce	Total	Deodar	Kail	Fir / Spruce	Total
A.	Total Prescribed yield	156260	5720	33020	195000	126880	11830	66950	205660
B.	Actual Realized Yield	89384	6556	41424	137364	11223	2623	5589	19435
C.	Excess or Deficit Realized Yield	- 66879	+ 836	+ 8404	-57636	-115657	-9207	-61361	-186225
D.	Excess or Deficit Realized Yield (% age)	-49%	+15 %	+26%	-30%	-91%	-78%	+92%	-91%

5.7.4 Fir Selectio Workin Circle:

- This Working circle comprised better stock of Fir and Spruce forests either pure or mixed with Deodar and Kail, the crop was stated to be mature to over mature with paucity of younger age classes.

- The silvicultural system was adopted Selection System with a technical rotation of 180 years with exploitable diameter of 70 cm d.b.h. for Fir and Deodar whereas 80 cm dbh of Kail.

- Fellings prescribed were of the nature of Selection-Cum-Improvement fellings amongst trees of exploitable size and over, while improvement fellings alone in the rest of the crop.

- A total of 70% commercial area in the working circle was enumerated. The total growing stock was assessed by applying the simple ratio proportion method. The annual yield was calculated by Brandis Method and the final annual yield prescribes as under:

Fir	=	7600 cum
Deodar	=	800 cum
Kail	=	40 cum
Total	**=**	**8440 cum**

5.7.5 The following compartments allotted for working during the period of the plan:**Table 25:**

Range	Compartments Allotted	Commercial Area (in ha)
Basohli Range (Seawa Block)	51, 52, 59, 60, 62, 63	1010
Basantgarh Range	21, 29, 38, 41, 42, 53, 54, 55, 56.	1141
	Total =	**2151**

Table -26: The Yield Realized from 1974-75 to 1986-87:

S. No.	Details	Volume (in cum)			Total
		Deodar	Kail	Fir / Spruce	
A.	Total Prescribed Yield	10400	520	98800	109720
B.	Actual Realized Yield	8109	434	72057	80600
C.	Excess or Deficit Realized Yield	- 2291	- 86	- 26743	- 29120
D.	Excess or Deficit Realized Yield (% age)	-22%	-17%	-27%	-27%

Thus, in this working circle, the average yield realized is -73% of total prescribed.

5.7.6 Chir Interim Working Circle:

- The Chir Interim Working Circle covered all the well stocked Chir forests in the Division. The crop was said to be generally in the upper zone quality as III and that in the lower zone with quality as IV. The crop was found deficient in mature and over mature trees and rich in younger age classes. Regeneration of Chir was stated to be very much deficient due to excessive grazing and frequent fires.

- Given the condition of Chir crop, an interim system of management was prescribed for these forests. This envisaged Thinnings-cum-Improvement fellings with gradual removal of malformed mature and over mature trees. An exploitable diameter of 60 cm d.b.h. and a rotation of 120 years were adopted.

- The growing stock of the entire W. C. was assessed after total 10 % area was enumerated and by applying the simple ratio of proportion method.

- The yield was calculated by Brandis Method and the final yield was prescribed for this circle was 16,985 cubic meters. An area of 6,420 hectares was prescribed to be gone over during the period of plan which comes to 642 hectares annually. No annual coups were prescribed in this working circle and thus the allotment of area for working was left to the discretion of the territorial Divisional Forest Officer.

The yield realized from 1974-75 to 1986-87 for the period of 13 years in this working circle is as under:

A-	Total Prescribed yield	= 2, 20,805 cubic meters
B-	Actual Realized yield	= 75,684 cubic meters
C-	Excess or deficit realized yield	= 1, 45,121 cubic meters
D-	Excess or deficit yield	= - 66%

- Thus, the average yield realized is 34% of the total prescribed yield of this working circle.

- The “French Cup and Lip” method of resin tapping was adopted involving light continuous tapping and heavy tapping. It was prevalent in the Division during this plan period. Trees of girth 100 cm to 180 cm dbh were given one blaze and those above 180 cm dbh were given two blazes at a time. The spacing between the two channels was kept 10 cm.

5.8 Results of the Fourth Plan:

- The prescriptions of Sh. Jamwal’s plan were very sound and befitting but their implementation was not upto the mark and most of the work remained unattended too.

- The intensive regeneration operations and the subsidiary cultural operations etc. were prescribed emphatically but were not paid any attention during plan period

with the result the regeneration of the valuable coniferous species has suffered to a great extent.

- Certain omissions in the area statement of the working circle of the draft plan resulted in wrong estimation of the area of the Division.

- It is not understandable why the growing stock for yield calculation has been taken 30 cm d.b.h. and above when it is prescribed that everything up to 45 cm d.b.h. is to be treated as regeneration and to be retained as such forming part of the future crop in Deodar – Kail Regular Working Circle.

- The annual yield from the unallotted block where only thinning and improvement felling are to be done is more than the annual yield from the Regeneration Block in Deodar – Kail Regular Working Circle. The huge deficit for the unallotted block is definitely because of the enormously high yield prescribed for the unallotted block.

5.9 Sh. H.S. Salathia's Plan (1989-90 to 1998-99):

Jamwal's Plan was revised by Sh. H.S. Salathia in 1989-90. Sh. Salathia adopted all the modern management techniques of his time. The growing stock was calculated by point sampling techniques (Bitterlich"s) method. Forests of the Division were classified according to Champion and Seth's classification. Bamboo working circle and Khair (overlapping) Working Circle have been replaced and a new working circle i.e. Resin (overlapping) working circle was constituted for Chir areas where Resin tapping could be carried out. The following circles were constituted in the plan:

(i) Deodar Working Circle

(ii) Fir Selection Working Circle

(iii) Chir Interim Working Circle

(iv) Protection-Cum-Improvement Working Circle

(vii) Resin (Overlapping) Working Circle

5.9.1 Deodar Working Circle:

- The Deodar Working Circle is almost identical of the previous working plan bearing only a few addition and subtraction. This working circle covers the most valuable Deodar forests of Billawar and Bani Ranges of this Division. Deodar crop predominated and the 40-50 cm. diameter class is represented maximum. The forests were treated under the Modified Shelterwood Compartment System for conversion into uniform crop within a specified period.

- The primary aim was to removal of the over wood growth whatever present. Various operations under this system of working were prescribed. They were regeneration felling, thinning and cultural operations.

- Rotation was fixed 150 years corresponding to an exploitable diameter of 70 cm. The average diameter of the future crop is about 45 cm which correspond to an age of 85 years for a deodar trees. It means that 85 years of conversion out of total of

150 years have passed and 65 years are left. So the conversion period was adopted 65years. The forests were divided into two main blocks viz. regeneration block and the unallotted block. Regeneration block comprised of conversion block and converted block.

(a)- Regeneration block: - This block comprised of conversion block and converted block which were described as under:

(i) **Conversion Block: -** This Block included over wood and varying proportion of advance growth or regenerate on below. The conversion block under new allotment as well as the compartments which were allotted but not worked in the last plan was 344 ha commercial area.

(ii) **Converted Block: -** In this Block, those compartments were included where regeneration or advance growth was adequate and well established but some over wood may also be present which was injurious to the young crop. The treatment will be final fellings to remove all the over wood.

The volume of the growing stock of 50 cm and above final annual yield for each species in the regeneration block was prescribed as under:

Deodar	Kail	Fir	Total
1960 cum	20 cum	170 cum	2150 cum

Unallotted Block: - It included the compartments having pole to middle aged crop with scattered mature stems and where advance growth was not sufficient. In this block, only except thinning and improvement fellings were prescribed and in case no over wood present felled only dead, dying and deceased trees.

Annual yield for Unallotted Block:

Deodar	Kail	Fir	Total
440 m	10 cum	160 cum	610 cum

Total volume calculated > 20 cm dia by "KULLU VOLUME TABLE" was given as under in D.W.C:

Species	Deodar	Kail	Fir	Chir	Total
Trees	505282	24792	15192	4749	550015
Volume (in cum)	611763	52525	20054	4315	688657

Having ascertained the volume of the growing stock 50 cm d.b.h. and above, the species-wise annual yield for the entire working circle prescribed as under:

Deodar	Kail	Fir	Total
2400 cum	30 cum	330	2760 cum

5.9.2 Results:

In view of the ban on commercial feelings in Billawar Forest Division vide Govt. order No. 24-FST of 1990, no yield was prescribed or realized in Billawar Forest Division. However, for academic interest, only the yield was calculated and prescribed. Due to the ban on commercial felling total rest was given to these areas of Deodar Working Circle and Fir Selection Working circle. However, it was proposed to add artificial regeneration in those areas where natural regeneration has not come up.

5.9.3 Fir Selection Working Circle:

- This working circle comprised well stocked Fir forests mixed with Spruce, some patches of Deodar, Kail and broad-leaved associates. Fir crop was middle aged to mature and over-mature while fresh regeneration was deficient. All areas fell in Billawar and Bani Ranges of this working circle:

(Area- in ha)

Deodar	Kail	Fir	Chir	Total Comm. Area
235	14	3792	31	4133

Broad-Leaved	Blanks / Scrub	Total	Grand Total
2082	2716	4798	8930

- The selection system was proposed. Exploitable diameter was prescribed 80 cm d.b.h. and rotation of 240 years for Fir and for Kail and Deodar it was 70 cm d.b.h. and rotation of 150 years felling cycle of 30 years was adopted. The annual yield was prescribed as below:

Deodar	Kail	Fir	Total
200 cum	40 cum	3760 cum	4000 cum

- Improvement fellings formed an integral part of the major marking and all dead, dying dry and diseased trees were marked. Also rotational grazing was proposed as to get regeneration.

5.9.4 Protection-Cum-Improvement Working Circle:

This Working Circle included all forest areas that were of the following categories:

(a) High altitude and un-commercial areas with steep slopes and pasture lands.

(b) Area mainly with broad-leaved canopies / crops.

(c) Area mainly with blanks or open scrub.

(d) Area with degraded coniferous crop.

No quantitative assessment of the growing stock was undertaken in the areas. No fellings of whatever nature were prescribed in respect of category (a) above. It was proposed to take measures for control against fires, illicit damage and excessive grazing and proposed to improve forage productivity by encouraging the growth of more nutritive grasses. It was also prescribed that a minimum 100 ha area under each category as given above of "b, c, d" should be tackled annually.

Results:

Prescription of this circle was implemented but the task was gigantic and required continuation on larger scale. Rehabilitation of degraded forests areas was done by resorting to artificial regeneration, closure formation and soil conservation works, thereby promoting natural regeneration and increasing the productivity of the areas.

5.9.5 Chir Interim Working Circle:

This Working Circle comprised of relatively better stocked Chir forests, Crop was almost pure. However, in upper reaches with Oak and the lower limits Sissoo and Kikar etc. are present. Mixed crop is generally malformed, twisted and crooked. Regeneration is much deficient due to biotic interference and frequent fires. Total area of this Working Circle was 20,242 ha.

No assessment of growing stock was made for this working Circle. Only the hygienic removal of dead, dry and fallen trees was prescribed. A number of the fire protection measures were recommended. Effective making of closures, rotational grazing and other regeneration operation were proposed.

Results:

At the time when Mr. Salathia's Plan was prepared, almost all Chir forests of this Division were under resin tapping. The resin extraction was given preference to other development works in the compartments.

5.9.6 Resin (Overlapping) Working Circle:

This Working circle overlaps all the Chir areas allotted to the four working circles of the division. It was prescribed to conduct Resin enumeration after every 5 years. "Rill Method" was proposed as per specification given by F.R.I. Dehra Dun.

Total number of trees 40 cm d.b.h. and above in the entire division were 6, 75,716 trees. Only 50% were allotted due to very poor density of crop in many places, un-commercial nature of the terrain and non-availability of space due to faulty tapping in the past. Yield was kept 2 kg per blaze per season and annual yield was estimated 6756 quintals per season in the Division.

Results:

Prescription for this Working Circle was followed. Although the method of tapping was shifted from cup and lip method to Rill method, but do's and don't were not implemented in letter and spirit. Timely enumerations have not been carried out. At many places, sparsely dense crop is also being tapped. Deviation in size of blazes, in number of blazes and

diameter class of trees can also be seen. In order to make up the prescribed minimum load per blaze, the Resin extraction per person / mate sometimes, resort to illicit practices. This led to excessive tapping of Chir trees which results in dry age and wind breaks.

5.9.7 Special Works of Improvement Undertaken:

a. During the past plan period has seen the advent of various development projects in the area. Social Forestry Division, Kathua, inception of NTFPs Project in Kathua, and River Valley Projects, Thein Dam in Billawar Forest Division has considerably reduced the pressure from the Forest Department in rehabilitating degraded areas.

b. The number of nurseries in this division has also increased considerably. Nurseries have been maintained by Billawar Forest Division, Social Forestry Division, Kathua, NTPF Project Kathua and River Valley Projects, Thein Dam. These nurseries are well maintained and cater to various requirements of the area.

c. As mentioned earlier, the Division has good network of roads and paths, both all-weather and fair-weather. These roads are maintained by PWD and GREF. The perennial rives and nalla have permanent bridges almost everywhere as seasonal nalla have cause-ways at places. The Division also has large number of Buildings located at various places. Unfortunately, for want of adequate provisions of funds, almost all the buildings are in poor conditions and most of them prone to collapse in due course of time. A few new constructions have come into being during the preceding plan period. The list of building existing in this division is appended in annexure.

d. The Divisional Forest Office-cum-Residence is still not constructed fully at Dewal. The old building located at Billawar town is sinking and is about to collapse, as such, it is full of risks,

e. Abstract of soil conservation works including sowing, planting etc. carried out in the division during the preceding plan period is given in miscellaneous chapter. The works have been completed but do not commensurate with the extent of the problems concurring to the soil conservation in this division.

f. No concrete steps and effective measures have been taken to protect specially the Chir forests, from the potential threat of fire.

5.10 Past Yield:

Though no commercial extraction of timber from these forests has taken place during past plan period. But the following volume harvested during the past plan period from submerged areas of Thein Dam and dead, diseased trees etc. in the division. The volume of timber, firewood and charcoal extracted from Billawar Forest Division is given in table no. 27.

Table – 27: Statement of Timber, Firewood and Charcoal Sale from Billawar Forest Division

YEAR	VOLUME OF TIMBER ISSUED / SUPPLIED(in cft)					FIREWOOD (in Quintals)	CHARCOAL (in Quintals)
	DEODAR	KAIL	FIR	CHIR	TOTAL		
1988-89	--	--	--	--	--	3394	--
1989-90	1421	--	761	42567	44749	265	--
1990-91	6696	118	31877	50891	50891	1340	--
1991-92	4744	--	56613	83886	83886	275	--
1992-93	215	--	--	--	--	5420	--
1993-94	--	--	--	--	--	577	--
1994-95	--	--	--	--	--	113	1260
1995-96	--	--	--	--	--	3702	3325
1996-97	--	--	--	--		598	580
1997-98	--	--	--	--	--	256	1814

Source: - D.F.O., Billawar Forest Division

5.11 Past Revenue and Expenditure:

The revenue and expenditure for past ten years is given below in table no. 26.

Table -28: Revenue and Expenditure Statement of Billawar Forest Division

(Rs. -in Lakh)

S.No.	Year	Revenue	Expenditure
1.	1989-90	16.19	50.79
2.	1990-91	15.33	59.03
3.	1991-92	45.53	70.15
4.	1992-93	57.98	94.09
5.	1993-94	39.72	103.48
6.	1994-95	57.82	123.46
7.	1995-96	262.46	143.08
8.	1996-97	114.47	193.39
9.	1997-98	154.43	242.82
10.	1998-99	370.23	304.72

Source: - D.F.O., Billawar Forest Division.

CHAPTER – VI

Statistics of Growth and Yield

6.1 Volume Table:

6.1.1 No local volume table have so far been prepared for this locality. The issue was discussed with the Principal Chief Conservator of Forests, Chief Conservator of Forests and Conservator of Forests in the meeting held on 23-11-1998 in the Forest Complex, Billawar during the discussion of Preliminary Working Plan Report. The Working Plan officer advised to adopt and use of "Kullu Volume Table" in actual yield calculations as there are said to be known to the field functionaries.

6.1.2 As such, the "Kullu Volume Table" will continue to be adopted during the currency of the plan and are reproduced as under, in respect of all the four important conifer species of this division.

Table – 29: Kullu Volume Table

S. No.	Diameter Class (cm)	Volume (in cum)			
		Deodar	Kail	Fir	Chir
1.	30-40	0.76	0.76	0.84	0.48
2.	40-50	1.33	1.36	1.56	1.13
3.	50-60	2.10	2.27	2.97	2.21
4.	60-70	3.14	3.34	4.90	3.54
5.	70-80	4.39	4.42	6.85	4.87
6.	80-90	5.66	5.35	8.30	6.20
7.	90-100	6.85	6.14	9.40	6.99
8.	100 & above	7.56	6.74	10.19	7.48

6.2 Growth Studies:

No stump analysis was carried out during the field work of this plan. However, the growth studies as conducted by Sh. B. L. Tikku in 1970 for Chir are reproduced as under:-

Table– 30: Average Age Corresponding To A Given Dimeter Class:

S. No.	Diameter Class (cm)	Age (in years)
1.	20-30	42
2.	30-40	58
3.	40-50	66
4.	50-60	75
5.	60-70	85
6.	70-80	102
7.	80-90	121
8.	90-100	140
9.	100 -110	170

6.3 The Quality Class:

The classes vary from place to place depending upon the locality factors of the area. The overall quality of Deodar and Fir in this division is generally estimated to be about I / II to II. The quality of Chir generally varied from II / III to III in this area.

6.4 Methodology Adopted for the Assessment of Preparation of Inventory of the Growing Stock:

6.1.4 For the assessment of the growing stock, the point sampling technique originated by Dr. Walter Bitterlisch using Wedge Prism was adopted. The sapling unit is a random point around which the crop measurement and description was done in accordance with standard forms. This technique has been tried earlier in the state on many occasions and has been found to be fairly precise. The technique is simple and is suitable for the hilly terrain.

6.1.5 The technique is preferable to total / partial enumeration because it involves least time and expenditure, gives accuracy to desired extent and eliminates personal bias and human error. The method adopted was stratified random sampling using probability proportional to the size method of sampling.

6.1.6 The basic concept of stratified random sampling is to divide the heterogeneous population into sub-population called “Strata”, each of which is more or less homogenous in characters. This method of division of population into homogenous groups called: Stratification”. Each stratum thus formed exhibits very little variation from one unit to another within that stratum and a precise estimate of any stratum for any character under study can be obtained by taking samples from the large stratum.

6.1.7 The stratification of the growing stock was done on the basis of conditions, composition and silvicultural requirement of the crop besides method of treatment adopted for the area. The following strata were accordingly constituted:

i. Deodar Stratum

ii. Fir / Spruce Stratum

iii. Chir Stratum

iv. Conservations Stratum

v. Rehabilitation Stratum

6.1.8 After having done the stratification, the number of sample points required to be surveyed and measured in each of the above, the strata to achieve the desired precision of 20 % at 95 % level of probability were determined. For this is a pilot survey exercise was conducted over the entire wooded land of Chir area of this division. The number of points has, therefore, been calculated by adopting the following standard statistical formula:

$$N = \frac{(t) \times (cv)2}{(E)2}$$

Whereas: - N = Number of samples required to achieve the desired accuracy "e" with probability level implied by the value "t:"

t =A constant denoting the reliability of estimate or level of statistical significance or statistical probability of 95 %. It is also called student's "t".

cv % =Co-efficient of variance, a relative measure of dispersion and is the standard deviation expressed as percentage of the mean.

e =Stated percentage of accuracy desired for the average. It is also called the maximum permissible error in the sampling design.

6.1.9 The number of sample points to be surveyed in other strata was determined by the following formula on the basis of preliminary survey at that point of the time and was based on the principle of proportion area representation as compared to conifer strata. The formula adopted for calculation of number of sample points to be surveyed in other strata is as follows:

Number of sample points to be surveyed in stratum (X) =

Number of sample points in Chir Stratum / Area of the Chir Strata x Area of stratum (X)

The numbers of sample points to be surveyed in various other strata were thus worked out.

6.1.10 For fixing the positions of sample points, one sample frame for all four ranges of the division was prepared on transparent sheets. The sample points were then delineated at random on the coordinates by using table on random numbers. These points then marked on sample frame and were subsequently transferred on base map and G. T. maps of the area mark their precise locations on the map. On the basis of their position on base map and G. T. maps of the area, these points were objectively located on the ground.

6.1.11 At each sample point, the stems all round the point were viewed through the wedge prism of suitable BAF by taking complete sweep of 360 degree. The number of trees whose trunks at breast height subtended at angle larger than the critical angle of the wedge prism was numbered and their details regarding dbh (ob) and height were recorded in tally sheets especially designed for the purpose. The wedge prism was selected so that at each point about 8 to 12 trees tally. Due care was taken in case of boarder line trees. Separate tally sheets were used for recording the details of trees tallied at each point.

6.1.12 Different variable i. e., number of trees per ha, basal area per ha and volume per ha were calculated for each sample point using the following formula.

i. Basal Area per ha = B A F x n

Where "B A F" =Basal area factor of the wedge prism used, and

"n" =Number of trees tallied at that point.

ii. Number of trees per ha =BAF x n x 1 x Bi

Where "BAF" =Basal area factor of the wedge prism used, and

'n' =Summation of the reciprocals of the trees tallied at that point.

iii. Volume per ha ="BAF" x n x Vi / Bi

Where "BAF" =Basal area factor of the wedge prism used, and

'Vi' =Volume of "I" th tallied trees at a point.

"Bi" =Basal area of the "i"th tallied trees at a point.

The number of trees per ha and volume per ha were calculated diameter class wise at each point.

6.4.10 "Kullu Volume Table" was adopted for calculation of volume above 20 cm dbh (ob). Mean value of the above named three variables have been calculated of Deodar, Fir / Spruce and Chir Strata by computing the arithmetic averages of all he sample points of the stratum. The results are given in the following tables.

6.4.11 In areas where sample points exercise was not possible due to lack of adequate number of trees around the point, sample plots of area 0.1 ha were laid and total enumeration of the growing stock was carried out in these plots. These plots were rectangular or circular in shape depending upon the location of the point. The species wise number of shrubs and the number of broad leaved trees with their heights and dbh (ob) were recorded at each point. The total number of different shrubs and number broad leaved trees were then recorded at each point. The average number of above variables per ha for broad leaved (non conifers) area were then worked out. The results are given in the following chapters.

Number of sample points in each working circle:

S. No.	Working Circles	No. of sample Points
1.	Deodar Working Circle	35
2.	Fir Selection Working Circle	55
3.	Chir Working Circle	113
4.	Conservation Working Circle	48
5.	Rehabilitation Working Circle	0
	Total:	**251**