## **REVISED**

# WORKING PLAN FOR BATOTE FOREST DIVISION (2017-2018 TO 2027-2028)



## By:

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#### INTRODUCTION

Rapid socio-economic changes in the state and the region are having profound impacts on all sectors including forestry. Societal transformations are changing people's perceptions of forests, while growing and often conflicting demands for forest-derived goods and services have increased the complexity of forest management. Concerns over climate change, escalating energy prices and deepening water deficits have moved forestry into the spotlight of global and national development. Added to these are long-standing challenges, such as poverty and deprivation, which are still to be resolved. Forestry has thus entered the 21st century with a plethora of old and new issues and more to emerge in the future.

Batote Forest Division is hilly and mountainous with steep slopes and deep valleys. The Division is situated on the northern flank of the Pir Panjal Range and thus geographically this tract forms a part of lesser Himalayas. Towards the northern and north-western boundary of the division is the mighty river Chenab and the entire division forms its catchment towards its southern and south-western side. The division possesses diverse climatic conditions ranging from sub-tropical to alpine as the elevation rises from as low as 586 meters on the banks of river Chenab on the south-western end to 3904 meters on the south-eastern extreme of the division.

Strategically also the division is very important as the area forms an important transit point to the northernmost (Kashmir valley, Ladakh and Chenab valley) part of the country. Because of the strategic importance of the area, it has always remained active with the various developmental activities. During the past one and half decade a number of projects have come-up in the area like Baghliar hydroelectric project, construction of national highways connecting Kashmir valley, Chenab valley etc., construction of tunnels, laying of high-tension wires carrying electricity from hydroelectric projects of river Chenab, laying of a number of underground network cables etc. Ramban district has been one of the most active districts of the state in terms of developmental projects. All these projects have taken over significant forest areas of the division also. During the past few years more than 50 Land diversion cases have been sanctioned in the division for various developmental projects under J&K Forest Conservation Act.

The developmental activities have caused significant changes in the area by affecting the geo-climatic conditions. The area has seen massive landslides besides land sinking affecting both habitations as well as forests, conifer trees in hundreds have got uprooted and buried in debris in different areas of the division in the recent past. In addition to this climate has also shown drastic changes during the past few years which can be gauged from the fact that cloudbursts have become quiet frequent in the area besides extreme/unpredictable weather conditions throughout the year. Although the emphasis in the recent past has shifted towards sustainable development and environmental conservation, the degradation of Forest has continued unabated. Forest cover is shrinking and the density of good forests is on the decline.

The study of the previous working plans and old records of this division reveals that the forests were worked under scientific management principles and systematic extraction of timber was the major activity of the department in the Chenab circle, including this division. The green conifer trees were felled and extracted in the coupes. The timber was transported either by head load, *pathru, tarspan* or launched in nallahs and rivers and caught in booms erected at various places. The division is the major home of important NTFPs such as Nagchatri, Dhoop, Kour, Banafsha, Dioscorea, Guchhies and many other medicinal herbs. Due to the ruthless destructive extraction of these species in the past, forced the State Government to ban the extraction of NTFPs (except Guchhies) which was however

lifted later and the State Government advocates for the non-destructive extraction of the legally allowed NTFPs.

Whether, it is management for timber production or for the intangible benefits that the forests provide, establishment of regeneration is the keystone on which hangs the fate of our forests. The proposed Working plan shall accord topmost priority for securing regeneration in areas that have hitherto failed to regenerate. This will require the involvement of local people in forest conservation by addressing their demands and making them aware and educated about the benefits of forests.

This is the Third Working Plan (2017-18 to 2027-2028) for the reconstituted Batote Forest Division which came into existence on 01 January, 1982. This Working Plan revises the Working Plan prepared by Shri. Vasu Yadav, IFS which covered the period from 2000-01 to 2010-11. The working Circles and the allotment thereof, constituted in the previous Working Plan has been slightly altered, the Shelterwood system which was being followed for Deodar-Kail forests has been discontinued and Selection system implied. Besides mandatory working circles as mandated under National Working Plan Code 2014 have been added to this plan. Yield calculation has been kept on the conservative side keeping in view the need for environmental conservation.

I was entrusted with the task of preparation of working plan of Batote Forest Division while I joined the office of DFO (Territorial), Batote in June, 2015. Later on I was transferred to the Forest Guard Training School, Doomi as Principal in September, 2016 however I was entrusted to complete the task of preparation of the working Plan in addition to my own duties.

The exercise of revising this plan involved a lot of teamwork. The Working Plan Officer (WPO) is highly indebted to Sh. A.K.Singh, Principal Chief Conservator of Forests, for being entrusted with the responsibility of handling this prestigious assignment. Thanks are also due to the Chief Conservators of Forests, Working Plan Research and Training, J&K Sh. J.Frankoi and Conservators of Forests, Working Plan Circle, J&K Sh. Samuel Changkija for their valuable support and guidance.

The WPO takes this opportunity to place on record his heartfelt gratitude towards Dr. K. Anand, IFS for sparing his valuable time and help in calculations and compilation as Conservators of Forests, Working Plan Circle, J&K besides valuable suggestions support and for the trust he reposed in the undersigned by allowing complete freedom in the conduct of the revision exercise.

The exercise of revision of this plan involved a lot of team work. The Working Plan officer (WPO) is highly indebted to staff of the Batote Forest Division for their help and cooperation in the revision of Working Plan in addition to their own engagements in their routine work.

The words of acknowledgments are incomplete without the mention of Sh. Vasu Yadav, IFS, the author of the previous plan. The process of revision was made a lot easier by the fact that his plan was so meticulously compiled, comprehensive and accurate in all respects.

Above all, thanks to Almighty, the creator of life for providing us the sense of analyzing his creations.

Zahid A. Moghal, SFS Working Plan Officer, Batote Forest Division.

### **GLOSSARY OF VERNACULAR TERMS**

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

## **GLOSSARY OF BOTANICAL TERMS**

	DIVISION	
S.No.	BOTANICAL NAME	COMMON NAME
1	Abies pindrow	Budloo / Fir / Raan
2	Acacia modesta	Kankar
3	Acacia nilotica	Kikar
4	Acer spp.	Kanzal / Trikanna
5	Aconitum heterophyllum	Atis
6	Adhatoda vasica	Bankhar / Basuti
7	Aesculus indica	Bankhor
8	Ainsliaea aptera	Dharu buti
9	Alnus nepalensis	Champ
10	Angelica glauca	Choru
11	Arisaema propinquum	Neel
12	Arisaema tortuosum	Sapp kukkari
13	Berberis lycium	Kaimal
14	Bergenia ciliata	Sapdotri
15	Betula utilis	Bhurj / Bhojpatra / Birch
16	Buddleja crispa	Dhuri
17	Buxus wallichiana	Chikhri
18	Cannabis sativa	Bhang
19	Carissa opaca	Garna
20	Cassia fistula	Krangal
21	Cedrus deodara	Deodar
22	Celtis australis	Khirak
23	Cirsium verutum	Barhush
24	Clematis montana	Chitta-chirwa
25	Colebrookia oppositifolia	Chitti Suali
26	Cornus macrophylla	Arhew
27	Corylus colurna	Bhutia badam
28	Cotoneaster microphyllus	Brithal
29	Cryptolepis buchanani	Kali terni
30	Cynodon dactylon	Drub
31	Dabregeasia hypoleuca	Siadu
32	Dalbergia sissoo	Tali / Shisham
33	Daphne cannabina	Kansari
34	Desmodium tiliaefolium	Gurkathi
35	Dioscorea deltoidea	Kinas

#### LIST OF IMPORTANT TREES AND HERBS FOUND IN BATOTE FOREST 1.

S.No.	BOTANICAL NAME	COMMON NAME
36	Dodonea viscosa	Saintha
37	Elaeagnus umbellata	Ghayanh
38	Epilobium latifolium	Ru pinji
39	Ficus palmata	Phokda /Fig
40	Ficus roxburghii	Tirmal
41	Fragaria vesca	Ankhen
42	Fraxinus excelsior	Ash/Hum/Sum
43	Geranium wallichianum	Gul-ai-sanobar/ Sucha phull
44	Gerbera gossypiana	Kapasi
45	Girardinia heterophylla	Bichchu buti
46	Grewia optiva	Dhaman
47	Hedera helix	Karnaidu
48	llex dipyrena	Khareu
49	Impatience glandulifera	Allu
50	Indigofera heterantha	Kathi
51	Ischaemum angustifolium	Babain
52	Jasminum humile	Peeli chameli
53	Juglans regia	Akhrot
54	Jurinea dolomiaea	Dhoop
55	Lagerstroemia indica	Panjtara
56	Litsaea umbrosa	Bansangla
57	Lonicera quinquelocularis	Bakru
58	Lyonia ovalifolia	Arman
59	Machilus odoratissima	Chandra
60	Mallotus philippinensis	Kaamal
61	Mimosa rubicaulis	Raal
62	Myrsine africana	Jhojru
63	Nerium indicum	Lal kaner
64	Olea cuspidata	Kau
65	Parrotia jacquemontiana	Killar
66	Picea smithiana	Tosh
67	Picrorhiza kurrooa	Kaur
68	Pinus roxburghii	Chir
69	Pinus wallichiana	Kail
70	Pistacia integerrima	Kakar
71	Podophyllum hexandrum	Bankakri
72	Populus ciliata	Pahari peepul
73	Potentilla nepalensis	Gul-ai-lal
74	Princepia utilis	Rooari

S.No.	BOTANICAL NAME	COMMON NAME								
75	Prunus cerasoides	Padam/ Pajja								
76	Prunus cornuta	Jamnoi								
77	Punica granatum	Daru								
78	Pyrus pashia	Kainth								
79	Quercus dilatata	Moru								
80	Quercus leucotrichophora	Banj								
81	Quercus semecarpifolia	Kharsu								
82	Ranunculus arvensis	Charmula								
83	Rhododendron arboreum	Mandal								
84	Rhus succedanea	Arkhor								
85	Rhus wallichii	Arkhal								
86	Rosa moschata	Karir								
87	Rubus ellipticus	Khaidi								
88	Rumex hastatus	Malodi								
89	Sageretia filiformis	Brainkhal								
90	Salix spp.	Bed								
91	Sapium sebiferum	Makkhan								
92	Sarcococca saligna	Bansangli								
93	Saussurea lappa	Kuth								
94	Skimmia anquetilia	Sangli dhoop								
95	Spirea canescens	Dhakk								
96	Taxus baccata	Brahmi								
97	Thalictrum alpinum	Dharu bini								
98	Toona ciliata	Toon								
99	Toona serrata	Hill toon / Dadri								
100	Trifolium pratense	Red clover								
101	Trifolium repens	White clover								
102	Trillium govanianum	Nagchatri								
103	Ulmus villosa	Bran / Manu								
104	Ulmus wallichiana	Brari / Kain								
105	Valeriana jatamansi	Mushkbala								
106	Viburnum grandiflorum	Guchh / Teolda								
107	Viola canescens	Bunafsha								
108	Woodfordia floribunda	Dhai								
109	Zanthoxylum alatum	Timru								
110	Zizyphus spp.	Beri								

2. IMPORTANT MEDICINAL PLANTS FOUND IN BATOTE FOREST DIVISION										
S.No.	BOTANICAL NAME	COMMON NAME								
1	Aconitum heterophyllum	Atis								
2	Adiantum venustum	Kalijanth								
3	Anemone obtuseloba	Rattanjog								
4	Artemisia spp.	Afsantin								
5	Atropa belladonna	Ban Tamaku								
6	Brassica rapa	Shalgum, Gaguj								
7	Bunium persicum	Kala Zeera								
8	Cannabis sativa	Bhang								
9	Dioscorea deltoidea	Kinas								
10	Ephedra gerardiana	Asmani Buti								
11	Ferula asafoetida	Hing								
12	Foeniculum vulgare	Saunf								
13	Geranium wallichianum	Kao-ashud								
14	Inula racemosa	Pushkramul								
15	Malva sylvestris	Bade sochasl								
16	Meconopsis aculeata	Kandeli								
17	Morchella esculenta	Guchchi								
18	Mentha longifolia	Pudina								
19	Picrorhiza kurrooa	Kutki, Kuor								
20	Plectranthus rugosus									
21	Podophyllum hexandrum	Ban-kakri								
22	Potentilla anserina	Penma								
23	Prunus armeniaca									
24	Salvia moorcroftiana	Kali-jari								
25	Sambucus ebulus	Gandal								
26	Saussurea lappa	Kuth								
27	Saxifraga ligulata	Silphata								
28	Skimmia anquetilia	Sangli Dhoop								
29	Trigonella foenum-graecum	Methi								
30	Taraxacum officinale	Dhudal								
31	Thymus serpyllum									
32	Trillium govanianum	Nagchattri								
33	Utrica dioica	Soie								
34	Valeriana jatamansi	Mushkabala								
35	Viola odorata	Bunafsha								

## **GLOSSARY OF COMMON ANIMALS AND BIRDS**

#### 1. Checklist of Mammals of Batote Forest Division

S.No.	ZOOLOGICAL NAME	COMMON NAME
1	Marten Martes foina	Beach of Stone
2	Uusus arctos	Brown Bear
3	Semnopithecus entellus	Common Langur
4	Ursus thibetanus	Himalayan Black Bear
5	Marmot bobak	Himalayan Marmot
6	Ochotona roylei	Himalayan Mouse Hare /
7	Martes flavigula	Himalayan yellow Marten
8	Capra ibex	Ibex
9	Canis aureus	Jackal
10	Felis chaus	Jungle Cat
11	Panthera pardus	Leopard
12	Mamot caudate	Long Tailed Marmot
13	Moschus chrysogaster	Musk Deer
14	Vulpes vulpes	Red Fox

#### 2. Checklist of Birds of Batote Forest Division

S.NO.	ZOOLOGICAL NAME	COMMON NAME
1	Tachymarptis melba	Alpine swift
2	Mycerobas icterioides	Black and yellow grosbeak
3	Phoenicurus ochruros	Black redstart
4	Parus rufonuchalis	Black tit
5	Milvus migrans	Black-eared Kite
6	Picus canus	Black-naped green wood-pecker
7	Columba livia	Blue Rock Pigeon
8	Monticola solitarius	Blue rock thrush
9	Myophonus caeruleus	Blue whistiling thrush
10	Phoenicurus caeruleocephala	Blue-headed redstart
11	Phylloscopus reguloides	Blyth's leaf warbler
12	Pyrrhula nipalensis	Brown bullfinch
13	Cinclus pallasii	Brown dipper
14	Catreus wallichi	Cheer pheasant
15	Akectirus chukar	Chukar patridge
16	Passer rutilans	Cinamon tree sparrow
17	Mycerobas affins	Collared grosbeak
18	Cuculus canorus	Common cuckoo

S.NO.	ZOOLOGICAL NAME	COMMON NAME
19	Alcedo atthis	Common kingfisher
20	Acridotheres tristis	Common myna
21	Parus melanolophus	Crested black tit
22	Galerida cristata	Crested lark
23	Hirundo concolor	Durskey crag-martin
24	Bubo bubo	Eagle owl
25	Coracias garrulous	European roller
26	Cephalopyurs flammiceps	Fire capped tit
27	Urocissa flavirostris	Gold billed blue magpie
28	Regulus regulus	Gold crest
29	Aquila chrysaetos	Golden eagle
30	Oriolus oriolus	Golden oriole
31	Parus monticolus	Green backed tit
32	Culicicapa ceylonensis	Grey- headed flycatcher
33	Turdus rubrocanus	Grey headed thrush
34	Parus major	Grey tit
35	Motacilla cinerea	Grey wagtail
36	Turdus boulboul	Grey winged blackbird
37	Gyps fulvus	Griffon vulture
38	Aquila chrysaetos	Himalayan Golden Eagle
39	Gyps himalayensis	Himalayan Griffon Vulture
40	Lophophorus impejanus	Himalayan monal
41	Dendrocopos himalayensis	Himalayan pied wood-pecker
42	Streptopelia orientalis meena	Himalayan Rufous Turtle Dove
43	Tetraogallus Himalayensis	Himalayan snowcock
44	Collocalias brevirostris	Himalayan swiftlet
45	Certhia discolor	Himalayan tree-creeper
46	Leucosticte nemoricola	Hodgson's mountain finch
47	Upupa epops	Ноорое
48	Corvus splendens	House crow
49	Passer domesticus	House sparrow
50	Affinis	House swift
51	Gyps bengalensis	India white-backed vulture
52	Cuculus micropterus	Indian cuckoo
53	Stretopelia decaocto	Indian ring dove
54	Dendrocitta vagabunda	Indian tree pie
55	Corvus macrorhynchos	Jungle crow
56	Sitta cashmirensis	Kashmir nuthatch
57	Ficedula subrubra	Kashmir red breasted Flycatcher

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S.NO.	ZOOLOGICAL NAME	COMMON NAME
58	Falco tinnunculus	Kestrel
59	Pucrasia macrolopha	Kiklas
60	Eudynamys scolopaceas	Koel
61	Pucrasia macrolopha	Koklass pheasant
62	Ceryle rudis	Lesser pied kingfisher
63	Carduelis cannabina	Linnet
64	Enicurus scouleri	Little forktail
65	Athene noctua	Little owl
66	Ficedula westermanni	Little pied flycatcher
67	Asio otus	Long-eared owl
68	Lophophorus impeajanus	Monal Pheasant
69	Phylloscopus griselous	Olivaceous leaf-warbler
70	Pyrrhula aurantiaca	Orange bullfinch
71	Tarsiger cyanurus	Orange flanked bush-robin
72	Phylloscopus proregulus	Pallas leaf-warbler
73	Terpsiphone paradise	Paradise flycatcher
74	Milvus migrans govinds	Pariah kite
75	Falco peregrines	Peregrine
76	Motacilla alba	Pied or white wagtail
77	Carpodacus rodochrous	Pink-browed rosefinch
78	Phylloscopus neglectus	Plain leaf-warbler Plain or yellow browned leaf-
79	Phylloscopus inornatus	warbler
80	Rhyacornis fuliginosus	Plumbeous water-redstart
81	Gallus gallus	Red jungle fowl
82	Stretopelia tranquebarica	Red turtle dove
83	Carpodacus puniceus	Red-breasted rosefinch
84	Pyrrhula erythrocephala	Red-headed bullfinch
85	Carpodacus rhodochlamys	Red-mantled rosefinch
86	Lanius schach	Rofous backed shrike
87	Psittacula krameri	Rose ringed parakeet
88	Prunella himalayana	Rufos-streaked accentor
89	Stretopelia orientalis	Rufous trustle dove
90	Muscicapa ruficauda	Rufous-tailed flycatcher
91	Picus squamatus	Scaly-bellied green wood-pecker
92	Accipiter badius	Shikra
93	Muscicapa leucomelana	Slaty blue flycatcher
94	Psittacula himalayana	Slatyuheaded parakeet
95	Larwa lerwa	Snow patridge

S.NO.	ZOOLOGICAL NAME	COMMON NAME
96	Columba leuconota	Snow pigeon
97	Accipiter nisus nisosimilis	Sparrow hawk
98	Mycerobas melanozanthos	Spot winged grosbeak
99	Stigmatopelia chinensis	Spotted dove
100	Enicurus maculates	Spotted forktail
101	Sturnus vulgaris	Starling
102	Hirundo rustica	Swallow
103	Apus apus	Swift
104	Phylloscopus affinis	Tickells leaf-warbler
105	Passer montanus	Tree sparrow
106	Phylloscopus tytleri	Tytler's leaf-warblers
107	Garrulax variegates	Variegated laughing thrush
108	Tragopan melanocephalus	Western tragopan
109	Halcyon omyrnensis	White breasted kingfisher
110	Pycnonotus leucogenysLeucogenys	White cheeked bulbul
111	Sitta leucopsis	White cheeked nuthatch
112	Aegithalos leucogenys	White throated tit
113	Cinclus cinclus	White-breasted dipper
114	Carpodacus thura	White-browned rosefinch
115	Chairmarrornis leucocephalus	White-capped water-redstart
116	Phoenicurus erythrogaster	White-winged redstart
117	Troglodytes troglodytes	Wren
118	Jynx torquilla	Wryneck
119	Motacilla flava	Yellow wagtail
120	Motacilla citreola	Yellow-headed wagtail

## PART –I SUMMARY OF FACTS ON WHICH THE PROPOSALS ARE MADE

#### Chapter I

### The track dealt with

#### 1.1 Name and Situation

1.1.1 Batote Forest Division was constituted on Ist January 1982 after merging of Batote (Co.01 to 44) and Gandhri (Co.45 to Co.81b) ranges of erstwhile Ramban Forest Division with the Marmat Range (Co.09 to Co.74) of erstwhile Doda Forest Division. The area comprising Batote Forest Division falls mainly under civil jurisdiction of Doda (Marmat Range) and Ramban (Batote and Gandhri Ranges) districts and is a part of Chenab circle Doda. The following flow chart depicts the history of Batote Forest Division in relation to the administrative jurisdiction of various divisions over Batote, Gandhri and Marmat Ranges over a period of time.



1.1.2 Batote Forest Division lies between **32**<sup>o</sup> 57' 22" **N** to **33**<sup>o</sup> 15' 52" **N** latitude and **75**<sup>o</sup> 5' 55" **E** to 75<sup>o</sup> 32' 46" **E** longitude. The entire area is covered by survey of India 1:50000 G.T. Sheets 43 0/3 ,43 0/4 , 43 0/8, 43 0/12, 43 P/5 and 43 P/9. The maximum length of the division is 60 Kms and the breadth varies from 7.5 Km to 22 Kms.



(Index to survey of India 1:50000 G.T. Sheet)

#### Figure 1.1 Location Map of Batote Forest Division.

1.1.3 The description of the boundaries of the Batote Forest Division is as under; River Chenab forms the northern and north-western boundary of the Division and delineates it from Doda, Ramban and Mahore Forest Divisions. Bhaderwah Forest Division lies towards east of this Division and the boundary is delineated by Khellani nallah and Padri-Sikri-Zamar-Lichha ridge. On the Southern side lies Lichha peak, Tangalghat, Kanshaunt, Dhupri, Dehra, Kurchunti, Shivgarh-Panti-Sankhpal ridge which merges with Kothiala ridge and forms boundary with Udhampur Forest Division. Towards South-west Mankani Khad drains into Manial Khad and forms the boundary with Udhampur Forest Division.

1.1.4 The Jammu Srinagar National Highway-44 enters Batote Forest Division at Patnitop and runs through the Division up to Karol bridge over river Chenab, about 4.5 Km short of Ramban. However, with the construction of Chenani-Nashri tunnel, the Jammu-Srinagar national highway NH-44 now enters the Batote Forest Division at Nashri (Co.14) about 12 kms ahead of Batote towards Ramban. The Batote Kishtwar National highway NH-244 originates from Batote and runs for about 50 Kms up to Khellani bridge.

#### 1.2 Configuration of the ground

- 1.2.1 The entire Batote Forest Division is hilly and mountainous with steep slopes and deep valleys. Marmat Range especially is highly rugged with steep to precipitous slopes. In comparison, the slopes of Batote and Gandhri Ranges are relatively easier. The confluence of Mandial Khad and River Chenab is the lowest point of the Division with an elevation of 586 mtrs. Therefrom, the elevation rises up to 3904 mtrs at Zammar, the highest peak of the Division, situated in the south-east extreme of compartment 29, Marmat Range. Other prominent peaks that deserve a mention are *Sikri (3397 mtrs) , Lichha (3895 mtrs), Dhupri (3269 mtrs), Dehra (2833 mtrs), Kurchunti (3048 mtrs), Chand Temple (2795 mtrs), Patni (2060 mtrs), Sankhpal (2909 mtrs), and Talai (3282 mtrs).*
- 1.2.2 There are many passes along the main ridge, the most important being the *Patni pass*, the gate way to Chenab Valley and *Dhera pass*, which connects Marmat Range with Dudu Range of Udhampur Forest Division. Marmat Range forms the water shed of Raggi and Kanderi Nallahs and partly of Khellani nallah. The main tributaries of Raggi nallah are Kalamut and Nagni nallahs. Prominent nallahs draining Batote and Gandhri ranges includes Chakwa, Magu, Nashiri, Peerah, Sawani, Kalapani and Dathwal khad in Batote Range, and Brachli, Mandial, Surnikund, Mankani, Garol and Jandalwala Khad in Gandhri Range. The Division as a whole forms a part of catchment of river Chenab. Some of the nallahs like Raggi, Khellani, Kunderi and Nashiri carry adequate water during the peak discharge period thereby being utilized for floating/transportation of sleepers by the SFC.

#### 1.3 Geology and Rocks

1.3.1 The Division is situated on the northern flank of the Pir Panjal Range and thus geographically this tract forms a part of lesser Himalayas. Geologically, the area has been part of the Himalayan organic movement and exposes a normal sequence of geological formations from *Precambrian* to Miocene and a few river traces of recent origin. The geological history of the area, is therefore, not much different from that

of Himalayan Range. The *Precambrian* of the Himalayas are ancient rock formation which were originally deposited in Tethys Sea, the region lying north of Indian Peninsula, and are represented by *Salakhalas*. Salakhalas are highly folded and compressed rock formations. The grade of metamorphism varies from place to place and the underlying rock comprises of slates, philistines, quartzite, mica, micaceous schist, carbonaceous and graphitic schist, biotitic, gneiss, hornblendic gneiss, prophyritic, and banded gneiss.

**1.3.2** The various geological formations found in the tract and their lithological description and are a summarized as under;

S.No.	Formations	Lithological description	Age
1	Alluvium and Soil		Recent
2	Murree series	Red, brown, grey and green sandstone, Purple shales	Miocene
3	Panjal group -Trap member -Agglomeratic Slate Member	Schistose Panjal trap associated with light pink and greenish lime stone agglomeratic slates with ash beds, grey quartzite and lime stone bands.	Permo- Carboniferous
4	Dogra Slates	Dark Grey phyllitics interbeded with green chloritised, amygloidal trap, a product of contemporaneous volcanic action.	Late Precambrain to earliest Cambrain
5	Salkhalas series	Gypsum, limestone, quartzite and chlorate schist and dolomite etc.	Older Precambrain

Table1.1Geological formations found in the tract.

- 1.3.2 The area wise distribution of the different geological formation is given below ;
  - (i) The Salakhala series is very well developed over the Marmat Range with a patch of intrusive granite-gneiss right from pull Doda up to Baggar Area.
     Salakahals are succeeded by Dogra slates which are mainly argillaceous with minor layers of quartzite and often intimately folded with *Salakhalas*. Dogra Slates are also well exposed at many places, in all the three Ranges of the Division.
  - (ii) Murrees comprises red, brown and grey micaceous, crumbling sand stones and shales. This formation exhibits plant impression, ripple marks and rain prints on shales and sand stones. Murrees are very well exposed in Batote Sudhmhadev areas.

Murrees are also well exposed from Batote to Peerah having intercalation of purple shale and sand stones. It is followed by a Panjal trap composed of igneous and volcanic rocks. Panjal trap is followed by Dogra slates consisting of phyllites etc. which extend up to Dharam pkund, with frequent appearance of numulitic series in this tract, as are conspicuous by their colour, consisting of quartzite, grey and green phyllites and grey, cream lime stones, variegated shale and gypsum.

#### 1.4 Mineral Resources

- 1.4.1 The important minerals found in this track are briefly described as under;
  - (i) Gypsum: Gypsum is an important mineral used in the manufacture of chemical Fertilizers, cement, plaster of Paris etc. Extensive deposit of gypsum occurs in Assar-Batote-Ramban area. All these deposits are reported to be of good qualities with an average gypsum content of 90 percent.
  - (ii) Lime stones: Lime stone is the one of most important industrial mineral used in the manufacture of cement, iron and steel, chemical fertilizer, lime etc. It is also used as building material. Thick band of lime stones have been recorded in Dharamkund, Chanderkote, Assar-Baggar areas. Some of these bands are of good quality and are suitable for cement and chemical industry.
  - (iii) **Galena:** It is an important ore of lead. Galena, associated with pyrite, has been recorded from Dedni-Humble area in Marmat Range.
  - (iv) **Copper:** Copper is an important industrial metal used in a large number of industries. Copper mineralization in the form of chalcopyrite has been reported from Dedni humble area.
  - (v) Slates: Slates are used for writing as well as roofing purposes. Good qualities slates occurs in Chkawa Nallah, Shivgarh area and a many other places in the Division and are locally used for roofing.
  - (vi) **Pyrite:** Pyrite has been reported to be present in carbonaceous phyllite band, traced from Assar to Khellani area. Pyrites occurs as disseminated grains in the rock. Veins of pyrite associated with phyrrhotite have been recorded to the east of Raggi Nallah.
- 1.4.2 Commercial exploitation of the minerals from this tract is not feasible from ecological, economical and geological point of view. The geological formation at many places for considerable distance is loose, fragile and highly susceptible to landslides. Important land slide prone areas include Nashri, Peerah and Masrsoo etc.

#### 1.5 Soils

Soils by and large, are shallow and immature containing large portion of undecomposed mineral matter. These are sandy, porous and fair in soil-humus except those having luxuriant tree growth. Generally soils are acidic in nature.

#### 1.6 Climate

Because of the variation in the altitude from 586 mtrs to 3904 mtrs, there is considerable variation in the climate also. Major portion (above 1500 mtrs altitude) has temperate climate which experiences cold and severe winters with snow fall and moderate and pleasant summers.

The low lying areas, commonly known as Kandi illaqua experiences sub-tropical climate with mild to moderate winters and hot and scorching summers.

#### 1.6.1 **Precipitation**

The tract receives most of its precipitation during winter months from December to March in the form of rain and snow. Some rain fall is received during monsoon season also. The rain-fall data for the period from 2001-02 to 2015-16 have been compiled under Table 1.2 & Table 1.3.

From a perusal of the tables it emerges that nearly 36.32 percent of the total precipitation is received during the winter months from December to march, some of it in the form of snow in the higher reaches. Bulk of monsoon rainfall is received during July and August. The intensity of precipitations is higher during winter months.

Generally, some rain fall is received every month however in certain years no rainfall was received during the month of April, October, November and December. On an average, the period from September to November is the driest part of the year followed by the period from April to June. These are also the periods when extra vigil is required against the threat of fire. The tract does not experience severe droughts normally but the effect of global warming is quiet evident with extreme weather conditions visible in this division also. Unexpected intense rain-falls occur very frequently causing landslides besides damage to forest crop as well alongwith frequent dry spells during the months of July to December causing forest fires.

#### 1.6.2 Temperature

The month wise data on maximum and minimum temperature from the period 2000-01 to 2015-16 is tabulated under Table 1.4.

December, January and February are the coldest months. Average minimum temperature during these months remains below  $04^{0}$ C during the month of January and February. The warmest period of the year is from May to August. However, even during these months the temperature rarely exceeds up to  $30^{0}$  C. Apart for the four

months cold period the temperature remain pleasant during the rest of the year. High temperatures, coupled with drier conditions during summers are largely responsible for high incidence of fire incidents during this period of the year. The effect of global warming is evident with every passing year as summer temperature seems to cross 30 C every year.

Year	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	Average
2001	0.00	0.00	0.00	160.60	106.50	97.80	170.50	86.60	36.80	10.80	66.60	40.80	777.00	86.33
2002	82.80	148.20	154.60	80.60	31.80	82.50	68.20	221.10	148.30	10.60	0.00	21.40	1050.10	87.51
2003	71.80	440.50	184.20	77.10	88.30	44.30	64.60	184.90	106.60	5.80	71.80	145.00	1484.90	123.74
2004	271.90	118.80	0.40	123.40	90.70	168.60	102.00	56.60	2.00	113.40	51.00	52.00	1150.80	95.90
2005	209.80	641.50	252.60	66.20	59.80	24.00	321.80	56.20	68.20	2.40	5.80	0.00	1708.30	142.36
2006	391.80	81.40	211.60	48.00	52.00	78.60	198.60	187.40	286.80	54.00	103.20	210.60	1904.00	158.67
2007	3.20	218.40	365.40	0.80	46.20	59.00	113.60	129.40	14.40	0.00	0.00	69.40	1019.80	84.98
2008	315.20	217.80	2.60	111.30	52.80	141.80	117.40	99.60	56.20	37.20	6.00	120.00	1277.90	106.49
2009	159.00	147.60	103.60	117.20	52.80	53.60	154.40	20.80	57.00	14.20	86.40	11.60	978.20	81.52
2010	45.10	319.80	67.60	76.80	159.80	101.80	147.00	184.10	170.70	58.00	54.40	93.70	1478.80	123.23
2011	68.40	372.30	249.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	690.50	230.17
Total	1619.00	2706.30	1592.40	862.00	740.70	852.00	1458.10	1226.70	947.00	306.40	445.20	764.50	13520.30	1320.90
Average	161.9	270.63	159.24	86.2	74.07	85.2	145.81	122.67	94.7	30.64	44.52	76.45	1352.03	132.09

Table No.1.2Actual precipitation in mm recorded at meteorological station Batote.

Year	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	Average
2001	0	0	0	10	6	7	11	5	3	2	2	3	49	5.44
2002	5	8	9	7	2	7	7	11	5	2	0	2	65	5.42
2003	3	11	8	6	4	7	6	14	5	1	3	8	76	6.33
2004	10	6	0	8	5	8	10	7	0	5	1	2	62	5.17
2005	6	16	14	5	3	4	10	4	7	0	1	0	70	5.83
2006	8	3	11	2	5	5	11	13	6	3	7	9	83	6.92
2007	0	11	9	0	4	6	7	6	1	0	0	5	49	4.08
2008	9	8	0	10	7	11	5	9	5	2	1	5	72	6.00
2009	10	6	7	7	7	5	9	4	2	2	6	3	68	5.67
2010	3	5	6	7	9	12	11	10	7	2	3	2	77	6.42
2011	3	9	8	0	0	0	0	0	0	0	0	0	20	6.67
Total	57	83	72	62	52	72	87	83	41	19	24	39	691	63.94
Average	5.70	8.30	7.20	6.20	5.20	7.20	8.70	8.30	4.10	1.90	2.40	3.90	69.10	6.39

 Table No.1.3
 Monthly number of rainy days recorded at meteorological station Batote

Year	Ja	n	Fe	eb	Ma	rch	Ар	oril	Μ	ay	Ju	ne	Ju	ıly	A	ug	Se	pt	0	oct	No	ov	De	ec
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
2001	0.00	0.00	0.00	0.00	0.00	0.00	21.30	10.10	27.90	15.10	26.40	17.00	26.30	18.60	26.60	18.20	26.70	14.50	24.80	11.40	18.80	7.40	14.20	4.60
2002	12.00	2.20	11.60	2.90	18.40	7.40	22.40	11.40	29.20	15.70	28.80	16.90	28.80	17.90	26.10	18.10	23.90	13.40	22.90	10.30	0.00	0.00	14.30	4.10
2003	14.20	3.40	10.70	3.30	15.50	6.70	22.30	12.00	25.50	13.40	30.10	18.50	26.80	19.30	25.70	18.20	25.20	16.20	23.30	10.80	17.20	6.50	12.80	4.20
2004	10.30	2.80	13.30	4.80	22.40	10.80	24.00	12.60	26.90	15.00	26.50	16.60	26.50	18.30	26.00	17.90	26.60	16.60	20.60	9.80	19.40	7.40	14.80	5.20
2005	9.70	2.10	6.50	1.00	15.10	6.50	21.80	10.60	23.60	12.70	29.50	17.30	25.50	18.20	26.50	18.10	25.40	16.40	23.70	11.00	18.30	6.40	15.40	3.60
2006	10.20	0.70	17.00	7.90	16.00	6.60	22.40	10.90	27.80	16.10	27.10	16.40	25.10	18.30	25.30	18.20	24.90	15.10	22.30	11.30	16.30	6.60	12.00	3.90
2007	12.70	2.20	12.30	4.10	15.60	6.20	25.90	13.40	26.50	14.90	28.20	18.70	26.50	19.10	26.50	19.40	26.20	16.60	24.20	11.10	20.00	7.90	12.20	3.30
2008	7.70	1.10	10.10	2.00	20.50	9.40	20.60	10.80	25.50	14.40	26.00	18.10	26.50	19.30	26.20	18.40	25.50	14.60	23.60	12.10	20.40	7.90	15.40	5.90
2009	11.00	3.80	13.80	4.90	17.90	8.30	21.50	11.20	26.80	14.50	28.70	14.60	27.90	18.10	27.00	18.40	26.30	15.40	24.30	10.60	16.90	6.90	14.00	4.30
2010	14.80	4.80	12.30	4.20	21.20	10.30	24.30	12.80	25.90	14.30	27.10	15.80	26.10	19.20	25.20	19.50	25.00	16.20	25.50	11.70	18.80	8.00	13.80	3.80
2011	10.70	2.30	10.40	4.50	17.60	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average	11.39	2.51	11.73	3.87	18.02	7.93	22.77	11.62	26.42	14.55	27.76	16.81	26.55	18.66	26.01	18.49	25.52	15.55	23.65	11.01	16.74	6.64	13.81	4.26

## Table No.1.4Monthly Average maximum and minimum temperature (in centigrade) recorded at meteorological<br/>station Batote.

#### 1.6.2 Wind

Data regarding monthly maximum wind speed for the period from 2000-01 to 2015-16 tabulated in Table 1.5. A perusal of the data reveals that wind speed is highest during the month of December and January and minimum from August to November.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2001	0.0	0.0	0.0	1.4	3.0	4.2	3.8	3.7	2.9	2.5	1.5	1.2
2002	1.0	1.6	2.0	2.1	1.6	2.1	3.3	2.0	0.9	0.7	0.0	0.3
2003	0.3	0.8	0.9	0.6	1.6	1.1	2.1	1.2	1.7	0.8	0.6	0.2
2004	0.3	1.2	1.5	1.8	0.9	2.1	3.0	3.2	3.6	1.6	0.7	0.4
2005	0.5	0.1	0.2	0.9	0.4	1.6	1.7	2.4	1.9	1.2	0.4	0.1
2006	0.1	0.4	0.5	0.3	0.9	0.6	0.7	0.5	0.6	0.7	0.1	0.6
2007	0.5	0.9	0.9	2.3	0.9	1.7	0.9	1.2	0.9	1.1	0.5	0.0
2008	0.3	0.4	1.3	0.6	0.9	1.1	1.2	0.6	0.6	0.5	1.2	1.6
2009	1.9	2.5	3.0	3.2	2.1	1.7	2.2	1.8	2.0	1.8	0.1	3.2
2010	3.5	2.6	1.5	2.7	2.5	1.9	3.1	2.2	1.5	1.9	0.1	0.1
2011	2.0	2.3	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average	0.89	1.25	1.28	1.59	1.48	1.81	2.2	1.88	1.66	1.28	0.52	0.77

## Table1.5Monthly maximum wind speed (Km/hours) recorded at scheduled<br/>hours of observation Meteorological Station Batote.

#### 1.7 Water Supply

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

The area of individual compartments/sub-compartments was calculated by applying dot-Grid method on the G.T. sheets 1:50000 scale. The computation of area under species and blanks, etc was done using the following procedure.

#### 1.8 Distribution of Area

- 1.8.1 The forest of Batote Forest Division forms a continuous unbroken strips tapering from South East to North-West. The presence of large number of *chaks* inside the demarcated forest is a prominent feature of this division. The lower fringes of forests are honeycombed with human habitation. Generally speaking, in most places where the land is flat or gently sloping, either on the top of the ridges, or along the Nallahs. The area is used for cultivation. Good forests are located on slopes that are too steep for cultivation.
- 1.8.2 The area under the jurisdiction of Batote Forest Division is spread over a part of Ramban Tehsil of Ramban District and part of Doda Tehsil of Doda district. The Range wise gross area of the watershed is tabulated as under;

Table 1.6	The area figures shown above were compiled from 1:50,000 G.T.
	sheets by applying graphic method at the time of previous revision
	of the plan.

Range	Gross area of the water shed $(km^2)$
Marmat	246.05
Batote	142.00
Gandhri	89.28
Total	477.33

1.8.3 The compartment boundaries were digitized by referring to previous working plan maps.

However, it is advisable to use the demarcation records for solving boundary issues. After estimation of the area of all the compartments the area of the Division is presented below.

S.No	Range	Area as pe	er previous wo plan (Ha)	orking	Area esti	Difference		
		Commerci al Area	Uncommer cial Area	Total Area	Commercial Area	Un- commercial Area	Total Area	in Area (Total)
1	Batote	5087	4091	9178	3638.85	5948.31	9587.16	409.16
2	Gandhri	4199	2615	6714	2911.98	4224.07	7136.05	422.05
3	Marmat	10016	5709	15725	8523.67	8061.29	16584.97	859.97
r	Fotal	19302	12315	31617	15074.51	18233.67	33308.18	1691.18

## Table 1.7Statement of Comparison of area of the Division under previous<br/>and present revision.

The Rangewise distribution of area under different species is provided in the Table 1.7 above. The perusal of the area statement shows that commercial forest area and uncommercial area (broad leaved, non wooded and blank area) constitute 54.75 and 45.25 percent respectively of the total compartmentalized area. The area of the individual compartments and sub compartments and their commercial forest area were estimated by using the GIS software as provided in the Appendix-III. The commercial forest areas of the compartments were digitized using LISS III satellite imagery and Google Earth. After ground truthing, the stock maps were prepared.

1.8.4 In comparison to the previous working plan, the total area of the compartments varies in this plan due to the change in the methodology. During the revision of the previous plan, the area was measured manually by using the dot grids.

#### **Dot Grid Method**

- Individual compartment stock maps were first prepared on the scale of 1:15000 in the field on the basis of ocular estimation.
- (ii) Compartment/sub-compartment maps of the division were prepared from G.T. sheets on the scale of 1:50000 on the tracing film.
- (iii) The Division map was super imposed on the corresponding 1:50000 geo-coded, false Colour Composed IRS-IB satellite imageries. Using the visual interpretation technique, and the stock map prepared in the field, area under blanks, high pasture land, landslides and different species were delineated and colored for each compartment individually.
- (iv) Area under different categories was then computed compartment wise by applying dot grid method on the scale of 1.50000.

In a transparent sheet, 2mm x 2mm squares were marked with a dot inside. Each square of 2mm x 2mm is equal to 1 hectare in 1:50,000 GT Sheet Map. The dot grids were overlaid on the compartment map of 1:50,000 and number of squares occupied inside the boundary was manually counted and hence area of the compartment was calculated and shown in the last revision. The non wooded area is being increasing due to creation of fresh blanks created due to various reasons in the intervening period. Accordingly, there has been a corresponding decrease in the commercial and un-commercial forest area. The area statement above does not reflect the changes on account of diversion of forest land for non-forest purpose under the forest conservation Act, 1990.

#### 1.9 State of boundaries

- 1.9.1 The work of renovating the boundary pillars, and compilation of demarcation files and maps, was carried out at the time of settlement operation by Demarcation Division -II, Jammu, in collaboration with the revenue authorities, for some of the forests of Batote and Gandhri Ranges.
- 1.9.2 The forest wise detail of renovation work carried out on boundary pillars are tabulated under Table 1.8.
| Year    | Forest       | Range   | Compartment    |
|---------|--------------|---------|----------------|
| 2000-01 | 0            | 0       | 0              |
| 2001-02 | 0            | 0       | 0              |
| 2002-03 | 0            | 0       | 0              |
| 2003-04 | 0            | 0       | 0              |
| 2004-05 | 0            | 0       | 0              |
| 2005-06 | 0            | 0       | 0              |
| 2006-07 | 0            | 0       | 0              |
| 2007-08 | 0            | 0       | 0              |
|         | Dedni        | Marmat  | 15-20/Marmat   |
| 2008-09 | Humble       | Marmat  | 12-14/Marmat   |
|         | Kothi        | Gandhri | 72-74/G        |
|         | Tangar       | Gandhri | 77/G           |
| 2009-10 | Hud Malhori  | Marmat  | 13-14/Marmat   |
| 2010-11 | Ranka        | Marmat  | 58-63/M & 68-  |
|         |              |         | 69/M           |
|         | Kothi-Badhol | Gandhri | 67/G,68/G &    |
|         |              |         | 74/G           |
| 2011-12 | Surnikund    | Gandhri | 64,66,74,75,78 |
|         |              |         | & 79/G         |
| 2012-13 | 0            | 0       | 0              |
| 2013-14 | Sana karma   | Batote  | 20,21,24,&     |
| 2014-15 |              |         | 26/Btt.        |
| 2015-16 | 0            | 0       | 0              |

Table 1.8Statement of Forest-demarcation works carried out in the Division<br/>during the previous plan period.

**1.9.3** Further the forest details as per Form-01 are tabulated as under;

Table 1.9	Forest	details a	as per	Form-1.

Range	No. of Forests	Forest area as per Form1 (Ha)	No. of Main line BPs	Length of main line (Kms)	No. of Chaks	Area of Chaks (Ha)
Batote	13	9166.59	1558	240.24	153	1304.97
Gandhri	4	5902.43	643	144.01	55	364.45
Marmat	19	14401.04	1650	289.63	205	596.49
Total	36	29470.06	3851	673.88	413	2265.91

- 1.9.4 Except for the pillars that have been recently renovated, the forest demarcation line is in a pathetic condition. Old pillars, being of temporary nature, are generally displaced by the local people in order to encroach upon the forest land. Record keeping of demarcation pillars is rather unscientific, with no reference to bearing with respect to each other, or to fixed bench marks. Demarcation of forests is one such area that needs to be taken up on priority if the ever increasing tide of encroachment is to be checked.
- 1.9.5 The table below shows the range wise number of boundary pillars in the external boundary lines, the number of chaks with their area and the number of boundary pillars demarcating them.

Range	Year of demarcat ion	Area of forest in (ha)	Boundary pillars (Nos.)	Length of main line (km)	Area of Chaks (Ha)	Boundary Pilars in chaks (Nos.)	Length of line in Chaks (km)
Batote	1966-71	9166.25	1558	240.25	1305.44	2210	167.63 0
Gandhri	1966-76	6729.70	782	162.05	750.71	1165	127.30
Marmat	1963-64	13811.83	1394	266.11	465.19	1838	123.09
Total:		29707.78	3794	668.420	5221.36	5213	418.03

Table 1.10Statement showing Range wise number of boundary pillars in the<br/>Division.

1.9.6 In Marmat range no demarcation work has been taken up since about five decades except few compartments. Boundary pillars are hardly visible on the ground to differentiate the legal status of the land whether forests or private and need of the hour is immediate taking up of the job in hand. The demarcation records which has been made available on-line to the division is going to help in reconciliation of our boundaries, however revenue department needs to be involved in reconciliation for further encroachment of our Forest land.

## 1.10 Legal Position

- 1.10.1 All these forests are the property of Government of J&K State and their Administration vest with the Forest department. Thus the State forest department is responsible for the protection, management and betterment of the flora and fauna found in these forests. The control of fluctuating grazing vests with the forest department. Closure of any forest area up to half of any forest subject to maximum of one quarter of the total area of a forest range, at a time, with adequate and suitable provision for right of way, can be effected by the Forest Department.
- 1.10.2 Berune-line forests (Un-demarcated) presently under control of state revenue department have been ordered to be taken over and managed by the Forest department but not much has so far been done in this direction, with the result these forests continued to be ill managed. Berun line forests include large forest area in this tract, with scant and depleted vegetative cover. These forests are likely to lose to whatever is left with them, in case they are not transferred to the forest department and managed on the scientific lines. Such guidelines were also mentioned in the previous Working Plan but remained confined to the Plan only.
- 1.10.3 All demarcated forests come under the purview of The J&K Forest Act. of Samvat 1987 Act No. II of 1987 (1930 AD) as amended up to December 1997 AD. Under the amended Act the respective Territorial DFO's, have also been designated as Authorized Officers and have been conferred with powers to issue orders of confiscation in respect of timber, vehicle, implements, etc involved in the commission of forest offences. In Batote Forest Division various such cases have been registered during last ten years in which confiscation proceedings were initiated and timber confiscated as well.

To ensure that the records of the division are not confounded with the record and function of Authorized Officer, provision for a separate Court room, record room and necessary ministerial staff needs to be made on priority, besides proper prosecution of the cases by an well law known officer.

- 1.10.4 The following are the other acts enacted by the State Government from time to time which governs the various process of law as are applicable to these forests for their management preservation, regulation and control.
  - (i) The J&K Forest (Conservation) Act 1990 Governor's Act No. XXIV of 1990.
  - (ii) The J&K Forests (sale of timber) Act 1987 (1931 AD) Act No. III of 1987.
  - (iii) The J&K State Kuth Act 1978 (1921 AD) Act No. I of 1978.
  - (iv) The Cattle Tress pass Act 1977 (1920 AD) Act No. VIII of 1977.

- (v) The J&K Land Improvement Scheme Act 1972 Act No. XXIVIof 1972.
- (vi) The J&K Khacharia Act. 2011 Act No. XVIII of 2011.
- (vii) The J&K State Forests Corporation Act 1978 Act No. XII of 1978.
- (viii) The J&K Wild life (Protection) Act 1978 Act No. VIII of 1978.
- (ix) The J&K Public premises (Eviction of Un-Authorized Occupants) Act 1959 Act No. XIII of 1959.
- (x) The J&K Nationalization of Forests working Ordinance, 1986 Ordinance of V of 1986.
- (xi) The J&K Extraction of Resin Act, 1986 Governors Act No.VIII of 1986.
- (xii) The J&K Preservation of Specified Trees Act, 1969, Act No. V of 1969.
- (xiii) The Jammu and Kashmir Forest (Protection) Force Act 2001.
- (xiv) The Jammu and Kashmir Willow (Prohibition on export and movement) Rules 2001, Notification Dated:-23-05-2002.
- (xv) Biological Diversity Act 2002.
- (xvi) Environment Protection Act, 1986.
- (xvii) The J&K Wildlife (Protection) Act 1978, Act VIII of 1978.
- (xviii) The J&K Public Premises (Eviction of unauthorised occupants) Act 1959, Act XIII of 1959.
- (xix) The Jammu Forest Notice and the Kashmir Forest Notice.
- (xx) The Saw Mills (Registration and Control) Rules 1968.
- (xxi) The J&K Nationalisation of Forest Working Ordinance 1986, Ordinance V of 1986.
- (xxii) The J&K Extraction of Resin Act 1986 (Governors Act No. VIII of 1986).
- (xxiii) Government Order No. 24 FST of 1990 dated 15-1-1990 Restriction on Commercial Fellings.
- (xxiv) The Jammu and Kashmir Forest (Conservation) Act. 1990/2007.
- (xxv) The Jammu and Kashmir Rehabilitation of Degraded Forest and Village Plantation Rules 1992 (Rules for benefits sharing). (SRO 16 of 1992 dated 29-3-1992. Recast vide SRO 17 of 12-01-1999.)

## 1.11 Rights and concessions

1.11.1 No rights have been recognized by the State. However, the villagers, including Zamindars and other categories are classified under Jammu Forest Notice, living in and around the forests within the radius of five KM from the boundary of the forests enjoy a number of liberal concessions from these forests, In lieu of obligatory discharge of certain duties as mentioned in the said notice. Depending upon the distance from the boundary of demarcated forests, the concession have been categorized into "A" and "B" classes for the purpose of granting major concessions like timber etc. The trees of Kail, Fir and Chir are granted from the demarcated

forests at a highly concession rate to the villagers in and around within a radius of five KM from demarcated forests, for their bonafide domestic requirements.

- 1.11.2 The timber may be granted as free of cost in case of fire and other natural calamities. Other concessions enjoyed by the local inhabitants are briefly described as follows:-
  - (i) Collection of dead, fallen material for bonafide domestic use as firewood and small timber.
  - (ii) Collection of felling debris/ refuse from the vacated coupes.
  - (iii) Lopping of tree for fodder and other domestic purpose only is allowed in case of forest trees other than conifers and special class broad leave trees such as Walnut, Ash, Toon, *Acer spp., Prunus pardus* etc.
  - (iv) All non-timber forest produce not forbidden by any special order and accepting those covered under The Kuth Act can be collected free of charge.
  - (v) Grass cutting and grazing allowed in all the forests except those which are closed for the purpose of conservancy.

Year	Number of
	concessionists/Volume (cft)
2000-01	183/36464
2001-02	111/21362
2002-03	213/29223
2003-04	219/40946
2004-05	205/38306
2005-06	251/38797
2006-07	320/61611
2007-08	219/42486
2008-09	229/43631
2009-10	363/69993
2010-11	432/83519
2011-12	344/67248
2012-13	440/85953
2013-14	428/83742
2014-15	387/75921
2015-16	269/52318

# Table 1.11Statement showing the number/volume of timber issued to<br/>concessionists during the previous plan period in this Division.

- 1.11.3 In addition to the above figures, the timber is also removed by local inhabitants from the forest illicitly, which remains mostly undetected/ unaccounted for. The damage cases, when registered, are generally compounded/ settled departmentally after the recovery of the cost and compensation, much lower than the prevailing rates in the open market.
- 1.11.4 The quantum of volume being granted to the concessionists has generally increased over the preceding decades and as such it may be concluded that the level of concession being granted is in proportion to the increase in population and general rise in the standard of living of the people in the rural areas. Even than more and more illicit damage is taking place.

## 1.12 Grazing

- 1.12.1 Most of the forests areas of Batote Forest Division are subjected to grazing through the year, the unrestricted, uncontrolled and unscientific grazing in the forests has largely been responsible for degradation of Fir and Chir Forests. Over grazing is the main cause for the failure of regeneration to come up and establish. However, Deodar-Kail forests are so far saved from this menace, excepting certain low lying, heavily populated localities. The pressure of grazing on the forests is increasing day by day with the rapid increase in the live stock population, and fast disappearance of grazing grounds outside the demarcated forests. Most of the grazing grounds, comprising Kahcharai/ hamlet/ common lands have either been encroached upon or put to uses other then grazing.
- 1.12.2 The village livestock date as could be available from the field staff in a recent survey is complied in following tabular statement.
  - Table 1.12
     Statement showing livestock population of local villagers Range wise.

Category of live stock	Range	Cattle	Buffal o	Sheep	Goats	others	Total
Population	Batote	5765	817	5038	3719	2970	18309
	Gandhri	5199	680	2519	2770	0	11168
	Marmat	10518	961	14119	8962	0	34560
	Total	21482	2458	21676	15451	2970	64037

1.12.3 Village live stock graze the low lying forest areas during winter months, and generally move to the high pasture during the summer season. In addition to the local live stock population, seasonal, migratory live stock also graze in these forests

during summer months, the detail of such seasonal migratory live stock as per recent survey conducted by the staff is given as under.

Category of live stock	Range	Cattle	Buffalo	Sheep	Goats	others	Total
Population	Batote	1118	4667	431	330	865	7411
	Gandhri	77	701	146	111	125	1160
	Marmat	951	1034	2567	1077	2524	8153
	Total	2146	6402	3144	1518	3514	16724

Table 1.13 Statement showing livestock population of nomads Range wise.

1.12.4 Detail of live stock grazing annually in the forests of this Division while moving from summer zone to winter zone and vise versa for the last 15 years(crosses check posts) along with the grazing fees recovered is given as under;

Year	Sheep/Goats	Cows /Buffalo	Others	Total	Grazing
		/Dunaio			recovered
2000-01	12468	2881	211	15560	20447.35
2001-02	24635	3483	267	28385	31368.65
2002-03	12567	4216	185	16968	27351.00
2003-04	12677	3936	305	16918	29124.70
2004-05	12303	3521	638	16462	26374.65
2005-06	11570	2629	451	14664	24395.00
2006-07	9354	3105	525	12984	24933.00
2007-08	9717	4105	484	14306	24933.00
2008-09	8240	2532	475	11247	17553.00
2009-10	11469	4234	256	10068	17821.00
2010-11	9030	2958	347	12337	19862.00
2011-12	8571	3384	374	12329	19905.00
2012-13	14162	4326	943	19432	30131.00
2013-14	8029	3494	473	11995	23636.00
2014-15	6420	4803	507	11731	21617.00
2015-16	7470	4497	123	12290	21304.00
Total	178682	58104	6564	237676	380756.35

 Table 1.14 Statement showing livestock population grazing annually in Batote Forest Division.

The figures stand no comparison to actual incidence of grazing in the forests by migratory graziers.

1.12.5 This division falls on the route adopted by the migratory grazers, (Gujjar, Bakarwaals and Gaddies) during their seasonal movement top and from their winter and summer pastures outside the jurisdiction of this division. The details of animals that crossed the Forest check post Doda, annually over the last 11 years are tabulated as under;

Year	Sheep/Goats	Cows	Buffalo	Others	Total
2000-01	NA				
2001-02	8134	57	28	301	8520
2002-03	6947	27	17	403	7394
2003-04	9642	17	11	317	9988
2004-05	9136	50	14	598	9798
2005-06	7760	21	17	208	8006
2006-07	8649	51	9	312	9021
2007-08	11182	151	72	512	11917
2008-09	17225	92	10	468	17795
2009-10	14658	88	28	706	15480
2010-11	20543	81	62	532	21218

# Table 1.15Statement showing livestock population crossing Doda Grazing<br/>Check post annually.

It is estimated that at least 20-30% of the above numbers do pass through these forests, which goes undetected. A substantial number of total live stock population is constituted by unproductive animals. The animals graze at liberty in the open and concept of stall feeding is virtually nonexistent.

## **CHAPTER II**

## FOREST FLORA AND FAUNA

## PART-A

## **FOREST FLORA**

## 2.1 OCCURENCE AND DISTRIBUTION OF SPECIES

- 2.1.1 The elevation of Batote forest Division varies from around 600 meters to 3900 meters above mean sea level. Accordingly, a corresponding diversity is exhibited in the forests of this Division, which include sub-tropical, temperate, sub-alpine and alpine elements. Generally speaking, the areas adjoining river Chenab which forms the northern boundary of this division are low lying areas and sub-tropical forests are encountered in the region. The elevation rises as we move away from river Chenab in southerly direction, and accordingly, the vegetation changes from temperate to alpine.
- 2.1.2 In the sub-tropical forests of this division, Chir (*Pinus roxburghii*) which occurs between 600m to 1500m, is the predominant species. Chir forests are mostly confines to areas adjoining to river Chenab in Batote and Gandhri Ranges. Chir is not found in Marmat Ranges except for a few patches in compartments 74, 13c and 10a all of which are along river Chenab.
- 2.1.3 Around two third of the wooded area of this division falls under the category of temperate forests. In these forests Kail (*Pinus walichiana*) has the widest distribution, both in respect of the area occupied and the altitudinal variation. Starting from upper limit of Chir around 1500 m, Kail occupies areas up to 2800 m adjoining Fir forests. It is either encountered in all the three ranges in its natural zone, in pure form or mixed with Deodar, Fir and Spruce. Deodar (*Cedrus deodara*) occurs between 1500 m to 2500 m and is mainly confined to Batote and Marmat Ranges. Apart from some pure patches, Deodar is mostly found mixed with Kail, Fir or Spruce.
- 2.1.4 Fir (*Abies pindrow* ) forests occupy more than one third of the wooded areas of Marmat Range but their presence in Batote and Gandhri Ranges is nominal. Fir forests are restricted to elevations above 2500 m and up to timberline. Fir is associated with Deodar and Kail towards its lower limit and occasionally with spruce (*Picea smithiana* ) on steep slopes. In moist shady localities on northern aspects, Fir and Spruce descent considerably into Deodar-Kail forests, Occasional trees of Yew (*Taxus baccata* ) are also encountered in these forests in Marmat Range, but their proportion is insignificant. Yew is almost absent in Batote and Gandhri Ranges except for a few trees found in the Fir zone.

- 2.1.5 Broad leaved species find representation in sub-tropical as well as temperate areas of the division. Generally, they are found mixed with conifers species but occasionally pure patches of broad-leaved species are also encountered. In sub-tropical areas, species like *Populus ciliata, Alnus nepalensis* and *Dalbergia sissoo* favour most shady depressions along nallas. On exposed sites, *Olea cuspidate* and *Punica granatum* scrubs are more frequent. In temperate regions of the Division, Oaks are prominent amoung broad leaved species along with *Populus ciliata* and *Alnus nepalensis*.
- 2.1.6 The high altitude pastures, devoid of tree cover occupy the alpine and sub-alpine belt above tree line. These are covered with miscellaneous grasses and legumes. Due to heavy grazing, the platable grasses are being replaced by unpalatable varieties. Table 2.1 provides the range wise distribution of area under different species as complied from stock maps of the division.

Range	Wooded area					
	Deodar	Kail	Fir	Chir	Broad	Total
					leaved	
Batote	1331	2376	543	1429	811	6590
Gandhri	489	1351	360	2640	821	5661
Marmat	2412	3212	5033	113	1955	12726
Total	4233	6839	5936	4282	3587	24977
% of total	17%	28%	24%	17%	14%	

#### Table 2.1Range wise distribution of wooded areas under different species.

## 2.2 COMPOSITION AND CONDITION OF CROP

2.2.1 The total number of trees of principal conifers and broad leaved species in different diameter classes is summarized under table 2.4 and 2.5 gives the distribution of the volume of conifers over different dia-meter classes. On the whole there is a preponderance of middle aged and mature growing stock.

The diameter distribution forms a bow shaped curve rather than following an "inverse J" curve as can be seen in figure 2.1.

Table 2.2 below gives species wise percentage distribution of the total number of stems and total volume of conifers in Batote Forest Division.

Figure 2.1

## PERCENTAGE DISTRIBUTION OF STEMS IN BATOTE FOREST DIVISION: VERSUSACTUAL



Diameter Class (cm)	10-20	20- 30	30-40	40- 50	50- 60	60- 70	Above 70
Ideal Distribution (%age)	41	25	15	9	5	3	2
Actual Distribution (%age)	9.81	14.11	15.19	14.55	14.23	12.19	14.16

- Figure 2.2 Percentage distribution of stems over different diameter classes in Batote Forest Division compared with ideal distribution.
- Table 2.3Species wise distribution of trees and volume (cum) in percentage;

Species	Number of stems (%)	Volume(cum)
Deodar	25.00	18.63
Kail	40.02	53.98
Fir	24.69	21.85
Chir	09.64	05.54
Broad leaved	04.98	0

2.2.2 Chir Forest occupies the sub-tropical zone of this division in Batote and Gandhri Ranges. In most places, the canopy density of the Chir crop is below 0.5 and the crop is open. A perusal of table 2.2 indicates that there is preponderance of mature and over mature trees and the regeneration of Chir is conspicuous by its absence. Trees below 30 cm diameter constitute only 16.27 % of the total growing stock of Chir in terms of number of stems whereas ideally around 66% of the total number of stems in a felling series should be below 30 cm d.b.h. The lack of regeneration can be attributed primarily to heavy grazing by local and migratory livestock, frequent fires, and neglect of subsidiary silvicultural operations that assist the establishment of natural regeneration. To make the matter worse, these forests have been tapped indiscriminately over the past years with complete disregard to the Working plan prescriptions. Unscientific and heavy tapping coupled with frequent fires has rendered the trees very weak from the base. Such trees are susceptible to wind –throw which results in creation of large gaps in the canopy.

Specie w	ise uisti ibuti	on or stems										
Species	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-above	Total
Chir	0	400	940	1480	1450	1310	1200	560	150	10	0	7500
Deodar	460	1140	1550	1540	1650	1660	1190	650	310	200	50	10400
Fir	800	1110	1310	1180	940	740	830	550	500	420	250	8630
Kail	920	990	2060	2690	2580	2900	2690	1930	880	390	130	18160
BL	240	860	550	320	150	140	100	20	10	10	0	2400
Total	2420	4500	6410	7210	6770	6750	6010	3710	1850	1030	430	47090
Specie-wise tree count from Stem distribution per ha commercial area (mean value)												
Species	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-above	Total
Chir	0.00	13.16	36.84	53.87	49.55	44.69	33.10	13.19	4.69	0.91	0.00	250.00
Deodar	6.24	16.60	22.38	22.74	23.55	24.46	16.18	9.48	4.50	2.73	0.89	149.75
Fir	43.03	48.10	54.46	42.72	33.33	28.31	27.45	19.68	19.23	15.15	9.31	340.77
Kail	21.60	29.43	49.42	55.61	42.25	48.91	46.88	32.59	16.69	9.30	2.88	355.56
BL	7.03	18.03	9.70	5.69	2.20	1.81	1.57	0.25	0.13	0.13	0.00	46.54
Total	77.90	125.32	172.80	180.63	150.88	148.18	125.18	75.19	45.24	28.22	13.08	1142.62
Total tree	count over t	he entire cor	nmercial area									
Species	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-above	Total
Chir	0	19064.68	47884.62	70504.52	68083.81	60920.4	54590.95	25400.79	7248.36	550.33	0	354248.46
Deodar	40068.67	95549.28	131452.31	128568.45	135617.58	135376.53	91470.92	48837.99	24828.59	12730.56	3394.90	847895.78
Fir	90835.55	115889.97	136231.67	116386.94	90550.91	69676.02	74260.65	46587.04	44025.05	34359.27	22548.83	841351.90
Kail	80692.21	79333.68	159911.53	202010.66	200708.54	217613.69	190990.98	135348.47	62160.82	26443.15	8630.77	1363844.50
BL	20694.04	59196.47	38988.67	24012.80	12253.92	12013.98	8600.89	1348.33	921.12	921.12	0.00	178951.34
Total	232290.47	369034.08	514468.80	541483.37	507214.76	495600.62	419914.39	257522.62	139183.94	75004.43	34574.50	3586291.98
Species w	ise minimum	Stem-distril	bution over th	e entire comm	ercial area at	lower limit		1				
Species	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-above	Total
Chir	0.00	16387.43	40233.03	59849.98	58197.35	52116.13	47730.05	22488.76	6236.32	396.24	0.00	303635.29
Deodar	36241.96	86215.85	118341.36	115645.92	122210.90	121827.31	82882.85	43824.03	22415.82	11569.72	3032.91	764208.63
Fir	53715.14	76209.07	91655.94	82043.61	64003.65	47779.20	55719.02	34313.80	30728.34	24492.77	15762.98	576423.52
Kail	65244.19	64967.86	137487.71	175174.00	179523.67	192858.28	170403.89	120924.96	54506.99	22502.93	7287.66	1190882.14
BL	17267.87	49615.74	34273.85	21465.17	11058.05	10888.94	7733.26	1230.22	833.34	833.34	0.00	155199.78
Total	172469.16	293395.95	421991.89	454178.68	434993.62	425469.86	364469.07	222781.77	114720.81	59795.00	26083.55	2990349.36
Specieswi	se percentag	e of stem Dis	tribution over	the entire cor	nmercial area			1				
Species	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-above	Total
Chir	0.00	5.40	13.25	19.71	19.17	17.16	15.72	7.41	2.05	0.13	0.00	100
Deodar	4.74	11.28	15.49	15.13	15.99	15.94	10.85	5.73	2.93	1.51	0.40	100
Fir	9.32	13.22	15.90	14.23	11.10	8.29	9.67	5.95	5.33	4.25	2.73	100
Kail	5.48	5.46	11.55	14.71	15.07	16.19	14.31	10.15	4.58	1.89	0.61	100
BL	11.13	31.97	22.08	13.83	7.13	7.02	4.98	0.79	0.54	0.54	0.00	100
Total	5.77	9.81	14.11	15.19	14.55	14.23	12.19	7.45	3.84	2.00	0.87	100

## Table No: 2.4 Statement showing specie and dia-class (cm) wise tree count of entire commercial area of Batote Forest Division Specie wise distribution of stems

Species wise Distribution												
Species	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-above	Total
Chir	0.00	48.10	78.00	504.00	1005.70	1966.90	2548.80	1071.40	496.00	69.90	0.00	7788.80
Deodar	0.00	132.60	182.00	1056.40	1981.70	3192.00	3328.40	2326.70	1471.60	822.00	378.00	14871.40
Fir	0.00	70.20	79.30	512.40	889.20	1485.00	3185.00	3014.00	3154.00	2914.00	1630.40	16933.50
Kail	0.00	231.40	434.20	3009.60	5072.80	8626.00	11823.60	11094.20	6045.50	3622.60	1482.80	51442.70
Total	0.00	482.30	773.50	5082.40	8949.40	15269.90	20885.80	17506.30	11167.10	7428.50	3491.20	91036.40
Specie-w	Specie-wise vol count per hectare (mean value)											
Species	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-above	Total
Chir	0.00	1.63	4.09	22.77	47.03	85.45	93.39	40.87	22.27	6.35	0.00	323.85
Deodar	0.00	1.97	2.65	15.10	27.70	47.95	46.06	35.48	22.23	12.34	6.77	218.25
Fir	0.00	2.18	2.00	11.36	22.02	52.25	96.05	100.15	116.72	94.82	44.75	542.30
Kail	0.00	8.28	12.63	72.71	99.14	155.70	212.92	194.39	126.69	94.70	52.56	1029.72
Total	0.00	14.06	21.37	121.94	195.89	341.35	448.42	370.89	287.91	208.21	104.08	2114.12
Species v	vise Volum	e-distribution	over entire c	ommercial ar	ea							
Species	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-above	Total
Chir	0	2299.88	4159.69	24504.09	48931.68	93336.42	118355.8	50550.32	25029.34	3840.23	0	371007.45
Deodar	0	11750.92	16247.68	92028.29	170216.61	272120.91	270386.69	192595.19	129071.46	64622.25	25906.53	1244946.5
Fir	0	6948.19	7521.91	47876.32	80296.87	140854.65	286898.45	250908.77	279674.58	229254.65	131209.43	1461443.8
Kail	0	20133.63	34998.23	227550.18	377713.02	621194.86	797718.5	734747.57	421265.66	249638.87	123417.91	3608378.4
Total	0	41132.62	62927.51	391958.88	677158.18	1127506.8	1473359.4	1228801.9	855041.04	547356	280533.87	6685776.2
Species v	vise minimu	um available v	volume over e	entire commer	cial area of t	he working ci	rcles at Lowe	r limit				
Species	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-above	Total
Chir	0	1914.7	3298.21	19710.4	39131.09	75290.71	97213.35	41341.3	20100.84	2764.97	0	300765.57
Deodar	0	10758.29	14898.49	84362.53	156104.65	248508.92	247361.18	175491.35	118000.2	58738.85	23028.35	1137252.8
Fir	0	6109.6	6698.2	43016.5	71370.68	121741.35	250260.74	214326.23	238061.76	195186.21	114238.85	1261010.1
Kail	0	17300.1	30505.89	199921.42	336827.11	555440.77	710520.65	654070.82	371031.72	214109.11	104686.85	3194414.4
Total	0	36082.69	55400.79	347010.85	603433.53	1000981.8	1305355.9	1085229.7	747194.52	470799.14	241954.05	5893442.9
Speciesw	vise percent	age of volume	count Distri	<u>bution over er</u>	ntire comercia	al area						
Species	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-above	Total
Chir	0	0.64	1.10	6.55	13.01	25.03	32.32	13.75	6.68	0.92	0.00	100.00
Deodar	0	0.95	1.31	7.42	13.73	21.85	21.75	15.43	10.38	5.16	2.02	100.00
Fir	0	0.48	0.53	3.41	5.66	9.65	19.85	17.00	18.88	15.48	9.06	100.00
Kail	0	0.54	0.95	6.26	10.54	17.39	22.24	20.48	11.62	6.70	3.28	100.00
Total	0	0.61	0.94	5.89	10.24	16.98	22.15	18.41	12.68	7.99	4.11	100.00

## Table : 2.5 Total volume count of entire commercial area of Batote Forest Division

2.2.3 In comparison to Chir, the health of Deodar- Kail Forests of this Division, which constitute around 45% of the wooded area, is considerably better. The aberrations in diameter class distribution are not very pronounced with all the classes finding representation. Nevertheless, the representation of lower diameter classes' class falls short of the desired distribution. In terms of density, most of the crops compact with canopy density averaging around 0.5 to 0.75. However, around heavily populated areas, the crop is open and scattered. Because relatively of lower biotic pressure from grazing animals and lesser incidence of fire, the status of regeneration in these forest is better than that of Chir forests. One comes across patches of adequate and established regeneration frequently in these forests. However, because of non-removal of over wood and lack of thinning. The regeneration is stagnating at many places. In its natural zone Kail crop has come up very well in landslip areas on freshly exposed soil. In certain areas, the blanks in the forests have been rapidly invaded by weeds including a few varieties of ferns. In such cases heavy carpet of weeds results in mortality in seedlings. More than 84% of the Fir Forests of this Division confined to Marmat range and some of

them are excellent quality. In most cases, especially in Batote and Gandhri Ranges, the situation is far from satisfactory. The canopy density of Fir crop is very poor and diameter distribution is highly skewed in favour of mature and over mature trees. These trees are dying and decaying in considerable numbers. Since the regeneration is practically absent, large gaps have been created in the canopy.

2.2.4 There are many factors that have contributed to decline Fir Forests in this Division, the most important being excessive grazing. Over grazing, has not only destroyed the regeneration of Fir/Spruce but has also resulted in compaction of soil which makes a difficult for the regeneration to establish. Secondly, many gaps have been created in the canopy either as a result of removal of trees, or natural death and decay of over mature trees. These gaps have been invaded by a thick carpet of weeds, which further reduce the chances of survival of Fir/Spruce seedlings. Things are also made difficult by the fact that a good seed year in Fir comes after an interval of about ten years. Lower seed production coupled with mortality of seedlings provides a recipe for disaster so far as regeneration of Fir Forests in concerned. In many places it has been noticed that regeneration of Kail is gradually intruding into gaps created in the Fir Forests. At the same time, excellent regeneration of Fir and Spruce can be seen under the canopy of deodar-Kail Forests that occur immediately between Fir zones. It appears that Fir/Spruce cones that roll down or seeds that fall in deodar-kail forests, find conditions suitable for regeneration in some pocket of these forests and therefore, thrive in such localities.

2.2.5 Pure broad-leaved forests are restricted to a very small area in this division. Generally, broad leaved species found mixed with conifers. The broad-leaved species around habitation, especially oaks, suffer heavily on account of lopping for fuel and fodder. Fairly large sized mature trees of broad-leaved species are found only deep inside the forests. Excessive lopping results in attenuated crowns and lower seed production. As a result, the regeneration of broad-leaved species like oaks is highly inadequate. Seedlings of angiosperms are also more susceptible to grazing and browsing. However, good regeneration of several species like *Dalbergia sissoo, Alnus nepalensis and Populus ciliata* can be seen on freshly exposed sites along nallahs at many places.

## 2.3 General Description of the Growing Stock

For the purpose of general description, the forests of this division can be divided into the following zones:

- (i) Sub-tropical Zones.
- (ii) Temperate Zones.
- (iii) Alpine Zones

#### 2.3.1 Sub-tropical Zone

About 21% of the total area of the division falls under the zone of vegetation. A major portion of Gandhri range and a part of Batote Range are included in this zone. Chir is pre-domintae species of this zone. It occupies about 71% percent of the total area of this zone. All Chir Forests are confined to Gandhri and Batote Ranges and occupy the lower elevations along river Chenab and the adjacent valleys. The common tree associates of this species are Quercus leucotrichophora, Quercus ilex, Olea cuspidata, Pistacia integerrima, Lyonia ovalifolia, Pyrus pashia, Alnus nepalensis, Acacia modesta, Celtis australis, Rhus spp and Corylus colurna. Shrubs commonly found in this zone are Myrsine africana, Dabregeasia hypoleuca, Berberis spp, Nerium indicum, Plectranthus rogosus, Daphne cannabina, Zizyphus spp, Spiraea sorbifolia, Pirinsepia utilis, Rubus ellipticus, Woodfordia floribunda, Rosa moschata and Punica granatum. These shrubs constitutes the under growth in Chir Forests. The intensity of undergrowth in Chir Forests varies from light to heavy. The ground flora generally comprises Fragaria vesca, Viola canescens, Polygonum spp, Girardinia heterophylla, Ainsliaea aptra, Impatiens *qlandulifera* and a variety of grasess and ferns. The common climbers of this zone are Clematis spp, Jasminum humile, Vitis spp and Rosa moschata.

#### 2.3.2 Temperate Zone

About three fourth (3/4) area of this division falls under this zone of vegetation; Kail and Fir are the two predominant species of this zone occurring almost in equal proportion, followed by deodar, spruce and sprinkling of *Taxus baccata*. These species occur either in pure form or mixed with each other and broad leaved species. These species cover roughly 80% of the area of this zone.

The common broad-leaved trees associates of deodar, kail and Fir are *Aesculus indica*, *Alnus nepalensis*, *Ulmus wallichiana*, *Prunus padus*, *Quercus dilatata*, *Quercus semecarpifolia*, *Pyrus pashia*, *Corylus colurna*, *Toona ciliata*, *Toona serrata*, *Populus spp* etc. Broad leaved species cover about 12% of the total area of this zone.

The incidence of the under growth in these forests varies in intensity from scant to moderate and the commonly found species are Viburnum foetens, Viburnum nervosum, Skimmia laureola, Podophyllum hexandrum, Parrotia jacquemontiana, Desmodium spp, Sarcococca saligna, Indigofera pulchella, Prinsepia utilis, Rubus spp, Rosa spp, Berberis spp, Daphne cannabina, Acer pictum, Cotoneaster spp etc.

The herbaceous ground flora includes *Viola canescens, Fragaria vesca, Rumex hastatus, Anemone spp, Polygonum spp, Girardinia heterophylla, Impatiens glandulifera, Atropa belladonna, Podophyllum hexandrum* and a variety of miscellaneous grasses and ferns. *Oryzopsis acquqlimisi* a poisonous grass which favors coolers aspect under light shade is quite common in Deodar-Kail forests in this zone on the northern aspects.

#### 2.3.3 Alpine Zones

A small area about 13% of total area of this division comprises alpine and sub-alpine zone of vegetation. The high level pasture lands, bare rocky and stony hill tops constitutes this vegetational zone. It occupies the top portion of the Marmat range particularly Shivgarh Dhar and sub alpine areas of Batote and Gandhri Ranges. At altitude above 3000 mtrs, the Fir Forests are gradually replaced by the alpine brush wood of Junipers and occasionally Brich, high level *Rhododendron spp, Salix spp* and *Spiraea spp* are also found.

Finally, these trees species gave way to grassy expanses which are rich in a variety of medicinal plants. This provides excellent grazing ground for large number of cattles, sheep and goats during the summer months. The rocky and stony hilltops remain covered under the thick layer of snow for most part of the year. As a result, these are devoid of tree growth.

#### 2.4 General Description of the Forest Type

The Forest of this Division can be classified into the following Forest types in accordance with the 'Revised Survey of Forest Types of India' by Champion and Seth.

## 2.4.1 Sub type 9/C1b-Upper or Himalyan Chir Pine Forest

This forest covers about 15.03 percent of the total forest area of this Division. This subtype covers all the Chir bearing trees in Batote and Gandhri forest Ranges and consist of high forest of Chir pine with light canopy. Annual fires and excessive grazing prevent the development of the shrubs which could otherwise from the under growth. These factors are equally inimical for the development and establishment of Chir seedling. Over wood consists of pure crop of Chir pine. Towards the upper, limit it is mixed with Kail and deodar at places while on the lower limit it is mixed, but rarely, with broad leaved species mostly along Nallas/streams and depressions.

## **General Floristic:**

- a) Pinus roxburghii.
- **b)** Quercus leucotrichophora, Pyrush pashia, Acacia modesta, Olea cuspidata, Pistacia integerrima, Ficus roxyburgii.
- c) Woodfordia floribunda, Rubus ellipticus, Colebrookia oppositifolia, Berberis lyceum, Mysrine africana, Punica granatum, Zanthoxylum alatum, Rhus cotinus , Nerium indicum, Prinsepia utilis, Crataegus crenulata, Indigofera pulchella.
- **d)** Rumex hastatus, Taraxacum officinale, Myosotics mycrantha, Plectranthus rugosus, Artemisia vulgaris, Desmodium spp, Fragaria vesca.
- e) Cynondon dactylon and miscellaneous grasses.
- f) Rosa moschata, Vitis spp, Clematis spp, Jasminum humile.

## Eclogical Status:

The Chir pine forests have been accorded a status of climatic climax by Champion and Seth. Chir occupies a definite altitude zone between 1000 mtr and 1800 mtr on the southern exposures and rather lower limit on the northern aspects varying naturally with micro relief and should be accorded a ecological status of climatic climax in these area. It occurs on quartzes, and stone, conglomerates and schist and colonizes exposed slope in its natural zone.

## 2.4.2 Type 10/C1. - Sub-tropical Dry Evergreen Forests:

This type of forests occupies a very limited area in this Division and is confined to lower fringes up to 1050 mtrs elevation above mean sea level along river Chenab in Peerah, Maitra and Dharamkund area. The climate of the area is characterized by long hot and dry season and cold winter. This forest type constitutes scrub forest of small leaved evergreen tree and shrubs. It grows on alluvium, conglomerates, sedimentary rocks, shale and lime stone in places having shallow and dry soil. Actually, this forest type

overlaps with Chir pine. However, since the density of these species is higher in lower fringes, it deserves a separate mention.

This type is divided into two sub-types viz.

- (i) Sub-type 10/C1a- Olea Cuspidate Scrub Forest
- (ii) Sub-type 10/C1b- Acacia modesta scrub forest

Both these sub-types occur mixed over a small area. *Acacia modesta* scrub forest is rare, and a few patches are confined along Maitra- Dhramkund road mixed with *Olea cuspidate, Punica granatum., Pistacia integerrima* and Chir. Olea cuspidate scrub forests are encountered in Peeerah, Chanderkote and Maitra-Dharamkund belt in association with *Acacia modesta, Pistacia integerrima, Punica granatum, and Chir pine.* 

#### 2.4.3 Group 12- Himalayan Moist Temperate Forest

The most important coniferous forests of this Division fall under this group. Dominant species are very few in number and pure crops are more frequent than the mixed ones. The distribution of species is dependent mainly on altitude and aspect. There is a little admixture of broad leaved species. Coniferous tend to avoid hot southern exposures and have been replaced there by the broad leaved forests. The conifers generally comprises of quality with varying amount of under wood. The under growth generally comprises of deciduous shrubs. Its preponderance is determined mainly by the canopy density and intensity of grazing. Some ever green shrubs such as *Sarcococca salgina*, *Daphne cannabina and Viburnum* spp. are generally encountered. The climbers of temperate region such as *Rosa moschata*, *Clematis*, *Hedera helix and Vitis* are rare. A variety of ferns mosses and grasses grow frequently within this forest type. This group occupies a significant portion of the Division and lies between the Sub-tropical Pine forests and sub-alpine scrub varying with aspect and configuration. This group is further distinguished into the following types and sub-types.

#### 2.4.3.1 Type 12/C1- Lower Western Himalayan Temperate Forests.

This type is divided into following sub-types.

#### 2.4.3.2 Sub-type 12/C1a-Ban Oak Forests (Quercus Leucotrichophora)

This forest type is confined to a small area having clayey soil. The forests are open with trees having short bole and low branches. The stand is low and under growth is scant. It occupies the lowest portion of the temperate belt extending a long way down towards to sub-tropical zone in moist localities. These forests are heavily lopes for fuel and

fodder and it may lead to the final disappearance of this type over a large area in a due course of time.

This sub-type is encountered in compartments 10, 11, 56 and 57 of Marmat Range and Compartments 50b, 51a, 52b, 66 and 67 of Gandhri Range.

## **General Floristic**

- a) Quercus leucotrichophora, Pinus roxiburghii, Pinus wallichiana.
- **b)** *Rhus semialata , Pyrush pashia, Quercus ilex.*
- c) Berberies spp, Indigofera pulchella, Viburnum foetens, Lonicera quinquelocularis, Reinwarditia spp, Desmodiumspp, Rubus ellipticus, Myrsine africana, Plectranthus rugous.
- d) Vitis himalayana, Hedra helix, Rosa moschata.

## Ecological Status

Through the present distribution of the species has been considerably reduce by human influences, particularly clearing, grazing lopping and fire etc, yet it is considered a climatic climax.

## 2.4.3.3 Sub-type 12/C1b-Moru Oak Forests ( Quercus dilatata)

This type represents excellent moist temperate broad leaved forest over a small area in this Division. Found gregariously on northern slope sometimes mixed will *Aesculus spp*, *Acer spp*, *Pinus wallichiana and Abies pindrow*. *Quercus dilatata* the main species is more *mesophytic* and sticks to more suitable and mature soils as compared to *Quercus ilex*. This type is well developed on the northern aspects in Marmat and Batote Range above Ban Oak. Being mesophytic, it is displaced by Ban on dry ridges and hot southern aspects. Adapted to cool and moist localities, *Quercus dilatata* highly in demand for leaf fodder and the onslaught of lopping is quite apparent in forests habitation. However forest in the interiors are relatively unaffected.

## **General floristic**

- **a)** Quercus Dilatata, Quercus leucotrichophora Aesculus indica, Abies pidrow. Pinus Wallichiana, Acer spp., Picea smithana, Cedrus deodar
- **b)** Toona serrata, Pyrush pashia, Rhododendronn spp, Fraxinus floribunda, Taxus bacccata.
- c) Rosa macrophylla, Rubus spp, Viburnunm spp, Berberies aristata, Strobilanthes wallichii, Indigofera pulchella, Daphne cannabina, Sarcococca saligna, Desmodium spp, Skimmia laureola.

- d) Viola, fragaria, rumex spp and Ferns.
- e) Hedera helix,Vitis spp,Rosa moschata etc.

**Ecological status:** It is considered to be a climatic climax.

#### 2.4.3.4 Sub-type 12/C1 (a'b)/DS1- Oak Scrub

This sub type is found over areas adjoining or easily accessible to human settlement extending form Ban Oak to Moru Oak types. Intense lopping of fodder, combined with continues grazing and felling for fuels, are responsible for reducing Oaks and associated species to low stunted , unsound trees/scrubs which generally coppice. The common associates are bushes of barberries species, *Crataegus spp, Prinsepia utilis, Wikstroemia spp, and Indigofera spp.* This degradation stage is well represented in the proximity of large human settlement in temperate belt of Marmat, Batote and Gandhri Ranges.

#### 2.4.3.5 Sub-type 12/C1c – Moist Deodar Forests

*Cedrus deodara* is the typical specie of this type which occurs mainly as pure crop but some kail and a little fir and spruce is commonly present. This does not appear to have reached true climax as most of the deodar forests have been considerably influenced directly or indirectly by biotic interference. The canopy is complete and dense in young crops. There is, at places, sprinkling of Oaks under the conifers with scrubs growth in varying amounts depending upon the intensity of the grazing. Deodar forests occurs in the altitude zone of 1800-2500 mtrs which , at places, has descended to lower level on the cool northern aspect and ascended up to 3000 mtrs on the hot southern aspects. Thereafter it is replaced by kail and fir tis type avoids heavy and badly drained soils. Fires rarely damage these forests accept natural regeneration. This sub-type is mainly represented in preponderance in Marmat and Batote Ranges and Constitutes all valuable deodar forests which have been brought under conversion to uniform it occurs on all geological formations over well drained soil. Naturally regeneration of deodar and kail, is satisfactory except on badly drained soil and extremely steep slopes.

## **General floristic**

- a) Cedrus deodara, Abies pindrow, Pinus wallichiana, Acer spp., Picea smithana,
- **b)** Quercus dilatata, Quercus leucotrichophora Aesculus indica, Quercus ilex, Rhus succedanea, Toona serrata, Prunus pardus, Rhododendron arboretum, Alnus nepalensis, Corylus colurna.

The under story is generally absent from the area havine dense deodar crop.

- c) Parrotia jacquemontiana, Viburnunm spp, Indigofera spp, Desmodium spp, Sarcococca saligna, Deutzia spp, berberies spp, Wikstroemia canescens, Buddleja paniculata, Prinsepia utilis.
- d) Viola, Fragaria, rumex, gallium.
- e) Smilax, clematics Montana, Hedera helix, Rosa moscchata, Vitis himalayana are rare but important climmers of these forests.

The important fungi are *Fomes pinii* and *Arceuthobium minutissimum* (attack kail on large scale in this sub-type.)

## **Ecological status:**

This sub-type, dominated by deodar practically in the form of a pure crop, has the status of secondary sepal stage. It may be accorded a climax status over an area where it is found as pure crop.

#### 2.4.3.6 Sub-type 12/C1d-Western Mixed Coniferous Forests

This sub-type comprises varying mixture of coniferous species like deodar, kail, spruce along with evergreen and deciduous broad leaved trees in patches. This type is found throughout the division, occupying mostly northern slopes from 2275 mtrs to 2875 mtrs and even ascending above this limit on warmer aspects. It occurs mainly above Deodar forests at an altitude of 2400 mtrs to more than 3000 mtrs. Pure blue pine crop is found both in it and above and below with varying mixture of broad-leaved species. This type occurs on all types of rocks and typical temperate soil of coniferous forests. It is interspersed, at places with open grazing grounds and their presence exerts a far reaching influence on the ground vegetation and regeneration of tree species mainly Fir and Spruce.

## General floristic:

The top canopy consists of Kail, Deodar, spruce, and Fir inter-mixed with broad leaved species in varying proportion varying with aspects and altitude. The broad leaved associates and Oaks are subordinates to coniferous species.

- a) Cedrus deodara, Abies pindrow, Pinus wallichiana, Acer spp., Picea smithana
- b) Quercus dilatata, Quercus leucotrichophora Aesculus indica, , Prunus pardus, Alnus nepalensis, Quercus semecarpifolia, Acer acuminatum, Acer caesium, Acer pictum, Taxus baccata, Betula utilis, Ulmus wallichiana, Juglans regia Populus cliata, Fraxinus floribunda, Corylus clourna, Salix spp.
- **c)** Viburnunm nervosum, Viburnunm foetens, Skimmia spp, Indigofera spp, Desmodium spp,

- **d)** Fragaria vesca, Viola canescans, Valeriana wallichii, Oxalis spp, Galium spp, Polygonum spp variety of mosses, ferns and grasses.
- e) Vitis himalayana , Clematis spp, Hedera helix, Schizandra spp.

This sub-type is known for its association with abundant medicinal flora and includes all workable Fir and Deodar-Kail forests of this Division. The growing stock is characterized by higher proportion of mature and our mature trees and deficiency in younger age classes in case of Fir and Spruce owing to excessive biotic interference. The fact of grazing and human pressure is pronounced around summer grazing rounds and area in proximity of huge human settlements. Kail contributes in colonizing bare hotter gaps whereas Deodar comes to occupy very steep and broken grounds.

#### **Ecological Status**

This sub-type appears to be climatic climax though probably with a much higher proportion of broad leaved trees than most of its now carries.

#### 2.4.3.7 Sub-type 12/C1e-Moist Temperate Deciduous Forests

This sub-type of forests of deciduous high forests, mostly occurring mixed, single or in groups of varying extent with moderate to scant under growth. This sub-type is met occasionally over a small area between 180-2700 mtrs with 12/C1c and 12/C1d type seen in the Division along suitable sites throughout the moist localities, shady depressions along Nallas and stream banks. It comprises of broad leaved trees like *Alnus nepalensis, Aesculus indica, Juglans regia, Acer spp, Prunus pardus, Corylus colurna, Celtis australis, Populus ciliata, Almus wallichiana, Rhus spp, Salix spp, Betula utilis, Quercus semecarpifolia.* Under growth is represented by *Viburnum foetens, Rubus spp, Berberies spp, Spiraea sorbifolia, Cotoneaster spp, Jaminum humile, Sarcococca saligna.* Ground flora includes *Impatiens spp, variety of ferns and grasses. Climbers commonly met with are Hedera helix, and species of Vitis spp, Clematis spp and Rubus spp.* 

## Ecological status

This type seems to be in a state of stable edathic climax and occurs only in shady moist localities. The regeneration of constituent species is often difficult. It is subject to heavy loping, griddling, and felling for fodder/firewood and small timber when it occurs in the proximity of the human settlements.

#### 2.4.3.8 Sub-type 12/C1f-Low level blue Pine Forests 9 Pinus wallichiana

Extensive and more or less pure Kail forests occurring in the Ban Oak, Moru Oak and mixed coniferous zones constitutes this sub-type. It is believed that these forests are

secondary to the destruction of the pre-existing forest of the various types from natural or biotic cause. *Pinus wallichiana* is universal colonizer of vacant site. Therefore, this sub-type is considered as other primary or secondary seral type. The top canopy consists of *Pinus wallichiana* with occasional *Picea smithiana*, *Abies pindrow* and *Cedrus deodara*. The middle story is practically absent through occasionally some broad leaves, species like, *Quercus leucotrichophora*, *Quercus dilatata*, *Acer spp. Prunus spp* are present. The undergrowth and ground flora are scanty.

## **Ecological Status**

The pure crop of Kail is secondary seral formation which has come up after destruction of original vegetation as a result of its colonizing habitants regular seeding.

## 2.4.3.9 Sub-type 12/C1/DS2-Himalayan Temperate Secondary scrub

This sub-type occur along the sites of a abandoned cultivation, on burnt areas especially on southern slopes, excessively grazed and loped sites near villages, and other similar sites consisting of an irregular, but often dense, and extensive scrub cover with a few pre-dominant species.

## **General floristic**

- a) Quercus leucotrichophora , Pinus wallichiana, Cedrus deodara
- **b)** Plectranthius rugosus, Berberies spp, Crataegus crenulata, Indigofera pulchella and Pyrus Pashia etc.

## 2.4.3.10 12/C2a Kharsu Oak Forests (Quercus semecarpifolia)

This sub-type consists of *Quercus semecarpifolia* forests occurring in typically gregarious nature and forming pure crops in its optimum zone. But it is frequently mixed with *Abies pindrow, Picea smithiana and Quercus dilatata*. At the top of the altitudinal range, it merges into the sub-alpine zone above. It also forms, at places, and under story with Fir and replaces it where biotic interference is excluded. This sub-type occur between 2500 mtrs to 3300 mtrs on northern/southern aspect and scarp slopes. It is met over small area mostly in Marmat Range.

The top canopy consist *Quercus semecarpifolia*. The second story is mostly absent. The ground cover mostly consist deciduous shrubs with varying amount of grasses ferns and herbaceous growth.

## **General floristic**

- a) Quercus semecarpifolia, Quercus dilatata, Acer spp, Abies pindrow, Betula alnodes.
- **b)** *Rhododandron arboretum, Betula utilis.*

- c) Rosa macrophylla, Viburnum foetens, Cotoneaster acuminate, Salix elegans.
- d) Medicinal herbs and miscellaneous grasses.
- e) Clematis montana, Vitis himalayana.

#### **Ecological Status**

It is regarded to be in stabled climatic climax in localities favourable to Oaks.

#### 2.4.3.11 Sub-type 12/C2b- West Himalayan upper Oak- Fir Forests

This sub-type occurs between 2600 mtrs and tree line where it disappears into pure Oak forests or merges into alpine/sub-alpine vegetation. The characteristic species of this type or *Quercus semecarpifolia, Abies pindrow* with sprinklings of Spruce here and there. It lies above the mixed coniferous forests. It is typically two storied high forest with Fir standing singly or in groups over the Oaks and other broad leaved trees. Thus the top canopy consists of *Abies pindrow with occasional Picea smithiana. The* middle story consist of *Quercus semecarpifolia, Quercus dilatata Rhododandron spp , Acer spp and Betula spp* with shrubs like *Sarcococca saligna, Indigofera spp, Cotoneaster pruniformis, Wikstroemia spp* and below them ground flora consists of species of *Rumex spp, Polygonum spp, Valeriana spp, Fragaria galium and Voila spp.* This type has not been considered as commercial forest. It is present in some of the interior compartments of Marmat range. This type is a transitional stage between pure Fir and pure Kharsu Oak type.

## **Ecological Status**

This type is considered as climatic climax.

#### 2.4.3.12 Sub type 12/DS3- Himalayan Temperate Pastures

This sub-type consist of the area where grazing has taken place in the temperate forests. Favourable sites on ridges and gentle slopes near moist localities have gradually been cleared, passing through the park land stage and to open grass land. This type includes blanks, commonly known as 'Behak' or 'Dhar' conspicuously devoid of tree growth. The ground is completely covered with grasses and herbaceous flora. These partial lands are mostly near the water sources. This type is heavily grazed behind its carrying capacity during the summer months. It supports a variety of plate able and non-plate able grasses. This sub-type is in all the three Ranges above the conifer limit.

#### 2.4.3.13 Sub-type 12/1S1 Alder Forests

This sub-type is confined, nearly in pure form, to the stream sites, exposed unstable hill sides and on land slip areas. This type is limited to sites with permanent water supply and extends over a wide altitudinal range from sub-tropical belt to temperate region.

#### **General floristic**

- a) Almus nepalensis, Populus ciliate, Ulmus wallichiana, Celtis australis.
- **b)** Sarcococca saligna, Spiraea, Crataegus crenulata.
- c) Plectranthus spp, Berberies spp, Prinsepia utilis.

Ground flora is represented by a variety of ferns and local; grasses.

These forests have, now assumed commercial importance and are in great demand for pencil factories. These forests meet the local demand for fuel, fodder and small timber. This sub-type is represented along perennial stream all over the Division.

#### 2.4.3.14 Sub-type 12/2S1 Low-level Blue Pine Forest

This sub-type consists of typically even-aged, pure, strongly predominating blue pine. At places, Deodar is also found inter-mixed where a seed source is present. It consists of dense forests, unless thinned out, with little under growth.

This sub-type occurs on sites which are usually at the lower edge of the forests on moderate slopes adjoining village cultivation. At places, traces of rough terracing indicate that the land has been cleared and at least partially cultivated in the past. This sub-type has come up on the sites which had been destroyed by fire, grazing, lopping and firewood collection. Most of the blue pine in this sub-type undoubtedly owes it origin to the introduction of forest conservancy and protection in this Division. A typical example of this sub-type is Co.11/Batote.

## **General floristic**

- a) Pinus wallichiana.
- **b)** *Quercus dilatata, Quercus leucotrichophora.*
- c) Viburnum spp, Sarcococca saligna, Wikstroemia spp, Myrsine africana.
- d) Fragaria spp, Viola spp, Adiantum spp.
- e) Rosa moschata.

#### 2.4.4 Sub-type 14/C1a West Himalayana Sub-alpine Birch/Fir Forests

This type forms the last limit of trees below the alpine scrub. It includes irregular forest consisting largely of Fir/Betula and rhododendron in a varying Proportion. In moist localities *Quercus semecarpifolia* also extends into this sub-type. Conifers mostly tend to occupy ridges and slopes where snow slides are less frequent. Found in the remote interior of Marmat Range only.

## General floristic

- a) Abies pindrow, Pinus wallichiana, Picea smithiana.
- **b)** *Rhododendron spp, Taxus baccata, Prunus spp.*
- c) Strobilanthes spp, Smilax spp, Viburnum foetens, Deutzia spp, Berberies spp.
- d) Anemone spp, Geranium spp.
- e) Clematis montana and Vitis spp.

#### 2.4.5 Sub-type 15/C1b Birch\_Rhododendron Scrub Forests

This sub-type is restricts to the upper most areas of the alpine catchment consisting of betuala as predominate species, along with *Rhododendron campanulatum* and *Berberies spp*. This type is heavily grazed. Brich may form a pure stand above the Fir forests.

## **General floristic**

Betula utilis, Rhododandron campanulatum, Quercus semecarpifolia, Viburnum nervosum, Berberies species, Cotoneaster spp., Primula spp, Spiraea spp, Clematis spp.

#### 2.4.6 Sub-type 15/C3 Alpine Pasture

There are continuous with those lower down and differ only in having shorter snow free period and in floristic detail. The meadows are comprised mostly of perennial mesophytic herbs with a little grass. Conspicuous among the herbs or Primula, anemone, Iris, Gentiana with many Rananculaceae, Cruciferea, Compositae and Cryophyllaceae members.

This type is well developed on the upper reaches of Marmat Ranges. These pastures are over grazed by buffaloes, sheep and cattle during summers.

## 2.5 Injuries to Which the Crop is liable

Various agents causing injuries to the forest crops of the division, directly or indirectly, are enlisted below-

- **a)** Human being and Livestock
- b) Fires
- c) Wild animals
- **d)** Insects, fungi and parasites.
- e) Physical causes.

#### 2.5.1 Human beings and Livestock

The greatest threat that the forests of this division faces comes directly or indirectly from human beings and domestic animals. The damage caused by over grazing , grass cutting, lopping, girdling, torchwood extraction, illicit felling, stump extraction, encroachments and intentional fires is assuming alarming proportions and is threatening the very existence of the forests in the area.

#### 2.5.1.1 Grazing

There has been a steep increase in the population of livestock over the years. The number of animals grazing per hectare has increased manifold and is far in excess of the carrying capacity of these forests. Furthermore, grazing is practiced in an unscientific and unrestricted manner. In addition to the livestock of local farmers, the forests and grass lands of this division are burdened by the animals of migratory graziers also. Overgrazing effects the forests in primarily three ways. Firstly, the young generation of tree species gets destroyed. Secondly, due to trampling, the soil gets compacted and makes it extremely difficult for the seedlings to establish after seed germination. Compacted soil also results in excessive run off, which in turn causes soil erosion and has adverse affect on the hydrological regime of the locality. Uncontrolled, continues grazing of grass lands also results in disappearance of palatable grasses which gradually get replaces by coarse, unpalatable species.

The most serious damage due to grazing is witnessed in the Chir and Fir forests of this Division. In these areas, regeneration is practically absent. With older trees dying due to various reasons, and no regeneration coming up, considerable gaps have been created in this canopy. The problem is more acute near villages and camps of migratory graziers. Once the trees in these forests past their physical rotation, degradation is going to set in rapidly. A serious rethink is required on grazing policy if these forests have to be saved from destruction.

#### 2.5.1.2 Grass Cutting

Grass cutting, if properly done, actually reduced the chances of fire thereby helping the establishment of regeneration. Unfortunately, villagers who maintain the grass reserves, locally known as kaps do cut and remove the coniferous recruits and seedlings indiscriminately along with the grass. They also girdle/fell the trees from kaps in a bid to expand the area of kaps. As a result of this practice the area continues as permanent blank and it is a common feature all over the diversion.

#### 2.5.1.3 Lopping

Lopping of broad leaves tree species, especially Oaks, Aesculus, Acer, Ulmus, Celtis and Juglans is very common in this division and is carried out on a large scale by the villagers for stall feeding their cattle during the winter months. Migratory graziers also lop the trees of Fir and *Taxus baccata* in the absence of adequate availability of fodder leaves from broad leaved trees and grasses. Lopping of conifers for firewood has become very common in the vicinity of towns and large sized villages. The forests that have suffered the brunt of lopping present a very shabby and sticky appearance. Heavy lopping of Oak and Olea at many places has rendered these species as scrubs. Lopping results in attenuated crowns, thereby severely reducing photosynthetic activity, rate of increment and seed production. It also renders the trees more susceptible to insect and fungal attacks. Consequently, the health of forest and its regenerative capacity is adversely affected.

#### 2.5.1.4 Torch wood Extraction

It is done by villagers more often from the standing trees of both chir and Kail. Sometimes, it leads to girdling of the trees. In general, the trees get weakened at base and become vulnerable to wind throw and snow break. Torch wood extraction also exposes the tree to fungal infection and insect attack. This practice is frequent in remote areas of this division, where it has actually to be extracted from the old marked stumps.

#### 2.5.1.5 Encroachment

The tremendous increase in human population and the number of households has heightened the demand of land for agriculture and settlement. Encroachments are a consequence of this increased land hunger. Villagers often girdle, scoop and fell the trees around their proprietary land/chaks with the objective of expanding their land holding. Without exception, around all chaks, one comes across numerous trees on the peripheries that have been killed by girdling. This insidious expansion of chaks has resulted in honeycombing of forests and degradation of forests adjacent to chaks. Also, since the cultivation is carried out on the sly, normal agricultural practices like terracing are not adopted and cultivation is carried out on steep slopes. This in turn results in severe soil erosion and further degradation of forests. Unfortunately, this process goes on unnoticed and unrecorded.

Range	Area(ha)under Encroachment
Batote	254.225
Gandhri	132.65
Marmat	24.59
Total	411.469

Table2.6 Statement of recorded encroachments in Batote Forest Division

A perusal of Table 2.6 shows that only 411.65 hectares of forest land is under encroachment, whereas the fact of the matter is that the actual encroachment figure is far in excess of the reported figure. At this point in time, it is very important that reforms are carried out with regard to the ownership status of forests which should actually vest in the forest department. Also, the necessary formalities regarding mutation of forest lands have to be taken up on priority. The present procedure of maintaining the demarcation record needs to be replaced by a more scientific method which incorporates the exact location of the boundary pillars with respect to each other and also with respect to fixed bench marks giving distances and bearings.

Digitalization of demarcation record has also been envisaged in the new J&K State Forest Policy 2011 be considered on priority.

#### 2.5.1.6 Illicit Felling

As a result of the increase in human population, there has been a tremendous increase in the demand for timber. At the same time, felling of green trees was banned in the year 1990 vide Government Order No. 24-FST of 1990 dated 15-01-1990, Consequently, the volume of timber extracted from forests fell sharply. This has created a large gap between the demand and supply of timber. This demand is therefore, very often, met through timber illicitly extracted from the forests by the locals Table 2.7 below shows Range-wise number of cases registered for breach of Jammu and Kashmir Forest Act.

Year	Batote	Gandhri	Marmat	S.C Range	Total
2000-01	27	0	17	1	45
2001-02	06	0	03	0	09
2002-03	03	0	00	0	03
2003-04	04	0	1	0	05
2004-05	07	2	9	0	18
2005-06	07	0	9	0	16
2006-07	03	0	17	0	20
2007-08	06	2	3	0	11
2008-09	05	1	13	0	19
2009-10	06	0	21	0	27
2010-11	08	8	30	0	46
2011-12	13	1	21	0	35
2012-13	10	2	29	0	41
2013-14	8	4	20	0	32
2014-15	5	7	22	0	34
2015-16	8	3	23	0	34
Total	126	30	238	1	395

Table 2.7Statement showing Range wise number of cases registered for breach<br/>of the J&K Forest Act during the previous working plan period.

The figures above are a small fraction of actual incidence of illicit damage. Many such cases go unnoticed and unregistered for want of strict vigil over the vast area under the field staff. The fact that the National Highway passes throughout the length of the Division makes it more susceptible to illicit removal of timber

#### 2.5.1.7 Deodar Stump Extraction

The removal of Deodar stumps for extraction of Deodar Wood Oil was started in the year 1993. In Batote Range, the extraction of Deodar stumps was concentrated mainly in Shivgarh block. In the period of previous plan about 4087 quintal Deodar stumps have been extracted in the shape of chips. The detail of quantity extracted compartment wise is as tabulated under Table 2.8.

Range	Year	Qty	Co.	Range	Qty	Со	Total
		(Qtls)			(Qtls)		(Qtls)
Batote	2000-01	1798	2,3,4	Marmat	350	12/M	2148
			/Btt				
	2001-02	276.50	-do-		1663	12/M	1939.50
	2002-03 to			·	Nil		
	2006-07						
	2007-08	0	0	Marmat	669.50	15/M	50
	2008-09 to			·	Nil		
	2013-14						
	2014-15			Marmat	68 Qnt/		68 Qnt/
					2 Barl		2 Barl
	2015-16			Marmat	6200 ltrs		6200
							ltrs

Table 2.8Statement showing Range wise extraction of Deodar stumps in Batote<br/>Forest Division.

The practice of extracting Deodar stumps has caused considerable damage to the forests in these areas. The pits excavated for extraction of Deodar stumps serve as starting points for gully erosion and when the stumps were rolled down along the slope they destroy all the re-generation coming in the way. Apart from that, extraction of stumps robs the forest of the organic matter which would otherwise have been released into the soil through decomposition of stumps. At the same time, the removal of "Deodar stumps also removes any evidence of illicit damage. In areas around Batote and Patnitop, where the pressure on forest is very high, the practice of Deodar stumps extraction should be stopped. From aesthetic stand point too, the exposed pits and roots present and ugly sight in areas like Patnitop where the tourists influx is high. This is a cause of serious concern. *However, with the adaptation of new method viz. extraction of Deodar stumps by chips retaining the tree number and hammer used intact and following of guidelines in this behalf, will go a long way in protecting the forests from above damages.* 

#### 2.5.1.8 Resin Tapping

Chir forests of Batote forest Division have suffered heavily on account of uncontrolled and heavy resin tapping. Irregularities of serious nature in respect of resin tapping were noticed all over the Chir forests in this Division. During certain years, resin tapping has been more than two times in excess of the prescribed yield. From the year 1985-86 to 2003-04, more than double the amount of resin tapping prescribed was carried out. The prescribed norms in respect of depth, width, number of channels and spacing have rarely been followed.

The Resin extraction stands stopped since 2003-04 owing to the bad condition of the crop in the forests. The tapping should not be started again in the immediate future as the condition of the crop hasn't improved much. In the year 2015 a survey of the Chir crop was carried out by the staff of the Batote Forest Division which didn't gave a satisfactory picture of starting of tapping of Chir crop again as the Chir trees which were available for tapping as per the enumeration were sparcely distributed and deep inside the forests making the tapping economically unfeasible. The tapping can be started again only after a thorough enumeration (done by a team of officials headed by a official not below the rank of a Range officer besides 25% checking by the concerned DFO) of the Chir trees is done and DFO is satisfied that the old Chir trees have healed up completely and the tapping of new trees is not going to affect the crop. Further ecology of the Gandhri range where Chir crop is present is very fragile besides a number of developmental activities (FCA cases) are going on in the range and all these factors need to be careful considered before taking any decision on starting the Resin-tapping again.

#### 2.5.2 Fires

Chir forests suffer heavily on account of fires every year. Chir needless, which accumulate in large quantities are highly inflammable and are responsible for frequent fires during summer and autumn. Dry needless are also responsible for fires in Kail forests. Fire not only damages regeneration but also damages, very severely, the Chir crop under resin tapping. In most cases, the villagers and migratory graziers are responsible for setting the forest floor on fire in order to get a fresh flush of grasses. In addition, frequent fires lower the soil fertility and accelerate the process of soil erosion. Table 2.9 shows the range wise areas burnt annually from 2001-02 to 2010-16.

Year	No of cases registered/Area burnt annually ( hectares)								
	Batote	Gandhri	Marmat	SC	Total				
2000-01	13/14.00	12/22.00	4/1.32	0	29/37.32				
2001-02	4/3.40	02/12.00	1/0.20	0	07/15.60				
2002-03	25/22.00	18/20.40	06/4.50	0	49/46.90				
2003-04	2/0.80	01/0.40	0	0	03/1.20				
2004-05	8/7.80	4/05.00	0	0	12/12.80				
2005-06	14/10.00	17/20.00	0	0	31/30.00				
2006-07	4/3.00	02/1.30	0	0	06/4.30				
2007-08	31/41.00	19/21.50	11/6.55	0	61/69.05				
2008-09	6/3.00	01/0.80	04/1.00	0	11/4.80				
2009-10	32/40.00	25/20.00	06/7.40	0	63/67.40				
2010-11	1/ 2.40	0	0	0	.1/2.40				
2011-12	4/2.40	2/1.80	4/2.00	0	10/8.80				
2012-13	8/23.84	6/6.40	3/0.10	0	17/29.50				
2013-14	4/10.72	2/1.40	4/2.40	0	10/23.50				
2014-15	21/33.28	11/6.40	18/1.60	0	50/52.70				
2015-16	0	2/1.00	1/ 2.65	0	3/3.65				
Total	181/217.64	120/140.40	62/29.72	0	363/387.76				

# Table 2.9Statement showing Range wise Fire Cases registered along with area<br/>burnt in Batote Forest Division.

## 2.5.3 Wild Animals

Injuries caused to the forests by wild animals are negligible as compared to the damage done by man and his animals. The extent of such injuries has gone down further because of a decrease in the population of wild animals. Black bears, rarely found in a few pockets, debark the young deodar and Kail trees which subsequently dry up. Such damage is negligible at present in these forests. It has only been noted in the remote pockets of Marmat and Gandhri ranges. Monkeys and langurs eat up Chir and Kail seeds and sometimes damage young seedling of conifers in the nurseries and young plantations. Porcupines dig up the roots and eat away the seedlings of Chir. Further Porcupine attack on polybagged plants planted in closures is very prominent in Chir zones of this division especially Gandhri range. Porcupines usually dig out the earth and remove the seedling and eat its root cap along with its bark thereby making the seedling dead.

#### 2.5.4 Insects Fungi and Parasites

The most injurious fungus in *Fomes pinii*, which attacks Kail, especially the wounded and lightening struck ones, and causes pith rot. The attack is severe in moist localities. The incidence of ring disease has been observed at a few places on Fir trees in Batote and Gandhri ranges. Kail is generally attacked by an angiospermic parasite (*Arceuthobium minutissimum*) which enters the host through some injured part. Its attack is visible after the appearance of witches broom formation. Generally, healthy standing trees are not attacked by the insects and only damaged and fallen trees are susceptible to insect attack.

## 2.5.5 Climate

Strong winds uproot the over mature, rot stricken and base scooped trees especially of Chir which is heavily tapped in the past. Snow breaks the tops of saplings and poles of Kail and Deodar and sometimes causes full-grown trees to topple over. Basal bends due to the rolling of snow are quite common in steeply sloped area that receives snowfall. Forest damage due to snow is occasional, depending upon the intensity of snowfall. Drought retards the growth of the trees, especially young generation and damages the seedlings and saplings. Its effects are quite visible in chir crop on the hotter aspect. The drought-affected trees are less resistant to fires. Heavy downpours lead to landslides and erosion of soil and cause uprooting of trees. Lightening does, but negligible, damage to forest trees. Every year a few trees are struck by lightning. Such trees dry out eventually. Landslides are quite common in the low lying area, especially Chir belt, because of weak and young geological formations. Some of the compartments have been badly hit by landslides. Avalanches are very rare except for stray cases in Marmat range. Further the global warming has had its impact in this division also as the precipitation has become very unpredictable and intense thereby causing landslides in the forests which in-turn cause huge damage to the forest crop and soil as well. Along with precipitation every year long periods of droughts are observed which cause severe forest fires.

#### PART-B

#### **FOREST FAUNA**

#### 2.6 GENERAL DESCRIPTION

2.6.1 A variety of fauna is found in this division because of varied climatic conditions and altitudinal zonation prevailing in the tract. The ever-increasing pressure of human population is responsible for sharp decline of faunal population in this region, as elsewhere in the state. The worst suffers are mainly game animals and birds. Excessive interference by the grazires, and their large herds of grazing animals, has resulted in the decline of certain species of wild animals like wild goats, must deer, brown bear and snow leopard. Apart from large scale killing of game animals and birds by humans, deforestation and consequent habitat reduction is also responsible for sharp reduction in their number. With the coming of the mobile towers in the region, local sparrows have also been disappeared. Also disposal of municipal/medical wastes in the open alongside roads in the entire state has also affected the faunal population as animals/birds feed on these wastes as is clear from a recent study wherein a drug diclofenac which was being fed to cattles has affected the breeding in Vultures thereby reducing their population to a considerable level. The open disposal of municipal/medical wastes is seen in this Division also thereby affecting the farmal population as can be seen at Km-9 on Batote- Doda road.

#### 2.7 Mammals

## 2.7.1 Carnivora

(i) THE LEOPARD OR PANTHER (Panthera pardus). It is commonly known as "Chitra" by the locals. Though its range of occurrence covers almost entire tract of this division, yet is only confine to a small portion of sub-alpine belt mostly close to villages. Sometimes it kills domestic animals, with the result that locals hunt this animal largely for protecting their livestock. Its number is on sharp decline. It has been declared as special game under the Jammu and Kashmir Wild Life Protection Act 1978. The man-animal conflict involving Leopard has been on the rise in the recent past in the division also wherein cases of attack on humans have also been reported in Marmat and Batote ranges. This has been mainly due to interference in the habitat of leopards by the humans as hunting of small wild animals in the forests and thus it comes towards the human habitation to find its prey. Uncontrolled nomadic movement inside forests alongwith trained dogs make this animal to leave forests and enter human habitations.
- (ii) THE LEOPARD CAT (Felis bengalensis) This beautiful forest cat is now almost extinct in this tract because of its wanton killing for its attractive skin. It is almost the size of domestic cat accepts its legs are larger than the latter. It is nocturnal in habit, rarely seen during daytime. Its colour and marking pattern are almost similar to those of panthers and thus it looks like a miniature panther. It prays upon small animals and birds. It has since been included in Schedule I of the J&K Wild Life Protection Act 1978 and its killing is totally prohibited in the state.
- (iii) **THE JUNGLE CAT (Felis chaus )** A small number is found in lower scrub forests of this division. It preys upon small animals and birds. This cat has long legs comparatively short tail, and distinctive pale green eyes exhibiting a cruel expression.
- (iv) THE SMALL INDIAN MONGOOSE (Herpestes auropunctatus) Its small size, shorter tail, olive brown gold-flecked, soft silky fur are distinctive. This animal lives in holes it burrows by itself. It is mostly found in low lying areas of this Division and around cultivated fields. It feeds pn rates, mice, snakes, scorpions,,centipedes,wasps and expression.
- (v) THE JACKAL (*Cains aureseus*) This animal is commonly found in the division up to elevation of 1500 meters above mean sea level, mostly around towns, villages and cultivation areas, sheltering in holes in the ground, dense grass and scrub. It is nocturnal in habit. It sometimes attacks small domestic animals like goat, sheep, and their young ones and birds. It is one of the most common scavengers in nature. This animal has been declared as vermin as per J&K Wild Life Protection Act 1978.
- (vi) THE RED FOX (Vulpes vulpes) It is mostly found in the upper sub-temperate and temperate zone of the tract. It is generally red in colour. It has been included in Schedule IV of the J&K Wild Life Protection Act 1978.
- (vii) THE INDIAN FOX (Vulpes bengalensis ) This fox is frequently found in the subtropical zone of the division. It lives in burrows dug by itself in open grounds or in the scrub. It feeds on small mammals, reptiles and insects. It has been declared a vermin as per the J&K Wild Life Protection Act, 1978.
- (viii) BROWN BEAR (*Ursus arctos*) It is commonly known as "Lal Bhalu "because of reddish brown colour of its coat. It is heavier in built than block bear. Open peaks high above the tree line an its usual hunts. Only interior areas of Marmat Range of this division are believed to have few number of this bear. It is 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 the Schedule II of the J&K Wild Life Protection Act, 1978.

- (ix) THE HAMALAYAN BLACK BEAR (Selenarctos thibetanus) A few decades ago this bear was quite common in this tract but now its number is on sharp decline because of its wanton killing by poachers. It is now found in the interior, steep forest areas of Gandhri and Marmat Ranges. Hardly a few numbers are believed to be surviving. It is black in colour with characteristic 'V' shaped breast mark which may be white, yellow or buff. In summer it is found near the tree line ( 3000 to 3500 meters), whereas it descends to low lying areas during the winter months. It lives in a variety of wild fruits berries, insects, termites and larvae. It raids the maize fields and sometimes causes heavy damage to the crop. It is more carnivorous in food habits than other bears and kills sheep, goats and even larger domestic animals. Many a times, even human beings are mauled/killed by this animal. It is included in schedule III of the J&K Wild life Protection Ac,t1978.
- (x) THE COMMON OTTER (Lutra lutra) This animal is found, but rarely, in the stream 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 Wild Life Protection Act, 1978.
- (xi) THE HAMALAYAN WEASEL (*Mustela sibirica*) The Himalayan weasel lives in temperate and alpine forests and open grass and scrub above tree line. It is sometimes seen in the sub-alpine area of Marmat range. It hunts rats, birds and their eggs. It has been included in the Schedule IV of the J&K Wild Life Protection Act, 1978.
- (xii) THE STONE (Martes foina) Its built suggests a mixture of squirrel and cat. It has moderately long legs and tail about half as long as its head and body.\it generally inhabits the temperate and alpine zone of the division and rarely found below 1500 meters. It lives both in the forests and on the barren heights above tree line. It prays on voles, mouse-hare, lizards and snakes. It also feeds on honey, nuts and fruits. It has been included in Schedule IV of the J&K Wild Life Protection Act, 1978.

#### 2.7.2 Rodents

- (i) THE RED FLYING SQUIRREL (*Petaurista petaurista*) It inhabitants the Deodar, Kail and Fir forests. It is rarely seen in the sub-tropical belt. It has a thick fur covering and a tail longer than the length of the body. It produces a sound like that of a falling parachute while leaping from one tree to another. 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 Wild Life Protection Act, 1978.
- (ii) **FIVE STRIPED PALM SQUIRREL (***Funambulus Pennanti***)** It is quite common in subtropical belt of this Division. It is rarely found in the forests but lives around the human

dwelling and agricultural fields. It has been included in Schedule II of J&K Wild Life Protection Act, 1978.

- (iii) THE INDIAN FIELD MOUSE (*Mus booduga*) It is common in fields, compounds, and generally ventures into the houses. It lives in burrows and feeds on grass, fruits, roots and nuts etc. It damages agricultural crops, nurseries and plantations. It has been declared a vermin under Schedule V of the J &K Wild Life Protection Act, 1978.
- (iv) THE INDIAN PORCUPINE (Hystrix indica) It favors rocky hill sides of sub-tropical and tropical belt and is encountered in the lower zone of Batote and Gandhri ranges. Its hair is completely modified into spine like structures. The neck and shoulders are crowned with a crest of bristles 15 to 30 cm long. The quills on the back are very profuse, and are ornamental with deep brown or black and white rings. It damages nurseries and young plantations. It has been included in Scheduled II of the J&K Wild Life Protection Act, 1978.
- (v) THE INDIAN HARE ( Lepus nigricollis) This animal is commonly found up to an elevation of 2500 meters. It is earthy brown in colour and generally weighs between 2-3 kg. When fully grown up. It runs fast and damages agricultural crops in Kandi belt. It has been included in Schedule IV of the J&K Wild Life Protection Act, 1978.

# 2.7.3 Goat-Antelops

(i) THE GREY HIMALAYAN GORAL (*Nemorhaedus goral*) It is stocky goat like animal. It has short insignificant horns. Generally its color is yellowish grey fused with black. It favors elevations of 900 to 2700 meters. Once believed to be in large numbers, its numbers have reduced to a few in this area at present. It is an important big game in the state. It generally weighs 25 to 30 kg. It has been included in Schedule III of J&K Wild Life Protection Act, 1978.

# 2.7.4 Deer

(i) BARKING DEER (*Munitiacus muntjak*) It is found in a very few number in low lying Chir bearing areas of Batote and Gandhri ranges and locally known as kakar. This deer has well developed horns on bony pedicles. Its haunts are thickly-wooded hills. 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. Once believed to have existed in large herds, it has now reduced to a small number. It has been included in Schedule III J&K Wild Life Protection Act, 1978. (ii) THE MUSK DEER (Moschus moschiferus) It is a small, horn-less deer, not more than 50 cm height at the shoulder. Its food consists of grasses, lichens, leaves and flowers. The male of the species secretes musk. This deer has mercilessly been killed for its musk pod and is now threatened with extinction. The males carry no antlers, but have peculiar tusks, which are elongated upper canine teeth. Musk is secreted in a glandular sac under the skin on the abdomen in males. It has a strong odor and is largely used in perfumery. It, therefore, needs special protection. It has been included in Schedule I of the J&K Wild Life Protection Act, 1978 and its hunting is totally prohibited. Its possible existence in this division is perhaps in the top smallest portion of Marmat range.

#### 2.7.5 Primates

- (i) THE COMMON LANGUR (*Presbytis entellus*) Locally known as *langur*, it is frequently found in Marmat and Gandhri ranges seen as much around the habitation as in the forests. It is a long limbed black faced and long tailed primate. Inhabits altitudes up to 3500 meters above mean sea level. In general more arboreal in habit than macaques. *Langurs* are herbivores. They eat wild fruits flowers-buds, shoots and leaves. They occasionally pillage garden and cultivation. *Langurs* live in fairly large groups of all ages and both sexes.
- (ii) THE RHESUS MACAQUE (*Macaca mulatta*) Locally known as Bandar, it is found almost all over this division in the low lying areas up to 2500 meters altitude. It is heavier in its build than the *langur*. The hair on its crown radiate backward from the forehead without the near center parting. This monkey lives in troops. It generally damages young seedlings of Chir by uprooting and chewing them.

#### 2.8 Aves

#### Land Birds

Because of the altitudinal variation, the avifauna of Batote Forest Division exhibits a degree of diversity. However, not all birds, that are frequently sighted south of Patnitop ridge, are seen in the low-lying areas of the division because of the barrier formed by Shivgarh-Patnitop-Nathatop-Shankhpal ridge. Important bird species that are found in this division are as follows;

#### 2.8.1 Pheasants and Fowl group

(i) **MONAL PHESANT** (*Lophophorus impejanus*) Village hen + : 70 cm. Magnificent pheasant with a brilliant metallic green head and crest of wire like spatula-tipped

feathers, glistening purple upper parts, white patch on back, cinnamon coloured, short broad and square cut tail. Found in high level fir and sub alpine zone of Marmat range.

- (ii) THE KOKLAS PHEASANT (*Ceriornis macrolophus*) Village hen +- 70 cm. The cock is grey above, streaked blackish, chestnut below. Brown crest between two long metallic green horn like tufts jutting out behind its metallic green head. White patch on either side of head, tail reddish-brown and pointed. Found in Batote and Marmat ranges.
- (iii) WHITE CRESTED KALEEJ PHEASANT (Gennaeus hamiltoni) Village hen +: 70 cm. Male black above, glossed with steel blue, with a whitish rump, long white lying-down crest. Tail long, of glossy black sickle-shaped pointed feathers. Female chiefly reddish-brown. Found in Ban Oak forests of this Division.
- (iv) **RED JUNGLE FOWL (***Gallus gallus***)** Village hen <u>+</u>: 66 cm. Golden brown and black, similar to domestic bantam breed. Found in Chir zone of this division.

#### 2.8.2 Partridges and Quail Group

- (i) **BLACK PARTRIDGE** (*Frabcikubys francolinus*) 34 cm. Chiefly black, glistening white cheek patches and chestnut collar of the male diagnostic. Found in subtropical zone of the division.
- (ii) **GREY PARTRIDGE** (*Francolinus pondicerianus*) 33 cm. Stub tailed, grayish brown with chestnut blotches and black vermiculations. Chestnut tail, Rufus buff throat.
- (iii) THE CHUKOR (Alectoris graeca Patridge) + : 37. Pinkish grey-brown partridge with a black band running across forehead through the eyes and down sides of the neck to meet on the upper breast. Found on bare rocky hill sides at higher altitudes.
- (iv) THE HIMALAYAN SNOWCOCK (*Tetraogallus himalayensis*) Looks like a giant edition of grey partridge with mixed grey, white, chestnut and black plumage. Found in uppermost portion of Marmat Range.
- (v) COMMON OR GREY QUAIL *Coturnix coturnix* Partridge : 20 cm. A plumb, squat almost tailless pale brown bird with buff spear shaped streaks. Found in the lower portion of the division.

# 2.8.3 Dove and Pigeon Group

(i) **BLUE ROCK PIGEON** (*Columba livia*) 33 cm. Slaty grey bird with metallic sheen of green, purple and magenta. Two dark bars on wings. Found on rocky hills of the division.

- (ii) **RING DOVE** (*Streptopelia decaocto*) Pigeon <u>+</u>: 32 cm. Vinous grey and brown with narrow black ring on hind neck .
- (iii) **SPOTTED DOVE** (*Streptopelia chinensis*) pigeon : 30 cm. White spotted pinkish brown and grey above. White and black chessboard on hind neck. Found all over sub-tropical to temperate areas of the division.
- (iv) RUFOUS TURTLE DOVE (Streptopelia orientalis) pigeion <u>+</u>: 33 cm .Large reddish brown dove. Scaly pattern above and a black and white 'chessboard' on sides of neck. Found all over upper portion of the Division in summers.

#### 2.8.4 Vultures

- (i) WHITE BACKED OR BENGAL VULTURE (*Gyps bengalensis*) 90 cm .White back and white band on under side of wings diagnostic. Found in lower areas of the division.
- (ii) HIMALAYAN GRIFFON VULTURE (*Gyps himalayensis*) Vulture <u>+</u>Enormous sized bird with long necked scrawny neck and un-feathered bald head. Color sandy white or khakhi. Found in higher reaches.

Vultures are under threat from the Vetenary drug namely Diclofenac, non-steroidal anti inflammatory drug(NSAID) used to treat livestock. Vultures feeding on the carcasses of the animals recently treated with Diclofenac suffer renal failure and die.

Vultures provides a crucial ecosystem serves through the livestock carcasses and their loss has had huge socio economic impact across the Indian sub-continent. Without Vultures hundreds of thousands carcasses have gone un eaten- left to rot in the sun, these pose a serious risk to human health. Livestock carcasses provide a breeding ground for numerous infectious diseases including Anthrax and encourage the proliferation of pest species such as rats.

In 2006, the Government of India, Pakistan and Nepal finally introduced a ban on the manufacture of Diclofenac and pharmaceutical firms are now encourage to promote an alternative drug "Meloxicam" which is proven be save for Vulture.

## Other birds

ROSERINGED PARAKEET (*Psittacula Krameri*) Myma + : 42 cm. A smaller edition of the Alexandrine parakeet but lacking maroon shoulder patches. Female lacks the black and rose-pink collar. Found in lower altitudes.

PIED CRESTED CUCKOO (*Clamator jacobinus*) Myna  $\pm$ : 33 cm. Crested black and white bird. White tips to tails. Restricted to lower areas.

CROW PHEASANT (Centropus sinensis) Crow + : 48 cm. Glossy black bird with conspicuous chestnut wings and long black graduated tail. Found in lower areas of the division.

ROLLER OR BLUE JAY (*Coracias benghalensis*) pegion  $\pm$  31 cm. Blue above with brown breast and pale blue abdomen and under tail. Found near cultivated areas in lower regions of the division.

SMALL YELLOWNAPED WOODPECKER (*Picus chlorolophus*) Myna + : 27 cm. Yellowish green with golden nuchal crest. Forehead, moustachial streak crimson. Found in wooded areas.

BRAHMINY MYNA (*Sturnus pagodarum*) Myna - : 22 cm. Grey above ,reddish fawn below with glossy black crown and long recumbent crest. Found near cultivation in lower areas.

INDIAN MYNA (*Acridotheres tristis*) - : 23 cm. Dark brown with bright yellow bill, legs and orbital skin. Found near habitations throughout the division.

JUNGLE MYNA (*Acridotheris fuscus*)Myna  $\pm$  23 cm. Similar to Indian myna but more grayish. Bare orbital skin absent. Bushy upstanding feathers on forehead diagnostic. Found fin wooded areas.

YELLOWBILLED BLUE MAGPIE (*Cissa flavirostris*): Pegion <u>+</u> With tail :39 to 43 cm. Purplish blue with black head, neck and breast. White patch on nape. Long streamered tail, bill yellow, legs orange. Found in dense forests as well as open areas in the temperate zone.

TREE PIE (*Dendrocitta vagabunda*) Myna + long tail : 50 cm. Chestnut brown bird with sooty head and neck. Black tipped grey tail.

HIMALAYAN TREE PIE (*Dendrocitta formosae*) Myna <u>+</u> with long tail : 43 cm. Sooty brown tree pie with chestnut under tail. Found in wooded areas.

JUNGLE CROW (*Corvus macrorhynchos*): 48-50. A glossy, jet-black crow with a hoarse *caw* call. Found in wooded country and near habitations all over the division.

HOUSE CROW (*Corvus splendens*) : 43 cm. Grey neck and smaller size distinguishes it from Jungle crow. Found near habitations all over the division.

WHITE CHEEKED BULBUL (*Pycnonotus leucogenys*) Myna - : 20 cm. Glistening white cheeks and sulphur yellow under rood of tail diagnostic. Found near habitations throughout the division.

RUFOUSTAILED FLYCATCHER (*Musciicapa ruficauda*) Sparrow  $\pm$  14 cm. Drab brown. Found in temperate zone on the division.

PARADISE FLYCATCHER (*Terpsiphone paradise*) Bulbul <u>+</u>: 20 cm. Adult male with metallic black crested heads, silvery white body and tail streamers. Female chest nut above and white below.

WHITE SPOTTED FANTAIL FLYCATCHER (*Rhipidura albicollis*) : Bulbul : 17 cm. sooty brown with white spotted breast and flanks. Found in temperate zone in wooden localities.

TAILOR BIRD (*Orthotomus sutorius*) Sparrow – 13 cm. Small olive green bird, white underneath, rusty crown and two elongated pinpointed feathers in tail. Seen in bushes around habitation.

BLACK REDSTART (*Phoenicurus ochruros*) Sparrow  $\pm$  15 cm. Black and orange chestnut bird with constantly shivering orange chestnut tail. Found along nallas in temperate regions of the division.

WHITE CAPPED REDSTART (*Chaimarrornis leucocephalus*) Sparrow + Robin like bird, black above, bright chestnut below, with a glistening snow white cap, and a bright chestnut tail. Found on stones and boulders along nallas in the division.

INDIAN ROBIN (Saxicoloides fulicata) Sparrow <u>+</u>16 cm. Male black with white wing patch, rusty red\_under root of tail. Hen ashy brown, no wing patch. Found near habitations and cultivated areas.

BLUE ROCK THRUSH (*Monticola solitaries*) Bulbul + : 23 cm. Male indigo blue with a wing bar. Found in rocky areas of the division.

HIMALAYAN WHISTLING THRUSH (*Myiophonus caeruleus*) Pegion  $\pm$ : 23 cm. Dark purple blue, spotted with glistening blue. White spots on wing coverts. Bill yellow. Found in dense forests and along nallas throughout the division. Song resembles human whistle.

GREY TIT (*Parus major* Sparrow) - : 13 cm. Glossy un crested black head, glistening white cheek patches. Found near habitation and light wooded areas.

WHITE WAGTAIL (*Motacilla alba*) Bulbul - : 18 cm. Black and white with white chin and throat. Constantly wags its tail. Found in open areas in the vicinity of water bodies.

HOUSE SPARROW (*Passer domesticus*) Bulbul - : 15 cm . Male with grey crown, black around eyes, chestnut in back. Very common around habitation throughout the division.

HIMALAYAN GREAT BARBET (*Megalaima virens*) R Myna + : 33 cm. Brightly colored barbet with heavy yellow bill with bristles at base. Maroon crown with violet blue, black head. Bright scarlet patch under tail. Sub-tropical evergreen and moist-temperate forest. Visits this division in spring and summers.

#### 2.8.5 Aquatic Birds

A few species of migratory ducks are encountered seasonally along the river Chenab and various natural water reservoirs of this division at high altitudes.

#### 2.8.6 Reptiles

A variety of both poisonous and non-poisonous snakes are found all over the division. Among the poisonous snakes Cobra, Rattlesnake and Himalayan Pit viper are worth mention. Lizards are common in sub-tropical belt.

#### 2.8.7 Fish

Local variety of fishes including Himalayan trout are of common occurrence in the river Chenab and its tributaries.

#### 2.9 Injuries to Which Fauna is Liable

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

#### 2.9.1 Injuries by Man

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

#### 2.9.2 Injuries by Epidemics

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

#### 2.9.3 Injuries by Fire

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

#### 2.9.4 Injuries by Atmospheric Influences

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

#### **CHAPTER III**

#### UTILISATION OF FOREST PRODUCE

#### 3.1 AGRICULTURAL CUSTOMS AND WANTS OF POPULATION

- 3.1.1 The tract is inhabited primarily by rural population. The total population of the tract, as per the census of 1981 was 44,770 which has increased to 1,32,599 as per census of 2011. Out of this the urban population is 4,315 only which is just 3.25% of the total population of the tract. Batote is the only urban township. Rest of the population lives in small villages besides a few large villages in Marmat Range.
- 3.1.2 The population consists of mainly Hindus and Muslims. Hindus predominate in Batote and Gandhri ranges, whereas Muslims out number Hindus in Marmat range. The population of the area is mainly agricultural-cum-pastoral. Agriculture is generally confined to low lying areas or gentle slopes along the contour. However, of late, due to scarcity of land, people have started cultivating on steep slopes as well. The tract is visited by nomadic population of Gujjars, Bakerwals and Gaddies during the summer months of the year for grazing their animals in the forests. These communities inhabit the areas just bordering on, or within the forests. Many local castes and languages are met within the jurisdiction of this division.
- 3.1.3 The population of this division is totally dependent upon the demarcated forests for meeting their requirement of timber for agricultural implements, house building and repairs, firewood and fodder. The demarcated forests of the tract provide livelihood to the local population by way of employment and other direct and indirect benefits due to them from the demarcated forests. The people are also totally dependent on forests for the grazing requirements of their cattle, sheep, goats etc. The tract is not sufficient in agriculture because of marginal holdings and uncertain crop harvests. Therefore, a lot of food grain is imported from outside to feed the population.
- 3.1.4 The firewood consumption and requirement of timber for construction and other purposes is very high in this region due to harsh climatic conditions which prevail in the area for most of the period. The situation was not so critical in earlier times when forest resources were protected and these demands were low. However, this balance has been seriously disturbed because of rapid growth in the population, huge demand of timber for house building, and other development activities within as well as outside the jurisdiction of the division.
- 3.1.5 Although no record of rural consumption of firewood and timber from these forests are available as result of any survey or study, in order to assess the demand for

timber and firewood, a survey was conducted in 46 villages of Batote Forest Division. On the basis of this survey the following assessments have been made in respect of timber and firewood demands.

#### 3.2 TIMBER REQUIREMENT

3.2.1 The population of Batote Forest Division is 1,32,599 as per census of 2011 with 26,043 number of households. Results of the village survey reveal that the construction of an average sized rural house requires 12 m<sup>3</sup> of standing timber. It is further assumed that a house requires complete renovation in 25 years. Given a decadal growth rate of 24.27 percent, around 300 new households will be added every year. Accordingly, the timber requirement per year is computed as under:

Annual timber requirement for new houses	=	300 x 12	$= \frac{3,600}{m^3}$	1
Annual timber requirement for the renovation of old houses	=	<u>26043 x 12</u> 25	$= \frac{12,50}{m^3}$	0
Total timbe	er requirem	ent per annum	$= \frac{16,10}{m^3}$	0

Against an estimated requirement of 16,100 m<sup>3</sup> Forest Department supplies around 1500 m<sup>3</sup> of timber per annum to the concessionists, which accounts for only 9.3 percent of the total timber requirement. Obviously, the rest of the requirement is met through illegal means and goes largely unrecorded. A statement of species wise and category wise timber sold annually from timber sale depot, Batote Forest Division, is tabulated under table No. 3.1 given below;

Year	Zone	Deodar	Kail	Fir	Chir	Total
2000.01	D	247	010.76	0	0	054.46
2000-01	D Other Divisions	2016.27	919.70	05.24	0	934.40 4206.26
	Dentt Lice	2910.27	1284.83	95.24	0	4290.30
2001.02	Depu. Use	117.98	200.4	0	22.22	404.38
2001-02	D Other Divisions	437.04	045.40	0	22.32	1945.25
	Dentt Lice	517.27	943.49	0	234.29	2931.91 621.79
2002.02	Depu. Use	214.04	2259.91	0	0	031.78
2002-05	D Other Divisions	514.04	2230.01	0	0	2372.03
	Dantt Lice	0	0	0	0	171.06
2002.04	Depu. Use	250.28	0	0	820.06	2401.52
2003-04	D Other Divisions	6054.27	200.65	0	029.90	6864.02
	Deptt Lise	37.65	119.06	0	0	156.71
2004-05	B	2557.34	117.00	0	115 53	3157.10
2004-03	Other Divisions	2337.34	-052	0	0	5519 58
	Deptt Use	0	0	0	0	71 13
2005-06	B	2339.62	2596.15	131.15	465.21	5532.13
2005 00	Other Divisions	1292.91	0	0	0	1292.91
	Deptt Use	19 39	0	0	0	19 39
2006-07	B	4966.29	2178.34	102.31	149.31	7396.25
	Other Divisions	615.75	0	0		615.75
2007-08	В	596.67	1352.41	26.47	31.55	2007.1
	Other Divisions	0	300.80	0	0	300.8
	Deptt. Use	72.14	17.35	0	0	89.49
2008-09	B	541.52	757.03	0	0	1298.55
	Other Divisions	0	2194.21	0	0	2194.21
	MC	25.88	172.22	0	0	198.1
	Other Divisions	0	149.36	0	0	149.36
2009-10	В	433.32	808.81	0	0	1242.13
	Other Divisions	10328.5	0	0	0	10328.5
	Deptt. Use	184.44	39.48	0	0	223.92
	MC	231.73	515.02	0	562.86	1309.61
	Other Divisions	0	0	0	0	4239
	Deptt. Use	0	0	0	0	782
2010-11	В	470.48	508.06	0	202.54	1181.08
	Other Divisions	3413.57	221.39	0	405.86	4040.82

Table 3.1Statement of Timber sold (cfts) from Timber Sale Depots of<br/>Batote Forest Division.

1	Deptt. Use	513.43	429.13	46.08	0	988.64
2010-11	MC	160.74	656.26	0	933.3	1750.3
	Other Divisions	0	0	0	0	16947
	Deptt. Use	0	0	0	0	1157
2011-12	А	4120	4510	0	939	9569
	В	793	1733	0	0	2526
	C (MC)	330	553	0	223	1106
	Other Divisions					6269
	Deptt. Use					964
2012-13	А	1432.56	6596.37	0	102.71	8131.64
	В	270.37	217.23	0	144.28	631.88
	C (MC)	71.18	1448.49	0	0	1519.67
	Other Divisions					5781.57
	Deptt. Use					692.41
	SSA					317.22
2013-14	А	4111.48	5044.05	0	1185.39	10340.90
	В	574.97	616.70	0	8799	9990.67
	C (MC)	85.03	1700.81	0	158.69	1944.53
	Other Divisions					1884
	Deptt. Use					69241
2014-15	А	6509.97	10326.9	0	0	16836.90
	В	497.98	1898.99	0	55.82	2452.79
	C (MC)	201.34	2654.40	0	0	2855.74
	Other Divisions					8518
	Deptt. Use					1088
2015-16	А	4639.45	8740.71	82.68	70.00	13532.8
	В	847.34	1783.17	0	0	2630.51
	C (MC)	342.54	1162.79	0	283.07	1788.40
	Other Divisions	3995.41	882.45	1457.8	0	6335.72
	Deptt. Use	325.71	105.43	0	0	431.14

# 3.3 Firewood Requirement

3.3.1 The consumption of firewood is very high in this region due to the harsh climatic conditions that prevail for most of the year. At the same time, firewood is available in abundance and located conveniently. The per capita firewood requirement, on the basis of village survey, is 4.5 kg per day. For an estimated population of 70,000 therefore, 11, 81,250 quintals of firewood is needed per annum.

3.3.2 In addition to the requirements of local population, firewood requirements of the security forces have also to be met. Further, Batote Forest Division also supplies firewood to the adjoining divisions sometimes. A statement of the quantity of firewood sold from firewood depot of Batote Forest Division is tabulated under table No. 3.2 given below;

	Total Firewod sold/ supplied/Used(Qtls.)					
Year	Cities	Army	Religious	Others	Deptt.	Total
			purposes		Use	
2000-01	0	0	0	0	0	0
2001-02	0	280	10.01	225.50	276.53	792.04
2002-03	0	55.00	95.50	179	128.45	448
2003-04	0	0	0	489	178	667
2004-05	0	0	0	1350	210	1560.50
2005-06						2072
2006-07	1570	750	212	860	0	3392
2007-08	370	291	128	512	709.10	2010.10
2008-09	0	35	250	366		651
2009-10	0	32	541	271	0	844
2010-11	0	20	408	52	0	480
2011-12	0	0	544	201	0	745
2012-13	0	0	407.50	166	526.60	1100.10
2013-14	0	5	495	0	637	1137
2014-15	0	0	543.80	80	662.40	1286.20
2015-16	0	0	469	90	463.5	1022.50

Table 3.2Statement of Firewood sold/supplied/used from Timber SaleDepots of Batote Forest Division.

#### 3.4 Markets and Marketable Products

3.4.1 Deodar, Kail, Fir and Chir are the four major marketable timber species found in the division. A major portion of this timber is exported in the form of sleepers, scantlings and even in smaller sizes to Jammu for further sale in the open market within or outside the territorial jurisdiction of the J&K State. Broad leaved species are mainly

consumed as firewood and used for making agricultural implements, furniture etc. Among the non-timber forest produce, *Chir Resin* has become the most important one in the recent past, however the resin is not extraction in this division from 2000 onwards and Chir crop hasn't reached an extractable state and will continue to be under rest.

3.4.2 The other saleable non-timber forest produce are *Nagchairi, Anardana, Dhoop, Dioscorea, Muskbala, Belladona, Bankakri* and *Kuth* roots etc. The quantities of these NTFP's extracted from the forests of this division from the period 2001-01 to 2015-16 are tabulated in appendix XXIII. However, the extraction of NTFP's was banned by the Government in the year 2004-05 vide Government Order No:290-FST of 2003 dated: 14-07-2004 and subsequently exempting Guchhies, Anardana and conifer seeds.

## 3.5 Lines of Export

- 3.5.1 River Chenab and its tributaries in the interior catchment have remained most important and cheap line of export till mid-seventies. At present the floating is reported only in the interior catchment of Marmat range. The major line of export of timber is by road. This has proved to be an easy mode of extraction and free from the danger of pilferage and theft.
- 3.5.2 National highway-44 (Jammu-Srinagar) and National Highway-244 (Batote-Kishtwar) are the two most important roads passing through this division. Some areas of Marmat range are accessible through Khelani Goha road which takes off from NH-244 at Khelani besides roads like Bargaran-Roat road, Bargaran-Mangota road, Assar-Thandapaani road add to accessibility. In Batote range, the Patnitop-Sanasar road connects some of the compartments to the National Highway-IA along with Champa-Dhianoo, Dhalwas-Sawani and Maitra to Dharmkund roads. Gandhri range is connected to the National Highway-44 by Maitra Gool road which exists this division at Dhamkund. A road from village Gandhri joins the Gool- Maitra road at Kanga and provides accessibility to some inner compartments of Gandhri range along with Kanga to Kabhi.

#### 3.6 Methods of Exploitation

3.6.1 The markings are done in advance and all marked trees are serially numbered and classified into diameter classes for volume estimation. Besides, these are branded with hammer marks at the base and breast height on the trees. Trees are felled by employing saws and axes as near to the ground as possible. The bole of the tree is then cross cut into logs of standard sizes by cross cut saw and converted into

sleepers and scantings by hand sawing. Extraction of timber in log form is not possible due to remoteness of the interior catchment from the road sides. Gravity rope ways, dry slides and wet slides are generally used for bringing down the converted stuff either to the banks of the stream / river or to the road sides. The J&K State Forest Corporation makes its own arrangements for extraction and export of the out turn.

- 3.6.2 In the year 2015 an additional activity of Drift Wood extraction was initiated as per rules under Chapter V of the Jammu and Kashmir Forest Act ,1987 wherein tree logs were salvaged from river Chenab at Drift Wood Salvage Point Trungal, Assar and converted into scants and approximately 2000 cft was extracted during the year 2015-16. The activity need to be continued as every year huge quantity of tree logs are seen floating in the mighty river and has the potential to become a major extraction activity.
- 3.6.3 Timber is also sold by the Forest Department through timber sale depots of respective divisions. The species wise rates charged at the timber depot of Batote Forest Division are tabulated under Table 3.3.

<b>Reference to Government Orders</b>	Zone	Туре	Sale Rate in Rupees/cft		t
			Deodar	Kail	Fir
G.O. No. 341-FST of 2000 Dated:-	"A"	Log	135	86	50
22-08-2011		Sawn	170	102	60
	"B"	Log	205	133	101
		Sawn	234	160	113
	"С"	Log	283	163	112
		Sawn	343	222	125
G.O. No. 314-FST of 2005 Dated:-	"A"	Log	146	93	54
01-08-2005		Sawn	184	110	74
	"В"	Log	197	128	96
		Sawn	225	154	109
	"С"	Log	272	157	108
		Sawn	329	213	120
G.O. No. 278-FST of 2006 Dated:-	"A"	Log	161	102	59
19-05-2006		Sawn	202	121	81
	"В"	Log	246	160	120
		Sawn	281	193	136
	"С"	Log	0	0	0
		Sawn	0	0	0
PCCF;s No:-1040-50/ Lease/Mis	"С"	Log	404	234	161
dated:-16-07-2008		Sawn	489	316	178
G.O. No. 212-FST of 2010 Dated:-	"MC"	Log	587	339	234
13-05-2010		Sawn	511	461	260
	"A"	Log	185	130	74
		Sawn	215	160	104
	"В"	Log	345	245	138
		Sawn	375	275	168
	""C"	Log	513	360	205
		Sawn	543	390	235
G.O. No. 177-FST of 2015 Dated:-	"MC	Log	657	461	262
13-07-2015	"&"C"	Sawn	695	499	301
	"A"	Log	222	156	89
		Sawn	258	192	125
	"В"	Log	428	304	171
		Sawn	465	341	208

 Table 3.3
 Table showing sale rates of Timber in different zones

#### **CHAPTER IV**

# **Activities of State Forest Corporation**

#### 4.1 Jammu & Kashmir State Forest Corporation

- 4.1.1 The J&K SFC was created by the act of legislation, namely The Jammu and Kashmir State Forest Act, 1978 and rules were framed in 1981. The forests were worked out by leases in the olden days and later the forest working was nationalised by The Jammu and Kashmir Nationalisation of Forest Working Act, 1987.
- 4.1.2 The Forest Department hands over the coupes to SFC and levies the royalty. Before the ban of green felling of trees, the SFC was handling huge volume of timber every year. Due to the imposition of ban on green felling by the State Government and the various directives issued by the Hon'ble Supreme Court of India regarding felling, resulted in least quantum of timber extraction by SFC. Later, the Hon'ble Supreme Court of India endorsed the Qualitative and Quantitative norms (popularly called as Q&Q Norms), proposed by the State. As per the Q&Q norms, 80 lakh cft of standing volume of conifer trees (dry, fallen; basically hygienic markings) can be cleared in the State for extraction every year, but except few years, the limit of 80 lakh cft was never touched hence it resulted in financial crunch to the corporation.
- 4.1.3 The State Forest Corporation suggests the available volumes from different compartments. If the compartment is fit to be worked as per the conditions imposed by Q&Q norms, then it is enumerated for dry/ fallen trees. After the issue of Technical Sanction and Administrative Approval, the marking in the compartment is handed over to the SFC for extraction.
- 4.1.4 The SFC prepares the estimate for the timber operation, based on the expected out turn and calculates the financial cost for extraction and transportation of timber up to its central depots. Then the SFC allocates the work to the contractors for execution of timber operation based on competitive bids. When the timber is dumped in the road head, the transportation of timber is permitted by either CF or the CCF (Territorial), after due verification of the stocks.
- 4.1.5 The entire operation of timber extraction and transportation is very closely monitored by the territorial field staff. From the starting of felling operation up to the disposal of debris and handing over the compartment back to the forest department, it should be monitored properly. The felling of marked trees shall start only after the proper handing over of the marking to the SFC. The felling shall always be on the uphill side; in rarest cases it is along the contour and never on the downhill side. The falling tree shall never injure the other standing trees. Likewise there are many conditions. The SFC shall report to the territorial department about the progress of the felling operation every month.

# 4.2 Activities of State Forest Corporations in Harvesting And Marketing Of Forest Produce

- 4.2.1 The J&K State Forest Corporation came to existence by the act of legislation, namely The Jammu and Kashmir State Forest Act, 1978. The rules for its operation were framed in the year 1981. The forests were worked out by forest lessees before 1984. There was broad consensus that the operations by lessees were not delivering expected returns and that there was a need to supplant it with government working. Accordingly nationalization of forest working Act, 1987. Thereafter the Forest Department hands over eligible forest coupes as per the working plan to the SFC and the SFC in return pay royalty to the Forest Department. The royalty rates changed species wise from SFC is as below. The rates were fixed in the year 1985 and last revised in 1989-90 and have not been revised since then.
  - Table 4.1SFC Royalty Rates i.e. The rates charged from The J&K State<br/>Forest Corporation from the year 1985-86 onwards, as<br/>approved by the Department of Finance, Government of<br/>Jammu and Kashmir, for Jammu Province are reproduced<br/>below.

Year	D	eodar	]	Kail		Fir	Cł	nir
	Rs/	Rs/	Rs/	Rs/	Rs/	Rs/ cum	Rs/Cft	Rs/cum
	Cft	cum	Cft	cum	Cft			
1985-86	64.78	2287.64	43.03	1519.56	33.41	1179.85	18.87	666.36
1986-87	87.78	3099.86	56.92	2010.07	39.84	1406.91	36.99	1306.26
1987-88	91.37	3226.64	43.31	1529.45	33.32	1176.66	36.99	1306.26
1988-89	87.22	3080.17	33.18	1171.72	29.9	1055.58	36.99	1306.26
1989-90 to	94.23	3327.64	44.77	1581	35.02	1236.7	36.99	1306.26
2015-16								

The royalty chargeable from J&K State Forest Corporation has been calculated on the above approved rates. The payment of the royalty in full has never been made by the J&K State Forest Corporation. It is generally paid in small amounts and piece meals. This has resulted into accumulation of huge outstanding dues against the Corporation. A summary of such outstanding dues is tabulated as under;

Year	Marking Handed over (cft in lacs)	Bill Issued Rupees in lacs	Royality outstanding Rupees in lacs
2000-01	3.904	100.657	1740.631 (including previous)
2001-02	5.932	179.771	1920.402
2002-03	1.222	33.465	1953.867
2003-04	3.101	106.788	2060.655
2004-05	5.132	142.328	2202.983
2005-06	3.038	157.722	2360.705
2006-07	0.768	41.804	2402.509
2007-08	0	0	2402.509
2008-09	0.7	20.304	2422.813
2009-10	1.757	61.907	2484.72
2010-11	2.501	71.114	2555.834
2011-12	0.141	5.171	2561.005
2012-13	0.317	8.981	2569.986
2013-14	1.349	43.575	2613.561
2014-15	2.605	83.399	2696.96
2015-16	1.206	60.111	2757.071
Total	33.006	1117.097	2757.071

Table 4.2Outstanding Royality against SFC in Batote Forest Division as<br/>on 31-03-2016.

- 4.2.2 The SFC annually surveys the forest coupes for availability of extractable timber. If the coupe satisfies the conditions prescribed by Q & Q norms, then dry/ fallen trees in the coupe are enumerated. The proposal for extraction is technically cleared by the Conservator of Forests (Working Plan) and felling of trees administratively approved by the Chief Conservator of forests of the region. The markings are then handed over to the SFC for extraction. The timber volume handed over to SFC from 2000-01 to 2015-16 and extraction thereof is given in appendix-XVII.
- 4.2.3 The SFC prepares the estimate for the timber operation, based on the expected out turn and calculates the financial cost for extraction and transportation of

timber upto its central depots. SFC then allocates the work to the contractors for execution of timber operation based on competitive bids. When the timber is dumped in the road head, the transportation of timber is permitted by either Conservator of Forests (Territorial), after due verification of the stocks.

Year of	Deodar	Kail	Fir	Chir	Total
over					
2000-01	46199	91683	17148	193875	348905
2001-02	94037	327742	33398	143319	598496
2002-03	19328	107316	50456	3953	181053
2003-04	52268	156248	41914	0	250430
2004-05	46807	226069	178161	39130	490167
2005-06	43430	130351	56675	73053	303509
2006-07	22774	12117	5199	36803	76893
2008-09	9577	53259	7132	0	69968
2009-10	53412	84069	13595	24637	175713
2010-11	76685	154964	18456	0	250105
2011-12	27	531	0	10369	10927
2012-13	3900	27813	0	0	31713
2013-14	28866	89251	12930	0	131047
2014-15	52082	204058	4402	0	260542
2015-16	19405	44036	5550	52160	121151
Total	568797	1709507	445016	577299	3300619

Table 4.3Table showing the volume (cft) handed over to SFC from<br/>Batote Forest Division

- 4.2.4 The entire operation of timber extraction and transportation is closely monitored by the territorial field staff. All operations from the starting of felling operation to the disposal of debris and felling refuse is monitored. Strict conditions are enforced in the execution of felling. The felling of marked trees start, only after the proper handing over of the markings to the SFC. The felling is carried out along the up-hill side and in rare cases along the contour, however never along the downhill side. The felling is undertaken in a manner that falling tree does not injure other nearby standing trees. The territorial department shall be reported about the progress of the felling over back the compartment any irregularity during the course of operations is accounted for.
- 4.2.5 At present, State Forest Corporation is the major agency responsible for extraction of timber all over the State of Jammu and Kashmir. The cost of extraction varies from year to year, and from one place of working to another depending upon the remoteness, terrain of the area and availability of the

labour, and volume of work involved. The detailed breakup of the cost of extraction for the year 2015-16 for Batote Forest Division is reproduced as under through the courtesy of Divisional Manager of State Forest Corporation.

# 4.3 Cost of Extraction

S.No.	Activity	Category				
		Norm	Norms Rate in Rupees			
	SAWN FORM	D	С	В	Α	
(a)	Extraction (on FMW)					
1	Felling per cft	3.37	2.82	2.56	2.01	
2	Hand Sawing. Under/odd size per	44.66	40.8	37.79	34.7	
	cft				9	
B	Hand sawing – standard size	51.04	46.63	43.18	39.2	
	10/12 x10x5, 10/12x10x5x Psl,8/9				8	
	x10x5, 10/12x10x4					
<b>(b)</b>	Off road Tpt. ( on DMM)					
3	Pathroo ( per cft/Km of 33 chain	7.46	7.26	7.07	6.88	
4	Pacci Nalli( per cft/Km of 33 chain	279	0.51	2.51	2.41	
5	Taar span( per/span/cft)	6.3	5.99	5.99	5.99	
6	S.N. Mahaan per cft/33 chain Km	1.96	1.85	1.85	1.71	
7	Main Nalla Mahaan( cft/Km)	1.71	1.71	1.71	1.71	
8	Head carriage ( forests ) per	0.55	0.55	0.55	0.55	
	cft/Chain					
9	Crane ( per cft/ Km)	9.44	8.97	8.97	8.97	
10	H/C after nikasi ( per cft/chain	0.58	0.58	0.58	0.58	
(c)	Minor related activities ( on					
	DMM)					
11	Launching(S.N. Mahanning /cft)		0.4	1		
12	Nikasi ( per cft0		0.8	3		
13	Stacking ( per cft)		0.7	8		
	LOG FORM					
( <b>d</b> )	A. Extraction(A1+A3)		7.56			
	A1. Conversion	5.03				
14	A1.1 Debranching & Debarking/cft	1.03				
15	A1.2 Sawing & logmaking/cft		4.01			
16	A3 felling ( per cft)		2.5	2		
17	Loading log ( per cft)		4.5	5		
18	Un-loading (per cft)		0.06			

Table 4.4Cost of Extraction in Rupees per cubic feet under different<br/>heads

# (e) Log rolling

S.No.	Log rolling up kachha Loading Point ( per	Norm Rate in
	cft per chain	Rupees
1	Category A (0-20 Degrees)	0.93
2	Category B (20-30 Degree)	0.67
3	Category C ( 30-40 Degrees)	0.49
4	Category D ( > 40 Degree)	0.22

# (f) Kachha Road Transportation( Log Form)

Volume slab (cft)	Distance Slab			
	0-5km	6-10km	11-20	Abo
			km	ve
				21
				km
Up to 5000	3.45	2.65	2.05	1.62
5001-10000	3.39	2.45	1.72	1.19
10001-20000	3.321	2.38	1.69	1.16
20001-40000	3.06	2.26	1.6	1.1
40001-800000	2.9	2.1	1.47	0.97
Above-80001	2.74	1.96	1.36	1.91

# (h) Pacca Road Transportation (Sawn Form)-National Highways (in Rupees)

S.No.	Distances slab in Km	Rate in Rs/	Rate with 15 %
		cft	contractors profit
			Rs/cft
1	0-50	0.19	0.21
2	50-100	0.17	0.2
3	101-150	0.16	0.18
4	151 and above	0.14	0.16

(i)	Road Transportation in (Sawn Forn	n)			
	Other than National highwa	ys =	Rs 1.46/cft/km		
(j)	Loading charges ( sawn timber)	=	Rs 0.23/cft		

# (k) Extraction in log form on old NPC procedure

Activity	Approved rate
Extraction including felling,	At the average rate of
Conversion, rolling etc (all	Rupees 244 Per /labour
operation)Up to KLP.	per day as per NPC
	Procedure

## **CHAPTER-V**

# **FIVE YEAR PLANS**

## 5.1 INTRODUCTION TO FIVE YEAR PLANS

- 5.1.1 The Five-year Plans (FYPs) were developed, executed, and monitored by the Planning Commission with the Prime Minister of the country as the ex-officio Chairman. The first Five Year Plan was launched in the year 1951. The Government of India constituted the NITI Aayog to replace the Planning Commission. The National Institution for Transforming India, also called NITI Aayog, was formed via a resolution of the Union Cabinet on January 1, 2015. This was done in order to better serve the needs and aspirations of the people of India.
- 5.1.2 As the world moved towards an increasingly unsure future as far as climate change is concerned, it is important to focus on sustainable management approach and maintenance of environmental stability. With the increase in population of both human as well as livestock, the forests are under great pressure due to open grazing, heavy exploitation and excessive biotic dependence. Therefore, augmentation of natural regeneration, eco-restoration of degraded forests along with increasing their productivity have assumed significant place in the economy.
- 5.1.3 In order to sustain the ecology the Government of India has been allocating funds to the forestry sector right from the beginning of the First Five Year Plan. Although the main focus during the initial years of implementation was towards agricultural productivity, but regular provisions have been made for forestry development and forest based programmes.

#### 5.2 DEVELOPMENT IN FORESTRY DURING FIVE YEAR PLANS IN INDIA

- 5.2.1 In first five year plan a sum of Rs. 9.50 crore was spent on forestry programmers in which emphasis was laid on afforestation, forest transport and communication, forest administration and small scale plantation by state governments. Similarly the central government gave priority to forest research, forestry education and wild life conservation.
- 5.2.2 In Second Five Year Plan an increased amount of 19.30 crore rupees was allocated for forestry development programmes. Here main focus was towards afforestation, development of plant species of commercial and industrial importance, increase production of timber and important minor forest products, wild life conservation, improvement in the living conditions of forest personnel, forestry research, extension of new technological facilities and widening the scope of cooperation with the Central Government. Due to these efforts value of major forest products increased from 19.00 crore rupees to 59.00 crore rupees and minor forest products

from 69.03 crore rupees to 111.03 crore rupees during 1951-61. The area of reserved forests also increased from 27 crore sq km to 36 crore sq km and the number of forest personnel grew from 4 to 50 lakhs.

- 5.2.3 In Third Five Year Plan a provision of Rs. 51.00 crore was made for forestry development which laid to the planting of quick growing varieties of trees on 64,000 ha and trees of economic importance on 240,000 ha. Of area. About 256 lakh hectares of forest land was replanted and 11,000 km long new roads were constructed besides the repairing of 4,000 km long old roads.
- 5.2.4 During Fourth Five Year Plan quick growing varieties of trees were planted on 4 lakh ha of land to meet industrial demand (paper, plywood and match industries) besides the afforestation on 3.4 lakh ha of area for economically important trees (teak, semal and shisham) and 75 lakh ha. for fuel wood. During this period about 2 lakh ha of old forest land was reforested. For the proper development of forests about 16,000 km long new roads were constructed and 2,000 km long old roads were repaired. About 2 lakh ha of forest land was also developed for providing fodder to the cattle.
- 5.2.5 During Fifth five Year Plan provision was made for planting quick growing varieties of trees on 8.6 lakh ha of area along the roads, rivers, canals and rail lines and trees of economic and industrial use on 16 lakh ha of area. The plan also proposed the construction of about 60,000 km of roads for the maintenance and development of forest areas.
- 5.2.6 During Sixth Five Year Plan an outlay of 69.26 crore rupees was made for forestry development with main objectives for the conservation of existing forests and the launching of country-wide afforestation and social forestry programmes to fulfill three sets of needs: (a) ecological security, (b) fuel, fodder and other domestic needs of the population; and (c) the needs of village, small scale and large scale industries. The programmes included forest conservation, social forestry, fuel wood, forest labour, forest survey, forest research and people's participation in forest development. The new thrusts included 'tree for every child programme', eco-development force, eco-development camps and agroforestry programmes. During this period afforestation was made over 21.5 lakh ha. of area. The Forest Conservation Act, 1980 restricted the transfer of forest land to other uses.
- 5.2.7 During Seventh Five Year Plan (1985-90) a sum of Rs. 185.91 crore was allocated for forestry development. It fixed up target for planting trees on 50 lakh ha of area with main programmes like (i) conservation of important flora and fauna for ecosystem, (ii) increasing forest area through afforestation programmes like social forestry, agro forestry etc, (iii) fulfilling the needs of fuel wood, fodder, timber and minor forest products, (iv) maintaining balance between forestry programmes and welfare of

tribal's dependent on forests, (v) laying emphasis on forestry research, forestry education, and forestry training, and (vi) seeking people's participation for forestry development under JFM (Joint Forest Management) Scheme.

- 5.2.8 During the Eighth Five Year Plan an outlay of Rs. 525 crore was provided for forestry development under Central Sector. The programmes included: (i) rehabilitation of degraded forests, (ii) soil and moisture conservation, (iii) farm forestry, (iv) roadside and canal bank plantation, (v) creation of wind-breaks, and 57 (vi) wood lots on community land and pasture development. Under these programmes besides social forestry scheme, rural fuel wood plantation has been introduced in 101 districts of the country which are chronically deficient in fuel wood and fodder resources.
- 5.2.9 The Ninth Five Year Plan came after 50 years of Indian Independence. It focused on environmental stability through social mobilization and participation of people.
- 5.2.10 An outlay of Rs 5945 crores was fixed for the forestry sector in the 10th Five Year Plan. As the National Forest Policy stipulated that 1/3rd geographical area of the country should be brought under forest/tree cover, the imperative was echoed in the 10th FYP, which stated that the country will bring 25% area under forest/tree cover by the end of 10th Plan period and 33% by the end of 11th FYP.
- 5.2.11 The outlays for the 11th FYP for forestry and Wildlife was Rs. 6213.99 crores and the budget outlay (with 20% increase for the 12th FYP (2012-13 to 2016-17) was 8577 crores.

# 5.3 PLANNING FOR FORESTY SECTOR IN THE STATE OF JAMMU AND KASHMIR

5.3.1 In the State of J&K the funds have regularly been allocated to the forestry sector since the 1st First Five year Plan. The detail of year wise allocation to the J&K Forest Department is given in the table below:

S. No	Plan	Period	Sector	Outlay	Expenditure
1		1051 56		1 6 77	14.01
1	Ist FYP	1951-56	Forest & Soil Conservation	16.77	14.91
2	2nd YP	1956-61	-do-	66.50	75.32
3	3rd FYP	1961-66	-do-	175.00	132.10
4	Inter Plan Period	1966-69	-do-	179.00	119.68
5	4th FYP	1969-74	-do-	575.00	302.64
6	5th FYP	1974-79	-do-	498.76	348.30
7	Annual Plan	1978-79		152.00	145.32
8	Annual Plan	1979-80	Forest & Soil Conservation	173.92	144.18
9	6th FYP	1980-85	-do-	1250.00	1910.93
10	7th FYP	1985-90	All Wings of Forest Deptt.	4922.00	5200.91
11	Annual Plan	1990-91	-do-	2180.86	2108.33
12	Annual Plan	1991-92	-do-	2371	2701.35
13	8th FYP	1992-97	-do-	15990.00	17891.01
14	9th FYP	1997-02	-do-	49700.00	43547.95
15	10th FYP	2002-07	-do-	66598.92	48717.66
16	11th FYP	2007-12	-do-	88292.14	-
17	Annual Plan	2012-13	-do-	3643.69	-
18	Annual Plan	2013-14	-do-	4841.95	-
19	Annual Plan	2014-15	-do-	4760.23	
20	Annual Plan	2015-16	-do-	3351.20	

Source: J&K Planning Deptt.

# 5.4 ACHIEVEMENTS OF BATOTE FOREST DIVISION DURING FIVE YEAR PLANS

5.4.1 The year wise achievements by Batote Forest Division and the total expenditure incurred in various restoration works is given Year wise in the table 5.2 on the next page.

TABLE 5.2       STATEMENT SHOWING PLAN ALLOCATION (RS IN LAKH) FROM 2000-01 TO 2015-16 IN BATOTE FOREST DIVISION																
Head	10th Fiv	ve year	11th Five year Plan			12th Five year Plan				13th Five year Plan						
	Plan					<u> </u>				l						
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Distt. Plan (Doda Distt)	0.00	0.00	0.00	0.00	0.00	0.00	9.17	2.00	2.00	2.30	2.30	3.30	3.30	2.30	2.30	2.30
Distt. Plan (Ramban Distt)	5.00	5.74	6.00	6.00	6.00	0.00	0.00	6.84	6.84	7.89	7.89	7.89	7.89	5.92	5.92	5.92
RDF (State Plan)	7.00	7.00	7.00	7.00	7.00	0.00	7.20	4.00	5.00	7.00	6.32	9.20	8.21	6.85	6.85	0.00
HCMPAP (State Plan)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.75	4.00	0.00	3.79	4.21	1.89	2.00	2.00	10.00
Dev. Of conifer (State Plan)	2.00	4.00	2.50	3.00	3.50	0.00	1.20	0.60	0.70	2.00	2.00	0.94	1.80	1.00	2.50	0.00
Buildings	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.99	9.00	2.50	2.40	0.00	0.00	0.00	0.00
CAMPA including addl. Funds	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.57	47.63	103.58	98.27	79.53	60.29	100.54
SDRF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00
Publicity etc	0.00	1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forest Protection	0.00	8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eco-fuelwood	1.00	0.52	1.50	1.00	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CSS																
12th FCA	0.00	0.00	0.00	0.00	0.00	0.00	4.69	12.27	0.00	23.52	10.00	0.00	0.00	0.00	0.00	0.00
13th FCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28.49	13.00	0.00	13.00	53.00	0.00
Intensification of Forest Management	0.00	0.00	0.00	0.00	0.00	0.00	4.27	0.50	0.44	0.00	0.91	4.40	3.48	0.00	0.00	6.28
BRGF (Doda Distt)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.87	0.00	2.50	0.00	2.00	3.00	0.00
BRGF (Ramban Distt)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	12.01	21.30	0.00
FDA	0.00	0.00	20.39	30.31	52.33	25.00	16.36	118.56	66.43	135.51	34.88	55.89	76.56	73.39	0	15.68
Grand Total	15.00	27.06	37.39	47.31	70.03	25.00	42.89	148.52	93.40	204.66	156.71	207.31	201.40	198.00	172.16	140.72

5.4.2 As can be observed from perusal of the above table, the allocations under various schemes to the Division are very meagre. It is an unfortunate aspect of planning that forests, the very resource which is the basis of the agricultural development, climate change mitigation and water security is being neglected as far as fund allocation is concerned. The targets specified are not thought out in detail, nor are schemes planned with any concerted long-term action plan in mind. Forests grow slowly, they give returns slowly, and they also absorb changes unleashed by unsustainable development slowly. In the case of planning for our forest wealth, we should also slow the pace down, while expanding the duration of the planning activity.

## Chapter -VI

# Staff and labour supply

#### 6.1 Staff

6.1.1 There has been a marginal increase in the sanctioned strength since the inception of the last plan. Unfortunately however, the actual strength, especially of Foresters and Forest Guards, is considerably less than the sanctioned strength. In the face of ever increasing workload, this has made the task of forest management and protection even more difficult.

S.No.	Designation	Pay Scale	Sanctioned strength	Working strngth
Ex	xecutive	L	L	1
1	Deputy Conservator of forests	9300-34800	1	0
2	Assistant Conservator of forests	9300-34800	1	1
3	Range Officer Grade -I	9300-34800	4	1
4	Range officer Grade -II	9300-34800	1	1
5	Forester	5200-20200	25	5
6	Deputy Forester	5200-20200	7	2
7	Forest Guard	5200-20200	72	56
8	Malies	4440-7440	2	3
9	Watcher	4440-7440	0	8
10	Chainman	4440-7440	0	2
11	Lab. boy	4440-7440	0	2
Mi	inisterial	·	·	
1	Accountant	9300-34800	1	0
2	Senior Assistant (HC)	5200-20200	1	0
3	Jr. Assistant	5200-20200	6	5
4	J. Driver	5200-20200	1	1
5	Orderlies	4440-7440	4	9
6	Chowkidar	4440-7440	6	6
7	Helper	4440-7440	0	2
8	Sweeper	2550/PM	1	1

Table 6.1The staff strength of Batote Forest Division as on 31.03.2017.

- 6.1.2 Though the increase in staff has been made during 2009-10 but as is evident from the above statement the Working Strength never remained at par with the sanctioned strength which results burden on the staff and affects badly the overall functioning of the Division in respect of protection and other activities. The Working Strength needs to be made at par with the sanction strength.
- 6.1.3 With the construction of various projects/roads in the Batote Forest Division by the various agencies (PWD/PMGSY/NHIA) huge destruction of forests has taken place though compensated by way of money by the user agencies, the roads passing through the hearts of the forests will remain permanent threat to the forest by the vested interests. Erection of Forest Check posts has become a necessity on all these newly constructed/ under construction roads. The erection of Check Post cannot put a full stop over the unwanted activities but a semicolon. The existing sanction strength needs not only to be increased but the working strength made at par in the best interest of the management of the Forests
- 6.1.4 The list of the D.F.Os remained In charge of the Batote Forest Division from the date of creation of the Division is given in the table 6.2 as under;

S.No.	Name of the Officers	From	То
1	SP Khajuria , SFS	01-01-1982	14-02-1985
2	Y.S. Narsinghia, SFS	14-02-1985	07-02-1987
3	A.K.Tikoo, SFS	07-02-1987	31-08-1987
4	Zaffar Iqbal, SFS	31-08-1987	12-09-1987
5	M.S. Jamwal, IFS	12-09-1987	21-05-1990
6	M.M. Gupta, SFS	21-05-1990	10-06-1993
7	Abdul Razzak, IFS	10-06-1993	28-04-1995
8	Ravi Kumar Kesar, IFS	28-04-1995	31-06-1997
9	N.S. Kala, SFS	31-01-1997	06-05-1999
10	P.B. Malik, SFS	06-05-1999	31-07-2001
11	Vasu Yadav, IFS	31-07-2011	12-06-2003
12	R.K. Tiwari, IFS	12-06-2003	05-08-2005
13	M.M. Sharma, SFS	05-08-2005	12-06-2006
14	J.L.Wali, SFS	12-06-2006	30-04-2008
15	J.H.Mir, SFS	01-05-2008	30-05-2009
16	S.K. Raina, SFS	01-06-2009	22-01-2011
17	Ch. Mushtaq Hussain	22-01-2011	07.09.2012
18	Bashir Ahmed Shah, SFS	07.09.2012	31.08.2013
19	Mohd Amin Mir	31.08.2013	26.10.2013
20	Shahzad Chowdhary, SFS	26.10.2013	08.06.2015
21	Zahid Aslam Moghal, SFS	08.06.2015	27.08.2016
22	Amrik Singh	27.08.2016	Till date

Table 6.2Statement showing list of DFOs holding the post since its creation.

6.1.5 The total salary paid during the financial year 2015-16 is Rs 377.727 Lac as compared to Rs.82.68 lac during 2000-01.

## 6.2 Labour Supply

In the past there has been acute shortage of labour to be employed in forest working. Most of the work was carried out using labour from outside the division. However the labour now employed is mostly local.

After the Jammu and Kashmir State Forest Corporation took up working of the forests, the policy has been to employ local labour for the execution of the works. This division, by and large, has sufficient labour supply. Availability of local labour, however, is poor at the time of sowing and harvest of agricultural crops.

#### 6.3. Labour rates

The labour is being paid meager wages as compared to the other working class as a whole.

Government Order No and Date	Rates	From		
10-F of 1999 Dated:-10-02-1999	Rs.45.00 per day			
69-F of 2001 Dated:-19-03-2001	Rs.60.00 per day	01-04-2001		
253-F of 2004 Dated:-31-12-2004	Rs.70.00 per day	01-01-2005		
190-F of 2009 Dated:-31-08-2009	Rs.110.00per day	10-08-2009		
117-F of 2011 Dated:-19-04-2011	Rs.125.00 per day	Only for DRW's		
Sr. No.:Dated:4 <sup>th</sup> Jan,2013	Rs. 150.00 per day	Minimum wage		
		Act		

#### Table 6.3 The labour rates during the last decade;

## **Chapter VII**

# **PAST SYSTEM OF MANAGEMENT**

# 7.1 General History of the Forests

- 7.1.1 Very little is known about the ancient history of these forests. However, it is certain that prior to 16<sup>th</sup> century A.D. the forests of this Division formed a part of small territories ruled by chieftains. The tract was ruled by Rajput Kings of Katoch, Rana, Chib, Jaral, Manahas and Thakur clans. These petty chieftains were at constant enmity with each other and the area, under their control changed hands several times. I those days of war fare, people lived mostly on the tops of the hills for their safety. This is born by the fact that their places of worship and other stone monuments are found even now on the summits of the hills. The remnants of old civilization are still found in the forests near water springs, deserted agricultural fields and many others monuments of stone.
- 7.1.2 The country was subjugated by late, Sh. Maharaja Gulab Singh in the year 1849 AD. In the years that followed, the supremacy of the Maharaja on the local Chiefs 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 settle down in the plains of the Kandi. This is how the even age patches of the Deodar and Kail sprang up in the erstwhile fields.
- 7.1.3 In the earlier times, the administration of the forests was under the control of the Civil Authorities. The Wazir-I-Wazarat, being in charge of the district, while the Tehsildar under him used to manage the affairs of the Tehsil. One Moharrir with Wazi-i-Wazara, constituted all the office establishment deemed necessary. The filed used to be looked after by a Girdawar or Kumbedan,most often illiterate, in each illaqa with few Rakhas are Chaorassis under him. The Girdawar use to collect Rasum, or forest dues, initially from individuals and latter on from village communities as a whole, for various forest produce consumed and utilized by them. The Rasum used to be collected at will of the administration and no protection of forest was ever thought of. The forests were at will, and there was no control over the quantity of forest produce consumed by the locals so long as rasum was paid. Thus the forest was on the worked within object of getting some revenue from them.
- 7.1.4 There are no records available to show the extent to which these forests were worked for timber. It is stated that the felling for export of timber were stared

around Smvat 1912 (1855 AD) originally by the traders from Punjab and afterwards by the local contractor. The *pattas* and written permits, granting permission to fell a certain number of trees anywhere, were issued to the traders on payment of fixed sum per tree in advance. The permit holders therefore, mostly felled the trees at places they found most convenient and economical. Generally these contractors used to employee local labourers, who preferred to fell trees around their cultivation, near their villages and as close as possible to the floating streams. The timber was not sawn in those days and it was mostly extracted in the form of logs. Concentration of felling around villages resulted in the creation in large gaps, which are now covered with various Broad leaved species, depending upon the locality factors. This practice resulted in heavy felling in area near and around villages and stream, whereas, the areas away from the villages and floating streams, escaped heavy cut. The forests in such localities bear the evidence of devastation in the shape of stumps still standing in cultivation and blanks filled up useless undergrowth.

- 7.1.5 A regular Sate Forest department under the control of Conservator of Forests, Mr. J. Mac Donell was started in 1891 AD. Forest was split up to into beats, which were grouped to form various ranges. Effective steps were immediately taken to check illicit felling. Udhampur Forest Division, comprising, the Udhampur and Reasi Wazarats was forms under a Divisional Forest Officer in Samvat 1950(1893 AD). The Udhampur Forest Division then comprised the present Bhaderwah, Kishtwar, Doda, Ramban, Udhampur, Reasi and Mahore Forest Division. Forest regulation No.1 of Samvat 1951(1894 AD) was passed by the State Council and rules for the protection of the Forest property were drawn up under the said regulation. Demarcation commenced, and survey of boundaries was under taken. Gradually, the Forest department expanded its establishment to cope up with the work. Forest fires were discouraged. Many roads and paths to open up the country were constructed. Felling of green trees was discontinued for some times and energies of the department were devoted mainly on the extraction of timber from the felled trees, logs and sleepers left in the forests by the former workers, and also the felling of dying and deformed trees which were not to be expected to survive for long. In Samvat 1961(1904 AD), departmental working of Forest was abounded and the procedure involving sale of standing trees to the purchasers, as practiced by the Forest department of the other provinces, was adopted.
- 7.1.6 The Udhampur Forest Division split into Kishtwar and Reasi Forest Division in Samvat 1963 ((1906 AD), Kishtwar Division formed the northern part of Udhampur-Wazarat comprising the whole Kishtwar Tehsil. The Kishtwar Division at that time comprised
Kuntwara, Siraj, Marmat, Udil, Paddar, Nagsani, Dachhan, Marwah and Kishtwar Ranges. Batote-Lander ranges formed one of the Ranges of Reasi forest Division. In Samvat 1981 (1924 AD), Ramban Forest Division was created. Consequently, Kuntwara, Siraj and Marmat ranges from Kishtwar Division and Ramban-Banihal ranges from Reasi forest Division were excluded and transferred to the newly formed Ramban Forest Division. The Udil Range of Kishtwar Forest Division was also transferred to Ramban Forest Division by the end of Samvat 1988 (1931 AD). The present Batote and Gandhri Ranges constituted only Batote range of the then Reasi forest division till Samvat 1975 (1918 AD). Udhampur Forest Division was constituted in the Samvat 1982 (1925 Ad). Batote and Gandhri Ranges transferred from Reasi forest division to form a part of newly constituted Udhampur Forest Division. Somewhere in the mid thirties, Marmat Range of Ramban Forest Division was transferred to Bhaderwah Forest division for administrative convenience. The above organization set up continued up to the year 1954 A.D. when the Ramban Forest division and Doda Forest Division were constituted as a result of reorganization of the then Ramban and Bhaderwah Forest division. Consequently Ramban and Banihal Ranges from the then Ramban Forest Division and Batote-Gandhri Ranges from Udhampur Forest Division were transferred to form the Ramban Forest Division, with its headquarter at Batote three Ranges namely Siraj, Kuntwara and Udil from the then Ramban Forest Division and Marmat range from Bhaderwah Forest Division were transferred to constitute Doda Forest division with its head guarter Doda.

7.1.7 The present Batote Forest Division Comprising Batote, Gandhri and Marmat Ranges which were transferred from Ramban and Doda Forest Divisions respectively, can into being with effect from January 1982 as a result of the Re-Organization of the erstwhile Ramban and Doda Forest Divisions, in pursuance of Government Order No:-34-FST of 1981. Simultaneously, the Soil Conservation Range, Batote of the erstwhile national Highway Division Batote was transferred to Batote Forest Division. Also the Soil Conservation Banihal, was transferred to Ramban forest Division resulting in winding up of National Highway Forest Division.

#### 7.2 Past System of Management and their results

The brief History, as discussed above, clearly indicates that the present Forest Division has been constituted of two distinct forest area namely Batote- Gandhri and Marmat ranges. Since these ranges have formed parts of different Forest divisions prior to their inclusion in the present Batote Forest division, these have been treated under separate plan and the past systems are discussed separately for these two units.

#### 7.2.1 Marmat Range

There was no working Plan for Marmat in the early stages and the forests were worked under selection-cum-improvement system. The markings were left to the discretion of the marking officer, who usually used to be a forest guard or a forester. This resulted in heavy and haphazard felling.

## 7.2.1.1Syed Mehdi Hussain Plan for Kishtwar Forest Division (1908 to 1927).

Marmat forests were brought under regular working plan for the first time in 1908 AD under the Working plan for Kishtwar Division prepared by Syed Mehdi Hussain. This plan remained in operation for 20 years till year 1927 AD. The significant feature of this plan was the division of the forests into two working circles namely Working Circle I and Working Circle II. Working circle I comprised the workable and accessible forests whereas Working circle II included all the inaccessible and unworkable forest under this plan.

The forests formed a part of one felling series. The silvicultural system adopted, advocated the felling of trees above 7'.6" girth on selection lines. Felling cycle was fixed at 14 years. Yield was fixed in terms of mature first class tree of Deodar only. Other species were ignored. In view of the intensity of grazing, the Working Plan Officer reduce the calculated yield by half until the control of grazing was vested in the Forest Department. Other subsidiary operations were prescribed for improvement of the forests.

#### **Result of the Plan**

Only the prescriptions related to the felling were carried out. Rest of the prescriptions under this plan were ignored which resulted in heavy felling and the safe guard introduced by reduction of yield was lost sight of. The forests were worked to the full possibility, though the control over grazing did not vest in the forest department to the extent required under the plan.

# 7.2.1.2Bhai Sher Singh's Plan Samvat 1985 to Samvat 1994 (1928 to 1937) for Ramban Forest Division.

Bhai Sher Singh's plan for Ramban Forest Division, which included Marmat Forest also, came into operations from Samvat 1985. The following working circles were formed:

- (i) Uniform Working Circle
- (ii) Selection Working Circle.
- (iii) Improvement Working Circle.
- (iv) Unregulated Working Circle
- (v) Un commercial Working Circle

The area of this range was allotted amongst all the above working circles except Improvement Working Circle. Felling was conducted in first two working circles. In both these working circles, Marmat was coupled with Siraj range of the then Ramban Forest Division to form Central Felling Series

## (i) Uniform Working Circle

Uniform Working Circle for Deodar and Kail forest was introduced for the first time under this plan. The silvicultural system introduced was Modified Shelterwood Compartment system. A rotation of 120 years was adopted with an exploitable diameter fixed at 20"d.b.h for Deodar and 29"d.b.h for Kail. Five periodic blocks were formed with a regeneration period of 24 years only. PB-I was definitely allotted, whereas other PB's were grouped and designated as PB unallocated. Complete enumeration in 6 inch diameter classes were done in the regeneration block down to 12"d.b.h. The yield was calculated by applying Cotta's formula:

Annual yield (Y) = V+ (I x N)/2

Ν

Where:

V = Growing Stock of Regeneration block

I = Current Annual Increment

N = Regeneration period fixed at 24 years

No enumeration was carried out in the unalloted block and thus no yield was prescribed. Only cleaning and thinning was proposed according to a definite sequence. Considerable stress was laid on the artificial regeneration. Poles up to 12 inches d.b.h were included in regeneration and retained as a part of the future crop.

## (ii) Selection Working Circle

In the Selection Working Circle, areas situated on steep grounds which had not been previously worked, were included. Out of these, only selected areas enumerated. A felling cycle of 30 years was adopted with an exploitable diameter of 30"d.b.h. The compartments allotted to this working circle were 9,19,20,29,35,38,40 & 41. Yield was based on complete enumeration in 6" diameter-classes of Deodar, Kail & Fir down to 12" d.b.h in the compartments allotted to this working circle during the 10 years of the plan.

The yield was calculated by applying the Howard's Modification of the Von Mantel's formula:

#### Y= 2GS/R

Where:

GS = Growing stock down to 18" d.b.h standing in the enumerated compartments
R = Rotation, fixed at 153 years for Deodar, 125 years for Kail and 175 years for Fir

Complete rest was prescribed for the remaining compartments of this Working Circle. Due to the slump after the First World War, work in Selection Working Circle was stopped for four years after the introduction of the plan.

## (iii) Improvement Working Circle

None of the Compartments of this Range was allotted to this Working Circle which prescribed improvement operations to be carried over the entire area twice during the plan period. As usual improvement operations included the removal of dead and diseased trees.

## (iv) Unregulated Working Circle

In the unregulated Working circle miscellaneous marking were prescribed, besides taking up any suitable compartment for working, at the discretion of the Chief Conservator of Forests. No sequence of felling was laid. The selection of compartments was left to the discretion of the Chief Conservator of Forests.

#### (v) Un commercial Working Circle

This Working Circle included most of the high pasture ground, Fir and bane sari areas with a sprinkling of commercial species. No felling, except at the discretion of the Chief Conservator of Forests, was prescribed in the working circle.

#### Results of the plan

The results of the Uniform Working, on the whole did not prove to be encouraging. Fellings were rather heavy on account of over calculation of yield and regeneration failed to come up. However, none of the compartments of the present Marmat Range were felled under this system.

# 7.2.1.3Bhai Sher Singh's working plan for Ramban Forest Division Samvat 1995-2002(1938 to 1947)

Bhai Sher Singh had the unique privilege of carrying out the prescription of his own plan himself and then revising his first plan as well. Bhai Sher Singh introduced the following prominent changes in his revised plan which covered the forest comprising Ramban Forest Division, including Marmat range which had already been transferred to Bhaderwah Forest Division.

- (i) Marmat Forests were treated as separate unit from the rest of the then Ramban Forest Division. Marmat was formed into a separate working circle to be worked under selection system.
- (ii) Uniform system, in view of the past results, was abandoned in the Marmat Forests in favour of selection system,
- (iii) The improvement, Unregulated and Un commercial Working Circles with slight modification, were grouped together to form the unregulated Working Circle.

Thus the following Working circles were constituted in this plan:

- (i) Uniform Working Circle.
- (ii) Selection Working Circle.
- (iii) Marmat Working Circle.
- (iv) Unregulated Working Circle.

The forests of Marmat Range were allotted to the Marmat and Unregulated Working Circle only.

#### Marmat Working Circle

Nearly all the commercial Deodar-Kail forests in Marmat Range were assigned to this working circle. These forests were generally steeper than those assigned from other ranges to the Uniform Working Circle. The system of management prescribed for this working circle resembled what was known as Modern Selection System, which is more elastic. This system advocated felling in the form of cleaning, thinning, improvement as well as secondary and final felling according to the requirement of the crop. This method is advocated primarily for forests containing large proportion of younger age classes. It has an advantage of lessening the sacrifice of immature trees, while encouraging the natural growth of even-aged groups and masses. A rotation of 150 years corresponding to exploitable size 30"d.b.h. was fixed for Deodar. A felling cycle of 30 years was adopted. The Marmat Working Circle was similar to selection working circle in all respects except that the yield was calculated by the formula G/30 where G is the volume of growing stock 30" diameter d.b.h and over, and 30 is the period in years, in which an average 24"-30" class tree reaches maturity. The yield was reduced by 5 percent in this case as well. The growing stock was taken to be more or less normal in distribution and no good tree below 30" was to be felled to discourage the cutting of immature stock.

The Compartments of Marmat Range allocated for working during the 12 years of this plan were 11,12,15,16,17,18,21,27,29,34 & 40.

#### **Unregulated Working Circle:**

This Working Circle comprised two kinds of forests viz. un commercial forests consisting chiefly of Fir and broad leaved species, whether pure or predominantly so, and such Deodar-Kail forests as could not be worked, either due to low density or poor quality, or as they were required to meet the local demands of the concessionists. Only miscellaneous markings to meet the requirements of concessionists, in accordance with Jammu Forest Notice, were prescribed in this working circle. However, selection felling in pure Fir Forests allotted to this working circle aiming at removal of mature and over mature stock were prescribed to be taken up in case the demand for Fir arose.

The compartments of Marmat Range allotted to this Working Circle were 13,14,22,23,24,25,26,30,31,32,33,36,37 & 38.

#### Results of the plan

The prescriptions of the plan worked well. However, due to some difficulties arising out of grouping of leases, all the compartments prescribed for felling were not gone over during the currency of this plan.

## 7.2.1.4M.L.Mehta's Plan for the Forests of Marmat Range in Bhaderwah Forest Division Samvat 2006 to 2015(1949 to 1958).

Bhai Sher Singh's second plan for Ramban Forest Division, including the then Marmat Range of Bhaderwah forest Division was revised by Mr. M.L.Mehta. This was the first separate plan for Marmat Forest since previously it was amalgamated with that of the Ramban Forest Division. Though these forests formed a separate working circle in the previous plan, the description of these forests was never given separately.

The Chief Conservator of Forests considered this plan a wash-out, for no pains had been taken by the Working Plan Officer in the revision of the plan. However, the yield of this plan was found conservative and thus adopted. For the purpose of allotment of compartments to working circles, the second plan of Bhai Sher Singh was extended over 20 years period. Mehta's plan was therefore nothing more than the yield check to Bhai Sher Singh's plan. The forests allotted for working from Samvat 2006 to 2015 were sanctioned by the Chief Conservator of forests from time to time, according to his personal knowledge of these forests. Compartments 38, 39 & 40 Marmat Range were worked under Selection Working Circle during this plan period. The period from Samvat 20006 to 2015 was a period of extreme deterioration in all aspects of territorial practices. Artificial regeneration operations were neglected. On the contrary, some already regenerated areas were taken up for cultivation by people during grow more food campaign and the younger crops utterly devastated. Much confusion was caused by the raids of Samvat 2004 and Forest lessees were completely dislocated and suffered heavy losses. Many compartments were worked under hygienic markings during the period, utilizing dead, dying and badly diseased trees which otherwise would have rotten.

#### 7.2.1.5 S.Sohan Singh's plan for Doda Forest Division (1958-59 to 1987-88).

Sardar Sohan Singh revised the Bhai Sher Singh's second plan. He constituted the following circles in his plan:

- (i) Deodar-Kail Uniform Working Circle
- (ii) Mixed Coniferous Working Circle
- (iii) Fir Uniform Working Circle
- (iv) Fir Selection Working Circle
- (v) Unregulated Working Circle

#### Marmat Working Circle was abolished.

Special features of this plan were the intensive creation of sub-compartments. Fir was mostly separated out from Deodar and Kail. Better regenerated portions were also set apart from the difficult and refractory areas and included in the Uniform Working Circle. Even aged crop was also segregated from the selection crop occurring on easy grounds. All colonizing Kail, both low and high level, was brought under Deodar-Kail Uniform Working Circle. The Fir and easier slopes was prescribed to be managed under uniform system for the first time in the history of Chenab Valley's Fir Forests. All the Fir Forests were brought under commercial category due to rise in its demand and price. Most of the un commercial forests in the previous

plan were placed under commercial category of forests. Intensive artificial regeneration operations were prescribed.

## (i) Deodar-Kail Uniform Working Circle

The working circle comprised all the valuable Deodar-Kail forests which were considered suitable for concentrated working due to their compact composition, accessibility, and easy slope. Three blocks were constituted i-e conversion block, unalloted block and converted block. Conversion block conformed to PB-I, unalloted to PB-II and PB-III and converted block to PB-IV & V. Conversion and converted block together constituted regeneration block. The forests were treated under modified Shelter wood Compartment system. Exploitable size was fixed at 27"d.b.h for Deodar and 24" for Kail and Fir. Rotation of 150 years was fixed to achieve the exploitable diameter of 27". Conversion period of 90 years was adopted.

## **Conversion Block**

Conversion block comprised of:

- (i) Forest with mature and over mature would deficient in re-generation, and
- (ii) Forest with plenty of regeneration with over wood.

None of the compartment from the present Marmat range worked under this block during this plan. Secondary- cum final felling in the first category with intensive artificial regeneration works for restocking the crop was advocated. Yield d from the entire working circle3 was based on the enumeration of the growing stock of green fit trees over 18" d.b.h. in the regeneration block. The yield was calculated using Von Mantel's formula.

Y = 2GS/R

Where:

GS = Growing stock over 18" d.b.h. and

R = Rotation fixed at 150 years. The yield figures so arrived were put to different checks and conservative yield was adopted.

## **Converted Block**

In this block three types of crops were distinguished:

- (i) Areas that were considered as regenerated from old PB-1 area.
- (ii) Areas that have been regarded as converted from former un allotted block.
- (iii) High level colonizing incipient Kail with scattered, diseased trees.

Complete removal of over wood in all the categories of converted block, except retention of some healthy Kail trees in the blanks was prescribed. Heavy cut Fir was prescribed in this block. The compartments of Marmat Range allotted to this Circle was 1b,2, 12a,13a,16,17b,20b,21b,21c,34a,35a,35b and 43b.

The yield was based on enumeration of growing stock down to 18" d.b.h. comprising green fit trees of deodar, Kail and Fir.. It was reduced by 10% on account of variation in stocking and other possible errors. The yield was lumped with conversion block. The yield was calculated on availability formula.

## **Un-allotted Block**

This block comprised mostly of middle aged and mature stands. Many of them were worked under hygienic- cum-improvement fellings and in most of the cases; they served as preparatory fellings, benefitting the crop materially. Thinning and improvement felling was prescribed. Heavy intensity of improvement felling was suggested in these forests where natural successions from Kail to deodar was in progress, with a view to have plentiful advanced growth by the time they come to be allotted to PB-I. Yield was based on enumeration of growing stock down to 18" d.b.h. Definite year wise sequence of fellings was laid down. Detailed marking rules were laid down for the guidance of the marking officer. An artificial regeneration programme for ten years for the failed area was suggested.

## (ii) Mixed Coniferous Working Circle

This working circle included forests situated on very steep slopes, comprising of deodar- Kail with varying proportion of Fir. Conservative pretreatments was prescribed in the form of selection fellings to free the regeneration, wherever present, or to induce it in deficient areas by judicious manipulation of the canopy. Deodar was intended to be favoured. Exploitable size of 27" d.b.h. for deodar and 24" d.b.h. for Kail and Fir, with rotation of 180 years was adopted. The whole Working Circle was treated as one felling series and a felling cycle of 30 years was adopted. The yield was based on enumeration down 18" d.b.h. and calculated after reduction of 10% on Von Mantel's formula:

Y = 2GS/R Where: GS = Growing stock over 18" d.b.h. R = Rotation.

The yield so calculated was put to availability formula check. Definite sequence of felling was prescribed. Detail marking rule were also given along with emphasis on subsidiary silvicultural operations.

#### (iii) Uniform Fir working Circle

For the first time in the Chenab Valley, a system of concentrated regeneration felling was introduced from some Fir forests in the Division. Fir was being managed previously on a limited scale under selection system. The major

factor guiding the constitution of this working Circle was case in which Fir was taken to be regenerating naturally in the areas allotted to this working circle.

Only compact, mature Fir forests with good amount of advance growth occupying easier slopes with fairly deep soil were assigned to this working Circle. Sprinkling of deodar and Kail patches were found mixed with Fir at places along the lower fringes and hotter aspects respectively. The silvicultural system adopted was Modified Shelterwood compartment System. To begin with, only such compartments were suggested to be taken up which had more or less adequate regeneration, and the over wood was required to be removed in a single operation over a large part of the compartment. The exploitable size was kept as 24" d.b.h. for all species with a rotation of 180 years. The rotation period was divided into six periods of 30 years each. Conversion period was also fixed at 180 years, equivalent to rotation, out of which 90 years were assumed to have elapsed and the conversion was to be completed in the remaining 90 years. In the regeneration block ( PB-I), definite areas were indicated. All the remaining five PB''s were collectively designated as unallotted block. Some of the PB-II areas were brought under regeneration block in order to treat them for preparatory fellings. Complete rest was prescribed for unallotted block.

Only compartment 24b of this Range was allotted to this working circle. The entire working circle was made into a single felling series. Yield was calculated on similar lines as that in the deodar, Kail uniform or mixed Coniferous Selection Working Circle .The yield calculated by the formula G/75 in case of deodar and Kail and g/90 in case of Fir was adopted after reducing it by 5%. Growing stock was enumerated down to 12" d.b.h and yield calculated according to the growing stock above 18" d.b.h detailed marking rules for guidance of the Marking Officers, and the subsidiary silvicultural operation with definite stress on intensive artificial regeneration operations were laid out. This working circle was not put into practice and was abandoned altogether in the year 1964 in pursuance of special orders from the Conservator of Forests, Working Plan and Research Circle, as it was considered to be dangerous to go in for such a system when much was not definitely known about the regeneration of Fir and also the terrain on the whole was not suitable. The Forests assigned to this working circle continued to managed under selection felling and other miscellaneous marking as described in Selection system. A separate yield control, however, was continued to be maintained for the working circle.

# (iv) Fir Selection Working Circle

This working circle comprised of Fir Forests which had not been included in the Fir Uniform working circle for reason of steeper slopes and precipitous, broken configuration of the ground, as also the lesser density of stocking, inadequacy of advance growth and preponderance of mature classes. Many of them formed catchment heads of nallas which necessitated conservative treatment. Deodar and Kail occurred in mixture. The forests were treated under selection system and the felling conducted to remove the exploitable size trees standing over established regeneration. In the crop below exploitable diameter, improvement markings were conducted. The whole working Circle was proposed to be gone over in 30 years. Exploitable size of 30" d.b.h for Dordar and Fir, and 24" for Kail, and a rotation of 180 years were fixed. The whole working circle was formed into one felling series. A felling cycle of 30 years was adopted. Enumeration was carried down to 12" d.b.h. The yield was regulated by exploitable trees based on the application of Brandis method. The yield was also calculated for the sake of comparison, by Von Mantel"s formula.

The yield figures so obtained were put to check by other formula and conservative yield was adopted. Detail marking rules and subsidiary silvicultural operations were laid down for the guidance of the marking officers and the territorial DFOs.

## (v) Unregulated working circle

This working circle included all other forests not included in any of the previous working circles, being either inaccessible and remote, forming nalla heads or being precipitous or poorly stocked or comprising mainly of banesari and Chir. These forests comprised of Fir,, commonly found over the Nalla heads. Deodar on precipitous portions, mostly mature to over mature and Kail at all levels and Chir along Chenab River. Kharshu, oak and Birch from extensive belt at higher level. Removal of over mature deteriorating stock in the accessible portion was recommended, whenever adjoining commercial compartments come up for working. Thinning was suggested in congested pole crop. Marking for concessionists was permitted on silvicultural grounds. Cultivation of drugs like Belladonna and Dhoop and raising of special class trees by artificial means and alternative closures to grazing was also suggested.

#### Results of the plan

The working plan of S. Sohan Singh was much improved and elaborate plan in comparison to the Bhai Sher Singh"s plan. Though treatment of forests' principally remained the same, yet the Forests were intensively divided into number of sub-compartments and many of the areas having even aged crops of Deodar and Kail

were brought into Deodar-Kail Uniform working circle from Selection Forests..Difficult area, and areas having inadequate regeneration and stocking in the PB-I Block were transferred to Mixed Coniferous Selection Circle. Fir Uniform Working Circle was carved out from the better Fir forests carrying certain amount of regeneration and situated on easy slopes. This working circle was suspended from operation by the Conservator of Forests W.P and Research Circle. Most of the un commercial Fir areas were brought for the first time under commercial category. Intensive regeneration operation and other subsidiary silvicultural operation were prescribed.

The plan though being exhaustive and elaborate did carry certain serious draw backs. These are enlisted as under:

- (i) The PB-I. area transferred to Selection Working Circle further deteriorated so far as its regeneration was concerned. The mature crop suffered most and dried up, with the result broad leaved species gained a strong footing in these subcompartments/compartments. The compartments which remained under regeneration works during the past plans should have been pursued vigorously, to take the management of these forests ahead, rather than ignoring them by prescribing less intensive management as envisaged under the selection working circle.
- (ii) Secondly, the area carrying high level incipient Kail were also assigned to Deodar-Kail Uniform Working Circle, unsuitable for concentrated regeneration felling as they formed the heads of Nalla catchments and occupied protection belt. These should not have been prescribed to be treated under Uniform System, for reasons of inviting soil erosion.
- (iii) The areas undergoing a nature secondary succession appeared to be that of Deodar and Fir, because at places, the remnant seed bearers and patches of these crops are present. This secondary succession is now in progression and is still gaining hold of these areas and it was not advisable to check this.
- (iv) The inclusion of fresh area in the converted block of Deodar-Kail Uniform Working Circle, swelled the area of this working circle. The area already in hand for conversion over the 30 years were altogether lost sight of and new areas transferred to this working circle were taken up with the result that the mature crop in the old PB-I areas deteriorated and broad leaved species like Parrotia and Viburnum invaded and suppressed the regeneration. These areas therefore, failed to regenerate within the stipulated regeneration period and continued

much beyond the regeneration period without any avail. This made the future management difficult and the conversion of more commercial and valuable forests virtually come to a halt.

- (v) Some of the commercial areas transferred from unregulated working circle proved difficult for working as they were only partly workable and bulk of them were not suited for working. The ambitious felling groups prescribed for working were very extensive carrying large number of compartments at a time. It proved difficult, to strictly follow them in actual practice.
- (vi) No definite annual area control check was prescribed for the regeneration block and the progress of the plan, therefore, could not be ascertained during any stage of the plan period with the result large areas were left.

The achievement of the plan in realizing the yield over a period of sixteen years from 1958-59 to 1973-74 in each working circle in whole of the division is tabulated as below:

Name of the Working Circle	Percentage of Prescribed Yield Actually realized
Deodar-Kail Uniform Working Circle a. Regeneration Block	34%
b. Unalloted block	58%
Mixed Coniferous Selection Working Circle.	36%
Fir Selection Working Circle.	37%
Fir Uniform Working Circle.	25%

Though the overall level of yield realized during the currency of this plan remained very low , yet the cut over the Deodar in all the working circles was comparatively heavier then the other conifers. The yield from the area allotted for working under Fir uniform working circle was realized in the form of light selection cum- improvement felling. So far as the actual carrying out of the prescription of the plan was concerned, they were ignored by the territorial staff. Confusion prevailed over the area and allotment in conversion and regeneration block. The regeneration block as a whole, was sometimes confused with conversion block, which in fact formed a part of the former. Further, markings rules laid down for converted block in fact related to conversion block and vice versa. Such errors for want of errata create lot of confusion and difficulty at the time of markings.

No attention was paid to the restocking of felled area by artificial means, which remained only an important prescription in the plan. No subsidiary cultural operations were carried out. Unhygienic conditions prevails both in the young generated areas and the compartments felled during the currency of the plan. None of the old PB-I areas of the previous plan could be declared fully generated. The plan was only followed broadly to realize the yield. Annual revenue largely depends on the market demand. The yield of the plan went in arrears; sowing and planting were altogether lost sight of.

Neither any new roads were constructed during the plan period nor were any effort made to maintain the old roads. Scant attention was paid on maintaining the compartment histories. The control form for the Deodar-Kail Uniform working circle were not maintained separately for each block as had been prescribed. The control form "C" was never maintained in the Division.

#### 7.2.1.6 S Y S Narsinghia plan for the Doda Forest Division 1978-79 to 1987-88.

Though S. Sohan Singh had fixed 30 years as plan period for his plan, yet it remained in operation for eighteen years only. He had suggested an interim check of his plan after fifteen years of the plan period which, although was carried out by Mr; M. S . Jamwal, yet its prescriptions could not be implemented. S .Sohan Singh plan was revised by S Y S Narsinghia. In his plan, S Y S Narsinghia divided the forests of the then Doda Forest Division, of which Marmat was one of the Range. Into the following six working Circles;

- (i) Deodar Kail Uniform Working Circle.
- (ii) Mixed Coniferous Selection Working Circle.
- (iii) Fir Selection Working Circle.
- (iv) Improvement Working Circle.
- (v) Reboisement Working Circle.
- (vi) Unregulated Working Circle

Constitution of Improvement Working Circle and Reboisement Working Circle in addition to the ones in the past plan, with special objectives of treating the old failed PB-I areas and high level incipient Kail occurring over bare hotter slopes along south western aspect was a significant feature of the plan. Also, the growing stock assessment was made by adopting a new and advanced technique of point sampling.

## (i) Deodar – Kail Uniform Working Circle

The working circle comprised all valuable commercial deodar-Kail forests deemed fit for concentrated regeneration felling due to the compact mature of the stand, easy accessibility and occurrence over comparatively gentle sloes. This working circle included some Fir which could not be set aside as separate sub-compartment. High level incipient Kail which formed a part of the forests constituting deodar-Kail Working circle in S. Sohan Singh's plan was transferred to Reboisement working circle . Modified Shelter wood, compartment system was prescribed for managing these forests with an objective of converting then to more or less uniform crop. This system advocates , besides concentrated regeneration, selection-cumimprovement fellings over steeper hill slopes.

A rotation of 140 years corresponding to exploitable size 60 cm d.b.h for Deodar, Kail and Fir with a regeneration period of 20 years and conversion period of 60 years from the start of this plan were fixed. Entire working circle was made into one felling series. Yield over the entire working circle was calculated in terms of fit growing stock 40 cm d.b.h and above, proposed to be removed over 60 years. An allowance for mortality at the rate of 10, 20 & 30 percent for Deodar, Kail and Fir respectively was allowed before rendering yield calculations. Annual yield prescribed for working circle was fixed at 2.14m3 per hectare per annum which was 1.14 percent of the total fit growing stock comprising of trees 30 cm d.b.h and above in relation to the total commercial area of the entire working circle.

The working circle comprised of three floating periodic block i-e conversion block, converted block and unalloted block. Conversion and converted block together constituted the so called regeneration block.

#### **Conversion Block**

This block included two categories:

 The area having mature and over-wood with or without adequate regeneration. In this block, crop up to 50 cm and above in case of Deodar and 40 cm and above in case of kail (when standing over adequate and establish regeneration) was considered as over-wood and prescribed to be felled, leaving a few mother trees. The growth of Deodar, Kail and fir up to 40 cm d.b.h was considered as advance growth. Fir was prescribed to be treated under Light Selection felling with exploitable size of 60 cm. d.b.h . All trees above 60 cm d.b.h, if Silvicultutrally available, were prescribed to be marked and in trees below 60 cm d.b.h only, hygienic and improvement felling were prescribed.

2. The area had already been gone over for regeneration felling during the past plan but could not be regenerated fully as yet. Artificial measure to regenerate these areas with removal of over-wood from congested patches was prescribed.

The yield from conversion block was calculated in terms of fit growing stock of 60 cm d.b.h and over, prescribed to be removed in 10 years and the yield worked to be 59.45 m3 per hectare at the rate of 31 percent of the average growing stock per hectare in relation to commercial area of this block were prescribed.

## **Converted Block**

This block included the areas having adequate and established regeneration after regeneration felling with due proportion of mother trees/seed bearers. In this block, B and C grade thinning respectively up to 30 cm and 30 to 40 cm diameter class was prescribed. All trees above 60 cm in this block were prescribed to be removed in the form secondary cum final felling.

A thinning cycle of 20 years was adopted. The yield from converted block was estimated in terms of the availability of the trees of harvestable size in diameter classes 40-50 cm d.b.h and above. The following availability percentages were assumed.

Species	Above 60 cms	50-60 cms	40-50 cms
Deodar	85%	35%	33%
Kail	90%	43%	33%
Fir	90%	30%	15%

The available stock was arrived after deduction of allowance for mortality at the rate of 10,20 and 10% for deodar, Kail and Fir respectively. The growing stock so arrived was divided by 30,trhe number of years calculated as exploitable period . The yield worked to be 63 Cum per hact per annum at the rate of 32 % of the average growing stock per hact in relation to the commercial area of this block proposed to be treated during the plan period.

#### **Unallotted block**

In this block, only hygienic and improvement felling and thinning of C grade in congested patches, and light crown and thinning in middle- aged crop was prescribed under a thinning cycle of 20 years. Removals above 30 cm d.b.h were accounted towards yield.

#### (ii) Mixed coniferous Selection Working Circle

This working circle included deodar-Kail forests occurring pure or mixed with varying proportion of Fir situated on steep to very steep and rugged hill slopes . Concentrated regeneration fellings were not feasible on account of poor stocking and considerations for protection of site against soil erosion,.

The forests under this working circle were prescribed to be managed under selection system with some modification to be exercised depending upon the requirement of the site and crop. Entire working circle constituted one felling series. Rotation of 150 years corresponding to exploitable size of 70 cm d.b.h for deodar and 60 cm d.b.h for Kail and Fir under a felling cycle of 30 years was adopted. Yield was calculated by adopting Brasnett's modification of Brandi's formula in terms of number of trees of exploitable size available for felling. The yield in relation to the commercial area of this working circle to be treated during the plan period was calculated at 30 cum per Hact per annum at the rate of 28% of Fir growing stock per Hact. Area check over the volume yield was also prescribed. The compartments of Marmat Range suggested to be worked on priority during this plan were 20c,65,38,56,57,72,73,62,64,43a.

Detail prescriptions for regenerating the areas deficient in regeneration, artificially, were laid down for the guidance of the territorial DFO.

#### (iii)Fir Selection Working Circle.

This working circle comprised all accessible commercial Fir forests occurring on various types of hill slopes either pure, or mixed with Spruce, deodar, and Kail in varying proportion. Fir forests, which formed uniform working circle of S. Sohan Singh's plan, were included in Fir Selection working circle. Selection system, which advocates light selection felling of trees of exploitable size subject to silvicultural availability without creating any permanent gap was prescribed. A rotation of 180 years corresponding to exploitable size 60 cm d.b.h in case of Fir And Kail and 70 cm d..b.h for Deodar with felling cycle fixed at 30 years was adopted. The whole working circle consisted of only one felling series. Yield was calculated in terms of

number of trees of exploitable size available, based on the calculations made by the application of Brasnett's modification of Brandis method of

Yield regulation. The yield , in relation to the commercial are of the working circle proposed to be gone over during the plan period , arrived at 84 cum per hact per annum which works out to 23% of the total growing stock in the entire working circle. An area check over the volume yield was prescribed to be exercised. The compartments which were proposed to be worked during the plan period on priority were 20a,30,31,37,and 35c. Detail marking rules and prescriptions for restocking the area by means of artificial regeneration were laid down for the guidance of the territorial DFO.

#### (iv)Improvement working circle

The working circle, as already discussed, was an addition over the working circles, constituted by S.Sohan Singh in his plan. The working circle included mostly all old PB-I areas of deodar-Kail uniform working circle, where on account of neglect, lack of subsidiary silvicultural operation, heavy grazing and human pressure, the regeneration had failed to come up. This working circle included failed areas of regeneration block and a few compartments of unallotted block of previous plan occurring very close to human habitation. This ground is mostly covered by broad leaved species which hindered the growth of existing as well as prospective regeneration. The forests contained matured and over mature trees, either with inadequate patchy regeneration or without it. The fast deteriorating matured stock warranted immediate removal by way of improvement felling intensive artificial regeneration operations, coupled with cleaning and shrub cutting, were prescribed to be followed immediately after improvement felling.

Although no silvicultural system as such was prescribed to manage these forests, yet improvement felling including regeneration, selection and hygienic felling according to the local requirements of the crop was prescribed. Intensive measures for regenerating the area immediately after such fellings were prescribed and the annual targets with regard top area to be tackled for regeneration was fixed .The growing stock assessment was although made in this working circle also, yet no yield was prescribed. Any felling on account of improvement operations were prescribed to be accounted for yield from uniform working circle.

#### (v) Reboisement working circle

This working circle included all incipient high level Kail forests with negligible proportion of Deodar and fir occurring along very steep to precipitous, bare, high

mountainous slopes with shallow soi8ls. This working circle consists mostly of the forests which were included in the converted block of Deodar-Kail Uniform working circle of S.Sohan Singh's plan. Because of their occurrence in the upper catchment area of main drainage system of this division, strict protection to these forests was prescribed on account of soil and site protection and water conservation. Complete rest was prescribed to these forests. Only concession marking was allowed to the concessionists if there is no other area falling in the proximity of the habitation from where such marking could be possible. Only diseased seed bearers were to be marked for this purpose. These markings, when carried out were to account for yield from Mixed Coniferous working circle. The growing stock was assessed but no yield prescribed. The blank areas were prescribed to be regenerated through artificial means. None of the compartments of Marmat range was, however, allotted to this working circle.

#### (vi)Unregulated Working Circle

This working circle comprised all other forest areas not covered by any of the above working circles, being uncommercial, as situated on precipitous slopes where working is impossible. Chir and banesri forests along the River Chenab formed a part of this working circle. As the name suggests, nothing was regulated in this working circle. Complete rest was prescribed to be given to these forests for reasons of soil conservation and site protection. Only concession marking, in unavoidable circumstances, was allowed. Prescriptions for control grazing and closure of area were also laid down.

#### Results of the plan.

The Working plan for the erstwhile Doda Forest Division, revised by Mr. SYS Narsinghia, came into operation w.e.f. 1978-79 for a period of 10 years. Marmat Range was included in the revision consequent to its transfer to Batote Forest Division. The prescriptions of the plan, relating to felling, were implemented fully with the result there was excessive removal of timber from some of the compartments. The plan prescriptions relating to regenerating the failed area and the area requiring protection and improvement were ignored. The working circle wise achievements of this plan are given below.

#### **Deodar-Kail Uniform Working Circle**

The pace of conversion remained slow and practically no area can be said to have been fully converted during the plan period. The yield was calculated by the working plan officer on the basis of many assumptions. The calculation of yield has been made on the basis of the tree count arrived as a result of point sampling carried all over the area of this working circle spread in all the ranges of erstwhile Doda forest Divisions. The total harvest from this circle was 17000cum of kail and 21000 cum of fir. Thinning and cultural operations which were prescribed to be carried out during his plan was totally ignored. A few hundred of poles were extracted from here and there by forest department on road side. Subsidiary silvicultural operations have remained, by and large unattended.

## **Mixed Conifer Working Circle**

A sizeable of this Range constituted the above working Circle. A large area was gone over during the plan period and 15500 cum of deodar and 35700 cum of Kail and 6900 cum of Fir was harvested from the area of this Working Circle. No silvicultural operation was carried to benefit the Forests.

## Fir selection working Circle

Only a few compartments of this Range constitute Fir working Circle. Extraction to the tune 500 cum of deodar and 1500 cum of Kail and 4200 cum of Fir from 24/M and 30/M was affected. No subsidiary operation has been carried out in this working circle.

Nothing worth mentioning has been done for improvement or Reboisement of forests allotted to improvement and Reboisement working Circle. Unfortunately the prescriptions laid down by the working Plan Officer have remained confined to the pages of the working Plan only.

#### 7.2.2 Batote and Gandhri Ranges.

As discussed under general history of the Forests above Batote and Gandhri (Erstwhile Lander) Ranges had never been a part of those divisions of which Marmat Range was a part, till the constitutions of Batote Forest Division in the year 1982. The Working Plan they were managed were, therefore, different from those under which Marmat Range was managed. Batote and Gandhri Ranges have been a part of Reasi, Udhampur and Ramban Forest Divisions in the past. Accordingly, the management history of the forests included in these ranges is discussed in the text that follows.

## 7.2.2.1HANS RAJI'S PALN SAMVAT 1972 (1915)

These forests were managed under scientific management for the first time in 1972. (1915) when Hans Raj Assistant Divisional Forest Officer prepared the first Working Plan. The Plan had the following Working Circles;

# (i) Selection Working Circle

This Working Circle included Deodar, Kail and Chir forests with large proportion of mature tree. The system adopted was Indian Selection system with a felling Cycle of 14 years. The exploitable limit was fixed for at 7'.5"g.b.h. Deodar and Fir, 7' d.b.h. for Kail and 6' 3" d.b.h. for Chir.

## Result

Forests were heavily worked.

## (ii) Improvement Working Circle

This Working Circle contained Kail forests and comprised of two categories, namely, A and B. The A category of the working Circle contained crop heavy mostly mature and malformed trees whereas B category contained young crop of deodar-Kail, requiring thinning and other improvements. The felling cycle for A category was 14 years and for B category it was 17 years.

## Result

- (i) Improvement could not be done actually in the category of A Working Circle, as the number of exploitable trees estimated to be present in the forests was much less then the number of such trees actually present
- (ii) In the B category of the Working Circle, thinning could not be carried out due to the high cost and other limitations.
- (iii) Yield was prescribed by the area but the exploitable trees were less than the number prescribed in the yield.

## (iii) Coppice with standard working Circle

This Circle was formed to meet the demand for fuel in Batote and Maître towns and included compartments lying in the vicinity of Banihal cart road (Now NHIA).

## Result

This circle also proved a failure for want of regular series of coupes.

## (iv)Unregulated Working Circle

All inaccessible and depleted forests, requiring rest for 14 years were allotted to t this Working Circle.

## Result

Uncontrolled grazing and frequent fires further deteriorated the condition of these forests.

## 7.2.2.2 Samler's Plan Samvat 1985-95 (1928-1938)

Mr. Samler observe that the working under selection system was less intensive and was un suitable to create proper conditions for the natural regeneration of Deodar,

Kail and Chir. He thus favored the adaptation of uniform system to convert to uniformity all the accessible Deodar, Kail and Chir Forests. He constituted the under mentioned Working Circle.

# (i) Deodar Kail Regular Working Circle

It converted all the accessible Deodar- Kail forests in the track. The system adopted was Shelter Wood compartment system.

## Result

Regeneration felling were conducted in areas having mature crop practically devoid of regeneration. The regeneration did not come up to the expectations and thus greatly fell in arrears. Artificial regeneration was induced in most of the compartments by patch sowing. It

has given excellent results in compartment 76, 78/Gandhri Range. Apart from that, regeneration in the most of the compartments is still in arrears.

## (ii) Chir regular Working Circle:

All the Chir bearing compartments with Deodar- Kail patches at the top were allotted to this Working Circle. The silvicultural system was adopted was Shelter Wood compartment.

#### Result

- i. The prescriptions of the plan were not followed rigidly and no cultural operations were carried out. The result was that the regeneration fell in arrears.
- ii. No proper control was exercised over uncontrolled grazing and repeated fires in the locality, which led to the future deterioration of the crop.
- iii. Though the fixed periodic blocks were allotted, yet these were far from normal. It was not advisable to try to shift compartments to equalize periods theoretically. A rotation of 120 years with a regeneration period of 30 years was fixed. One fourth of the area was allotted to PB-1 and this area had to be regenerated within 30 years instead of 20 years. Though most of the forests were open, yet no work was prescribed except in PB-1 areas. Enumeration was carried down to 12"d.b.h. The yield was calculated by the formula:

Where V, is the volume of PB-1, 1 is the current annual increment; and P,

the regeneration period.

## (iii) Unregulated Working Circle

The working Circle covered the steep and precipitous areas and fir forests of poor quality and density. Complete protection was prescribed to be given to the compartments allotted to this working circle.

#### Results

No protection was afforded to the crop in this working circle against heavy grazing and uncontrolled repeated fires, which further deteriorated the crop.

# 7.2.2.3 JL Khushoo's Plan Samvat 1996 to 2005 (1939 to 1948)

Samler's plan was revised by Sh. JL Khushoo in 1939 and the following working circles were constituted.

# (i) Deodar-Kail Regular Working circle

The Uniform system adopted during Samler's plan was continued. Old PB-1 areas, which had regeneration in arrears, were continued by PB-1 and V were grouped together and named as regeneration block. Rotation was fixed at 150 years, against 120 years in the previous plan. Regeneration period of 30 years was fixed. Only PB-1 and PB-V areas were defined. PB-V areas comprised of compartments containing sufficient advance growth with scattered over-wood.

Yield was based on complete enumeration of the growing stock down to 12"d.b.h. Yield was mostly secured from the regeneration block and the balance from thinning and improvement fellings in the intermediate block. In the regeneration block, everything up to 21"d.b.h was considered as advance growth. The entire volume of 12"-18" diameter class consideration for calculating the yield. The yield of the entire Working circle was worked out by Von Mantel's formula as under:

Y = V/75

To give allowance for ignoring the increment it was further calculated by the formula:

Y = V/100

The yield for regeneration block was calculated by dividing the total volume of growing stock in the block minus the volume of 12"-18" class and half of the volume 18"-24" by the period during which regeneration felling were to be completed in regeneration block.

The yield for intermediate block was calculated by subtracting the yield for regeneration block from the yield of the entire working Circle.

## Results

- i. Prescriptions of the plan regarding post harvest cultural operations were not followed rigidly and regeneration work fell in arrears.
- ii. Uncontrolled fires and heavy grazing further deteriorated the crop.

# (ii) Chir Regular Working Circle

The Chir forests were worked under uniform system and a rotation of 150 years, instead of 120 years in the previous plan, was fixed. Regeneration period of 30 years was prescribed. The working circle was theoretically split up into five period blocks, each having its area equal to one fifth of the area of the working circle. The PB-1 areas, which has regeneration in arrears, were prescribed rest for 10 years i-e the period of the plan so that regeneration is completed. Complete enumeration down to 12"d.b.h was carried out.

## Results

- Prescriptions of the plan were not followed vigorously and thus the failed PB 1 areas showed no improvement in regeneration.
- ii. Heavy grazing and repeated fires in the locality further deterioration the conditions of the crop.
- iii. As a result of heavy incidence of grazing and repeated fires, coupled with weak geological formations of the area, the process of erosion accelerated in the tract, thus causing mage to the forest crop.

## (iii) Batote Location Working Circle

The Working Circle included some Deodar-Kail compartments and one Chir compartment situated along the national Highway and on Batote-Bhaderwah road. These were such compartments as had not been worked in the past and could meet the annual demand for timber in Batote and Udhampur town regularly, without taxing the compartments in the vicinity of Batote town, whose preservation and maintenance was necessary to preserve sylvan beauty of the Batote town. Selection felling had been prescribed in this working circle with and exploitable diameter of 30 inches. A rotation of 150 years with 10 year felling cycle was fixed.

## Results

- i. Since there was no regular sequence of felling, some of the compartments near Batote have been overworked.
- ii. The local demands were also met from other forests in the vicinity of the town, thus this working circle had no importance.

# (iv) Unregulated Working Circle

All compartments lying on precipitous slopes with crop of poor quality and density, and fir bearing compartments were allotted to this working circle. Complete rest was prescribed to the compartments allotted to this working circle.

## Results

No protection could be afforded to the crop in this working circle against heavy grazing and uncontrolled repeated fires, which further deteriorated the crop.

# 7.2.2.4PC Gupta's Plan Samvat 2006 to 2015 (1949-1958)

Khushoo's plan was revised by Sh. PC Gupta, but the draft remained unchecked and never came into operation. Gupta's plan had the under mentioned working circles.

# (i) Deodar-Kail Regular Working circle

All easily accessible Deodar-Kail forests were assigned to this working circle. These compartments included some Fir and Chir portions as well, which could easily be segregated into sub-compartments. Compartments allotted to Batote Location Working Circle were also assigned to this working circle, thus increasing its area by 20 percent. The silvicultural system adopted was shelter wood compartment system. A rotation of 150 years with 90 year conversion period and 20 year regeneration period was fixed.

## Results

- From the prescriptions of the draft plan, it transpires that the Working plan
   Officer had made no changes to Khushoo's plan except merging the Batote
   location Working Circle with this working circle.
- ii. The Working Plan Officer paid no attention towards sub-compartmentation.
- iii. The allotment, in some cases, was also defective.

## (ii) Chir Selection Working circle

All Chir bearing compartments on easy ground were allotted to this working circle. The silvicultural system adopted was Selection system, prescribing conservative fellings in these forests, where the regeneration was already in arrears in old PB-1 areas. A rotation of 150 years with a felling cycle of 30 years was fixed. The exploitable diameter was fixed at 30'd.b.h. complete enumeration of the crop down to 12"d.b.h was carried out. Yield calculated by dividing the volume of green fit trees of classes 30" and over, standing in the entire working circle, minus the volume

of such green fit trees in failed PB-1 areas, by 30; the number of years that an average tree of 24"-30" diameter class will take to reach the exploitable diameter of 30".

## Results:

- (i) Experience gained from the past has shown that there is nothing wrong to treat the light demander like Chir under uniform or Shelterwood compartment system as this species can regenerate well under uniform system. The only defect lies in not carrying out the prescriptions and cultural operations vigorously. Examples in the past have revealed that even under uniform system, good regeneration has come up with controlled grazing and fire conservancy.
- (ii) No protection could be given to these forests against repeated fires and uncontrolled grazing which further deteriorated the crop.

## (iii) Unregulated Working Circle

This working circle included compartments poorly stocked, lying on precipitous grounds and fir forests. Complete rest was prescribed to the compartments allotted to this working circle.

#### Results

- (i) Some of the Fir forests included under this working circle were workable under regular system of management, but the Working Plan Officer did not pay any attention towards this.
- (ii) Heavy grazing and repeated fires further deteriorated the crop in this working circle.

## 7.2.2.5 J.S Jamwal's Plan for Ramban Forest Division (1961-62 to 1971-72)

Sh. Jagraj Singh Jamwal revised the Khushoo's plan of Batote and Gandhri Ranges of the erstwhile Udhampur Division. As discussed vide section 1.7.14 Khushoo's plan of Batote and Gandhri Ranges was revised by sh. P.C Gupta, which, in fact, never came into operation. The Batote and Gandhri Ranges, then formed a part of Ramban Forest Division. Thus Jamwal's plan was the first combined plan for the Batote-Gandhri and Ramban-Banihal Ranges. He constituted the following working circles.

- (i) Kail Conversion Working Circles
- (ii) Deodar-Kail Selection Working Circle
- (iii) Chir Interim Working circle
- (iv) Fir Selection working Circle

- (v) Protection-cum-Improvement Working Circle
- (vi) High Pasture Land Development Working Circle
  - (i) Kail Conversion Working Circle

This Working circle covered the important Deodar-Kail forests, situated on easy slopes. The method of treatment was conversion to more or less uniform crop under Shelterwood compartment system. The crop consisted of young to middle aged Kail forest in even-aged groups, and Deodar crop in irregular from with marked deficiency of young regeneration. The immediate requirement of the crop was the removal of over-wood as early as possible in consistence with the realization of sustained yield from mature trees during the conversion period. Creation of normal age class distribution as envisaged in the theoretical Shelter wood compartment system, was not the aim of the Working Plan Officer, at least during the first rotation. Therefore, in areas under regeneration fellings everything up to 18 d.b.h was taken as regeneration, forming a part of the future crop. Also, pole crop of higher limits averaging 20"-21"d.b.h occurring in uniform patches was to be retained as part of future crop. Thus the sacrifice of immature stock was avoided as best as possible. A rotation of 150 years with a regeneration period of 30 years was adopted. Conversion period was fixed at 80 years. The forests were divided into two main blocks viz. regeneration block and unalloted block. The regeneration block was further divided into conversion block and converted block.

# **Conversion Block**

Contained mostly PB-1 areas of the past plan, which had more or less two storied crop and where the removal of over-wood was required.

## **Converted Block**

This block mostly contained PB-V areas of the past plan, where major fellings had been completed during the past 25 years. The only operation required in this block was the removal of few seed bearers, which were still standing over the young regeneration.

## **Unalloted Block**

Rest of the area in working circle was assigned to unalloted block where thinning and improvement felling were prescribed. Fifty percent of the crop in the working circle was enumerated down to 12"d.b.h.

The yield of entire working circle was calculated by the formula:

## <u>Growing stock actually available in working circle</u> Conversion period

The growing stock actually available in the working circle was taken as the volume of all trees of and above 24" d..b.h plus one-fourth of the 18"-24" class volume

The yield from regeneration block was calculated by dividing the total growing stock present therein, minus the volume of 12"-18" class and three-fourth volume of 18"-24" class, by 30; the period during which regeneration felling were to be completed in the regeneration block.

The yield from unallotted block was calculated by subtracting the yield of regeneration Block was calculated by subtracting the yield of regeneration block from the yield of entire working circle.

#### Results

- i. The plan prescriptions regarding post harvest cultural operation were not followed and consequently, the generation could not keep pace with felling.
- ii. No protection could be afforded to the areas in regeneration block against heavy grazing and fires, which hampered the progress of regeneration.

#### (ii) Deodar –Kail Selection Working Circle.

This working circle covered all Deodar -Kail forests, lying on steeper terrain then those assigned to the Kail Conversion Working Circle. The crop assigned to this working circle was the more or less selection type though the proportion of different age classes was far from normal, the higher age classes being over presented and forests being under stocked. The crop generally had young to middle age Kail and middle aged to mature Deodar. The compartments assigned to the working circle also contained some patches of middle aged to mature Fir at the top. The silvicultural system adopted was selection system. A rotation of 180 years with30 years felling cycle was adopted. Exploitable diameter for Deodar and Fir was fixed with 30" d.b.h and for Kail it was fixed at 24" d.b.h. Twenty-three percent enumeration was conducted in this working circle down to 12" d.b.h Yield was calculated using Brandis method.

The yield thus calculated was compared calculated by Von Mantel's formula and it was found that the yield prescribed is quite conservative and safe.

#### Results

- i. Prescriptions laid down by the W were quite elaborate, but the desired results working Plan Officer were quite elaborate, but the desired results were not achieved because the cultural operations were totally neglected by the territorial staff.
- ii. Heavy grazing and repeated fires further deteriorated the crop and site in the working circle.

## (iii) Chir interim Working Circle:

This working circle included all the pure Chir bearing compartments, lying on easy terrain only in Batote and Gandhri Forest Ranges. The crop consisted mostly mature to over mature trees deficient in regeneration. Some unavoidable Deodar-Kail patches also occur at the top of the compartments and assigned to this Working Circle. The deficiency of regeneration is due to excessive grazing and frequent fires in the locality. Distribution of ager classes is very abnormal in Chir crop due to management neglect in the past.

The crop in this Working Circle was prescribed an interim treatment of thinningcum-improvement with gradual removal of mature trees that they were likely to deteriorate in due course of time. A rotation of 120 years was adopted. The exploitable size for Chir was fixed at 30" d.b.h. complete enumeration down to 12" d.b.h. was carried out in this Working Circle. Yield was realized and controlled on the area basis. The area of the annual coupe was calculated as under:

Size of annual coupe;	Commercial area	=	<u>3694</u>	=32.3 hac.
	30		30	

Thirty years is the period during which it was proposed to go over the entire working Circle.

Though the yield was to be realized and controlled by area, volume available annually was worked out by applying Brandies method and it worked out as 1,37,000 cft. Therefore, it was prescribed that though the yield is regulated on the area basis, yet, the annual yield should not exceed 1 lakh cft. The yield thus calculated compared with the yield calculated by the Von Mantel's formula.

Y= 2GS/R = 2x2, 3624460/120 = 33, 73741 cft

This showed that the yield calculated by the above method is quite conservative and safe.

This volume yield was to serve as a guide only.

#### Results

Failure on the part of the DFO to carry out the plan prescriptions regarding strict closures of the area against grazing and strong measures to save these forests from frequent fires is mainly responsible for the deterioration of the crop and the site. Had these plans prescriptions been carried out as sincerely as those regarding felling, the situation would have been better than it is at present.

#### (iv)Fir selection Working Circle

This working circle contained compartment having pure crop of Fir. The crop was composed mainly of mature to over mature-stock with very little of younger age classes. Kail is coming up in these forests as a sign of retrogressions. Thirty eight percent enumerations was carried out in this circle. Silvicultural system adopted was selection-cum-improvement. Selection-cum-improvement felling were prescribed for trees of exploitable size and over, and improvement felling were prescribed in rest of the crop. To check heavy grazing in these forests, high pasture land limits were delineated on the spot, so that grazing is confined to these portions of the forests only. A rotation of 180 years with 30 years felling cycle was adopted. The exploitable diameter for Fir, Kail and Deodar was fixed at 30", 24" and 30" respectively. Only small areas in theses ranges formed the Fir Selection Working Circle.

The yield was calculated by Brandis method. The yield thus calculated was compared with the yield calculated by Von Mantel'sn Formula and it was found to be on the safer side.

#### Result

Prescriptions regarding the closures of the area against grazing and its re-habilitation not executed on the ground. This resulted in further deterioration of the crop and the site.

#### (v) Protection-cum-Improvement Working Circle

This Working Circle covered all such Forests whose exploitation was not economical on account of their situation on precipitous ground or poor stocking. Most of these forests are situated on the protective belt along the National Highway or skirt along River Chenab, where their retention is obligatory for soil conservation.

Complete rest was prescribed to the areas allotted to this Working Circle. The treatment prescribed was strict fire protection and closure to grazing.

#### Results

The prescriptions of the Plan were quite sound but were not carried out and the area could not be afforded protection against heavy grazing and repeated fires. Both

these factors lead to the further deterioration of the site and crop in this Working Circle.

## (vi) High Pasture Land Working Circle:

This Working circle was formed for the first time for the development of high pasture lands and protective purposes as it covers the water seed of various streams. The vegetation consists Viburnum *foetens Viburnum nervosum, Cotoneaster spp*, and a variety of legumes and grasses like *Aquilegia vulgaris, Thalictrum alpinum, Ranunculus spp, Epilobium latifolium, Poterntilla spp.* The high pasture lands were separated from the forests by means of coal tar rings marked on suitable trees. For distinction, symbols of arrow mark and letters 'HP' had been marked on the trees, showing the delineation of the boundary of the high pasture land. Various prescriptions in this Working Circle were as under:

- i. Cattle of nomadic graze were not to be permitted to go below the limit of high pasture land. Similarly local Zamindars were not allowed graze their cattle in high pasture land as they enjoyed grazing facilities in the forest areas.
- ii. On fifth of the total area of high pasture land was proposed to be closed to grazing.
- iii. Subject to the availability of funds, improvements works like removal of undesirable herbaceous plants, introduction of better variety of grasses be done. Also channels for safe removal of runoff may be constructed.

#### Results

- (i) The prescriptions of the plan regarding improvement of the High pasture land could not be followed as there were contrary to the grant of concession for grazing which were enjoyed by the grazers for the long past.
- (ii) The separation of high pasture lands by means of coal tar rings was misleading and confusing to the staff for compartment boundary rings.

# 7.2.2.6 MS Jamwal's plan for Ramban Forest Division (1972-73 to 1981-82)

Sh. MS Jamwal revised the working plan of Ramban forest Division by sh. Jagraj Singh Jamwal for the period of 1972-73 to 1982-83. Mr. MS Jamwal constituted the following working circles.

- (i) Deodar-Kail Regular Working Circle
- (ii) Deodar-Kail Selection Working Circle
- (iii) Chir Interim Working Circle
- (iv) Fir Selection Working Circle
- (v) Coniferous Rehabilitation working Circle

- (vi) Protection-cum-Improvement Working Circle
- (vii) High Pasture Land Development Working Circle

## (i) Deodar-Kail Regular Working Circle

This working circle included all the easily accessible Deodar-Kail Forests, which are capable of being worked under system of concentrated Regeneration felling. The compartments allotted to this working circle contained, at some places, a little but unavoidable amount of other conifers like Chir and Fir which could not be separated into sub-compartments. Shelter wood compartment system advocating removal of over-wood above 45 cm d.b.h from the area having been adequately regenerated with an objective to bring these forests to normalcy was prescribed. In area under regeneration felling, everything up to 40 cm d.b.h was treated as regeneration forming a part of the future crop. A rotation of 150 years corresponding to exploitable size 60 cm d.b.h for Deodar and Kail, conversion period of 80 years from the start of the plan, and regeneration period fixed at 30 years were adopted. Entire working circle formed one felling series. The working circle was divided into three floating periodic blocks namely conversion block, converted block and unalloted block. Conversion and converted block together constituted the regeneration block. Yield for the entire working circle was calculated on the basis of the results of complete enumeration down 30 cm d.b.h in most of the well stocked compartments deemed fit for working during the plan period. The yield was calculated by adopting formula :

#### Y = V/Conversion period,

Where V is the total enumerated growing stock over the entire working circle. Only the growing stock over 50 cm d.b.h was actually taken into account for calculation of the total yield proposed to be realized from the working circle.

#### **Conversion Block**

The conversion block comprised of three categories of the crop area:

- (i) In the first category, the compartments having been worked under regeneration felling during the past plan, resulting into more or less two storied forests were included. The presence of over-wood was considered injurious to the future development of the regeneration and prescribed to be removed as secondarycum-final felling.
- (ii) In the second category, areas having a lot of mature over-wood with some regeneration were included. These forests were suggested to be opened up to

induce and free the young regeneration. Most of these areas formed part of unalloted block in the previous plan.

(iii) The third category included the compartments having adequate and established regeneration with a few mature and over-mature trees intermixed with young and middle aged crop.

#### **Converted Block**

This block comprised of area having more or less adequate and establishment regeneration and regeneration felling almost completed. Some mature and over mature trees, found scattered and interfering with the regeneration all over the block, were suggested to be removed during the plan period.

The yield in regeneration block was calculated and adopted in terms of number of exploitable trees which would be available during the exploitable period, arrived at 30 years, after due deduction on account of mortality. The yield from thinning in converted block was ignored in favour of possible errors in the calculation.

#### Unalloted Block

The rest of the area of Deodar-Kail Regular Working Circle constituted and unalloted block. This block constituted more or less middle aged crop. Only thinning and hygienic felling to remove dead and disease trees were prescribed. The yield in unallotted block was calculated as difference between the yield calculated for whole of the working Circle and regeneration block. Area check over the volume yield was provided in this block.

The compartment allowed for working during the currency of the plan on priority basis were 18a, 16a, 20, 33/Batote and 50b/Gandhri.

#### (ii) Deodar Kail Selection Working Circle:

This Working Circle included all the commercial Deodar –Kail other than those included in deodar regular working circle. The compartments allotted to their working circle situated on comparatively steeper slopes and contained Deodar –Kail crop mixed at places with unavoidable Fir in varying proportion.

The forests under this working Circle were prescribed to be treated under selection system with rotation of 150 years corresponding to exploitable size of 60 cm d.b.h. for Deodar-Kail and 70 cm d.b.h. for Fir , and felling cycle fixed at 30 years. The entire working Circle was constituted into a one felling series. The growing stock was assessed by complete enumeration down 30 cm d.b.h. in almost all the well stocked compartments assigned to this working Circle. The yield was calculated by adopting the Brandis Method of yield calculation depending upon the availability of

trees of exploitable diameter. No area check over the volume yield was prescribed. The compartments suggested to be worked during the plan period were 8a and 14c of Batote Range. Neither any sequence of felling nor any normal coupes were constituted.

#### (iii) Chir Interim Working Circle

This Working Circle covered all the easily accessible Chir Compartment in Batote and Gandhri ranges. An interim management was constituted to manage these forests during the plan period till the normal distribution of age classes restored in these forests and the failed PB- I areas regenerated. As such selection-cum-Improvement felling were prescribed, aiming at gradual removal of mature and over mature trees following the progress of the regeneration. A rotation of 120 years corresponding to 70 cm d.b.h. exploitable size was fixed. Only one felling series for Batote and Gandhri Ranges was formed. Yield was calculated on the basis of the result of complete enumeration down 30 cm d.b.h. in 10 cm diameter class over the entire working circle. The yield was suggested to be controlled on the basis of area also. The average crop diameter of the working circle was assumed at 40 cm d.b.h..lt was worked out from then available statistics that it takes 30 years for a Chir tree of 40 cm d.b.h. to attain diameter of 60 cm. The entire working Circle was prescribed to be gone over in 30 years and accordingly, the size of the annual coupe was worked out. The volume yield was calculated by adopting the Brandis Method of yield calculation depending upon the availability of number of trees size, Compartment 40b,41,14b, and 23a of Batote and 50a,61,62,71,72 of Gandhri were prescribed to be worked during the plan period.

#### (iv) Fir selection working Circle:

This working Circle covered all the commercial Fir forests. The compartments allotted to this working Circle mostly contained the pure crop of Fir with some amount of deodar and kail at places mixed in varying proportion and could not be separated out. The forests were proposed to be worked under selection system with slight modification here and there to suit the local requirements of the crop and site. Rotation of 180 years corresponding to exploitable size of 70 cm d.b.h. for Fir and felling cycle of 30 years was adopted. Yield was calculated on the basis of the results of total enumeration down 30 cm d.b.h. The yield was calculated on the availability of trees of exploitable size using Brandi's Method of yield calculation. The compartments proposed to be worked on priority basis were 26a and 33b of Batote Range crop and site. Rotation of 180 years corresponding to exploitable size of 70 cm d.b.h. for Fir and felling cycle of 30 years was adopted. Yield was calculated on the basis of the results of total enumeration down 30 cm d.b.h. The yield was calculated on the availability of trees of exploitable size using Brandi's Method of yield calculation. The compartments proposed to be worked on priority basis were 26a and 33b of Batote Range crop and site. Rotation of 180 years corresponding to exploitable size of 70 cm d.b.h. for Fir and felling cycle of 30 years was adopted. Yield was calculated on the basis of the results of total enumeration down 30 cm d.b.h. The yield was calculated on the basis of the results of total enumeration down 30 cm d.b.h. The yield was calculated on the basis of total enumeration down 30 cm d.b.h. The yield was calculated on the basis of the results of total enumeration down 30 cm d.b.h. The yield was

calculated on the availability of trees of exploitable size using Brandi's Method of yield calculation. The compartments proposed to be worked on priority basis were 26a and 33b of Batote Range.

## (v) Coniferous Rehabilitation Working Circle

The area of this Working Circle was classified into three distinct categories so far it related to Batote Forest Division.

Fist Category included such areas where regeneration was absent as a result of heavy grazing and repeated fires due to their proximity to human habitation. Exhaustive prescriptions including closure of the area, artificial sowing and planting, control fires and soil working were prescribed to treat this category.

In the second category were included some compartments of Batote and Gandhri ranges, containing mostly Fir, mixed with Deodar Kail, and broad leaved trees in the lower portion. Fir crop was generally over mature and the regeneration practically absent. The over mature trees were gradually falling down thus creating big blanks in these forests. The incidence of nomadic grazing is very heavy in these forests during summers. Complete closures, cleaning, shrub cutting, soil working, patch sowing and planting were prescribed to treat this area.

Third category included badly encroached area here and there spread all over the division. Effective measures to eject the encroachers followed by complete closures, soil working. Sowing and planting were prescribed.

# (vi) Protection-cum-Improvement Working Circle

This Working Circle comprised of all such forests, where the crop was poor density and the forests situated on very rugged and highly precipitous slopes. The removal of trees from such sites was likely to accelerate the process of erosion, which has already started in most of these compartments. Detailed prescriptions for protection of site from five and grazing, raising of broad leaved species and grasses of local importance, protection of watershed, and control grazing were laid down.

# (vii) High Pasture Land Development Working Circle:

This working circle was formed for the first time by Sh. Jagraj Singh Jamwal in his plan. Definite prescription were suggested for the improvement of high level grazing grounds, which are deteriorating day by day and thus increasing the erosion hazards in the locality. However, the prescriptions were altogether ignored by the territorial staff and no improvement worth the name could takes place in these grazing grounds. The working circle was continued with the hope that the prescriptions would be followed vigorously by the territorial staff and the potential capability of the pasture improve to allow sustainable grazing and to maintain a dependable water regime in the locality. This Working Circle covered all the pasture land found in the sub-alpine zone in the Division. To safeguard the valuable forests and cultivation against erosion, it was essential to manage these pastures scientifically. Detail prescriptions for control of grazing and development of deteriorated pasture land including complete closures, fertilization and sowing of better variety of palatable grass were prescribed.

#### **Results of the Plan**

The prescriptions of this plan so far as they were related with felling, were implemented fully with sincerity. This resulted in heavy removal from some of the compartments. However the prescriptions of the plan relating to the regeneration of the failed area, protection and improvement of the forests seem to have totally been ignored by the territorial DFO. Working Circle wise achievement of the past plan are briefed as under;

#### Deodar Kail regular Working Circle

Taking into account the area of Batote and Gandhri Ranges, which now form a part of Batote Forest Division, it was observed that the pace of conversion has remained quite slow and negligible area was converted during the plan period. The Working Plan Officer had calculated the yield on the basis of total enumeration figures arrived after total count of some of the compartments allotted to this Working Circle. Many assumptions were made while calculating the yield. The total removal from the area of this working circle in |Batote and Gandhri was 10600 cum of Deodar; 23300 cum of Kail; 6700 cum of Fir and 13400 cum of Chir. The total removal combined with those from Ramban and Banihal Ranges of the erstwhile Ramban Forest Division exceeded the prescribed yield.

Thinning which was prescribed to be carried out over 2300 hact in Batote and Gandhri Ranges was not carried out and only accessible areas were taken up for thinning with the result the areas requiring thinning remains unattended.

#### **Deodar Kail Selection Working Circle**

A very small area of present Batote Range formed Deodar Kail selection working circle. None of the compartments allotted from range to this working were gone over for any major felling. A little volume amounting to 500 cum of deodar, 100 cum of Kail was removed by way of hygienic felling during the plan period. No major operations as envisaged from improvement and regeneration were carried out during the plan period.
#### Fir selection Working Circle

Only a very small area consisting of four sub-compartments, two each from Batote and Gandhri Ranges, formed fir selection working circle of erstwhile Ramban Forest Division. No operation of any kind was reported to have been done in these compartments during the plan period.

#### Chir Interim Working Circle

A sizeable area of the Batote and Gandhri Ranges were formed into Chir Interim Working Circle. No operation of any kind except a removal of 1000 cum of Chir volume was done in this working circle. The failed areas continue as such and no attention was paid on regenerating these areas. However adequate measures to protect these forests against fire were taken and regeneration in the old closures were protected against the fires and other inimical agencies.

There was no resin tapping at the time of the revision of the plan by Mr. MS Jamwal. Resin tapping however started in this division soon after the implementation of the plan by MS Jamwal. In the beginning, resin extraction was carried out ruthlessly, by adopting a crude and unscientific method of resin extraction. Since no prescriptions were given in the plan, the resin tapping continued to be in the hands of wage contractors and little attention was paid by the territorial staff. Resin tapping of Chir trees in this division was taken up at a relatively large scale from the year 1975-76 with the result more and more Chir areas was brought under resin tapping thereafter. This resulted into haphazard working and gross violation of the norms fixed for the resin tapping. Tapping has been mostly unrestricted, unscientific and uncontrolled with the result the tap able life of the Chir trees was reduced to be less than the half of the potential tap able age. Gross irregularities in respect of the sizes of the blazes were committed which resulted into large scale drying and breaking of trees at the base level.

No operation worth mention was taken to implement the prescriptions of the plan in respect of Coniferous Re-habilitation Working Circle, Protection-cum-Improvement Working Circle and High Pasture Land Development Working Circle. The prescriptions of these working circles remained confined to the pages of the working plan only.

#### 7.2.3 Pritam Chand's Working Plan for Batote Forest Division (1985-86 to 1994-95)

Sh. Pritam Chand prepared the first Working Plan for Batote after its creation in 1982, consequent upon the amalgamation of Batote and Gandhri ranges of erstwhile Ramban Forest Division with Marmat Range of erstwhile Doda forest Division. This

plan, therefore, was the revision of fifth plan for the period of 1971-72 to 1981-82 for the Ramban Forest Division prepared by Mr. M S Jamwal, and sixth plan for the period 1978-79 to 1987-88 for Doda forest Division prepared by Mr. S Y S Narsinghia. A proper evaluation of how the working plan prescriptions have been applied over a period of time is possible only if the data pertaining to the said period are maintained meticulously, compartment/sub-compartment wise and working circle wise. Unfortunately, neither the control forms nor the compartment history files were maintained for the plan period. In fact, the Division office is in the position of neither the compartment history files, nor the stock maps prepared at the time of revision of the plan by Sh. Pritam Chand. To make the matters worse ,the records pertaining to the marking lists ,abstracts of marking lists for sub-compartments, and sometimes even different compartments, were clubbed together thus confounding the marking carried out in one working circle with another working circle.

The data pertaining to extraction, supplied by the J&K State Forest Corporation (SFC), also suffered from similar defects. In addition, whereas the volume marked by the forest department is in terms of whole tree volume, the extraction figures supplied by the SFC or in terms of sawn outturn. Accordingly the marked volume were converted into corresponding sawn outturn figures to make comparison possible using the following ratios supplied by the SFC.

Sh.Pritam Chand in his working plan constituted the following Working Circles:

- (i) Deodar -Kail (R) Working Circle
- a. Conversion Block
- b. Converted Block
- c. Unalloted Block
- (ii) Mixed Conifer (Selection) Working Circle
- (iii) Fir Selection Working Circle
- (iv) Chir Working Circle
- (v) Reboisement Working Circle
- (vi) Protection Working Circle
- (vii) Resin (Overlapping) Working Circle

#### (i) Deodar-Kail (R) Working Circle.

All well stocked Deodar-Kail Forests occupying easier slopes, that were deemed fit for concentrated working and conversion to uniformity were allotted to this

working circle. Out of a total of 7620 Hect area allotted t this working circle, 3856 Hact falls in Batote Range, 2084 Hact in Gandhri Range and 1630 Hact in Marmat Range..The forests constituting this Circle consist mainly of Kail and Deodar with some amount of interspersed Fir and Chir.

The Deodar-Kail working circle was prescribed to be worked under the Shelter wood compartment system. Existence of regeneration was to be the main criteria while effecting removals. Thus in view of irregular distribution of age classes and prevailing locality factors, uniformity was not aimed at during the first rotation. A rotation of 150 years with a balance conversions period of 60 years was adopted. Anything below 50 cm in diameter was to be treated as advance growth.

The whole working circle formed only one felling series and was divided into three floating periodic blocks viz. conversion block, converted block and unallotted block.

#### **Conversion Block**

The areas wherein seeding and secondary felling have been carried out since 1928, but have failed to regenerate have been allotted to conversion block. In addition, areas with preponderance of mature and over- mature crop with adequate / inadequate regeneration in the form of advanced growth were also included in conversion block.

Only secondary/ final felling were proposed to be carried out in the conversion block for liberation of advanced growth. The size of annual coupe in conversion block was fixed at 112 Hact.

#### **Converted Block**

The areas in which conversion was started in 1928 and were either full of advanced growth or otherwise successfully regenerated were allotted to converted block. This block was to be treated for removal of the leftover Shelter wood and thinning out of advanced growth, on a 10 years thinning cycle with an annual coupe of 234 hectares.

#### **Unallotted Block**

The unallotted block included those unconverted areas which were not taken up for conversion. Only improvement felling together with occasional light grade ordinary thinning, on a ten year cycle were prescribed for unallotted block. The total size of annual coupe for unallotted block was fixed at 236 Hectares.

#### **Yield regulation**

The yield was calculated on the basis of available trees above 50 cm diameter after subjecting this growth stock to availability coefficient percentage based on past

experienced and marking date. Only commercial areas were taken into account for the purpose of yield calculation.

Species	Conversion block	Converted and un allotted block	Total
Deodar	1100 cum	1200 cum	2300 cum
Kail	4200 cum	1000 cum	5200 cum
Fir	300 cum	300 cum	600 cum
Total	5600 cum	2500 cum	8100 cum

The annual yield for the working circle was prescribed as follows;

Table 7.1

1 Statement showing annual yield of the Deodar-Kail (R) Working Circle.

In order to secure adequate regeneration, it was prescribed that regeneration areas be closed to grazing. In addition, patch sowing and planting of

Saplings raised in-situ in polythene tubes was prescribed for refractory areas. Application for prescription and results.

Felling of greens trees was banned by the Govt of Jammu and Kashmir in January 1990. Therefore, the only major markings that were carried out, were prior to 1990. Therefore, removals have been restricted to dry, fallen trees, and trees marked in connection with development project only.

SPECIES	Yield prescribed for 10 years	Volume marked in 13 years	Average sawn outturn of marked volume	Actual volume extracted by SFC
DEOADR	23000 cum	12264 cum	8585 cum	9759 cum
KAIL	52000 cum	34075 cum	20445 cum	23071 cum
FIR	6000 cum	3513 cum	1757 cum	1056 cum
CHIR	0	417 cum	157 cum	81 cum
TOTAL	81000 cum	50269 cum	30944 cum	33967 cum

Table 7.2Table showing extraction/prescription data for the Deodar-Kail<br/>(R) Working Circle.

The table shows how the prescription has been applied in so far as they relate to extraction of the prescribed yield.

The volume marked for felling is considerably less than the prescribed yield for the period. The volume removed by SFC is less than expected sawn outturn of the marked volume in case of Fir and Chir but exceeds the expected outturn by 2626 cum in case of Kail and by 1174 cum in case of Deodar. Not much importance was attached to the sequence of felling suggested by the Working Plan Officer in the selection of annual coupes.

Aspects relating to regeneration have been thoroughly neglected. The areas proposed to be regenerated were exposed to continuous grazing. Little was done by way of artificial regeneration and the plantation programme has mostly concentrated in fast growing exotics like *Robinia spp* and *Ailanthus spp*.

#### (ii) Mixed coniferous (Selection) Working Circle:

Compartments containing well stock commercial deodar. Kail and fir, but occupying steep and rugged slopes thereby rendering them unfit for concentrated working, were allotted to this working circle. A total 5414 hact of forest area was allotted to this working circle of which 5098 hact was in Marmat Range, 205 hact in Batote Range and 111 hact in Gandhri Range.

Keeping in view the importance of theses forest in soil and water conservation, selection system was prescribed for management of these forests. Silvicultutrally available trees above exploitable diameter from area having adequate and established regeneration were proposed to be removed.

Exploitable diameter was fixed at 70 cm for deodar and Kail and 80 cm for Fir corresponding to a rotation of 150 years in Deodar and Kail and 225 years in Fir. A felling cycle of 25 year was adopted.

#### Yield Regulation

The yield for mixed conifer (Selection) Working Circle was calculated on volume basis using Modified Brandis diameter Class Method. An area check was also provided. The yield was computed on the basis of commercial growing stock only. Accordingly, the annual yield from entire Working Circle was fixed as follows:

Deodar	=4200 cum
Kail	= 5900 cum
Fir	=1100 cum
Total:	=11200 cum

The size of annual coupes worked out to 165 hact.

Regeneration: In order to secure regeneration, measures removal of shrubs, raking of leaf litter and top layer of soil, patch sowing in planting of nurseries raised seedling along with closures to grazing of were prescribed. In this respect it was proposed that an area equal to the size of annual coupes be taken up for effecting closures each year, evenly distributed over the entire working circle.

SPECIES	Yield prescribed	Volume	Average sawn	Actual volume
	for 10 years	marked in 13	outturn of	extracted by
		years	marked volume	SFC
DEOADR	42000 cum	3669 cum	2778 cum	3956 cum
KAIL	59000 cum	14895 cum	8938 cum	10758 cum
FIR	11000 cum	15099 cum	7550 cum	3916 cum
CHIR	0	0	0	0
TOTAL	112000 cum	33963 cum	19266 cum	18633 cum

#### Application of the prescriptions and Results

### Table 7.3 showing extraction/prescription data for Mixed Conifer (Selection) working circle.

Only 30 percent of the prescribed volume was actually marked for felling. However, the volume of deodar and Kail extracted by SFC exceeds the expected average sawn outturn in this circle also. The sequence of felling suggested by the Working Plan Officer has been followed to some extent.

The prescriptions relating to securing of regeneration were largely ignored and this is reflected in the inadequacy of established regeneration over most of the working circle area.

#### (iii) Fir (Selection) Working Circle:

All well stocked, commercially exploitable Fir forests of Batote Forest Division were allotted to this working Circle. This Working Circle covered 4666 hact forest area in Marmat Range, 269 hact in Batote and 352 in Gandhri Range respectively. Mature and over mature trees formed a large proportion of the growing stock in this working circle. The condition of regeneration was more or less satisfactory.

Keeping in view the silvicultural requirements of the specie and the need for soil and water conservation in upper catchment areas, these forests were proposed to be manage under Selection System. Removal of exploitable sized Silvicultutrally available trees was prescribed from areas having adequate and established regeneration. Deodar Kail trees above 70 cm and Fir trees above 80 cm were considered exploitable. A felling cycle of 25 year was adopted.

#### **Yield Regeneration**

The yield was calculated using the Modified Brandis Diameter Class Method and was subjected to area check. Only commercial growing stock was taken into account for

the purpose of yield calculation. The annual yield for the entire working circle was prescribed as under:

Deodar	= 300 cum
Kail	= 1200 cum
Fir	=16000 cum
Total:	=17500 cum.

The volume yield was subjected to area check and the size of annual coupe was fixed at 145 hectares.

#### Application for prescriptions and Results

The following table 7.4 provided the specie wise marking and extraction figures.

Table 7.4 showing extraction/prescription data for Fir SelectionWorking Circle.

SPECIES	Yield prescribed	Volume	Average sawn	Actual volume
	for 10 years	marked in 13	outturn of	extracted by
		years	marked volume	SFC
DEOADR	3000 cum	1173 cum	821 cum	723 cum
KAIL	12000 cum	4855 cum	2913 cum	2693 cum
FIR	160000 cum	91472 cum	45736 cum	26442 cum
CHIR	0	0	0	0
TOTAL	1750000 cum	97500 cum	49470 cum	29858 cum

About 55 percent of the prescribed yield was actually marked. However, in this working circle, the actual volume extracted was nearly 20000 cum less than the expected outturn of the marked volume. Other prescriptions relating to cultural operations, artificial regeneration and grazing control were ignored as a result of which the status of regeneration of Fir area s is pathetic.

#### (iv) Chir Working Circle:

The working circle included most of the Chir forests of Batote and Gandhri. An area of 1232 hact in Batote Range and 2557 hact in Gandhri Range was placed under this working Circle. Chir occurs mostly as pure crop except at higher places where it is found mixed Deodar and Kail. These forests are poorly stocked and the regeneration too is highly in adequate. Most of the crop is mature and over mature.

Although a strong light demander, the Chir forests were prescribed to be worked on the lines of selection felling. This was necessitated because of the fact that the crop was already very open, and regeneration woefully in adequate, with intense biotic pressure over the entire area of the working circle. Exploitable diameter of 70 cm, which roughly corresponds to an age of 150 years, was prescribed and the felling cycle was fixed at 30 years.

#### Yield Regulation

Modified Brandis Diameter Class Method was applied for computation of the yield. On the commercial growing was taken into account for calculating the yield and the annual cut prescribed from the working circle is as under:-

Deodar	= 20 cum
Kail	= 380 cum
Chir	= 2900 cum
Total:	= 3300 cum

This yield was subjected to an area check and the size of annual coupe was fixed at 80 hact. In subsidiary silvicultural operations, disposal of debris, fire protection, controlled burning and tending were prescribed with special emphases on grazing control and artificial regeneration through patch sowing and planting of nurseries raised seedlings.

#### **Application of Prescriptions and Results**

The volume marked and extracted from Chir Working Circle is tabulated as under:

SPECIES	Yield prescribed for 10 years	Volume marked in 13 years	Average sawn outturn of marked volume	Actual volume extracted by SFC
DEODAR	200 cum	107 cum	75 cum	16 cum
KAIL	3800	595 cum	356 cum	329 cum
	cum			
FIR	29000 cum	11227 cum	4210 cum	4909 cum
CHIR	0	0	0	0
TOTAL	33000 cum	11229 cum	4641 cum	5254 cum

Table 7.5 showing extraction/prescription data for Chir Working Circle.

 Table 7.5 showing extraction/prescription data for Chir Working Circle.

The volume of trees marked was only 36 percent of the prescribed yield. Not much attention was paid to subsidiary silvicultural operations and prescriptions relating to artificial regeneration, as a result of which the status of Chir has gone from bad to worse.

#### (v) Reboisement Working Circle

Potentially productive areas that had undergone degradation either due to excessive biotic interference or due to failed regeneration after drastic treatment were

allotted to this working circle. Some compartments from Deodar Kail working circle, mixed conifer selection working circle, Fir Selection Working Circle and Chir Interim Working Circle also transferred to Reboisement Working Circle in Sh. Pritam Chand's Plan. Some areas which, though adequately stocked but located near human habitation, along National Highway and at places of Tourist interest were allotted to this working Circle. A total of 6314 hectares forest area was places under this Working Circle. No regular felling were prescribed in this working circle and removals were to be restricted to meeting of the demands of concessionists. Every year, 78 hectares of degraded area was proposed to be re-habilitated.

#### **Application of Prescriptions and Results**

Prescriptions relating to regeneration of conifers were not implemented to any significant extent. Plantations have been limited to raising of fast growing exotics like *Robinia* and *Ailanthus*. About 1707cum of timber was removed from this working circle in connection with installation of transmission lines, road construction, or marking of dry trees.

#### (vi) Protection Working Circle

Those compartments of Batote Forest Division that had not been allotted to any of the working circles above were placed under this working circle. Generally these areas included precipitous hill slopes devoid of vegetal cover, inherently unproductive and uneconomical. This working circle was spread over 3207 hectares of forest area. No felling of whatsoever nature was prescribed in this area. Surprisingly however, supplementary markings to the extent of 2078 cum were carried out in compartments 68, 69 and 70 of Marmat Range and 1925cum of timber (sawn outturn) was actually removed.

#### (vii) Resin (Overlapping Working Circle)

The Chir forests of this division have been under tapping since 1974-75. However, Resin (Overlapping) Working Circle was introduced for the first time in Sh. Pritam Chand's plan and it included all the Chir bearing areas covered under Chir Working Circle. Tapping of trees below 50 cm diameter was prohibited. One blaze was prescribed for trees between 50 to 70 cm d.b.h and trees above 70 cm d.b.h could be given two blazes. Rill method of resin tapping was prescribed for harvesting resin. Annual yield was fixed at 60,000 blazes. Detailed prescriptions on how the tapping has to be carried out were provided.

#### **Application of Prescriptions and Results**

Resin tapping was carried out in utter disregard to the Working Plan prescriptions. The following table provides year wise details of blazes tapped vis-à-vis the prescribed yield.

Year	Batote	Gandhri	Total	Prescribed	Surplus/Defocit
1985-86	79920	105173	185093	60000	125093
1986-87	94551	119361	213912	60000	153912
1987-88	70966	100990	171956	60000	111956
1988-89	22500	29500	52000	60000	-8000
1989-90	34900	58595	93495	60000	33495
1990-90	34900	58595	93495	60000	33495
1991-92	34900	58595	93495	60000	33495
1992-93	54000	74095	128095	60000	68095
1993-94	54000	92395	146395	60000	86395
1994-95	0	0	0	60000	-60000
1995-96	26200	42006	68206	60000	8206
1996-97	47000	60500	107500	60000	47500
1997-98	54537	84423	138960	60000	78960
1998-99	40776	73198	113974	60000	53974
1999-2000	26776	71197	97973	60000	37973
2000-01	51221	84423	135644	60000	75644
Total	675926	1028623	1704549	900000	804549

Table 7.6Statement showing number of Blazes tapped in<br/>Batote Forest Division.

A perusal of the table above shows that except for the year 1988-89 and 1994-95, the number of blazes marked exceeds the prescribed yield considerably. From the year 1985-86 to 1987-88, it was three times the prescribed yield. Nearly, twice the number of prescribed blazes were tapped from the period from 1985-86 to 1998-99.

Despite detailed procedure, regulation and asset of do's and don'ts having been provided, series of irregularity in marking blazes and cutting rills and grooves were noticed in the field. Tapping was done on trees below 50 cm diameter and such trees formed nearly 41 percent of the crop placed under tapping. The tappable surface area has been damaged to the extent of 50-90 percent in five percent of the crop. In sixty four percent of the crop the surface area scarred and damaged by resin tapping varies from 20 to50 percent. As a result thousands of Chir trees have either dried or snapped from base due to wind. Excessive tapping also renders trees susceptible to insect and fungal attack. The Chir crop of Batote Division has suffered heavily due to non-adherence of Working Plan prescriptions relating to resin (overlapping) Working Circle.

#### 7.2.2 Vasu Yadav's Working Plan for Batote Forest Division 2001-2010-11.

Sh. Vasu Yadav revised the working plan of Batote Forest Division of Sh. Pritam Chand's working plan for the period of 1985-86 to 1994-95. The volume tables as adopted in the previous plan i.e. Kullu volume table has been continued in this plan as well as growth-studies bas been continued from the previous plan.

Point sampling using wedge prism has been adopted after calculating the desired sampling intensity to achieve an accuracy of 20% at 95% confidence level. With the objective of rehabilitations of degraded areas, restocking of areas where regeneration has failed to come by artificial and assisted natural regeneration besides applying sylvicultural treatments in commercial forests to liberate the advance growths, following working circles were constituted;

- (i) Deodar kail Irregular Working Circle
- (ii) Mixed Conifer (Selection) Working Circle
- (iii) Fir Selection Working Circle
- (iv) Chir Working Circle
- (v) Reboisement Working Circle
- (vi) Protection Working Circle
- (vii) Resin (Overlapping) Working Circle
- (viii) Grass land Development (Overlapping) working Circle

Allotment of compartments to these working circles were kept same as in previous working plan by Sh Pritam Singh as working on forests was stopped halfway and pace of conversion got halted besides not much significant achievement was achieved in the status of regeneration.

#### (i) Deodar kail Irregular Working Circle

All well stocked Deodar-Kail Forests occupying easier slopes that were deemed fit for concentrated working and conversion to uniformity were allotted to this working circle. Out of a total of 7541 hectares area allotted to this working circle, 3821 hectares falls in Batote Range, 2060 hectares in Gandhri Range and 1660 hectares in Marmat Range. The forests constituting this Circle consist mainly of Kail and Deodar with some amount of interspersed Fir and Chir.

The Deodar-Kail working circle was prescribed to be worked under the Shelterwood compartment system. Existence of regeneration was to be the main criteria while

effecting removals. Thus in view of irregular distribution of age classes and prevailing locality factors, uniformity was not aimed at during the first rotation. A rotation of 150 years with a balance conversions period of 50 years was adopted. Anything below 50 cm in diameter was to be treated as advance growth. The whole working circle formed only one felling series and was divided into three floating periodic blocks viz. conversion block, converted block and unallotted block.

#### **Conversion Block**

The areas wherein seedling and secondary felling have been carried out since 1928, but have failed to regenerate, have been allotted to conversion block. In addition, areas with preponderance of mature and over- mature crop with adequate / inadequate regeneration in the form of advanced growth were also included in conversion block.

Only secondary/ final felling were proposed to be carried out in the conversion block for liberation of advanced growth. The size of annual coupe in conversion block was fixed at 112 hectares.

#### **Converted Block**

The areas in which conversion was started in 1928 and were either full of advanced growth or otherwise successfully regenerated were allotted to converted block. This block was to be treated for removal of the leftover Shelterwood and thinning out of advanced growth, on a 10 years thinning cycle with an annual coupe of 234 hectares.

#### **Unallotted Block**

The unallotted block included those unconverted areas which were not taken up for conversion. Only improvement felling together with occasional light grade ordinary thinning, on a ten year cycle were prescribed for unallotted block. The total size of annual coupe for unallotted block was fixed at 236 hectares.

#### **Yield regulation**

The yield was calculated on the basis of available trees above 50 cm diameter after subjecting this growth stock to availability coefficient percentage based on past experienced and marking date. Only commercial areas were taken into account for the purpose of yield calculation.

The annual yield for the working circle was prescribed as follows;

Species	Conversion	Converted and	Total
	block	un allotted block	
Deodar	900 cum	1000 cum	1900 cum
Kail	2300 cum	2200 cum	4500 cum
Fir	0	0	0
Total	3200 cum	3200 cum	6400 cum

Table 7.7Annual Yield for the working circle.

#### Regeneration

In order to secure adequate regeneration, it was prescribed that regeneration areas be closed to grazing. In addition, patch sowing and planting of saplings raised in-situ in polythene-bags was prescribed for refractory areas.

#### Application for prescription and results

Felling of green trees was banned by the Govt of Jammu and Kashmir in January 1990. Therefore, the only major markings that were carried out were prior to 1990. Therefore, removals have been restricted to dry, fallen trees, and trees marked in connection with developmental projects only.

The following table shows how the prescription (cubicmeters) has been applied in so far as they relate to extraction of the prescribed yield.

# Table 7.8Table showing prescribed yield and actual volume of<br/>timber extracted from Deodar-Kail Irregular Working<br/>Circle during the Working Plan Period.

Species	Yield prescribed for 10 years (M <sup>3</sup> )	Volume marked in 15 years (2001 to 2016) (M <sup>3</sup> )	Actual volume extracted (2001 to 2016) (M <sup>3</sup> )
DEODAR	19000	6846	3615
KAIL	45000	22409	11843
FIR	50000	2331	296
CHIR	0	2271	1103
TOTAL	64000	33857	16857

The volume marked for felling is about 53 % of the prescribed yield for the period. The volume removed is very less than expected sawn outturn of the marked volume in case of Fir and Chir as also in case of deodar and Kail (approx. 50%). Not much importance was attached to the sequence of felling suggested by the Working Plan Officer in the selection of annual coupes. Aspects relating to regeneration have been thoroughly neglected. The areas proposed to be regenerated were exposed to continuous grazing. Little was done by way of artificial regeneration and the plantation programme has mostly concentrated in fast growing exotics like *Robinia spp.* and *Ailanthus spp.* The result of regeneration works carried out in this Working Circle during the Plan period are tabulated under appendix XII.

#### (ii) Mixed coniferous (Selection) Working Circle.

Compartments containing well stock commercial Deodar, Kail and Fir but occupying steep and rugged slopes thereby rendering them unfit for concentrated working were allotted to this working circle. A total 5496 hectares of forest area was allotted to this working circle of which 5180 hectares was in Marmat Range, 205 hectares in Batote Range and 111 hectares in Gandhri Range. Keeping in view the importance of this forest in soil and water conservation, selection system was prescribed for management of these forests. Silviculturally available trees above exploitable diameter from area having adequate and established regeneration were proposed to be removed.

Exploitable diameter was fixed at 70 cm for Deodar and Kail and 80 cm for Fir corresponding to a rotation of 150 years in Deodar and Kail and 225 years in Fir. A felling cycle of 25 year was adopted.

#### **Yield Regulation**

The yield for Mixed Conifer Selection Working Circle was calculated on volume basis using Modified Brandis Diameter Class Method. An area check was also provided. The yield was computed on the basis of commercial growing stock only. Accordingly, the annual yield from entire Working Circle was fixed as follows;

Deodar	= 4400 cum
Kail	= 4000 cum
Fir	=1600 cum
Total:	=10000 cum

The size of annual coupes worked out to 163 hectares.

#### **Regeneration:**

In order to secure regeneration, measures removal of shrubs, raking of leaf litter and top layer of soil, patch sowing in planting of nurseries raised seedling along with closures to grazing of were prescribed. In this respect it was proposed that an area equal to the size of annual coupes be taken up for effecting closures each year, evenly distributed over the entire working circle.

#### Application of the prescriptions and Results:

Table 7.9Table showing prescribed yield and actual volume of<br/>timber extracted from Mixed Conifer Selection Working<br/>circle during the Working Plan Period.

SPECIES	Yield prescribed for 10 years (M <sup>3</sup> )	Volume marked in 15 years (2001 to 2015) (M <sup>3</sup> )	Actual volume extracted (2001 to 2016) (M <sup>3</sup> )
DEODAR	44000	7970	3966
KAIL	40000	20637	10323
FIR	16000	5351	1001
CHIR	0	0	2
TOTAL	100000	33958	15291

Only 34% percent of the prescribed volume was actually marked for felling. However, the volume of deodar and Kail as also Fir extracted is very less than the expected average sawn outturn (approx. 45%) in this circle. The prescriptions relating to securing of regeneration were largely ignored and this is reflected in the inadequacy of established regeneration over most of the working circle area. The result of regeneration works carried out in this Working Circle during the Plan period are tabulated under appendix XII.

#### (iii) Fir (Selection) Working Circle.

All well stocked, commercially exploitable Fir forests of Batote Forest Division were allotted to this working Circle. This Working Circle covered 4626 hectares forest area in Marmat Range, 269 hectares in Batote and 376 in Gandhri Range respectively. Mature and over mature trees formed a large proportion of the growing stock in this working circle. Keeping in view the silvicultural requirements of the specie and the need for soil and water conservation in upper catchment areas, these forests were proposed to be managed under Selection System. Removal of exploitable sized silviculturally available trees was prescribed from areas having adequate and established regeneration. Deodar Kail trees above 70 cm and Fir trees above 80 cm were considered exploitable. A felling cycle of 25 year was adopted.

#### **Yield Regulation**

The yield was calculated using the Modified Brandis Diameter Class Method and was subjected to area check. Only commercial growing stock was taken into account for the purpose of yield calculation.

The volume yield was subjected to area check and the size of annual coupe was fixed at 145 hectares.

#### Application of the prescriptions and Results:

Table 7.10Table showing prescribed yield and actual volume of<br/>timber extracted from Fir Selection Working circle during<br/>the Working Plan Period.

SPECIES	Yield prescribed for 10 years (M <sup>3</sup> )	Volume marked in 15 years (2001 to 2015) (M <sup>3</sup> )	Actual volume extracted (2001 to 2016) (M <sup>3</sup> )
DEODAR	3000	159	66
KAIL	13000	1918	904
FIR	90000	2856	123
CHIR	0	0	0
TOTAL	106000	4933	1093

About 4.65 percent of the prescribed yield was actually marked. However, in this working circle, the actual volume extracted was very less than the expected outturn of the marked volume (approx.22% of the marked volume). Other prescriptions relating to cultural operations, artificial regeneration and grazing control were ignored as a result of which the status of regeneration of Fir areas is very poor. The result of regeneration works carried out in this Working Circle during the Plan period are tabulated under appendix XII.

#### (iv) Chir Irregular Working Circle.

The working circle included most of the Chir forests of Batote and Gandhri ranges. An area of 1231 hectares in Batote Range and 2557 hectares in Gandhri Range was placed under this working Circle. Chir occurs mostly as pure crop except at higher places where it is found mixed with Deodar and Kail. These forests are poorly stocked and the regeneration too was highly inadequate without showing any sign of coming up. Most of the crop is mature and over mature with high mortality among these trees.

Although a strong light demander, the Chir forests were prescribed to be worked subject to Improvement felling only. This was necessitated because of the fact that the crop was already very open, and regeneration woefully inadequate, with intense biotic pressure over the entire area of the working circle. Exploitable diameter of 70 cm, which roughly corresponds to an age of 150 years, was prescribed and the felling cycle was fixed at 10 years.

#### Yield Regulation

Modified Brandis Diameter Class Method was applied for computation of the yield. On the commercial growing was taken into account for calculating the yield and the annual cut prescribed from the working circle as under;

Chir	= 1500 cum
Total:	= 1500 cum

This yield was subjected to an area check and the size of annual coupe was fixed at 226 hectares. In subsidiary silvicultural operations, disposal of debris, fire protection, controlled burning and tending were prescribed with special emphases on grazing control and artificial regeneration through patch sowing and planting of nurseries raised seedlings.

#### Application of the prescriptions and Results:

<b>Table 7.11</b>	Table showing prescribed yield and actual volume of
	timber extracted from Chir Irregular Working circle
	during the Working Plan Period.

SPECIES	Yield prescribed for 10 years (M <sup>3</sup> )	Volume marked in 15 years (2001 to 2015) (M <sup>3</sup> )	Actual volume extracted (2001 to 2016) (M <sup>3</sup> )
DEODAR	0	0	73
KAIL	0	0	504
FIR	0	0	0
CHIR	15000	6972	3110
TOTAL	15000	6972	3567

The volume of trees marked was only 45% percent of the prescribed yield. The volume extracted is less than the expected sawn outturn (approx 51%). Not much attention was paid to subsidiary silvicultural operations and prescriptions relating to artificial regeneration, as a result of which the status of Chir has gone from bad to worse. The various regeneration works taken up under this Working Circle are tabulated under appendix XII.

#### (v) Reboisement Working Circle;

Potentially productive areas that had undergone degradation either due to excessive biotic interference or due to failed regeneration after drastic treatment were allotted to this working circle. Some compartments from Deodar Kail Working Circle, mixed conifer selection working circle, Fir Selection Working Circle and Chir Interim Working Circle also transferred to Reboisement Working Circle in Sh. Pritam Chand's Plan. Some areas which, though adequately stocked but located near human habitation, along National Highway and at places of Tourist interest were also allotted to this working Circle. A total of 6314 Hectares forest area was places under this Working Circle. No regular felling were prescribed in this working circle and removals were to be restricted to meeting of the petty demands of concessionists. Every year, 70 hectares of degraded area was proposed to be rehabilitated.

#### Application of Prescriptions and Results.

Prescriptions relating to regeneration of conifers were not implemented to any significant extent. Plantations have been limited to raising of fast growing exotics like *Robinia spp.* and *Ailanthus spp.* About 4669 (M<sup>3</sup>) of timber was removed from this working circle in connection with installation of transmission lines, road construction and other FCA cases. The result of regeneration works carried out in this Working Circle during the Plan period are tabulated under appendix IX.

#### (vi) Protection Working Circle.

Those compartments of Batote Forest Division that had not been allotted to any of the working circles above were placed under this working circle. Generally these areas included precipitous hill slopes devoid of vegetal cover, inherently unproductive and uneconomical. This working circle was spread over 3207 hectares of forest area. No felling of whatsoever nature was prescribed in this area. The result of regeneration works carried out in this Working Circle during the Plan period are tabulated under appendix XII.

#### (viii) Resin (Overlapping) Working Circle.

The Chir forests of this division have been under tapping since 1974-75. However, Resin (Overlapping) Working Circle was introduced for the first time in Sh. Pritam Chand's plan and it included all the Chir bearing areas covered under Chir Working Circle. Tapping of trees below 50 cm diameter was prohibited. One blaze was prescribed for trees between 50 to 70 cm d.b.h and trees above 70 cm d.b.h could be given two blazes. Rill method of resin tapping was prescribed for harvesting resin. Annual yield was fixed at 50,000 blazes. Detailed prescriptions on how the tapping has to be carried out were provided.

#### Application of Prescriptions and Results;

Resin tapping was carried out in utter disregard to the Working Plan prescriptions. The following table provides year wise details of blazes tapped vis-à-vis the prescribed yield.

	_	_			
Year	Batote	Gandhri	Total	Prescribed	Surplus/Deficit
2000-01	51221	84423	135644	60000	75644
2000-02	50605	86252	136857	60000	76857
2002-03	45895	83649	129544	60000	69544
2004-05 to	Nil	Nil	Nil	Nil	Nil
2015-16					
Total	147721	254324	402045	180000	222045

## Table 7.12Statement showing number of Blazes tapped during the<br/>previous working plan period.

Despite detailed procedure, regulation and asset of do's and don'ts having been provided, during previous plan, serious irregularity in marking blazes and cutting rills and grooves were noticed in the field. Tapping was done on trees below 50 cm diameter and such trees formed nearly 41 percent of the crop placed under tapping. The tappable surface area has been damaged to the extent of 50-90 percent in five percent of the crop. In sixty four percent of the crop the surface area scarred and damaged by resin tapping varies from 20 to 50 percent. As a result thousands of Chir trees have either dried or snapped from base due to wind. Excessive tapping also renders trees susceptible to insect and fungal attack. The Chir crop of Batote Division has suffered heavily due to non-adherence of Working Plan prescriptions relating to resin (overlapping) Working Circle.

#### (viii) Grass land Development (Overlapping) Working Circle:

The area under pasture development land in the alpine and sub-alpine zones, are mostly devoid of tree growth and sustain a variety of medicinal herbs, shrubs and palatable and un palatable grass. Out of 6113 hectares under high pasture land, 2388 hectares falls in Batote Range, 914 hectares in Gandhri and 2811 hectares in Marmat range. Both local and migratory live stock graze in these forests for about 06 months of the year. Grass leaf fodder from a number of tree species is procured by the local population for feeding their livestock, resulting thereby fodder trees are mercilessly lopped for the said purpose. Little seems to have been done for the betterment of these pasture lands/ forests.

#### 7.3 Special Works of Improvement Undertaken.

#### 7.3.1 Nurseries

At the time of inception of the previous plan, 16 nurseries existing in Batote Division. However, most of them were not operational during the year 2001-2002. This sad state of affairs is the result of the severe financial crunch that is state is currently facing. The list of nurseries as they exists during the year 2015-16 appears is tabulated as under;

S.No.	Range	Name of the Area where Nursery is existing	Area (Hact)
1	Batote	Batote	0.6
2	Batote	Sarga	1.00
3	Batote	Sanasar	0.25
4	Gandhri	Tangar	1.00
5	Gandhri	Borka	0.30
6	Marmat	Khellani	0.15
7	Marmat	Behota	0.05
8	Marmat	Richoo (Pvt)	0.50
		Total	3.85

Table 7.12Staement showing Nurseries Existing in Batote Forest<br/>Division in the year 2015-16

There has been little improvement in the nursery technique over the last decades. Technologies like root trainers, glass houses etc have not been tried even at an experimental level. Raising of conifers in the nurseries is by and large neglected, and more stress is laid on the raising of fast growing exotics like *Robinia pseudoacacia and Ailenthus excelsa*. Other broad leaved species raised in the nurseries are *Aesculus indica, Juglans regia, Populus ciliata, Salix spp.* etc. There is a need for increasing the diversity of plant species in the nurseries especially conifer species.

#### 7.3.2 Roads and bridges

Batote Forest Division is very well connected to Udhampur-Ramban, Bhaderwah-Doda and Mahore Forest Divisions by Jammu-Srinagar National Highway 44, Batote Kishtwar NH 244 and Ramban- Gool road respectively. Other roads falling within this division are Patni-top Sanasar road, Dhalwas-Sawani road Kanga Gandhri-Bhathni road, Khellani-Goha road and other roads under construction. Considerable damage has already been caused to the forests of this Division by the construction of these roads. The list of forests roads/paths are appended under appendix XVI. In addition to the above various roads remained under construction under PMGSY/PWD in the Division which has also caused considerable damage to the forests and the detail of such roads/projects showing area, trees affected are appended under appendix XXII (FCA).

#### 7.3.3 Buildings

There are large numbers of buildings existing in this Division, most of them locating at Divisional Headquarter, Batote. Unfortunately, for want of adequate funds, almost all the buildings are in dilapidated condition and many of them may collapse in the near future. The list of buildings existing in this division as on 31-03-2016 is provided under appendix XV.

#### 7.3.4 Soil Conservation works

Abstract of soil conservation works including sowing, planting and minor engineering works, carried out in the division during the proceeding plan period are listed under appendix XII. The works done are not commensurate to the extent of problem this division faces in relation to soil conservation and landslide. Because of the weak geological formations along National high way, this aspect needs special attention. The National Highway Project, with its head quarter at Batote is engaged in activities related to the stabilization of landslides along National High way during the plan period and is still continuing in the job.

#### 7.4 Past Yield

The compartment wise and working Circle wise detail of volume of timber marked and extracted have been provided under appendix XVIII &XX respectively. The Working Circle wise abstract of timber harvested during the period from 2000-2001 to 2015-16 from Batote Forest Division is tabulated under 7.13.

# Table 7.13Abstract of Timber harvested during the plan period by<br/>SFC/Deptt. in Batote Forest Division from 2000-01 to 2015-<br/>16.

Working Circle	Volun		e Harvested	$(m^3)$	
	Deodar	Kail	Fir	Chir	Total
Deodar – Kail					
Conversion Block	2287	4226	184	1	6698
Converted Block	2311	6467	36	797	9611
Unallotted Block	664	3277	76	32	4049
Sub-total	5262	13970	296	830	20358
Mixed Conifers Selection	4292	10384	1012	0	15688
Fir Selection	66	904	123	0	1093
Chir	31	512	0	3357	3900
Reboisement	460	1118	299	848	2724
Protection	24	0	0	17	42
Grand Total	10135	26888	1729	5052	43804

#### **CHAPTER-VIII**

#### STATISTICS OF GROWTH AND YIELD

#### 8.1 Volume Table

- 8.1.1 Local volume tables are not available for the important tree species found in this region. No sample plots are maintained either by the State Forest Research Institute or by the Territorial Divisions. There has been a practice so far to prepare local volume table by developing some local equations, for academic interests only. The local volumes so prepared have never been adopted for actual yield calculation.
- 8.1.2 At the time of the preparation of the Plan by Sh. Pritam Chand, it was decided that Kullu volume table shall be adopted in actual yield calculation. For the sake of continuity, and in the absence of the appropriate local volume tables, Kullu volume tables have been adopted in respect of all the four conifers species of this Division . Mr. Vasu Yadav IFS has also adopted the same volume table and is being adopted in the present revision of the Working Plan.

Diameter		Volume in Cft/Cum			
	Deodar	Kail	Fir	Chir	
30-40	27/0.76	27/0.76	30/0.84	17/0.48	
40-50	47/1.33	48/1.36	55/1.56	40/1.13	
50-60	74/2.10	80/2.27	105/2.97	78/2.21	
60-70	111/3.14	118/3.34	173/4.90	127/3.54	
70-80	155/4.39	156/4.42	242/6.85	172/4.87	
80-90	200/5.66	189/5.35	293/8.30	219/6.20	
90-100	242/6.85	217/6.14	335/9.40	247/6.99	
100 &	267/7.56	238/6.74	360/10.19	260/7.48	
above					

#### Table 8.1 Kullu Volume table for Principal Conifer Species

#### 8.2 Quality Class

8.2.1 The quality class of forests in Batote Forest Division varies from place to place, depending upon the locality factors of the area. On an average, the quality class of Deodar, Kail and Fir in this Division is II, with occasional patches of I/II crop being encountered in favourable localities. On exposed south western aspects, spurs and ridges, the quality falls to class II/II. The quality class of Chir Varies from II/III in Batote Forest Division.

#### 8.3 Growth Studies

Sh. Pritam Chand carried out growth studies at the time of preparation of the

Working Plan. Bases on the results of the data analyzed, the following diameter- age tables were then prepared. The same have been utilized for calculation in Mr. Vasu Yadav Plan, and in this Plan as well.

Diameter		Age in years				
Class (cm)	Deodar	Kail	Fir	Chir		
10	30	23	40	28		
20	44	37	64	43		
30	60	53	84	61		
40	74	70	109	80		
50	90	82	136	105		
60	106	99	166	127		
70	121	112	196	151		
80	137	122	221	173		
90	152	134	0	0		
100&	180	147	0	0		
above						

#### 8.4 Methodology Adopted for Assessment of Growing Stock

8.4.1 For estimation of growing stock, stratified random sampling using Bitterlich Technique, also known as point sampling, using wedge prisms, was adopted. The sampling unit is a random point around which the crop measurement and description are carried out in accordance with a standard format. Point sampling is suitable for the forest of this Division because the breast height of the tree is clearly visible, and the crops are generally uniform in age and composition within a given strata. The stratification (division of heterogeneous population into more or less homogeneous sub-group called strata) of the demarcated forest area into different strata by grouping compartment was carried out on following lines:

I. First stage stratification	1. Wooded area including Commercial and Un		
of total demarcated forests area	Commercial area.		
into	2. Non-Wooded area including high level pasture		
	land, rocky and stony waste land, landslide area.		
II. Second stage	1. Production Stratum.		
stratification of wooded area into	2. Protection Stratum.		
	3. Reboisement Stratum.		
III. Third Stage Stratification	1. Deodar Kail Sub-stratum.		
of Production stratum	2. Mixed Coniferous sub-stratum.		
	3. Fir sub stratum.		
	4. Chir sub stratum.		
IV. Fourth stage stratification	1. Conversion Block.		
of Deodar Kail sub-stratum into	2. Converted Block.		
periodic blocks	3. Un allotted Block.		

8.4.2 The number of Sample points required to be surveyed and measured in each of the above strata to achieve the desired accuracy of 20 percent and 95 percent confidence level was computed on the basis of a preliminary survey. The numbers of sample points surveyed in each stratum/sub-stratum are listed below.

S.No.	Name of Stratum/Sub-	No of sample points/Plots
	Stratum	surveyed.
1	Deodar Kail Selection Working	46
	Circle	
2	Mixed conifers Selection	30
	Working Cirlce	
3	Fir Selection Working Cirlce	17
4	Chir Irregular Working Circle	11
5	Reboisement Working Cilrcle	86
6	Protection Working Cilrcle	25
	Grand Total	215

The combine mean for various parameters was calculated using the formula:

Where

x = mean of the combine series.

n1 = number of points in series one.

- x1 = mean of series one.
- n2 = number of points in series 1.
- X2 = mean of series 2.

The variance of the pooled data was computed using the following formula.

$$O2 = \underline{n1 (d1^{2} + O1^{2}) n2 (d2^{2} + O2^{2})}_{n1+n2}$$

Where,

O2 = Variance of pooled data.

n1, n2 = number of points in series 1 & 2 respectively.

- d**1** = x**1**-x
- d2 = x2-x

 $01^2$  = variance of series 1.

 $O2^{2}$  = variance of series two.

Standard deviation of pooled data =  $| O^2 |$ 

The standard deviation of pooled data was then utilized to compute other parameters like co-efficient of variation, standard error, and confidence limits.

The variable of interests i.e. number of trees, basal area and volume per hectare has been calculated in respect of each of these sample points using the following formula.

1. Basal area per hectare = BAF x n

Where AF = basal Area factor of the wedge prism and

n = number of trees tallied at sample points.

2. Number of trees for a given sample points, N= BAF x E I/B1

Where N = number of stem per hectare.

B1 = Basal area of 1<sup>th</sup> tree tallied.

3. Volume per hectare V = BAF x E V1/B1

Where V = volume per hectare.

V1 = volume of 1<sup>th</sup> tallied tree at a given sample point.

B1 = Basal area of 1<sup>th</sup> tallied tree at a given sample point.

#### 8.5 Allocation of compartments to various working circle

The compartment allocation during the previous working plan was consulted. The compartment wise marking carried out during the period of 1978 to 2012 was studied carefully. The working plan officers visited more than 50% of the compartments and observations regarding availability of growing stocks, distribution of various dia classes in the compartment and the regeneration established in the areas where felling operations carried out, were made. As per the observation and the inferences the compartments were allocated into various working circles.

#### 8.6 Layout and Delimitation of boundaries

In the revision exercise the layout and delimitation of compartment boundaries and Range boundaries has been undertaken. The layout of boundaries of Range and Compartment was undertaken after detailed ground survey using GPS and existent working plan map. The boundaries were delimited on ground by marking the trees located on or adjacent to the boundary by coal tar rings. As per past convention in such delimitation exercise, single ring was used to denote compartment boundary, two rings to denote range boundary and three rings for divisional boundary. And the rings are marked in such a manner that from one ring the other ring is visible. At places of prominence where the Compartments are separated were marked by Boards on the tree trunk. The boards depict the compartment number and the natural feature separating them along with the direction of location of the compartments by arrows and where Boards were already existing, they were refreshed.

#### 8.7 Analysis of Data

The data obtained from the field was compiled in the Computer. The data was further processed and analysed using Microsoft Excel software. The sampling data obtained was then put to statistical test to arrive at acceptable accuracy levels. From the field data was then ascertained the average stem distribution in dia-classes per hectare. This data was then extrapolated for the entire area of the Working Circle to arrive at an estimate of the stem stand and the growing stock of the Circle. The allowable cut was calculated taking into account the growing stock in dense forested area alone. For the purpose of calculation of yield Brandis Volume Method (Indian Method) was used and the annual yield so arrived at was cross checked by Von Mantel's Volume limit for normal forest.

#### 8.8 Creation of GIS platform for working plan exercise

Using open source softwares, scanned maps, satellite imageries such as LISS III, LANDSAT 7 (supplied by USGS) and Google Earth, the GIS plate form for Batote Forest Division was created. Using DEM produced from Cartostat I and the rectified working plan maps the compartment boundaries of the division were digitised.

#### 8.9 Stratification of forest area

Using open source satellite imageries the commercial forest areas of the compartments were identified, digitised and map was prepared. The map of commercial forest area of the various working circles was sent to the field for verification. After verification, the map was used for sampling exercise. A pilot survey was conducted in the working circles to ascertain the numbers of sample plots to be laid down in the commercial forest area for estimation of growing stock. Based on the pilot survey the number of sample plots was decided using statistical analysis. The GIS software was used to locate the centre of the sample plots in the commercial forest area of the working circle, randomly. The location of the plot centres were transferred to GPS (Global Positioning System). Using the GPS the field survey parties located the centre of the plot in the field and laid down 0.1 ha sample plots and collected the required data.

#### 8.10 Laying out of 0.1 Ha sample plot in the field

The random points were reached in the field by use of GPS. The random point will be the centre of the plot. In plain areas, from the centre of plot 22.36 m was measured in four directions, i.e. North, south, east and west using compass, and pegs were fixed on ground. The inter distances between the pegs were measured and adjusted to 31.62m so that it encloses an area of 0.1 Ha. If the terrain is slopy, angle of slope was measured using hypsometer. Based on the degree of slope, slope correction factor was used and the length of the plot was adjusted so that 0.1 ha of horizontal area was delineated for sampling. Once the plot of 0.1 Ha horizontal area was delineated on the field, all the

trees/ poles having diameter, more than 10 cm is enumerated and tabulated, dia class wise and species wise, in the form, for estimation of growing stock. All the entities of less than 10 cm was considered as seedling and counted as regenerations. Using wedge prism (Factor 1), the no. of tally trees and half tally trees were counted. The height of the tree and its corresponding dia class was also measured and noted in the form. Signs of wild life and other important parameters were also recorded in the form. The sample plot enumeration data were compiled working circle wise and the parameters such as dia class wise, species wise distribution of stems and corresponding volume in the working circle and basal area of the crop were calculated.

#### 8.11 Survival Co-efficient

The growth and statistics of the previous working plans of the Chenab circle were consulted. The Yield tables of common Indian timber species (Himalayan region) Volume–I complied in the Directorate of Forest education and published by Forest research Institute & colleges Dehradun in 1967 was also consulted. The growth statistics of conifer species of Kullu region, published by Troop was also studied carefully. The data on the relationship between age and dia class of major conifers, presented by Troop was found to be more appropriate for this region and compared with the field observations. It was found that both are similar and it was used in the present study.

#### 8.12 Resin Channel Survey

The channel survey for the extraction of resin form Chir trees is not felt necessary because the general condition of Chir crop does not allow the extraction of Resin and the forests are proposed to be kept under rest for further two decade till the condition of crop is improved.