

HIMACHAL PRADESH GOVERNMENT FOREST DEPARTMENT



REVISED WORKING PLAN

FOR THE FORESTS OF

NACHAN FOREST DIVISION

VOLUME- 1

(22.12.2023 to 31.3.2034)

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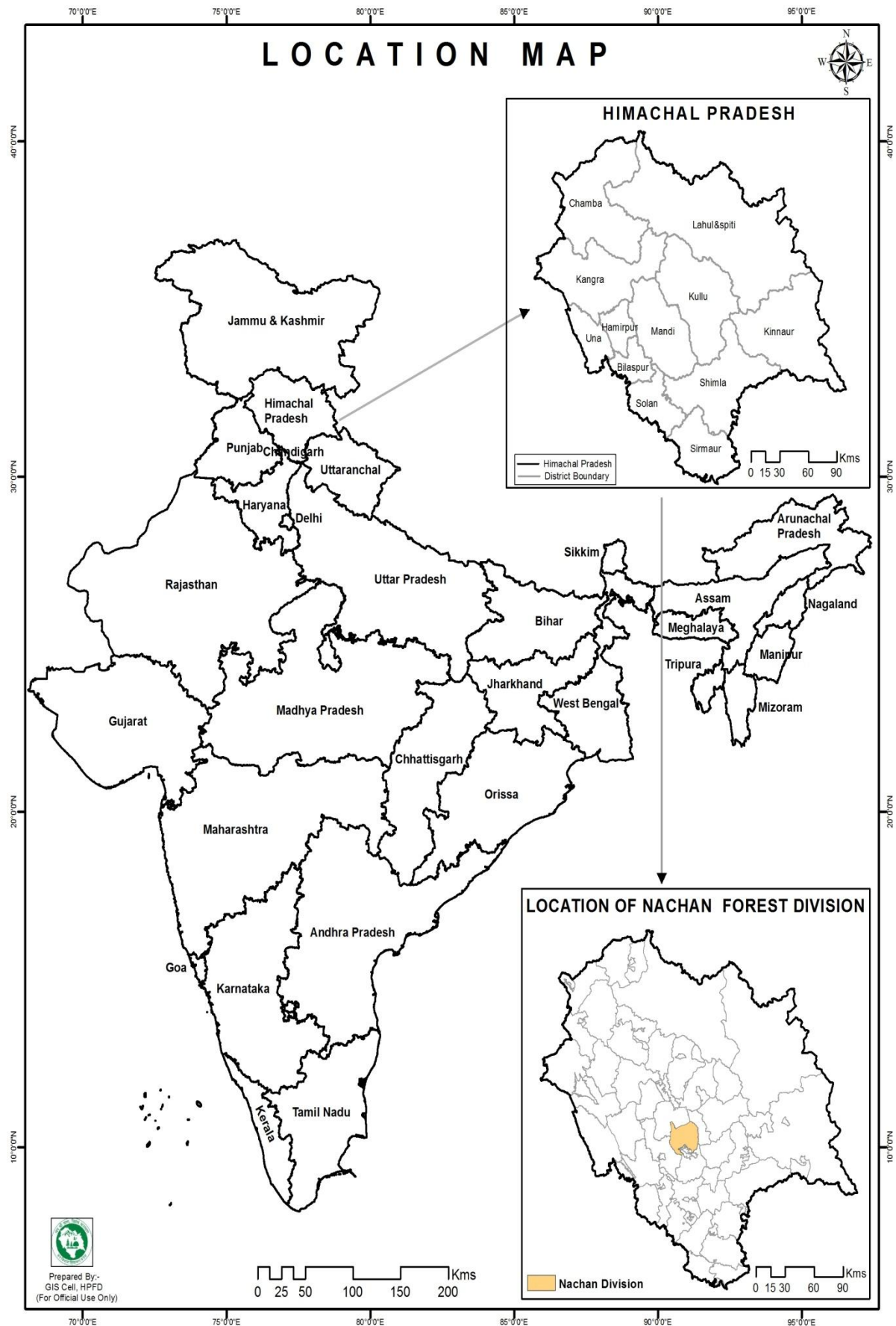
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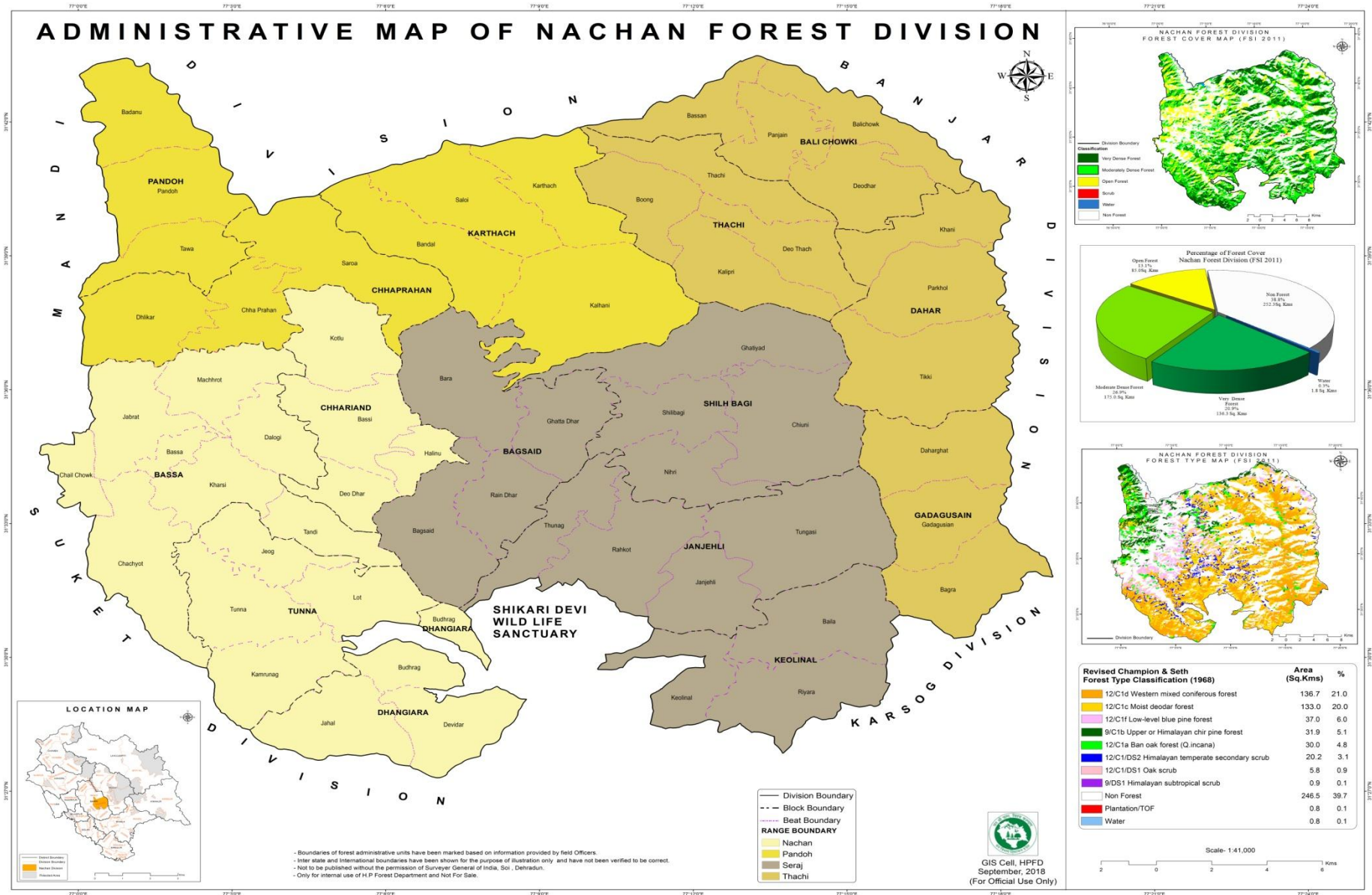
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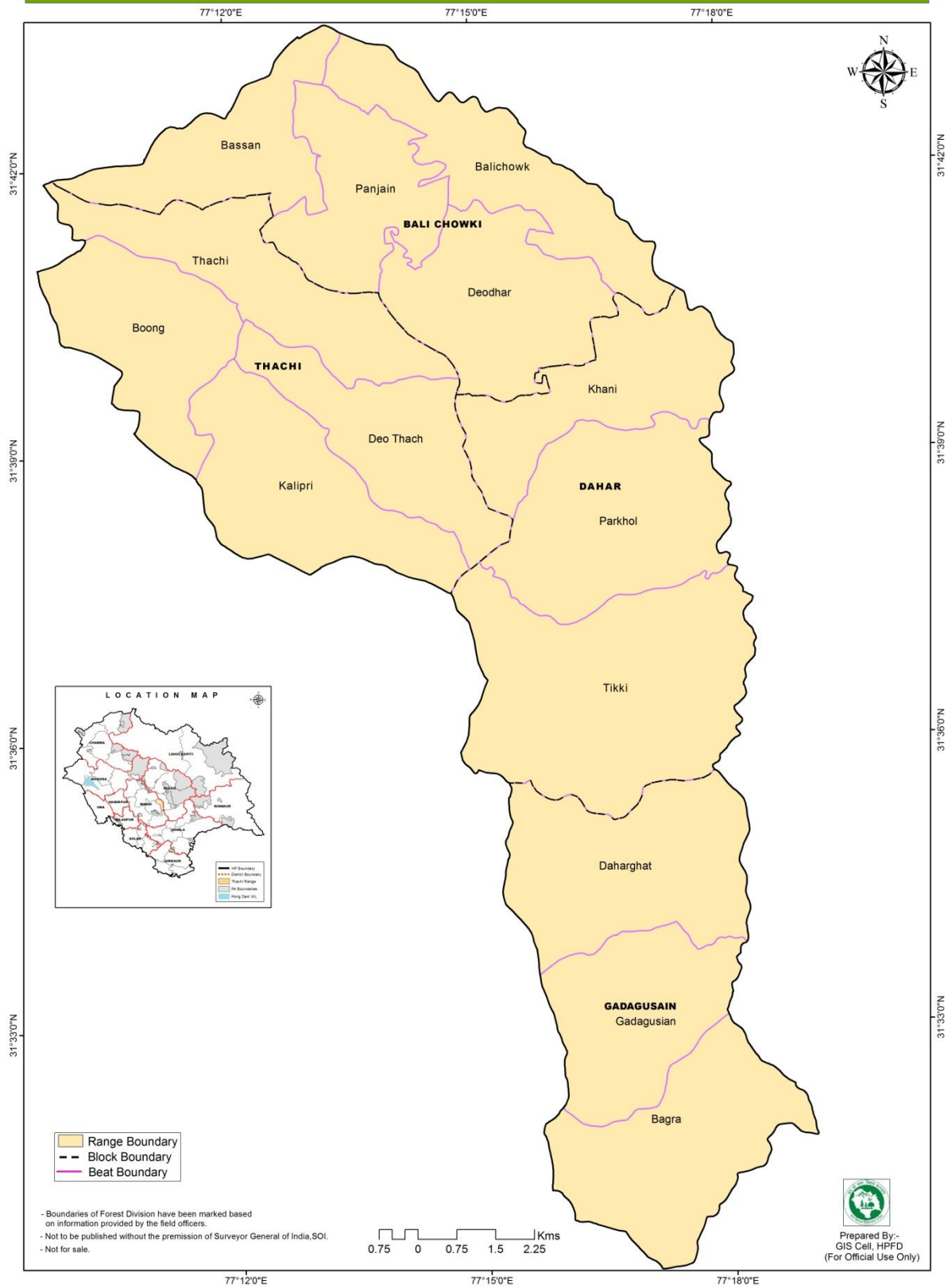
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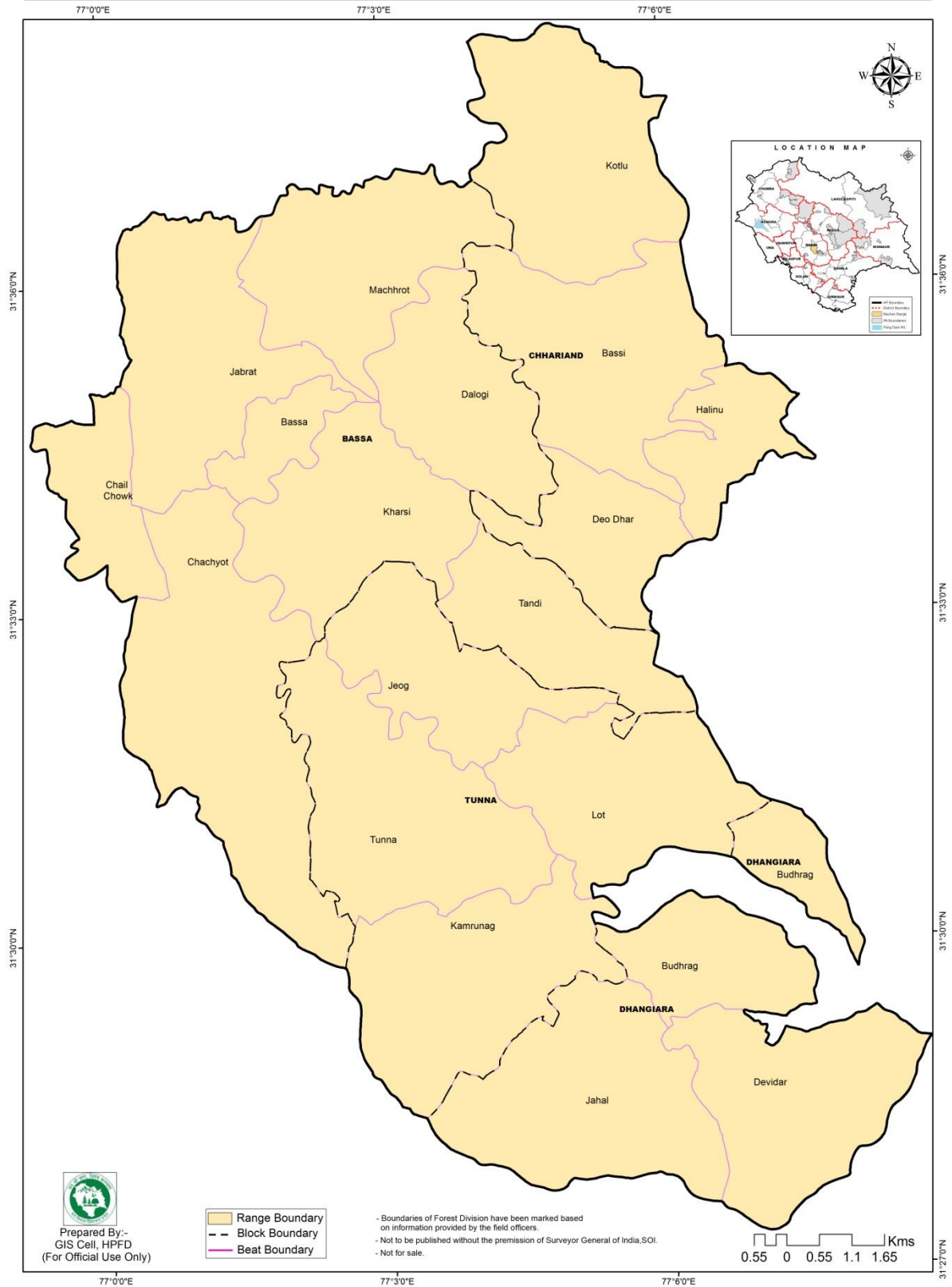




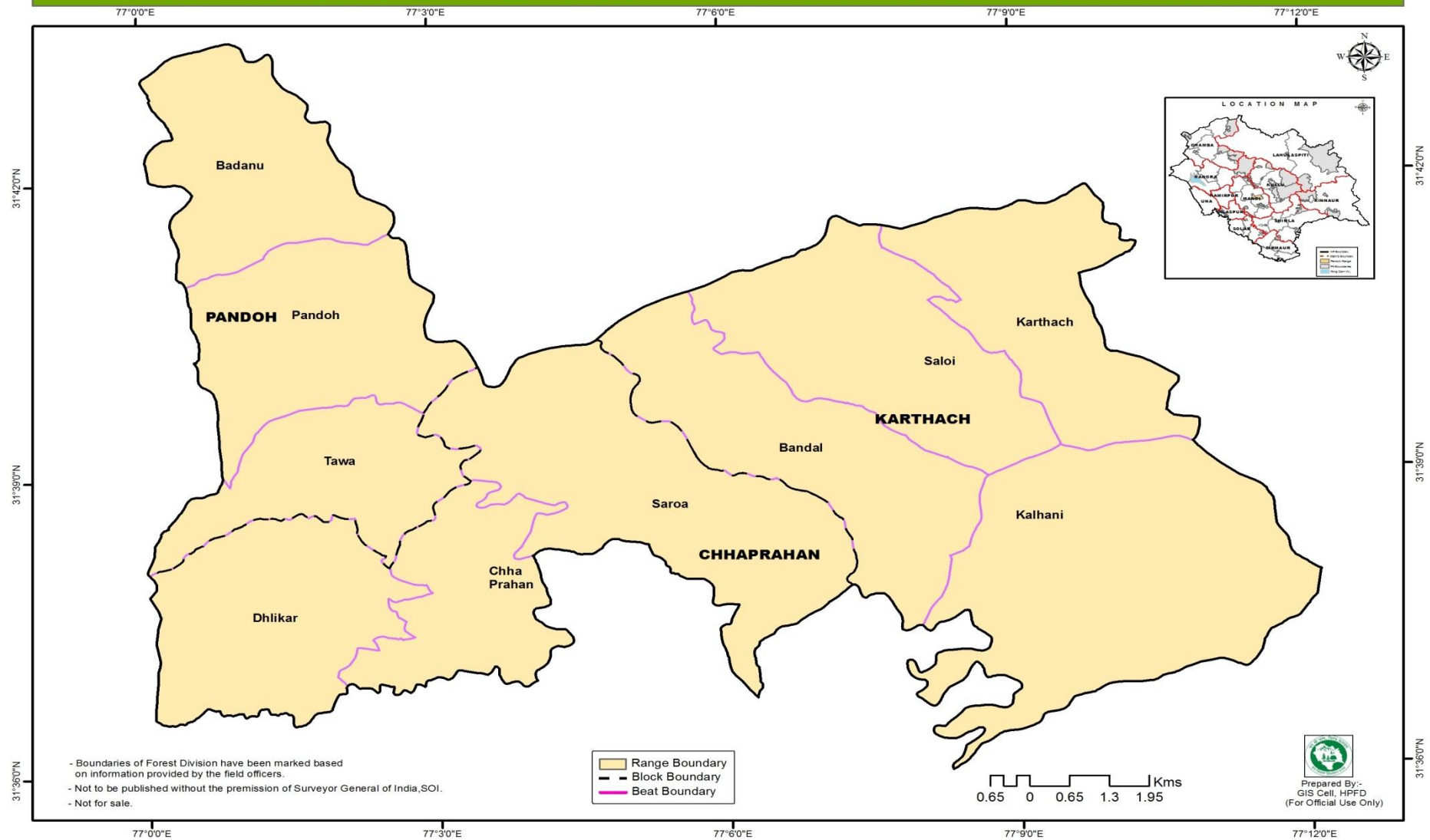
ADMINISTRATIVE MAP OF THACHI FOREST RANGE



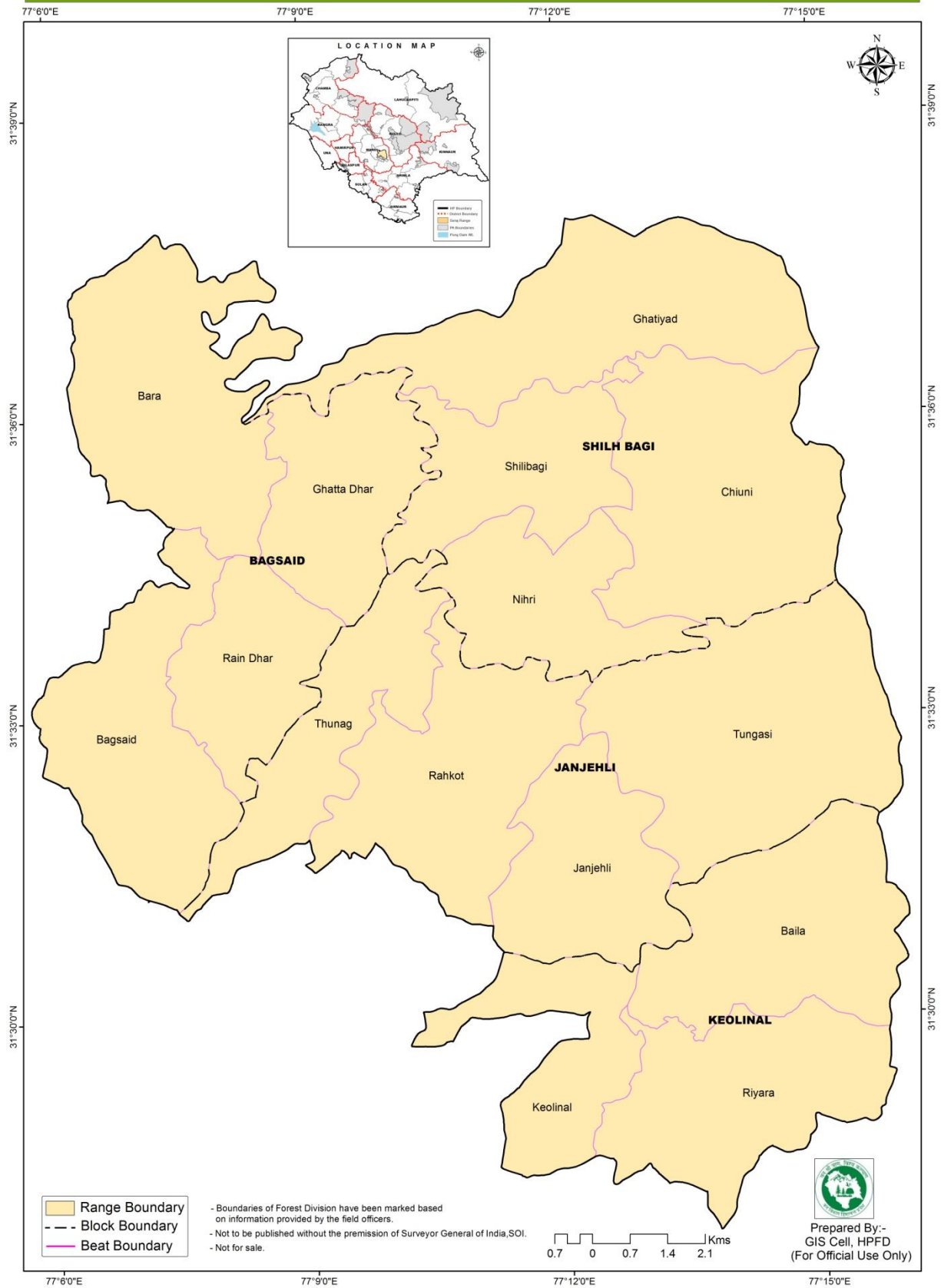
ADMINISTRATIVE MAP OF NACHAN FOREST RANGE



ADMINISTRATIVE MAP OF PANDOH FOREST RANGE



ADMINISTRATIVE MAP OF SERAJ FOREST RANGE



ACKNOWLEDGEMENT

Revision of Working Plan of Nachan Forest Division has been a great learning experience. This was a challenge to accomplish the task along with a very busy schedule of territorial division like Nachan. It required Planning, execution in field, collection and compilation of various important data from different sources and computer work. It has been a team effort and was impossible to be achieved single handedly without the support of the field and ministerial staff posted in the Nachan Forest Division. Special thanks are due to Sh. G.S. Goraya, IFS Pr. CCF, HP, Sh. Sanjeeva Pandey, IFS Pr, CC (Working Plan), Sh. Tajinder Singh, IFS Additional Pr. CCF (WP), Sh. P.L. Chauhan, Additional Pr. CCF (WP), Sh. H.S. Dogra, IFS Pr. CCF (Working Plan) & Sh. K.D. Sharma, IFS, CCF (WP) and Dr. Suresh IFS, Addl. PCCF (FS & WP) Mandi and Sh. H.V. Kathuria, IFS, CCF (WP & FS) Mandi for their guidance, encouragement and help during the final drafting of the Working Plan. Sh. C.B. Pandey, IFS, CF, Mandi (T) provided the necessary platform to build up this plan in his PWPR. Smt. Upasana Patial, IFS, CF Mandi (T), Sh. S.K. Musafir, IFS, CCF Mandi and Sh. Ajit Thakur, IFS, CCF Mandi helped in final drafting of the Working Plan. Sh. Narender Kumar Chandel, HPFS, Sh. Ambrish Sharma, HPFS and Sh. Kamal Jaswal, HPFS, ACFs Nachan provided the necessary momentum to the completion of field work. Their contribution is highly acknowledged. Divisional Superintendent Sh. Narain Singh, Sh. Govind Ram and all ministerial staff of DFO Nachan merit special mention for their whole hearted co-operation in helping out during the field work and making available data from time to time for compilation/updating in this Working Plan in addition to their heavy work load. I would like to acknowledge the valuable contribution made by R.O Nachan, R.O Seraj, R.O. Thachi, and R.O Pandoh, and all field staff of Nachan Division. My special thanks are due to Sh. T.R. Dhiman, HPFS, who as DFO Nachan for almost for a period of around seven years contributed a lot in the compilation of this document.

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INTRODUCTION

1. Present working plan is revision of Working Plan of Smt. Archana Sharma IFS and Sh. H.S. Dogra, IFS (1992-93 to 2006-07). The period of operation of this working plan is from 2013-14 to 2028-29.
2. The preliminary working plan report was written by Sh. C. B. Pandey, IFS, Conservator of forests, Mandi. The first PWPR was approved in January 2012. From the date of approval, the revision of this WP has seen the tenure of the two DFO-cum-WPO's, Sh. V. K.Babu, IFS (16.02.2012 to 05.08.2013) and Sh. P. D. Dogra (19.07.2013 to 24.12.2014). Sh. Rahul M. Rohane, IFS took over as DFO-cum-WPO on 24 December 2014. At that time, the enumeration work was completed and Part I of working plan was submitted. But the Part- I was returned back by APCCF (WP), Mandi raising few observations.
3. Sh. Rahul M. Rohane, IFS has attended to the observations raised in Part I and submitted the same, complete in all respect with all revised information to APCCF (WP), Mandi on 18/04/2015.
4. Sh. Rahul M. Rohane, IFS has written Part II of the WP with Selection Silvicultural System being prescribed first time for this division. The working circles have been constituted and prescriptions for each working circle have been written after consulting the various books on Forest Management, various Working plans, Forest policies and laws and National Working Plan Code, 2004.
5. The whole plan has been revised thoroughly according to the National Working Plan Code, 2004 incorporating all the new instructions and guidelines.
6. The draft working plan was returned back by Additional Principal CCF, MOEF with few observations on dated 08.02.2017. Thereafter, I was declared WPO and have attended the observations raised by Additional Principal CCF, MOEF.

7. Special mention has to be made of Sh. N. K. Chandel, ACF, HPFS, who has been associated with this WP preparation from the beginning and has completed the painstaking work of enumeration with the help of field staff.
8. I would like to express my sincere thanks to Sh. K. D. Sharma and Sh. H.S. Dogra IFS, CF(WP), Mandi and Sh. H.V. Kathuria, IFS, CCF (W & FS) Mandi for their valuable guidance and support.
9. I sign off with this hope that this comprehensive document is followed in letter and spirit and it results in better scientific and sustainable management of forests of Nachan Forest Division.

T.R DHIMAN, HPFS

**DIVISIONAL FOREST OFFICER-CUM
WORKING PLAN OFFICER,
NACHAN FOREST DIVISION**

EXECUTIVE SUMMARY

NACHAN FOREST DIVISION

There is no reliable record about the history of these forests prior to 1880. However, it is unlikely that large scalefellings were carried out prior to this. In 1880, 10 years lease of all the Deodar forests was granted to the Mandi Forest Company. The lease bound the company to fell a minimum of 1500 Deodar trees per annum of 190 cm. to 240 cm. girth. Consequently, large scale felling was done during the period with the result that there was a depletion of stock of big trees. Having felled most of the mature Deodar, there was little to fell for many years and fellings were confined to the sale of standing dead and malformed Deodar, and some Kail and Fir. However, between 1895-1910, heavy fellings were done in Chil and in some accessible Spruce forests, and as the method of sale was “HassabPasand”(contractor’s choice).

In 1917, regular forest settlement was done by HL Wright and the First Working Plan prepared by him for the period 1918-36, which was subsequently revised by RM Gorrie for the period 1937-56 which in turn was revised by RV Singh for the period 1957-58 to 1976-77 then by Sh. D.C. Thakur for the period w.e.f. 1977-78 to 1991-92. The Nachan forest division was created during the year 1984 and the prescriptions of D.C. Thakur’s working plan were followed. Sh. D.C. Thakur working plan revised by Smt. Archana Sharma and Sh. H.S. Dogra for the period 1992-93 to 2006-07. Present working plan w.e.f. 2013-14 to 2028-29 is revision of Archana Sharma and H.S. Dogra’s working plan.

Since then it is 6th working plan of Nachan Forest Division. From Management point of view following work circles is constituted:

1. Deodar-Kail Working Circle.
2. Chil Working Circle.
3. Fir& Spruce Working Circle.
4. Oak Working Circle.
5. Protection Working Circle.
6. Plantation Working Circle.
7. Grazing (Overlapping) Working Circle.
8. Soil and Water Conservation (Overlapping) Working Circle.
9. Joint forest Management (Overlapping)Working Cirlce.
10. Wild Life (Overlapping) Working Circle.
11. Non Timber Forest Produce (Overlapping) Working Circle.

There are four ranges namely Thachi, Seraj, Nachan and Pandoh. Total Geographical area of Nachan Division is about 638 Sqkm. out of which total Forest area is 37219.56 Ha (372.19 Sqkm.). The location of the Division lies at Longitudes-77°01' & 77°20' East and Latitudes-31°29' & 31°46' North. The detail of the forest area is as under:

(Table No 1)

A.	Category wise Forest area	Area (Ha)
i	RF	-
ii	DPF	36696.26
iii	UPF	523.00
B.	Area by Working Circle	Area (Ha)
i	Deo/Kail Woking Circle	8002.84
ii	Fir & Spruce Woking Circle	8535.21
iii	Chil Woking Circle	5219.61
iv	Oak Working Circle	2103.49
v	Protection Woking Circle	12074.92
vi	Plantation Woking Circle	1283.49

Enumeration has been carried out as per the methodology suggested at point No. 6.6.1 of approved PWPR. The abstract of working circle wise prescriptions is as under:

(Table No. 2)

Name of W.C.	Silviculture System	Rotation Period in yrs	Exploitable Diameter at dbh	Regeneration Period in yrs	Annual Yield Prescribed in cum/ No.	
					Species	Nos
Deodar & Kail WC	Selection System	120 years	60 cms	30	Deodar	24057
					Kail	14829
					Fir/Spruce	3636
					Chil	785
Fir WC	Selection System	120 years	60 cms	30	Spruce	29426
					Fir	21066
					Deodar	1498
					Kail	4011
Chil WC	Selection System	120 years	60 cms	30	Chil	7580
					Kail	1337
					Deodar	603
					Spruce	429

Oak WC	Coppice with standard system	30 years for coppice 90 years for standard	-	-		By area/ volume
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The Shikari Wildlife Sanctuary falls to the south of the Division and its area has been excluded from management point of view. After rationalization of this Wildlife Sanctuary the transfer and receipt of areas has been undertaken between this Division and Wildlife Division Kullu. As a result the total forest area including UPFs of Nachan Division is 37219.56 Ha. The total UPF Area is 523 ha which needs to be notified as DPFs on priority basis.

The major problems of the area is rampant encroachments particularly in forests adjoining habitation. This is because the boundaries are not clear to the field staff and the boundary pillars record has not been maintained properly. Other problems of the area are illicit fellings, illegal mining, stray cattle, overgrazing, soil erosion and heavy demand of forest land diversion for roads and other infrastructure etc.

**LIST OF COMMON TREES, SHRUBS, HERBS AND CLIMBER FOUND IN
NACHAN DIVISION.**

TREES

Sr.No.	Local Name	English Name	Botanical Name
1	Ailanthus	Ailanthus	<i>Ailanthus altissima</i>
2	Airean, Ehraan		<i>Lyonia ovalifolia</i>
3	Am	Mango	<i>Mangifera indica</i>
4	Amaltas	Hornbear	<i>Cassia fistula</i>
5	Amla		<i>Emblica officinalis</i>
6	Arlu		<i>Oroxylum indicum</i>
7	Auar, Daru	Pomegranate	<i>Punica granatum</i>
8	Bhehra		<i>Terminalia bellerica</i>
9	Bakli		<i>Ehretia acuminata</i>
10	Ban	White Oak	<i>Quercus leucotrichophora</i>
11	Banni	Greek Oak	<i>Quercus glauca</i>
12	Bar	Banyan	<i>Ficus scandens</i>
13	Barmi, Rakhata	Yew	<i>Taxus baccata</i>
14	Bel, Beelfiri		<i>Aegle marmelos</i>
15	Beuns	Willow	<i>Salix denticulata</i>
16	Beuns	Willow	<i>Salix tetrasperma</i>
17	Beri		<i>Zizyphusoxyphylla</i>
18	Bhojpatra	Brich	<i>Betula alnoides</i>
19	Bihul		<i>Grewia optiva</i>
20	Bihul		<i>Grewia elastica</i>
21	Bumfal		<i>Pyrus lanata</i>
22	Bursh		<i>Rhododendron arboreum</i>
23	Chamror		<i>Ehretia laevis</i>
24	Chil	Chil Pine.	<i>Pinus roxburghii</i>
25	Chiluna, Pahari Pipal	Popular	<i>Populus deltoides</i>
26	Chiluna, Pahari Pipal	Popular	<i>Populus ciliata</i>
27	Chiluna, Pahari Pipal		<i>Populus nigra</i>
28	Chirandu	Maple	<i>Acer sterculiaceum</i>
29	Chirindi		<i>Machilusduthiei</i>
30	Chirindi		<i>Machilusorodatissima</i>
31	Chuli	Wild Apricot	<i>Prunus armeniaca</i>
32	Cimmu	Mulberry	<i>Morus alba</i>
33	Darel	Bill Toon	<i>Cedrela serrata</i>
34	Drek	Persian Lilac	<i>Melia azedarach</i>
35	Dhou, Chhal		<i>Anogeissus latifolia</i>
36	Draindu		<i>Xylosma longifolia</i>
37	Dudhla	Chinese Tallow	<i>Sapiumsebiferum</i>
38	Fagura, Fegra	Wild fig.	<i>Ficus palmata</i>
39	Haldu		<i>Adina cordifolia</i>

40	Har Singar		<i>Lagerstroemia indica</i>
41	Harad		<i>Terminalia chebula</i>
42	Jacranda		<i>Jacaranda ovalifolia</i>
43	Jammu	Bird cheery	<i>Prunus cerasoides</i>
44	Jhamirdi		<i>Citrus limetta</i>
45	Kahu	Olive tree	<i>Olea ferruginea</i>
46	Kakare		<i>Pistacia integerrima</i>
47	Kala chindwara	Indian spind	<i>Euonymus tings</i>
48	Kala chindwara		<i>Euonymus lucidus</i>
49	Kambal	Kamila tree	<i>Mallotusphilippinensis</i>
50	Kangu, Kaudel		<i>Flacourtiamontchi</i>
51	Kaphal		<i>Myrica esculenta</i>
52	Karala		<i>Bauhinia variegata</i>
53	Karanj	Indian Beech	<i>Pongamia pinnata</i>
54	Kelo, Diar	Deodar	<i>Cedrus deodara</i>
55	Khair		<i>Acacia catechu</i>
56	Khajri	Wild data palm.	<i>Phoneix humilis</i>
57	Khajur, Khajri	Wild data palm.	<i>Phoenix sylvestris</i>
58	Khanor	Horse Chestnut	<i>Aesculus indica</i>
59	Kharsu	Brown Oak	<i>Quercus semecarpifolia</i>
60	Khirk	Nettle tree	<i>Celtis australis</i>
61	Khirk, Chevs	Himalayan	<i>Carpinus viminea</i>
62	Kiker		<i>Acacia nilotica</i>
63	Kosh	Alder	<i>Alnus nepalensis</i>
64	Kosh, Kunish	Alder	<i>Alnus nitida</i>
65	Kreeva	Dog Wood	<i>Cornus capitata</i>
66	Kreeva	Dog Wood	<i>Cornus macrophylla</i>
67	Lasura		<i>Cordia dichotoma</i>
68	Majnu	Weeping willow	<i>Salix babylonica</i>
69	Mandlu, Mander	Maple	<i>Acer ceasium</i>
70	Marinu	Small leaf elm	<i>Ulmus wallichiana</i>
71	Mohru	Greek Oak	<i>Quercus dilatata</i>
72	Ohi		<i>Albizzia chinensis</i>
73	Paharitut	Hill Mulberry	<i>Morus serrata</i>
74	Paja	Wild Cherry	<i>Prunus cerasoides</i>
75	Parange		<i>Acer oblongum</i>
76	Pariara	Coral tree	<i>Erythrina suberosa</i>
77	Paror	Laurel	<i>Litseaumbrosa</i>
78	Pimple, Goela		<i>Casearia elliptica</i>
79	Pipal		<i>Ficus religiosa</i>
80	Pula		<i>Kydiacalycina</i>
81	Rai	Spruce	<i>Picea smithiana</i>
82	Ritha	Soap nut tree	<i>Sapindusmukorosii</i>
83	Robinia		<i>Robinia pseudoacacia</i>
84	Safada	River red gun	<i>Eucalyptus commaldulensis</i>

85	Safada	Lemon scented gun	<i>Eucalyptus globulus</i>
86	Safada	Blue gun	<i>Eucalyptus grandis</i>
87	Safada	Rose gun	<i>Eucalyptus hybrid</i>
88	Samma		<i>Engelhardtiacolebrookianum</i>
89	Sanden		<i>Desmodiumoojeinesis</i>
90	Saru	Pyremidal Cyprus	<i>Cupressus sempervirens</i>
91	Saunjna		<i>Moringa pterygosperma</i>
92	Segli, Kainth		<i>Pyrus pashia</i>
93	Selambra		<i>Lannea grandis</i>
94	Semal	Red cotton tree	<i>Bombax ceiba</i>
95	Shamshed	Box wood	<i>Buxus wallichiana</i>
96	Sharol	Hazlenut	<i>Corylus jacquemontii</i>
97	Shisam, Tali	Sissoe	<i>Dalbergia sissoo</i>
98	Siris (Black)		<i>Albizzia odoratissima</i>
99	Siris (Black)		<i>Albizzia lebbek</i>
100	Siris (White)		<i>Albizzia procera</i>
101	Subabool	Subabul	<i>Leucaena leucocephala</i>
102	Summa		<i>Wightia tinctoria</i>
103	Summa		<i>Wightia arborea</i>
104	Titri		<i>Rhus punjabensis</i>
105	Tooni, Tun	Toon	<i>Toona cilata</i>
106	Tosh	Silver Fir	<i>Abies pindrow</i>
107	Tremal		<i>Ficus roxburghii</i>
108		Paper mulberry	<i>Broussonetia papyrifera</i>
109		Pool	<i>Carevaviminsa</i>
110		India laburnum	<i>Cassia siamea</i>
111			<i>Cassia frondosa</i>
112		Bottle brush	<i>Callistemon viminalis</i>
113		Ash	<i>Fraxinus floribunda</i>
114		Silver Oak	<i>Grevillea robusta</i>
115			<i>Holarrahenaaantidysenterica</i>
116		Himalayan holly	<i>Slexdipyrena</i>
117			<i>Symplocoscicataegoides</i>

SHRUBS

Sr.No.	Local Name	English Name	Botanical Name
1	Akh		<i>Calotrpriosprocera</i>
2	Arand		<i>Ricinus communis</i>
3	Bakhal		<i>Prinsepia utilis</i>
4	Ban tamakhu		<i>Solanum erianthum</i>
5	Bangra		<i>Plectranthusbeddomei</i>
6	Banha		<i>Vitex negundo</i>
7	Bani Wakra		<i>Hypericum oblongifolium</i>
8	Bankakri		<i>Clerodendronserratum</i>
9	Banse		<i>Colebrookeaoppositifolia</i>
10	Bari podari		<i>Hamiltoniasuaveolens</i>

11	Basuti		<i>Justicia simplex</i>
12	Bhangra	Mistletoe	<i>Viscum album</i>
13	Bilan		<i>Leptodermis lanceolata</i>
14	Buins		<i>Salix denticulata</i>
15	Buins		<i>Salix dephnoides</i>
16	Changari		<i>Loranthus lingustrinus</i>
17	Charabri		<i>Sarcococcasaligna</i>
18	Chichri		<i>Plectranthusrugosus</i>
19	Chilngari		<i>Caryopteriswallichiana</i>
20	Chingari		<i>Cassia occidentalis</i>
21	Choti podari		<i>Lantana camara</i>
22	Chururu		<i>Deutzia compacta</i>
23	Chururu		<i>Deutzia staminea</i>
24	Cuine		<i>Salix karelinii</i>
25	Dab		<i>Viburnum cotinifolium</i>
26	Dhwe		<i>Woodfordiafruticosa</i>
27	Diha		<i>Viburnum cylindricum</i>
28	Dlatchi		<i>Nyctanthes arbor-tristis</i>
29	Drubaha		<i>Artemisia indica</i>
30	Drubha		<i>Artemisia vulgaris</i>
31	Drubha		<i>Artemisia vestita</i>
32	Durlu		<i>Andrachne cordifolia</i>
33	Gangiachu		<i>Opuntia monacantha</i>
34	Garana		<i>Carrisa opaca</i>
35	Garna, Khern		<i>Carrisa spinarum</i>
36	Geal		<i>Elaeagnus parvifolia</i>
37	Jammu		<i>Loicoraquinquelocularis</i>
38	Japloti		<i>Ipomea spp.</i>
39	Jhao		<i>Tamarixgallica var. indica</i>
40	Kacharipatha		<i>Rhododendron campanulatum</i>
41	Kajre		<i>Phoenix acaulis</i>
42	Kala akha		<i>Rubus biflorus</i>
43	Kala akha		<i>Rubus ellipticus</i>
44	Kala akha		<i>Rubus lasiocarpus</i>
45	Kala akha		<i>Rubus paniculatus</i>
46	Kanaru		<i>Myrsineaficana</i>
47	Kanla		<i>Daphne cannabina</i>
48	Karnaititpoti		<i>Royleacalcina</i>
49	Kasmal		<i>Berberis aristata</i>
50	Kasmal		<i>Berberis chitria</i>
51	Kasmal		<i>Berberis lycium</i>
52	Katbri		<i>Spiraea lindleyana</i>
53	Kathi		<i>Indigofera heterantha</i>
54	Mandru		<i>Dodanaeaviscosa</i>
55	Negdaun	Snake sticks	<i>Staphyleaemodi</i>
56	Panch-phuli		<i>Jatorphacurcas</i>
57	Pothi, Jaunkra		<i>Elsholtzisfruticosa</i>

58	Ramban		<i>Agave cantala</i>
59	Rikhal		<i>Rhus punjabensis</i>
60	Riunsh		<i>Cotoneaster acuminatus</i>
61	Riunsh		<i>Cotoneaster affinis</i>
62	Riunsh		<i>Cotoneaster congestus</i>
63	RoeniParasita		<i>Limonia spp.</i>
64	Rumri		<i>Caryopterisfoetida</i>
65	Safed Kathi		<i>Desmodiumsambuense</i>
66	Safed Kathi		<i>Desmodium elegans</i>
67	Shameh		<i>Caragana brevispina</i>
68	Siar		<i>Boehmeria macrophylla</i>
69	Slaru		<i>Debregaesiasalicifolia</i>
70	Thor		<i>Euphorbia royleana</i>
71	Tilak		<i>Wikstroemiacanescens</i>
72	Tilenal		<i>Viburnum grandiflorum</i>
73	Tirmira		<i>Zenthoxylumarmatum</i>
74			<i>Baliospermummontanum</i>
75			<i>Cassia obtusifolia</i>
76			<i>Crotalaria prostrata</i>
77			<i>Duranta repens</i>
78			<i>Euphorbia prolifera</i>
79			<i>Eunonymusfimbriatus</i>
80			<i>Flemingiaprostrata</i>
81			<i>Indigofera heterantha</i>
82			<i>Indigofera cylindrica</i>
83			<i>Indigofera cassioides</i>
84			<i>Inula cappa</i>
85			<i>Inula barbata</i>
86			<i>Lonicera angustifolia</i>
87			<i>Lonicera myrtillus</i>
88			<i>Murrayapaniculata</i>
89			<i>Murrayakoenigii</i>
90		Oisendor	<i>Nerium indicum</i>
91			<i>Ougeniadalbergioides</i>
92			<i>Potentilla fruticosa</i>
93			<i>Spiraebella</i>
94			<i>Viburnum mullaha</i>

HERBS

Sr.No.	Local Name	English Name	Botanical Name
1	Ban Ajwayan		<i>Thymus linearis</i>
2	Banafsha		<i>Viola canescens</i>
3	Banjwain		<i>Bupleurum lanceolatum</i>
4	Banjwain		<i>Bupleurum tenue</i>
5	Banjwana		<i>Elsholtziastachyodes</i>
6	Bankakri		<i>Podophyllum hexandrum</i>
7	Barin	Sweet Flag	<i>Acorus calamus</i>
8	Barin	Maiden hair	<i>Adiantum capillus</i>
9	Bheng	Hemp	<i>Cannabis sativa</i>

10	Bhumia	Straw berry	<i>Fragaria indica</i>
11	Bichhuti		<i>Girardinia heterophylla</i>
12	Brahmi		<i>Hydrocotyle asiatica</i>
13	Brechra, Kharera		<i>Iris germania</i>
14	Carbinimamiri		<i>Aquilegia pubiflora</i>
15	Carbinimamiri	ColumbineArgemone Mexicana	<i>Aralia cachemirica</i>
16	Chamrali		<i>Pilea obesa</i>
17	Charaite		<i>Swertia chirayita</i>
18	Charaite		<i>Swertia cordata</i>
19	Charaite		<i>Swertia paniculata</i>
20	Chowhri		<i>Geranium robertianum</i>
21	Darpatre		<i>Ajuga parviflora</i>
22	Datura		<i>Datura stramonium</i>
23	Dodu		<i>Malva rotundifolia</i>
24	Dora		<i>Potentilla fulgens</i>
25	Dudhli		<i>Prenanthesbrunoniana</i>
26	Durwa		<i>Ainsliaea aptera</i>
27	Fye		<i>Achillea millefolium</i>
28	Gaddi Tamaku	Mullain	<i>Verbascum thapsus</i>
29	Guadra		<i>Salvia</i>
30	Jangli sarsen		<i>Sisymbrium thalianum</i>
31	Jangli sarsen		<i>Sisymbrium irio</i>
32	Jatamansi		<i>Nardostachysjatamansi</i>
33	Jawain		<i>Carcumcopticum</i>
34	Kanaula		<i>Agrimonia pilosa</i>
35	Karu		<i>Picorhizakurroa</i>
36	Kauri		<i>Primula denticulata</i>
37	Kelulu		<i>Delphinium vestitum</i>
38	Kharwar		<i>Habenariadensa</i>
39	Khelti		<i>Chaerophyllumreflexum</i>
40	Kopra		<i>Gerbera lunginosa</i>
41	Kugas		<i>Urtica dioica</i>
42	Kugas		<i>Urtica mairei</i>
43	Malora		<i>Rumex nepalensis</i>
44	Malori		<i>Rumex hastatus</i>
45	Mashna		<i>Strobilanthesartipurens</i>
46	Mushkbala		<i>Velerianajatamansi</i>
47	Nalora		<i>Polygonum nepalense</i>
48	Nalora		<i>Polygonum capitatum</i>
49	Nohani, Nakh		<i>Velerianahardwickii</i>
50	Padis, Mohra		<i>Aconitum heterophyllum</i>
51	Pathan beg		<i>Coleus aromaticus</i>
52	Patindu		<i>Brunella vulgaris</i>
53	Pessumer		<i>Beenninghauseniaalbiflora</i>
54	Pitpapra		<i>Halanina elliptica</i>

55	Pitpapra		<i>Fragaria parviflora</i>
56	Podin		<i>Mentha longifolia</i>
57	Putkanda		<i>Achyranthes portulacastrum</i>
58	Putkanda		<i>Achyranthes bidentata</i>
59	Saegnpur		<i>Atropa acuminata</i>
60	Salang Mishri		<i>Polygonatum verticillatum</i>
61	Saunf	Fenua	<i>Foeniculum vulgare</i>
62	Sirab		<i>Habanaria galeandra</i>
63			<i>Allium loratum</i>
64		Pimperna	<i>Anaphalis margaritacea</i>
65			<i>Anaphalis contorta</i>
66			<i>Anaphalis triplinervis</i>
67			<i>Anemone obtusiloba</i>
68			<i>Anemone rivularis</i>
69			<i>Anemone rivularis</i>
70			<i>Argemone mexicana</i>
71			<i>Arisaema intermedium</i>
72			<i>Arisaema propinquum</i>
73			<i>Asparagus adscendens</i>
74			<i>Asplenium polypodioides</i>
75			<i>Aster molliusculus</i>
76			<i>Aster peduncularis</i>
77			<i>Campanula latifolia</i>
78			<i>Campanula colorata</i>
79		Shopherbs purse	<i>Capsella bursa-pastoris</i>
80			<i>Cassia obtusifolia</i>
81			<i>Chenopodium foliosum</i>
82			<i>Delphinium incisum</i>
83			<i>Echionopsis niveus</i>
84			<i>Erigeron multiradiatus</i>
85		Straw berry	<i>Fragaria rubiginosa</i>
86			<i>Galium</i> spp
87			<i>Gentiana kurroo</i>
88			<i>Geranium nepalense</i>
89			<i>Geranium ocellatum</i>
90			<i>Geranium wallichianum</i>
91		Balsam	<i>Impatiens bicolor</i>
92		Balsam	<i>Impatiens glandulifera</i>
93			<i>Justicia japonica</i>
94			<i>Lilium giganteum</i>
95			<i>Nepeta ciliaris</i>
96			<i>Nepeta elliptica</i>
97		Poppy	<i>Papaver dubium</i>
98			<i>Pimpinella acuminata</i>
99			<i>Pimpinella diversifolia</i>
100			<i>Polygonatum cirriferifolium</i>
101			<i>Potentilla astrosanguinea</i>
102		Butter Cup	<i>Ranunculus arvensis</i>

103			<i>Salvia mukerjeei</i>
104			<i>Saussurea spp.</i>
105			<i>Saxifraga moorcroftiana</i>
106			<i>Scutellarialineari</i>
107			<i>Sidarhombifolia</i>
108			<i>Strobilanthesangustifrons</i>
109			<i>Strobilanthesglutinosus</i>
110			<i>Thalictrum foliolosum</i>
111			<i>Tragopogon gracilis</i>
112			<i>Trifolium pretense</i>
113			<i>Veronica serpyllifolia</i>
114			<i>Vicia gidula</i>
115			<i>Vicia tetrasperma</i>
116			<i>Viola serpens</i>

GRASS AND BAMBOOS

Sr. No.	Local Name	English Name	Botanical Name
1	Baggar		<i>Ischaemum angustifolium</i>
2	Bans		<i>Dendrocalamusstrictus</i>
3	Darog		<i>Bambusa nutans</i>
4	Dub		<i>Cynodondactylon</i>
5	Gari, Ringal		<i>Arundinaria spathiflora</i>
6	Ghor bager		<i>Erianthuscomosum</i>
7	Kohi		<i>Erianthus fulvus</i>
8	Lambaru		<i>Aristida depressa</i>
9	Maggar		<i>Bambusaarundinacea</i>
10	Mohr Bans		<i>Dendrocalamushamiltonii</i>
11	Nirgal		<i>Arundinaria falcata</i>
12	Palwan		<i>Bothriochloa intermedia</i>
13	Phulna		<i>Andropogon halepensis</i>
14	Sarialasyu		<i>Heteropogonmonranus</i>
15	Siuh		<i>Setaria glauca</i>
16			<i>Arundinaria brasiliensis</i>
17			<i>Avena aspera</i>
18			<i>Chrysopogon martini</i>
19			<i>Cyperus niveus</i>
22			<i>Panicum platactum</i>
23			<i>Phicum asperum</i>
24			<i>Panicum flocculum</i>
25			<i>Poa annua</i>
26			<i>Setariaviridis</i>

CLIMBER

Sr.No.	Local Name	English Name	Botanical Name
1	Akash bel		<i>Cuscuta-reflexa</i>
2	Banmalti		<i>Jasminum officinale</i>
3	Banmalti		<i>Jasminum humile</i>
4	Banmalti		<i>Jasminum pubescens</i>

5	Bel Kangu		<i>Clematis gouriana</i>
6	Grumru		<i>Hedera helix</i>
7	Kanderi		<i>Caesalpinia bonducella</i>
8	Kanderi		<i>Caesalpiniasapiaria</i>
9	Khurnmble		<i>Cryptolepisbucharani</i>
10	Kujas		<i>Rosa macrophylla</i>
11	Kujus		<i>Rosa moschata</i>
12	Mizae		<i>Vitis semicordata</i>
13	Pola		<i>Vitis trifolia</i>
14	Salanghe		<i>Millettia auriculata</i>
15	Tardi		<i>Dioscorea belophylla</i>
16	Taur		<i>Bauhinia vahlii</i>
17			<i>Clematis connata</i>
18			<i>Dioscorea bulbifera</i>
19			<i>Dioscoreadeltoidea</i>
20			<i>Ichneoparus frutescens</i>
21			<i>Rubia cordifolia</i>
22			<i>Smilax aspera</i>
23			<i>Smilax parvifolia</i>
			<i>Zehneriaumbellata</i>

LIST OF COMMON ANIMALS AND BIRDS FOUND IN THE DIVISION

ANIMALS

1	<i>Panthera pardus</i>	Leopard
2	<i>Felis chaus</i>	Jungle Cat
3	<i>Canis lupus</i>	Wolf or Baghiar
4	<i>Vulpes bengalensis</i>	Indian Fox or Lomeri
5	<i>Canis aureus</i>	Jackal or Gidder
6	<i>Naemorhedus goral</i>	Ghoral
7	<i>Muntiacus muntjak</i>	Barking Deer, Kakar
8	<i>Moschus cupreus</i>	Musk Deer, Kastura
9	<i>Hemitragus jemlahicus</i>	Aimu, Himalayan Goat
10	<i>Cervus unicolor</i>	Sambar
11	<i>Hystrix indica</i>	Indian Procupine
12	<i>Lepus nigricollis</i>	The Indian Hare
13	<i>Funambulus palmarum</i>	Indian Palm Squirrel
14	<i>Melursus ursinus</i>	Sloth Bear
15	<i>Ursus thibetanus</i>	Black Bear
16	<i>Martes flegigula</i>	Himalayan Pine Marten

BIRDS

1	<i>Arborophilatorqueola</i>	Common Hill Partridge
2	<i>Alectoris chukar</i>	Chakor
3	<i>Gallus gallus</i>	Red Jungle Fowl
4	<i>Lophuraleucomelanos</i>	Kalij Pheasant
5	<i>Catreus wallichii</i>	Cheer Pheasant
6	<i>Pucrasia macrolopha</i>	Koklass Pheasant
7	<i>Lophophorus impejanus</i>	Monal Pheasant
8	<i>Columba livia</i>	Kabutar, Blue Rock Pigeon
9	<i>Streptopelia chinensis</i>	Spotted Dove
10	<i>Psittacula eupatria</i>	Alexandrine Parakeet
11	<i>Psittacula krameri</i>	Rose ringed Parakeet
12	<i>Upupa epops</i>	Common Hoopoe
13	<i>Ocyrops birostris</i>	Indian Grey Hornbill
14	<i>Megalaima virens</i>	Great Barbet
15	<i>Picus chlorolophus</i>	Lesser Yellow nape
16	<i>Dendrocopos himalayensis</i>	Brownfronted Woodpecker
17	<i>Dicrurus macrocercus</i>	Black Drongo
18	<i>Acridotheres tristis</i>	Common Myna
19	<i>Jungle Myna</i>	<i>Acridotheres fuscus</i>
20	<i>Garrulus glandarius</i>	Eurasian Jay
21	<i>Urocissa flavirostris</i>	Yellow billed Blue

		Magpie
22	<i>Urocissaerythrorhyncha</i>	Red billed Blue Magpie
23	<i>Pycnonotusleucogenys</i>	Himalayan Bulbul
24	<i>Turdoides striatus</i>	Jungle Babbler
25	<i>Heterophasiacapistrata</i>	Rufous Sibia
26	<i>Seicercusxanthoschistos</i>	Grey-hooded Warbler
27	<i>Enicurus maculatus</i>	Spotted Forktail
28	<i>Chaimarrornis leucocephalus</i>	White-capped Water Redstart
29	<i>Myophonus caeruleus</i>	Blue Whisting Thrush
30	<i>Parus major</i>	Great Tit



SUMMARY OF FACTS ON WHICH PROPOSAL ARE BASED

PROPOSAL ARE BASED

CHAPTER 1

THE TRACT DEALT WITH

1.1 Name and Situation

The name of the Division which working plan is being written is Nachan Forest Division situated at station Bassa, Gohar. This working plan revises that of Mrs. Archana Sharma IFS and Mr. Hari Singh Dogra IFS. The Forests included in this working plan are situated in Mandi District covering Chachiot, Sadar, Thunag Tehsils of district Mandi along the left bank of River Beas and its tributary Tirthan. The territory is entirely hilly and drained by Beas and its tributaries. The extremes of latitudes are N 31°-29' and N 31°-46' and of longitude E 77°-01' and 77°-20'. The entire valley in which these forests are situated is thus some 22 kilometres long with an average width of about 29 kilometers. The whole area is about 638 square kilometers which is divided into four forest Ranges, namely Pandoh, Thachi, Seraj and Nachan. The division is bounded in the North by river Beas, in the East by Bane-ka-NalKhauli-TeerthanKhad, in the South by Bagra-Shikari-Kamru Nag Dhar and in the West by Saroa-MoviDalikarBahliDhar down to river Beas near SukiBauri just opposite the Uhal tributary of river Beas.

1.2 Configuration of the Ground

The entire tract is mountainous with gently sloping areas only near Gohar, Sainj, Jachh and Janjehli. The altitude varies from 750 meters at Badanu and 3371 meters at Shikari. Bagra-Shikari-Kamru Nag Dhar, forming the southern boundary, is the most prominent ridge. It starts from Jalori Pass near Kullu border and runs along Shikri Devi, Kanjira to Kamru Nag, thereby forming the boundary of Nachan Forest Division with Karsog and Suket Divisions. This dhar forms the catchment between the rivers Beas and Satluj. Shikari Devi temple is the highest point on this main dhar, which throws the following three almost parallel ridges, namely SamehniDhar, Dungather-Charianddhar, Saroa-Movidhar ending at the bank of river Beas at Larji, Pandoh and Mandi respectively.

1.2.1 SamehaniDhar

It is an extension of Nagru-Tunga Devi dhar (Mandi Division), enters into Nachan Division at the confluence of Teerthankhad with Beas river near Aut and goes up along SarolJogni temple Panjain, NarainGaloo to TangasiGarh, where it meets with BagraShikariKamru Nag dhar. Besides numerous small ridges, it gives off Deo-Kandhadhar from NarainGaloo, NiruHadimbaddhar from ChanjwalaDeota temple and Seraji-Deo-dhar from Chetgaloo near Satti Nag Deota temple. It makes the catchment between BakhliKhad and Teertan from Tungasigarh to NarainGaloo.

(a) DeoKandhaDhar

It starts from Naraingaloo and runs from Southeast to Northwest up to village Bakhali near Pandoh. It makes the watershed Bakhali and ChoharKhad.

(b) NiruHadimbaDhar

It originates from the ChanjwalaDeota temple and goes down to River Beas just opposite to Doda. It makes the watershed between Choharikhad and PanjainNala.

(c) Seraji-DeoDhar or ShilhibagiDhar

It originates from Chet Galoo near Satti Nag Deo, runs along Bhuj DPF, goes down to Northwest and ends at the confluence of ShillibahiNala with BakhaliKhad.

1.2 Dungathar-ChariandDhar

It originates about 1 km to the West of Shikari Devi, runs through Bijahi down to river Beas near Pandoh. It goes almost parallel to the Samehanidhar. It makes the watershed between Bakhali and JiuniKhads. It gives off four ridges from a place called Chamundha (junction of four ridges). The ridges are:

(a) RayanDhar

Originates from DungatharChariandddhar near Sainf forests, runs along Lehgaloo and goes down into BakhaliKhad.

(a) LohatiBajarnDhar

It starts from Dungathar, runs down along Maliach DPF to DeolaNal (ThunagKhad).

(c) BurgujuDhar

It starts from Dungathar, goes down to Jachh through Salog.

(d) SidhpurgarhDhar

It originates from Dungathar, runs along Sidhpurgarh down into Jiuni near Bassa.

1.2.3 Saroa-MoviDhar

Starts from Kamrunag (3050 meters), runs through Saroa, Chail and moves down to Mandi (762 meters). It appears to be an extension of Ghogardhar beyond Mandi. It forms watershed between Jiuni and Kansa Khads and gives off a number of spurs. From Dalikar, it gives off Daliker –Balhidhar ridge, which is as high as the main ridge. This dhar makes the western boundary of the Division. The ridge separates the Nachan Forest Division from Suket Division up to Movi, and below Movi the DalikarBalhidhar makes the boundary between Mandi and Nachan Divisions.

1.2.4 Chilma-Gad-Kala KamesharDhar

Originating from east of Shikari, ends into BakhaliKhad near Rahkot. It makes the watershed between ThunagKhad and Jenjehlikhad. Both these khads contribute into the Bakhalikhad.

1.2.5

From the main ridges and their off-shoots described above, a series of spurs splay off in different directions and intermingle with one another in such a way that they lose all semblance of regularity or order. Separating the confused mass of spurs are deep valleys of varying width, in which flow the various streams that being their tributes to the Beas. The valleys between Samehanidhar and Daughter-Chariandddhar are narrow and deep. The valleys between Dungathar-Chariandddhar and SaroaMovidhar are comparatively wider and have gentler slopes. The area towards the east of the Samehanidhar is mountainous and very steep. Gentle slopes are few and usually only of a small extent. The more precipitous forests are often studded with rocks or are interrupted with landslips and it is often difficult to get about in them, except along the roads and paths and the more gradual spurs or ridges.

- 1.2.6** There is a great range of altitude, from 3371 (Shikari temple) to 760 meters near Badanu. River Beas enters this tract from Kullu valley and flows along the northern boundary of the division. From Larji to Pandoh, the Beas runs through a deep gorge, with banks standing almost vertical about 1200 meters high at places. The main tributaries, by which the area is drained in rivers are Beas, Kansa, Jiuni, Bakhali, Gorahan (Chohari) and Teerthan.

1.3 Geology, Rock and Soil

1.3.1 Geology & Rocks

The Proterozoic (2500-900 m.y. old) rocks intruded by Early Paleozoic granites are exposed over this area. The rocks show a general trend of NW. SE with easterly dips. The stratigraphic order of various rocks of the area is as follows:

(Table No. 1)

AGE	GROUP	FORMATION	LITHOLOGY
Early Palaeozoic (485-365 m.y.)	Intrusives	Mandi Granitoid	Porphyroblastic granite gneiss, biotite-muscovite
NeoProterozoic (900-570 m.y.)		Katarigali	Carbonaceous phyllite, Quartzite, minor limestone.
		Manjir	Pebbly quartzite, slate, Grit and intra-formational conglomerate.
MesoProterozoic (900-1660 m.y.)	Kullu	Khamrada	Carbonaceous phyllite, slate, minor bands of Quartzite.
		Gahr	Streaky and banded gneiss.
		Khokhan	Greenish chlorite, phyllite, gneiss
Palaeo Proterozoic	Vaikrata	B	Carbonaceous schist, Phyllite, gneiss
		A	Garnet-mica-schist, Greenish grey quartzite, Calc-silicate rocks.

1.3.1.1 Vaikrata Group

Vaikrata Group constitutes probably the oldest rocks in the area. It is overlain by Manjir Formation and intruded by Mandi Granitoids.

Ia. 'A' Formation

It comprises of garnet mica schist, greenish grey quartzite, calc silicate rocks and gneisses. Quartzite is hard, massive and thickly bedded and resistant to weathering. This formation is exposed at Pandoh, Gohar, along Beas river from Kanda to Pandoh, Mathiana.

Ib. 'B' Formation

This formation is mainly carbonaceous and pyriteous. It comprises of carbonaceous schist/ phyllite, gneisses. This formation is highly prone to weathering due to carbonaceous nature and from thick soil covers. It is exposed around Dhar, Nihlu, Bhatwara, Pareli up to Rataun.

1.3.1.2 Kulu Group

The rocks of Kulu group tectonically overlay the Vaikrata group, along the KuluThrust. It is classified into three formations.

2a Khamrada Formation

It comprises of carbonaceous Phyllite, slate with minor bands of quartzite and thinly bedded limestone. Carbonaceous units are more prone to weathering. This formation is exposed around Khamrada and Thalati.

2b Ghar Formation

It comprises of mainly streaky and banded gneisses. These gneisses are hard, compact but at places show strong foliation. These are resistant to weathering. This formation is exposed to west of Khamrada and Thalati.

2c Khokhan Formation

It consists of chlorite phyllite/ schist with minor quartzite bands. Schist/phylites are compact and form angular fragments on weathering. This formation is exposed around Khini and Panala.

1.3.1.3 Manjir Formation

Manjir Formation comprises of pebbly quartzite, slate, grit and intraformational conglomerate. Conglomerate and pebbly units are prone to weathering. This formation is exposed around Bhabas, Nahogi, Salen, Bakhlikhad.

1.3.1.4 Katarigali Formation

Katarigali formation is composed of carbonaceous phyllite quartz arenite, slate and minor limestone. Quartzarenite is resistant to weathering. This formation is exposed around Kun, Kareri, Bata, Rahan, Lahag.

1.3.1.5 Mandi Granitoids

Mandigranitoid is exposed over a large area in southern eastern continuity of the Dhouladhargranitoids. Broadly stating, it has two phases. The foliated, biotite muscovite granite (465 m.y) is emplaced in the Vaikratarocks. The second phase is basically very light coloured and containing muscovite and tourmaline rich is intrusive into the earlier granite phase. The second phase is 360 m.y. old. The exposure of this granitoid continues from west of Pandoh, Chachiot, 2518, 3082 up to Dhangira reserve forest. It forms an isolated body around Shikari Devi ridge. It forms conspicuous high hills and ridges.

Mandigranitoids are composed of granites of varied compositions and textures. These are prophyroblastic granite gneiss, biotite granite, muscovite granite and leucogranites. These granites are mainly composed of quartz, feldspar and mafics. The granites are grey to whitish in colour.

1.3.2 Soil

The soils derived from the two chief types of rocks found within the area differ in their clay content and consequent permeability and the water holding capacity. Gneissic rocks found to the east of the boundary fault (strike and location) give rise to sandy loam soils, the cohesive power and the fertility of which depend on their organic matter content. Shales and slates give rise to clayey loam soils. Black rubbly loam is derived from the black shales and slates.

From the silivculture standpoint, all types of soils found within the tract are suitable for forest growth. Because of the steepness of the hill sides, even the clayey soils are fairly well drained. It is, therefore, the organic matter content and the depth of the soil which exercise influence on the vegetation more than the soil type. The type of vegetation exercises influence on the fertility and organic matter content of the soil. The soil of Fir forest is very rich in humus while that of Deodar and Kail forests has adequate organic matter. The soil of Chil and scrub areas is poor in organic matter content and is consequently friable and liable to be easily eroded.

1.4 Climate

1.4.1 Climate & Rainfall

Depending upon the altitude, the climate varies a good deal. Taken as a whole, the climate is temperate with well marked seasons. The winter lasts from December to February, both inclusive, and is characterized by snowfall. The change-over from winter to summer is gradual. The temperature begins to increase rapidly after the middle of April and the rise continues till the break of rains in July. Towards the end of April, and occasionally in May, heavy thunderstorms frequently accompanied by hail may occur.

The monsoon usually sets in properly in July and continues till the middle or end of September. During these months the atmosphere is usually misty, humidity is high and the higher hills are often obscured with mist and clouds. October and November are comparatively dry and the cold weather may be said to start by the middle of November. With the approach of winter, the temperature gradually falls. Now a day snow does not generally come till December and sometimes it may be as late as January.

1.4.2 Rainfall

Details of average monthly rainfall for various meteorological stations in the Division for the last ten years are shown in the following statement.

(Table No. 2)

Monthly Rainfall in mm

Name of Station	Elevation (Mtr)	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Bassa	1303	98.5	116.24	113.84	69.21	95.85	115.71	359.11	346.95	220.41	38.15	32.40	156.82
Baila	1812	58.30	89.04	139.17	99.36	89.94	155.20	248.60	234.34	123.86	38.17	27.56	63.69
Bijahi	2006	45.42	68.79	105.67	91.99	126.57	156.57	337.57	339.98	170.88	46.67	22.78	54.66
Panjain	2300	25.8	57.71	103.42	93.50	181.20	82.83	187.90	155.00	72.83	45.16	30.33	31.4

[Source: DFO Nachan Record]

Average number of rainy days in different months for different rain recording stations is given in the following statement.

(Table No. 3)

Sr.No.	Name of Station	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1	Bassa	4	5	8	5	6	9	16	16	9	3	3	4
2	Baila	4	8	9	6	7	8	14	12	7	2	2	4
3	Bijahi	4	6	8	7	8	11	18	18	15	4	3	5
4	Panjain	2	5	8	7	8	8	11	9	6	3	2	2

(Rainfall of 2.5 mm or above in 24 hours is considered in a rainy day)

1.4.3 Temperature

Temperature data is only available for Pandoh and the same are given in the statement for the last ten years. Data available shows that the maximum temperature touches 42°C in July while the minimum is 1°C in January.

(Tabl No. 4)

Year		Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1982	Max	16	21	21	28	32	35	36	33	34	32	26	21
	Min °C	4	3	4	11	20	20	22	21	19	16	12	6
1983	Max °C	18	19	23	29	34	36	36	31	30	24	18	18
	Min °C	5	5	7	10	14	24	25	22	22	16	10	7
1984	Max °C	15	16	27	29	40	33	31	31	31	30	27	22
	Min °C	4	6	12	17	25	24	23	22	21	16	9	3
1985	Max °C	19	27	32	36	39	42	40	34	33	31	28	24
	Min °C	4	6	11	12	19	21	18	20	19	12	8	4
1986	Max °C	22	27	29	36	37	39	36	35	35	31	26	20
	Min °C	3	5	9	11	15	17	19	18	19	12	9	3
1987	Max °C	23	25	34	36	39	41	41	38	34	32	28	23
	Min °C	2.5	4	9	11	12.5	18	18.5	19	16	10	6	3
1988	Max °C	21	27	29	36	40	40	36	35	35	33	31	28
	Min °C	3	3	4	12	16	16	19	18	15	11	7	5
1989	Max °C	26	30	32	39	42	40	38	36	36	35	33	27
	Min °C	2	3	6	10	16	19	20	19	18	13	8	3
1990	Max °C	27	27	30	37	39	38	34	36	36	36	31	25
	Min °C	3	6	5	9	13	18	18	19	16	10	4	1
1991	Max °C	26	26	32	34	38	39	39	36	34	34	30	25
	Min °C	3	4	8	10	16	17	19	19	16	11	5	1
1992	Max °C	25	29	29	35	38	38	35	36	35	35	32	39
	Min °C	1	3	6	13	14	18	19	19	16	9	5	3

1.4.4 Snowfall

The average monthly snowfall on the important stations of the tract is given below to give an idea of the snowfall in the area. The figure, however, cannot be taken to be very reliable.

(Table No. 5)

Average snowfall in cm. in different stations				
Months	Stations			
	Bassa	Baila	Bijahi	Panjain
November	-	0.75	3	3
December	-	18.75	27.12	5
January	13.33	46.64	45.66	9.95
February	2.75	40.32	25.96	15.5
March	0	10.5	9.62	16

1.5 Water Supply

The main streams and their tributaries rising in the higher hills covered by well stocked forests of Silver Fir, Spruce, Deodar and Kail, have perennial water supply, while those having their origin in dry ridges or low-lying Chil areas, which do not have adequate vegetative cover due to overgrazing, generally get flooded during the rains and dry up during summer. The water supply is satisfactory in the area along the top of the ridges. The increase of vegetative cover for ensuring sustained water supply is well borne out.

There is adequate water in the main stream of Tirthan to allow telescopic floating. Tirthan is the only khad where timber can be floated. Log floatation is possible only in the river Beas.

Agriculture lands are mostly rainfed, but there is enough water to irrigate most of the fields where the gradient is moderate enough to allow it.

1.6 Distribution and Area

The following table gives the distribution, area and other particulars of the forests dealt with in this Working Plan:

(Table No. 6)

Range	DPF		UPF		Grand Total	
	No./ Comptt.	Area (Ha)	No./ Comptt.	Area (Ha)	No./ Comptt.	Area (Ha)
Thachi	128/275	9767.32	18	259.00	552/984	37219.56
Seraj	154/227	9847.97	6	144.00		
Nachan	133/258	9256.48	3	40.00		
Pandoh	109/196	7824.79	1	80.00		
Total	523/956	36696.26	28	523.00	552/984	37219.56

(The detailed forestwise and working circle wise area is in Volume-II, Appendix-I, Page No. 1-56.

Note:-2445.57 hac. of forests transferred from Shikaridevi sanctuary has been included.

The change of area from the year 1978 has occurred on account of the transfer of the areas to Mandi Forest Division, Suket Forest Division and Wild life Division which were dealt by the working plan/ scheme of respective divisions. The area of the individual Compartment & forests remain unchanged. The division was re-organized in 1978, 1986, 1993. Some of the forests of Shikaridevi hill terrain were transferred to wild life & some forest area near majhwar to Mandi Forest Division. Some of the area of Suket Forest Division near Chailchowk has been transferred to Nachan Forest Division. As a result total forest area of division upto the plan under revision was 34773.69 ha. There after vide Notification No. FFE-B-F(6)11/2005-II/Shikari Devi Dated 07/06/2013 rationalization of Shikari Devi Wildlife Sanctuary was undertaken in the year 2014 and some of the forests were Transferred to Nachan and Karsog Divisions. Nachan forest Division received an area of 2445.57 ha to its

territory and the total area of tract at present is 37219.56ha(34773.69+2445.57). Out of 2445.57 ha Nachan Forest Range received 1362.58 ha and Seraj Range Received 1082.99 ha. The details of Forests transferred to Nachan Forest Division are as under:

Forests transferred from Shikaridevi W.L. Sanctuary during 2014 is listed below:-

Rangewise forest area transferred from Shikari Devi Wild Life Sanctuary during 2014

(Table No. 7)

NACHAN RANGE

Sr. No.	Name of Range	Deodar/Kail W.C.	Fir/Spruce W.C.	Chil WC	Oak WC	Prot.	Plant	UPF	Total
1	Nachan	901.86	371.94	0	0	84.58	0	4.00	1362.38
2	Seraj	0	69.61	0	0	1013.35	0	0	1082.96
	Total	901.86	441.55	0	0	1097.93	0	4.00	2445.34

Forest area statement as per previous and current working plan

(Table No. 8)

Sr. No	Name of Range	Area as per previous W.P.		Area transferred from W.L.		Area as per current W.P.		Total
		DPF	UPF	DPF	UPF	DPF	UPF	
1	Thachi	9767.32	259.00	-	-	9767.22	259.00	10026.32
2	Seraj	8765.01	144.00	1082.96	-	9847.97	144.00	9991.97
3	Nachan	7898.10	36.00	1358.38	4.00	9256.48	40.00	9296.48
4	Pandoh	7824.79	80.00	-	-	7824.59	80.00	7904.79
	Total	34254.92	519.00	2441.34	4.00	36696.26	523.00	37219.56

Change in area of Nachan Division as compared to previous Working Plan

(Table No. 9)

Area as per previous WP of Smt. Archana Sharma & Sh. H.S. Dogra.	Forest Area transferred as result of Rationalization of Shikaridevi WL Sanctuary	Net Area during current Working Plan
34773.69ha	(+)2445.57ha	37219.56ha

After Rationalization of Shikaridevi Wildlife Sanctuary, the reorganization of beats and blocks of division was undertaken and the re-organized beats after transferring some area of adjoining beats are Devidarh (777.11ha.) and Budhragh (688.26 ha.) beats in Nachan Range and Raira (862.07 ha.) and Keolinal (447.60 ha.) beats in Seraj Range forming two new blocks Dhangara in Nachan Range and Keolinal in Seraj Range. This also includes UPF Tungrasi of 4 ha. added in Budhragh beat of Nachan Range. The details of re-organised beats and blocks after rationalization of Shikaridevi Wildlife Sanctuary and transfer of area to Seraj and Nachan Ranges of Nachan Forest Division are as under:

(Table No. 8)

Name of Forest	Area in ha.	Beat where area added	Block	Range	Remarks
O.D-313 Chulinal	134.76	Devidarh	Dhangiara	Nachan	Newly created beat and block
O.D-316 Devidarh	129.21	Devidarh	Dhangiara	Nachan	
O.D-315 TokhriNal	231.49	Devidarh	Dhangiara	Nachan	
OD-04 Poi Nal	250.08	Devidarh	Dhangiara	Nachan	
OD-301 Daint	246.80	Budhrag	Dhangiara	Nachan	Newly created beat and block
OD-310 Tungrasni	177.66	Budhrag	Dhangiara	Nachan	
OD-31 Charagti	188.58	Budhrag	Dhangiara	Nachan	
UPF Tungrasni	4.00	Budhrag	Dhangiara	Nachan	
OD-187 Darotha	300.70	Thunag	Janjehli	Seraj	Added to existing beat and block
OD-109NaurSilh	69.61	Raira	Keolinal	Seraj	Newly created beat and block
OD-160 Rira Silh	160.26	Raira	Keolinal	Seraj	
OD-161 Raigarh	66.37	Raira	Keolinal	Seraj	
OD-163 SodhaShilh	169.16	Keolinal	Keolinal	Seraj	Newly created beat and block
OD-165Keolinal	125.46	Keolinal	Keolinal	Seraj	
OD-167GadounSilh	152.98	Keolinal	Keolinal	Seraj	
OD-181 Lamb	38.45	Rahkot	Janjehli	Seraj	Added to existing beat and block
Total	2445.57				

The details of ranges, blocks and beats are at **Page No. 117-118, Appendix-VII of Volume-II**

The details of Protected Forests Notified alongwith Notification No. are given as under:

(Table No. 9)

Sr. No.	Notification No.& Date	No.of DPF
1	No.8-3/74 S.F. (Part –II) dated 15-10-76	3
2	No. Van (F) 5-38/79 dated 21-03-1980	78
3	No. Van (F) 5-46/79 dated 21-03-1980	40
4	No. Van (F) (3) -1/81 dated 26-12-1981	46

5	No. Van (B)(A) 7-1/81 dated 26-12-1981	78
6	No. Van (S)(F)(3)1/81 dated 26-12-1981	3
7	No. Van (F) 5/7/85 dated 20-07-1986	24
8	No. Van (D) 7-12/87 dated 09-02-1988	5
9	No. Van (Fts)(A) 7-1/87 dated 09-02-1988	3
10	No. Van (F) 5-3/89 dated 28-03-1989	15
11	No. Van (F) 5-7/85 dated 26-04-1991	10
12	No. Van (F) 5-7/85 dated 26-04-1991	9
13	No. Van (F) 5-7/85 dated 26-04-1991	1
14	No. Van (F) 5-5/92 dated 20-03-1993	1
15	No. Van (F) 5-4/92 dated 26-05-1993	5
16	No. FFE-B-F(6)11/2005-II/Shikari Devi dated 07-06-2013	15

1.7 State of Boundaries

The limits of the DPFs are properly demarcated with large dry stone pillars, which are serially numbered by means of wooden posts, built into the stone work and are shown on the (1:15000) Survey maps. Included cultivation is likewise determined. Uncertainty about the boundaries is there and near the cultivation pillar is often removed. The boundary line does not always follow the natural features, especially in the case of new DPFs, and is quite complicated. In the case of remote forests, pillars are put up at long distances apart and erection of intermediate pillars is highly desirable. No attempt has been made to clear the line between the pillars. The boundary pillars have also not been regularly repaired; as a result of this the majority of the pillars is in a dilapidated condition without any number, and at places is missing altogether. There are no boundary registers. Boundaries have, therefore, not been checked after the original delimitation. In the absence of a boundary register, it is not possible to fix the missing or displaced boundary pillars at the proper places. A large number of newly demarcated protected forests do not have boundary pillars so far. There are a large number of encroachments in the demarcated protected forests.

The undemarcated protected forests left as such during the demarcation of the forests are in the shape of strips along the demarcated protected forest. These forests have been encroached and whatever left are heavily eroded. Serious steps should be taken to evict these encroachments so that the forests land can be saved from the use other than forestry.

1.8 Legal Position

With the dawn of independence on the 15th August, 1947, the erstwhile Mandi State merged with the Centre on 15th April, 1948 and was subsequently constituted into the present civil district of Mandi. The forests now constituting Nachan Forest Division falls in the Civil District Mandi.

1.8.1 Prior to the merger of Mandi State with other princely hill states to form Himachal Pradesh in 1948, all the land having tree or grass growth not accessed to land revenue, were classed as State forests. His highness the Raja Sahib of Mandi was the outright owner of all such State forests. Forest Conservancy in Mandi State started in 1889 with the introduction of Forest Conservancy Rules made by Mr. Maynard. Forest

Settlement was done by Mr. Wright in 1917, when all lands except that had been assessed to land revenue were recorded as forest and classed into demarcated and undemarcated, and rights of villagers in these forests recorded. It was also provided in the settlement report, that at some future time, the undemarcated area may be restricted and added to the demarcated area without prejudicing the interests of the right holders.

- 1.8.2** On the merger of the erstwhile Mandi State with other Princely States, a new State of Himachal Pradesh was born on 15-04-1948. According to the new set-up, the proprietary right of His Highness the Raja of Mandi has been transferred to the Government of Himachal Pradesh. Thus all the forests and waste land in the district which are not held by private individuals and are not assessed to land revenue are the sole property of the Government, which has full powers to control and manage these lands in their absolute discretion, subject, of course, to the rights of the user.
- 1.8.3** The Indian Forest Act was made applicable to these forests vide notification No. 386-IB dated 25-12-1948. Subsequently, vide notification No. Ft. 19-241 BB/49 dated 25th February, 1952, all the demarcated and undemarcated forests were declared protected under the provisions of Chapter IV of the Indian Forest Act Rules to regulate different matters in the forest declared protected under the above notification were framed under Section 32 of the Indian Forest Act vide Himachal Pradesh Government Notification No. 43-241-D/49 dated 25-02-1952.
- 1.8.4** The wild life (protection Act 1972) came into force in Himachal Pradesh on 2-04-1973 vide Notification No. F.S.R.190 (E) dated 02-04-1973. The DFOs concerned are declared as Wild Life Warden in their territorial jurisdiction vide Notification No. Fts. (CF) 7-6/82 dated 10-01-1986 under Clause (a) of Sub-Section (i) of Section four.
- 1.8.5** The Forest (Conservation) Act, 1980 came into force to all the lands other than those which are assessed for revenue. This Act is applicable to the private forests as well as to the private lands which are having tree cover. Under Section 2 of the Forest Conservation Act, 1980 and its amendment, 1988 the prior approval of the Central Government is to be obtained for putting the forest land to non-forestry purposes.
- 1.8.6** Further, to give more teeth to the Forest Department to save the forest land from encroachment and unauthorized occupation, the DFO's territorial, as conferred by Clause (a) of section (2) of the HP Public Premises and Land (Eviction and Rent Recovery) Act, 1971 (Act No. 22 of 1971) have been appointed to perform the functions of the Collectors within their jurisdiction vide Notification No. 1-21/71 L.S.G. dated 8.6.1994. Recently A.C.F's are given the power of collectors in the Divisions where the number of encroachment cases are enormously high vide notification No.UD-A(3)-8/2007-II.Dated 15.07.2014.

1.9 Rights and Concessions

Forest Settlement was carried out in 1917, when the rights concessions of the local people admitted in the forests were recorded.

- 1.9.1** The main principle for the admission of rights and concessions at the time of Forest settlement was that all land and trees growing on it are the property of the State and that no private rights exist against it; but in practice, the State has permitted certain kinds of usages (bartan) on waste land whether high forest, scrub jungle or grass land,

to meet the reasonable domestic and agriculture requirements of the people in the matter of grazing and forest produce, and such usages will be maintained in so far as they are compatible with a system of forest conservancy suited to the requirements of the State and the people. The bartans (rights) are appended to cultivated land assessed to revenue or the revenue of which has been assigned, and which are situated in the village recorded as having bartan in the forest concerned. The bartan can be exercised only in regard to the village for which it is recorded and that timber granted at privileged rates can be used only in that village and cannot be taken to any other place even if the bartandar is residing there. For example, the residents of Mandi town cannot bring to Mandi the timber obtained at concessional rates on account of the land possessed by them in a village recorded as having bartan in a forest. The rights of a user are limited to the reasonable agriculture and domestic requirements of the people and timber applied for in excess of genuine domestic requirements can be refused. The timber obtained by the bartandars at privileged rates cannot be sold or bartered.

- 1.9.2** Certain conditions have been attached with the bartans granted to the villagers. One of these conditions is that the bartandars will be responsible for the protection of the forests in which the bartans are exercised i.e. they are responsible that no trees are felled without permission, the forests are protected against fire and that no outside grazing is done. Where the bartandars fail in their protective duties, the rights can be curtailed or suspended. This excellent rule has gone a long way in preserving forest wealth of this tract. Another condition attached with bartans is that the forests, whether demarcated or undemarcated, cannot be burnt to get fresh growth of grass. Only the grass lands with no tree growth can be burnt only once during the winter and the villagers will be responsible to see that the fire is kept under control and does not spread to forests.
- 1.9.3** A short resume of principal rights which have a direct bearing on forest management are discussed in the following paragraphs. The sale, transfer or bartan and forest produce obtained at bartandari rates is prohibited.

(a) Grazing

At the time of settlement, the tract was considered very rich in grazing and liberal rights were admitted, both in demarcated and undemarcated protected forests. The bartandars were permitted to graze their cattle, buffaloes, sheep and goats for the whole year without any restrictions of rates Rs. 3.12 per hundreds of sheep and goats and Rs. 0.50 per buffalo (all animals over one year to be assessed) within the Waziri and an additional amount of Rs. 1.56 was to be charged and grazing of cow and bullocks are allowed free. The Forest Settlement, however, provided that the rights of the user are limited to the responsible agriculture and domestic requirements of the people. The maintenance of cattle, sheep or goat for purposes other than agricultural can be controlled if it results in the excessive grazing in the demarcated forests. For nomadic graziers from Chamba, Kullu and Bushahar, the rates of grazing were higher than that for the local graziers. The grazing fee was abolished and the rates were unified by the HP Government in 1955. The position however, again changed during the year 1975, when vide HP Government Notification No. 22-11/71 S.F. dated 23rd July, 1973 and No. 6-2/69-SF-11 dated 24-09-1975, the rates, only for migratory graziers have been fixed as under:-

(Table-10)

S.No.	Description of Animals	Rate per animal in Rs.
1	Horses, Ponies and Mules	2
2	Donkeys, Ass	1
3	Sheep	0.2
4	Goats	0.4
5	Buffaloes	8

(b) Timber

HP Forest (Timber distribution to Right holders) Rules, 2013 is under operation since 2013 for grant of timber for domestic purpose to the right holders viz, 7 Cum. Standing volume for Construction of new house and 5 Cumstanding volume for repair of old house. Timber is granted once in 15 years for genuine requirements. In case of buildings destroyed due to natural calamities like Fire, Flood etc. timber is granted immediately free of cost. The Detailed TD Policy is appended in Volume-II, **Page No. 201-205, Appendix XIV**. The grant of standing trees to the right holders after a gap of approx. eight years has led to enormous amount of applications and felling of large number of trees within a very short span of time. In many forests due to felling of trees and movement of lots of people in forests the undergrowth's and the natural regenerations are trampled badly which will affect the future growth of the trees. Also in the timber distribution very good mother trees are felled which will hamper natural regeneration in the forests. The best way to meet right holders genuine requirements could be to distribute converted timber at Forest Corporation Sale Depot at subsidized rates so that only genuine people will claim for the timber and there will be no misuse of the timber thus obtained.

(c) Lopping

Right of lopping the trees for fodder and litter has been admitted only in respect of Oak, Fir and Spruce. Heavy and continuous lopping of Spruce near the villages is resulting in the death of trees. It is extremely necessary to prohibit the lopping of Spruce and Fir and to restrict the indiscriminate lopping of Ban Oak trees. The forests near the habitations are the notable sample of indiscriminate lopping.

(d) Minor Forest Produce

There is the right of cutting grasses, collection/sale of flowers, fruits, medicinal herbs, honey, guchhi (Morchella/Morels) and Nirgals (hill bamboo) admitted to the right holders, Besides they can extract slates, stones for their buildings and earth for plastering. Removal of bark from Oak and other suitable species is also permitted for tanning. Extraction of torch wood is permissible from stumps of all species, provided the hammer mark is kept intact.

- 1.9.4** Recent discovery shows that the “Taxon” drug, which is extracted from the bark and needles of *Taxusbaccata*, is very helpful in the treatment of cancer. This drug has the capacity to stop the multiplication of cancer cells. Now, obviously, *Taxusbaccata* has become a very important species of the area. The tree has been heavily hacked for its needles by the right holders as well as other persons and exported outside the State.
- 1.9.5** Forestry as a means of public welfare and sustained yield production must be practiced and developed rationally and systematically on the basis of well recognized principles of forest valuation and management. Unrestricted exercise and misuse of rights cannot but severely prejudice the operation of scientific forestry. With the increase in population of human beings and cattle, the grazing rights have greatly multiplied, and cultivation is likewise extending, and the practice of lopping broad leaved trees especially Ban Oak, for winter fodder, is being ruthlessly abused.
- 1.9.6** The Government has put a ban on green felling; only salvage marking is done and handed over to the Forest Corporation for working. But for the right holders the trees marked are green and marking is not in accordance with silviculture principles. Thus the gaps are increasing day by day. These gaps are occupied by weed or inferior species. Thus the quality, quantity, composition and mixture of the forests are deteriorating day by day. It is advisable that we should switch over to the scientific management of forests in accordance with the guidelines/prescriptions laid down in the Working Plan.

CHAPTER IIA (FLORA)

A FOREST FLORA**2.1 General description of the Growing Stock**

The composition and condition of the crop varies considerably with altitude and aspect. Detailed descriptions of each compartment or sub-compartment have been written and entered into the compartment history file alongwith information regarding factor of locality, enumeration results, stock maps and future prescriptions. An attempt has, therefore, been made here to briefly describe the flora of this country in terms of Revised Survey of the forest types of India by HG Champion and SK Seth (1963).

2.1.1 The following forest types and sub types are found in the tract:

(Table-1)

S.No	Major Groups	Type Group or Group	Sub-Group	Forest Type	Forest Sub-Type
1.	Tropical	5 Tropical dry Deciduous Forest	5-B Tropical Northern Dry deciduous Forests	5-B/C-2 Northern dry Deciduous Forests 5-B/DS2 Dry Deciduous scrub forests	----
2.	Montane Sub-Tropical forests	9 Sub-tropical Pine forests 10 Sub-tropical Dry Evergreen Forests.	---- ----	9/C-1 Himalayan Sub-tropical Pine forests. 10/C-1 Sub-tropical dry Evergreen forests.	9-C-1-b Himalayan Chir Pine forests. 9-C-1-D-SI Himalayan Sub-tropical scrub 10-C-1a Olea cupidata scrub Forests.
3.	Montane Temperate forests	12 Himalayan Moist Temperate Forests	----	12/C-1 Western Lower Himalayan Temperate Forests.	12/C-1-a Ban Oak forests 12/c-1-b Moru Oak forests 12/C-1(a&b) DSI Oak Scrub 12/C-1-c Moist Deodar forests

					12/C-1-c Western Mixed Conifer forests 12/C-1-e Moist Temperate Deciduous forest 12/C-1-f Low level Blue Pine forests
				12/C-2 Upper West Himalayan Temperate forests	12/C-2-a Kharsu Oak forests 12/C-2-b Western Himalayan Upper Oak Fir forests 12/ISI-b Alder forests (General Edaphic and Seral types of Himalayan forests) 12/DSI Montace Bamboo Brakes 12/DS2 Himalayan Temperate Park Land 12/DS3 Himalayan temperate Pastures There are degradation stages of Himalayan Moist Temperate forests.

Forest types important from management point of view are described as under:

2.1.2 5 B/C-2

Northern Dry Mixed Deciduous Forests.

This type of forests occurs in the lower hills below and in between Chil forests, to the elevation below 1200 mtrs. These forest types are represented by thin strips along the banks of River Beas and its tributaries mainly in Pandoh and Thachi Ranges. Canopy is irregular, the trees having poor growth and relatively shorter boles rarely exceeding 10 m in height.

The important species in order of preponderance are *Lanneacoromandelica*, *Embliaofficiniales*, *Cassia fistula*, *Dalbergiasissoo*, *Terminaliabelerica*, *Bombaxcieba*, *Bauhinia racemosa*, *Grewiaoppositifolia*, *Syzygiumcummunii*,

Ficus glomerata, *Anogeissus latifolia*, *Melia azadirachta*, *Albizia stipulata*, *Albizia procera* etc.

The other associates commonly found with the species enumerated above are *Terminalia tomentosa*, *Eugenia dalbergioides*, *Ferula limonia*, *Cassia tomentosa*, *Kydia calycina*, *Ougeinia dalbergioides*, *Cordia mysa*, *Pistacia integerrima*, *Flacoutia indica*, *Mallotus philippensis* etc.

The undergrowth is mainly of *Carissa opaca*, *Woodfordia floribunda*, *Dodonaea viscosa*, *Adhatodasica*, *Murrayakoenigii*, *Indigofera pulchella*, *Ziziphus nummularia*, *Zanthoxylum alatum*, etc. *Euphorbia royleana* also grows in some degraded and over grazed areas.

The herbaceous ground cover is generally very thin and consists mainly of grasses with scattered plants of *Flemingia* species, *Inula cuspidata*, *Cassia tora* and *Ageratum conyzoides*. Climbers commonly found with are *Bauhinia vahlii*, *Puraria tuberosa*, *Acacia pinnata*, *Caesalpinia sepiaria* and *Rubus paniculatus*.

2.1.3 5B/DSI

Northern Dry Deciduous Scrub Forests

It is a degraded stage of northern tropical dry deciduous forests, which is brought about by lopping and hacking of these forests. It is characterized by abrupt broken soil cover of shrubs which are either thorny like *Carissa randia* etc. or distasteful to cattle like *Dodonaea*, *Hotarrhena* etc. A few tree spp. Which occur dotted, have also been reduced to shrubby growth and are generally many-stemmed from the base. These types of forests are found near the habitations where the animals of the local inhabitants graze.

2.1.4 9C-1b

Himalayan Chil Pine Forests

The Chil forests generally occur in the tract between 1200 meters to 1800 metres. At lower limits, it occupies northern slopes and restricts itself to cooler place, but above 1200 meters Chil occurs in all aspects, although its density and quality on southern, southwestern slopes and ridges is rather poor. The best Chil forests in fairly compact blocks are met with in the altitudinal zone of 1300 meters to 1700 metres. Above 1760 metres Chil confines itself to southern, well drained slopes. Kail and Deodar can be seen encroaching along the nallas and depressions.

Generally, the forests are having quality Class II with density varying from 0.3 to 0.6.

Chil occurs in variety of soil formation developed from quartzite, gneiss and shales. On quartzite it has attained large dimension and quality II crops are occurring on this formation. However, it also occurs on bare rocks and shallow soils where it is stunted.

Most of Chil forests are remarkably pure, young and predominantly poles to middle aged, with maturing and over matured trees seen either scattered singly here and there or few small groups of maturing trees met with at places. Practically, no other species occurs in the top canopy. The absence of understory and paucity of undergrowth is primarily attributable to contained heavy grazing and repeated fire. Near its lower

limit its associates are *Lanneacoromandalica*, *Pistacia integerrima*, *Euphorbia royleana* etc. While *Quercusincana*, *Rhododendron arboreum*, *Myricanagi*, *Lyoniaovalifolia*, *Cedrusdeodara*, *Pinuswallichiana*, are associated near its upper limit of distribution. The common scrubs met within the forests or in the small blanks in these forests are *Berberis* species, *Rubus* species, *Carrissaopaca*, *Myrsineaficana*, *Randiatetrasperma*, *Zanthoxylumalatum*, *Inulalappa*, *Plectrantusrugosus*, *Woodfordiafruticosa* etc. Ground cover consists of *Anaphalis*, *Cinnamomum* and grasses.

2.1.5 9/CI DSI

Himalayan Sub-Tropical Scrub

The extensive grassy slopes within the altitudinal zone occupied by Chil, which avoids such locations due to their extreme dry and shallow nature of soil is represented by this type. The tree growth is sparse and is represented by occasional or some other broad leaved trees species. Bush growth is also scanty. These areas are used as grazing grounds or Ghasnis and during Feb. / March are burnt to get fresh flush of tender grass which is perhaps the main reason for the exiting status.

2.1.6 10/C-I-a

(*Oleacuspidata* scrub forests)

These forests are found in the shape of small patches/strips and scattered trees along the left side of TeerthanKhud from Larji to Balichowki.

The main associates are *Pistaciaintegarrima*, *Phonerixhumilis*, *Ficuspalmata*. The shrubs are *Berberis* species, *Princepiautillis*, *Rubus* species.

2.1.7 12/C-1-a

Ban Oak Forests

Ban Oak forests are widely distributed in the tracts and occur between an altitude of 1000 to 2300 meters. Near its lower limit of distribution, it generally confines itself to northern slopes but above 1500 meters, it occurs in all aspects. This type of forest mainly occurs along SaroaMoviDhar in Nachan and Pandoh Ranges. In Seraj Range Ban Oak is confined only to small pockets along BakhliKhad. Ban Oak forests are fairly well stocked in the northern slopes in the interior valleys while the stocking is poor in southern aspect and in lower areas, especially near habitation where it has been reduced to more scrub due to heavy lopping and indiscriminate hacking for fodder and fuel.

The canopy in these forests is complete and the trees attain height upto 20 meters, sometimes with a clean hole of 9 to 10 meters. Kail/Chil is extending itself into the Ban areas where ever there is a break in the canopy. Seedling regeneration is present only where grazing incidence is light. In areas adjoining thickly populated villages, Ban has been subject to severe lopping and hacking.

The common associates of Ban Oak are *Rhododendron arboreum*, *Lyoniaovalifolia*, *Machilusodoratissima*, *Litseaumbrosa*, *Myricanagi*, *Quercusglauc* etc. In nallas and shady localities deciduous forests like Toonaciliate. *Pyruspashia*, *Aesculusindica*, *Acer* species also get associated. Undergrowth is generally not very thick and usually consist of *Berberieslycium*, *Indigoferagerardiana*, *Sarcococcasaligna*, *Loniceraquiquelocularis*, *Leptoderrieslanceolata*, *Desmodiumtiliefolium*,

Randiatetrasperma, *Viburnum cotinifolium* and *Daphnecannabina* etc. Herbaceous flora is rich on moist northern slopes and generally consists of *Ainsliaeaoptera*, *Boenninghauseniaalbiflora*, *Viola serpens*, *Pileaumbrosa*, *Arisaemawalichii*, *Salvia glutinosa*, ferns and grasses. The climbers frequently met with are *Rubusellipticus*, *Vitishimalayana*, *Rosa moschata* etc. *Loranthus* species occurs as a parasite. Mosses and lichens are seen on these trees in damp locations near its upper limit of distribution on northern slopes.

2.1.8 12/C-I-b

Mohru Oak Forests

Mohru Oak occupies very small area of the tract and occurs in small pockets in Seraj, Nachan and Thachi Ranges. It either grows mixed with Ban Oak or Kharsu Oak or in small pockets in Kail or Spruce forests. As it yields better fodder than the other two oaks, it has been very heavily lopped, especially near habitation, with the result that the trees are stunted and poorly grown. The floristic composition of this type is generally the same as described in case of Ban Oak except that in top storey it replaces Ban Oak.

2.1.9 12/C-I (ab) DSI

Oak Scrub

Forests of this type are met within area adjoining Chahciot, Tunna. Due to its fuel, fodder value and an excellent timber of agricultural implements the Ban has been indiscriminately hacked and lopped and reduced to a mere scrub growth.

2.1.10 12/C-1c

Moist Deodar Forests (*Cedrusdeodara*)

These forests occur generally between 1500 to 2200 meters on northern slopes and along nallas, it descends down to a much lower level, while on southern aspect and along drier ridges it is confined to comparatively higher elevation only. Bakhli and Banyur are the example of the areas where Deodar descends down in Chil zone on northern aspect and along nallas. In Bakhli forests it grows at the lowest elevation of 900 meters in the tract. Main Blocks of Deodar are in juini valley in Nachan Range. Scattered forests, however, occur in Seraj and Thachi Ranges. These forests occur on all geological formations but have shown excellent development on granite/ gneiss. Kail is mixed on hotter situations and drier ridges. Spruce comes occasionally in the storey along nallas.

The overall quality of the crop is II and average density varies from 6 to 9. There is generally a paucity of Underwood in the Deodar forests and where ever present consist of scattered Ban near its upper limit of distribution and Moru/ Kharsu near its upper limit of distribution. Deciduous broad leaved trees occasionally met within the nallas are *Cedrellaserrata*, *Ulmuswallichiana*, *Alnusnitida*, *Aesculusindica* etc.

Undergrowth is generally sparse and consists mainly of *Rosa macrophylla*, *Berberis lyceum*, *Loniceraangustifolia*, *Deutzia staminea*, *Rubusellipticus*, *Indigofera species*, *Sarcococcasaligna* etc. in more moist locality Iris species also occur. Herbaceous growth is generally present and consists of *Boenninghausemia*, *Ainsliaeaaptera*, *Viola serpens*, *Fragaria vasica*, *Anaphaliscinnamomea*, *Thymus serpyllum*. Climbers are rare and the ones met with are *Vitissemicordata*, *Hedranepalensis*, *Rosa moschata*, *Clematis montana* etc.

2.1.11 12/C-Id**Western Mixed Coniferous Forests**

These forests have a varying mixture of coniferous trees like Spruce, Silver, Fir, Kail and Deodar together with a varying intermixture of ever green and deciduous broad leaved trees. In addition this type includes pure Spruce and Silver Fir formation also. These forests occur at an elevation ranging from 2100 mt. to 3000 mt. and are mostly confined to the interior of the valleys. The trees are of quality class II and density varies from 0.3 to 7. Canopy is sometimes broken by small grassy blanks. Depending upon the local abundance of particular conifers, the following sub-types have been recognized.

(a) Spruce –Deodar Forests

Near the upper limit of Deodar zone Spruce grows mixed with it, the former occupying the nallas and shady places and later growing along dry ridges and spurs. Kail appears in locations which are too dry for Deodar and Spruce. Deciduous broad leaved trees occasionally found are *Aesculus indica*, *Acer spp.*, *Cedrela serrata*, *Juglans regia*. Heavy and indiscriminate lopping of Spruce near villages has resulted in development of red heart and knots in the timber.

(b) Spruce –Kail Forests

Spruce and Kail occur in intimate mixture as well as compact pure group, Kail coming on warm situation, dry ridges and Spruce confining itself to higher elevation and cool locations. Spruce shows excellent tendency to regenerate under Kail shade.

(c) Spruce-Silver Fir Forests

These forests are confined to higher zone between 2500 meters, with Fir predominating near the upper limit and Spruce on the lower limit. Intimate mixture of these two species is only met with in the interior pockets. Silver Fir tends to regenerate under the overwood of Spruce and is encroaching into Spruce zone. On warm situations and lower elevations, Spruce occurs in pure patches. With Kail coming up on still drier locations. Spruce has a tendency to regenerate in dense even aged patches. Density of stocking shows a wide variation from 3 to 7. Spruce habitation has been subject to heavy lopping.

The soil generally has well developed “A” horizon, especially in the fir Zone with a layer of undecomposed humus. Deciduous spp. Like *Aesculus indica*, *Acer species*, *Prunus padus*, grow in the nallas.

The understorey is generally light and consists of Kharsu, Mohru and scattered *Taxus baccata*. The undergrowth is moderately heavy and consist of *Viburnum cotinifolium*, *Berberis species*, *Skimmia species*, *Sarcococca species*, *Arundinaria falcata*, *Lonicera angustifolia*. Herbaceous flora is also very rich, exhibiting a luxuriant growth during rain. Main species are *Strobilanthes impatiens*, *Fragaria vesica*, *Viola serpens*, *Valeriana species*, *Anaphalis species*. Out of the ferns, the most common are *Adiantum species*, *Pteris species*, *Asplenium polypodioides*. Common climbers are *Hedera helix*, *Vitishimalayana*. Lichen and mosses are quite common.

2.1.12 12/C-I-e**Moist Temperate Deciduous Forests**

These forests occur in moist localities and are in Spruce, Silver Fir left in the form of glades of broad leaved trees like *Aesculus indica*, *Acer caedum*, *Corylus colurna*, *Populus ciliata* and *Prunus* species. The tree run into large girth and is rather branchy. Ground flora is rich because of very mesophytic conditions. The species commonly met with as understorey and under-growth are *Rhus* spp., *Taxus baccata*, *Berberis* species, *Cotoneaster bacillaris*, *Sarcococcaligna*, *Litsea* spp., *Viburnum continifolium*, *Machilus species*, *Spiraea bindleyana*, *Strobilanthes species* etc.

2.1.13 12/C-I/f**Low Level Blue Pine Forests**

Extensive Kail Forests more or less occur pure between 1500 meters to 2500 meters extending to high elevation on drier and hotter ridges. The quality of the crop is II and density varies from 5 to 7. The crop shows good diameter and height growth. In many places profuse regeneration of Deodar and Kail has come up partly as a result of artificial showing operations as seen in DPF Mirjodhar Janjehli Range. In Kail forests Deodar is invariably present if a seed source is available in the near vicinity and similar is the case with spruce on the cool moist sites. In Thachi and Janjehli Ranges, Kail has occupied the gaps which were created due to salvage or TD marking in all type of the forests occurring in the Ranges.

On the warmer slopes, species of *Berberis* and *Indigofera* occur as common undergrowth.

Kail forests are subject to heavy lopping which renders them very vulnerable to attack by *Trametes pinii*.

2.1.14 12/C-2-a**Kharsu Oak Forests**

This type occurs above Spruce and Silver and Silver Fir forests between 2500 to 3500 meters along Shikari and Samehani Dhar. On the northern slopes regeneration of Spruce Silver Fir and occasional trees of these species occur, Kharsu Oak forests and mostly of middle aged diameter classes. These forests are not commercially exploitable and only few trees are removed by local people for making agriculture implements. In pure Kharsu stands, the understorey is generally absent. Undergrowth consist of *Viburnum cotinifolium*, *Desmodium tiliaefolium*, *Indigofera species*, *Cotoneaster bacillaris*.

2.1.15 12/C-2b**West Himalayan Upper Oak and Fir forests**

This forest type is generally confined as small strips above Fir forests adjoining Kamrunag-Shikari Chinjwar Dhar. It is two storeyed high forests with Silver Fir standing singly or in groups over Oak and other ever green and deciduous trees. The two canopies form a conspicuous mantle of mosses. Herbaceous flora becomes very luxuriant during summers and rains and some of the important species are of *Primula*, *Polygonum*, *Strobilanthes*, *Anaphalis*, *Senecio* spp., etc. Silver Fir regenerates quite

profusely under Kharsu Oak and the seedlings get the chance to establish themselves since grazing is not heavy in these areas.

2.1.16 12/ISI

Alder Forests

This type of forests are met with along the Beas and Teerthan rivers between Aut and Balichowki and also in other tributaries in higher reaches especially on fresh alluvium, *Alnusnitida* form pure overwood with usually no understory. Shrub growth consists of mainly *Berberies*, *Rubus spp.* and *Princepiautilis*.

2.1.17 12 DSI

Montane Bamboo Brakes

Arundinariafalcata (Nirgal) and *Arundinariaspathiflora*, two Bamboo species occur as undergrowth, the former in Ban forests and the latter in Spruce, Fir and Kharsu forests. These are gregarious in habit.

2.1.18 12/CI DS-2

Himalayan Temperate Secondary Scrub/ Pasture

This type of forest consists of scattered trees of Ban Oak with *Plectranthus*, *BerberisIndigofera*, *Spireacanensceus*, *Princepiautilis*, *Rosa moschata* etc. These areas are the result of misuse and are potential source for raising new plantation.

2.1.19 12/D-S-3

Himalayan Temperate Park Land

This type occurs along ShikariDhar, SamehaniDhar and KamarunagDhar and is represented by Open Park like grazing ground at higher elevation, mostly in Kharsu and Fir Forests Birdcherry or Silver Fir. The turf is full of flower by spring. Due to heavy grazing by buffaloes, sheep and goats, erosion has set in such pastures along Kamaru Nag and ShikariDhar.

The forests are not uniformly distributed throughout the tract but are mostly confined to the higher reaches. Most of the Chil, Kail and Deodar forests here are honeycombed with cultivation. The forests adjoining to local habitation have been badly lopped and hacked for fodder and fuel wood purposes. As a result the broad leaved species have been reduced to new scub and coniferous trees have lost their growth vigour. Kail has been badly attacked by the fungus *Trametespinii*. Because of the heavy burden of the right holder, stocking near habitation is poor. In the higher hills, the stocking of the forests is good. The quality of the coniferous species altogether is II/III.

2.2 Status of natural regeneration

Since long time there is no green felling and no other silvicultural operations are carried out in the forests of this Division, as the result of which there is over crowding of young saplings which compete among themselves for space and light. The enumeration of forests have been natural regeneration and tress in sampling stages has been carried out in sample plots as per the methodology prescribed at point No. 6.6.1 in approved PWPR. The sample enumeration results are at **Page No. 105-112Appendix IV** of Volume-II. As a result of which there is no proper growth of the crop and there is no space for the natural regeneration to come up. This is a general phenomenon in almost all forests where there is little natural regeneration. In order to encourage natural regeneration thinning operation needs to be carried out in the

forests followed by Assisted Natural Regeneration (ANR). Grazing permitted for the right holders in the forests add to the worry as the animals trample the young seedlings that come up naturally. The areas open to grazing needs to be closed rotationally to protect the natural regenerations in the forests.

2.3 Injuries to which the crop is Liable

Principal injuries to which this tract is liable can be classified as under:

2.3.1 Fire

Chil forests are subjected to fires since Chil have a dense undergrowth. The damage is usually heavy, as in such areas the fire quickly reaches the crowns and sometimes completely wipes out the whole growing stock. Such absolute destruction generally does not take place in even aged crop with light undergrowth, where the actual casualties from fire are usually confined to the younger stages of growth.

Too close resin channels are another aggravating cause for the death of trees by burning of the cambium all around the tree. Repeated fires in the lower areas are inhibiting Chil regeneration and restricting it to cooler aspects only.

The chief predisposing causes of forest fires are droughts and accumulation of pine needles, thick brushwood growth, abundance of dry grass and felling debris. Sometimes the fires are lit to drive out pigs from forests with dense undergrowth, but there is little doubt that the destruction by accumulation of dry pine needles (which prevent the growth of grass) and often an attempt to convert a predominantly Chil forest into a mixed Chil and Scrub forest with its better grazing and extensive lopping facilities are the principal causes of forest fires.

Fires affect fertilization and seed production to a considerable extent. Early summer fires interfere with fertilization of the cones and thus reduce the seed production, while late summer fires burn seeds of the year and either kill or reduce the germinating power of the seeds in the cones of the succeeding year.

**The following statement indicates the occurrences of fires from 1993-94 to 2014-15:
(Table-2)**

Year of fire Cases	No. of Fire cases year Wise	Total Area Burnt by Fire in ha. Year-Wise	Thachi Range (Area in ha)	Seraj Range (Area in ha)	Pandoh Range (Area in ha)	Nachan Range (Area in ha)
1993-94	2	47	7	--	40	--
1994-95	2	2.15	--	--	--	2.15
1995-96	36	966.11	448.81	--	455	62.3
1996-97	2	6	--	--	5	1
1997-98	0	---	-	--	--	--
1998-99	2	8.5	--	6.5	--	2
1999-2000	30	353.4	239	38	21.9	54.5
2000-01	4	44	---	41	---	3

2001-02	1	37.64	---	37.64	---	---
2002-03	5	84	---	---	65	19
2003-04	15	182	81	5	46	55
2004-05	13	57.45	32.25	5	--	20.2
2005-06	5	23.75	--	--	0.5	23.25
2006-07	4	7.5	1	--	1	5.5
2007-08	8	17.25	--	--	10	7.25
2008-09	1	0.04	--	0.04	--	--
2009-10	20	193.81	20	11	131.81	31
2010-11	18	85	44	7	3	31
2011-12	1	0.5	---	----	----	----
2012-13	24	156.5	32	0	60	64.5
2013-14	1	3	----	----	----	----
2014-15	3	8.5	----	----	----	----

2.3.2 Injuries by man

The following types of injuries are caused by humans:

(a) Lopping

Ban Oak and other low level broad leaved species such as Bihul, Chimnu, Khirak, Jhingan, Soris, Semal, Ficus etc. are lopped very heavily, especially near the villages. As a result of the unrestricted right of lopping, broad leaved species in the vicinity of the villages have been so heavily lopped that they are nearing extinction in some of the areas. Most of the undermarked forests in the lower areas, which once carried good crop of broad leaved species, have been reduced to scrub and will in no time be nothing but blanks as a result of unrestricted and indiscriminate lopping and hacking of fodder and fuel. Moru Oak is also very heavily lopped and has suffered very much on this account. Among the conifers, Spruce growing near the villages has suffered most because of excessive lopping. Lopping of Spruce is permissible only up to half the height while trees of less than 3 ft in girth cannot be lopped.

This rule is observed more in breach than in observance and Spruce trees of all sizes are lopped right up to the top resulting in their death. The damage done by heavy lopping is tremendous as some of the trees die of excessive lopping and those, which survive it, put on hardly any increment. Heavily lopped Spruce trees develop red heart also. Deodar is not lopped. Though lopping of Kail and Chil is prohibited, these species are sometimes lopped illicitly. Because of heavy lopping of Kail in the past, most of the Kail trees are suffering from *Trametespinii*. Lopping of Chil reduces the vigor of the trees and consequently, the resin yield.

(b) Grass Cutting

There is a recorded right of grass cutting in almost all Chil forests. Villagers voluntarily close such areas for production of Grass, which they divide amongst themselves. In this process young seedlings of one to two years in age also get cut with the result that regeneration fails to establish in such grass reserves.

(c) Debarking

Chil is sometimes debarked by the local goldsmiths for making charcoal. This damage is not very appreciable and is confined to forests neighboring villages. Ban Oak is debarked by cobblers for tanning hides and the damage is quite appreciable in localities with small areas under such forests. Spruce and Silver Fir trees are debarked for making ridge pieces for roofs, especially for doghries situated in the Fir zone. Demand being limited, damage is not appreciable if the trees are not completely girdled. Spruce poles completely debarked at the base often dies. Debarking of Walnut roots is also done to extract dandasa and considerable damage is done to Walnut trees because of this practice. Because this practice is increasing, it is necessary to check it in the interest of preservation of Walnut trees.

(d) Illicit Felling

The incidence of illicit felling is not very high in this area, but a few trees are sometimes cut illicitly by the villagers. There have been few instances where the Timber given in T.D is mixed with illicitly cut trees and transported away. On some occasions right holders fell more trees other than given in T.D, violating the rules and commit offences. Also the private sale depot and joineries are encouraging some miscreants for illicit felling. The villagers have unrestricted rights for cutting of Ban Oak and other suitable broad leaved species for agriculture implements. They can cut such trees without taking any permission from the Forest Department. This practice has resulted in ruination of the Ban Oak demarcated forests at low elevations, especially near the villages. Illicit felling of Ban Oak and other broad leaved species for fuel in areas neighboring Sundernagar has reduced some good forests to scrub blanks.

(e) Exploitation Refuge

With conventional methods of rough squaring near the stump, a lot of refuse is left in the forests. This accumulated refuse does not allow the seed to touch the soil which are, therefore, unable to germinate. The debris burning has become an essential part of cultural operations.

(f) Extraction of Stones by Mining

A lot of damage is caused to forest growth due to mining of stones or slates in forest areas. Due to it erosion occurs and there is large scale uprooting of trees in the areas where such operations are taken up.

2.3.3 Injuries by Animals

Animals cause the following injuries to crops:-

(a) Animal Grazing

In view of the unrestricted rights of grazing admitted for the local people almost all the forest areas, except the high lying Fir forests, are heavily grazed. The grazing damage does not only confine to browsing and trampling down of the young seedlings of forest trees species, but also results in stripping hillsides of vegetative covering and consequent increased soil erosion and run off. Excessive grazing does great harm to regeneration, especially on southern slopes. Overgrazing in Chilforests increases soil erosion and leads to reduction in soil fertility and deterioration of site quality. Harmful effects of overgrazing are noticeable in all the Chil forests and more so on forests adjoining habitations. Grazing during rains, especially by buffaloes, pulverizes

the soil and compacts it so that it is no longer able to absorb rain and thus increases run-off and soil erosion. The harmful effects of overgrazing have been discussed also.

Overgrazing is doing considerable damage in Deodar and Kail forests also where it does not let natural regeneration come in. Damage due to overgrazing is greatly increased on the southern aspect and drier site conditions are not very favorable for Deodar. On dry overgrazed sites near the villages, Deodar is of very poor quality and natural regeneration is conspicuous by its absence. PBI areas of the Working Plan under revision could not be regenerated as they were not effectively closed to grazing. Besides this, overgrazing is resulting in depletion of the ground cover and in deterioration of site quality.

Spruce forests are also not free from this evil and their more accessible parts are already suffering from overgrazing. Areas of Silver Fir and Spruce away from villages are, however, not overgrazed and in such areas thick growth of weeds inhibits natural regeneration. Harmful effects of excessive grazing are more pronounced in the waste lands, demarcated forests and in alpine pasture. Continuous overgrazing in these areas has almost completely destroyed the soil cover of good grasses and leguminous plants giving place to coarser grasses and thorny shrubs incapable of affording adequate protection to the soil. Serious soil erosion has started in these areas and hardly any fertile soil has been left, because of which forestation of these area is posing a serious problem and sowing and planting of broad leaved species done simultaneously with the closure of the areas have not met with desired success. Besides the local cattle, the migratory sheep and goats which come for grazing in the lower areas during winter do a lot of damage on their way to these areas and back to higher hills for summer grazing. Goats and buffaloes are worse than cows and sheep and attempts should be made to put a curb on their number.

(b) Wild Animals

The damage done by wild animals in this tract is not appreciable and is only occasional. Bear debark young Deodar and Kail poles, which sometimes die. Branches of Oak are also broken by bears to get acorns. Porcupines also gnaw off the barks from the base of Deodar and Kail poles and dig out and eat roots of Chil saplings. Monkeys do a lot of damage by pulling out seedlings from nurseries and plantation areas especially Ban Oak and digging out walnut and other edible fruits and seeds grown in the nurseries and in forest areas. Flying squirrel destroys large quantities of Chil, Kail and Deodar cones and Nutcracker (Kalii-kawa) consumes large quantities of Deodar and Kail seeds. Different types of pheasants met with in the area do some damage by pulling out seeds and seedlings from the nursery and plantation areas. Woodpeckers bore the bark of Deodar and Chil poles. The pheasants and the woodpeckers do a lot of good by eating innumerable harmful insects and because of little damage they do in the forests, these should not be discouraged.

2.3.4 Plants and Weeds

(a) Weeds

Except in forests in damp localities and open scrub forests in the lower zone ranging between 600-100 mtr. altitudes, weeds do not pose a very serious problem. In many forests *Strobilanthes* spp. and *Arundinaria falcata* form fairly thick undergrowth inhibits natural regeneration. At some places *Spiraea* spp. and *Indigofera* spp. also form fairly thick undergrowth. In the lower zone *Lantana camara* and *Ageratum* spp. are actively encroaching upon the open forests and have assumed the position of a serious menace to forests growth. Lantana eradication programme is in operation every year which seems to put break on invasion of Lantana in forest lands.

(b) Parasites

Loranthus spp. and *Viscum* spp. are commonly found parasites in this Division. They do some damage in Ban Oak and broad leaved forests of the lower zone.

(c) Climbers

These are not very harmful except in scrub forests, where *Bauhinia vahlii* and *Pueraria tuberosa* completely envelops the trees and thereby retard its growth. The commonly climbers in Kail and Deodar forests are *Vitis semicordata*, *Rosa moschata*, *Hedera helix*, *Rubus* etc.

2.3.5 Fungii

(a) *Trametes pinii*

This causes significant damage to Kail in this Division. The fungus causes decay, mainly in the heartwood. In incipient decay, the heartwood is stained light pink or brown or reddish, due to which the disease is known as red-rot. *Trametes pinii* infects Kail mainly through trunk wounds caused during lopping which should be prohibited or controlled to minimise infection. In case of severe attack, the loss of timber is enormous.

(d) *Fomes annosus*

It attacks Deodar poles through the roots in badly drained soil and results in their death. The damage due to this fungus is not appreciable and only sporadic casualties have been noticed in this Division. As the fungus is soil borne, digging of trenches around infected groups of poles and uprooting and burning the infected material will be helpful in controlling this fungus.

(c) *Peridermium companulatum* and *P. brevis*

These pathogens attack the needles of Chil and Kail respectively and kill them. Slight attacks of these have been sporadically noticed in some Chil and Kail forests.

(d) *Ganoderma lucidum*

Root disease in Shisham due to this fungus is common, both in natural forests and in plantations. Trees of advanced age are normally attacked by the pathogen. This disease is prevalent in both light and heavy textured soils. The effected trees exhibit a stag headed appearance, in which condition they may continue for a year before being

killed. Its attack has been noticed sporadically in some Shisham and Khair forests but the damage done is not serious.

(e) *Fomesbadius*

It causes heart rot in Khair and is common in all Khair forests. The fungus infects Khair through injuries due to mechanical and damage caused by animals.

(f) *Fusarium* Species

It attacks the roots of young Deodar seedlings which consequently damp off. Its attack has been noticed in Deodar forests of Jhungi valley in small patches. Bad drainage and poor aeration are the main causes of this disease. Deodar should, therefore, always be grown in well drained soils, because this damping off in conifer seedlings is also caused by *Pythium*, *Rhizoctonia* and *Phytophthora* spp.

2.3.6 Insects

Only sporadic insect damage has been noticed in this division. *Ectropisdeodarae* sometimes does appreciable damage to Deodar. *Euzopheracedrella* attacks Deodar cones and destroys seeds. *Scolytusmajor*, bark beetle causes damage to Deodar poles and saplings on rocky and dry sites. *Agrotis* spp. does considerable damage in the nurseries by cutting the seedlings at the ground level. *Platypus biformis*, the short bole borer of Chil, attacks felled and sickly standing Chil trees and riddles them with holes. It is quite common in Chil forests and greatly depreciates the value of the timber if the conversion is not quickly done. *Ipslongifolia* bores Kail poles and makes irregular galleries which may result in snapping of these poles in case of severe attack.

2.3.7 Injuries by Nature

Due to climatic variation, the following injuries are caused by nature.

(a) Snow

Snow damage occurs chiefly at higher altitudes but exceptionally heavy snowfall at low elevations also does considerable damage. A large number of Chil trees were uprooted during 1960-61. Recently during unusual snowfall of December 2014 thousands of Deodar, Chil, and kail trees were uprooted and top broken. Majority of them were of pole stage, which could not stand the weight of the wet snow. This heavy snow damage was due to congestion of young crop in forests since no thinning and other silviculture operations are carried out. The remedy lies in a regular and timely thinning. Because of heavy load of snow, the boles of Kail and Deodar are bent near the base and this sometimes lasts till maturity. It results in the wastage of valuable bole during exploitation. In young plantations or regeneration areas, where weed growth is very heavy, the seedlings are sometimes smothered by dead weeds which are pressed on them from uphill side due to the weight of snow. Snow slides do not let any tree growth come in the nullas in the Silver Fir Zone. Wet March snow does more damage than dry winter snow.

(b) Hail and Storms

Hail and storm during summer do not do any appreciable damage in the forests, Strong winds after heavy snow or rain results in the uprooting of a fairly large number of trees in these forests every year. Hailstorms are quite frequent and heavy during March and do appreciable damage in Deodar and Fir nurseries by killing the young seedlings germinating at that time.

(c) Lightening

The damage due to lightening is not appreciable but solitary trees are sometimes killed by it. In some cases the trees are not killed but the top is broken and the bole splits up. The villagers do not accept trees struck with lightening even if the bark has been slightly charred as they apprehend that lightening strikes the building in which such timber has been used.

(d) Frost

The damage by frost is confined to lower hills, mostly in December –January and has sometime been very severe as it strips the bamboo shoots naked of their foliage and kills an enormous number of bamboos and seedling of other species. Frost does little damage to Chil but when it is exceptionally severe, the seed production is adversely affected.

(e) Drought

Drought conditions prevail in the lower overgrazed areas during May and June and sometimes during October and November also. In case of severe drought, fairly large number of plants dies in the plantation areas, especially in southern exposed and overgrazed slopes. Mortality of seedlings is pretty high in afforestation work being done on eroded areas in the lower zone where soil is shallow. Deodar seedlings also die of drought during summer, if there is not sufficient over-head shade. Besides killing young seedlings, drought increases fire hazard in Chil and other low lying forests.

(f) Erosion and Landslips

Soil erosion in the lower overgrazed areas of Chil and other miscellaneous forests is doing considerable damage by washing away fertile soil and deteriorating site quality, giving rise to poor quality crops. Some of the low-lying areas have become so refractory, because of fertile soil having been washed away, that is a problem to satisfactorily afforest them now. Land slips occurring in forests take away trees with them. Though the land slip problem is not very acute, small land slips are not uncommon in Chil and scrub forests. There are many landslips along the road in Seraj range and Thachi range which needs to be treated with mechanical structures and Bio-engineering species.

(g) Isolation Shock

Spruce trees, when suddenly exposed to more light and sun due to heavy fellings, die of isolation shock.

CHAPTER IIB(FAUNA)

B. The Fauna

The wide range of altitude, temperature and rainfall results in diversified and rich forest flora varying from Northern tropical dry mixed deciduous forests to West Himalayan Temperate forests. The forests are, however, not uniformly distributed throughout the tract and are mostly confined to higher hills and interesting wild life is found in the tract.

The following important wild animals and birds are found in the tract.

2.4 Mammals

Though with the increased human activity in the forests, more particularly poaching, the population of game animals is very much reduced. Nevertheless, a few are seen in some sheltered places. The main species of the animals are mentioned below:-

(a) Carnivora**(Table-1)**

1	<i>Pantherapardus</i>	Leopard
2	<i>Felischaus</i>	Jungle Cat
3	<i>Canis lupus</i>	Wolf or Baghiar
4	<i>Vulpesbengalensis</i>	Indian Fox or Lomeri
5	<i>Canisaurens</i>	Jackal or Gidder

(b) Herbivora**(Table-2)**

1	<i>Naemoredus goral</i>	Ghoral
2	<i>Muntiacusmuntjak</i>	Barking Deer, Kakar
3	<i>Moschuscupreus</i>	Musk Deer, Kastura
4	<i>Hemitragusjemlahicus</i>	Aimu, Himalayan Goat
5	<i>Cervusunicolour</i>	Sambar
6	<i>Hystrixindica</i>	Indian Procupine
7	<i>Lepusnigricollis</i>	The Indian Hare
8	<i>Funambuluspalmorum</i>	Indian Palm Squirrel
9	<i>Melursusursinus</i>	Sloth Bear
10	<i>Ursusthibetanus</i>	Black Bear
11	<i>Martesflevigula</i>	Himalayan Pine Marten

2.5 Birds

Amongst the birds which are commonly found in the tract, the following are some of the important ones:

(Table-3)

1	<i>Arborophilatorqueola</i>	Common Hill Partridge
2	<i>Alectorischukar</i>	Chakor
3	<i>Gallus gallus</i>	Red Jungle Fowl
4	<i>Lophuraleucomelanos</i>	Kalij Pheasant
5	<i>Catreuswallichii</i>	Cheer Pheasant
6	<i>Pucrasiamacrolopha</i>	Koklass Pheasant
7	<i>Lophophorusimpejanus</i>	Monal Pheasant
8	<i>Columba livia</i>	Kabutar, Blue Rock Pigeon
9	<i>Streptopeliachinensis</i>	Spotted Dove
10	<i>Psittaculaeupatria</i>	Alexandrine Parakeet
11	<i>Psittaculakrameri</i>	Rose ringed Parakeet
12	<i>Upupaepops</i>	Common Hoopoe
13	<i>Ocyerosbirostris</i>	Indian Grey Hornbill
14	<i>Megalaimavirens</i>	Great Barbet
15	<i>Picuschlorolophus</i>	Lesser Yellownape
16	<i>Dendrocoposhimalayensis</i>	Brown fronted Woodpecker
17	<i>Dicrurusmacrocerus</i>	Black Drongo
18	<i>Acridotherestrictis</i>	Common Myna
19	<i>Jungle Myna</i>	Acridotheresfuscus
20	<i>Garrulusglandarius</i>	Eurasian Jay
21	<i>Urocissaflavirostris</i>	Yellow billed Blue Magpie
22	<i>Urocissaerythrorhyncha</i>	Red billed Blue Magpie
23	<i>Pycnonotusleucogenys</i>	Himalayan Bulbul
24	<i>Turdoidesstriatus</i>	Jungle Babbler
25	<i>Heterophasiacapistrata</i>	RufousSibia
26	<i>Seicercusxanthoschistos</i>	Grey-hooded Warbler
27	<i>Enicurusmaculatus</i>	Spotted Forktail
28	<i>Chaimarrornisleucocephalus</i>	White-capped Water Redstart
29	<i>Myophonuscaeruleus</i>	Blue Whisting Thrush
30	<i>Parus major</i>	Great Tit

2.6 Reptiles

Important reptiles found in the tract given below:

(Table-4)

1	<i>Najanaaja</i>	The Indian Cobra
2	<i>Ancistrodonhimalayanus</i>	Himalayan Pit Viper
3	<i>Bungaruscaerulens</i>	Common Indian Krait
4	<i>Varanus spp.</i>	Monitor Lizard

2.7 Fish

Fish are found in almost all the rivers and streams. Trout (*Salmo species*) is commonly found in the Beas and *Barbus mosal* (Mahaseer) is also found in the Beas and Sutlej rivers. Besides these *Laboo Calhan* (Black fish) is found in all the streams. All the fishes except Mahaseer are small in size. Illicit angling and dynamiting fish in the streams has caused irreparable damage and as such their population is dwindling.

2.8.1 Injuries to which Fauna is Liable:

The biggest and the only injury to which wildlife is exposed, is man himself. The other hazards to the fauna are epidemics, atmospheric influences, animals and fire. A brief resume of the damages done to the forest fauna are listed below:

Hunting/Poaching:

The destruction of wildlife at the hands of bonafide residents is common because a large section possesses arms although most of the arms are for crop protection, yet these are commonly used in shooting game. The animals are killed for meat or other valuable products like-fur, musk, medicines, and trophies or only for sport. Carnivorous animals are killed because they are dangerous and can harm other people and farm/domestic animals. Other animals are killed to save agricultural crops. Panther, musk deer, monal, cheer pheasants are the endangered species in the area. The poachers have ingenious ways of poaching of game animals. Opening up of the area by more motor roads and paths is resulting increased poaching activities.

Dynamiting:

The H.P. Public Works Department, Hydro Projects and military men get plenty of explosives for developmental works, which people use for killing fish etc. This naturally depletes the stock of fish for future crop.

Poisoning:

During the dry season, poisoning is practiced, in water pools for over all destruction of fish in the pool. The poison is made from lime, juice of *Euphorbia royleana*, pounded seeds of *Zanthoxylum alatum* and *Cassia tomentosa* etc. These are mixed and thrown into pools and stirred up and made to mix with the water. After an hour or so fish come to the surface stupefied or dead and are removed in quantities.

Fire:

It plays havoc with forest fauna in the fire season. The animals get trapped in fire and perished. The eggs and young ones are destroyed in the nest, nest holes and hollows in the tree trunks and rocks and dead stumps. The entire food chain is destroyed and the pyramid structure of wildlife is broken. The habitat is rather destroyed completely.

Epidemics:

It is not a common feature in wildlife but sambar and other members of deerfamily may suffer from infectious and contagious diseases like rinderpest etc. through domestic cattle grazing in the forests.

Atmospheric Influences:

The adults are seldom effected by the climatic disturbances but young ones suffer casualties mostly from frost. The fires adversely affect bird hatching. Drought causes the drying up of natural water holes.

Animals:

The ecological balance maintained by the predator –prey relationship has been disturbed by the man. Carnivore pray on herbovora, reptiles on birds and eggs and rodents, other destroys fishes, reptiles and small birds shooting of particular animal species like sambar, Kakarand other herbivores has recoiled on depletion of food for carnivore like Panther and is one of case for extinction.

CHAPTER – III

UTILISATION OF THE PRODUCE

3.1 Agriculture Customs and Wants of Population**3.1.1 Agriculture Customs**

The population of the Nachan Valley is mostly rural, depending largely upon agricultural and development works. Agriculture much neglected in the past has lately come to assume considerable importance. Almost every available piece of land outside the forest (DPF) has been broken up for cultivation (Agriculture and Horticulture), thus UPFs are very scarce. The principal crops raised are; wheat, barley, maize, mash, rape seed (*Brassica compestris*), Phullan (*Fagobyrumemmaginatum*), Bres (*F.esculentum*) and Suil (*Amaranthus anardana*) vegetables like potato and pea are grown in abundance. Maize is the staple food, wheat bread being rarely eaten by the poorer people.

3.1.2 Agricultural Practices

Agriculture is the main occupation of the majority of the tract. The holdings are invariably small and primitive methods of framing are adopted. The percentage of irrigated land is insignificant and majority of the farmers have to depend on monsoon rains.

In the higher ridges potato cultivating is done, which gives good income to the farmers. However, proper terracing is never attempted and cultivation is done in steeper gradients also. Cultivation of Pea is done in Gadagosani area. Pea is very popular all over India. Due to various incentives given by the Government a number of orchards have come up in the area, which gives extremely good income to the growers. These orchards belong to elite group like employees of State Government, Panchyat Pradhan, military men or big zamindars. Local people work as watch and ward in the orchards of the abovementioned groups. Majority of the people in the hills are poor and to supplement their meager income many people work with the Public Works Department, Irrigation cum Public Health and development works undertaken by Block Development Agency. As the exploitation works of forests have been decreased considerably due to blanket ban on green felling, the employment generated by raising plantation in far flung areas by Forest Department, gives good opportunity to the people to augment their earning.

This opportunity will also be lost by the poor people of the area if the daily rated labours are regularized as declared by the State Govt. recently Forest Department works are successful only with the Co-operation of the local people. If the exported regularized labour is employed for plantation in the far flung areas, the local people will not cooperate in making the plantation successful. So, it is very essential that the labour for plantation works should be from the vicinity of the area. With this approach our plantation programme can be made successful.

3.1.3 Population

The population of the area has been increasing steadily. The rate of growth of the population in Mandi district during this century has been summarized in the following tables:

(Table-1)

Census Year	Total Population	% age rate of growth per annum
1901	2,28,721	-
1911	2,36,038	0.31
1921	2,38,376	0.14
1931	2,65,873	1.11
1941	3,03,685	1.41
1951	3,10,626	0.22
1961	3,84,224	2.36
1971	5,15,180	3.4
1981	6,44,827	2.51
1991	7,68,446	1.91
2001	9,01,344	1.172
2011	9,99,518	1.089

3.1.4 Wants of the People

The wants of the people are met within the framework of the settlement of Mandi State. The day-to-day wants of the people are following:

3.1.4.1 Timber

The people living in the villages depend entirely on the forests for their timber requirements. The people in villages have their recorded rights in the settlement report and get the timber at concessional rate.

The rates at which timber is given to the right holders as per Mandi settlement are given below:

(Table-2)

Species Prior to the year 2010	Rate in Rs./Trees diameter in cm.					
	20-30	30-40	40-50	50-60	60-70	Over
Deodar	0.25	0.50	1.00	1.00	2.00	4.00
Kail	0.25	0.25	0.50	0.75	0.75	1.00
Chil	0.12	0.25	0.37	0.37	0.50	0.50
Rai/Tosh	0.12	0.12	0.12	0.12	0.12	0.25

T.D. granted per cubic meter on concessional rates during the year 2010-2014 as detail given below:

(Table-3)

Year	Particular of grantees	Deodar	Kail	Rai/fir	Chil
2010	Above Poverty line	7684	4614	2276	1733
To 2012	Below Poverty line	2561	1538	757	578
2013 onwards	-	500	250	250	250

[Source: DFO Nachan office record]

As a result of great improvement in the economic condition of the people, increase in population and dying out of joint family system demand for timber has considerably increased. Therate of tree at concessional rates is too low. This system should be abolished and depot system (no profit no loss) be started at Panchayatlevel. If this is not possible then the rates should be increased keeping in view the market value of the timber.By this increase or depot system misuse of timber by way of smuggling can be reduced.

The timber granted to the right holder for their bonafide requirements at concessional rates are given below:

(Table-4)

Year	Deo	Kail	Chil	Fir/spruce	Total volume
1980-81	320.30	1002.27	1006.31	343.79	2672.67
1981-82	774.17	1369.07	1369.75	154.27	3667.26
1983-84	4007.15	2942.80	1235.93	1383.02	9568.9
1984-85	6258.64	4269.58	2798.68	1214.46	14541.36
1985-86	3020.55	2892.58	1307.59	953.79	8174.51
1986-87	1616.00	1170.71	1548.66	439.12	4774.49
1987-88	1685.07	1030.53	1627.38	356.23	4699.21
1988-89	1263.31	756.17	1531.43	37.60	3588.51
1989-90	2120.59	738.86	1155.06	179.64	4194.15
1990-91	1755.91	816.83	1217.29	78.71	3868.74
1991-92	1564.70	485.74	2326.59	78.98	4456.01
1992-93	892.32	783.53	536.93	310.77	2523.55
1993-94	1207.995	1038.38	888.21	96.47	3231.055
1994-95	2249.70	1648.78	828.85	198.875	4926.205
1995-96	1739.45	1371.65	1342.19	197.145	4650.435
1996-97	1802.365	1700.86	850.79	324.615	4678.63
1997-98	1396.36	1073.61	999.19	223.61	3692.77
1998-99	2342.86	1405.07	1060.9	141.950	4950.78
1999-2000	2709.02	1259.26	869.08	225.75	5063.11
2000-01	1941.59	892.925	831.07	142.07	3807.655
2001-02	2925.66	1401.46	1150.59	184.29	5662
2002-03	1499.185	416.73	568.84	41.5	2526.255
2003-04	1489.79	449.63	445.51	21.61	2406.54
2004-05	1253.525	249.11	646.53	40.78	2189.945
2005-06	1086.295	280.85	482.32	34.79	1884.255
2006-07	232.435	8.83	25.09	0	266.355
2007-08	0	0	0	0	0
2008-09	0	0	0	0	0

2009-10	0	0	0	0	0
2010-11	0	5.0	0	0	5
2011-12	7	9	0	0	16
2012-13	35.5	20	4	11	70.5
2013-14	125.425	77.95	30.81	4	238.185
2014-15	2980.705	483.01	538.59	84.6	4002.305
2015-16	35.8	6.095	6.14	0	48.035
2016-17	905.275	250.57	84.572	68.25	1308.667
2017-18	1295.525	384.31	192.822	262.6	2135.257
2018-19	1333.33	500.635	281.634	101.1	2216.699
2019-20	1153.90	369.405	183.51	154.975	1861.81
2020-21	2105.575	485.877	596.92	375.875	3564.247
2021-22	1143.40	552.325	116.57	284.275	2096.57
2022-23	1357.20	415.53	252.46	378.21	2403.4

[Source: DFO Nachan office record]

3.1.4.2 Free Grants:

Details of the timber granted to the right holders as free grants from the years 2003-04 to 2013-14 is given below:

(Table-5)

Year	Deo	Kail	Chil	Fir/Spruce	Ban	Other B/L	Total Vol
2003-04	178.8	164.73	59.06	131.46	-	-	534.05
2004-05	224.439	247.204	81.215	47.495	-	3.34	603.693
2005-06	172.765	198.95	82.4	174.065	-	3.34	631.52
2006-07	144.69	228.96	35.97	62.5	-	1.2	473.32
2007-08	48.2	92.37	0	4.5	-	11.51	156.58
2008-09	21.805	64.2	4.205	5.25	-	-	95.46
2009-10	50.235	86.99	2.145	3.905	-	-	143.275
2010-11	75.125	34.395	109.98	-	-	-	219.5
2011-12	16.8	26.05	42.9	20.075	-	-	105.825
2012-13	29.395	45.62	1.3	14.68	-	-	90.995
2013-14	21.41	15.39	56.06	-	-	9.184	102.044
2014-15	97.075	91.47	110.54	52.535	0	11	362.62
2015-16	138.865	85.22	130.91	47.79	0.56	9.85	413.195
2016-17	133.165	59.58	219.65	32.275	1.84	14.85	461.38
2017-18	194.16	103.71	273.77	34.14	2.52	12.45	620.75
2018-19	215.1	99.93	166.42	103.91	5.13	12	602.49
2019-20	113.845	101.38	130.51	111.46	0.06	0	463.355
2020-21	198.56	60.94	92.84	76.67	0.56	7.45	437.02
2021-22	374.86	264.575	200.505	164.73	5.18	15	1024.85
2022-23	259.305	139.29	242.63	95.485	6.4	6.55	749.66

[Source: DFO Nachan office record]

Besides constructional timber, large quantities of timber, especially of ban oak, are required for agricultural implements. As the people enjoy unrestricted rights for receiving timber for agricultural implements, it is difficult to estimate accurately the timber extracted for this purpose.

However, the average requirement for construction timber has been worked out from the timber granted in the past and tabulated below:

(Table-6)

Deodar	2000 cu.m.
Kail	1500 cu.m.
Chil	1000 cu.m.
Fir/Spruce	500 cu.m.
Total	<u>5000 cu.m.</u>

[Source: DFO Nachan office record]

This much timber will be required by the population of the area every year.

3.1.4.3 Firewood and Charcoal

The recorded rights for removal of fallen and dry trees are in itself insufficient to meet the requirements of firewood in most of the trees. For assessment of firewood requirement the tract can be broadly divided into the following:

(a) Area above 2500 mtr.

These remain snow covered for about 3 months. Here the average requirements for each household are estimated as 50 quintals for winter only. The average annual requirement is estimated to be 100 quintals. Thus, the wood is collected before the onset of winters and stored by the villagers in the ground floor and verandas.

(b) Areas below 2500 Mtr.

In these areas where winters are less severe the annual firewood requirements of a family may be roughly taken as 50 quintals. The total annual demand is thus colossal which cannot be met with from the existing Govt. Forests without prejudicing their proper management. Forests have also started deteriorating especially adjoining densely populated localities.

Projection for Fuelwood Demand

The total population of the Division is 87753 comprising 17551 villages. According to FAO study the average fuelwood requirement is 5 kg per head per day. The average family size has been taken as 5 members. Thus the requirement of the fuelwood works out to 90 qtl. per family per year. The total requirement of the fuelwood for the Division is 15,79,590qtl. Peryear. 75% of it is extracted from the forests by the people being right holders.

3.1.4.4 Medicinal Herbs

The medicinal herbs are collected locally. The important herbs are *Marchellaesculenta*(Guchhi) *Viola serpens* (Banaksha), *Valerianawallichii* (Mushkbala), *Dioscorea species*, *Berberis*, *lyciums*, *Pedophyllum*, *Berberisaristala*, *Merthasylvestris*. The collection and export of medicinal herbs is regulated by Himachal Pradesh Administration (Forest Department) Notification No. Ft. 12-306/57-II dated 05-09-1962, HPGovt.notificationno.FFE-B-G(9) 9/94-11 dated 28/2/2003 and Fts.B-A(3)-1/77-III-loose dated 21/9/2006.

The dynamics of various NTFPs collected and reported from area are tabulated below:

(Table-7)

S. No	Name of Spp.	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
1	Mushkbala	27	18	80	22	5.5	-	20	3	31	13.3
2	Guchhi	25	53	60	-	4.83	-	-	4.95	6.75	20.9
3	Jhullagrass	34	12	51	-	33	20	3	-	1	-
4	Pathanbel	6	11	54	4	4	-	30	-	3.30	56
5	Bindiphool	-	-	90	3	1.80	-	-	-	1	-
6	TejPatra	-	--	-	-	-	-	-	15	4.80	22.70
7	Birmi	--	-	-	-	-	-	50	5	-	-
8	Banafsa	-	-	19	-	-	-	-	-	0.60	6
9	Berberis roots	-	928	-	-	178	-	-	-	748	695
10	Kail Cones	59	31	289	454	165	130	107	84	177	80
11	Deo Cones	-	-	-	-	-	-	14.42	-	5	-
12	Rakhal	-	-	-	-	-	-	32.68	25	30	20
13	Karoo	--	-	-	-	-	-	-	-	-	-
14	Butkeshki	--	-	1	1	-	-	-	-	30	8
15	SingliMingli	-	-	-	-	-	-	-	-	-	-
16	Telis Patra	40	-	-	-	-	-	-	18	6	-
17	Thuth	-	-	2	1	10.50	-	-	11	4	-
18	Van Haldi	-	-	56.50	18	3	-	4	-	4	3
19	Marigold grass	32	-	125	-	25	100	42	-	10	-
20	Chrochi	-	-	-	-	-	-	-	-	-	-
21	BichchuButi	-	-	17	2	-	-	-	-	-	5
22	Chora	-	-	-	-	-	-	-	-	-	-
23	Kuth	-	-	-	-	-	-	-	-	-	-
24	Chalora	-	-	-	-	-	-	-	-	5.75	20
25	Mehandi	10	-	-	-	-	-	-	-	-	-
26	Bhuki Flower	-	-	-	-	-	-	-	-	-	-
27	Dung Tuli	101	53	83	-	5	-	1.50	97	28	138.2
28	Dori Grass	12	10	202	63	43	-	10	10.30	18	30
29	Chirata	-	228	-	8	11	-	-	5	-	0.20
30	Kakarsingi	-	-	-	-	-	-	23	4	0.30	-
31	Seski	-	-	-	-	-	-	-	-	-	-
32	Kashmiri Patta	-	-	-	-	-	-	-	-	-	-
33	DandasaAkhr	-	-	-	-	-	-	-	-	-	-

	ot										
34.	Chachroacha Kharera	-	-	-	-	-	-	-	-	-	-
35.	Jharaka	1	-	-	-	-	-	-			
36.	Naihnoo	8	-	-	-	-	-	-	1.50	-	-
37.	Rai Cones	5		-	-	14	-	-		35	-
38.	Brass phool	-	-	14	13	-	-	-	12	4	2
39.	Green moss Grass	-	-	10	-	-	-	-		142	213

[Source: DFO Nachan office record]

3.2. Markets and Marketable Products:

Medicinal herbs and fruits from the forests are collected by the locals for their own domestic use & for export for which permits are issued by the DFO. The local population has access to markets in Mandi district by road to sell their produce at handsome prices. There is not any prominent market in the division but the produce is transported to other market by various means and transportation to fetch good price for their produce.

3.2.1 Market:

There is only one Market Yard in the jurisdiction of Nachan Forest Division which is situated at Chailchowk.

3.2.2 Marketable products:

The following marketable products which are grown on private land are found in the jurisdiction of Nachan Forest Division:

(Table-8)

Sr. No.	Name of marketable products
1	Mattar
2	Band Gobhi
3	FulGobhi
4	Tamatar
5	Aalu
6	Seb
7	Khira
9	Nashpati
10	Kafal
11	Lingad

3.3 Mining Activities

Information regarding Mining Activities in Nachan Forest Division are tabulates below:

(Table-9)

Sr.N o.	Name & address of owner of Mine	Name of Revenue Muhul	Kh. No.	Area in (bigh	Whether in govt or private	Type of mine/ Quary	Pupose of lease	Date of grant	Lease period
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UTILISATION OF THE PRODUCE

				a)	land				
1	S/Sh. Tejinder Pal S/o jai Dev R/o Dhwas PO BagachanogiThunagDistt. Mandi (HP)	Dhwas	455	7-1-3	Private	Slate	For free sale	11.6.2007	9.12.2012
2	Mohan Singh & Bhupender Pal S/o Hari Ram & Bhag Singh R/o BagsaidThunagDistt. Mandi (HP)	Chaudhar	27/1	4-4-1	Govt. Land	-do-	-do-	22.5.2007	12.2.2013
3	Balbirmalhotra r/o Akhara Bazar KulluDistt. Kullu(HP) Prop. Malhotra Stone crusher	Burah	297 & 298	7-6-13	Private	Stone	For use in already established stone crusher	29.9.2007	3.3.2013
4	Abhishek Thakur S/o Roop Singh VPO SundernagarDistt. Mandi (HP) Prop. Murarimata Stone Crusher	Khamradh a/596	406/02	1-4-5	Govt. land	Stone	-do-	17.8.2007	24.4.2013
5	-do-	-do-	406/01	4.2.10	-do-	-do-	-do-	26.4.2008	29.9.2010
6	Bhwanidutt S/o kanshi Ram R/o Sunah PO Keoli Tehsil ThunagDistt. Mandi (HP)	Keoli/497	393	4-18-18	-do-	Slate	For free sale	19.12.2008	21.6.2014
7	Dhameshwar Singh S/o Ram Singh R/o BagsaidThunagDistt. Mandi (HP)	Leh/498	128/1	3-6-4	-do-	Slate	Fee sale	20.2.2009	25.8.2014
8	Balbirmalhotra S/o KulbirMaohotra R/o RopiPOBalichowki Sub-Tehsil BalichowkiDistt. Mandi (HP) Prop. Malhotra Stone crusher & Partner M/S DugraBhwani Stone Crusher	Bounchhari	1111/727	4-15-14	Private	Sand Bajari & Stone	For use in already established stone crusher	19.9.2009	24.5.2015
9	NarenderGuleria S/o DharamChand R/o Lunapani PO BhangrotuSadarDistt. Mandi (HP) Prop. Naina Stone crusher	GhaatMurrah	46,47/1	11-4-10	-do-	Stone	For setting up of stone crusher name and style \Naina Stone Crusher	20.3.2010	11.7.2015
10	Tejinder Pal S/o jai Dev R/o Katwani PO ShikawariThunagDistt. Mandi (HP)	Dhwas/519	375 & 376	3-6-18	Private	Slate	For free sale	22.12.2008	20.6.2019
11	Amar Singh S/o Keshav R/o Bajnor PO Jarol Tehsil ThunagDistt. Mandi (HP)	Bara/14	181	2-19-09	Govt.	-do-	-do-	27.11.2008	11.4.2020
12	Indresh Sharma S/o Gopal Sharma R/o Tarour PO Segli Tehsil ChachiotDistt. Mandi (HP)	Tarour/43	724 & 726	9-16-8	Private	Sand Bajri & Stone	For setting up of stone crusher	15.7.2008	22.1.2024
13	NandLal S/o KameshwarDutt R/o lehPO	Thunag/Leh	6/1	5-18-4	-do-	Slate	For free sale	28.5.2010	24.10.2015

	Lambathach Tehsil ThunagDistt. Mandi (HP)								
14	Kishore Kumar S/o Bishan Singh R/o Lassi PO Chhatari Tehsil ThunagDistt. Mandi (HP)	Tapnali	1018/21	4-2-00	-do-	Slate	-do-	28.9.2010	27.3.2016
15	Narender Sharma , Managing Partner M/S Shankar Stone Crusher Udyog VPO & Sub-Tehsil BalichowkiDistt.Mandi (HP)	Balichow ki/611	898/2, 921/2 & 919/2	11-2-19	-do-	Stone	-do-	1.10.2011	-
16	Tehal Singh S/o Ved Ram R/o Bagiseri PO Hurla Tehsil & Distt.Kullu (HP)	Devdhar/ Rahi	1369/1086	4-14-5	-do-	Stone	-do-	18.01.2012	-

[Source: DFO Nachan office record]

3.4 Line of Export

3.4.1 Important Roads:

The Important roads in the tract are as under:-

(Table-10)

S.No	Particulars of Road	Total length in Km.	Length of the road within Divn. Nachan (Km)	Remarks
1	Mandi to Magru Gala	110	80	
2	Pandoh to Chailchowk	23	23	
3	Chailchowk to Jahal	22	22	
4	Kandha to Pandoh via Saroa	24	24	
5	LambaThach to DhamarThach	12	12	
6	Chailchowk to Movi Seri	6	6	
7	Chailchowk to Karsog	90	6	
8	Mandi to Khauli	108	20	
9	Bali Chowki to Sudhrani	18	18	
10	Bali Chowki to Panjain	18	18	
11	Bagsaid to LehGaloo via Shikauri	12	12	

[Source: DFO Nachan office record]

3.4.2 Roads under construction

A few roads concerning lines of export are under construction, the detail of which is given below:

(Table-11)

1	Sainj to Daran
2	Kandha- Bah -Batand
3	Burahta to Kathla
4	Bagsaid to Parwara
5	Katwandi-Tandi-Thunag
6	Link road ChailJanjehli road to village Bukhlwar
7	Segali to Burahta road
8	Pandoh –Patikari- Shilhibagi
9	Kau(Chhakidhar) to Dobha road
10	Sainj to Ropa
11	BhalothiSaryach
12	ThachadharNalotiKillanDawada
13	BagsaidRahidhar ,KathyaliDhanshyalShikarimata

[Source: DFO Nachan office record]

3.5 Past and Current Prices

(a) **Standing trees:** The price of trees (standing) for following years are as under:-
(Table-12)

Rate of standing Timber (In Rs) CUM				
Year	Deodar	Kail	Fir/Spruce	Chil
1995-96	5994	5002	1674	957
1996-97	6593	5502	1841	1053
1997-98	7252	6052	2025	1158
1998-99	10152	8170	2632	1737
1999-2000	10355	8497	2632	1390
2000-01	10562	9772	2816	1390
2001-02	3890	2640	720	480
2002-03	3950	2430	770	400
2003-04	3940	2190	740	380
2004-05	3940	2190	740	380
2005-06	4576	2833	880	568
2006-07	4146	2817	835	484
2007-08	4315	2388	677	431
2008-09	4315	2388	677	431
2009-10	5664	2944	836	626
2010-11	5903	3098	790	572
2011-12	5903	3098	1030	704
2012-13	5357	3096	1123	739

[Source: DFO Nachan office record]

(c) **Market price class wise:**

(Table-13)

Market Rate 2014-15

Dia in cm	Class	Deodar	Kail	Silver/Fir	Spruce	Chil
10-20	V	3096	2663	1683	1683	932

UTILISATION OF THE PRODUCE

20-30	IV	14287	10272	6170	6395	3167
30-40	111	38099	25489	17950	16828	11551
40-50	11A	82151	57066	40387	34216	24219
50-60	11B	139300	108425	72920	61702	39868
60-70	1A	198830	166252	107137	103210	57194
70-80	1B	257170	218753	141353	143597	75452
80-90	1C	315509	263264	175570	187349	94082
90 & above	1D & above	372658	296743	209786	228296	11178 0

[Source: Rates fixed by Pr.CCF.HOFF]

CHAPTER IV

ACTIVITIES OF THE FOREST DEVELOPMENT CORPORATION IN HARVESTING AND MARKETING OF FOREST PRODUCE

The commercial exploitation of the forests has been transferred to the Himachal Pradesh Forest Corporation Ltd. Since 1982, when the H.P Forest Produce (Regulation of trade) 1982 came into force and since then all commercial exploitation is being executed through the HPSFDC. The principal marketable products are timber, resin, firewood and charcoal.

4.1 Timber:

The detail of Deodar, Kail, Chil, Fir/Spruce trees removed by HPFDC since 1981-82 to 2014-15 is given below:

(Table-1)

Year	Deo	Kail	Chil	Fir/Spruce	Total
1981-82	1138.62	1162.03	139.4	4149.2	6589.31
1982-83	4699.35	4240.55	130.04	471.79	9541.34
1983-84	5082.85	777.16	3198.66	5685.79	11744.5
1984-85	56.48	15.11	255.5	5017.91	829.15
1985-86	266.19	300.95	1604.55	3822.5	5994.19
1986-87	573.93	399.29	4260.24	3364.34	8597.9
1987-88	460.07	175.74	2764.47	3475.34	6875.62
1988-89	-	25.9	237.73	184.02	447.65
1989-90	-	19.76	-	119.58	139.34
1990-91	23.9	814.56	2605.2	5583.07	9026.73
1991-92	30.8	2707.14	1075.92	9149.45	12963.3
1992-93	1724.05	5460.98	641.96	23280.1	31107.1
1993-94	517.995	843.1	604.45	25535.11	27500.7
1994-95	221.915	420.95	707.35	3506.35	4856.57
1995-96	528.97	562.86	483.64	6817.715	8393.19
1996-97	1.795	619.27	240.12	319.105	1181.29
1997-98	--	--	1082.73	--	1082.73
1998-99	143.075	310.9	1458.38	5383.77	7296.13
1999-2000	489.74	2146.94	1453.74	9494.055	13584.5
2000-01	--	73.63	801.17	1004.86	1879.66
2001-02	401.605	230.02	804.03	2056.51	3492.17
2002-03	269.49	1100.49	646.48	8715.275	10731.7
2003-04	--	--	1432.55	--	1432.55
2004-05	418.39	154.67	1359.41	1918.12	3850.59
2005-06	63.115	133.6	1202.23	4701.66	6100.61
2006-07	169.59	1690.08	1023.45	4023.195	6906.32
2007-08	53.455	116.95	642.72	341.49	1154.62

2008-09	121.95	177.55	3.61	1908.02	2204.13
2009-10	544.165	489.52	1669.56	2533.375	5238.62
2010-11	458.275	113.38	12.29	1067.625	1651.57
2011-12	107.465	135.21	1910.74	142.33	2295.75
2012-13	306.075	120.05	648.15	612.435	1686.71
2013-14	569.36	102.95	242.23	5427.98	6342.52
2014-15	0	15.4	1546.96	773.69	-
2015-16	0	0	0	2192.82	2192.82
2016-17	62.1325	6.32	580.485	32.545	681.4825
2017-18	432.28	111.51	638.71	2733.485	3915.98
2018-19	265.045	172.84	951.99	1093.641	2483.516
2019-20	15.71	23.49	998.02	2565.523	3638.743
2020-21	0	0	1404.67	377.175	1781.845
2021-22	0	73.68	51.88	1644.81	1770.37
2022-23	38.14	69.94	0	2422.606	2530.686

4.2 Resin

Resin is extracted from Chiltrees. From 1975 onwards, the tapping operations are done by the HP State Forest Corporation. Resin, after extraction from the various forests is transported to Resin and Turpentine Factories at Bilaspur and Nahan. Quantity of resin extracted yearwise is given below:

(Table-2)

Year	No. of Blazes	Resin Extracted In Quintals	Av. Per Section (Kg)	Average per Blaze(Kg)
2002-03	111402	4418.62	39.66	-----
2003-04	110877	4572.5	41.24	3.966
2004-05	112175	4885.52	43.55	4.124
2005-06	110521	4795.38	43.39	4.355
2006-07	111533	4870.86	43.67	4.339
2007-08	110553	4738.91	42.87	4.367
2008-09	99164	3882.18	39.15	4.287
2009-10	99164	3881.68	39.14	3.915
2010-11	87470	3476.12	39.74	3.974
2011-12	84448	3340.84	39.56	3.956
2012-13	85318	3196.34	35.46	3.746
2013-14	88503	3358.86	35.95	3.795
2014-15	85857	3135.48	36.52	3.652
2015-16	88932			
2016-17	88862			
2017-18	87496			
2018-19	85683			

2019-20	81260			
2020-21	85624			
2021-22	84214			
2022-23	84182			

Resin Tapping

Enumeration for resin blazes is carried out well in advance. During proceeding winter season and the number of resin blazes is calculated lot-wise. The lots are handed over to Forest Corporation in January every year. The average cost of extraction of resin per quintal has been worked out as under:

(Table-3)

1	Setting up of the crop @ 50 per section of yield fixed 40 quintal/sec	1873/-
2	Average yield per section	36.52/Qtl.(As per tapping season 2014)
3	Resin extraction rate per quintal on average yield including Mate commission	928/-
4	Cost of Tins per quintal	212/-
5	Carriage charges of resin per quintal from forest to road side depot for average lead of 7 K.M @ Rs.34/- per qtl./k.m	238/-

[Source: Rates are fixed by Pricing Committee of H.P. Govt]

CHAPTER V FIVE YEAR PLANS

5.1 GENERAL:

In the past the forests of the division have been managed for getting sustainable yield through various Working Plans. The silvicultural fellings were mainly aimed at making the forest uniform and the regeneration achieved through natural means. Till the early seventies, the emphasis was on planting commercially important species such as deodar, Kail, Chil, etc. The increasing demands of forest produce in the state especially that of timber and fuel wood resulted in focus on large scale plantations of commercially important species. Although the plantation programme started from Ist. Five year Plan but it gained momentum from IIIrd Plan onwards. The Plan wise management of forests and expenditure is as under:

5.2 First Five Year Plan (1951-56)

During Ist. five year plan Nachan Forest Division was not in existence. However, the tracts

under Nachan Forests Division now were managed under Dr. R.M. Gorrie's Plan (1937-38 to 1956-57). The forest tracts were exploited commercially to meet with the timber & Fuel wood requirements. Some of the work suggested like; roads, Buildings etc. were implemented.

5.3 Second Five year Plan (1956-61)

The forests of this tract were managed under Sh. R.V. Singh WP (1957-58 to 1976-77) during this period. The forests of the tract were grouped into seven Working Circle. Viz. (i) Regular Working Circle (ii) Chil of Working Circle (iii) Protection working Circle (iv) Plantation Working Circle (v) Plantation (OL) working Circle. During the first 8 years of the Working Plan period, proportionate area were not worked out. A lot of roads, paths were suggested under this plan and many of them constructed during this period. Number of forest buildings were also constructed & put to use by field staff. The figures of revenue and expenditure of this five year plan are not available with the divisional record.

5.4 Third Five year Plan (1961-66)

During this period working plan by Sh. R.V. Singh was in operation in the tract of this division. During the year 1961 Nachan Forest Division was established and it's the H.Q. was placed at Mandi. The administrative control of newly created Forest Division was placed under Bilaspur Forest Circle which was also a new creation. A lot of area was worked out and regenerated during this period, Shelterwood system for silvicultural management was adopted and Fuel working circle was manager under "coppice with standard. Number of roads, paths, Buildings was established during this period.

5.5 Fourth Five year Plan (1969-74)

During this period the working plan by Sh. R.V. Singh (1957-58 to 1976-77) was operative. The combined figures of revenue & expenditure are not available with the divisional record.

5.6 Fifth Five year Plan (1974-79)

During this period to working plan by Sh. R.V. Singh (1957-58 to 1976-77) was operative. The figures of revenue & expenditure during this IV Five Year Plan of Nachan Forest Division are tabulated in Table 5.6.

(Table No. 1)

Year	Revenue in (Rs.)	Expenditure in Rs.		Total
		Non –Plan	Plan	
1977-78	3970370	1806336	1124520	2931355
1978-79	4793450	2086900	5859960	2672860
1979-80	7985950	1562280	1509380	3071660
Total	16749770	5455516	8493860	8675875

* Source: Nachan Forest Division.

5.7 Sixth Five year Plan (1980-1985)

From the year 4/1977, the tract was managed under DC Thakur's plan (1977-78 to 1991-92). The plan period for 15 years ending with March 1992. The forests were managed under Deodar Kail, Chil, F/S, Oak, B.L. (OL), protection, plantation, Grazing (OL) & Wild life Working Circles. Forests were worked out under Punjab Shelter wood system & oak working circle was prescribed to be worked under coppice with standard system. Due to ban on green falling only salvage removals have been done. During this period. Launching of Social Forestry programme, the focus shifted towards raising fuel wood

fodder, small timber and grasses to meet with the growing domestic needs of the rural people. The revenue & expenditure During VI 5year Plan of Nachan Forest Division are tabulated under in table 5.7.

(Table No. 2)

Year	Revenue in (Rs.)	Expenditure in Rs.		Total
		Non –Plan	Plan	
1980-81	4529340	2023350	1704980	2728330
1981-82	3061290	2199220	2330480	4429700
1982-83	9129403	1957281	3738428	5695709
1983-84	1825001	2051054	3685894	5736949
1984-85	1532343	1382889	4694168	6077058
Total	20077377	9613794	16153950	24667746

* Source: Nachan Forest Division.

During the year 6/1984 the Hqr. of Nachan Forests was shifted to Gohar (Bassa) from Mandi Town.

5.8 Seventh Five Year Plan (1985-90)

As above the forests during this period were managed under D.C. Thakur's Working Plan

(1977-78 to 1991-92) . The Social Forestry works were in full swing. Main emphasis being on raising fuel, fodder small timber & grasses to meet with the increasing domestic need of rural people & communities. The revenue & expenditure during VII 5 year Plan of Nachan Forest Division are tabulated under in table 5.8.

(Table No. 3)

Year	Revenue in (Rs.)	Expenditure in Rs.		Total
		Non –Plan	Plan	
1985-86	3161320	1605563	5291165	6896729
1986-87	546442	1507304	6232289	7739594
1987-88	135631	2121347	6402685	8524033
1988-89	581336	1809736	7211283	9021020
1989-90	419831	2316901	7742488	10059389
Total	4844560	9360851	32879910	42240765

* Source: Nachan Forest Division.

5.9 Eighth Five year Plan (1992-97)

During this period the forests of Nachan Forest Division were managed under Smt. Archana Sharma & Sh. H.S. Dogra Working Plan (1992-93 to 2006-07). The management of forest were divided into 8 Working Circles viz Deodar Kail , Chil, F/S, Oak, protection, plantation , Grazing & Soil Conservation. The Joint Forest Management

approach also started in the division & due to ban on green felling the objective was afforesting degraded/denuded forests. JFMC's were constituted. The prescriptions of Working Plan could not be implemented and achieved because of ban on green felling only salvage trees were removed. Figure of revenue & expenditure during this 5 year plan are tabulated 5.9.

(Table No. 4)

Year	Revenue in (Rs.)	Expenditure in Rs.		Total
		Non –Plan	Plan	
1990-91	348159	2478173	8160060	10638233
1991-92	471846	2520725	9056505	11577230
1992-93	620519	3722169	4824759	8546928
1993-94	425555	3283141	8877669	12160810
1994-95	1839457	4024242	10162142	14186384
Total	3705536	16028450	41081135	57109585

* Source: Nachan Forest Division.

5.10 NinthFive year Plan (1997-2000)

The JFM activities continued in this period & due to ban on green felling objective was mainly to afforestate the degraded forests areas. Sanjhi Van yojna on the principle of JFPM was in operation. The figure of revenue& expenditure are tabulated table 5.10.

(Table No. 5)

Year	Revenue in (Rs.)	Expenditure in Rs.		Total
		Non –Plan	Plan	
1995-96	-	--	--	--
1996-97	-	--	--	--
1997-98	-	--	--	--
1998-99	-	--	--	--
1999-2000	2637679	10715570	893120	11608690
2000-01	-	--	--	--
2001-02	3922328	10016440	8996600	19013040
Total	3922328	10016440	8996600	19013040

* Source: Nachan Forest Division.

5.11 TehthFive year Plan(2002-07)

Beside, JFM programme&SVJ focus was again on raising plantation , soil conservation works and Entry point activities. CAT Plan of Kol Dam project & Compensatory afforestation in lieu of diverted forest area for non-forestry activities was carried out with the emphasis on soil water conservation. Due to ban on green felling only salvage tree could be removed & most of the prescription under Smt.

Archana Sharma & Sh. H.S. Dogra's Working Plan could not be implemented. The figure of revenue & expenditure are tabulated table 5.11.

(Table No. 6)

Year	Revenue in (Rs.)	Expenditure in Rs.		Total
		Non –Plan	Plan	
2002-03	-	--	--	--
2003-04	3256166	17874775	3401565	21276340
2004-05	1517540	19102500	2491170	21593670
2005-06	21780687	8875635	10053995	18929630
2006-07	1757267	21506630	23332615	44839245
Total	28311660	67359540	39279345	106638885

* Source: Nachan Forest Division.

5.12 Eleventh Five year Plan(2007-12)

The JFM programme & Sanjhi Van Yojna created mass awareness about Forestry. Jan-Jan Sanjeevan programme was launched & all house holders were provided a plant free of cost for planting on their pvt. Land/premises. Focus was again on raising plantation & medicinal plants. CAT Plan provisions of Kol Dam & Patkri HEP were implemented in the areas of Saraj Range & Largi HEP in Thachi Range of Nachan Forest Division. Compensatory afforestation was also carried out. The revenue & exp. Figure XI Five year Plan are tabulated as under .

(Table No. 6)

Year	Revenue in (Rs.)	Expenditure in Rs.		Total
		Non –Plan	Plan	
2007-08	2629947	33262163	536304	33798467
2008-09	3159937	32737663	6905605	39643268
2009-10	12065844	36179335	7963100	44142435
2010-11	4187189	44250582	5081594	49332176
2011-12	1663108	3128281	3644250	6772471
Total	23706025	149558024	24130853	173688817

* Source: Nachan Forest Division.

CHAPTER VI STAFF AND LABOUR SUPPLY

6.1 Staff position:

The detail of staff sanctioned for Nachan Division as on 03/2015 is as under:-
(Table No-1)

Sr.No.	Category	Saction strength	Existing strength	Variation
1.	D.F.O	1	1	--
2.	A.C.F	1	1	--
3.	Superintendent Gr.-II	1	1	--
4.	Sr.Assistant	3	2	(-)1
5.	Jr.Asstt./clerk	7	3	(-)4
6	Forest Ranger,	5	3	(-)2
7	Deputy Ranger	20	10	(-)10
8	Forest Guard	78	44	(-)34
9	Kanungo	1	--	(-)1
10	Peon/Khalasi	15	13	(-)2
11	Chowkidar.	9	8	(-)1
12	Mali	4	6	(+)2
13	Forest Worker	82	76	(-)6
14	Sweeper	1	--	(-)1
15	Driver	1	1	--
16	Dak runner	--	1	(+)1
17	Mule Man/Syces.	--	--	--

6.2 Executive Charges

The detail of territorial Ranges, Blocks and Beats are given in appendix.

6.3 Labour Supply

Adequate labour is available locally for all forestry and allied works such as construction of roads and buildings, carriage of timber, plantation works, soil works etc.

The prevailing rates in the area for the year 2011-12 are as under:

(Table No-2)

Sr.No.	Designation	Rate per day (w.e.f. 01-09-2012)
1	Beldar (Mazdoor) Casual Labourer	170
2	Cook	170
3	Mali	170
4	Chowkidar	170
5	Sweeper	170
6	Electrical Beldar	170
7	Store Attendant	170

8	Process Server	170
9	Whiter Washer	170
10	Peon	170
11	Unskilled Labourer	170
12	Quarryman	170
13	Jumper Man	170
14	Driller Man	170
15	Fire Watcher	170
16	Carpenter (Grade –IV)	182
17	Painter 2 nd Class	185
18	White Washer	185
19	Plumber Grade –II	212
20	Mason Grade – II	212
21	Painter Grade –II	212
22	Store Clerk	212
23	Store Keeper	212
24	Patwari	212
25	Data Entry Operator	212
26	Clerk	212
27	Carpenter 2 nd Class	225
28	Mason 2 nd Class	225
29	Painter 1 st Class	225
30	Distemper	225
31	Junior Draftsman (Tracers)	260
32	Mason 1 st Class	291
33	Carpenter Grade -1	291
34	Carpenter (1 st Class)	291
35	Computer Operator	319
36	Draftsman (Arch. Wing)	380

CHAPTER – VII

PAST SYSTEM OF MANAGEMENT

7.1 General History of the Forests

There is no reliable record about the history of these forests prior to 1880. However, it is unlikely that large scalefellings were carried out prior to this. In 1880, 10 years lease of all the Deodar forests was granted to the Mandi Forest Company. The lease bound the company to fell a minimum of 1500 Deodar tress per annum of 190 cm. to 240 cm. girth. Consequently, large scale felling was done during the period with the result that there was a depletion of stock of big trees.

Having felled most of the mature Deodar, there was little to fell for many years and fellings were confined to the sale of standing dead and malformed Deodar, and some Kail and Fir. However, between 1895-1910, heavy fellings were done in Chil and in some accessible Spruce forests, and as the method of sale was “HassabPasand”(contractor’s choice).

In 1917, regular forest settlement was done by HL Wright and the First Working Plan prepared by him for the period 1918-36, which was subsequently revised by RM Gorrie for the period 1937-56 which in turn was revised by RV Singh for the period 1957-58 to 19765-77.

7.2 Past Systems of Management and their Results

The past history of management of these forests can be divided into three periods i.e. 1880-90, 1891-1917 and 1918 to date.

7.2.1 Period 1880-1890

Forest exploitation was started in 1880, prior to which only a few of more accessible forest was worked by a company of Sikh traders. In 1880 a ten years lease of all Deodar forests were granted to Mr. Thelwal who transferred it to a commercial concern, called the Mandi Forest Company. The lease bound the company, under the pain of having the contract cancelled, to fell a minimum of 1500 mature threes per annum. The price fixed was Rs. 5/- per tree of 6 to 8 feet girth and Rs. 2/- per foot girth of trees over 8 feet in girth. The leases were made responsible for preservation and conservation of the forests. One of the conditions was that “The said lessee will reserve 10% of the seed bearing threes in each forest in which felling operations are being carried out at such places as he shall consider suitable to act as parent trees and also will plant and conserve not less than 10 deodar plants of every deodar tree felled. “Consequently, more number of trees than the minimum prescribed wereremoved. The State had been a great sufferer because of these over-fellings, which having disposed off practically the whole stock of matured Deodar in ten years, had to forego the revenue which it would have obtained, if the fellings has been so adjusted as to give sustained yield.

Mr. Maynard, counselor to the Raja of Mandi State, prepared a forest Jamabandi for the whole State in 1889 giving the rights which the residents of the villages could enjoy in a particular forest. The first demarcation of the forest was also done simultaneously and two classes of forests viz. Siyan or demarcated forest and bartan or undemarcated forests were created.

7.2.2 Period of 1891-1917

After the expiry of the Mandi Forest Company's lease in 1890, the State had little Deodar trees to fell for many years. Only half dead and rotten or malformed Deodar trees were sold to the local contractors who cleared the forest of Deodar pieces left unconverted by the Mandi Forest Company along with the felling of some Kail trees. Between about 1895 and 1910, fellings were largely confined to Spruce and Chil and to a lesser extent, to Fir. Heavy fellings were made in many Spruce forests and nearly everything fit for timber was removed from Chil forests, which were of a poor quality.

In all the contracted, the trees were sold before they were actually marked. The method sale was *hassabpasand* that is, the contractors used to select trees according to their choice and the forest officials merely put hammer marks on them. The contractor could obtain as many more trees as they pleased from the same forest at the same price. The results was that all the best trees were felled and only inferior trees were left in the forests.

The first regular forest settlement was done in 1917 by Mr. Wright and two categories of forest viz. demarcated forests and undemarcated forests created. Generally speaking, the following types of area were made into demarcated forests.

- (i) All coniferous areas capable of yielding appreciable revenue. Areas containing young crops at that time, but which would have eventually become valuable, were also demarcated.
- (ii) Forests required to be preserved for supply of timber for State buildings and Mandi depot and for the supply of firewood and charcoal to Mandi town.
- (iii) Sivan forests which have been reserved for regeneration as shooting preserves.
- (iv) Forests, which though not of much value from the revenue point of view, were required to be conserved for amenities and other purposes.

Large areas of Ban Oak and other broad leaved species in the lower hills and of Spruce and Silver Fir in the higher hills, which were not considered to be of much economic value at that time, were left as undemarcated forests. Small patches of Deodar, Kail and Chil forests heavily burdened with rights, were also left as undemarcated forests. A detailed record of defining the rights which the villagers could enjoy in a particular forest, was prepared. The Mandi Forest Regulation No. 1 (Sambat 1975) was promulgated and made applicable to the whole of Mandi State from the first day of Chet, Sambat 1975 (corresponding roughly to April, 1918). This regulation prohibited breaking of land for cultivation, except with the permission of the *darbar*, setting fire to trees, brushwood and shrubs, cutting of stumps for torchwood from the standing trees, felling or lopping of trees, selling of trees leaving dead leaves on surface soil, grazing cattle or cutting grass from the demarcated forests during the closed season, removing or damaging of any forest boundary pillar and removal, burning or defacing any mark placed by Forest officials on any tree. It embodied detailed rules on different forestry matters. These rules, along with definite provisions laid down in the forest settlement report afforded ample protection to these forests.

7.2.3 Wright's Plan (1918-1936)

The first regular Working Plan for the management of forests was prepared by Mr. HL Wright, IFS, who was on deputation from Punjab in 1918, for a period of 20 years. This Working Plan marked the beginning of scientific forest management in this tract. The forests, for the first time, came to be worked under a definite system. However, this was a simple working plan as the staff at that time was not adequate and properly trained to execute the prescriptions of an elaborate working plan. Though Wright felt that a system of concentrated regeneration was the most suitable for the coniferous forest, it was considered unworkable with the staff. His prescriptions were an attempt to reconcile scientific forestry with Mandi conditions. It was indicated that the Plan should be completely revised.

With this background, the main objects of proposals made were to carry on until such time as the conditions in Mandi were favourable for the introduction of more intensive methods of management under skilled supervision, and meanwhile, it was necessary to obtain for the State as much revenue as possible and at the same time, to provide for the maintenance of a continued and undiminished supply of timber not only for export but also for local needs. To fulfill these objects of management, six Working Circles were constituted as under:-

- (i) The Deodar Working Circle.
- (ii) The Thinning Working Circle.
- (iii) The Spruce Working Circle.
- (iv) The Chil Working Circle.
- (v) The Fuel Working Circle.
- (vi) The Unregulated Working Circle.

7.2.3.1 The Deodar Working Circle

It is comprised of all the forests having an appreciable number of mature Deodar trees and also other forests containing an appreciable number of mature Deodar trees among which, Deodar although represented, was not the predominant species. The objects of management in this Working Circle were (i) to remove Deodar trees in such a quantity that sustained yield of Deodar is maintained; (ii) to obtain regeneration of this species wherever necessary; and (iii) to increase the proportion of Deodar by removing trees of other species.

Total enumeration of Deodar and Kail down to 18" girth was carried out. The forests allotted to this working Circle were prescribed to be managed under a system of selection fellings. Early heavy selection fellings of Deodar, Kail and Spruce were prescribed to be done in each forest once during the period of the plan. The exploitable girth of Deodar was fixed at 7 ½ ft. and 90 % of 1st class and 25% of II class were prescribed for felling. In case of Kail, all the I and II class trees were prescribed to be felled. Along with main fellings, thinning were prescribed. Deodar areas were expected to regenerate with light grazing prevalent there. However, areas requiring effective closure were prescribed to be fenced.

Results of Working

Wright's Plan was well suited for the conditions prevailing at that time, but serious fires of 1921 necessitated some deviation from the Working Plan prescriptions. The period of the Plan was, therefore, reduced to 19 years in order to compensate the serious damage done to the growing stock. The fellings of Deodar were done more than prescribed. The over fellings was of an order of 7% Cleanings were carried out in accordance with Working Plan prescriptions, which greatly benefited the crop.

7.2.3.2 The Thinning Working Circle

All forests containing immature crop in which Deodar or Kail was the predominant species, were allotted to this Working Circle. The whole area of the Working Circle was prescribed to be gone over the thinning in 10 years. As these forests were not subjected to any regular treatment before the thinning were to be done even when they were not expected to produce any revenue, no cleanings were prescribed.

Results of Working

Thinnings were chiefly carried out in areas which could yield timber to justify extraction. Some forests were thus thinned fairly heavily while other were left because they could not yield any sawn timber. As no cleanings were prescribed many of the young crops suffered from congestion and over shadowing by inferior species.

7.2.3.3 The Spruce Working Circle

This Working Circle comprised of all Spruce and Fir forests including the sub-alpine Kharsu and broad-leaved mixture. No enumerations were carried out. One selection felling followed by complete rest for the remaining period of the Plan was prescribed.

Results of Working

It was also prescribed that if, for silviculture reasons, the number of Spruce and Fir trees prescribed for any year in the Deodar, Working Circle were not available, the balance could be made up by felling from this Working Circle. The prescribed yield remained somewhat in arrears on account of less demand offer in the market. The prescriptions on the whole, however, benefited the crop.

7.2.3.4 The Chil Working Circle

All pure Chil forests were allotted to this Working Circle. The object of the management was to afford protection to these forests until the conditions were favourable for a system of concentrated regeneration fellings. Accordingly, complete protection was provided to these forests, markings being confined only to meet the demands of local people and that of State requirements. The forests allotted to this Working Circle were not enumerated.

Results of Working

The Chil forests were benefited greatly from the rest given to them.

7.2.3.5 The Fuel Working Circle

It comprised of Oak and hardwood forests prescribed to be worked to supply firewood and charcoal to Mandi town. All the trees were to be worked out under coppice with standards. 20 beat grown trees per were to be retained as standards.

Results of Working

The charcoal areas were fully worked out; firewood fellings remained in areas because the demand for firewood was met from the unregulated fellings done by the villagers in the undemarcated forests around Mandi town.

7.2.3.6 The Unregulated Working Circle

The demarcated protected forests not allotted to any of the working circles were allotted to this working circle. The forests were to be worked to meet the local requirements only.

Results of Working

The protection afforded greatly benefited the forests.

7.2.4 Gorrie's Plan (1937-38 to 1956-57)

Dr. R.M. Gorrie revised Wright's Working Plan. The forests were broadly classified in the following category:-

- (i) Commercially valuable forests in which grazing is not very heavy i.e. large blocks of Deodar and Chil and mixed conifers with Deodar as the predominant species.
- (ii) Commercially valuable forests in which grazing and other local needs are fairly heavy and deserve serious consideration i.e. smaller coniferous forests adjoining villages where exercise of local rights does not permit free commercial working and large Deodar areas in which regeneration does not come in because of adverse climate and biotic factors.
- (iii) Forests of no great commercial value, but which if preserved will meet the local requirements for timber, fuel and other scrub species adjoining villages, some poor quality Chil forests and forests of thorn scrub and ruta lands.

In view of the above broad classification of forests and to attain the objects of management, the following Working Circles were constituted:-

- (i) The Concentrated Regeneration Working Circle.
- (ii) The Selection Working Circle.
- (iii) The Chil Working Circle.
- (iv) The Fuel Working Circle.
- (v) The protection Working Circle.

7.2.4.1 The Concentrated Regeneration Working Circle

All better stocked Deodar forests suitable for the introduction of shelter wood working were allotted to this Working Circle. The forests were prescribed to be managed under the shelterwood system but strict uniformity was not to be aimed at and the main object of introducing shelterwood working in these forests was to secure Deodar regeneration. The exploitable diameter was fixed as 24" d.b.h. A rotation of 140 years was adopted to fit in the 20 years felling cycle corresponding to the period

of the Working Plan. Three periodic blocks viz: PB I, PB II and un-allotted were formed and 1/7th area was allotted to each of PB I and PB II and the remaining 5/7th area was allotted to PB I included (i) areas destroyed by the 1921 fires, and (ii) areas in which valued regeneration was sufficiently established to justify removal of the scattered and generally branchy over wood, PB II was allotted only tentatively and consisted of well stocked areas of Deodar with maximum number of maturing trees. The remaining forests were allotted to PB unallotted.

Results of Working

It was proposed to allot to PB I either areas destroyed by 1921 fires or the areas in which natural regeneration was already established to justify removal of scattered and branchy over wood. No seeding or secondary fellings were proposed in such areas because of already established regeneration. Closure of PB I as prescribed in the Working Plan was nowhere done. With the result sufficient natural regeneration did not come in the open areas. No provision to supplement natural regeneration by artificial planting in case the former failed to fill the area in the first few years after felling, was made. No restriction was placed on the prescribed yield, or if the regeneration did not keep the pace with fellings.

7.2.4.2 The Selection Working Circle

The forest carrying an appreciable proportion of Deodar, but not allotted to the Concentrated Regeneration Working Circle thus included areas (i) carrying open and rather slow growing Deodar in hot southern slopes generally with shallow soil, (ii) small forests of good quality Deodar so heavily burdened with rights as to make any seeding felling un-desirable, (iii) extensive areas of Kail which were worthless because of rot, but in which Deodar had already established or could be brought in artificially, (iv) Ban Oak areas with fairly high percentage of Kail or Deodar, (v) Spruce and Silver Fir forests in which occasional Deodar occurs, and (vi) parts of upper Chil belts which contain a useful percentage of Deodar in mixture with Chil. The main object of management was to increase the percentage of Deodar by judicious removal of competing species from around scattered Deodar and with an intelligent use of closures over fairly long periods. These areas were prescribed to be managed under selection system. A felling cycle of 20 years with rotation of 180 years was fixed.

Results of Working

The forests allotted to this Working Circle were heavily burdened with rights. As a result of heavy grazing and no measures taken to induce regeneration, the regeneration was everywhere wanting. No regular thinning and improvement fellings were carried out in Kail crops, which suffered from congestion. Cultural works were to be carried out. As a result, young Deodar struggling to establish suffered badly.

7.2.4.3 The Chil Working Circle

The working Circle comprised of all the Chil forests in Beas catchment. The forests were prescribed to be managed under shelterwood system with more rapid removal of overwood than prescribed of Deodar was prescribed. A felling cycle of twenty years was suggested and all areas were prescribed to be gone over once during the Working

Plan period. The yield fixed was on the basis of area, as the growing stock was not enumerated. Frequent cleanings and thinning were prescribed in dense young sapling crops of chil to make them fire resistant and to have proper spacing of the individual stems. No regular programme of sowing was prescribed.

Results of Working

The allotment of Delikar and Runjh forests to Chil Working Circle was not justified as these areas carried mainly Ban Oak or miscellaneous broad leaved species with only scattered Chil trees. Though these areas were allotted to Chil Working Circle but were prescribed to be worked for firewood and charcoal supply which was rather confusing. No periodic blocks were formed and in all the areas thinning and improvement fellings were done and no areas were regenerated. Further, hardly any regeneration came in any of these areas because of heavy grazing. Felling cycle of 20 years prescribed for these areas was long and some areas were not thinned even once in 20 years period of the Working Plan. As such, the pole crop in such areas definitely suffered for want of timely thinning.

7.2.4.4 The Fuel Working Circle

This Working Circle comprised of scrub forest carrying a wide variety of the species and some pure Ban Oak areas lying within 8 miles radius of Mandi town. No schedule of the areas to be felled annually was prepared due to uncertainty of the firewood and charcoal requirements. Ordinary light selection markings, removing the majority of the mature trees of all the species and thinning the younger growth were prescribed in the scrub forests.

Results of Working

The forests were worked purely according to the convenience, with the result that the more accessible areas were worked very heavily. The mature and overmature trees removed in selection fellings did not coppice and the growing stock was thus impoverished as no young regeneration came because of heavy grazing, browsing and lopping.

7.2.4.5 The Protection Working Circle

This Working Circle comprised of demarcated protected Fir forests, demarcated protected Ban Oak and miscellaneous scrub forest. The exploitable diameter was fixed as 60cm but this was not to be strictly enforced when overwood was being removed from established regeneration. As Fir forests were of very low commercial value, approximate number of trees of 60 cm and over was given as an indication of what can be taken out from each of the main blocks of Fir in the year when neighboring Deodar forests were worked departmentally. For protection of Ban Oak and scrub forests rotation closure of 1/3rd of each forest for 10 years to all sorts of grazing and a 3 years lopping rotation were prescribed.

Results of Working

The forests allotted to this Working Circle were prescribed for working in normal way and thus the name of the working Circle was a misnomer, Forests with better terrain

and approach were worked heavily while some forests in the remote valleys and occupying difficult terrain were left unworked. Rotational grazing and rotational closure were not adopted and there was no prescription for obtaining the regeneration after felling. All these forests were very much over-grazed and consequently, deteriorated.

7.2.4.6 Works of Improvement Undertaken

(a) Roads

In view of the scarcity of good bridle paths and roads, the construction of motor roads, bridle paths and inspection paths was prescribed. The list of the paths to be constructed was given and these projects were included in the three years works programme to be prepared by the Range Officers. However, all the paths prescribed in plan were not constructed.

(b) Buildings

No extensive building programme was suggested as most of the staff was comfortably housed. However, construction of two forest guard huts and six inspection huts was suggested. During the plan period only one inspection hut was constructed at Devidhar.

(C) Forests Industries

It was suggested that Semal trees (*Bombaxceiba*) growing in demarcated protected forests and undemarcated forests should be prescribed for export to feed match wood industry. This suggestion was not implemented. To utilize Ban Oak, it was suggested that its charcoal may be used for smelting the iron ore found in the tract. Since the suggestion was not implemented, Ban Oak areas remained unworked.

7.2.5 R.V. Singh's Plan (1957-58 to 1976-77)

Gorrie's Working Plan was revised By Dr. RV Singh, IFS. Dr. RV Singh's plan includes all the demarcated forests in Gorrie's plan and many of the undemarcated protected forests of commercial importance. These undemarcated protected forests were brought under management for the first time. Based on their composition the forests were grouped into the following seven Working Circles.

- (i) The Regular Working Circle
- (ii) The Chil Working Circle.
- (iii) The Selection Working Circle.
- (iv) The Spruce Working Circle.
- (v) The Fuel Working Circle.
- (vi) The Protection Working Circle.
- (vii) The Plantation Working Circle.

7.2.5.1 The regular Working Circle (7420.32 ha)

This circle is comprised of forests where Deodar and Kail were predominant species and were situated on relatively gentle slopes. Concentrated regeneration felling system was adopted. Rotation age of 120 years was fixed and forests were divided

into 4 periodic blocks. Definite allotments were made only for PB I and PB II (only for plan period). Remaining forests were lumped together as PB Unallotted including undemarcated protected forests. The annual yield for PB I was calculated by two formulae and the conservation one was prescribed. Since no commercial fellings were prescribed in the forests of PB –II hence no yield was prescribed. The yield from PB – Unallotted was calculated by Smythie's safe guarding formula for the trees II B and above.

The yield from different periodic blocks was to be controlled separately. Transfer of yield of Fir and Spruce and vice versa was allowed: the yield prescribed was too conservative.

Result of Working

PB I.

Area allotted to this periodic block is not proportionate. The seeding felling done in the past was too conservative to induce regeneration. As per suggestion of Working Plan, no corrective marking was done. All these factors retarded progress of regeneration. However, where the areas were either blank or open to the desired extent, regeneration has come up very well.

PB II.

The forests allotted to this block, barring a few exceptions, are not true PB II areas. Due to a blanket ban imposed from 1974 on removals from this periodic block, some forests have suffered congestion and stagnation with resultant loss of growth.

PB Unallotted.

The stands that carried the youngest stock were allotted to this periodic block and were to be gone over in thinning and improvement felling. Due to the ban on marking in forests allotted to PB II the pressure of right-holders demand for timber had to be borne by these forests, as a result of which some of these forests near habitations suffered.

7.2.5.2 The Chil Working Circle.

This Working Circle comprised of all demarcated and the then undemarcated protected forests. Total enumeration of DPF and important Chil bearing UPFs were carried out in 10 cm diameter classes down to 20 cm d.b.h. The rotation was fixed at 120 years with floating periodic blocks. The area divided into three quartiers viz. Q. Bleu, Q. Jaune and Q. Blanc. Q. Q. Bleu is further divided in Type A: most mature Chil trees to be regenerated through seeding felling; Type B Chil area poorly stocked; Type –C forest having Chil in pockets and the remaining area under Ban or miscellaneous broad leaved species which were to be replaced by Chil sowing. Q. Jaune: The forests with preponderance of maturing Chil trees were allotted to Q. Jaune. The forests were to be gone over in thinning to increase their average crop diameter, so that in course of time it can be allotted to Q. Blanc: the young Chil stands of demarcated protected forests of this working were allotted to quartiers. The yield removed was to be constituted by final yield from Q. bleu and yield of mature and over mature trees from Q. Blanc. The yield was calculated with Smythie's safe guarding formula and conservative ore.

Result of Working

(i) Q. Bleu

Almost all the areas have been successfully regenerated in spite of the fact that marking had been too conservative.

(ii) Q. Jaune

Some of the forests allotted to this block were large and thus carry growing stock of heterogeneous ages in different parts. Therefore, in the absence of sub-division in compartments and sub-compartments of reasonable size, it was not possible to make a realistic allotment.

The removal from the Q> Bleu was very much in deficit while there is excess removal in Q. Blanc.

7.2.5.3 Selection Working Circle

To this Working Circle were allotted commercially exploitable demarcated and undemarcated protected forests of Spruce and Silver Fir. A few Deodar and Kail forests situated on steep and difficult terrain were also allotted. The exploitable size was fixed at 60 cm d.b.h. for all coniferous species. The yield was calculated by Smythie's safe guarding formula. All trees of 50cmd.b.h. and over felled for whatever purpose computed towards the yield.

Result of Working

During the first 8 years of the Working Plan period, proportionate areas were not worked out. The forests in arrears were to be worked out in the remaining period of the Working Plan. The yield prescribed, though on the face of it was conservative being based only on the then existing surplus of mature trees of various species, yet the Working Plan failed to give allowance for the trees that stood in blanks, on precipitous stands, along enter boundaries of the forests and were, therefore, not available for felling. This, along with conservative markings, explains the deficit in case of Fir and Spruce.

7.2.5.4 The Spruce Working Circle

The circle was constituted by pure or predominately Spruce forests situated on comparatively easy ground. The forests were to be worked under the Punjab Shelter wood system with floating periodic block. Thus, concentrated regeneration felling had to be done and natural regeneration to be supplementary with artificial planting wherever necessary. The yield from Q. Bleu was based on volume of trees over 50 cm d.b.h. and was calculated by two formulae and the one based on silvicultural availability. No commercial felling were envisaged in Q. Janue and, was calculated by Smythie's safe guarding formula based on the removal of mature and over mature trees (60 d.b.h. and over).

All green trees 40 cm d.b.h. in Q. Blanc and Q. Jaune and over 50 cm d.b.h. in Q. Blanc, felled for any purpose including bartan marking were counted towards yield.

Result of Working

The fellings in this Circle have also been quite conservative, with the result that regeneration has not come up except at a few open patches. The forests, specially those allotted to Q.Blanc were vary will thinned, which has improved the stand.

The fellings like these of the Selection Working Circle have been somewhat deficit. The deficit is due to conservative marking. The system of floating PBs is also hardly suitable for these forests.

7.2.5.5 The Fuel Working Circle

Easily accessible Ban forests were allotted to this Working Circle. The forests contain mainly Ban with its usual associates Rhododendron arboretum, Lyoniaovalifolia, Myricanagi, and Quercusglauca. The coppice with standard system was adopted with rotation of 30 years for coppice and 90 years for standard. It is seen that due to old age of the stool there is not much coppice regeneration. But seedling regeneration has come up. It is not proper to replace Ban Oak with Chil or Deodar.

7.2.5.6 The Protection Working Circle

The forests (demarcated as well as undemarcated protected forests) having Oak and other miscellaneous broad leaved species were allotted to this Working Circle.

No felling other than occasional or for bartandars was allotted and thus no yield was prescribed. Lopping was enforced according to lopping rules.

7.2.5.7The Plantation Working Circle

Areas of DPF and UPF suitable for raising plantation were allotted to this Working Circle. The areas are partially overlapped with all other working circles.

The object was to raise plantation of suitable species of economic importance and to rehabilitate degraded and denuded hills.

7.2.5.8 Works of improvement Undertaken.

Roads, Bridle Paths and Inspection Paths.

A lot of roads and paths were suggested under this plan and many of them constructed also. A number of buildings as listed in the Working Plan were constructed and put to use by the field staff.

7.2.6 D.C .Thakur's Plan (1977-78 to 1991-92)

The Plan now under revision was compiled by Mr. DC Thakur, IFS and came into operation in April, 1977. It covered a period of 15 years, ending with March, 1992. The prescription of the draft plan was followed with effect from 1984.

The following Working Circles were created, depending upon the composition of the crop and topography of the area.

- 1 The Deodar and Kail Working Circle.
- 2 The Chil Working Circle.
- 3 The Fir and Spruce Working Circle.
- 4 The Oak Working Circle.

- 5 The Broad-leaved (Overlapping) Working Circle.
- 6 The Protection Working Circle.
- 7 The Plantation Working Circle.
- 8 The Grazing (Overlapping) Working Circle.
- 9 Wild Life and its Management.

7.2.6.1 Deodar and Kail Working Circle

The Working Circle includes all areas where Deodar and Kail, either pure or mixed and found fit for being worked under the Punjab Shelterwood System. Some forests of the Fir/Spruce Working Circle on easier slopes with a fair proportion of Deodar, Kail were also allotted to this Working Circle. The Working Circle covered an area of 8171.70 ha. Total enumeration was carried out in DPFs and UPFs in 10 cm diameter classes down to 10 cm d.b.h. The Forests of this Working Circle were envisaged to be worked under the Indian Irregular Shelterwood system. The rotation was 120 years with four periodic blocks. The regeneration period was prescribed 30 years and the felling cycle was 15 years.

Allotment of the crop into different PB's was on the age of the crop and status of the reproduction. Area allotment to different PB's was following:

PB I	PB II	PB III	PB IV	Total
1789.35	2029.29	2443.16	1909.96	8171.70

PB I.

The forests with preponderance of mature age classes which includes un-felled PB I areas and some of PB I areas of RV Singh's plan which have not been fully regenerated. These are categorized as A and B type respectively.

The A and B types of areas of the PB I were conceived and been correctly done. The total area of PB I under type A was 1323.22 hectares. Seedling felling was done over an area of 222.27 ha. till the date. The felling has been stopped due to the blanket ban on green felling by the HP Government. Also, the excessive removals of the trees in TD and salvage fellings were the compulsion for this blanket ban. An area of 195.5 ha. has been fully regenerated and these forests were allotted to PB IV in the plan under revision. Final felling was duly done over 70.5 ha.

The annual yield of PB I was calculated by three formula and the conservative one was adopted. Total growing stock was taken into account while calculating the yield. All removal counted towards the yield increment was ignored as a safety factor against fire and natural calamity and to serve as an emergency reserve. The yield expected from.

PB I was	9300 m ³
PB II	Nil
PB III	2300,,
PB IV	1000,,

The yield from different PBs was to be controlled separately. The yield is calculated for all species jointly. The prescribed yield was 0.8% of the total growing stock of the Working Circle. The control of yield for a period of five years and plan period was to be 10% of the prescribed annual yield. The deviation in respect of a single year will not be more than 20% of the prescribed annual yield. Removal was to depend on the pace of regeneration. In case regeneration was not keeping pace with felling, then further felling could be stopped till the state of regeneration improved.

Result of Working

PB I

An area of 1323.22 ha. out of 1789.35 ha. and 194.27 ha. out of 1909.96 ha. was prescribed for felling in PB land PB IV respectively and required to be felled during the plan period. Except Malari, Chunji Chaliar, Karthach and Daru Deo. No PB I marking was carried out since 1987-88 onwards; even corrective marking suggested in the plan under revision was not done, with the result, the regeneration is patchy in these DPFs. Chulinal, Poinal and Barmax PB I areas were felled under Singh's plan. The regeneration is almost blank, partly due to rank growth of bushes and partly poor protective measures.

The felling programme was formulated according to the annual yield worked out of periodic blocks. The ban was imposed on marking green trees as the regeneration was not keeping pace with felling. Compensatory planting also could not be done in the area due to excess removal of trees under salvage felling and hassabpansand (TD marking). The result was patchy regeneration, invasion of the blanks (blanks due to TD marking and salvage marking) by inferior spp. or weeds, poor composition of crop, poor stocking and loss of uniformity in the crop.

PB II

The area allotted to the periodic blocks was to be maintained in order to build up except maximum stockings to prepare to get entry into PB I and suggested that no felling except salvage was to be carried out. But the deviations statement, the control forms and cash book reveal that trees were marked to the right holders with the result that stocking is poor, potential mother trees are less and the area gives a look of PB III areas.

PB III

The yield from PB III was to be in the form of thinning and improvement felling. The prescribed yield for this PB was 2300 m³. 50% demand of the right holders was to be met from these PBs but in reality, only a small portion was marked in TD. The blank was being marked to the HPSEB for electrical poles.

PB IV

All I and II class trees were to be marked and removed during the plan period. But none of the areas had been marked for felling. Although the TD marking was continued, yet the deviation is negative. The total yield prescribed from this PB was 1000 m³ annually.

The yield position on 31-03-1993 is as follows:

(Table No-1)

Periodic Block	Yield Position (31-03-1993)
PB I	-38592.73 m3
PB II	+20419.54 m3
PB III	+34975.997 m3
PB IV	-787.394 m3

From the above table, one thing that is clear, that we quarreled with our forests instead of managing it on scientific principles, our aim became to fulfill the exaggerated demands of the right holders. Where removal was needed, there we were conservative. Where it was not required, there we were quite liberal. During the plan period silviculture of the species is not kept in view. It is subordinated over the right holders demands. Due to the suspension of felling programme, regeneration through planting and sowing and weeding and cleaning operation has to be suspended.

7.2.6.2 The Chil Working Circle

All the pure Chil forests or the established Chil plantations were allotted to this Working Circle to be worked under the Punjab Shelter Wood system. The total area of the Working Circle was 6653.7 ha. The forests were divided into compartments and sub-compartments not more than 40 ha. in extent. The stock maps were prepared for all the demarcated protected forests. On the whole, the crop was young to middle aged classes; the maturing or over mature trees were somewhat deficient total enumerations of all conifers and broad leaved species were carried out in 10 cm dia., classes down to 10 cm d.b.h. Forests of this Working Circle were divided into 4 periodic blocks. The area of different PBs is the following:

(Table No-2)

Periodic Block	Type	Area (Ha)	Total of all PB
PB I	A	718.39	
	B	656.85	
PB II		1636.87	6653.07 Ha.
PB III		1871.72	
PB IV		1969.24	

The regeneration period of 25 years was adopted for rotation. The felling cycle was 15 years. The following areas were allotted to PB I.

PB I

The forests with preponderance of mature classes were allotted to this type.

The yield calculation:

Removal of any kind in the Working Circle was counted towards the yield. The annual yield from PB I was calculated as 1000 m³. No commercial felling was prescribed in PB II and III. The yield from PB IV was calculated as 270 m³ annually.

The deviation for a period of five years and plan period was not to exceed 10% of the annual yield. Removal would depend on the progress of regeneration.

Result of Past Management

Out of total area of 6653.07 ha. allotted to this Working Circle 913.69 ha. were prescribed for felling during the plan period, and accordingly, the annual felling programme was drawn. The actual area so far felled in the first 13 years of the 10/94 was 171.01 ha. only. The felling in PB I was suspended as the regeneration was not keeping pace with felling due to conservative marking. The salvage removal and TD marking to the right holder had been more than the prescribed yield. No commercial planting was done in lieu of salvage removal.

Although no commercial felling was prescribed in PB II and PB III, yet the removal in the form of TD marking to the right holders and salvage marking were there. As such, some of the PB II and PB III areas are not fit to be retained as PB II or PB III. The stocking of these forests are below normal.

The position of the yield as it stood on 31-03-1993 is as under:-

(Table No-3)

Periodic Block	Yield Position
PB I	-2800.890 m ³
PB II	+12139.575 m ³
PB III	+10394.869 m ³
PB IV	+1148.109 m ³

From the above table it reveals that in spite of suspension of felling, over –all position of yield is +20882.553 m³ on 31-03-1993. It shows a professional bank reply of the department who failed to convince of the Government regarding the sound silvicultural practices of the forestry by which our forestry by which our forest wealth can be manipulated.

7.2.6.3 The Fir and Spruce Working Circle

All pure or mixture of Fir and Spruce forests situated on comparatively easier slopes were allotted to this Working Circle, which can be worked under the Indian Irregular Shelter Wood system.

The over wood consist of Spruce with scattered trees of Fir, Deodar and Kail trees occurring on the ridges and spurs and broad leaved trees like Walnut, Maple, Cirdcherry and Horse Chestnut are found in nallas. For intensive management, forests were allotted into smaller compartments of 40 Hs. All compartments and sub-compartments have been stock on 1:15000 (or 4" = 1 mile) scale. Total enumerations were carried out in demarcated protected forests. All conifers and broad

leaved species were enumerated in 10 cm dia. Classes down to 10 cm. The summary of the growing stock in different PBs are as under:-

(Table No-4)

PB	Type	Area in ha	Total Volume in cm ³	Total Volume per
PB I	A	1166.21	4,37,221.11	350.74
	B	289.88	289.88	
PB II		2626.03	7,73,761.21	294.36
PB III		2810.41	4,04,785.09	286.36
PB IV		1630.28	3,60,649.82	221.85
Total		8532.81	24,53,462.24	1153.31

The Indian Irregular Shelter Wood System has been followed. The rotation age was fixed at 120 years and regeneration period of 30 years. Thus the area was allotted into 4 periodic blocks.

The basis of allotment of area into different PBs were

PB I

Forests containing predominantly mature crop were classified as type “A” and areas felled during the previous plan but deficient in regeneration were classified as type “B”.

PB II

Forests in which trees are approaching towards maturity were allotted to PB II.

PB III

Forests containing middle aged to mature were allotted to these PBs.

PB IV

Forest area carrying mostly young crop of sapling of pole stage with a few scattered mature trees were allotted to this PB.

Yield

The yield has been calculated by volume for PB I type A. It is 8000 m³ for commercial felling series and 1600 m³ for packing cases felling series. No separate yield for PB II, III and IV has been calculated as the forests were very open and under stocked, and no silvicultural removal was needed. Trees marked in TD and salvage felling or any other purposes was accumulated towards the total yield of the Circle. The deviation for a year and a siab of 5 years was not to exceeded 10% of the prescribed yield.

No commercial felling was to be done in the absence of 4 1/2 year and 2 1/2 year old nursery stock of Fir and Spruce respectively.

Felling Series

There were two felling series viz. commercial and packing cases felling series.

Result of Working

An area of 1166.21 ha. out of 8,532.81 ha. allotted to PB I "A" was prescribed for felling during the plan period. Seedling fellings were carried out only in Bagra 40 ha. and Jufarkot 21.76 ha. The regeneration was not keeping pace with felling for want of adequate plantation nursery stock. So further felling of PB I was stopped. A few areas felled in the past require corrective marking. The yield position on 31.3.1993 is as under:-

(Table No-5)

Periodic Block	Yield Position
PB I	-42619.300 m ³
PB II	+12484.815 m ³
PB III	+5099.750 m ³
PB IV	+6445.270 m ³

All the removals in PB II, III and IV are due to salvage and TD marking.

7.2.6.4 Oak Working Circle

This Working Circle included area carrying predominantly Ban Oak forests that could be worked for supply of firewood and charcoal to Mandi, Gohar, Baggi and Pandoh towns. An area of 2796.71 ha. was allotted to this Working Circle. To facilitate proper management, the forests were divided into compartments and sub-compartments. All the compartments have been stock mapped on 1:15000 scale. All forests were enumerated in 10 cm dia classes down to 10 cm d.b.h. The forests were to be worked under coppice with standards system. A rotation of 30 years for coppice and 90 years for standard was prescribed. Felling cycle of 30 years was adopted. The estimated requirement of firewood and charcoal was 25000 quintals and 8850 quintals respectively for Mandi, Pandoh, Gohar and Baggi towns. This demand was to be met partly from Mandi, Suket and Nachan Forest divisions. Annual area of 30 ha. was prescribed to yield 1500 m³ or 18000 quintals of firewood. The sequence of felling was laid out from 1977-88 to 1992-93.

Result of Working

Out of 576.03 ha. about 138.82 ha. i.e. Dalikar C-a, Dofa C-4, Jabal C-3 and Kalisapri C-3 was felled in the past to meet the charcoal requirement of Mandi town. The area felled so far has not coppiced well due to adverse biotic factors and failure of over-mature stumps to rejuvenate. Efforts are made to ensure that the areas are fully regenerated by coppice or artificially. The felling was stopped due to the ban imposed by the State Government on the felling of Ban Oak trees for commercial purposes and due failure of coppice of the yield position of this circle as it stood on 31-03-1993 is 7676.155 m³.

In spite of strict vigil, Ban Oak could not be protected against lopping by the villagers for fodder, agriculture implements and fuel wood. It appears that the practice of indiscriminate cutting of Ban trees remains unabated. Degraded Ban Oak forests were replaced by Chil or Deodar due to plantation by the Forest Department. Due to heavy lopping and cutting, the forests have been changed into thorny bushed (scrub forests).

7.2.6.5 Broad Leaved Over-Lapping Working Circle

Economically important species like Walnut, Maple, Birch, Birdcherry, Horse Chestnut, Ash, Boxwood and Poplar etc. are found scattered in depressions and nallas in the forests. The forests allotted to various Working Circles have been allotted to this Working Circle as an overlapping working circle. The main object was to improve the stocking by bringing under scientific management to meet the requirements of wood-based industries. Enumerations of broad leaved species in the forests allotted to Deo/Kail, Chil, Fir/spruce Working Circle were carried out in 20 cm. dia class down to 10 cm d.b.h. The species were to be managed under the Indian irregular Shelter Wood system along with conifer forests. The exploitable diameter was fixed as under:-

(Table No-6)

S.No.	Species	Exploitable Diameter
1	Walnut, Maple, Horse-Chestnut.	60 cm.
2	Ash, Betula, Poplar, Kharsu, Birdcherry	50 cm.
3	Hornbeam, (Carpines) Celtis	40 cm.
4	Boxwood	20 cm.
5	Other Broad Leaved Species	60 cm.

The felling cycle of 15 years was adopted coincide with the period of plan under revision. No different felling programme was prescribed. It was left at the discretion of the Divisional Forest Officer, who was free to take up any area for exploitation.

Result of Working

Due to the inaccessibility of the scattered localities, exploitation was not possible. Neither was there any demand for these species and nor was there any wood based industry. As such, no felling and subsidiary operations were carried out in any of the forests during the plan period. However, Walnut and Poplar plantations have been raised in the past on suitable areas.

7.2.6.6 Protection Working Circle

All coniferous and broad leaved forests, which lie on precipitous and difficult terrain and uneconomical to exploit commercially, were allotted to this Working Circle. Forests which form the part of Shikari Devi Sanctuary were also included in this Circle. The main object was to preserve/protect the forests from denudation and soil erosion. The total area of the Working Circle was 15677.27 ha. All the demarcated protected forests were stock mapped on 1:15,000 scale. No enumeration was carried out as no commercial exploitation was to be done. No felling was to be done except

TD marking to the right holders. No exploitation was to be done, therefore rotation was left physical.

Cultural blanks of 2200 ha. were proposed to be planted during the currency of the Working Plan and all such plantations were to be notified for closure for 15 years. Fire protection measures were to be enforced effectively.

Result of Working

The primary object was to preserve the forests from denudation and to improve the stocking with the view to meet the demand of right holders of timber, fuelwood and fodder. 2200 ha. of cultural blanks suggested for planting could not be achieved due to inadequate allotments of the funds. No perceptible improvement has come about in the forest allotted to this Working Circle. The yield position in this Working Circle as it stood on 31-03-93 is +22718.325 m³.

7.2.6.7 Plantation Working Circle

General

This working Circle included areas suitable for raising plantations of valuable and economically important species. The total area of the Plantation Working Circle was 3182.44 ha. It included demarcated as well as undemarcated protected forest. DPF of this Working Circle were stock mapped on 1:15,000 scale. The density of the forests of this Working Circle was very poor. No enumerations were carried out because area allotted to this Working Circle is mostly blank and plantation with average diameter of less than 10 cm DBH. No silviculture system was prescribed. No exploitation was anticipated under the currency of the plan. A sequence of plantation programme was laid down. Tending and protection of old plantations was suggested. Areas under protection were to be closed for 15 years.

Result of Working

The areas prescribed for planting were taken up as far as possible according to the forests available under different development schemes. The total area proposed for planting could not be achieved due to inadequate allotment of funds. The plantation of Poplar has been undertaken haphazardly, ignoring the site conditions. Tending of old plantations as prescribed was not done. The yield position on 31-03-1993 was +2792.520 m³.

7.2.6.8 Grazing Over-Lapping Working Circle

General

This Working Circle overlaps all Working Circles and covers an area of 45,615.10 Ha. important fodder trees and grasses found in the tract were listed up. The object of management was to improve the quality and other graziers as laid down in faisla-janglat. Areas available for grazing by nomadic and migratory graziers were given.

No separate silviculture system was suggested.

These areas were to be managed in accordance with the prescription of the concerned Working Circle to which they were allotted. Control on cattle population, reduction in the grazing incidence and other remedial measures to control and regulate grazing and for improvement of pastures were prescribed. No sowing and planting of fodder and grasses were laid down separately.

Result of Working

In view of legal status, increasing cattle population and pressure of some of the migratory graziers, the prescription of the Working Plan could not be enforced strictly.

7.2.7 Archana Sharma's & H.S. Dogra's Plan (1992-93 to 2006-07):-

Under Archana Sharma's & H.S. Dogra's Plan, the forests were divided into eight working circles as under:-

- (i) Deodar and Kail Working Circle.
- (ii) Chil Working Circle.
- (iii) Fir and Spruce Working Circle.
- (iv) Oak Working Circle
- (v) Protection Working Circle.
- (vi) Plantation Working Circle.
- (vii) Grazing (Over-Lopping) Working Circle.
- (viii) Soil Conservation (Over- Lopping) Working Circle.

7.2.7.1 DEODAR AND KAIL WORKING CIRCLE:

All the forests having with more than 60% deodar and Kail on easy slopes were allotted to this working circle. The forests were not even aged. The forests were to be managed under Indian Irregular Shelter Wood System. The emphasis was laid on natural regeneration supplemented with artificial regeneration.

GENERAL CONSTITUTION, CHARACTER AND VALUATION OF CROP:-

Nearly all pure crops of deodar and Kail having 60% or more of these species were allotted to this working circle. The total area of this working circle was 7614.12 ha. The crop varies from young to over mature trees. Regeneration in these forests especially of Kail is very good except in the areas where the incidence of grazing is very high.

The whole area of this working Circle was stock mapped on 4"=1 mile scale. Average site quality for deodar & Kail is II. The density varies from 0.4 to 0.5. Total enumeration of Deodar, Kai and important B.L. species were carried out in 10cm dia classes down to 20 cm d.b.h. for whole working circle.

METHOD OF TREATMENT:

The forests of this working circle were managed under Indian Irregular Shelter Wood System. The working was to be done on selection principle along steep and precipitous slopes and broken ground. Rotation period was 120 years, based on age at

which trees will attain d.b.h. of 60 cms. Four periodic blocks were constituted with specific allotment. The regeneration period of 30 years was therefore adopted.

CALCULATION & CONTROL OF YEILD:-

Yield in the circle was calculated on the basis of Hufnagel's formula. The yield was to be controlled by volume. All dia classes of confers felled for whatsoever purpose was to count towards the yield. The yield was PB wise.

REGENERATION FELLING:-

No regeneration felling has been undertaken due to ban on green felling. However, on the basis of selection felling of trees has been given to right holder in T.D. In addition to it salvage marking has been carried out.

CULTURAL OPERATION:-

Removal of unfit trees of inferior species, slash disposal, thick humus layer etc. were suggested in this working circle. A thick layer of partially decomposed humus has been found to be one of the main causes of failure of natural regeneration. 'D' Grade thinning was also suggested besides shrubs cutting etc. Shrubs and weeds are found to be a menace and interfering with regeneration.

RESULTS OF IMPLEMENTATION OF PLAN:-

i) The yield position as it stood on 31-03-2007 is excess in PB-I due to the removal from PB-II and PB-III counted towards the yield from PB-I and deficit in PB-IV on account of salvage marking and removal for T.D. to meet the demands of the local people. However, the overall removal from the PB's is deficit during the plan period due to the imposition of ban on green felling.

ii) No green felling in PB-I to PB-IV was carried out during the plan owing to change in Govt. policy and in compliance of the Supreme Court's order.

iii) There are large numbers of regenerated Deodar areas in PB-1 & PB-IV which require immediate removal of the over wood and thinning in the crops and young pole crops should be retained as part of the new crops.

iv) The various prescription and suggestion made in PB-IV areas were not followed in practice i.e. bush cutting, weeding, cleaning, effective closures, grazing and grass cutting etc.

Annual yield prescribed was 18000cum against which the total volume removed from this working circle during the plan period was 16125.639 m³ and position of deviation as on 31-03-2007 is as under:-

(Table No-7)

Species.	PB-I	PB-IV	Total.
Deodar	5736.630	3803.780	9540.410
Kail	1425.245	3360.048	4785.293
Fir/Spruce	1142.290	508.000	1650.290
Chil	14.374	112.432	126.806

B.L.	12.100	10.740	22.840
Total	8330.639	7795.000	16125.639

Critical Appraisal of the prescriptions of WP under revision:-

- (i) Indian Irregular shelterwood system was prescribed in DC Thakur's plan (77-78 to 91-92) and Archana/ Hari Singh Dogra's plan (1992-93 to 2006-07) but no felling was carried out for last 30 years as per prescription. Due to this proportion of younger diameter classes has generally decreased while proportions of diameter class trees above 60cm dia has increased.
- (ii) Due to ban on green felling silvicultural operations prescribed in different PBs were not followed and only salvage felling was undertaken. This has resulted in irregular removal and over stocking of mature trees with poor regeneration.
- (iii) Special objects of the management could not be achieved.
- (iv) As no felling as desired under Indian Irregular Shelter wood system in D. C. Thakur Plan and Archana/ Hari Singh Dogra's Working Plan was carried out, no PB I areas can be designated as on date. Therefore, it is better that Indian Irregular Shelter wood system is replaced with Selection System.

7.2.7.2 THE CHIL WORKING CIRCLE:-

This includes all demarcated and un-demarcated protected forests containing Chil as pure crop. These forests were to be worked under Punjab Shelter wood system. Regeneration to be obtained naturally, supplemented with artificial regeneration.

GENERAL CONSTITUTION, CHARACTER AND VALUATION OF CROP:-

Nearly all pure Chil forests of this Division were allotted to this Working Circle. The total area of this working circle was 4938.50 ha. The forests on the whole were under stocked, vastly variable in density and normal distribution of age class was lacking except PB-IV and PB-III areas. Young to middle aged trees predominated and mature trees were rather scattered in them.

The whole area of this working circle was stock mapped on 4"=1 mile scale. General site quality was II & III. The density varied from 0.2 to 0.6. Total enumeration of Chil and some important B.L. species was carried out in 10cm dia classes down to 20cm d.b.h. for whole working circle and exploitable diameter at 60cm.

METHOD OF TREATMENT:-

The forests were to be managed under Punjab Irregular Shelter wood system. The marking was to be done on selection principal along steep slopes, nallah and broken ground. Natural Regeneration supplemented by artificial regeneration wherever necessary was to be relied upon. The rotation of 120 years was adopted. Four periodic blocks were constituted with specific allotment. The regeneration period of 30 years was therefore adopted.

CALCULATION & CONTROL OF YIELD:-

Yield in this circle was also calculated on the basis of Von Mantel's increment method, and by Hufnagel's formula. As prescribed in Para 2.13.4 & 5 the annual

prescribed yield for PB-I is 800 cum and 700 in PB-IV. The removals from PB-II, PB-III was to count towards PB-1.

REGENERATION FELLING:-

No regeneration felling has been undertaken due to ban on green felling. However, on the basis of selection felling trees has been given to right holder in T.D. besides salvage marking has also been carried out.

SOWING AND PLANTING:-

The plantation programme has only been prescribed for PB-IV areas a special treatment.

REGENERATION STATUS:-

The regeneration status in the forests which were worked during plan period is satisfactory.

CULTURAL OPERATIONS:-

Subsidiary Silvicultural Operation suggested in PB-1 areas were carried out by removing the refuse and effective closure of the areas and regeneration by artificial planting/regeneration including, cleaning of the areas as safeguard against fire hazards.

CONTROL BURNING: -

The control burning was followed and fire lines maintained as per availability of funds as per recommendations.

RESULT OF IMPLEMENTATION OF THE PLAN:-

- i) The yield position as it stood on 31-3-2007 is deficit in PB-1 and PB-IV due to general moratorium on green felling and removal of T.D. Thus the deficit position is due to the ban on green felling of trees.
- ii) No green felling in PB-1 to PB-III and PB-IV were carried out during the plan period.
- iii) There are large number of regenerated Chil areas in PB-1 and PB-IV in the working circle, which require immediate removal of the over wood. However, this silvicultural requirement remained wanting for allowing regeneration to set in these patches.
- iv) The chil forests prescribed under PB-III and unfelled PB-1 areas were left to meet the demand of right holders as per the provision of settlements. No thinning cum improvement felling programme was prescribed for PB-III areas.
- v) Resin tapping by rill method has been adopted as per recommendation of Resin Advisory Committee, where tap able diameter has been suggested to be kept at 40cm and above and acid concentration was to be diluted.

Annual yield prescribed was 1500 cum against which the total cumulative volume removed from this working circle during the plan period was 8938.606 m³ and position of deviation as on 31-03-2007 is as under:-

(Table No-8)

Species	PB-I	PB-IV	Total
Deodar	175.535	181.880	357.415
Kail	5.340	24.310	29.650
Fir/Spruce	-	-	-
Chil	3599.461	4943.740	8543.201
B.L.	--	8.340	8.340
Total	3780.336	5158.270	8938.606

Critical Appraisal:

- (i) It was worked under Indian Irregular Shelterwood system. Yield was prescribed in PB –I and PB –IV
- (ii) The prescribed yield viz. seedling. Secondary and thinning cum improvement felling were to be carried out but could not be done due to ban on green felling.
- (iii) Due to fire, grazing and lack of proper opening of crop, regeneration remained deficient.
- (iv) Special objects of the management could not be achieved.
- (v) As no felling as desired under Indian Irregular Shelter wood system in D. C. Thakur Plan and Archana/ Hari Singh Dogra's Working Plan was carried out. Therefore, it is better that Indian Irregular Shelter wood system is replaced with Selection System.

7.2.7.3 THE FIR-SPRUCE WORKING CIRCLE:

The forests with predominately Fir & Spruce were allotted to this working circle. Due to heavy felling in the past for apple packing cases, most of the forest allotted to this working circle gave a look of PB-1 area. Felling done in the past in the majority of the areas had not been followed by regeneration.

GENERAL CONSTITUTION, CHARACTER & VALUATION OF CROP:-

All the Fir, Spruce Forests having pure crop or having 60% more of these species were allotted to this working circle. The total area of this working circle was 8034.49 ha. The forests were very much under stocked and there was preponderance of mature to over mature trees. Natural regeneration in these forests was very poor and artificial regeneration was also inadequate.

The whole area of this working circle was stocked mapped on 4"=1 mile. The average crown density is 0.3 to 0.4 & the crop is irregular. The UPF's areas have no specific boundaries.

METHOD OF TREATMENT:

The forests of this working circle were managed under the Indian Irregular Shelter wood system. Rotation period 150 years was adopted and the whole working circle was divided into 5 fixed periodic blocks with regeneration period of 30 years.

CALCULATION OF YIELD:

Yield in this Working circle was calculated on the basis of Hufnagel's formula. Removal from PB-II & PB-III was to count towards PB-I.

REGENERATION FELLING:

Annual sequence of felling has laid down in this working circle. No regeneration felling has been undertaken due to ban on green felling in compliance of the Supreme Court's order. However, salvage marking of dead, dying, dry and uprooted trees and T.D. has been carried out as per the norms fixed by the expert committee in compliance of the Supreme Court's order in CWP No. 202/95 dated 12-12-1996 and as per settlement report. Thus seeding felling prescribed in PB-1 areas was not done owing to change in policy of the Government.

RESULT OF IMPLEMENTATION OF THE PLAN:

- i) The yield position as it stood on 31-03-2007 is deficit in PB-1 and PB-IV. The reason for the deviation is due to the removal of dead, dying, dry and uprooted trees in salvage marking. The deficit in PB-IV is due to the ban on green felling in compliance of the Supreme Court's order.
- ii) No green felling in PB-1 to PB-IV was carried out during the plan period.
- iii) The various prescription and suggestion made in the working circle could not be followed owing to change in Policy of the Government and large areas could not be regenerated due to lack of fund. For this reason, fellings as prescribed were not done and as a result opening in the canopy not carried out consequently areas could not be properly regenerated.

Annual yield prescribed was 6500 cum against which the total cumulative volume removed from this working circle during the plan period was 27803.379 m³ and position of deviation as on 31-03-2007 is as under:-

(Table No-9)

Species	PB-I	PB-IV	Total
Deodar	99.990	456.655	556.645
Kail	924.000	1412.325	2336.325
Fir/Spruce	17281.144	7536.515	24817.659
Chil	-	59.650	59.650
B.L.	14.900	18.200	33.100
Total	18320.034	9483.345	27803.379

Critical Appraisal:

- (i) Dominant species is Fir and other spp. are spruce, Kail along with Kahrsu, Walnut, Horse, chestnut and Maple etc.

- g (ii) Indian Irregular shelterwood system was prescribed but no felling was carried out for last 30 years as per prescription. Due to ban on green felling silvicultural operations prescribed in PB-I were not followed and only salvage felling was undertaken in different PBs. This has resulted in irregular removal and over stocking of mature trees with poor regeneration.
- (iii) Special objects of the management could not be achieved.
- (iv) As no felling as desired under Indian Irregular Shelter wood system in D. C. Thakur Plan and Archana/ Hari Singh Dogran's Working Plan was carried out. Therefore, it is better that Indian Irregular Shelter wood system is replaced with Selection System.

7.2.7.4 OAK WORKING CIRCLE:

The working circle includes all the Ban Oak forests situated in the tract. Since, there was ban on the green felling of Oak trees; no felling was done during this plan period.

GENERAL CHARACTER OF THE VEGETATION:

It included predominantly Ban Oak forests mostly in pure patches. Pure Ban Oak forests occur in sheltered belts in all ranges of this division. An area of 2167.96 ha. was allotted to this Working Circle. The forests are of selection type and irregular in age.

No separate compartment and sub compartments have been formed in this working circle.

ANALYSIS & VALUATION OF THE CROP:

Random enumeration was done with the help of Rela-scope. No commercial felling was prescribed. It was felt that coppice shoots had come up well only in those forests that were away from habitation and where biotic pressure was low.

No commercial felling were carried out and only dead, dry, uprooted & fallen trees were removed in salvage marking & utilized for meeting the requirements of the right holders. No yield or its control was prescribed.

RESULTS OF IMPLEMENTATION OF THE PLAN:

The only activity prescribed was planting as per the oak planting programme, but not much have been achieved under it as most of the forests still are under stocked. The weeding, cleaning and other cultural operations were not carried for want of funds.

The control over lopping of Ban-Oak trees as envisaged could not be enforced effectively resulting in depletion of growing stock and degradation especially in near habitation but status of these forests is good where biotic pressure are low.

Against the prescribed annual yield of 8000 cum, the total cumulative volume removed from this working circle during the plan period was 3348.510 m³ and position of deviation as on 31-3-2007 is as under:-

(Table No-10)

Species	Yield (m3)
Deodar	308.585
Kail	929.345
Fir/Spruce	54.990
Chil	1283.590
B.L.	772.000
Total	3348.510

Critical Appraisal:

Heavy lopping for fodder purpose has been noticed in these forests near habitation.

7.2.7.5 PROTECTION WORKING CIRCLE:

This working circle included all the forests which were not part of any other working circles described above. These forests were on steep and precipitous slopes where concentrated felling was not advisable due to environmental hazards and regeneration problems. The blanks and other degraded areas were to be rehabilitated by planting species suitable to the area.

GENERAL CHARACTER OF THE VEGETATION:-

It included all forests which are not included in other working circles. Besides all forests, which are not fit for working under any silvicultural system have also been included in this working circle.

No separate compartment or sub compartments have been formed in this working circle. No enumerations have been carried out in these areas. No commercial felling was prescribed. The total area allotted to this working circle is 10748.14 ha.

METHOD OF TREATMENT:

No definite silvicultural system was prescribed. However, salvage marking was suggested.

RESULTS OF THE IMPLEMENTATION OF PLAN:

Though no yield was prescribed and the only removals suggested were to meet the demands of the right holders and salvage removal of trees i.e. dead, drying, dry and uprooted trees as prescribed in the plan. Regeneration in these forests is very poor and artificial regeneration is also inadequate.

Though no yield was prescribed, the total volume removed from this working circle during the plan period was 22953.832 m³ and position of deviation as on 31-3-2007 is as under:-

(Table No-11)

Species	Yield(m3)
Deodar	1850.391

Kail	3536.096
Fir/Spruce	15736.300
Chil	1158.985
B.L.	672.060
Total	22953.832

Critical Appraisal:

As is visible from the data above, a huge volume has been removed from Protection WC for timber distribution to the Right Holders and salvage marking.

7.2.7.6 Plantation WORKING CIRCLE:-

This working circle included areas which are blank and poorly stocked but were suitable for raising plantation of valuable and economically important species. The plantation raised in the UPFs in the past which were not fully established was included in this circle.

GENERAL CHARACTER OF THE VEGETATION:

It included the young plantation and other blank areas and all areas which were under stocked. The compartments or sub compartments have been formed in this working circle for better treatment. The area of this working circle was 1279.68 ha. Enumeration was not done. No commercial felling was prescribed.

METHOD OF TREATMENT:

No silvicultural system was prescribed. Culturalable blanks areas were to be planted with suitable species. In the vicinity of habitation, species capable of yielding fuel, fodder and fruit trees were suggested. The year wise plantation programme was suggested Range wise.

RESULTS OF IMPLEMENTATION OF THE PLAN:

- (i) The various prescriptions & suggestions made in the working plan could not be followed in total due to various administrative and financial constraints.
- ii) Neither list of successful plantation was prepared nor was the list of established plantation which is required to be transferred to respective working circle identified.
- iii) No norms & methodology was prescribed to assess the survival percentage of Plantation carried out during the plan period.
- iv) Effective closures of the plantation were suggested but how to make it effective not prescribed. It needs to be incorporated in the plan under revision keeping in view of the provisions given in Indian Forest Act, 1927.

Though no yield was prescribed, the total volume removed from this working circle during the plan period was 1976.015 m³ and position of deviation as on 31-03-2007 is as under:-

(Table No-12)

Species	Yield(m3)
Deodar	76.385
Kail	391.240
Fir/Spruce	1079.890
Chil	389.900
B.L.	38.600
Total	1976.015

7.2.7.7 GRAZING (OVER-LAPPING) WORKING CIRCLE:

This Working Circle overlaps all other working circles. Important fodder trees and grasses found in the tract were listed up. The object of management was to improve the quality of fodder to meet the legitimate requirement of right holders and other grazers. Areas available for grazing by nomadic and migratory grazers were given. The carrying capacity of the area works out to 0.073 ha against the norm of 0.5 ha per unit. Hence, there is tremendous pressure on the grazing grounds.

GENERAL CHARACTER OF THE VEGETATION:

No separate compartments or sub compartments were formed in this working circle. The area of this working circle was entire division. Random enumeration was done with the help of Rela-scope. No commercial felling was prescribed.

METHOD OF TREATMENT:

No separate silvicultural system was prescribed. Areas were to be managed in accordance with the prescription of the concerned Working Circle to which they were allotted.

RESULTS OF IMPLEMENTATION OF THE PLAN:

- i) The various prescriptions & suggestions made in the working plan could not be followed in practice due to administrative and financial constraints.
- ii) Control on cattle population, reduction in the grazing incidence and other remedial measures to control and regulate grazing could not be followed due to its far reaching social economic and interdepartmental ramifications. The improvement of pastures as prescribed was implemented to the extent funds made available.
- iii) Due to increasing cattle population and pressure of the migratory graziers etc. the prescription of the Working Plan could not be enforced strictly.

The total volume removed from this working circle during the plan period was nil m3.

7.2.7.8 Soil Conservation (Overlapping WC)

This working circle overlaps all other WCs. Apart from this all UPFs and other Govt. land is taken in the WC circle.

7.2.7.8 Annual programme for soil conservation works:

8 Micro watershed were suggested for soil conservation works in the Beasa catchment.

Public participation:

Micro plan was suggested to be prepared with the active involvement of local communities.

Result of implementation of the plan:

- i) The various prescriptions and suggestions made in the Working Plan could not be followed in practice due to administrative and financial aspects.
- ii) List of soil conservation works was not prepared.
- iii) Active participation of local communities was lagging.

Joint Forest Management Working Circle:

The working circle includes the Demarcated forests and UPFs near to habitation which had been degraded. Besides these DPFs it also includes UPFs.

Special Object of Management:

The objective of Joint forest management is to strengthen the forestry institutions and improve the environment in all respect.

ODA Project (UK):

The goal of this project was to develop and improve sustainable system of the forests and management with a cost of 3.1 Million Pounds (UK). The overall cost was borne by the ODA.

Implementation of JFPM:

For implementation of JFPM in the project areas some activities were suggested and while preparing the micro plan for the pilot areas some subsidiary silvicultural treatments were also prescribed.

Demonstration Plots:

Demonstration plots were suggested to be developed for training and to educate the local community.

Results of implementation of Plan:

- i) Some micro plans under ODA Projects have successfully been implemented.
- ii) One demonstration plot in pilot location near Bakhli village has successfully been developed and is being used to educate and encourage the other people to promote the concept of JFMC. The site is also visited by the committees from other parts of the state.
- (iii) The concept of the JFMCs could not pick up due to lack of proper exposure.

7.2.7.9 Miscellaneous Regulation

(a) Road and Paths

A motorable road was suggested to be constructed under para 199.1 of the Working Plan, but since neither constructed nor required as the area now falls under the Wild Life Sanctuary. None of the bridle paths suggested under para 190.2 of the Working Plan has been constructed.

(b) Buildings

A large number of buildings including inspection huts, Officer's residence, Clerk quarters, Block Office quarters, Forest Guard's Hut and Check-post were suggested in the Working Plan under revision. Except for the DFO residence, ACF and Range Officer residence and Clerk quarters, no buildings as suggested were constructed.

7.3 Past Revenue and Expenditure:

The figure of annual and expenditure during the plan under revision is given in the following table:-

(Table No-13)

Year	Revenue in (Rs.)	Expenditure in Rs.		Total	Surplus
		Non –Plan	Plan		
1977-78	3970370	1806336	1124520	2931355	+1039015
1978-79	4793450	2086900	5859960	2672860	+2120590
1979-80	7985950	1562280	1509380	3071660	+4914290
1980-81	4529340	2023350	1704980	2728330	+801010
1981-82	3061290	2199220	2330480	4429700	+1368410
1982-83	9129403	1957281	3738428	5695709	3433693
1983-84	1825001	2051054	3685894	5736949	3911948
1984-85	1532343	1382889	4694168	6077058	4544714
1985-86	3161320	1605563	5291165	6896729	3735408
1986-87	546442	1507304	6232289	7739594	7193151
1987-88	135631	2121347	6402685	8524033	8388401
1988-89	581336	1809736	7211283	9021020	8439684
1989-90	419831	2316901	7742488	10059389	9639558
1990-91	348159	2478173	8160060	10638233	10290074
1991-92	471846	2520725	9056505	11577230	11105348
1992-93	620519	3722169	4824759	8546928	7926409
1993-94	425555	3283141	8877669	12160810	11735255
1994-95	1839457	4024242	10162142	14186384	12346927
1995-96	-	--	--	--	--
1996-97	-	--	--	--	--
1997-98	-	--	--	--	--
1998-99	-	--	--	--	--
1999-2000	2637679	10715570	893120	11608690	8971011
2000-01	-	--	--	--	--
2001-02	3922328	10016440	8996600	19013040	15090712
2002-03	-	--	--	--	--
2003-04	3256166	17874775	3401565	21276340	18020174
2004-05	1517540	19102500	2491170	21593670	20076130

2005-06	21780687	8875635	10053995	18929630	+2851057
2006-07	1757267	21506630	23332615	44839245	43081978
2007-08	2629947	33262163	536304	33798467	31168520
2008-09	3159937	32737663	6905605	39643268	36483331
2009-10	12065844	36179335	7963100	44142435	32076591
2010-11	4187189	44250582	5081594	49332176	45144987
2011-12	1663108	3128281	3644250	6772471	5109363
2012-13					
2013-14					
2014-15					
2015-16					
2016-17					
2017-18					
2018-19					
2019-20					
2020-21					
2021-22					
2022-23					

[Source: Record from DFO Nachan]

CHAPTER VIII

STATISTICS OF GROWTH AND YIELD

8.1 General:

Deodar, Kail, Fir, Spruce and Chil are the coniferous species on which the economics of forest working in Nachan Division depends. The following records for their growth and yield are available.

- (i) Multiple yield table for Deodar by HG Champion and ID Mahindru, Indian Forest Records, Volume XV Part III (Silviculture Series 1933).
- (ii) Yield Table for Blue Pine by HG Champion, PN Suri and ID Mahindru, Indian Forest Record Volume XIII Part X (Silviculture Series 1929).
- (iii) General Volume Table for Abiespindrow (Silver Fir) by SK Seth, SN Dabral and MM Singh, Indian Forest Records (New Series) Silviculture 1957 Volume X No. 4.
- (iv) Volume Table for Piceasmythiana (Spruce) by SN Dabral, MM Singh and DS Rawat, Indian Forest Records, Volume II No. 3.
- (v) Growth and yield statistics of common Indian timber species (Himalayan region) compiled by the Directorate of Forest Education, Fri 1976.
- (vi) The Silviculture Research Code Volume III. Local statistical data for Nachan Division which corresponds to site quality II was collected for coniferous species by Archana's&Dogra's. Thus, volume factors calculated and adopted in his plan will also be adopted in this plan.

8.2 Volume table for Coniferous Species

The volume factors for different species are tabulated below:

(Table No. 1)

Dia in cum	Class	Volume of Standard Stem Timber in Cubic meters				
		Deodar	Kail	Silver/fir	Spruce	Chil
10-20	V	0.065	0.070	0.075	0.075	0.05
20-30	IV	0.300	0.270	0.275	0.285	0.17
30-40	III	0.800	0.670	0.800	0.750	0.62
40-50	IIA	1.725	1.500	1.800	1.525	1.30
50-60	IIB	2.925	2.850	3.250	2.750	2.14
60-70	IA	4.175	4.370	4.775	4.600	3.07
70-80	IB	5.400	5.750	6.300	6.400	4.05
80-90	IC	6.625	6.920	7.825	8.350	5.05

90 & above	ID	7.825	7.800	9.350	10.175	6.00
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8.3 Volume Table for Broad Leaved Species

The volume factors of *Quercusincana* (Ban Oak) and *Quercusdilatata* (Mohru Oak) of Mandi- Nachan Working Plan by RV Singh have been adopted in this plan. Similarly, the volume factors of other important species have been adopted from Kullu Working Plan by Shri JC Sharma. The volume factors of important broad leaved species are tabulated below:

(Table No-2)

	Name of Species	Diameter Class and Volume in Cubic metres									
		10-20 CM	20-30 Cm	30-40 cm	40-50 cm	50-60 cm	60-70 cm	70-80 cm	80-90 cm	90-100 cm	100 cm & over
		V	IV	III	II A	II B	I A	I B	I C	I D	I E
1	<i>Quercusleucotrichophora</i> (Ban Oak)	0.03	0.28	0.84	1.70	2.54	3.11	3.40	3.40	3.40	-
2	<i>Quercusdilatata</i> (Mohru Oak) <i>Quercussemicarpifolia</i> (Kharsu)	0.028	0.3	1.0	1.8	3.0	4.6	6.30	9.0	9.6	12.2
3	<i>Aesculusindica</i>	0.028	0.3	0.8	1.7	2.7	3.9	5.9	7.1	9.0	12.0
4	<i>Juglansregia</i>	0.028	0.2	0.8	1.5	2.5	3.8	5.1	7.2	8.9	11.3
5	<i>Acer species</i>	0.028	0.2	0.7	1.3	2.1	3.3	5.1	6.9	8.5	11.2
6	<i>Prunuspadus</i>	0.028	0.1	0.7	1.4	2.2	3.2	4.3	5.6	6.9	9.6
7	<i>Betulaalnidaes</i>	0.028	0.3	0.9	1.6	2.3	3.3	4.4	5.4	6.6	8.0
8	<i>Carpinus species</i>	0.028	0.3	0.9	1.5	2.4	4.0	6.0	7.8	9.7	12.6
9	<i>Populus ciliate</i>	0.028	0.3	0.7	1.4	2.8	4.9	6.8	9.0	11.1	14.5
10	<i>Cedrelaserata</i>	0.028	0.5	1.0	1.8	2.8	4.4	6.0	8.0	9.0	13.3
11	<i>Rous species</i>	0.028	0.3	0.7	1.4	2.4	2.9	4.0	5.1	7.0	10.1
12	<i>Celtisaustralis</i>	0.028	0.3	0.7	1.3	2.2	3.3	4.6	6.3	8.0	11.1
13	<i>Alnusnitida</i>	0.028	0.33	0.8	1.5	2.2	3.2	4.3	5.7	7.8	11.0
14	<i>Salix species</i>	0.028	0.4	0.8	1.5	2.4	3.1	3.9	-	-	-
15	<i>Robiniapseudocasia</i>	0.028	0.3	0.6	1.0	1.4	1.7	2.0	-	-	-
16	<i>Buxuxsempervirens</i>	0.028	0.1	0.2	-	-	-	-	-	-	-

Note: C.F. Working Plan & Settlement Shimla vide letter No. Addl. 1-16/92(NP)/754 dated 15.7.2004 has informed that the volume factor for Vth Class Broad Leaved and Ban Oak species i.e. 0.028m^3 & 0.03m^3 respectively have been approved by the Pr. CCF HP for Mandi-Jogindernagar Forest Division and accordingly the volume has been adopted for Nachan Working Plan as well.

8.4 Diameter of Growth

The rate of growth of different species is taken from the Plan under revision (Archana Sharma & Hari Singh Dogra's Working Plan).

(Table No-3)

DBH(OB) In cm	Number of Years to reach DBH (OB) in Column 1				
	Deodar	Kail	Chil	Spruce	Silver Fir
10	15	12	17	25	34
15	19	16	23	31	43
20	24	20	28	35	50
25	30	25	35	43	58
30	36	30	43	50	67
35	44	36	49	56	78
40	51	42	57	36	88
45	60	49	63	71	98
50	70	57	71	80	108
55	82	5	79	89	120
60	95	74	87	100	132
65	107	84	95	111	145
70	120	84	104	122	158
75	132	104	112	134	172
80	145	114	121	148	186
85	157	124	129	160	200
90	168	133	137	178	214

8.5 Recruitment Period

From the rate of growth summarized in the above table, the recruitment period from lower to higher diameter class for different species works out as under:

(Table No-4)

Species	Recruitment Period in Years						
	V to IV	IV to III	III to IIA	IIA to IIB		IA to IB	IB to IC
Deodar	11	14	16	22	25	25	25
Kail	9	11	13	16	19	20	20
Chil	12	14	14	16	16	17	17
Spruce	12	13	15	18	22	23	26
Silver Fir	15	20	20	22	25	27	28

8.6 Mortality Rate (Value of Z)

The figures regarding the time taken “t” by approach class to grow exploitable size and mortality percent “Z” i.e. percentage of approach class trees which disappear in “t” years, as available in the Working Plan Suket Division by Nanak Chand has been

adopted in this Plan. This is available for Deodar only and derived from the multiple yield table for Deodar.

(Table No-5)

	Dia Class	Percentage Mortality for Different Grade of thinning			Average Value of "Z"
1	From 40-50 cm to 50-60 cm	27	25	24	25
2	From 50-60cm to 60-70 cm	27	26	25	26

8.7 Quality Class Assessment

The quality class of all the coniferous species was assessed. Heights of two dominant trees of the species of a particular forest were measured. In the case of Deodar, Kail, Chil and Spruce forests, the quality class of each compartment and sub compartment was determined by comparing the heights of dominant trees with those given for a standard quality classes in the yield tables of these species. Quality classes of various coniferous species relating to height are tabulated as below:

(Table No-6)

Species	Quality Classes				Remarks
	I	II	III	IV	
Deodar	120-140 Ft.	100-120 Ft.	80-100 Ft.	0-80 Ft.	From FRI table
Kail	120-140 Ft.	100-120 Ft.	80-100 Ft.	-	From Howards pocket
Fir & Spruce	150 & above	100-150 Ft.	Below 100 Ft.	-	As adopted by Trevor in his kullu Working Plan

The average quality class of the forests of the Division has been taken to be II.

8.8 Density

As the crops are unevenaged, no mathematical calculation of density based on the comparison of actual based area with that given in the yield table for normal crops is possible. The density in each compartment and sub-compartment has therefore been based on ocular estimates and given in the history files.

8.9 Enumeration

As per the approved Preliminary Working Plan for Nachan Division, Selection System has been suggested and according to methodology prescribed for enumeration work, some forest/compartments have been identified randomly in Deodar, Kail, Chil, Fir & Spruce & Oak Working Circles. Enumeration is carried out in 10 cm dia classes and down to 10 cm diameter at Breast Height.

8.10 Stock Maps

All the demarcated protected forests are stock mapped. All the UPFs which were of reasonable size have been described but not mapped in the scale of 1:15840 (4"=1 mile). The rest of the UPFs are enlisted in the appendix.

8.11 Increment

For this purpose the data from the plan under revision has been adopted. The statement of growth and yield are given below:

(Table No-7)

Deodar					
DBH (OB)	Age in Volume in year m ³		Volume table Adopted for This Plan m ³	C-A-I in m ³	C-A-I %
Cm	Years	m ³			
10	15	--	0	--	--
20	24	0.17	0.3	0.19	6.3
30	37	0.55	0.8	0.29	3.6
40	51	1.15	1.72	0.43	2.5
50	70	2.25	2.92	0.58	1.9
60	95	3.7	4.17	0.58	1.3
70	132	4.8	5.4	0.3	0.5
80	--	6.03	6.62	--	--
90 & Over	--	7.77	7.82	--	--
Kail					
DBH (OB)	Age in Volume in year m ³		Volume table Adopted for This Plan m ³	C-A-I in m ³	C-A-I %
Cm	Years	m ³			
10	13	--	0.07	--	--
20	24	0.18	0.27	0.02	7.41
30	32	0.43	0.67	0.04	5.97
40	42	1.02	1.5	0.06	4
50	57	2.02	2.85	0.07	2.46
60	81	3.6	4.37	0.07	1.6
70	--	5.05	5.75	--	--

80	--	6.33	6.92	--	--
90 &Over	--	7.38	7.8	--	--
Spruce					
DBH (OB)	Age in Volume in year m ³		Volume table Adopted for This Plan m ³	C-A-I in m ³	C-A-I %
Cm	Years	m ³			
10	26	--	0.075	--	--
20	37	0.18	0.285	0.02	7.02
30	49	0.48	0.75	0.03	4
40	63	1.1	1.525	0.04	2.62
50	82	2.13	2.75	0.05	1.82
60	114	3.68	4.6	0.05	1.09
70	--	5.5	6.4	--	--
80	--	7.38	8.35	--	--
90 &Over	--	9.28	10.175	--	--
Silver Fir					
DBH (OB)	Age in Volume in year m ³		Volume table Adopted for This Plan m ³	C-A-I in m ³	C-A-I %
Cm	Years	m ³			
10	35	0.05	0.07	--	--
20	50	0.18	0.27	0.01	3.7
30	68	0.53	0.8	0.02	2.5
40	92	1.2	1.8	0.03	1.67
50	13	2.5	3.25	0.03	0.92
60	--	4.05	4.77	--	--
70	--	5.6	6.3	--	--
80	--	7.05	7.82	--	--
90 &Over	--	8.6.	9.35	--	--
Chil					
DBH (OB)	Age in Volume in year m ³		Volume table Adopted for This Plan m ³	C-A-I in m ³	C-A-I %
Cm	Years	m ³			
10	17	--	0.05	--	--
20	28	0.11	0.17	0.01	9.09
30	43	0.2	0.2	0.01	4.55
40	57	0.53	1.3	0.02	2.53
50	71	1.2	2.14	0.05	2.99
60	87	2.13	8.07	0.06	2.24
70	104	3.44	4.05	0.08	1.91
80	121	4.8	5.05	0.07	1.3

90 &Over	137	5.57	0	0	1.01
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8.12 Out turn of Firewood and Charcoal from Ban Oak

The figure arrived at in Dr. RV Singh's plan have been adopted in this plan also, which are as under:

(Table No.8)

Diameter Cm	Class in	Yield in Quintals from each trees of the diameter	
		Class given in column I	
		Firewood	Charcoal
	20-Oct	1.9	0.32
	20-30	3	0.5
	30-40	8.2	1.2
	40-50	12.3	2.05
	50-60	18	3.1
	60-70	22.4	3.73
	70 & over	30	5

8.13 Growing Stock.

In the Working Plan under revision sample enumeration was not done for which some forests/compartments had been selected randomly in Deodar, Kail, Chil, Fir & Spruce & Oak Working Circles. Enumeration was carried out in 10 cm dia classes and down to 10 cm diameter at Breast Height.

(Table No-9)

Deodar Kail Working Circle(No. of tree/volume)

Name of WC	Area in Ha.	Spp.		V	IV	III	IIA	IIB	IA	IB	IC	ID	Total	No./Vol.m 3/Ha.
DKWC	8174.2	Deo	T	606680	183512	87000	65888	54288	32016	19256	9512	7192	1065344	130.33
			V	39434.2	55053.6	69600	113657	158792	133667	103982	63017	56277.4	793481	97.07
		Kail	T	1512408	252880	51504	26912	24128	15544	4408	1856	232	1889872	231.2
			V	105869	68277.6	34507.7	40368	68764.8	67927.3	25346	12843.5	1809.6	425713	52.08
		Rai	T	271904	112056	41760	22272	11368	8816	3944	2088	1392	475600	58.18
			V	20392.8	31936	31320	33964.8	31262	40553.6	25241.6	17434.8	14163.6	246269	30.13
		Tosh	T	2088	696	464	232	0	232	0	0	464	4176	0.51
			V	156.6	191.4	371.2	417.6	0	1107.8	0	0	4338.4	6583	0.81
		Chil	T	161008	62640	15080	4872	1160	464	0	0	0	245224	30
			V	8050.4	10648.8	9349.6	6333.6	2482.4	1424.48	0	0	0	38289.3	4.68
		G.Total	T	2554088	611784	195808	120176	90944	57072	27608	13456	9280	3680216	450.22
			V	173903	166107	145148	194741	261302	244680	154570	93295.3	76589	1510335	184.77

(Table No. 10)

No./ Volume of Trees IN Chil Working Circle

Working Circle	Area in Ha	Species		V	IV	III	IIA	IIB	IA	IB	IC	ID	Total No. of trees	No./Vol.M 3/Ha
CWS	4938.5	Chil	T	615549	381146	94537	23458	10230	4409	1764	882	176	1132151	229.25
			V	30777.44	64794.88	58612.94	30495.24	21891.67	13536.78	7143.19	4453.47	1058.25	232763.9	47.1325

STATISTICS OF GROWTH AND YIELD

		Kail	T	9877	6173	3880	1587	1940	2117	706	706	353	27338	5.53569
			V	691.39	1666.74	2599.77	2381.06	5529.36	9249.11	4056.63	4882.06	2751.45	33807.56	6.84571
		Deodar	T	11288	10053	8995	5291	1411	353	0	0	0	37392	7.57153
			V	733.72	3016.01	7196.1	9127.41	4127.18	1472.73	0	0	0	25673.15	5.19857
		Rai	T	1058	353	882	706	1235	0	353	706	176	5468	1.10722
			V	79.37	100.53	661.41	1075.89	3395.22	0	2257.6	5890.93	1794.62	15255.56	3.08911
		B/Leave	T	336347	73372	24163	7584	4586	2646	882	353	529	450462	91.2143
			V	-	20544.16	6765.64	6370.56	7796.2	6720.84	2743.02	1200.2	1798.6	1531571	310.1286

Note: Volume for B/L species has been calculated on the basis of volume of *Quercusleucotrichophora*(Ban Oak) class wise.

(Table No. 11)

Number/ Volume of Fir/Spruce Working Circle

Name of WC	Area (hac.)	Species		10-20cm	20-30cm	30-40cm	40-50cm	50-60cm	60-70cm	70-80cm	80-90 & over	90-100cm	Total	No./Vol. M3/Ha
				V	IV	III	IIA	IIB	IA	IB	IC	ID		
Fir/Spruce	8034.49	Rai/Spruce	T	207952	149268	116185	92948	77588	64985	31508	21662	15754	777849	96.8137
			V	15596.4	42541.4	87138.8	141746	213367	298930	201650	180875	160296	1342140	167.04
		Silver Fir/Tosh	T	60259	40172	70499	71286	64197	40566	28357	14572	12209	402118	50.049

STATISTICS OF GROWTH AND YIELD

			V	4519.4	11047.4	56399	128316	208641	193704	178649	114029	114157	1009461	125.641
		Deodar	T	34265	13391	4332	4726	3545	2363	1182	1182	3151	68136	8.48039
			V	2227.21	4017.25	3465.86	8152.64	10368	9865.88	6380.33	7827.72	24654.9	76959.8	9.57868
		Kail	T	290266	98856	19299	15360	6695	3545	788	788	788	436383	54.3137
			V	20318.6	26691.1	12930	23040.1	19081.9	15490	4529.25	5450.85	6144.02	133676	16.6378
		B/Leave	T	150844	92948	57502	21662	8665	3545	1575	2363	394	339497	42.2549
			V	-	26025.44	16100.56	6065.36	2426.2	992.6	441	661.64	110.32	95059.16	11.83137

Note: Volume for B/L species has been calculated on the basis of volume of QuercusLeucotrichophora(Ban Oak)

8.14 COMPARISON OF GROWING STOCK

On the basis on enumeration results, number of trees per ha. and volume per ha. has been worked out for different working circle in respect of different species. Here, the growing stock enumerated in this working plan is compared with that of the working plan under revision. The figure "A" represents per ha. growing stock in the beginning of the last working plan. The figure "B" represents similar growing stock in the beginning of the present working plan.

(Table No. 12)

Comparison of growing stock of Deodar and Kail Working Circle				
Area in Ha	Species	No. of trees per Ha and vol. in m ³ per HA		Remarks
7614.12	Deodar	T	100	"A"
8174.29		V	124.49	"A"
		T	130	"B"
		V	97.07	"B"
	Kail	T	105	"A"
		v	91.51	"A"
		T	231	"B"
		v	52.08	"B"
	Spruce/rai	T	41	"A"
		V	33.92	"A"
		T	58	"B"
		V	30.13	"B"
	Silver fir/tosh	T	5	"A"
		V	7.86	"A"
		T	1	"B"
		V	0.81	"B"
	Chil	T	9	"A"
		V	3.31	"A"
		T	30	"B"
		V	4.64	"B"
	Grand Total	T	261	"A"
		V	261.1	"A"
	Grand total	T	450	"B"
		V	184.73	"B"

(Table No. 13)

Comparison of growing stock of Fir/Spruce Working Circle				
Area in Ha	Species	No. of trees per Ha and vol.in m3 per HA		Remarks
8034.5	Deodar	T	8	"A"
8034.49		V	11.56	"A"
		T	8	"B"
		V	9.58	"B"
	Kail	T	27	"A"
		V	24.8	"A"
		T	54	"B"
		V	16.64	"B"
	Spruce	T	140	"A"
		V	208.04	"A"
		T	97	"B"
		V	167.04	"B"
	Silver Fir	T	105	"A"
		V	192.77	"A"
		T	50	"B"
		V	125.64	"B"
	Chil	T	0	"A"
		V	0	"A"
		T	0	"B"
		V	0	"B"
	Grand Total	T	281	"A"
		V	437.18	"A"
	Grand Total	T	209	"B"
		V	318.9	"B"

(Table No. 14)

Comparison of growing stock of Chil Working Circle				
Area in Ha	Species	No. of trees per Ha and vol.in m3 per HA		Remarks
4938.5	Deodar	T	4	"A"
4938.5		V	0.59	"A"
		T	8	"B"
		V	5.2	"B"
	Kail	T	10	"A"
		V	1.99	"A"
		T	6	"B"

		V	6.85	"B"
	Spruce	T	0	"A"
		V	0	"A"
		T	1	"B"
		V	3.09	"B"
	Silver Fir	T	0	"A"
		V	0	"A"
		T	0	"B"
		V	0	"B"
	Chil	T	273	"A"
		V	78.95	"A"
		T	229	"B"
		V	47.13	"B"
	Grand Total	T	288	"A"
		V	81.54	"A"
	Grand Total	T	244	"B"
		V	62.27	"B"

8.15 Calculation of yield:

The silviculture method prescribed for this working plan is selection system. It is the most conservative method among all the method for exploitation of forests. Since there is ban on green felling and on exploitation is carried out in these forest since long time except the salvage removal, selection system is best suited in existing circumstances. The most widely used method for selection system of forest management is Smythies' safe-guarding formula.

8.16 Smythies' Safe-guarding Formula

This is also known as U.P. Safe-guarding Formula. It was evolved by Smythies in the thirties, mainly for the Sal forests of U.P., which were worked under Selection System and where the chief object of Management was the production of tree of large size. Smythies found that in most of the working Plans there was a tendency to regard everything above the selection limit as surplus stock; this tendency had been responsible for decrease in the yield from Selection trees in many areas. He, therefore, considered it essential to maintain sustained yield, mostly from Selection Class of trees, which he termed as Selection Yield. His method stipulates:-

- (i) Sustained yield of selection trees (above the exploitable limit) and not total yield of large and small timber.
- (ii) No method of yield calculation could by itself safe-guard the Selection Yield, including methods of area yield.
- (iii) Area yield with a check on the Selection trees can be applied to all types of forests, and eliminates most of the objections of Indian Management Systems.

The formula is based on the following assumptions:-

- (i) That exploitable (Selection) trees already exist and are being recruited everywhere (and not in any particular compartments only) and that fellings pass regularly through the forest in consecutive annual coupes in a felling cycle of 15 years.
- (ii) The basic object of management is to ensure, as far as possible, sustained or increasing yield of exploitable dia. trees above the exploitation limit at every felling cycle of 60cm.
- (iii) The middle-aged and younger dia. classes are well represented, and the present rate of recruitment into the two highest dia. classes (I and II) will not decrease for quite a few decades.
- (iv) Sustained yield of selection trees is adequately safe-guarded if, in any area, the number that may be felled is limited to the number that will pass up from below by the time fellings come round again.

8.17 Method for yield calculation:

The method for yield calculation is adopted as under:-

- (i) The felling cycle has been fixed for 15 years and exploitable diameter is 60cm.
- (ii) The diameter classes are indicated by symbols I, II, III, IV, etc. Class I standing for trees above the exploitable dia., and other successively below it to the youngest.
- (iii) Enumeration has been carried out in various dia. Classes.
- (iv) Every Selection tree is prescribed for felling subject to the limitation fixed by the W.P.O to safe-guard the Selection Yield; this limitation is the number of class II tree which pass into class I during the felling cycle 'f'-let this number be 'x' per hectare.

This number 'x' is determined from the formula:

$$x = \frac{f}{t} (II - Z\%II)$$

Where,

'f' = felling cycle (f.c)

't' = time taken by a class II tree to pass into class I.

'Z' = percentage of class II trees that do not pass into class I in 't' years; due to mortality or removal in thinning, etc.

Values of 't' and 'Z' can be obtained with reasonable accuracy by re-enumeration of large sample areas, statistical sample plots, from Yield Tables or even by considering the normality of the existing distribution of dia. classes.

(v) After calculating 'x', the area of the Working Circle, or the Felling Series(F.S), is subdivided into 'f' annual coupes, made as equi-productive as enumerations and W.P.O's knowledge of the forest permits. The W.P.O may prescribe the annual yield of Class I trees by any of the two alternative methods, viz.:-

1. Fix a volume yield of 'x' trees per hectare area of the coupe, per annum, i.e., $x \times \text{Total area of F.S./f.c.}$. If the data are correct, this ensures no reduction of class I trees at the end of the felling cycle.

2. The second alternative (and a better one) is to prescribe an area yield, by dividing the forest into 'f' annual coupes and limiting the removal of class I trees to a percentage 'p' of their number per ha ('N') in the coupe of the year at the time of marking. The number 'N' is ascertained by the marking officer at the time of marking the year's coupe and can also be expressed in terms of 'I', the number of class I trees per ha at the beginning of the f.c., and 'x'.

The number of class I trees per ha at the end of the f.c. = $I + x$. Therefore, the average number of trees, i.e., 'N' during the f.c. = $I + \frac{x}{2}$

The percentage of class I trees to be removed in any year's coupe then becomes (taking average value of 'N', which is strictly true of the 'f/2 year's coupe only; it will be an over-estimate for the earlier coupes and an under-estimate of subsequent coupes):

$$\text{Yield} = \left(\frac{x}{I + x/2} \times 100 \right)$$

In order to allow for the influence of various factors, which may affect the realization of the full calculated yield (e.g., silvicultural non-availability, allowance for low-density of Class I trees requiring to be increased, need for sustaining average yield and revenue, etc., and also to round off the percentage, an arbitrary allowance of $\pm A$ is given and the formula becomes :

$$Y = \left(\frac{x}{I + x/2} \times 100 \pm A \right) \% N$$

Of the two formulas involved in this method, the principle underlying the equation:

$X = \frac{f}{t} (II - Z\%II)$, gives the measure of recruitment of selection trees from the next lower class, and forms the basis of the safe-guarding Formula. The actual yield is prescribed as a percentage of the exploitable trees found in the course of the year, as given above.

Smithies' formula is now very widely used in Selection forests of India.

Chapter IX

ESTIMATE OF CAPITAL VALUE OF FORESTS

9.1 Volume and Value of standing trees enumerated: The enumeration has been carried out in as per the procedure laid down in at point no.6.6.1 of the PWPR and the working circle wise analyzed data was then extrapolated to assess the growing stock of the Nachan Tract. Thus, on the basis of enumerations carried out, total volume of standing trees has been tabulated as under:-

(Table 1)

Species	Deo/Kail WC	Fir/spruce WC	Oak WC	Chil WC	Total	Rate Per cum (Rs.)	Value (inRs.)
Deodar							
Number	1065344	68136	110927	37392	1281799		
Vol.	793480.60	76959.78	18953.39	25673.15	915066.9	47624	43579146045.60
Kail							
Number	1889872	463383	81660	27338	2462253		
Vol.	425713.04	133675.80	47933.60	33807.56	641130	38044	24391149720.00
Fir/Spruce							
Number	479176	1179967	--	5468	1664611		
Vol.	252852.16	2351601.00	--	15255.56	2619709	22437	58778410833.00
Chil							
Number	245224	--	102617	1132151	1479992		
Vol.	38289.28	--	40240.95	232763.85	311294.1	18630	5799409083.00
Broad Leaved							
Number	----	339497	1001598	450462	1791557		
Vol.	----	158915.40	381282.77	79608.98	619807.2	6888	4269231993.60
Total Nos.	3680216	2050983	1296802	1652811	8680212		
Total Volume	1510335.08	2721152.00	488410.71	387108.69	5107006	Total Value	136817347674.00

* The rates applied for calculation of value are as per PCC HP letter No. Ft. 21-700/82(S) Vol. VIII for the year 2011-12.

9.2 Value of Forest land: - Under different working circles, Range-wise area, in hectares, is tabulated as under:-

Range	DPF		UPF		Total	
	No. of Forests/ Comptt.	Area(ha)	No. of Forests/ Comptt	Area(ha)	No. of Forests/Co mptt	Area(ha)
Nachan	133/258	9507.86	03	40.00		
Pandoh	109/196	7811.20	01	80.00		
Seraj	153/227	9608.60	06	144.00		
Thachi	128/275	9768.60	18	259.00		
	523/956		28	523.00	551/984	37219.56

For assessment of the total value of the land, the value of land as applicable in FCA cases which was approved by Supreme Court of India can safely be applied. The rate applicable for the Nachan tract is Rs. 699000 and same rate is applied here to calculate the value of land. The total value of land is thus:

37219.56 haX Rs. 699000 = Rs. **26016262740/-**

The value of NTFP and grass production is not assessed and is therefore ignored.

The total value of Forests of Nachan Forest Division is assessed as:

(136817347674.00+26016262740.00) = Rs. **162833610414.00**only



CHAPTER I

BASIS OF PROPOSALS

1.1 OBJECTIVES OF MANAGEMENT:

Consistent with the objectives of management as laid down in the National Forest Policy, 1988 and Himachal Pradesh Forest Sector Policy and Strategy, 2005, the general objectives of management of forest shall be as under:

- i) To conserve and improve the quality and productivity of the existing forests for the maintenance and restoration of environmental stability and ecological balance, sustainable utilization and recreational forestry.
- ii) To conserve and manage forests scientifically, sustainably and contemporarily by incorporating the best practices in order to achieve normal forests as far as possible.
- iii) To check soil erosion and denudation of catchment areas of natural streams and rivers by adopting appropriate soil and water conservation measures.
- iv) To protect, conserve, and manage the biological diversity including the vast variety of flora and fauna native of the area.
- v) To strive for livelihood security of local forest dependent communities through protection of rights to forest goods and services.
- vi) To increase substantially forest and tree cover through massive afforestation on all degraded and denuded areas to reduce pressure on existing forests.
- vii) To create conditions conducive for active peoples participation and involvement in the management of forests.

1.2 METHOD OF TREATMENT TO BE ADOPTED:

The era of timber centric forestry is now over and the forests are now to be managed primarily for the conservation of biodiversity, management of wildlife habitat and for soil and water conservation. In the previous working plans, Indian Irregular Shelterwood system was adopted to manage the forests

but due to the ban on green felling and commercial extraction of timber in the state the said system has become out of place in the present scenario. In the changed context of present day forestry, which is more conservation oriented and eco system service rather than timber centric, the Selection System is the most suitable system because it is the closest form of natural system of forest management. The biodiversity conservation is the bedrock of the modern forestry which is best achieved under Selection System. Therefore, in place of Indian Irregular Shelterwood System, Selection system is being adopted for management of the forests of Nachan Forest Division.

1.3 CONSTITUTION OF WORKING CIRCLES:

Since forests have been proposed to be managed under Selection System, keeping in view the objectives of management following working circles have been constituted with an area shown against each.

(Table No. 1)

Sr. No.	Name of Working Circle	Area under Working Circle	Annual yield prescribed
1	Deodar Kail Working Circle	8002.84 ha	43307Nos.
2.	Chil Working Circle	5219.61 ha	8749Nos.
3	Fir Spruce Working Circle	8535.21 ha	56001Nos.
4.	Oak Working Circle	2103.49 ha	8000cum
5	Protection Working Circle	12074.92 ha	No yield prescribed
6	Plantation Working Circle	1283.49	-
7	Grazing(Overlapping) Working Circle	-	-
8	Soil & Water(Overlapping) Conservation Working Circle.	-	-
9.	Joint Forest Management Working Circle	-	-
10	Wild Life Management(Overlapping) Working Circle	-	-
11	Non-Timber Forest Produce	-	-

	Management Working Circle.		
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1.3.1 DEODAR AND KAIL WORKING CIRCLE:

This working circle comprises of the forests with Deodar and Kail either occurring pure or in mixture with other species, containing Deodar and Kail as 60 % or more, keeping the consideration of slope, accessibility and suitability for regeneration, will be included in this working circle. These forests will be managed under Selection System. The emphasis will be laid on natural regeneration supplemented with artificial regeneration. This working circle covers an area of 8002.84 hectares. The total annual yield prescribed from this working circle is in terms of no of trees viz. 43307 Nos. The compartments which are allotted to DKWC are divided in 15 annual coupes which will be worked every year during the period of the plan.

1.3.2 CHIL WORKING CIRCLE:

This working circle comprises of 5219.61 ha. of pure Chil forests as well as areas of Chil plantation that lie in the lower parts of this division. All the pure Chil forests or the forest containing Chil as 60 % or more in composition are included in this working circle. The forests of this W.C. are poorly stocked, degraded and mostly blank due to heavy biotic interference like grazing, fire, breaking up of lands for agricultural use especially in UPFs. Prolonged tapping of trees for resin and uprooting of trees by wind and snow have caused a vast destruction to the crop. The special objectives of management are to harvest the standing mature/over mature Chil trees on a sustainable principle, with an aim to regenerate the forests and also to free them from suppression the established regeneration of overhead shade to allow optimum conditions for growth and restocking of the poorly stocked and blank as far as possible through closure and afforestation. The total annual yield prescribed is 8749 Nos.

1.3.3 FIR AND SPRUCE WORKING CIRCLE:

This Working Circle includes Silver Fir, Spruce or mixture of both. B.L. species, situated comparatively on easy grounds and can be worked under

Selection System. All the Fir & Spruce forests with the consideration of accessibility for exploitation and suitability for regeneration purpose, occurring either pure or in mixture with B.L. species as 60% or more are allotted to this Working Circle. The “Selection System” will be adopted for Silvicultural Operation. The emphasis will be laid down on natural regeneration supplemented with artificial regeneration. Total area of working circle is 8535.21 Ha and the annual yield prescribed is 56001 Nos.

1.3.4 OAK WORKING CIRCLE:

The Working Circle includes all the Ban (Oak) forests situated in the tract. These forests will be worked for meeting the firewood and fodder supplies of the tract. The Ban Oak is the main species. The stocks are middle aged to mature with some stands of pole stage. Seedling and sapling regeneration is almost absent due to heavy pressure of grazing. Ban Oak trees near the villages have been heavily lopped and reduced to scrub. *Rhododendron*, *Lyonia ovalifolia*, *Litsea corpinus* are important associates of Ban Oak. The forests will be worked under coppice with standard with a rotation of 30 years for coppice and 90 years for standard as fixed in the plan under revision. No efforts should be made to convert these forests into conifer or other broad leaved species as was the practice in the past. The annual coupe will be 20 ha. The yield will be controlled by area as well as by volume. Total area of working circle is 2103.49 Ha.

1.3.5 PROTECTION WORKING CIRCLE:

This circle will include DPFs having steep, precipitous, inaccessible and broken terrain comprising of conifers, Ban or open crop of broad leaved species. These forests are mainly situated in difficult, precipitous and erodible terrain and form the catchments of River Beas and perennial streams. These forests are required to be maintained for the preservation of biodiversity and also required as permanent clothing to the difficult terrains. In this working circle, the forests allotted are of (a) Ban, Mohru and Kharsu forests (b) Northern dry mixed deciduous forests (c) Western Oak, Fir forests. As no felling other than marking to the local right holders are proposed in these areas hence no silvicultural system is prescribed. Planting of suitable species of

Deodar, Kail, Oaks and other B/L species will be taken in these areas. Total area of working circle is 12074.92 Ha.

1.3.6 PLANTATION WORKING CIRCLE:

This working circle include areas which are devoid of vegetation and young plantation comprising of demarcated and un-demarcated protected forests as are mostly tree less and suitable for plantations. Areas of failed plantation, Broad leaved, Scrub and Scattered trees grown requiring restocking with Deodar, Kail, Chil and other species will be included in this working circle. These areas are deteriorating gradually for lack of concentrated attention. These extended wooden areas will improve the economy of local people by providing fodder, fuel wood as well as livelihood etc. Only such areas will be included which has site factor favorable for raising plantations. The plantation will be raised by planting seedling from the nurseries. In the areas at high altitudes and stocked with natural species, plantation of species naturally occurring in the vicinity will be planted in the plantation areas. In areas at lower altitude adjoining to habitations species of importance to local people will be planted. Total area of working circle is 1283.49 Ha.

1.3.7 GRAZING WORKING CIRCLE:

This Working Circle covers whole of the geographical area of the Division. The area which will be available for grazing to the graziers is the total area of the Division except those areas which will be closed for grazing as mentioned in other working circles. Forest area will be managed in accordance with the prescription of concerned Working Plan Circle to which they are allocated. This Working Circle is concerned with the management of grazing, grass cutting and lopping etc.

1.3.8 SOIL AND WATER CONSERVATION WORKING CIRCLE:

This Working Circle overlaps all other Working Circle. Apart from this it also includes all the UPF's, other Govt. lands and also all categories of private lands falling in this Division. The entire tract is drained into River Beas by its tributaries like Bakhli, Thirthan, Chouri and Jiunikhad etc. All areas by and

large require soil and water conservation measures in varied degrees. The objectives are to identify critically eroded and water scarcity areas and suggest suitable prescriptions for treatment in order to arrest soil erosion and to improve water regime.

1.3.9 JOINT FOREST MANAGEMENT WORKING CIRCLE:

This Working Circle includes demarcated forests and UPFs near to habitations which have become degraded. Besides these DPFs and UPFs, it also includes the UPFs which are in small bits, honeycombed surrounded by cultivations and are left out after demarcation and settlement. Furthermore, these categories of area are heavily encroached upon and it will be a very good attempt to manage these forests through people's participation approaches. Joint forest management committees under the FDA scheme of the state government are formed to manage such kinds of forest lands in collaboration with the forest department.

1.3.10 WILDLIFE MANAGEMENT WORKING CIRCLE:

This working circle includes the forest areas of the entire division where the wildlife population is threatened due to disturbance in their habitats. In this working circle the management of wildlife in their habitats and the management of human-wildlife conflict are prescribed.

1.3.11 NON-TIMBER FOREST PRODUCE MANAGEMENT WORKING CIRCLE:

This chapter includes all areas of the tract except private tilled lands where agricultural crops are grown. The special objects of management are to ensure scientific harvesting of NTFP by enforcing control of methodology of harvesting NTFP species found in the tract, to develop the resources by natural or artificial means wherever and to the extent possible, to promote ex-situ and in-situ cultivation and conservation of important NTFP species, to improve the quality and quantity of NTFPs in the area for sustainable management so as to ensure continuous supply of these products consistent with the capacity of the land resource, to maintain and improve the gene pool for biological diversity and conservation.

1.4 PERIOD OF THE WORKING PLAN:

The period of the current working plan will be 15 years i.e. 2013-14 to 2028-29 commencing from 1st April, 2013. The working plan under revision expired on 31-3-2007.

1.5 NUMBER OF FORESTS:

The old distinction between old and new DPF has been removed and only one category of DPF is retained. The denomination of OD and ND has been removed and the numbering is done in clockwise sequence starting from Nachan Range and denoted as DPF and UPF only.

CHAPTER II

THE DEODAR – KAIL WORKING CIRCLE

2.1 GENERAL CONSITUTION OF WORKING CIRCLE:

This working circle comprises of the forests with Deodar and Kail either occurring pure or in mixture with other species, containing Deodar and Kail as 60 % or more, keeping the consideration of slope, accessibility and suitability for regeneration, will be included in this working circle. The basis of constitution of this working circle will remain the same as in the earlier working plan.

Since, no felling have been undertaken for about last 30 years prescribed in the plan under revision based on Shelter Wood system and in the changed context of the present day forestry i.e. more eco system – service rather than timber centric, therefore, Selection System is the most suitable system because it is the most natural system that allows the forests to remain as they are and nature of canopy almost remains unchanged. Thus, these forests will be managed under Selection System. The emphasis will be laid on natural regeneration supplemented with artificial regeneration. The overall condition of the crop is young to middle age with a few mature age groups besides above, the suitable forests as have promising Deodar regeneration coming up naturally in compartments of Chil working circle will be included in this working circle.

2.2 GENERAL CHARACTERS OF VEGETATION:

This working circle covers an area of 8002.84 hectares. The forests of this circle lie at lower elevation and proximity of villages. Due to their accessibility and the valuable species of Deodar and Kail, they are by far the most valuable.

The crop is generally irregular except Kail forests of Thachi Range which are even aged. The crops are fairly well stocked, except on southern slopes or on steep portions. Deodar forests are mostly of quality II. Kail is suffering from the attack of *Trametespinii* in most of the forests. Deodar and Kail trees are heavily lopped in the forests adjoining habitations.

2.3 THE SPECIAL OBJECTIVES OF MANAGEMENT:

The special objectives of management will be:-

- (i) To improve health of the forest by reducing congestion and by removing overhead shade.
- (ii) To restock the area deficient in natural regeneration by artificial means.

THE DEODAR – KAIL WORKING CIRCLE

- (iii) To provide bonafide requirements of timber, firewood and fodder to the Right holders on the more systematic lines for bonafidedomestic purpose, as per settlement report through participatoryforest management.
- (iv) Toobtain maximum sustained yield of timber and eco system-services from the forests.

2.4 FELLING SERIES:

The whole working circle constitute only one felling series i.e. Nachan Felling Series. The total areas of working circle constitute the felling series i.e. 8002.84ha.

2.5 BLOCKS AND COMPARTMENT:

The existing blocks and compartments of the forest have been retained. But since some new area have been added, there is re-organization and creation of new blocks and compartments and these are placed in suitable working circle as per their composition. The list of forests and compartments added from Wild life Sanctuary Shikari Devi is tabulated as under:-

(Table No. 2)

Compartmentwise and Blockwise details of forest area transferred from Shikari Devi Wild Life Sanctuary during 2014 is listed below									
Sr. No.	Name of Forest	Old No.	New No.	Comp tt No.	Deodar/Kail W.C.				
					I	II	III	IV	V
1	Chulinal		OD 313	C-1	0	55.85	0	0	0
				C-2	34.80	0	0	0	0
				C-3	0	44.11	0	0	0
	Total				34.80	99.96	0	0	0
2	Devidarh		OD 316	C-1a	0	35.73	0	0	0
				C-1b	31.05	0	0	0	0
				C-2b	0	0	31.05	0	0
	Total				31.05	35.73	31.1	0	0
3	Tokhrinal		OD 315	C-1	0	48.97	0	0	0
4	Poinal		OD 04	C-1a	21.41	0	0	0	0
				C-1b	22.76	0	0	0	0
				C-1c	0	17.34	0	0	0
				C-2a	0	17.57	0	0	0
				C-2b	35.43	0	0	0	0
	Total				79.60	83.88	0	0	0
5	Daint		OD 301	C-1b	0	0	28.87	0	0
				C-3	0	39.66	0	0	0
				C-4	0	79.32	0	0	0
				C-5a	55.23	0	0	0	0

THE DEODAR – KAIL WORKING CIRCLE

	Total				55.23	118.98	28.9	0	0
6	Tungrasni		OD 310	C-5	0	57.47	0	0	0
				C-6	23.47	0	0	0	0
				C-7	36.02	0	0	0	0
				C-8a	0	26.38	0	0	0
				C-8b	0	34.32	0	0	0
	Total				59.49	118.17	0	0	0
7	Charagti		OD 31	C-1a	0	40.78	0	0	0
				C-1b	29.78	0	0	0	0
				C-1c	0	54.49	0	0	0
	Total				29.78	95.27	0	0	0
	Grand Total				289.95	551.99	59.92	0	0

2.6 ANALYSIS AND VALUATION OF THE CROP:

2.6.1 AREA STATEMENT:

The range wise and species wise area distribution is as under:

Area Analysis of Crops Demarcated/ Undemarcated Forests

(Table No. 3)

Range	Species-wise Area in Ha											
	Deodar	Kail	Chil	Spruce	Silver Fir	Ban	Kharsu	Mixed Conifers	Misc Broad Leaved	Mixed B/L Conifers	Blank	Total
Thachi	485.18	1028.92	50.40	43.04	20.86	9.73	-	125.13	47.51	6.39	29.72	1846.88
Pandoh	214.48	36.28	51.42	19.72	-	17.28	-	74.88	3.33	-	38.59	455.98
Seraj	471.34	1485.21	1.17	51.12	-	153.93	-	471.11	9.63	-	25.48	2668.99
Nachan	1494.1	648.45	205.02	114.37	-	117.35	175.60	237.95	-	38.15	-	3030.99
Total	2665.1	3198.86	308.01	228.25	20.86	298.29	175.60	909.07	60.47	44.54	93.79	8002.84

2.6.2 STOCK MAPS:-

The forests allotted to this working circle have been stock mapped. These stock maps have been placed in the concerned Compartments History Files. These are prepared on 1:5000 scale maps. Regenerations maps on 6" = 1 mile scale or 1 = 3750 are prepared.

2.6.3 QUALITY CLASSES:-

Each compartments and sub-compartments has been assigned a site quality by ocular / actual measurement of height and diameter of dominant trees. The average quality for Deodar and Kail is II (FRI).

2.6.4 AGE CLASSES:-

The stands are irregular, but occur in compact patches. Broadly age classes viz. young, middle aged, mature. All age classes are present but middle aged trees predominate.

2.6.5 ENUMERATIONS:

Enumeration has been carried out as per methodology suggested in the PWPR vide point No. 6.6.1. The list of methodology is as under:-

1. All the compartments of a division after inspection should be allocated to one or the other Working circle and then the compartment falling in a working circle should be arranged in some order (if they can be arranged in spatial order, it will be better) and numbered 1,2,4 and so on.
2. Out of 1, 2 and 3 one number is to be randomly chosen, say number 2 is selected randomly.
3. It means that compartment which is numbered 2nd in item 1 is included in the sample of compartments (compartment is first stage sampling units)
4. Adding 3 to this number will provide next selected compartment ($2+3 = 5$), i.e. 5th compartment is selected.
5. Going this way, compartments numbered 2, 5., 8, 11 and so on will be selected.
6. At least, eight compartments should be selected from each Working Circle.
7. Having selected these compartments, field crew who is responsible for enumeration has to reach at the location of compartment with sketch of the compartment drawn from CH file indicating direction of the sides and approximate length of sides.
8. Locate the South-West corner (S-W corner) of the sketch on the ground.
9. From this point, with the help of compass, go 100 meter in East direction. From this point go 50 meters in North direction. This is the location of first sample point (second stage sampling unit).
10. From the S-W corner, now go 100 meters in north direction and from there go 50 meters in each direction. This is the location of second sample point in that compartment.
11. Now locate the north-east (N-E corner) corner of the sketch on the ground.
12. From this point, with the help of compass, go 100 meters in west direction, from this point go 50 meters in South direction. This is the location of third sample point.

THE DEODAR – KAIL WORKING CIRCLE

13. From the N.E. corner, now go 100 meters in South direction. This is the location of fourth sample point in the compartment.
14. This way four points are selected in every selected compartment.
15. These points are plot centers of the plot where enumeration is to be carried out.
16. After reaching the plot centers put a stout peg of 10 cms. Diameter and 1.5m height, and fix it firmly on the ground. If a GPS is available take the Longitude, Latitude and Altitude of the plot center . Selected a large tree near the plot center and take bearing and distance of plot center from this tree. The bearing and distance of the plot centre from the tree be written with red paint on this tree stem after making a square blaze at the breast height. The GPS co-ordinates and the measurements from the nearby tree would help in the location of the plot center at the time of checking by the checking party.
17. After reaching the plot center, from true north, fix the NE at 45^0 , SE at 135^0 , SW at 225^0 NW at 315^0 corners of the plot by measuring 22.36 m horizontal distance i.e. half of the diagonal by steel tape in all four directions.
18. Check the dimensions of the plot i.e. all sides should measure 31.62 meters horizontal distance. Care should be taken to adjust the dimensions of the plot according to slopes.
19. The data regarding herbs and shrubs (including regeneration) is to be collected from four square plots of 1mx1mand 3mx3m respectively. These plots will be laid out 30 meters from the center of 0.1 ha. Plot in all four directions along diagonals in non-hilly area and along trails in hilly areas. In case of hilly areas the plot will be taken randomly 2-10 meters away either side of the trail as shown in the diagram. Now to lay out 1m x 1m square plots for herbs whose centers are marked at 30 meters from the center of 0.1 ha. Plot, mark four points at the distance of 0.71 meter along diagonal in both sides and at right angles. Join all the four points. Similarly, for shrubs and regeneration square plots of 3m x 3m will be laid out at the same centre by marking and joining four points at 2.12 meters distance along diagonal and at right angles.

From the center of 0.1 ha. plot The diagonal 50m in each direction Square plot of 3m x 3m from shrub And regeneration, 1m x 1m

20. This methodology may provide estimates at 10% SE at Working Circle Level.

THE DEODAR – KAIL WORKING CIRCLE

The enumerations results have been given in the Compartments History File of the concerned compartment.

The sample enumeration done Range wise in the Deodar/ Kail working circle is at **Page No. 60-77 in Appendix III of Volume-II**

THE DEODAR – KAIL WORKING CIRCLE

The Specieswise and classwise extrapolated enumeration results of Deodar/Kail Working Circle:

(Table No. 4)

DEODAR KAIL WORKING CIRCLE (NO.OF TREES/VOLUME)

Name of WC	Area in ha	Spp.		V	IV	III	IIA	IIB	IA	IB	IC	ID	Total	No./Vol. m3/ hac
DKWC	8002.84	Deo	T	606680	183512	87000	65888	54288	32016	19256	9512	7192	1065344	130.33
			V	39434.2	55053.6	69600	113656.8	158792.4	133666.8	103982.4	63017	56277.4	793480.6	97.07
		Kail	T	1512408	252880	51504	26912	24128	15544	4408	1856	232	1889872	231.2
			V	105868.56	68277.6	34507.68	40368	68764.8	67927.28	25346	12843.52	1809.6	425713.04	52.08
		Rai	T	271904	112056	41760	22272	11368	8816	3944	2088	1392	475600	58.18
			V	20392.8	31935.96	31320	33964.8	31262	40553.6	25241.6	17434.8	14163.6	246269.16	30.13
		Tosh	T	2088	696	464	232	0	232	0	0	464	4176	0.51
			V	156.6	191.4	371.2	417.6	0	1107.8	0	0	4338.4	6583	0.81
		Chil	T	161008	62640	15080	4872	1160	464	0	0	0	245224	30
			V	8050.4	10648.8	9349.6	6333.6	2482.4	1424.48	0	0	0	38289.28	4.68
G.Total			T	2554088	611784	195808	120176	90944	57072	27608	13456	9280	3680216	450.22
			V	173902.56	166107.36	145148.48	194740.8	261301.6	244679.96	154570	93295.32	76589	1510335.1	184.77

2.7 SILVICULTURE SYSTEM:

The “Selection System” will be adopted for Silvicultural Operation. Mainly Natural Regeneration will be relied upon and supplemented with planting wherever required. The black patches and areas available for planting have been listed in plantation working circle.

The Selection System is defined as a Silvicultural System in which fellings and regeneration are distributed over whole of the area (except in so far as felling cycle introduces a modification) and the resultant crop is so uneven-aged that trees of all ages are found mixed together over every part of the area. Such a crop is referred to as ‘Selection forest’ or ‘all-aged forest’. The main features of the selection system are:

- (i) The felling and regeneration in Selection System are distributed over the whole area.
- (ii) The resultant crop in the Selection System is completely uneven – aged, so much so that all age – classes are mixed together on every unit of area.
- (iii) In Selection System, regeneration operations are carried out throughout the life of the crop and thinning is done simultaneously for improving the growth and form of trees.

2.7.1 ADVANTAGES OF SELECTION SYSTEM:

In its ideal or typical form described so far, the Selection System offers following advantages:-

- (i) The Selection System results in the production of a selection forest in which trees of all ages are mixed together on each unit of area. Thus, the system maintains not only a continuous canopy at the top but also some layers of canopy below it, making full use of the site factors. While the crowns of trees make full use of the environment above the ground, their roots draw sustenance from different layers of soil.
- (ii) By maintaining a continuous leaf cover, both horizontally and vertically, the Selection System conserves soil and moisture to the fullest extent possible.
- (iii) The selection forest produced by this system is most resistant to injuries by insect pests and adverse climatic factors. It prevents invasion of grass and weeds also.
- (iv) Natural regeneration comes up without difficulty due to abundance of seed bearers, use of every seed year, and the protection afforded to seedlings. The forest regenerates itself continuously, without any limit to the length of time.

(v) As the lower age class trees grow below the older trees, the Selection System results in producing more growing stock in large sized trees per unit area than the Uniform System. On the basis of data collected from an 80 acre forest, Bourne (6) has proved that uneven-aged forest has not only larger growing stock but also higher increment.

(vi) It is claimed that this is the best system for producing large-sized trees. Isolated trees with well-developed crowns and long clean boles, as a result of side shade of the lower trees, maintain high growth percent upto greater age, while in Uniform System continuous horizontal competition retards growth resulting in lower increment percent.

(vii) It produces a forest which is superior biologically, as well as in its aesthetic and scenic values, to the forests of Uniform System.

2.7.2 DISADVANTAGES OF SELECTION SYSTEM:

The following are the main disadvantages of Selection System:

(i) Considerable skill is required in carrying out marking and felling to ensure regeneration to come up in the gaps. This requires an intimate knowledge of the silviculture of species on the part of marking officer.

(ii) As the mature trees to be removed are scattered, cost of logging and extraction is higher.

(iii) As the mature trees stand over the young crop, felling, logging and extraction, howsoever carefully done, results in damage to the young crop.

(iv) As the seed is obtained from good as well as bad trees, inherent qualities of timber of the young crop may not be high. This system cannot take advantage of the genetically superior trees alone, as inferior trees also disperse their seed in the same area. This imposes a serious disadvantage from genetically point of view.

(v) As regeneration is a continuing process all over the area, protection against grazing can be achieved only when the entire area is closed. But as this is not feasible, the area remains open to grazing with consequent damage to regeneration.

(vi) As the area is extensive, strict fire protection is difficult to achieve. Thus accidental fires result in damaging the young regeneration.

(vii) Success or failure of regeneration is difficult to assess. This often results in wrong judgment about the success of regeneration and, consequently, continuance of felling, even when regeneration is not coming up, depletes the stock.

(viii) In a mixed crop with lower percentage of valuable species, when valuable trees are removed, their vacancies are often filled up by regeneration of less valuable species. Thus, the growing stock progressively degenerates with every felling.

2.8 Exploitable diameter:

The exploitable diameter above which the trees are considered mature in these forests is kept at 60 cm and above diameter at breast height (dbh). Since Deodar and Kail are of middle to mature age classes and selection system aims at sustained yield of timber and maintaining natural forest, 60cm and above exploitable diameter is reasonable enough to achieve these objectives. Selection System will result in more uneven aged forests compared to shelter wood system.

2.9 Felling cycle:

Felling cycle is the time which elapses between successive felling on the same area. Simons has shown that with a yield assessed at 2 % of the growing stock, a felling cycle of 10 years would result in removal of approximately 20 % of growing stock in a circle. They maintain selection nature of these forests. The period of the working plan is 15 year i.e. 2013-14 to 2028-29, hence felling cycle is proposed for 15 years to coincide with the period of the working plan, under Ideal Selection System in which fellings are carried out over the whole area each year.

2.10 CALCULATION OF THE YIELD:

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CALCULATION OF YIELD OF DEODAR:

No. of class I trees = > 60 cm dbh = 32016+19256+9512+7192 = 67976

No. of class II trees = 50-60 cm dbh = 54288

(Note: Refer to Table No.4at Page No.118)

Where, f = 15 years, t=25 years, z= 25 %

No. of class II trees
which pass into class I
trees, during felling
cycle (per ha.),

$$x = \frac{f}{t} (II - z \% II)$$

$$= \frac{15}{25} \left(54288 - \frac{25}{100} \times 54288 \right)$$

$$= 24430$$

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$$\begin{aligned}\text{Avg. No. of trees during the F.C., } N &= I + \frac{x}{2} \\ &= 67976 + \frac{24430}{2} \\ &= 80191\end{aligned}$$

$$\begin{aligned}\text{Yield, } Y &= \left(\frac{x}{I + \frac{x}{2}} \times 100 \right) \pm A\% N \\ &= \frac{24430}{80191} \times 100 \pm A\% N \\ &= 30.4-.4 \% 80191 \\ &= 30 \% \text{ of } 80191 \\ &= 24057 \text{ No. of trees}\end{aligned}$$

= 1 in 3 trees in a coupe above exploitable diameter and silviculturally available.

CALCULATION OF YIELD OF KAIL:

No. of classes I trees = > 60 cm = 15544 + 4408 + 1856 + 232 = 22040

No. of class II trees = 50-60 cm = 24128

Where, $f = 15$ years, $t = 19$ years, $z = 20 \%$

No. of class II trees which pass into class I trees, during felling cycle (per ha.),

$$x = \frac{f}{t} (II - z \% II)$$

$$\begin{aligned}x &= \frac{15}{19} \left(24128 - \frac{20}{100} \times 24128 \right) \\ &= \frac{15}{19} \times 19302 \\ &= 15238\end{aligned}$$

Avg. No. of trees

$$\begin{aligned}\text{during the F.C. } N &= I + \frac{x}{2} \\ &= 22040 + \frac{15238}{2}\end{aligned}$$

$$= 29659$$

$$\text{Yield, } Y = \left(\frac{15238}{29659} \times 100 \right) \pm A \% N$$

$$= 51.1 \% \text{ } 29659$$

$$= \frac{50}{100} \times 29659$$

$$= 14829 \text{ No. of trees}$$

= 1 in 2 trees in a coupe above exploitable diameter and silviculturally available.

CALCULATION OF YIELD OF RAI/ SPRUCE:

$$\text{No. of classes I trees} = > 60 \text{ cm} = 8816 + 3944 + 2088 + 1392 = 16240$$

$$\text{No. of class II trees} = 50-60 \text{ cm} = 11368$$

$$\text{Where, } f = 15 \text{ years, } t = 22 \text{ years, } z = 50 \%$$

No. of class II trees
which pass into class I
trees, during felling
cycle (per ha.),

$$x = \frac{f}{t} (II - z \% II)$$

$$x = \frac{15}{22} \left(11368 - \frac{50}{100} \times 11368 \right)$$

$$= \frac{15}{22} \times 5684$$

$$= 3875$$

$$\text{Avg. No. of trees during the F.C. } N = I + \frac{x}{2}$$

$$= 16240 + \frac{3875}{2}$$

$$= 18178$$

$$\text{Yield, } Y = \left(\frac{3875}{18178} \times 100 \right) \pm A \% N$$

$$= 21.1 \% \text{ of } 18178$$

$$= 20 \% \text{ of } 18178$$

$$= 3636 \text{ No. of trees}$$

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= 1 in 5 trees in a coupe above exploitable diameter and silviculturally available.

CALCULATION OF YIELD OF TOSH / SILVER FIR:

No. of classes I trees = > 60 cm = 232+464 = 696

No. of class II trees = 50-60 cm = 0

Where, f = 15 years, t = 25 years, z = 50 %

No. of class II trees which pass into class I trees, during felling cycle (per ha.),

$$\begin{aligned}x &= \frac{f}{t} (II - z \% II) \\&= \frac{15}{25} \left(0 - \frac{50}{100} \times 0 \right) \\&= \frac{15}{25} \times 0 \\&= 0\end{aligned}$$

$$\text{Avg. No. of trees during the F.C., } N = I + \frac{x}{2}$$

$$= 696 + \frac{0}{2}$$

$$= 696$$

$$\text{Yield, } Y = \left(\frac{0}{696} \times 100 \right) \pm A \% N$$

$$= 0 \% \text{ of } 735$$

$$= 0 \text{ No. of trees}$$

CALCULATION OF YIELD OF CHIL:

No. of classes I trees = > 50 cm = 464 = 464

No. of class II trees = 40-50 cm = 1160

Where, f = 15 years, t = 16 years, z = 25 %

No. of class II trees which pass into class I trees, during felling cycle (per ha.),

$$x = \frac{f}{t} (II - z \% II)$$

$$\begin{aligned}
 x &= \frac{15}{16} \left(1160 - \frac{25}{100} \times 1160 \right) \\
 &= \frac{15}{16} \times 870 \\
 &= 816
 \end{aligned}$$

$$\begin{aligned}
 \text{Avg. No. of trees during the F.C., } N &= I + \frac{x}{2} \\
 &= 464 + \frac{816}{2} \\
 &= 872
 \end{aligned}$$

$$\begin{aligned}
 \text{Yield, } Y &= \left(\frac{816}{872} \times 100 \right) \pm A \% N \\
 &= 94.4 \% 872 \\
 &= \frac{90}{100} \times 872
 \end{aligned}$$

= 785 No. of trees in a coupe above exploitable diameter and silviculturally available.

2.11 METHOD OF EXECUTING FELLINGS:

Unlike the forests created under systems of concentrated regeneration, in which trees of different age classes are found in different areas, where gradually mature trees die out and their place is taken up by younger regeneration. The Selection System follows nature in respect of its pattern of felling. Thus, scattered single mature trees are selected all over the area and felled to enable regeneration to replace them. As the process is repeated year after year, uneven aged character of the crop, in which trees of all ages are mixed together in every unit of area, is maintained. This is an ideal condition but even in nature it is seldom found. It is difficult to find trees of all ages mixed together in every nit of area. The regeneration generally appears in small groups because of periodicity in seed years and these age classes are found in small groups.

Areas to be worked under the Selection System are usually very large. It is not possible to go over the entire area annually. Therefore, the area to be worked under Selection System is divided into coupes and fellings confined to one coupe every year. Fellings are done coupe by coupe in a sequence each year and, when fellings are over in all the coupes, these are resumed in the first coupe in the second cycle. Thus, felling is done in a coupe after a certain number of years, which is equal to the felling cycle of coupes. This

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interval is known as felling cycle. Felling cycle adopted is 15 years under Ideal Selection System in which felling are carried out over the whole area each year. Hence there will be 15 coupes.

Conduct of felling: In the Selection System, following categories of trees are usually removed in descending priority.

- (i) Removal of trees of and above the exploitable diameter:
The trees of and above the exploitable diameter upto the numerical limit fixed by the working plan provided they are silviculturally available. A selection tree is considered silviculturally available if its removal
 - (a) Does not create a permanent gap in the canopy.
 - (b) Tends to improve the remaining crop in terms of volume production or
 - (c) Helps the growth of groups of young trees down to the sapling stage of any of the valuable species.
- (ii) Removal of Immature trees which can be removed in judicious thinning carried out in different age classes.
- (iii) Removal of Trees of undesirable species such as exotics.
- (iv) Removal of Dead, dying, diseased, misshapen or otherwise defective trees interfering with the growth of better trees.

2.12 FORMATION OF ANNUAL COUPES:

Annual coupes are the felling areas where the felling is confined to one coupe every year.

Annual coupe is calculated by dividing felling series by felling cycle ie $Ac = \frac{FS}{FC} = \frac{8002.84}{15} = 533 \text{ ha.}$

The compartments which are allotted to DKWC are divided in 15 annual coupes which are as shown in following table:

(Table No. 5)

Annual Coupe	No. & Name of Forests	Compartment	Area in Ha	Total Area of the Coupe
1	OD-6-Kawari Silh	C-1	12.82	517.00
	OD-7-Jufer Kot	C-1	23.55	
	OD-9-Manjhi	Whole	14.16	
	ND-14-Mathaini Dhar	C-1	27.84	
	-do-	C-2	26.79	
	OD-15-Dugha	Whole	35.61	

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	Kaloun			
	OD-18-Rangcha	C-1b	24.63	
	ND-23-Naraingarh	C-1a	30.00	
	-do-	C-1c	42.00	
	-do-	C-2e	64.60	
	OD-28-Sudhrani Silh	C-1a	46.65	
	-do-	C-2	21.45	
	OD-30-Parkhol	C-1a	26.69	
	-do-	C-1b	22.01	
	-do-	C-1c	13.62	
	OD-31-Darangahar	C-1	38.85	
	ND-34-Dhunjgehar	Whole	39.66	
	OD-36-Makhrol Dhar	Whole	6.07	
II	OD-38-Kashehal	C-1	29.39	532.88
	-do-	C-2	23.22	
	OD-39-Khani	Whole	37.63	
	ND-45-Segali	Whole	12.14	
	OD-46-Kali Safari	C-1a	24.28	
	OD-50-Chamdhiar	Whole	22.66	
	OD-51-Jhira Deori	C-1	25.50	
	-do-	C-2	25.09	
	-do-	C-3	23.88	
	OD-55-Chunjhu Chalar	C-1a	27.45	
	-do-	C-1b	19.39	
	-do-	C-2a	20.07	
	-do-	C-2b	25.36	
	ND-56-Chunjhu Chalar	Whole	17.00	
	OD-57-Malari	C-1	24.28	
	-do-	C-2a	35.35	
	-do-	C-2b	55.20	
	ND-58-Malari	Whole	18.62	
	OD-59-Kashal	C-1	39.64	
	-do-	C-2	26.73	
III	OD-68-Jhalru	Whole	29.14	545.24
	ND-69-Jhalru	Whole	2.43	
	ND-77-Bajha	Whole	4.05	
	OD-87-Birni Samlohi	C-1	52.00	

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	-do-	C-2	40.67	
	ND-88-Birni Samlohi	Whole	23.07	
	OD-89-Thachi	Whole	23.47	
	OD-90-Dhunju Segla	C-1	24.68	
	-do-	C-2	38.45	
	ND-91-Dhunju Segla	Whole	17.81	
	OD-92-Thah Nalout	Whole	34.80	
	OD-93-Shelapani	C-1	57.92	
	-do-	C-2	37.29	
	ND-95-Shelapani	Whole	10.52	
	OD-96-Kanisilh	C-2	27.11	
	ND-97-Kanisilh	Whole	6.07	
	OD-98-Janji Kalyala	Whole	32.38	
	ND-99-Janji Kalyala	Whole	4.45	
	OD-108-Marholi Silh	Whole	40.67	
	OD-109-Begloo	C-1	38.26	
IV	OD-109-Begloo	C-2a	32.65	530.76
	-do-	C-2b	22.98	
	OD-110-Salwad	Whole	29.14	
	OD-116-Badyar	C-3	40.32	
	ND-121-Chohari Kalyala	Whole	46.95	
	OD-122-Dudhagi	Whole	79.73	
	OD-132-Koon	C-1	36.91	
	-do-	C-2	31.08	
	ND-136-Khaliach	C-1	38.45	
	OD-138-Karthach	C-1a	14.40	
	-do-	C-1b(i)	20.59	
	-do-	C-1b(ii)	49.99	
	-do-	C-2	35.21	
	OD-143-Kholanal	C-1	15.64	
	-do-	C-3	36.72	
V	OD-318-Kajauri	Whole	43.30	525.17
	ND-328-Bakhali	C-1	50.60	
	-do-	C-2	25.48	
	OD-474-Dalika	C-2b	17.14	
	ND-477-Baniur	C-2	40.47	
	ND-353-Biradhar		29.95	

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	OD-357-Hallinu	C-1	40.99	
	-do-	C-2	34.74	
	-do-	C-3	59.38	
	-do-	C-4	30.75	
	-do-	C-5	40.20	
	OD-358-Chayali	C-1	22.56	
	-do-	C-2	27.22	
	OD-360-Bharot	C-1a	36.49	
	ND-376-Chakaryala	Whole	25.90	
VI	ND-377-Kandha	C-1	46.12	532.78
	-do-	C-2	17.70	
	ND-378-Jakanwali	Whole	37.64	
	ND-383-Dughal	C-1	6.48	
	-do-	C-2	10.52	
	OD-386-Chamani	C-2a	19.69	
	-do-	C-2b	33.83	
	-do-	C-3a	43.25	
	-do-	C-3b	22.30	
	-do-	C-4a	5.74	
	OD-387-Tandi	C-1	28.24	
	-do-	C-2	23.95	
	ND-392-Surandhi	C-2	34.56	
	OD-393-Dhar	C-1	30.08	
	-do-	C-2	32.58	
	ND-393-Dhar	Whole	42.56	
	ND-394-Dhameshi	Whole	6.48	
	ND-395-Ganeshi	Whole	39.66	
	ND-396-Shawa	Whole	40.07	
	ND-398-Gulandhi	Whole	11.33	
VII	OD-401-Jhurdi	C-1	22.43	522.62
	-do-	C-2	32.15	
	-do-	C-3	27.95	
	-do-	C-4	20.67	
	ND-402-Khanyog	Whole	13.36	
	OD-403-Gani	C-1a	25.25	
	-do-	C-1b	19.27	
	-do-	C-2b	26.06	
	OD-404-Bhakhariar	C-1	40.26	
	ND-405-Lot	C-4	35.01	
	OD-406-Deoth	C-1a	28.14	
	-do-	C-1b	32.16	

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	-do-	C-2a	23.56	
	-do-	C-2b	26.62	
	ND-407-Shodha	Whole	9.71	
	OD-408-Daint	C-1a	39.93	
	-do-	C-1b	28.87	
	OD-409-Kandhali	C-1	24.92	
	-do-	C-2	46.3	
VIII	OD-412-Gadoun Nal	C-1a	32.85	541.05
	-do-	C-1b	39.79	
	-do-	C-1c	34.20	
	OD-413-Kamru Nag	C-1a	10.52	
	-do-	C-1b	27.17	
	-do-	C-1c	36.32	
	-do-	C-1d	17.66	
	-do-	C-2d(i)	42.32	
	-do-	C-2d(ii)	47.12	
	ND-422-Kandhi Syash	C-2	38.89	
	ND-423-Samnos	Whole	6.07	
	ND-424-Kandhi	C-1	24.44	
	-do-	C-2	27.70	
	ND-426-Biradhar	C-1	36.64	
	-do-	C-2	16.55	
	-do-	C-3	39.32	
	OD-430-Darudeo	Whole	32.37	
	ND-436-Dofa	C-9	31.12	
IX	OD-452-Jabrat	C-1a	54.09	542.70
	-do-	C-1b	52.34	
	ND-454-Bhangroh	C-1a	33.86	
	-do-	C-1b	22.94	
	OD-455-Machhrot	C-3	18.83	
	OD-313-Chulinal	C-1	55.85	
	-do-	C-2	34.80	
	-do-	C-3	44.11	
	OD-316-Devidarh	C-1a	35.73	
	-do-	C-1b	31.05	
	-do-	C-2b	31.05	
	OD-315-Tokhari Nal	C-1	48.97	
	OD-411-Poi Nal	C-1a	21.41	
	-do-	C-1b	22.76	
	-do-	C-1c	17.34	

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	-do-	C-2a	17.57	
X	-do-	C-2b	38.43	544.22
	OD-309-Daint	C-1b	28.87	
	-do-	C-3	39.66	
	-do-	C-4	79.32	
	-do-	C-5a	55.23	
	OD-310-Tungrashni	C-5	57.47	
	-do-	C-6	23.47	
	-do-	C-7	36.02	
	-do-	C-8a	26.38	
	-do-	C-8b	34.32	
	OD-311-Chiragti	C-1a	40.78	
	-do-	C-1b	29.78	
	-do-	C-1c	54.49	
XI	OD-226-Baila	C-1a	28.66	532.88
	-do-	C-1b	5.94	
	-do-	C-1c	7.49	
	OD-227-Thathaini	C-1	29.72	
	-do-	C-2	26.13	
	OD-228-Bharmex	Whole	11.33	
	ND-236-Lehari Silh	C-2	32.85	
	-do-	C-3	57.23	
	OD-237-Gadgalu	Whole	74.46	
	OD-238-Chakruhan Dhar	C-1	44.80	
	-do-	C-2	46.25	
	OD-244-Baliyandha	C-1	29.62	
	-do-	C-2	33.51	
	OD-245-Odi Dhar	C-1	27.94	
	-do-	C-2	54.62	
	OD-247-Dhari Dhar	C-1	22.33	
XII	-do-	C-2	37.17	561.38
	OD-248-Chopru	C-2	27.52	
	OD-258-Malahach	C-4a	25.97	
	-do-	C-4b	25.98	
	ND-260-Sandrut	Whole	23.88	
	ND-261-Bakhrotu	Whole	31.97	
	ND-264-Khamrar	C-1	39.49	
	-do-	C-2	28.9	
	OD-265-Khamrar	Whole	12.14	
	OD-268-Bakhrar	Whole	14.36	

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	ND-268-Bakhrar	Whole	42.29	
	ND-269-Tand Tilar	Whole	14.97	
	OD-270-Bharari	C-1a	25.64	
	-do-	C-2b	29.16	
	-do-	C-1c	20.11	
	-do-	C-2a	26.48	
	-do-	C-2d	39.04	
	OD-272-Shikawari	C-1a	43.47	
	-do-	C-2	23.69	
	-do-	C-3	29.15	
XIII	OD-273-Soor	Whole	26.71	536.79
	ND-277-Bai Nal	Whole	29.95	
	OD-279-Auhan	Whole	37.23	
	OD-280-Daroun	C-1	29.43	
	-do-	C-2	32.49	
	-do-	C-3	32.78	
	OD-281-Sunash	C-1	40.81	
	-do-	C-2	27.99	
	ND-282-Jabal Sanjaur	Whole	7.69	
	ND-283-Jabal Sanjaur	Whole	7.28	
	ND-284-Dhias	Whole	1.62	
	OD-285-Riangalu	C-1	29.83	
	-do-	C-2	36.45	
	-do-	C-3	36.10	
	OD-286-Rahidhar	C-1	30.02	
	-do-	C-2	23.40	
	ND-287-Khalori	C-1	44.05	
	-do-	C-3	29.15	
	ND-288-Dharwargad	C-1	33.81	
XIV	OD-291-Kalyala Silh	Whole	27.52	504.28
	ND-292-Togra	C-3	28.05	
	-do-	C-4	59.22	
	ND-293-Bijahi Bir		2.83	
	ND-294-Baneshidhar	C-1	29.50	
	-do-	C-2	37.01	
	-do-	C-3	35.02	
	-do-	C-4	48.70	

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(i) Disposal of	ND-295-Baneshidhar	Whole	22.26	
	ND-296-Baneshidhar	Whole	28.33	
	ND-297-Bagsiad Silh	Whole	6.48	
	ND-298-Lota Silh	Whole	15.38	
	ND-302-Tikar Dhar	Whole	47.35	
	ND-316-Bara	Whole	16.19	
	ND-181-Jahalgad	Whole	11.41	
	OD-189-Shillibagi	C-1	28.89	
	-do-	C-2	31.00	
	ND-190-Shillibagi	Whole	29.14	
XV the felling	OD-199-Keoli	Whole	64.75	533.09
	ND-200-Keoli	Whole	47.35	
	OD-201-Sunah	C-1	31.15	
	-do-	C-2	47.36	
	ND-202-Sunah	C-3	55.04	
	ND-208-Nihari	Whole	42.09	
	ND-209-Nihari	Whole	42.09	
	OD-210-Bajoun	Whole	33.99	
	ND-218-Kulashi	Whole	11.74	
	ND-219-Bakhalwar	Whole	37.64	
	ND-223-Pokhari Silh	C-1	51.89	
	U-13-Dhingali	Whole	8.00	
	U-27-Kamrunag	Whole	20.00	
	U-20-Pounti Silh	Whole	40.00	

2.13 SUBSIDIARY SILVICULTURAL OPERATIONS:

(i) Disposal of the felling refuse

After the exploitation work is over, felling refuse has to be disposed off as cheaply and effectively as possible. The villagers should be encouraged to remove as much of the felling refuse as possible. Whatever felling refuse is left by the villagers should be disposed off in the following manner.

- A) The slash should be removed from around the base of retained trees at a distance of about five meters after the exploitation work is over. The branch wood and debris should be collected in small heaps and gaps but never under the crowns of seed

- bearer. This slash should be burnt under strict supervision. The bushes in the area are to be cut and burnt for clean bed. Debris burning should be done in the winter months.
- B) In areas where there is young re-generation and advance growth has been retained, slash should be removed from patches of re-generation or advance growth and collected in small heaves or gaps outside the re-generation patches. The slash should be carefully burnt. Care should be taken that no debris or log rolls down in young regeneration or advance growth during burning.

(ii) Sowing and planting

At the time of marking, problematic areas will be located and mapped for planting up in subsequent years. After debris burning in a good seed year, natural re-generation is thus supplemented by artificial planting. The areas are to be taken up in the rainy season following the years of exploitation and removal of slash. Thus, for reducing the period of closure to the shortest possible period, artificial re-generation is advocated.

(iii) Weeding and bush cutting

For healthy growth of plants, timely weeding is of immense importance. Growing season is first limited to the months of April, May and June and the plants must be kept free of weeds during this period. Growth retards with the onset of rains as the temperature falls, but still another weeding during July-August to keep the plants free of weeds as is essential and beneficial. The weeding will be continued till the plants are free from damage of weeds. Two weeding's are advocated for two years as under:

- | | |
|---------------------------|------------------|
| 1 st weeding - | June-July |
| 2 nd weeding- | August-September |

(iv) Cleaning

In cleaning operations, following type of stems will be removed.

- (i) Sickly and damaged stems.
- (ii) Forked stems
- (iii) Crooked short stems

The first cleaning is to be undertaken easily when the plants are two meters high. Frequent cleanings will be no doubt expensive but are necessary to attend the crop properly in the early stages. Cleaning will provide the best opportunity to regulate the mixture in favor of Deodar. The aim of cleaning is to remove the less valuable stems to provide growing for the better stems.

THE DEODAR – KAIL WORKING CIRCLE

(v) Control Burning

Control Burning will be done after the exploitation of coupe in safer places under the control of concerned forest guard. So that natural regeneration may take place easily.

(vi) Thinning

Thinning is very essential especially in the Kail forests where the crop is of young age and overcrowded. Due to profuse regeneration in Kail forests and since there is no green felling and the thinning has not been in practice for long time the crop of young age have become overcrowded and there is no proper growth of desirable trees. Thinning has to be carried out immediately especially in Seraj range. Necessary budget provisions for thinning under sub head of SSO should be made available to this division.

The area in which immediate thinning in Kail forest is required is given below:

(Table No. 6)

Range	Forests	Area (ha.)	No. of Trees	Remarks
Seraj	Gadagalu	74.46	--	The areas have been visited and inspected by the W.P.O. personally but sample enumeration has been carried randomly. Keeping in view ban on green felling and site visit these forests need special thinning.
	Odidhar	27.94	24	
	Balyandha	29.62	110	
	Pakharisilh	51.89	--	
	Khamrar	80.53	--	
	Sunah	133.05	--	
	Keoli C2	64.75	371	
	Shirthu	21.85	--	
	Shillibaghi C2	31	--	
	Baneshidhar C1 to 4	172.49	--	
	Lotasilh	15.38	--	
	Droun	94.7	--	
	Sunas C1	40.81	721	
	Tikkardhar	47.35	--	
	Laharisilh	32.85	--	
	Shodhasilh	20	--	
	Tharahan	29.72	--	
	Keolinal	125.46	--	
Pandoh	Koon C1 & CII	62.99	--	
	Khaliyah CII	70.85	--	
	Karhali	120	--	
	Kamera CV	131.26	--	
	Kholanal CI, CII, CIII	80.53	--	
	Kajuri	43.30	181	

THE DEODAR – KAIL WORKING CIRCLE

	Bakhli CI & II	76.08	--
	Dalika	435.45	--
	Banyur CI & CII	70.82	--
Thachi	Bagra		--
	Thunadigad	10	--
	Kanisilh	10	--
	Beglow	93.89	--
	Maninal	10	--
	Kalisafari	24.28	--
	Kashal CI & CII	52.44	--
	Khani	37.63	--
	Rangcha	24.63	--
	Naraingarh	42	--
	Lagjansilh	15	--
	JhiraDeori	74.47	--
	Jhulka	10	--
	Salwad	29.14	85
Nachan	Chayali	49.78	--
	Kelti	15	--
	Biradhar	20	--
	Kandha	63.82	--
	Dharot	36.49	244
	Galandhi	11.33	--
	Malhog	10	--
	Shattadhar	15	--
	Bhathadhar	10	--
	Dhar	62.66	--
	Chachiot	14.59	--
	Jawal	20	--
	Dofa	246.65	--
	Chamani	124.81	--
	Jablad	20	--
	Karnalasilh	20	--
	Bagkedanal	10	--
	Biradhar	92.51	--
	Kandhi	52.21	--
	Kandhisayas	38.89	910
	Samnosh	6.07	--
	Chain megal	10	---
	Deot	32.16	--
	Khaneog	13.36	--
	Bakhryar	40.26	117
	Ghaneshi	39.66	274

2.14 MISCELLANEOUS REGULATIONS:-

i) Other regulations regarding participatory forest management, closure of area, fire protection, plantation of NTFP and its exploitation, grass cutting and exercise of various rights admitted in these forests should be given.

ii) Right holder's requirements.

Their requirement will be met as per the new TD Policy of 2013. HP Forest (Timber distribution to Right holders) Rules, 2013 is under operation since 2013 for grant of timber for domestic purpose to the right holders viz, 7 cu.m. Standing volume for Construction of new house and 3 cum. Standing volume for repair of old house. Timber is granted once in 15 years for genuine requirements. In case of buildings destroyed due to natural calamities like Fire, Flood etc. timber is granted immediately. The grant of standing trees to the right holders after a gap of approx. eight years has led to enormous amount of applications and felling of large number of trees within a very short span of time. In many forests due to felling of trees and movement of lots of people in forests the undergrowths and the natural regenerations are trampled badly which will affect the future growth of the trees. Also in the timber distribution very good mother trees are felled which will hamper natural regeneration in the forests. The best way to meet right holders genuine requirements could be to distribute converted timber at Forest Corporation Sale Depot at subsidized rates so that only genuine people will claim for the timber and there will be no misuse of the timber thus obtained.

iii) Fire Protection

The whole of the working circle shall be protected against fire. Maintenance of cordial relations with the local people through participatory management, educating them properly and posting of fire watcher are some such measures. JFMCs identified for fire protection shall be given complete control of fire protection in their area. Timely action to extinguish fire will be taken through the help of right holders and joint forest management committees. Offenders to be booked under the Indian Forest Act, 1927, H.P. Panchayati Raj Act, 1994, Forest (Protection from Fires) Rules, 1999 and under the provisions of Indian Penal Code etc.

iv) Effective Closure

The plantation area should be closed for grazing and other biotic influences under the provision of Indian Forest, Act, 1927.

v) Demarcation of Forests

Pucca masonry boundary pillars shall be put along boundaries of reserve, demarcated and un- demarcated forests indicating the straight line distance between two consecutive pillars and noting backwards and forwards bearing at each boundary pillar and check pillars be put along the boundaries of the cultivated land. The boundary pillars which are in dilapidated condition are to be repaired on priority basis to control environment of forest lands.

vi) Lopping, Grazing and Grass cutting

These operations will not be allowed in areas prescribed for regeneration or areas with young crop, under the provisions of Indian Forest Act, 1927. Lopping, grazing and grass cutting and removal of pine needles will not be allowed in closed area and same will be allowed from other areas under the provisions of settlement report.

vii) Soil & water Conservation Works

In order to control landslides and to improve moisture regime in the forest areas, suitable soil and water construction works will be carried out. The areas to be treated will be identified and treated by constructing suitable engineering structures supported by plantation of Bio-engineering species like Agave, yucca, grasses etc.

Control Burning:-

It is of prime importance to protect our forests from fires, incendiary forest fires must be checked and controlled. Fire lines, inspection paths and bridle paths should be maintained and fire watchers should be engaged and provided with adequate fire fighting equipments in order to tackle and control fire incidences. In case of fires, local help is a must.

CHAPTER –III

THE CHIL WORKING CIRCLE

3.1 GENERAL CONSTITUTION OF WORKING CIRCLE:

This working circle comprises of 5219.61 ha. of pure Chil forests as well as areas of Chil plantation that lie in the lower parts of this division and detail of which appear in appendix. All the pure Chil forests or the forest containing Chil as 60 % or more in composition are included in this working circle. The established Chil plantation of 2.5 m in height and above also allotted to this circle.

3.2 GENERAL CHARACTERS OF VEGETATION:

The forests of this W.C. are poorly stocked, degraded and mostly blank due to heavy biotic interference like grazing, fire, breaking up of lands for agricultural use especially in UPFs. Prolonged tapping of trees for resin and uprooting of trees by wind and snow have caused a vast destruction to the crop.

3.3 SPECIAL OBJECTIVES OF THE MANAGEMENT:

The special objectives of management are:

- i) To harvest the standing mature/over mature Chil trees on a sustainable principle, with an aim to regenerate the forests and also to free from suppression the established regeneration of overhead shade to allow optimum conditions for growth.
- ii) Restocking of the poorly stocked and blank as far as possible through closure and afforestation.
- iii) To obtain the maximum possible yield of resin, timber on sustainable basis.
- iv) Protection of forests from natural destruction as well as biotic interference.
- v) To address the bonafide local demand of right holders to best possible extent.

3.4 FELLING SERIES:

The entire working circle constitutes one felling series.

3.5 BLOCKS AND COMPARTMENTS:

All the forests have been divided into compartments and sub-compartments of not more than 40 hac.in extent have been made to form compartments and sub-compartments by taking natural features i.e. Ridges and Nallas as the boundaries to make it a permanently defined unit. The PB wise area statement is as under:

THE CHIL WORKING CIRCLE

(Table No. 1)

Name of Range	Chil WC					Total
	I	II	III	IV	V	
Thachi	117.29	225.55	160.40	217.97	0	721.21
Nachan	206.44	256.61	304.72	1087.49	32.79	1888.05
Pandoh	433.99	292.47	923.68	697.73	0	2347.87
Seraj	0	13.36	87.82	161.30	0	262.48
Total	757.72	787.99	1476.62	2164.49	32.79	5219.61

3.6 ANALYSIS AND VALUATION OF THE CROP:

3.6.1 AREA STATEMENT:

Range-wise, species-wise distribution of the working circle is as under:-

(Table No. 2)

CHIL WORKING CIRCLE

Range	Deo (ha.)	Kail (ha.)	Chil (ha.)	Silver Fir (ha.)	Ban (ha.)	Mixed Conifer (ha.)	Misc. B/L (ha.)	Mixed B.L. Conifer (ha.)	Blank (ha.)	Total (ha.)
Thachi	1.61	2.26	319.55	-	-	9.28	6.96	273.47	108.08	721.21
Pandoh	-	27.44	1821.49	-	224.08	60.26	103.01	35.73	75.86	2347.87
Seraj	1.75	6.00	134.06	10.92	1.75	33.72	-	74.28	-	262.48
Nachan	20.14	-	1653.54	-	94.61	35.91	-	13.69	70.17	1888.05
Total	23.50	35.70	3928.64	10.92	320.44	139.17	109.97	397.17	254.11	5219.61

3.6.2 STOCK MAPS:

The stock maps have been prepared for all the demarcated protected forest on 1:15000 scales. Tracing have been placed in the compartment history files, Regeneration maps 16"-1 mile scale have been prepared.

3.6.3 QUALILTY CLASSES:

The quality class of each compartment and sub-compartment was determined by ocular estimation / actual measurement of height and diameter of dominant trees and is given in the compartments history files. The average quality class for the whole working circle has been taken as III.

3.6.4 AGE CLASSES:

The stands are irregular but occur in compact patches. On the whole young to middle, aged classes are predominant. Mature and over mature trees are deficient. The stands are irregular, but also occur in even aged patches in a forest or a compartment.

3.6.5 ENUMERATIONS:

The enumeration have been carried out on the methodology suggested vide para 6.6.1 in PWPR. List of methodology has been described in Chapter-II under paraNo. 2.6.5. The sample enumeration results are in **Appendix-III, Page No.78-87of Volume-II**. The abstract of enumeration results is as under:

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The abstract of extrapolated enumeration results of Chil Working Circle:

(Table No. 3)													
Working Circle	Area in Ha	Species		V	IV	III	IIA	IIB	IA	IB	IC	ID	Total No. of trees
CWS	5219.61	Chil	Total	615549	381146	94537	23458	10230	4409	1764	882	176	1132151
			Volume	30777.44	64794.88	58612.94	30495.24	21891.67	13536.78	7143.19	4453.47	1058.25	232763.85
		Kail	Total	9877	6173	3880	1587	1940	2117	706	706	353	27338
			Volume	691.39	1666.74	2599.77	2381.06	5529.36	9249.11	4056.63	4882.06	2751.45	33807.56
		Deodar	Total	11288	10053	8995	5291	1411	353	0	0	0	37392
			Volume	733.72	3016.01	7196.10	9127.41	4127.18	1472.73	0	0	0	25673.15
		Rai	Total	1058	353	882	706	1235	0	353	706	176	5468
			Volume	79.37	100.53	661.41	1075.89	3395.22	0.00	2257.60	5890.93	1794.62	15255.56
		B/Leave	Total	336347	73372	24163	7584	4586	2646	882	353	529	450462
			Volume	0	20544.16	20296.92	12892.8	11648.4	8229.06	2998.8	1200.2	1798.6	79608.98
	Grand Total		Total	974119	471097	132457	38626	19402	9525	3705	2647	1234	1652811
			Volume	32281.92	90122.32	89367.14	55972.4	46591.8	32487.6	16456.2	16426.6	7402.9	387109.1

3.7 Silviculture System:

The “Selection System” will be adopted for Silvicultural Operation. Mainly Natural Regeneration will be relied upon and supplemented with planting wherever required. A Silvicultural System in which felling and regeneration are distributed over the whole of the area and the result and crop is so uneven – aged that trees of all ages are found mixed to gather over every part of the area. Such a crop is referred to as selection forest or all aged forest.

3.8 Exploitable Diameter:

The exploitable diameter above which the trees are considered mature in these forests is kept at 50 cm and above diameter at breast height (dbh). Since the crop is of middle to mature age classes and selection system aims at sustained yield of timber and maintaining natural forest, 50cm and above exploitable diameter is reasonable enough to achieve these objectives.

3.9 Felling Cycle:

Felling cycle is the time which elapses between successive felling on the same area. Simons has shown that with a yield assessed at 2 % of the growing stock, a felling cycle of 10 years would result in removal of approximately 20 % of growing stock in a circle. They maintain selection nature of these forests. The period of the working plan is 15 year i.e. 2013-14 to 2028-29, hence felling cycle is allotted for 15 years under Ideal Selection System in which fellings are carried out over the whole area each year.

3.10 CALCULATION OF THE YIELD:-

CHIL WORKING CIRCLE

Calculation of yield of Chil:

No. of class I trees = > 60 cm = 4409+1764+882+176 = 7231

No. of class II trees = 50-60 cm = 10230

Where, f = 15 years, t = 16 years, z = 25%

No. of class II trees which pass into class I trees, during felling cycle (per ha.)

$$x = \frac{15}{16} \left(10230 - \frac{25}{100} \times 10230 \right)$$

$$= \frac{15}{16} \times 7673$$

$$= 7193$$

$$N = I + \frac{x}{2}$$

$$= 7231 + \frac{7193}{2}$$

$$= 10828$$

$$Y = \left(\frac{7193}{10828} \times 100 \right) \pm A \% N$$

$$= 66+4 \% 10828$$

$$= \frac{70}{100} \times 10828$$

$$= 7580$$

= 2 in 3 trees above exploitable diameter and silviculturally available.

Calculation of yield of Kail :

No. of classes I trees = > 60 cm = 2117+706+706+353=3846

No. of class II trees = 50-60 cm = 1940

Where, f = 15 years, t = 19 years, z = 20 %

No. of class II trees which pass into class I trees, during felling cycle (per ha.)

$$x = \frac{15}{19} \left(1940 - \frac{20}{100} \times 1940 \right)$$

$$= \frac{15}{19} \times 1552$$

$$N = I + \frac{x}{2}$$

$$= 3846 + \frac{1225}{2}$$

$$= 4458$$

$$\text{Yield, } Y = \left(\frac{1225}{4458} \times 100 \right) \pm A \% N$$

$$= 27+3 \% 4458$$

$$= \frac{30}{100} \times 4458$$

= 1337 No. of trees

= 1 in 3 trees above exploitable diameter and silviculturally available.

Calculation of yield of Deodar:

No. of classes I trees = > 60 cm = 353 = 353

No. of class II trees = 50-60 cm = 1411

Where, f = 15 years, t = 25 years, z = 25 %

No. of class II trees which pass into class I trees, during felling cycle (per ha.)

$$\begin{aligned} x &= \frac{15}{25} \left(1411 - \frac{25}{100} \times 1411 \right) \\ &= \frac{15}{25} \times 1058 \\ &= 635 \end{aligned}$$

$$N = I + \frac{x}{2}$$

$$= 353 + \frac{635}{2}$$

$$= 670$$

$$\text{Yield, } Y = \left(\frac{635}{670} \times 100 \right) \pm A \% N$$

$$= 94.4 \% N$$

$$= \frac{90}{100} \times 670$$

$$= 603 \text{ No. of trees}$$

$$= 4 \text{ in } 5 \text{ trees.}$$

Calculation of yield of Rai/ spruce :

No. of classes I trees = > 60 cm = 353+706+176=1217

No. of class II trees = 50-60 cm = 1253

Where, f = 15 years, t = 22 years, z = 50 %

$$x = \frac{15}{22} \left(1253 - \frac{50}{100} \times 1253 \right)$$

No. of class II trees
which pass into
class I trees, during
felling cycle (per
ha.)

$$= \frac{15}{22} \times 626$$

$$= 427$$

$$N = I + \frac{x}{2}$$

$$= 1217 + \frac{427}{2}$$

$$= 1430$$

$$Y = \left(\frac{427}{1430} \times 100 \right) \pm A \% N$$

$$= 29.86 \pm 14 \% N$$

$$= \frac{30}{100} \times 1430$$

$$= 429 \text{ No. of trees}$$

= 1 in 3 trees above exploitable diameter and
silviculturally available.

3.11 METHOD OF EXECUTING FEELINGS:-

Unlike the forests created under systems of concentrated regeneration, in which trees of different age classes are found in different areas. Gradually mature trees die out and their place is taken up by younger regeneration. The Selection System follows nature in respect of its pattern of felling. Thus, scattered single mature trees are selected all over the area and felled to enable regeneration to replace them. As the process is repeated year after year, uneven aged character of the crop, in which trees of all ages are mixed together in every unit of area, is maintained. This is an ideal condition but even in nature it is seldom found. It is difficult to find trees of all ages mixed together in every nit of area. The regeneration generally appears in small groups because of periodicity in seed years and these age classes are found in small groups.

Areas to be worked under the Selection System are usually very large, it is not possible to go over the entire area annually. Therefore, the area to be worked under Selection System is divided into coupes and fellings confined to one coupe every year. Fellings are done coupe by coupe in a sequence each year and, when fellings are over in all the coupes, these are resumed in the first coupe in the second cycle. Thus, felling is done in a coupe after a certain number of years, which is equal to the number of coupes. This interval is

known as felling cycle, which is defined as the time that elapses between successive main felling on the same area. Simmons (39) has shown that with a yield assessed at 2% of the growing stock, a felling cycle of 10 years would result in the removal of approximately 20% of the growing stock in the coupe. They may maintain the selection nature of the forest. The period of the working plan is 15 years w.e.f. 2013-2014 to 2028-2029. Felling cycle is adopted for 15 years under Ideal Selection System in which felling are carried out over the whole area each year.

Conduct of felling:- in the Selection System, following categories of trees are usually remove.

- (v) Dead, dying, diseased, mis- shapen or otherwise defective trees interfering with the growth of better trees.
- (vi) Trees of undesirable species.
- (vii) Immature trees which can be removed in judicious thinning carried out in different age classes.
- (iv) Removal of trees of and above the exploitable diameter.

The trees of and above the exploitable diameter upto the numerical limit fixed by the working plan provided they are silviculturally available. A selection tree is considered silviculturally available if its removal

- (a) Does not create a permanent gap in the canopy.
- (b) tends to improve the remaining crop in terms of volume production or
- (c) Helps the growth of groups of young trees down to the sapling stage of any of the valuable species.

3.12 Formation of annual coupes:

Annual coupes are the felling areas where the felling is confined to one coupe every year.

Annual coupe is calculated by dividing felling series by felling cycle ie $Ac = \frac{FS}{FC} = \frac{5219.61}{15} = 347 \text{ ha.}$

The compartments which are allotted to CWC are divided in 15 annual coupes which are as shown in following table:

(Table No. 4)

Annual Coup	No. & Name of Forests	Compartment	Area in Ha.	Total Area of the Coupe
1	OD-35-Chhanj	Whole	4.45	344.91

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	OD-41-Naun Chalyala	Whole	15.38	
	OD-42-Shalanu Chalyala	Whole	14.97	
	OD-48-Kandhi Chalyala	Whole	5.66	
	ND-52-Bharwah	Whole	95.91	
	ND-61-Hiun Chalyala	Whole	15.3	
	ND-63-Tiper Chalyala	C-1	29.4	
	-do-	C-2	36.2	
	-do-	C-3	37.64	
	-do-	C-4	27.8	
	ND-66-Ghanyat Chalyala	Whole	37.2	
	ND-67-Jughari	Whole	6.38	
	ND-310-Chhariyandgarh	Whole	18.62	
II	OD-70-Ropa Karot	C-1	39.32	343.36
	-do-	C-2	33.57	
	ND-71-Ropa Karot	Whole	32.30	
	OD-72-Sanoun	C-1	27.60	
	-do-	C-2	40.79	
	ND-73-Sanoun	Whole	42.90	
	OD-74- Kashu	Whole	30.75	
	ND-78-Feta Pathru	Whole	31.16	
	ND-82-Kashinhu Pat	Whole	48.97	
	ND-83-Sarog	Whole	15.98	
III	OD-84-Silh	C-2	40.63	362.65
	ND-85-Silh	Whole	26.81	
	ND-142-Basdiyari	Whole	50.18	
	ND-145-Bhekhidhar	Whole	45.33	
	ND-159-Fanjir	C-1	34.24	
	-do-	C-2	41.84	
	-do-	C-3a	24.94	
	-do-	C-3b	26.70	
	-do-	C-4	71.98	
IV	-do-	C-5a	38.97	353.19
	-do-	C-5b	26.92	
	-do-	C-6a	37.34	
	-do-	C-6b	32.96	
	ND-161-Fanjir	Whole	27.92	

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	OD-162-Bagi Banwar	Whole	61.51	
	ND-326-Majhan	Whole	21.14	
	ND-329-Saula	Whole	42.89	
	ND-331-Ropari	Whole	46.54	
	ND-312-Baryandi	Whole	17.00	
V	ND-332-Tandi	Whole	10.93	370.53
	ND-333-Tandi	Whole	44.52	
	ND-334-Ropari Mashwari	Whole	18.14	
	ND-335-Ropari Mashwari	Whole	11.73	
	OD-336-Saron	C-1	28.02	
	-do-	C-2	26.61	
	ND-337-Saron	Whole	10.93	
	ND-338-Nandi	Whole	15.78	
	ND-466-Thamlah	Whole	42.49	
	ND-473-Movi	Whole	36.83	
	ND-477-Baniur	C-1	30.25	
	ND-478-Chhaprahan	Whole	7.69	
	ND-489-Ghatlu	Whole	46.54	
	ND-317-Bara	Whole	40.07	
VI	OD-491-Tawa	C-2	43.04	333.34
	-do-	C-3	48.70	
	OD-492-Bageodh	C-1	23.88	
	-do-	C-2	57.88	
	-do-	C-3	48.84	
	-do-	C-5	65.60	
	-do-	C-6	45.40	
VII	ND-494-Chandeh	Whole	30.55	331.42
	OD-495-Dhuma Devi	C-1	43.90	
	-do-	C-2	35.35	
	OD-496-Sawardhar	C-1	17.41	
	-do-	C-2	47.32	
	ND-497-Jamu	C-1	32.70	
	OD-499-Janjohi	C-1a	30.02	
	-do-	C-1b	42.27	
	-do-	C-1c	28.95	
	-do-	C-2a	22.95	
VIII	-do-	C-3b	58.80	342.82
	-do-	C-6	47.48	
	-do-	C-5	30.68	
	ND-505-Behlidhar	C-1c	26.40	

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	-do-	C-1d	25.12	
	-do-	C-2d	29.90	
	-do-	C-3a	20.20	
	-do-	C-3b	20.40	
	-do-	C-3c	19.36	
	-do-	C-3e	20.96	
	-do-	C-3f	22.72	
	-do-	C-3g	20.80	
IX	-do-	C-3h	20.80	344.94
	-do-	C-3(i)	18.26	
	-do-	C-4c	23.84	
	-do-	C-4d	32.80	
	-do-	C-4e	24.00	
	-do-	C-4f	24.95	
	-do-	C-4g	25.04	
	-do-	C-4h	26.28	
	-do-	C-4(i)	30.80	
	OD-506-Runjh	Whole	118.17	
X	ND-135-Chief-II	Whole	33.59	348.50
	OD-340-Daran	Whole	31.57	
	OD-344-Kotlu	Whole	41.28	
	ND-345-Kotlu	Whole	31.16	
	OD-346-Goar	Whole	9.71	
	ND-447-Goar	Whole	12.95	
	ND-351-Bassi Fangwar	Whole	24.25	
	ND-352-Bhalout	Whole	48.56	
	ND-355-Toler Bhet- II	Whole	34.85	
	OD-360-Dharot	C-2	26.71	
	OD-362-Parala Shalog	Whole	28.78	
	ND-364-Pangliur	Whole	25.09	
	ND-365-Dehari Kalai	Whole	21.04	
XI	OD-366-Tharadhar	C-1	24.00	356.50
	-do-	C-2	24.97	
	OD-367-Dalogi	C-1	36.15	
	-do-	C-2a	30.55	
	-do-	C-2b	19.50	
	ND-370-Bhungan	Whole	65.16	
	OD-371-Kapri	Whole	48.52	
	OD-372- Ghadhimani	C-1	38.23	
	ND-372-	C-2	28.14	

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	Ghadhimani			
	ND-381-Mathiyana Dhar	Whole	4.05	
	ND-385-Bharsi	Whole	16.19	
XII	ND-384-Mahithana	C-1	36.88	345.82
	-do-	C-2	27.05	
	-do-	C-3	37.51	
	-do-	C-4	40.32	
	-do-	C-5	39.54	
	OD-385-Kharsi	C-1	19.89	
	-do-	C-2	39.60	
	OD-386-Chamani	C-4b	21.67	
	OD-397-Jeog	C-1	32.90	
	-do-	C-2	27.18	
	-do-	C-3	23.28	
XIII	ND-399-Bakhalot	Whole	10.52	352.25
	ND-400-Dari	Whole	14.57	
	OD-403-Gani	C-2a	26.95	
	ND-426-Biradhar	C-6	29.98	
	ND-433-Sulandhi	Whole	8.09	
	ND-439-Oddi	Whole	20.24	
	ND-440-Maseran	Whole	13.36	
	ND-441-Katlog	Whole	19.43	
	ND-444-Jasan	C-3	19.92	
	-do-	C-4	13.57	
	ND-445-Pathri-I	C-1	36.41	
	-do-	C-2	16.60	
	OD-447-Pathri-II	C-1	23.28	
	-do-	C-2	44.53	
	ND-448-Dugrain	Whole	2.83	
	ND-449-Badhu	Whole	8.50	
	ND-450-Miah	Whole	43.47	
XIV	ND-451-Leohati	Whole	12.95	338.17
	OD-452-Jabrat	C-2a	23.27	
	-do-	C-2b	21.10	
	-do-	C-2c	37.94	
	-do-	C-2d	26.98	
	ND-453-Molichaloun	Whole	37.23	
	ND-454-Bhangroh	C-3	50.33	
	-do-	C-4	22.56	
	OD-455-Machhrot	C-1	48.35	
	-do-	C-2	18.62	
	-do-	C-4	19.62	
	-do-	C-5	19.22	

XV	OD-457-Silh Chaloun	C-1	20.81	351.21
	-do-	C-2	27.76	
	ND-458-Kathala		14.16	
	OD-460-Babag	C-1	30.76	
	-do-	C-2	30.24	
	ND-462-Sianj-I	Whole	10.12	
	ND-463-Sianj-II	Whole	26.31	
	ND-464-Behlidhar-I	Whole	20.24	
	ND-276-Dhar Killan	Whole	13.36	
	ND-299-Saran Parala	Whole	34.40	
	ND-301-Thunagi	Whole	24.28	
	ND-305-Patikari	Whole	12.95	
	ND-306-Patikari	Whole	47.35	
	ND-307-Bakoda	Whole	27.52	
	ND-184-Poi Nal	Whole	10.95	

3.13 SUBSIDIARY SILVICULTURAL OPERATIONS:

3.13.1 Subsidiary felling:-

After the exploitation work is over, felling refuse has to be disposed off as cheaply and effectively as possible. The villagers should be encouraged to remove as much of the felling refuse as possible. Whatever felling refuse is left by the villagers should be disposed off in the following manner.

A) The slash should be removed from around the base of seed bearers at a distance of about five meters after the exploitation work is over. The branch wood and debris should be collected in small heaps and gaps but never under the crowns of seed bearer. This slash should be burnt under strict supervision. The bushes in the area are to be cut and burnt for clean bed. Debris burning should be done in the winter months.

B) In areas where there is young re-generation and advance growth has been retained, slash should be removed from patches of re-generation or advance growth and collected in small heaves or gaps outside the re-generation patches. The slash should be carefully burnt. Care should be taken that no debris or log rolls down in young regeneration or advance growth during burning.

(ii) Sowing and planting

At the time of marking, problematic areas will be located and mapped for planting up in subsequent years. After debris burning in a good seed year, natural re-generation is thus supplemented by artificial planting. The areas are to be taken up in the rainy season following the years of exploitation and removal of slash. Thus, for reducing the period of closure to the shortest possible period, artificial re-generation is advocated.

(iii) Weeding and bush cutting

For healthy growth of plants, timely weeding is of immense importance. Growing season is first limited to the months of April, May and June and the plants must be kept free of weeds during this period. Growth retards with the onset of rains as the temperature falls, but still another weeding during July-August to keep the plants free of weeds as is essential and beneficial. The weeding will be continued till the plants are free from damage of weeds. Two weedings are advocated for two years as under:

1st weeding -	June-July
2nd weeding-	August-September

(iv) Cleaning

In cleaning operations, following type of stems will be removed.

- (i) Sickly and damaged stems.
- (ii) Forked stems
- (iii) Crooked short stems

The first cleaning to be undertaken easily when the plants are two meters high. Frequent cleanings will be no doubt expensive but are necessary to attend the crop properly in the early stages. Cleaning will provide the best opportunity to regulate the mixture in favour of Deodar. The aim of cleaning is to remove the less valuable stems to provide growing for the better stems.

(v) Control Burning

Control Burning will be done after the exploitation of coupe in safer places under the control of concerned forest guard. So that natural regeneration may take place easily.

(vi) Mechanical Thinning

Mechanical Thinning is essential for 2 to 3 years to attain trees of different age classes as required in the selection system.

(vii) Majority of the forests of Pandoh and Nachan Forest Ranges are heavily infested by the abnoxious weeds like Lantana. Its uncontrolled growth has hampered the natural regeneration of native species to the large scale. Its infestation has also resulted into the reduction in grazing area. Hence it is recommended that it should be eradicated at war footing level followed by plantation of fast growing and indigenous species. The detailed management strategy using CRS (Cut Root Stock) has been annexed in **Appendix- XIII, Page No. 200-201 of Volume-II** .

3.14 RESIN TAPPING:-

All Chil trees above 35 cmsd.b.h. are tapped for resin. New method (Rill Method) is adopted for this purpose. Details regarding the technique/instructions/rules of this method are given in the Chapter-XIII (Page 68 to 81) of H.P. Forest Manual Vol-IV. Two blazes are carved in the trees having dia. meter above 50 cms and one blaze in the trees having dia. meter 35 to 50 cms.

Following forests require rest from resin tapping, and a sequence of 10 years rotation will be laid down as per detail below: -

(Table No. 5)

Sr. No.	Name of Range	Name of forest	Compartment	Area in Hac.	Rest period	Remarks
1.	Nachan	Pathri DPF	Whole	46.13	10 Years	
2.	Nachan	Dharot DPF	Whole	24.69	10 Years	
3.	Nachan	Gadhiman	Whole	40.87	10 Year	
4.	Nachan	Mahithana DPF	Whole	181.3	10 Year	
5	Pandoh	Behli-Dhar DPF	Whole	695.64	10 Year	
6.	Pandoh	Jammu DPF	Whole	69.20	10 Year	
7.	Pandoh	Sawar-Dhar DPF	Whole	82.86	10 Year	
8.	Pandoh	Janjohi DPF	Whole	435.87	10 Year	
9.	Pandoh	Begeodh DPF	Whole	284.09	10 Year	
10.	Pandoh	Chandh	Whole	30.35	10 Year	

3.15 MISCELLANEOUS REGULATIONS

3.15.1 Soil & Water Conservation Works

These activities prescribed to improve the land capability and moisture regime in the water sheet to reduce run off by providing engineering structures wherever necessary.

1. Selection of area for treatment.
2. Evaluation of effectiveness of soil conservation works.
3. Annual programme of soil conservation works.
4. Treatment of non-priority watersheds.

3.15.2 Fire Protection

All the Chil areas except areas under regeneration, shall be control burnt once in three years. Sufficient budget should be provided for this purpose. It may be emphasized that forest cannot be protected against fire without co-operation of the local people, which can be obtained by the meeting their reasonable demands as per Settlement Report. Besides this following preventive measures should be adopted before the commencement of the fire season (i.e. 15 March).

(a) Maintenance of Fire Lines

No effective fire lines exist at present. Fire lines suggested in the Working Plan under revision have not been cleared and properly maintained. The following fire lines will be maintained to protect the Chil forests from fire:

Name of Range	Name & Location of Fire Lines	Approximate Length of Fire Line.
Thachi	Along PanjainSarolDhar	5 Km/
Pandoh	Along BahaliDhar, Dalikar ridge passing through Dhuma Devi.	8 Km.
Nachan	Along TandhiDhar separating Jeog, DPF, Malri Thana DPF and Chamani forests.	--

List of Fire Prone Areas:-

Chil forests are subjected to fires since Chil forest has a dense blanket of chil needles on the ground. The damage is usually heavy, as in such areas the fire quickly reaches the crowns and sometimes completely wipes out the whole growing stock. Such absolute destruction generally does not take place in even aged crop with light undergrowth, where the actual casualties from fire are usually confined to the younger stages of growth

The following statement indicates the occurrences of fires from 1993-94 to 2014-15:

(Table No. 6)

Year of fire Cases	No. of Fire cases year Wise	Total Area Burnt by Fire in ha. Year-Wise	Thachi Range (Area in ha)	Seraj Range (Area in ha)	Pandoh Range (Area in ha)	Nachan Range (Area in ha)
1993-94	2	47	7	--	40	--
1994-95	2	2.15	--	--	--	2.15
1995-96	36	966.11	448.81	--	455	62.3
1996-97	2	6	--	--	5	1
1997-98	0	---	-	--	--	--
1998-99	2	8.5	--	6.5	--	2
1999-2000	30	353.4	239	38	21.9	54.5
2000-01	4	44	---	41	---	3
2001-02	1	37.64	---	37.64	---	---
2002-03	5	84	---	---	65	19
2003-04	15	187	81	5	46	55
2004-05	13	57.45	32.25	5	--	20.2
2005-06	5	23.75	--	--	0.5	23.25
2006-07	4	7.5	1	--	1	5.5
2007-08	8	17.25	--	--	10	7.25
2008-09	1	0.04	--	0.04	--	--
2009-10	20	193.81	20	11	131.81	31
2010-11	18	85	44	7	3	31
2011-12	1	0.5	---	----	0.5	----
2012-13	24	156.5	32	0	60	64.5
2013-14	1	3	----	3.0	----	----
2014-15	3	8.5	8.5	----	----	----

Fire Protection Staff:

About 35 Fire Watchers should be employed during the Fire Season to help the field staff. Each Fire Watcher/Forest Guard should be provided with sufficient firefighting equipments. Besides the above, all the bridle path, inspection paths and

fire lines existing in the Chil forest should be kept clear of debris and pine needles throughout the fire season.

Reporting about the Fires:

The field staff should immediately inform the Range Officer about the occurrence of fire, he will immediately proceed to the spot and will also inform the DFO. If the fire is of a serious nature, non-existence of Range Officer on the spot may be taken as serious and disciplinary action shall be initiated against him. The daily report shall be self-contained and in prescribed Performa along with the map (1:15000) of the burnt area and should be placed in the concerned Compartment History File.

CHAPTER-IV

FIR-SPRUCE WORKING CIRCLE

4.1 GENERAL CONSITUTION OF WORKING CIRCLE:

This Working Circle includes Silver Fir, Spruce or mixture of both B.L. species, situated comparatively on easy grounds and can be worked under Selection System. All the Fir & Spruce forests with the consideration of accessibility for exploitation and suitability for regeneration purpose, occurring either pure or in mixture with B.L. species as 60% or more are allotted to this Working Circle.

4.2 GENERAL CHARACTERS OF THE VEGETATION:

The area is very much under stocked and there is preponderance of mature to over mature trees. Natural regeneration in these forests is very poor and artificially regeneration is inadequate. The emphasis will be laid down on natural regeneration supplemented with artificial regeneration. Broad leaved species viz. Walnut, Maple, Horse Chestnut etc. grow in nallas and shady places scattered in some forests. Kharsu grows in a thin belt, where the stocking is poor because of snow slides.

4.3 FELLING SERIES:

The whole circle constitutes one felling series i.e. 8535.21 ha.

4.4 BLOCK AND COMPARTMENTS:

Most of forests being allotted to this Working Circle have large area. For intensive management these forests have been divided into compartments and sub-compartments giving due consideration to the composition of crops and configuration of ground. As far as possible, compartments and sub-compartments boundaries have been kept along the natural physical features.

P.B wise area statement of Fir/Spruce Working Circle**(Table No. 1)**

Range	Fir/Spruce Working Circle					Total
	I	II	III	IV	V	
Thachi	799.62	1845.54	0.00	637.64	242.91	3525.71
Nachan	170.23	878.24	615.46	145.86	27.08	1836.87
Pandoh	0.00	0.00	26.80	32.37	131.26	190.43
Seraj	195.01	877.14	1280.22	427.67	182.16	2962.20
Total	1164.86	3600.92	1922.48	1243.54	583.41	8515.21
	UPF					20.00
G. Total						8535.21

Details of Rangewise area as per previous and current working plan**(Table No. 2)**

Sr. No	Range	Area as a previous WP	Area transferred from WL	Area as a current WP		
				DPF	UPF	
1.	Thachi	3525.71	-	3525.71	16.0	3541.71
2.	Nachan	1464.93	375.94	1836.87	4.0	1840.87
3.	Pandoh	190.00	-	190.43	0	190.43
4.	Seraj	2892.59	69.61	2962.20	0	2962.20
	Total	8073.23	445.55	8515.21	20	8535.21

4.5 SPECIAL OBJECTIVES OF MANAGEMENT: -

- i) To restock the areas deficient in regeneration either naturally or artificially.
- ii) To replace mature and over mature growing stock within the conversion.
- iii) To obtain sustained yield.
- iv) To improve the forest covers for soil and water conservation.
- v) To protect these forests from damages caused by various agencies.

4.6 ANALYSIS AND VALUATION OF THE CROP:

4.6.1 AREA STATEMENT:

Total area of the working circle is 8535.21 ha and its range-wise and specieswise area statement as under:

(Table No. 3)

Species wise area distribution

Range	Deo	Kail	Chil	Spruce	Silver fir	Ban	Kharsu	Mixed conifer	Misc.BL	Misc.BL, Conifer	Blank	Total
Thachi	14.34	176.16	-	328.91	842.58	-	-	1812.63	108.37	97.91	139.72	3520.62
Pandoh	-	-	-	40.62	-	-	-	32.47	-	20.00	117.44	210.53
Seraj	60.22	198.98	-	1140.64	113.84	41.29	20.32	1150.64	25.03	148.39	62.84	2962.19
Nachan	69.98	46.15	-	845.57	84.66	100.25	7.83	406.00	5.55	261.97	13.91	1841.87
Total	144.54	421.29	-	2355.74	1041.08	141.54	28.15	3401.74	138.95	528.27	333.91	8535.21

4.6.2 STOCK MAPS:-

All the forests, Compartments and sub-compartments have been stock maps on 1:15000 scale and filed in the concerned compartment History Files. Regeneration maps on 16"-1 mile scale or 1:3750 will be prepared. However, most of maps of demarcated protected forests have been prepared as these have not been demarcated and surveyed.

4.6.3 QUALITY CLASSES:-

The quality of each compartments or sub-compartments have been assessed and given in the respective compartment History Files.

4.6.4 AGE CLASSES:-

The stands are irregular, but occur in compact patches. Broadly age classes viz. Young, middle aged, mature and over mature crop is present. The young regeneration on the whole is deficient throughout.

4.6.5 DENSITY:

The ocular estimate of density was made for all forests and is recorded in the concerned compartment history files. The crop on the whole is fairly stocked. The density varies from 0.2 to 0.8.

4.6.6 ENUMERATIONS:-

Enumeration has been carried out as suggested at point 6.6.1 of PWPR. The sample enumeration results are in **Appendix-III, Page No. 88-97 of Volume-II**. The extrapolated results of enumeration in abstract form are as under:

(Table No. 4)

The abstract of the extrapolated enumeration result is given in following table :

Name of WC	Area (hac.)	Species		10-20cm	20-30cm	30-40cm	40-50cm Class II	50-60cm Class I	60-70cm	70-80cm	80-90 & over	90-100cm	Total
				V	IV	III	IIA	IIB	IA	IB	IC	ID	
Fir/Spruce	8535.21	Rai/Spruce	T	207952	149268	116185	92948	77588	64985	31508	21662	15754	777849
			V	15596.36	42541.44	87138.77	141745.7	213366.9	298930.3	201649.9	180874.5	160296	1342140
		Silver Fir/Tosh	T	60259	40172	70499	71286	64197	40566	28357	14572	12209	402118
			V	4519.401	11047.42	56398.97	128315.5	208640.7	193704.1	178649.2	114028.7	114156.7	1009461
		Deodar	T	34265	13391	4332	4726	3545	2363	1182	1182	3151	68136
			V	2227.208	4017.245	3465.858	8152.644	10368.04	9865.881	6380.33	7827.72	24654.86	76959.78
		Kail	T	290266	98856	19299	15360	6695	3545	788	788	788	436383
			V	20318.6	26691.05	12930.02	23040.08	19081.91	15490.02	4529.247	5450.85	6144.022	133675.8
		B/Leave	T	150844	92948	57502	21662	8665	3545	1575	2363	394	339497
			V	-	26025.44	48301.68	36825.4	22009.1	11024.95	5355	8034.2	1339.6	158915.4

4.7 SILVICULTURE SYSTEM:

The “Selection System” will be adopted for Silvicultural Operation. Mainly Natural Regeneration will be relied upon and supplemented with planting wherever required.

The Selection System is defined as a Silvicultural System in which fellings and regeneration are distributed over whole of the area (except in so far as felling cycle introduces a modification) and the resultant crop is so uneven-aged that trees of all ages are found mixed together over every part of the area. Such a crop is referred to as ‘Selection forest’ or ‘all-aged forest’. The main features of the selection system are :

- (i) The felling and regeneration in Selection System are distributed over the whole area.
- (ii) The resultant crop in the Selection System is completely uneven – aged, so much so that all age – classes are mixed together on every unit of area.
- (iii) In Selection System, regeneration operations are carried out throughout the life of the crop and thinning are done simultaneously for improving the growth and form of trees.

4.8 Exploitable diameter :

The exploitable diameter above which the trees are considered mature in these forests is kept at 50 cm and above diameter at breast height (dbh). Since Fir and Spruce are of middle to mature age classes and selection system aims at sustained yield of timber and maintaining natural forest, 50cm and above exploitable diameter is reasonable enough to achieve these objectives.

4.9 Felling cycle :

Felling cycle is the time which elapses between successive felling on the same area. Simons has shown that with a yield assessed at 2 % of the growing stock, a felling cycle of 10 years would result in removal of approximately 20 % of growing stock in a circle. They maintain selection nature of these forests. The period of the working plan is 15 year i.e. 2013-14 to 2028-29, hence felling cycle is allotted for 15 years under Ideal Selection System in which felling are carried out over the whole area each year.

4.10 CALCULATION OF THE YIELD:-

FIR SPRUCE WORKING CIRCLE:**Calculation of yield of Rai/Spruce :**

No. of classes I trees = > 60 cm = 64985+31508+21662+15754=133909

No. of class II trees = 50-60 cm = 77588

f = 15 years, t = 22 years, z = 50 %

No. of class II trees which pass into class I trees, during felling cycle (per

$$x = \frac{15}{22} \left(77588 - \frac{50}{100} \times 77588 \right)$$

$$= \frac{15}{22} \times 38794$$

$$= 26450$$

$$N = I + \frac{x}{2}$$

$$= 133909 + \frac{26450}{2}$$

$$= 147134$$

$$Y = \left(\frac{26450}{147134} \times 100 \right) \pm A \% N$$

$$= 17.97 + 2.03 \% N$$

$$= \frac{20}{100} \times 147134$$

$$= 29426 \text{ no. of trees.}$$

= 1 in 5 trees above exploitable diameter and silviculturally available.

Calculation of yield of Silver Fir/Tosh :

No. of classes I trees = > 60 cm = 64197+40566+28357+14572+12209=95704

No. of class II trees = 50-60 cm = 64197

f = 15 years, t = 25 years, z = 50 %

No. of class II trees
which pass into class I
trees, during felling
cycle (per ha.),

$$\begin{aligned}x &= \frac{15}{25} \left(64197 - \frac{50}{100} \times 64197 \right) \\&= \frac{15}{25} \times 32098 \\&= 19259\end{aligned}$$

$$N = I + \frac{x}{2}$$

$$= 95704 + \frac{19259}{2}$$

$$= 105333$$

$$Y = \left(\frac{19259}{105333} \times 100 \right) \pm A \% N$$

$$= 18+2 \% N$$

$$= \frac{20}{100} \times 105333$$

$$= 21066 \text{ No. of trees}$$

= 1 in 5 trees above exploitable diameter and silviculturally available.

Calculation of yield of Deodar :

No. of classes I trees = > 60 cm = 2363+1182+3151=6696

No. of class II trees = 50-60 cm = 3545

Where, f = 15 years, t = 25 years, z = 25 %

No. of class II trees which
pass into class I trees,
during felling cycle (per
ha.),

$$\begin{aligned}x &= \frac{15}{25} \left(3545 - \frac{25}{100} \times 3545 \right) \\&= \frac{15}{25} \times 2658 \\&= 1595\end{aligned}$$

$$N = I + \frac{x}{2}$$

$$= 6696 + \frac{1595}{2}$$

$$= 7493$$

$$Y = \left(\frac{1595}{7493} \times 100 \right) \pm A \% N$$

$$= 21.1 \% N$$

$$= \frac{20}{100} \times 7493$$

$$= 1498 \text{ No. of trees}$$

= 1 in 5 trees above exploitable diameter and silviculturally available.

Calculation of yield of Kail :

No. of classes I trees = > 60 cm = 3545+788+788+788=5909

No. of class II trees = 50-60 cm = 6695

Where, f = 15 years, t = 19 years, z = 20 %

No. of class II trees
which pass into class
I trees, during
felling cycle (per

$$x = \frac{15}{19} \left(6695 - \frac{20}{100} \times 6695 \right)$$

$$= \frac{15}{19} \times 5356$$

$$= 4228$$

$$N = I + \frac{x}{2}$$

$$= 5909 + \frac{4228}{2}$$

$$= 8023$$

$$Y = \left(\frac{4228}{8023} \times 100 \right) \pm A \% N$$

$$= 52.2 \% N$$

$$= \frac{50}{100} \times 8023$$

$$= 4011 \text{ No of trees.}$$

= 1 in 2 trees above exploitable diameter and silviculturally available.

4.11 METHOD OF EXECUTING FELLINGS:

Unlike the forests created under systems of concentrated regeneration, in which trees of different age classes are found in different areas. Gradually mature trees die out and their place is taken up by younger regeneration. The Selection System follows nature in respect of its pattern of felling. Thus, scattered single mature trees are selected all over the area and felled to enable regeneration to replace them. As the process is repeated year after year, uneven aged character of the crop, in which trees of all ages are mixed together in every unit of area, is maintained. This is an ideal condition but even in nature it is seldom found. It is difficult to find trees of all ages mixed together in every nit of area. The regeneration generally appears in small groups because of periodicity in seed years and these age classes are found in small groups.

Areas to be worked under the Selection System are usually very large. It is not possible to go over the entire area annually. Therefore, the area to be worked under Selection System is divided into coupes and fellings confined to one coupe every year. Fellings are done coupe by coupe in a sequence each year and, when fellings are over in all the coupes, these are resumed in the first coupe in the second cycle. Thus, felling is done in a coupe after a certain number of years, which is equal to the number of coupes. This interval is known as felling cycle. Felling cycle adopted is 15 years under Ideal Selection System in which felling are carried out over the whole area each year. Hence there will be 15 coupes.

Conduct of felling:- In the Selection System, following categories of trees are usually removed in ascending priority.

- (i) Removal of Dead, dying, diseased, mis-shapen or otherwise defective trees interfering with the growth of better trees.
- (ii) Removal of Trees of undesirable species.

- (iii) Removal of Immature trees which can be removed in judicious thinning carried out in different age classes.
- (iv) Removal of trees of and above the exploitable diameter.

The trees of and above the exploitable diameter upto the numerical limit fixed by the working plan provided they are silviculturally available. A selection tree is considered silviculturally available if its removal,

- (a) Does not create a permanent gap in the canopy.
- (b) tends to improve the remaining crop in terms of volume production or
- (c) Helps the growth of groups of young trees down to the sapling stage of any of the valuable species.

4.12 Formation of Annual Coupes:

Annual coupes are the felling areas where the felling is confined to one coupe every year. Annual coupe is calculated by dividing felling series by felling cycle

$$\text{i.e. } Ac = \frac{FS}{FC} = \frac{8535.21}{15} = 569 \text{ ha.}$$

The compartments which are allotted to Fir/Spruce working circle are divided in 15 annual coupes which are as shown in following table:-

(Table No. 5)

Annual Coup	No. & Name of Forests	Compartment	Area in Ha.	Total Area of the Coupe
1	OD-1-Bagra	C-1a	17.65	588.13
	-do-	C-1b	34.59	
	-do-	C-2a	35.76	
	-do-	C-2b	36.63	
	-do-	C-2c	26.86	
	-do-	C-3a	22.29	
	-do-	C-3b	33.43	
	-do-	C-5a	21.10	
	-do-	C-5b	36.80	
	-do-	C-5c	23.02	
	-do-	C-6a	22.68	
	-do-	C-6b	33.39	
	-do-	C-8	33.43	
	-do-	C-9	14.97	
	-do-	C-10	16.19	
	-do-	C-11a	28.95	
	-do-	C-11b	21.54	
	-do-	C-12	20.72	
	-do-	C-13	32.91	

	-do-	C-15	32.04	
	-do-	C-14	43.18	
II	-do-	C-16	42.49	570.89
	-do-	C-17a	19.91	
	-do-	C-17b	34.94	
	-do-	C-18a	31.56	
	-do-	C-18b	45.35	
	-do-	C-18c	22.86	
	ND-2-Bagra	C-1a	47.72	
	-do-	C-2a	16.06	
	ND-3-Dhaut	Whole	21.04	
	OD-4-Ghughu Gahar	C-1a	28.43	
	-do-	C-1b	36.31	
	-do-	C-2a	37.06	
	-do-	C-2b	21.97	
	-do-	C-3a	33.68	
	-do-	C-3b	20.75	
	-do-	C-4	63.79	
	ND-5-Ghughu Gehar	Whole	46.97	
III	OD-6-Kawari Silh	C-2	17.63	590.00
	OD-7-Juferkot	C-2	45.92	
	-do-	C-3	50.45	
	-do-	C-4	85.26	
	ND-8-Saroa Gahar	C-1	11.55	
	-do-	C-2	37.82	
	OD-10-Thunadigad	C-1	38.17	
	-do-	C-1b	42.27	
	-do-	C-2a	56.28	
	-do-	C-3b(i)	30.49	
	-do-	C-3b(ii)	20.59	

	ND-12-Khadul Silh	Whole	79.30	
	ND-13-Kandhi Silh	C-2	17.43	
	OD-18-Rangcha	C-1c	56.84	
IV	-do-	C-2c(i)	23.42	554.22
	-do-	C-2c(ii)	32.83	
	-do-	C-2d(i)	23.30	
	-do-	C-2d(ii)	24.76	
	-do-	C-2e	14.83	
	-do-	C-2f	19.93	
	-do-	C-2g	76.03	
	OD-18-Rangcha	C-2h(i)	32.12	
	-do-	C-2h(ii)	20.88	
	-do-	C-2(i)	47.29	
	ND-19-Boong	Whole	19.43	
	ND-23-Naraingarh	C-2a	43.60	
	-do-	C-2b	40.32	
	-do-	C-2c(i)	17.08	
	-do-	C-2c(ii)	23.81	
	-do-	C-2d(i)	9.71	
	-do-	C-2d(ii)	43.69	
	ND-24-Sarol	C-1	14.85	
	OD-33-Dhunjgahar	C-1a	26.34	
V	-do-	C-1b	27.28	585.39
	-do-	C-4	43.56	
	-do-	C-5	48.63	
	-do-	C-6	37.16	
	OD-46-Kalisafri	C-2a(i)	28.80	
	-do-	C-2a(ii)	27.21	
	-do-	C-2b	50.46	
	-do-	C-2c	42.45	

	OD-57-Malari	C-3a	36.76	
	-do-	C-3b	52.28	
	OD-93-Shellapani	C-3	50.48	
	OD-101-Sawandarh	C-1	40.60	
	-do-	C-2	33.80	
	-do-	C-3	65.92	
VI	-do-	C-4	33.70	581.89
	ND-102-Sawandarh	Whole	24.28	
	ND-103-Sawandarh	Whole	14.57	
	OD-104-Deothach	C-1	33.16	
	-do-	C-2	23.03	
	-do-	C-3a	35.59	
	-do-	C-3b	22.93	
	-do-	C-4	39.88	
	OD-106-Rajan Kora	C-1a	32.38	
	-do-	C-1b	32.37	
	-do-	C-2b(i)	34.36	
	-do-	C-2b(ii)	23.58	
	-do-	C-2c	70.95	
	-do-	C-2d(i)	14.97	
	-do-	C-2d(ii)	44.05	
	-do-	C-2e	72.91	
	OD-107-Shargad	C-1	29.18	
VII	OD-116-Badiyar	C-1	22.56	552.59
	-do-	C-2	32.63	
	ND-136-Khaliach	C-2	32.37	
	ND-139-Kamera	C-1	26.80	
	-do-	C-5	131.26	
	ND-392-Surandhi	C-1	40.39	
	ND-405-Lot	C-2	22.64	

	-do-	C-3	46.07	
	OD-410-Devidhar	Whole	31.87	
	OD-412-Gadoun Nal	C-2a	47.90	
	-do-	C-2b	33.43	
	OD-413-Kamru Nag	C-2a	84.67	
VIII	-do-	C-2b	52.05	586.34
	-do-	C-2c	71.29	
	OD-414-Lota Pukhar	C-1	84.98	
	-do-	C-2	43.61	
	-do-	C-3	45.84	
	-do-	C-4	49.50	
		C-5	46.00	
	ND-415-Lota Pukhar	Whole	36.83	
	OD-416-Golhan	C-1	35.79	
	-do-	C-2	44.70	
	-do-	C-3	30.81	
	-do-	C-4	44.94	
IX	-do-	C-5	32.42	571.62
	-do-	C-6	54.08	
	ND-417-Golhan	Whole	40.47	
	OD-418-Naraihal	Whole	63.94	
	ND-419-Naraihal	Whole	42.09	
	ND-420-Chhenmegal	Whole	19.43	
	ND-421-Chhenmegal	Whole	52.21	
	ND-422-Kandhi Syash	C-1	27.08	
	ND-425-Jhaur	C-1	29.45	
	-do-	C-2	39.65	
	-do-	C-3	37.74	
	ND-426-Biradhar	C-4	41.70	
	ND-435- Jawal	C-1	43.29	
	-do-	C-2	48.07	
X	OD-316-Devidarh	C-2a	31.38	597.39
	OD-315-Pokhari Nal	C-2a	38.78	
	-do-	C-2b	59.16	
	OD-411-Poi Nal	C-3a	31.71	
	-do-	C-3b	61.13	
	-do-	C-3c	42.73	
	OD-309-Daint	C-5b	43.92	
	OD-311-Charagati	C-2a	35.91	
	-do-	C-2b	27.22	
	OD-159-Naur Silh	Whole	69.61	
	OD-224-Tungashi	C-1	51.43	
	OD-226-Baila	C-2a	49.74	
	-do-	C-2b	54.67	

XI	ND-229-Kudar Silh	C-1a	38.00	589.27
	-do-	C-2	51.93	
	ND-230-Girjanu	C-1	83.79	
	-do-	C-2	70.00	
	ND-231-Girjanu	Whole	8.09	
	ND-232- BhalwarSilh	Whole	15.78	
	OD-233-Halsigad	C-2	40.97	
	-do-	C-3	40.35	
	-do-	C-4a	33.43	
	-do-	C-4b	30.02	
	-do-	C-5a	53.47	
	-do-	C-5b	37.20	
	-do-	C-6	46.92	
	ND-234-Halsigad	C-1	39.32	
XII	-do-	C-2	65.50	555.76
	ND-235-Khudu Silh	C-1	44.46	
	-do-	C-2	50.32	
	-do-	C-3	26.63	
	ND-236-Lahari Silh	C-1	26.07	
	OD-240-Sankir	Whole	52.61	
	ND-241-Sankir	Whole	118.58	
	ND-242-Kandhi Press	C-1	66.93	
	-do-	C-2	43.55	
	OD-248-Choparu	C-1	44.92	
	ND-249-Choparu	Whole	16.19	
XIII	OD-250-Bara	C-1	37.19	584.06
	-do-	C-2	43.75	
	OD-255-Kala Kameshar	C-1	53.35	
	-do-	C-2	38.73	
	-do-	C-3	33.63	
	-do-	C-4	28.84	
	-do-	C-5	40.33	
	-do-	C-6	31.52	
	-do-	C-7	56.17	
	ND-256-Kala Kameshar	Whole	43.71	
	ND-257-Kala Kameshar	Whole	7.69	
	OD-258-Malhach	C-1	21.92	
	-do-	C-2	41.16	
	-do-	C-3	51.71	
	ND-262-Togra		35.21	
	ND-287-Khalori	C-2	19.15	

XIV	ND-288-Dharwargad	C-2	39.44	550.11
	OD-290-Sainf	C-1	27.70	
	-do-	C-2	51.79	
	-do-	C-3	30.42	
	-do-	C-4	32.23	
	-do-	C-5	45.45	
	-do-	C-6a	31.06	
	-do-	C-6b	24.16	
	ND-292-Togra	C-1	30.08	
	-do-	C-2	50.60	
	ND-294-Baneshi Dhar	C-5a	27.32	
	-do-	C-5b	23.98	
	OD-191-Bunga	C-1	13.67	
	-do-	C-2	35.53	
	OD-214-Dhaingad	C-1	47.90	
	-do-	C-2a	38.78	
XV	-do-	C-2b	25.38	477.55
	-do-	C-3	56.70	
	OD-220-Ghoreligad	C-1	78.48	
	-do-	C-2	39.81	
	-do-	C-3a	17.57	
	-do-	C-3b	28.93	
	-do-	C-4	61.03	
	ND-221-Shawar	Whole	82.56	
	ND-223-Pokhari Silh	C-2	67.09	
	U-15-Ling Gehar	Whole	16.00	
	UPF-Tungrashni	C-1	4.00	

4.13 SUBSIDIARY SILVICULTURAL OPERATION :

(i) Disposal of the felling debris

After the exploitation work is over, felling refuse has to be disposed off as cheaply and effectively as possible. The villagers should be encouraged to remove as much of the felling refuse as possible. Whatever felling refuse is left by the villagers should be disposed off in the following manner.

- C) The slash should be removed from around the base of seed bearers at a distance of about five meters after the exploitation work is over. The branch wood and debris should be collected in small heaps and gaps but never under the crowns of seed bearer. This slash should be burnt under strict supervision. The bushes in the area are

to be cut and burnt for clean bed. Debris burning should be done in the winter months.

- D) In areas where there is young re-generation and advance growth has been retained, slash should be removed from patches of re-generation or advance growth and collected in small heaves or gaps outside the re-generation patches. The slash should be carefully burnt. Care should be taken that no debris or log rolls down in young regeneration or advance growth during burning.

(ii) Sowing and planting

At the time of marking, problematic areas will be located and mapped for planting up in subsequent years. After debris burning in a good seed year, natural re-generation is thus supplemented by artificial planting. The areas are to be taken up in the rainy season following the years of exploitation and removal of slash. Thus, for reducing the period of closure to the shortest possible period, artificial re-generation is advocated.

(iii) Weeding and bush cutting

For healthy growth of plants, timely weeding is of immense importance. Growing season is first limited to the months of April, May and June and the plants must be kept free of weeds during this period. Growth retards with the onset of rains as the temperature falls, but still another weeding during July-August to keep the plants free of weeds as is essential and beneficial. The weeding will be continued till the plants are free from damage of weeds. Two weedings are advocated for two years as under:

- 1st weeding - June-July
2nd weeding- August-September

(iv) Cleaning

In cleaning operations, following type of stems will be removed.

- (i) Sickly and damaged stems.
- (ii) Forked stems
- (iii) Crooked short stems

The first cleaning is to be undertaken easily when the plants are two meters high. Frequent cleanings will be no doubt expensive but are necessary to attend the crop properly in the early stages. Cleaning will provide the best opportunity to regulate the mixture in favor of Deodar. The aim of cleaning is to remove the less valuable stems to provide growing for the better stems.

(v) Mechanical Thinning

Mechanical Thinning is essential for 2 to 3 years to attain trees of different age classes as required in the selection system.

CHAPTER-V

THE OAK WORKING CIRCLE

5.1 GENERAL CONSTITUTION:

In recent years, the fuelwood and fodder supply to the private individuals in the towns like Gohar, Thunag, Janjehli, Pandoh, Bagsaid and Balichowki will assume a considerable administrative importance. It is, therefore, in furtherance of the cause of action detailed above that this Working Circle will be constituted.

The Working Circle includes all the ban oak forests situated in the tract. These forests will be worked for meeting the firewood and fodder supplies of the tract.

5.2 GENERAL CHARACTER OF VEGETATION:

The Ban Oak is the main species. The stocks are middle aged to mature with some stands of pole stage. Seedling and sapling regeneration is almost absent due to heavy pressure of grazing. Ban Oak trees near the villages have been heavily lopped and reduced to scrub. *Rhododendron*, *Lyonia ovalifolia*, *Litsea corpinus* are important associates of Ban Oak.

5.3 BLOCKS AND COMPARTMENTS:

Forests are divided into compartment and sub-compartment of reasonable sizes for proper management and which have natural features as their boundaries. List of the compartment and forest attached.

(Table No. 1)

Sr. No.	No. & Name of Forests	Compartment	Area in Ha.
1	ND-32-Darangehar	Whole	39.26
2	ND-43-Mani Nal	Whole	31.97
3	ND-47-Kali Safari	C-1	30.81
4	-do-	C-2	27.29
5	-do-	C-3	32.56
6	ND-170-Garal	Whole	44.92
7	OD-474-Dalikar	C-1	36.67
8	-do-	C-2a	13.28
9	-do-	C-3	24.52
10	-do-	C-4	52.54
11	-do-	C-5	41.78
12	-do-	C-6	28.38
13	-do-	C-7	73.50
14	-do-	C-8	52.54
15	-do-	C-9	65.40

16	-do-	C-10	29.80
17	OD-491-Tawa	C-1	42.25
18	OD-492-Bageodh	C-4	42.49
19	OD-495-Dhuma Devi	C-3	38.92
20	OD-499-Janjohi	C-2b	26.30
21	-do-	C-2c	38.36
22	-do-	C-4	60.36
23	ND-505-Behlidhar	C-1a	20.25
24	-do-	C-1b	21.28
25	OD-360-Dharot	C-1b	18.54
26	OD-386-Chamani	C-1	26.15
27	OD-387-Tandi	C-3	26.32
28	ND-390-Malhog	C-1	33.48
29	ND-391-Galiyandhi Daint	Whole	38.85
30	ND-392-Surandhi	C-3	22.17
31	ND-427-Bakeda Nal	C-2	19.43
32	ND-428-Bakeda Nal	Whole	41.68
33	ND-434-Jablad	C-1	17.64
34	-do-	C-2	34.16
35	-do-	C-3	53.52
36	ND-435-Jawal	C-3	35.37
37	-do-	C-4	26.49
38	-do-	C-5	26.76
39	-do-	C-6	26.76
40	-do-	C-7	14.75
41	-do-	C-8	12.97
42	-do-	C-9	7.65
43	-do-	C-10	14.47
44	ND-436-Dofa	C-1	28.21
45	-do-	C-2	42.92
46	-do-	C-3	80.02
47	-do-	C-4	39.55
48	-do-	C-5	48.90
49	-do-	C-6	44.91
50	-do-	C-7	24.98
51	-do-	C-8	24.83
52	ND-437-Chachiot	C-1	14.69
53	-do-	C-2	49.84
54	-do-	C-3	70.35
55	-do-	C-4	28.31
56	ND-438-Fangiar	C-1	27.91
57	-do-	C-2	27.12
58	ND-313-Gortah	Whole	33.59
59	ND-193-Gagan Silh	C-2	41.77

60	U-21-Balyanda	Whole	63.00
Total area in ha.			2103.49

5.4 SPECIAL OBJECTIVES OF MANAGEMENT:

The special objectives of the management are:

1. To protect and preserve the hill side.
2. To meet the local demand of people for fodder and fuel.
3. To improve the stocking of the forests by effective closure and carrying out artificial sowing and planting.
4. To protect the Ban Oak from heavy lopping and indiscriminate hacking.
5. To obtain maximum yield of firewood and fodder to supplement the increasing requirement of new local towns.

5.5 AREA STATEMENT:

The Range-wise area of Oak working circle is given in following table:

(Table No. 2)

S.No.	Name of Range	Total Area in Ha.
1.	Thachi	161.89
2.	Seraj	138.36
3.	Pandoh	753.34
4.	Nachan	1049.60
Total		2103.19

Area under different species in hectares:

(Table No. 3)

Name of Range	Deo	Kail	Chil	Spruce	Silver /Fir	Ban	Kharsu	Mixed Conifer	MiscB.I	Mixed B.I/conifer	Blank	Total
Thachi	-	-	-	-	-	142.13	-	19.76	-	-	-	161.89
Pandoh	-	-	93.27	-	-	601.66	-	4.26	-	14.07	40.08	753.34
Seraj	-	-	-	-	-	138.36	-	-	-	-	-	138.36
Nachan	2.56	18.12	42.04	-	-	949.63	-	32.94	-	4.31	-	1049.60
Total	2.56	18.12	135.31	-	-	1831.78	-	56.96	-	18.38	40.08	2103.19

5.6 ANALYSIS AND VALUATION OF CROP:

5.6.1 STOCK MAP:

The Demarcated Protected Forests have been stock mapped on 1:15,000 scale. The stock maps have been filed in the respective compartment history files.

5.6.2 AGE CLASSES:

Middle aged trees of Ban Oak predominate and the younger age classes are generally deficient. Seedling and sapling regeneration is absent from all these areas because of over browsing and heavy lopping.

5.6.3 DENSITY:

Density has been ocularly estimated and recorded in the compartment history files of individual compartments and sub-compartments. The stocking on the whole is poor because of heavy lopping and browsing. The areas adjoining to the villages have been badly lopped and hacked in the past as a result of which stock is of very poor quality.

5.7 ENUMERATIONS:

Enumeration methodology has been adopted as suggested at Para 6.6.1 of PWPR. Details of methodology adopted have already been detailed in chapter No. 2 of Part-II in para No. 2.6.5. The sample enumeration results are in **Appendix-III, Page No. 98-104 of Volume-II.**

Abstract of extrapolated results of enumeration in Oak Working Circle

(Table No. 4)

No./ Volume of tree in Oak Working Circle													
working circle	Area in Ha.	Species		V	IV	III	IIA	IIB	IA	IB	IC	ID	Total
OWC	2103.19	Oak	T	154647.8	77685.23	59257.57	36132.67	21679.6	9755.82	3251.94	2167.96	2167.96	366746.6
			V	--	21751.87	49776.36	61425.53	55066.18	30340.6	11056.6	7371.064	7371.064	244159.3
		Mohru	T	5419.9	3251.94	2890.613	1445.307	722.6533	0	361.3267	0	0	14091.74
			V	--	975.582	2890.613	2601.552	2167.96	0	2276.358	0	0	10912.07
		Deodar	T	82021.15	21679.6	5781.227	1445.307	0	0	0	0	0	110927.3
			V	5331.375	6503.88	4624.981	2493.154	0	0	0	0	0	18953.39
		Kail	T	48779.1	15537.05	7226.533	3251.94	2167.96	3251.94	361.3267	361.3267	722.6533	81659.83
			V	3414.537	4195.003	4841.777	4877.91	6178.686	14210.98	2077.628	2500.381	5636.696	47933.6
		Chil	T	53837.67	22763.58	15537.05	5058.573	2167.96	1083.98	1445.307	722.6533	0	102616.8
			V	2691.884	3869.809	9632.969	6576.145	4639.434	3327.819	5853.492	3649.399	0	40240.95
		Other	T	422752.2	123573.7	46249.81	20234.29	3613.267	1806.633	722.6533	722.6533	1083.98	620759.2
			V	--	37072.12	32374.87	26304.58	7949.187	5961.89	3324.205	4552.716	8671.84	126211.4
		Grand	T	767457.8	264491.1	136942.8	67568.09	30351.44	15898.37	6142.553	3974.593	3974.593	1296801
		Total	V	11437.8	74368.25	104141.6	104278.9	76001.45	53841.29	24588.28	18073.56	21679.6	488410.7

5.8 SILVICULTURAL SYSTEM:

As no felling except minor felling to meet with the annual consumption of firewood, charcoal and agricultural equipments by the local right holders is allowed in this working Circle, hence no Silvicultural system is prescribed and removal not suggested.

5.9 PLANTING PROGRAMME:

Planting of Ban, Carpinus, Walnut, Maple, Birdcherry etc. would be carried out at suitable places identified for planting. Sincere efforts would be made to regenerate the area deficient in natural regeneration by artificial regeneration.

5.10 WEEDING:

In all area where planting is to be done weeding, one before and other after the monsoon, would be carried out every year until the plants are sufficiently high to escape suppressions from surrounding weed growth.

5.11 CLEANING AND THINNING:

Cleaning would be done in the eighth year after coppicing and number of shoots per stumps should be reduced to two or three. Thinning would be done in the 16th year after felling.

5.12 GRAZING AND GRASS CUTTING:

The coppice coupes would be closed to grazing immediately after the fellings. Grass cutting could, however, be allowed to the right holders under strict spot supervision so that the plants, coppice shoots and seedlings will not be cut along with grasses.

5.13 CLOSURE:

The coppice coupe will be closed to grazing for a period of 15 years after felling. Each area should be duly notified for closure and should be fenced with barbed wire. The areas deficient in natural regeneration are to be closed for grazing and other biotic interference till sufficient regeneration comes up.

5.14 LOPPING:

Lopping of Ban Oak trees for fodder and animal bedding during winter is rampant throughout the Division. The existing practice of indiscriminate and ruthless lopping has reduced these forests to merely a scrub growth adjoining the habitations. The existing practice of indiscriminate lopping should be stopped. The people of the area will be educated through VDC about the value of the forests. The villagers will be approached through the good offices of their Panchayat to exercise controlled and rotational lopping within the provision of the settlement and rules laid down from time to time in this context. The control of lopping will be achieved by strict vigil of the forest guards and carrying out necessary actions against the offenders.

CHAPTER – VI

THE PROTECTION WORKING CIRCLE

6.1 GENERAL CONSITITUTION OF WORKING CIRCLE:

This circle will include DPFs having steep, precipitous, inaccessible and broken terrain comprising of conifers, Ban or open crop of broad leaved species. These forests are mainly situated in difficult precipitous and erodible terrain and form the catchments of River Beas and perennial streams. These forests are required to be maintain for the preservation of biodiversity and also required as permanent clothing to the difficult terrains.

6.2 GENERAL CHARACTER OF VEGETATION:

In this working circle, the forests allotted are of (a) Ban, Mohru and Kharsu forests (b) Northern dry mixed deciduous forests (c) Western Oak, Fir forests.

6.3 BLOCKS AND COMPARTMENTS:

The existing compartments or sub-compartments remain unchanged in most of the DPFs.

List of Compartment of Protection Working Circle:-**THACHI RANGE****(Table No. 1)**

Sl. No.	No. & Name of Forests	Compartment	Area in Ha.
1	OD-10-Thanadigad	C-2b	51.77
2	-do-	C-3a	48.88
3	-do-	C-3b(ii)	48.16
4	-do-	C-4	4.45
5	ND-13-Kandhi Silh	Whole	29.92
6	OD-16-Kawalisilh	C-1	206.66
7	-do-	C-2	92.00
8	ND-17-Kawanu	Whole	116.9
9	OD-18-Rangcha	C-1a	35.89
10	-do-	C-2a	36.93
11	-do-	C-2b	52.38
12	ND-21-Bekhali	Whole	11.33
13	ND-22-Jhukhari	Whole	59.09
14	ND-23-Naraingarh	C-1b(i)	51.07
15	-do-	C-1b(ii)	54.40
16	-do-	C-1b(iii)	44.70
17	OD-25-Lagjan Silh	Whole	77.70

18	ND-26-Dahar	Whole	38.04
19	ND-27-Khalwan	Whole	30.45
20	OD-28-Sudhrani Silh	C-1b	44.40
21	ND-29-Sudhrani Silh	Whole	17.81
22	OD-30-Parkhol	C-1c	36.42
23	OD-31-Darangehar	C-2a	35.18
24	-do-	C-2b	43.84
25	-do-	C-2c	30.41
26	-do-	C-2d	56.49
27	OD-33-Dhunjgehar	C-2	28.80
28	-do-	C-3	38.68
29	ND-40-Dahar	Whole	46.52
30	ND-44-Jognidhar	Whole	84.18
31	ND-47-Kali Safari	C-4	62.72
32	ND-49-Dibi Thachi	Whole	15.38
33	ND-54-Deoli	Whole	27.92
34	ND-60-Kashal	Whole	27.15
35	ND-62-Ropi	Whole	43.30
36	ND-64-Tiper Chalyala	Whole	119.7
37	OD-74-Kashu	C-2	46.23
38	OD-75-Jhulka	C-1	29.69
39	-do-	C-2	33.49
40	ND-76-Jhulka	Whole	26.31
41	ND-79-Bachhar	Whole	30.75
42	ND-80-Basan	Whole	15.37
43	ND-81-Chhakidhar	Whole	23.47
44	ND-83-Kasunpat	Whole	23.07
45	ND-84-Silh	C-1	91.30
46	ND-86-Guran	Whole	26.71
47	ND-94-Shellapani	Whole	9.71
48	OD-96-Kanisilh	C-1	27.52
49	-do-	C-3	25.90
50	ND-105-Deothach	Whole	13.35
51	OD-106-Rajankoda	C-2a	30.16
52	OD-107-Shargad	C-2	44.43
53	-do-	C-3	50.23
54	OD-111-Ling Gehar	C-1	70.22
55	-do-	C-2	83.96
56	OD-112-Badori	Whole	46.13
57	ND-113-Badori	Whole	8.50
58	OD-114-Nalout	Whole	22.66
59	ND-115-Nalout	Whole	8.09
60	ND-117-Badiyar	Whole	5.67
61	OD-118-Chasrus	Whole	141.6
62	OD-119-Dori Pathar	Whole	51.40

63	OD-120-Chohari Kalyala	Whole	90.65
64	ND-123-Dudhagi	Whole	21.85
65	OD-124-Gachigad	Whole	48.97
66	ND-125-Gachigad	Whole	159.86
67	OD-126-Mathendi Dhar	Whole	42.09
68	OD-127-Ghaneshar	Whole	34.4
69	ND-128-Ghaneshar	Whole	56.66
70	U-2-Ghughu Gehar	Whole	20.00
71	U-3-Kawari Silh	Whole	4.00
72	U-5-Ukanibanwla	Whole	10.00
73	U-6-Dahargaher	Whole	8.00
74	U-7-Lagjan Silh	Whole	60.00
75	U-8-Pannu	Whole	40.00
76	U-12-Dhar Kalyala	Whole	8.00
77	U-14-Deothach	Whole	15.00
78	U-17-Dhunju Kalyala	Whole	12.00
79	U-18-Dibh	Whole	12.00
80	U-16-Begloo	Whole	6.00
81	U-10-Pheta Patharu	Whole	8.00
	Total		3493.02
	PANDOY RANGE		
	(Table -2)		
82	ND-129-Chheti Gatti	Whole	54.23
83	ND-130-Taltla	Whole	99.56
84	ND-131-Sher	Whole	56.25
85	ND-133-Koon	Whole	51.40
86	ND-139-Kameda	C-2	62.08
87	-do-	C-3	21.33
88	-do-	C-4	30.08
89	OD-143-Kholanal	C-2	28.17
90	ND-144-Titaridhar	Whole	19.33
91	ND-146-Bhekhlihar	Whole	69.61
92	OD-147-Saloi	Whole	61.51
93	ND-148-Saloi	Whole	62.32
94	ND-149-Saloi	Whole	21.04
95	ND-150-Saloi-I	Whole	23.47
96	ND-151-Saloi-II	Whole	94.69
97	ND-152-Pajout Nal	Whole	19.43
98	ND-153-Pajout Silh	Whole	159.45
99	ND-154-Bhela	Whole	201.54
100	ND-155-Kalwah (Kuklah-I)	Whole	17.40
101	ND-156-Kulwah	Whole	7.25

	(Kuklah-II)		
102	ND-157-Bakhali-I	Whole	14.56
103	ND-158-Bakhali-II	Whole	19.03
104	ND-160-Fanjiar	Whole	144.07
105	ND-163-Bagi Banwar	Whole	126.67
106	ND-165-Segli Silh-I	Whole	151.76
107	ND-166-Segli Silh-II	Whole	135.16
108	ND-167-Jarwash	Whole	112.05
109	ND-167-Jarwash	C-1	30.00
110	ND-168-Khunachi-I	Whole	145.29
111	ND-169-Khunachi-II	Whole	11.73
112	ND-171-Thach	Whole	84.18
113	ND-172-Drunu	Whole	49.37
114	ND-173-Banadhar	Whole	45.74
115	ND-174-Deokandha	C-1	44.48
116	-do-	C-2	25.28
117	-do-	C-3	24.12
118	-do-	C-4	24.60
119	-do-	C-5	20.22
120	-do-	C-6	25.20
121	-do-	C-7	65.16
122	ND-320-Kajiuri	Whole	67.98
123	ND-321-Khumcha Nal-I	Whole	8.49
124	ND-322-Khumcha Nal-II	Whole	45.73
125	ND-323-Jhangarbari-I	Whole	28.66
126	ND-324-Jhangarbari-II	Whole	2.42
127	ND-325-Jhout	Whole	90.37
128	OD-327-Natharli	Whole	28.73
129	ND-330-Thach	Whole	4.04
130	ND-339-Biradhar	Whole	18.61
131	ND-464-Chalouni Silh-I	Whole	9.77
132	ND-468-Chalouni Silh-II	Whole	4.86
133	ND-469-Sakohar	Whole	86.61
134	ND-470-Bachhar	Whole	49.37
135	ND-475-Dalika-I	Whole	178.47
136	ND-476-Dalika-II	Whole	17.81
137	ND-480-Bai Nal-II	Whole	10.12
138	ND-481-Bail Nal	Whole	54.63
139	ND-482-Khandel	Whole	2.83
140	ND-483-Luhath	Whole	16.99
141	ND-484-Khoba Bhet	Whole	6.07

142	ND-485-Choki Bhet	Whole	6.47
143	ND-486-Latosh	Whole	43.30
144	ND-487-Surah	Whole	6.07
145	ND-488-Doghari	Whole	41.68
146	ND-490-Ghatlu	Whole	6.07
147	ND-493-Bageodh	Whole	20.24
148	OD-496-Sawardhar	C-3	18.13
149	ND-497-Jamu	C-2	36.50
150	OD-499-Janjohi	C-2b	13.37
151	-do-	C-7	36.31
152	OD-500-Seogi	Whole	48.15
153	ND-501-Basta	Whole	5.26
154	ND-502-Basta-I	Whole	19.83
155	ND-503-Basta-II	Whole	13.75
156	ND-504-Shambal	Whole	6.07
157	ND-505-Behlidhar	C-2a	77.88
158	-do-	C-2b	24.16
159	-do-	C-2c	59.07
160	-do-	C-3d	20.80
161	-do-	C-4a	22.08
162	-do-	C-4b	17.45
	Total		3734.01
	NACHAN RANGE		
	(Table No.-3)		
163	ND-343-Satyogi	Whole	28.14
164	ND-348-Kashandhari	Whole	25.90
165	ND-349-Chhariyand Dhar	Whole	93.08
166	ND-350-Chhariyand Dhar	Whole	55.04
167	OD-356-Kelti Dhar	Whole	43.97
168	ND-359-Rai Nal	Whole	25.09
169	ND-361-Dharot	Whole	24.69
170	ND-368-Seglu	Whole	26.71
171	ND-369-Sanot	Whole	18.62
172	ND-373-Ghadhimani	Whole	40.87
173	ND-374-Riun Nal	Whole	12.14
174	OD-375-Siun Dhar	Whole	40.07
175	ND-377-Kandha	C-3	11.45
176	ND-379-Deodhar	Whole	17.00
177	ND-380-Halan Chora	Whole	8.90
178	ND-388-Bhatha Dhar	Whole	14.97
189	ND-389-Santadhar	Whole	38.45
180	ND-390-Malhog	C-2	10.62
181	OD-404-Bakharyar	Whole	27.32

182	ND-405-Lot	Whole	75.56
183	OD-408-Daint	C-2	59.09
184	ND-426-Biradhar	C-5	19.38
185	ND-427-Bakeda Nal	C-1	36.58
186	-do-	C-3	24.53
187	ND-429-Karnala Silh	Whole	118.98
188	ND-431-Togra	Whole	83.37
189	ND-432-Shalla Sherpur	Whole	27.11
190	ND-454-Bhangroh	C-2	84.40
191	ND-459-Mehachar	Whole	47.25
192	ND-465-Behlidhar-II	Whole	11.74
193	OD-315-Tokhari Nal	C-3	84.58
194	U-26-Daint	Whole	16.00
	Total		1251.6
	SERAJ RANGE		
	(Table No.-4)		
195	OD-161-Raigarh	Whole	66.37
196	OD-160-Riadasilh	Whole	160.26
197	OD-163-Sodha Silh	C-1	83.99
198	-do-	C-2	46.30
199	-do-	C-3	38.87
200	OD-165-Keoli Nal	Whole	125.46
201	OD-167-Gadoun Silh	Whole	152.98
202	OD-181-Lamb	Whole	38.45
203	OD-187-Dharotha	C-2	67.19
204	-do-	C-3	75.92
205	-do-	C-4	20.77
206	-do-	C-5	33.65
207	-do-	C-6	37.35
208	-do-	C-7	38.39
209	-do-	C-8	27.40
210	OD-224-Tungasi	C-2	56.22
211	ND-225-Tungasi	Whole	106.84
212	OD-233-Halsigad	C-1	57.55
213	ND-239-Marothi Silh	Whole	34.40
214	ND-246-Odi Dhar	Whole	5.26
215	ND-251-Bara	Whole	7.69
216	ND-252-Rilla	Whole	17.00
217	ND-253-Bai Nal	Whole	32.38
218	ND-254-Bai Nal	Whole	82.56
219	ND-259-Malhach	Whole	5.26
220	ND-263-Bhajwas	Whole	8.50
221	ND-266-Bakharer	Whole	29.14
222	ND-267-Bakharer	Whole	6.88
223	ND-271-Bah	C-1	5.67

224	-do-	C-2	4.86
225	ND-274-Soor	C-1	6.88
226	-do-	C-2	12.14
227	ND-275-Handu Nal	Whole	11.33
228	ND-278-Ghanshila	Whole	8.09
229	ND-289-Bajaran	C-1	38.89
230	-do-	C-2	57.43
231	ND-300-Kutla Hallinu	Whole	21.45
232	ND-303-Bharun	Whole	46.95
233	ND-304-Sukaran	Whole	17.00
234	ND-308-Dalikaar Dhar	Whole	24.28
235	ND-309-Parwara	Whole	39.66
236	ND-314-Gurtah	Whole	11.74
237	ND-314-Suhlu	Whole	232.38
238	ND-175-Kandha	Whole	164.31
239	ND-176-Jognidhar	Whole	89.44
240	ND-177-Deodhar	Whole	126.67
241	ND-178-Kamesher Dhar	Whole	16.19
242	ND-179-Sirthu	Whole	21.85
243	ND-180-Samohanidhar	Whole	163.09
244	ND-192-Dadoun	Whole	16.92
245	ND-185-Bhuj	Whole	177.66
246	ND-186-Grot	Whole	14.57
247	ND-187-Chhanudhag	Whole	12.14
248	ND-188-Dressi	Whole	16.19
249	ND-192-Chalehari Silh	Whole	5.44
250	ND-194-Ropari	Whole	9.32
251	ND-195-Naktera	Whole	44.92
252	ND-196-Leh	Whole	19.02
253	ND-198-Jhijhu	Whole	59.09
254	ND-203-Pakhari	Whole	77.70
255	ND-204-Chiuni	Whole	16.31
256	ND-205-Chet	Whole	106.88
257	ND-207-Jhakroo	Whole	96.32
258	ND-211-Ghiar	Whole	32.71
259	ND-212-Bhradagad	Whole	36.02
260	ND-213-Jhugandi	Whole	25.09
261	ND-215-Dharmrala	Whole	97.94
262	ND-216-Gussaina	Whole	98.75
263	ND-217-Mirjoo Dhar	Whole	14.97
264	U-22-Dhar	Whole	15.00
265	U-23-Baneshi Dhar	Whole	5.00
266	U-24-Jhakhari Nal	Whole	15.00
	Total		3596.29

G. Total	12074.92
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6.4 SPECIAL OBJECTS OF MANAGEMENT:-

- i) Protection of hill sides from denudation and erosion by preserving and enhancing the forest cover.
- ii) To improve the growing stock in quality as well as in quantity by sowing and planting.
- iii) To protect the forests from indiscriminate exploitation and to preserve them as representative Eco-system of the region.
- iv) To provide a suitable habitat to wild animals in forests within the boundary of wild life sanctuary.
- v) Consistent with the principles of soil conservation, to provide for grazing of sheep, goat and buffaloes of local and migratory graziers who come to these areas and also to meet the genuine demands of right-holders for timber and other forest produce.

6.5 ANALYSIS AND VALUATION OF THE CROP

All the forests in this working circle have been stock mapped on 1:15000 scale the tracing of each compartment or sub compartment has been placed in each compartment history file. The sizable plantable blanks have been identified and marked on the stock maps. The area detail under different species is given in a table in hectares.

Protection Working Circle

(Table No 5)

Name of Range	Deo	Kail	Chil	Spruce	Silver Fir	Ban	Kharsu	Mixed Conifer	Misc B/L	Mixed B/L Conifer	Blank	Total
Thachi	49.61	612.11	300.11	375.54	148.34	155.68	28.72	1154.73	218.44	126.69	317.05	3487.02
Pandoh	2.21	44.07	650.01	-	-	1115.44	464.37	151.34	472.92	140.57	693.08	3734.01
Seraj	20.53	336.35	29.46	331.27	111.09	507.21	365.41	761.95	261.15	453.45	424.42	3602.29
Nachan	54.88	57.38	145.23	-	-	807.74	-	37.02	-	128.11	21.24	1251.60
Total	127.23	1049.91	1124.81	706.81	259.43	2586.07	858.50	2105.04	952.51	848.82	1455.79	12074.92

6.5.1 Area Statement:

Range wise detail of area under this working circle is given below:

(Table No. 6)

Range	DPFs	Area in Ha. UPFs	Total
Nachan	1235.60	16.00	1251.6
Pandoh	3734.01	0	3734.01
Thachi	3290.02	197.00	3487.02
Seraj	3561.29	41.00	3602.29
	11820.92	254	12074.92

6.5.2 QUALITY CLASS/DENSITY:-

General assessment of quality class and density has been made ocularly and recorded in the compartment history files. Stocking in all the forests allotted to this working circle is poor.

6.5.3 ENUMERATION:-

No enumeration has been done in this working circle because no regular felling has been prescribed.

6.6 SILVICULTURAL SYSTEM:-

As no felling other than marking to the local right holders are proposed in these areas hence no Silvicultural system is prescribed.

6.7 PLANTATION PROGRAMME:

Sizeable plantable blanks and under steep areas all over the working circle are identified and a definite plan of sowing/planting for the plan period will be laid down every year as per availability of funds. Planting of suitable species of Deodar, Kail, Oaks and other B/L species will be taken in these areas.

6.8 CLOSURE:

All plantation area and the areas having poor natural regeneration will be closed for grazing for period of 15 years and to be opened only when fully established. The closed areas should be notified well in time.

6.9 GRAZING:

Grazing rights of the right holders as admitted in the settlement report will not be interfered within the areas other than those under regeneration.

6.10 SOIL AND WATER CONSERVATION WORKS:

In order to control landslides and to improve moisture regime in this working circle, suitable soil and water conservation works will be carried out. The areas to be treated will be identified and treated by constructing suitable engineering structures supported by plantation by Bio engineering species like Agave, Yucca, Grasses etc.

CHAPTER-VII

THE PLANTATIONWORKING CIRCLE

7.1 GENERAL CONSTITUTION:

This working circle include areas which are devoid of vegetation and young plantation comprising of demarcated and un-demarcated protected forests as are mostly tree less and suitable for plantations. Areas of failed plantation, Broad leaved, Scrub and Scattered trees grown requiring restocking with Deodar, Kail, Chil and other species will be included in this working circle. These areas are deteriorating gradually for lack of concentrated attention. These extended wooden areas will improve the economy of local people by providing fodder, fuel wood as well as livelihood etc. Only such areas will be included which has site factor favorable for raising plantations. Total area of plantation working circle is 1283.49 Ha.as tabulated as under:-

THACHI RANGE

Sl. No.	No. & Name of Forests	Compartment	Area in Ha.
1	OD-1-Bagra	C-4	54.85
2	-do-	C-7	23.50
3	ND-2-Bagra	C-1a	9.28
4	-do-	C-1b	30.14
5	ND-20-Tikki	Whole	8.50
6	ND-24-Sarol	C-2	22.38
7	ND-37-Makhrol Dhar	Whole	19.4
8	ND-53-Sungar	Whole	8.90
9	ND-65-Pakhari	Whole	33.90
10	ND-100-Janji Kalyala	Whole	10.52
11	U-1-Nehra	Whole	12.00
12	U-4-Banwala	Whole	10.00
13	U-9-Khani	Whole	4.00
14	U-11-Hadimba Dhar	Whole	6.00
PANDOHI RANGE			
15	ND-137-Jhandhri Dhar	Whole	10.93

16	ND-140-Khahari-I	Whole	21.04
17	ND-141-Khahari-II	Whole	3.64
18	ND-164-Jogani Nal	Whole	133.96
19	ND-319-Kajiunri	Whole	14.97
20	ND-471-Ladu Tungar-I	Whole	12.95
21	ND-472-Ladu Tungar-II	Whole	25.50
22	ND-479-Bai Nal-I	Whole	56.13
23	ND-498-Jaral	Whole	47.75
24	ND-134-Chief-I	Whole	16.29
25	U-19-Kalhani	Whole	80.00
	NACHAN RANGE		
26	ND-341-Thaltu	Whole	15.38
27	ND-342-Badan	Whole	31.97
28	ND-354-Tolar Bhet-I	Whole	9.71
29	ND-363-Tikar	Whole	6.07
30	ND-442-Ratohti	Whole	10.94
31	ND-443-Jasan-II	Whole	24.13
32	ND-444-Jasan-I	C-1	32.64
33	-do-	C-2	33.02
34	ND-446-Pathari-I	Whole	46.13
35	ND-456-Mahan	Whole	4.86
	SERAJ RANGE		
36	ND-229-Kudar Silh	C-1b	31.88
37	ND-243-Kandhi Press	Whole	37.23
38	ND-311-Surah	Whole	9.71
39	ND-315-Siyandi Nal	Whole	14.17
40	ND-193-Gagan Silh	Whole	43.22
41	ND-197-Kathla	Whole	10.3
42	ND-206-Saraji Deo	Whole	151.7
43	ND-222-Janj Silh	Whole	87.9
44	U-25-Suketi	Whole	6.00

7.2 GENERAL CHARACTER OF THE VEGETATION:

Almost all the types of the forests which are described in the chapter II of Part-I are included in this Working Circle. Detailed description of the vegetation has been given in the concerned compartment history files.

7.3 BLOCKS AND COMPARTMENTS:

No change will be made in the boundaries of forest allotted to this working circle and the sizable blanks and under stocked areas identified are given in table below:

Range/Block/Beat/Forest/Compartment wise detail of blank area for plantation in respect of Nachan Forest Division at Gohar is as under:-

(Table No. 1)

Sr. No.	Name of Range	Name of Block	Name of Beat	Name of Forest	Compartment
1.	Nachan	Tunna	Tunna	Biradhar DPF	C.1
2.	Nachan	Tunna	Tunna	Karnalasilh	-
3.	Nachan	Tunna	Tunna	Jablad	-
4.	Nachan	Tunna	Tunna	Darudev	-
5.	Nachan	Tunna	Tunna	Togra	-
6.	Nachan	Tunna	Tunna	ShallaSherpur DPF	Whole
7.	Nachan	Tunna	Kamrunag	ChhainMegal DPF	C.1
8.	Nachan	Tunna	Kamrunag	Jhour DPF	-
9.	Nachan	Tunna	Kamrunag	Kandhi DPF	-
10.	Nachan	Tunna	Jeog	Jeog DPF	C.2
11.	Nachan	Tunna	Jeog	Ganeshi DPF	-
12.	Nachan	Tunna	Jeog	Dhar DPF	-
13.	Nachan	Tunna	Jeog	Jhurdi DPF	
14.	Nachan	Tunna	Lot	Gani DPF	C.3
15.	Nachan	Tunna	Lot	Bakhryar DPF	C.2
16.	Nachan	Tunna	Lot	Lot DPF	-
17.	Nachan	Tunna	Lot	Daint DPF	-
18.	Nachan	Dhangiara	Devidarh	Poinal	C2B
19.	Nachan	Dhangiara	Budhrag	Tungrassan	C8
20.	Nachan	Dhangiara	Jahal	Kamrunag	-
21.	Nachan	Chhariyand	Hallinoo	Hallinoo DPF	C4
22.	Nachan	Chhariyand	Hallinoo	Hallinoo DPF	C1
23.	Nachan	Chhariyand	Halinoo	Biradhar DPF	-
24.	Nachan	Chhariyand	Halinoo	Chhariyandhar	-
25.	Nachan	Chhariyand	Devdhar	Riunal	Whole

26.	Nachan	Chhariyand	Devdhar	Kandha DPF	-
27.	Nachan	Chhariyand	Devdhar	Chaklyala DPF	-
28.	Nachan	Chhariyand	Bassi	Tolarbhet DPF	-
29.	Nachan	Chhariyand	Kotlu	Thaltu DPF	-
30.	Nachan	Chhariyand	Kotlu	Charriyengarh DPF	-
31.	Nachan	Bassa	Chailchowk	Pathari ND 445	C1
32.	Nachan	Bassa	Chailchowk	Jassan ND 444	C3
33.	Nachan	Bassa	Jabrat	Bhangroh	C2A
34.	Nachan	Bassa	Jabrat	Molichalon DPF	-
35.	Nachan	Bassa	Bassa	Miah	Whole
36.	Nachan	Bassa	Dalogi	Sanot	---
37.	Nachan	Bassa	Dalogi	Bhungan	C1
38.	Nachan	Bassa	Dalogi	Dalogi DPF	-
39.	Nachan	Bassa	Kharsi	Bharsi DPF	-
40.	Nachan	Bassa	Kharsi	Mahithana DPF	-
41.	Nachan	Bassa	Tandi	DharasurandhiD PF	-
42.	Nachan	Bassa	Tandi	Tandi DPF	-
43.	Nachan	Bassa	Chachiot	Chachiot DPF	-
THACHI RANGE					
1	Thachi	Gadagusain	Bagra	Bagra	C9
2	Thachi	Gadagusain	Gadagusain	DPF JuffarKot	C4
3	Thachi	Gadagusain	Daharghat	Mathenidahr	C2
4	Thachi	Dahar	Tikki	Ranchacha	C2A
5	Thachi	Dahar	Parkhol	DaranGehar	C2D
6	Thachi	Dahar	Khani	Dhavehar	Whole
7	Thachi	Thachi	Thachi	Shelapani	C2
8	Thachi	Thachi	Deothach	Sawandar	C3
9	Thachi	Thachi	Kalipari	Shalgad	C1
10	Thachi	Thachi	Boong	ChohariKalyala	Whole
11	Thachi	Balichowki	Panjain	Sanon	C2
12	Thachi	Balichowki	Devdhar	ChunjiChallar	C2
13	Thachi	Balichowki	Bassan	PhetaPatharu	Whole
14	Thachi	Balichowki	Balichowki	Bharwah	Whole
SERAJ RANGE					
1	Seraj	Shillibagi	Ghatiyad	Samahanichar	Whole

2	Seraj	Shillibagi	Ghatiyad	Devdhar	Whole
3	Seraj	Shillibagi	Ghatiyad	Jahal Gad	Whole
4	Seraj	Shillibagi	Ghatiyad	Saraugh	Whole
5	Seraj	Shillibagi	Nihari	Ghiar	Whole
6	Seraj	Shillibagi	Chiuni	Chet	Whole
7	Seraj	Shillibagi	Chiuni	Bhuj	Whole
8	Seraj	Janjehli	Tungasi	PokhariSilh	C2
9	Seraj	Janjehli	Tungasi	Ghuraligad	C4
10	Seraj	Janjehli	Tungasi	Dhengad	C2b
11	Seraj	Janjehli	Tungasi	Jughand	Whole
12	Seraj	Keolinal	Keolinal	Gadounsilh	Whole
13	Seraj	Keolinal	Riyada	Halsigad	C3 and C4
14	Seraj	Keolinal	Baila	Girjanu	C3
PANDOH RANGE					
1	Pandoh	Karthach	Karthach	Shar	-
2	Pandoh	Karthach	Karthach	Koon	C-I
3	Pandoh	Karthach	Karthach	Koon	C-II
4	Pandoh	Karthach	Karthach	Cheef-I	-
5	Pandoh	Karthach	Karthach	Cheef-II	-
6	Pandoh	Karthach	Karthach	Khaliach	C-I
7	Pandoh	Karthach	Karthach	Khaliach	C-II
8	Pandoh	Karthach	Karthach	Karthach	CIa
9	Pandoh	Karthach	Karthach	Karthach	C-Ib (i)
10	Pandoh	Karthach	Karthach	Karthach	C-Ib (ii)
11	Pandoh	Karthach	Karthach	Karthach	C-II
12	Pandoh	Karthach	Karthach	Kamera	C-I
13	Pandoh	Karthach	Karthach	Kamera	C-V
14	Pandoh	Karthach	Saloi	Kalhani-I	-
15	Pandoh	Karthach	Saloi	Badsari	-
16	Pandoh	Karthach	Saloi	KholaNal	C-I
17	Pandoh	Karthach	Saloi	KholaNal	C-III
18	Pandoh	Karthach	Saloi	Bhekhalidhar	-
19	Pandoh	Karthach	Bandal	Fanjjar	C-I
20	Pandoh	Karthach	Bandal	Fanjjar	C-II
21	Pandoh	Karthach	Bandal	Fanjjar	C-IIIa
22	Pandoh	Karthach	Bandal	Fanjjar	C-IIIb
23	Pandoh	Karthach	Bandal	Fanjjar	C-IV
24	Pandoh	Karthach	Bandal	Fanjjar	C-Va
25	Pandoh	Karthach	Bandal	Fanjjar	C-Vb
26	Pandoh	Karthach	Bandal	Fanjjar	C-VI a
27	Pandoh	Karthach	Bandal	Fanjjar	C-VIb
28	Pandoh	Karthach	Bandal	Fanjjar-II	-
29	Pandoh	Karthach	Bandal	BagiBanwar	-
30	Pandoh	Karthach	Kalhani	Garal	-
31	Pandoh	Chhaprahan	Saroa	Kajiuri	-

32	Pandoh	Chhaprahan	Saroa	Majhen	-
33	Pandoh	Chhaprahan	Saroa	Bakhali	C-I
34	Pandoh	Chhaprahan	Saroa	Bakhali	C-II
35	Pandoh	Chhaprahan	Saroa	Sawala	-
36	Pandoh	Chhaprahan	Saroa	Ropari	-
37	Pandoh	Chhaprahan	Saroa	Tandi	-
38	Pandoh	Chhaprahan	Saroa	Ropari/Maswari	-
39	Pandoh	Chhaprahan	Saroa	Saroa	C-I
40	Pandoh	Chhaprahan	Saroa	Saroa	C-II
41	Pandoh	Chhaprahan	Saroa	Thamlah	-
42	Pandoh	Chhaprahan	Chhaprahan	Baniur	C-I
43	Pandoh	Chhaprahan	Chhaprahan	Baniur	C-II
44	Pandoh	Chhaprahan	Chhaprahan	Bain Nal-I	-
45	Pandoh	Chhaprahan	Dalika	Sakohar	-
46	Pandoh	Chhaprahan	Dalika	LaduTungar-II	-
47	Pandoh	Chhaprahan	Dalika	Movi	-
48	Pandoh	Chhaprahan	Dalika	Dalika	C-I
49	Pandoh	Chhaprahan	Dalika	Dalika	C-2a
50	Pandoh	Chhaprahan	Dalika	Dalika	C-2b
51	Pandoh	Chhaprahan	Dalika	Dalika	C-3
52	Pandoh	Chhaprahan	Dalika	Dalika	C-4
53	Pandoh	Chhaprahan	Dalika	Dalika	C-5
54	Pandoh	Chhaprahan	Dalika	Dalika	C-6
55	Pandoh	Chhaprahan	Dalika	Dalika	C-7
56	Pandoh	Chhaprahan	Dalika	Dalika	C-8
57	Pandoh	Chhaprahan	Dalika	Dalika	C-9
58	Pandoh	Chhaprahan	Dalika	Dalika	C-10
59	Pandoh	Pandoh	Tawa	Ghatalu	-
60	Pandoh	Pandoh	Tawa	Tawa	C-I
61	Pandoh	Pandoh	Tawa	Tawa	C-II
62	Pandoh	Pandoh	Tawa	Tawa	C-III
63	Pandoh	Pandoh	Tawa	Bageodh	C-I
64	Pandoh	Pandoh	Tawa	Bageodh	C-II
65	Pandoh	Pandoh	Tawa	Bageodh	C-III
66	Pandoh	Pandoh	Tawa	Bageodh	C-IV
67	Pandoh	Pandoh	Tawa	Bageodh	C-V
68	Pandoh	Pandoh	Tawa	Bageodh	C-VI
69	Pandoh	Pandoh	Tawa	Chandeh	-
70	Pandoh	Pandoh	Pandoh	Dhumadevi	C-I
71	Pandoh	Pandoh	Pandoh	Dhumadevi	C-II
72	Pandoh	Pandoh	Pandoh	Dhumadevi	C-III
73	Pandoh	Pandoh	Pandoh	Sawardhar	C-I
74	Pandoh	Pandoh	Pandoh	Sawardhar	C-II
75	Pandoh	Pandoh	Pandoh	Jammu	C-I
76	Pandoh	Pandoh	Pandoh	Jaral	-

77	Pandoh	Pandoh	Pandoh	Janjohi	C-Ia
78	Pandoh	Pandoh	Pandoh	Janjohi	C-Ib
79	Pandoh	Pandoh	Pandoh	Janjohi	C-Ic
80	Pandoh	Pandoh	Pandoh	Janjohi	C-IIa
81	Pandoh	Pandoh	Pandoh	Janjohi	C-IIc
82	Pandoh	Pandoh	Pandoh	Janjohi	C-IIa
83	Pandoh	Pandoh	Pandoh	Janjohi	C-IIb
84	Pandoh	Pandoh	Pandoh	Janjohi	C-IV
85	Pandoh	Pandoh	Pandoh	Janjohi	C-V
86	Pandoh	Pandoh	Pandoh	Janjohi	C-VI
87	Pandoh	Pandoh	Badanu	Bahlidhar	C-Ia
88	Pandoh	Pandoh	Badanu	Bahlidhar	C-Ib
89	Pandoh	Pandoh	Badanu	Bahlidhar	C-Ic
90	Pandoh	Pandoh	Badanu	Bahlidhar	C-Id
91	Pandoh	Pandoh	Badanu	Bahlidhar	C-IIb
92	Pandoh	Pandoh	Badanu	Bahlidhar	C-IId
93	Pandoh	Pandoh	Badanu	Bahlidhar	C-IIIa
94	Pandoh	Pandoh	Badanu	Bahlidhar	C-IIb
95	Pandoh	Pandoh	Badanu	Bahlidhar	C-IIc
96	Pandoh	Pandoh	Badanu	Bahlidhar	C-IIc
97	Pandoh	Pandoh	Badanu	Bahlidhar	C-IIIf
98	Pandoh	Pandoh	Badanu	Bahlidhar	C-IIIg
99	Pandoh	Pandoh	Badanu	Bahlidhar	C-IIIf
100	Pandoh	Pandoh	Badanu	Bahlidhar	C-IIIf
101	Pandoh	Pandoh	Badanu	Bahlidhar	C-IVc
102	Pandoh	Pandoh	Badanu	Bahlidhar	C-IVd
103	Pandoh	Pandoh	Badanu	Bahlidhar	C-IVe
104	Pandoh	Pandoh	Badanu	Bahlidhar	C-IVf
105	Pandoh	Pandoh	Badanu	Bahlidhar	C-IVg
106	Pandoh	Pandoh	Badanu	Bahlidhar	C-IVh
107	Pandoh	Pandoh	Badanu	Bahlidhar	C-IVi
108	Pandoh	Pandoh	Badanu	Runjh	-

7.3.1 Year-wise planting programme(from Plantation Working Circle) Range-wise is given below: -

Proposed year of plantation	Range	Name of Forest	Compart. No.	Total area of Forest/ Compart ment in hac.	Area to be planted in hac.
2013-14	Thachi	OD-1 Bagra	C.4	54.85	40.00
	Pandoh	ND-131-Shar	Whole	60.06	35.00
	Thachi	ND-193 Gagan Shgilh	C.1	43.22	30.00
	Nachan	ND-341 Thaltu	Whole	15.38	10.00

2014-15	Thachi	Bagra	C.7	23.51	15.00
	Pandoh	ND-134 Cheef -1	Whole	16.19	12.00
	Seraj	ND-197 Kathiala	Whole	10.52	10.00
	Nachan	ND-342 Badan	Whole	31.97	24.00
2015-16	Thachi	ND-2 Bagra	C.1b	9.28	8.00
	Pandoh	ND-137 Jandharidhar	Whole	10.93	10.00
2016-17	Thachi	ND-2 Bagra	C.2a	30.14	25.00
	Pandoh	ND-140 Kajuri	Whole	21.04	20.00
	Seraj	ND-206 Seraji Deo	Whole	151.76	50.00
2017-18	Thachi	ND-20 Tikki	Whole	8.5	8.00
	Seraj	ND-222 JanjSilh	Whole	27.92	20.00
	Nachan	ND-363 Tikkar	Whole	6.07	5.00
2018-19	Thachi	ND-24 Sarol	C-2	22.38	18.00
	Seraj	ND-141 Kajuri-II	Whole	3.64	3.00
	Nachan	ND-29 Kadar Silh	C1b	31.88	27.00
2019-20	Thachi	ND-37 Makhreli Dhar	Whole	19.43	15.00
	Seraj	ND-243 Kandhi Press	Whole	37.23	35.00
	Nachan	ND-442 RatehriDhagwahan	Whole	10.9	10.00
2020-21	Thachi	ND-49 Dibi Thach	Whole	15.38	15.00
	Pandoh	ND-472 Ladu Tungar-II	Whole	25.5	20.00
2021-22	Thachi	ND-53 Sungar Dhar	Whole	8.9	8.00
	Pandoh	ND-164 Joghani Nal	Whole	133.96	45.00
	Nachan	ND-443 Jasan-II	Whole	24.13	20.00
2022-23	Thachi	ND-60 Kashal	Whole	27.11	20.00
	Pandoh	ND-319 Kajuri	Whole	14.97	12.00
	Nachan	ND-444 Jassa-I	C.1	32.64	25.00
2023-24	Thachi	ND-65 Pakhari	Whole	33.99	30.00
	Seraj	ND-311 Surah	Whole	9.71	9.00
2024-25	Thachi	ND-100 JanjhiKalyala	Whole	10.52	10.00
	Seraj	ND-315 Siyandi Nal	Whole	14.17	12.00
	Nachan	ND-444 Jasan-II	C.2	33.02	30.00
2025-26	Thachi	U-1 Nehra	Whole	12.00	10.00
	Thachi	U-4 Banwala	Whole	10.00	10.00
	Seraj	U-24 Jhakri Nal	Whole	15.00	14.00
2026-27	Thachi	U-9 Khani	Whole	4.00	4.00
	Pandoh	ND-471 Ladu Tungar-I	Whole	12.95	12.00
	Nachan	ND-446 Pathari-II	Whole	46.13	32.00
2027-28	Thachi	U-10 PhetaPathru	Whole	8.00	8.00
	Seraj	U-25 suketi	Whole	6.00	6.00
2028-29	Thachi	U-11 Hadimba Dhar	Whole	6.00	6.00
	Pandoh	ND-498 Jaral	Whole	47.75	40.00
	Seraj	U-19 Kalhani	Whole	80.00	50.00
	Nachan	ND-456 Maharan	Whole	4.86	400

In addition to above, plantation has also been carried out/will be carried out in following DKWC, CWC, FS, Oak WC and Protection WC which are blank for carrying out plantation:-

Proposed year of plantation	Range	Name of Forest	Compart. No.	Total area of Forest/ Compartment in hac.	Area to be planted in hac.
2013-14	Nachan	ND-426 Biradhar	C-1	36.64	15.00
		ND-429 KarnalaSilh	Whole	118.98	35.00
		ND-434 Jablad	C-1	17.54	8.00
	Thachi	OD-1 Bagra	C-9	14.97	6.00
	Seraj	ND-180 Samanidhar	Whole	163.09	32.00
	Pandoh	ND-131 Shar	Whole	56.25	18.00
		OD-132 Koon	C-1	36.91	14.00
		OD-132 Koon	C-2	31.08	10.00
		ND-134 Cheef-I	Whole	16.19	5.00
		ND-135 Cheef-II	Whole	33.59	10.00
		ND-136 Khalaich	C-1	38.45	11.00
		-do-	C-2	32.37	10.00
2014-15	Nachan	OD-430 Darudev	Whole	32.37	12.00
		ND-431 Togra	Whole	83.37	12.00
		ND-432 Shalla Sherpur	Whole	27.11	10.00
	Thachi	OD-7 Juferkot	C-4	85.26	20.00
	Seraj	ND-177 Deodhar	Whole	126.67	24.00
	Pandoh	OD-138 Karthach	C-1a	14.40	5.00
		-do-	C-1b(i)	20.59	8.00
		-do-	C-1b(ii)	49.99	12.00
		-do-	C-2	35.21	8.00
		ND-139 Kamera	C-1	26.80	10.00
		-do-	C-5	131.26	18.00
		U-19 Kalhani –I	Whole	80.00	15.00
2015-16	Nachan	ND-420 Chhainmegal	Whole	19.43	10.00
		ND-425 Jhour	C-1	29.45	12.00
		ND-424 Kandhi	C-1	24.44	9.00
	Thachi	ND-14 Mathenidhar	C-2	26.79	8.00
	Seraj	ND-181 Jahalgad	Whole	11.41	5.00
	Pandoh	ND-142 Basdiary	Whole	50.18	25.00
		OD-143 Kholanal	C-1	15.64	10.00
		-do-	C-3	36.72	11.00
		ND-145 Bhekhalidhar	Whole	45.33	14.00
		ND-159 Fanjiar	C-1	34.24	10.00
		-do-	C-2	41.84	15.00
		-do-	C-3a	24.94	10.00
2016-17	Nachan	OD-397 Jeog	C-2	27.18	8.00

		ND-395 Ganeshi	Whole	39.66	10.00
		ND-393 Dhar	Whole	42.56	12.00
	Thachi	OD-18 Rangcha	C-2a	36.93	14.00
	Seraj	ND-183 Saroug	Whole	15.98	6.00
	Pandoh	ND-159 Fanjiar	C-3b	26.70	10.00
		-do-	C-4	71.98	15.00
		-do-	C-5a	38.97	12.00
		-do-	C-5b	26.92	9.00
		-do-	C-6a	37.34	5.00
		-do-	C-6b	32.96	6.00
		ND-160 Fanjiar-II	Whole	144.07	10.00
2017-18	Nachan	OD-401 Jhurdi	C-1	22.43	9.00
		OD-403 Gani	C-1a	25.25	7.00
		OD-404 Bakryar	C-2	27.32	10.00
	Thachi	OD-31 DaaanGehar	C-2d	54.49	12.00
	Seraj	ND-211 Ghiar	Whole	32.71	8.00
	Pandoh	OD-162 Bagi Banwar	Whole	61.51	6.00
		ND-171 Garal	Whole	44.92	10.00
		OD-318 Kajiuri	Whole	43.30	8.00
		ND-326 Majhan	Whole	21.04	6.00
		ND-328 Bakhali	C-1	50.60	12.00
		-do-	C-2	25.48	10.00
		ND-329 Shawal	Whole	42.89	11.00
2018-19	Nachan	ND-405 Lot	C-1	75.56	10.00
		OD-408 Daint	C-2	59.09	11.00
		OD-411 Poi Nal	C-2b	38.43	8.00
	Thachi	ND-40 Devdhar	Whole	46.52	11.00
	Seraj	ND-205 Chet	Whole	106.88	12.00
	Pandoh	ND-331 Ropari	Whole	46.54	8.00
		ND-332 Tandi	Whole	10.93	6.00
		ND-334 Ropari/Mashwari	Whole	18.14	8.00
		OD-336 Saroa	C-1	28.02	10.00
		-do-	C-2	26.61	11.00
		ND-466 Thamlah	Whole	42.49	16.00
		ND-477 Baniur	C-1	30.25	12.00
		-d0-	C-2	40.47	14.00
2019-20	Nachan	OD-310 Tungrashan	C-8a	57.47	15.00
		OD-413 Kamru Nag	C-1a	10.52	6.00
		OD-357 Hallinu	C-4	30.75	10.00
	Thachi	OD-93 Shellapani	C-2	37.29	12.00
	Seraj	ND-185 Bhuj	Whole	177.66	30.00
	Pandoh	ND-479 Binal-I	Whole	50.03	20.00
		ND-469 Sakohar	Whole	86.61	18.00

		ND-472 LaduTungar-II	Whole	25.50	10.00
		ND-473 Movi	Whole	36.83	12.00
		ND-474 Dalikar	C-1	36.67	8.00
		-do-	C-2a	13.18	10.00
		-do-	C-2b	17.14	11.00
2020-21	Nachan	OD-357 Hallinu	C-1	40.99	9.00
		ND-353 Biradhar	Whole	29.95	11.00
		ND-349 Chharyand Dhar	Whole	93.08	15.00
	Thachi	OD-101 Sawandarh	C-3	65.92	18.00
	Seraj	ND-223 PokhariSilh	C-2	67.09	15.00
	Pandoh	OD-474 Dalikar	C-3	24.52	21.00
		-do-	C-4	52.54	11.00
		-do-	C-5	41.78	10.00
		-do-	C-6	28.38	12.00
		-do-	C-7	73.50	12.00
		-do-	C-8	52.54	20.00
		-do-	C-9	65.40	15.00
2021-22	Nachan	ND-374 Riun Nal	Whole	12.14	8.00
		ND-377 Kandha	Whole	75.27	14.00
		ND-376 Chakdiyala	Whole	25.90	10.00
	Thachi	OD-107 Shalgad	C-1	29.18	8.00
	Seraj	OD-220 Guraligad	C-4	61.03	10.00
	Pandoh	OD-474 Dalikar	C-10	29.80	11.00
		ND-489 Ghatlu	Whole	46.54	10.00
		OD-491 Tawa	C-1	42.15	9.00
		-do-	C-2	43.04	10.00
		-do-	C-3	48.70	14.00
		OD-492 Bagyodh	C-1	23.88	10.00
		-do-	C-2	57.88	8.00
2022-23	Nachan	ND-354 Tollar Bhet-I	Whole	9.71	5.00
		ND—341 Thaltu	Whole	15.38	8.00
		ND-349 Chharyandgarh	Whole	93.08	10.00
	Thachi	OD-120 ChohadiKalyala	Whole	90.65	11.00
	Seraj	OD-214 Dhaigad	C-2b	25.38	10.00
	Pandoh	OD-492 Bagyodh	C-3	48.84	12.00
		-do-	C-4	42.49	10.00
		-do-	C-5	65.60	9.00
		-do-	C-6	45.40	16.00
		ND-494 Chandeh	Whole	30.55	10.00
		OD-495 Dhumadevi	C-1	43.90	9.00
		-do-	C-2	35.50	10.00

2023-24	Nachan	ND-445 Pathari	C-1	36.41	12.00
		ND-444 Jasan	C-3	19.92	10.00
		ND-454 Bhagroh	C-2a	84.40	18.00
	Thachi	OD-72 Sanoun	C-2	40.79	12.00
	Seraj	ND-213 Jhugand	Whole	25.09	11.00
	Pandoh	OD-492 Bageodh	C-3	48.84	10.00
		-do-	C-4	42.49	12.00
		-do-	C-5	65.60	20.00
		-do-	C-6	45.40	11.00
		OD-494 Chandeh	Whole	30.55	10.00
		OD-495 Dhumadevi	C-1	43.90	15.00
		-do-	C-2	35.35	11.00
2024-25	Nachan	ND-453 Molichaloun	Whole	37.23	10.00
		ND-450 Maih	Whole	43.47	12.00
		ND-369 Sanout	Whole	18.62	9.00
	Thachi	OD-55-Cunji Chalahar	C-2	20.07	10.00
	Seraj	OD-167 GadounSilh	Whole	152.98	32.00
	Pandoh	OD-495 Dhuma Devi	C-3	38.92	20.00
		OD-496 Swardhar	C-1	17.41	10.00
		-do-	C-2	47.32	11.00
		ND-497 Jamun	C-1	32.70	10.00
		ND-498 Jaral	Whole	47.75	15.00
		OD-499 Janjohi	C-1a	30.02	11.00
		-do-	C-1b	42.27	20.00
2025-26	Nachan	ND-370 Bhungan	Whole	65.16	22.00
		OD-367 Dalogi	Whole	36.15	10.00
		ND-382 Bharsi	Whole	16.19	10.00
	Thachi	ND-79 Phetapathru	Whole	31.16	11.00
	Seraj	OD-233 Halsigad	C-3 & 4	120.00	28.00
	Pandoh	OD-499 Janjohi	C-1c	28.95	12.00
		-do-	C-2a	22.95	10.00
		-do-	C-2c	26.30	11.00
		-do-	C-2b	13.37	10.00
		-do-	C-4	60.36	20.00
		-do-	C-5	30.68	15.00
2026-27	Nachan	ND-381 Mahithana	Whole	4.05	4.00
		ND-392 Dhar Surandhi	Whole	97.12	22.00
	Thachi	ND-52 Bharwah	Whole	95.91	32.00
	Seraj	ND-230 Girjanu	C-1	83.79	26.00
	Pandoh	OD-499 Janjohi	C-6	47.48	15.00
		ND-505 Behlidhar	C-1a	20.25	10.00
		-do-	C-1b	21.28	12.00
		-do-	C-1c	26.40	10.00
		-do-	C-1d	25.12	9.00

		-do-	C-2b	24.16	14.00
		-do-	C-2d	29.90	10.00
2027-28	Nachan	OD-387 Tandi	Whole	78.51	20.00
	Pandoh	ND-505 Behlidhar	C-3a	20.20	14.00
		-do-	C-3b	20.40	12.00
		-do-	C-3c	19.36	10.00
		-do-	C-3e	20.96	8.00
		-do-	C-3f	22.72	10.00
		-do-	C-3g	20.80	11.00
		-do-	C-3h	20.80	8.00
		-do-	C-3i	18.26	7.00
2028-29	Nachan	ND-437 Chachiot	Whole	163.19	30.00
	Pandoh	ND.505 Behlidhar	C-4c	23.84	10.00
		-do-	C-4d	32.08	11.00
		-do-	C-4e	24.00	9.00
		-do-	C-4f	24.95	10.00
		-do-	C-4g	25.04	6.00
		-do-	C-4h	26.28	11.00
		-do-	C-4i	30.08	10.00
		OD-506 Runaj	Whole	118.17	28.00

7.4 SPECIAL OBJECTS OF MANAGEMENT:

The special objects of management are: -

- i) To raise plantations of suitable species of bio-diversity importance and augment forest resources of the area in order to meet the demand of the local right holders for fire woods, fodder etc.
- ii) To conserve soil and water conservation through afforestation.
- iii) To rehabilitate degraded area, low density and blank areas to increase forest cover so as to reduce the pressure on the existing forests.
- iv) To introduce economically important NTFP suitable to the locality and to promote income generating activities under JFM programme.
- v) To execute works through participatory management made use PRA technique for monitoring as well by providing special assistance of JFM.
- vi) To raise plantations of suitable species of bio-diversity importance and augment forest resources of the area in order to eradicate the problem of Alien Invasive species.

7.5 ANALYSIS AND VALUATION OF THE CROP:

7.5.1 Stock Maps:

All the areas allotted to this Working Circle have been stock mapped on 1:15,000 scale. The stock maps have been placed in respective compartment history files.

7.5.2 Quality Class/Density:

General assessment of quality class and density will be made during field inspection and recorded in the compartment history files.

7.5.3 Enumerations:

Since the areas to be allotted to this working circle will be either blank or carrying young plantations and failure plantation so no enumerations have been carried out.

7.6 SILVICULTURAL SYSTEM:

As the main object is to raise plantation of suitable species, no silvicultural system has been prescribed. The plantation will be raised by planting seedling from the nurseries.

7.7 CHOICE OF SPECIES:

The area is at high altitudes and stocked with natural species, plantation of species naturally occurring in the vicinity will be planted in the plantation areas. In areas at lower altitude adjoining to habitations species of importance to local people will be planted.

7.8 METHOD OF EXECUTING FELLING:

Marking to right holders will be done on the selection principle.

7.9 SEQUENCE OF FELLING:

In view of above no sequence of felling will be required.

7.10 PLANTATION TECHNIQUE:**7.10.1 Planting Stock, its Size and Age:**

The planting stock will usually be nursery raised seedlings, transplants, container plants and stumps. Surplus seedlings from direct sowing, wherever practised may also be used for planting. Planting wild stock has generally proved unsatisfactory and should be avoided. As a general rule seedlings i. e. which have not been pricked out in nursery, should be planted on average sites and transplants i. e. plants pricked out in nursery, on difficult sites. The size and age of the stock for planting varies with the site and the species. No plant with a shoot less than 20 cm in length should ordinarily be used. Exposed areas and sites subject to drought and excessive weed growth must be planted up with large plants. Ordinarily Deodar seedlings should be planted out when 1½ year old,

but in difficult and weedy areas, 2½ years old transplants pricked out once should be used. Silver fir, under 4½ years should not be planted and spruce under 2½ years. If kail has to be planted, 2 years old kail transplants should be used. Chil plants of 8 to 12 months old raised in Polythene bags are planted out. Chilgoza plants raised in Polythene bags are planted in the field when they are 3 to 4 years old.

7.10.2 The time of Planting:

Planting of conifers should always begin immediately after the first heavy rain in July and finished by the first or second week of August at the latest as late planting are generally unsuccessful. Chilgoza pine is, however planted during December, before snowfall. Chil can be planted during winter also. Cloudy and rainy days should be selected for planting work and bright sunny days avoided. On hot southern slopes to ensure success, transplants should be put on upper side of bushes. Planting of broad-leaved species of deciduous nature should be done in December-January when plants are leafless. The stumps however should be planted in early spring, wherever irrigation is possible, planting can be done both in the monsoons and in early spring, the latter gives more satisfactory results.

7.10.3 The Spacing and the preparation of Planting Areas

The standard planting distances are

- (i) 2. 5 x 2. 5 m for coniferous species.
- (ii) 5 x 5 m for broad leaved species.

Square planting will be adopted on average sites and line planting in areas of excessive weeds and bushes. Closer spacing may be adopted depending upon the species and object of plantations. In felled over areas, the felling debris should be burnt before planting. In other areas the bushes and undesired trees may be cut down and burnt or removed. In light soils, pits (30 x30 x 30cm) should be made just before plants are put out or if there are no labour difficulties, simultaneously with the planting. In the case of heavy clay soils and weedy areas, the pits should be made well in advance of planting and the earth left in unbroken clods. This allows soils to get weathered.

7.10.4 Method of Planting:

The following standard methods of planting will be used:

- (i) Planting of entire plants with naked roots,
- (ii) Stump planting and
- (iii) Planting entire plants with ball of earth (raised in Polythene bags).

(i) Planting with naked roots:

The actual method of planting is well known to every trained forester. It is, however, essential to emphasize that in planting (i) the roots should not be crowded together or doubled up, (ii) the collar should neither be below the soil level nor above it. It should be in the same position with reference to the surface soil after it has been planted as it was in the nursery, (iii) the plants should never be put out in the pits below the surface level of the soil where water will stand. It must be remembered that after planting the earth sinks consequently the surface of the soil after planting should be above that of the ground in the neighbourhood, (iv) the earth must be firmly pressed round the roots and stamped down round the collar, (v) thick humus should be entirely removed from the actual planting sites before planting holes are made, and it should be seen that only good mineral soil is placed in contact with the roots and not the litter an organic matter of the upper soil layer and (vi) in weedy areas transplants should be staked.

(ii) Stump planting

Planting of stumps is simple operation. On sites with loose porous soil, the stumps are pushed in by hand. If the ground is hard, the stump is completely driven into the soil (i.e. about 20 to 25 cm), stem part (about 5 8 cm) is left above ground. Similar method can be used in areas where irrigation facility is available after saturating the soil fully. After planting the hole is closed and the earth around it, is pressed gently with hand.

(iii) Planting entire plants with ball of earth:

This is undoubtedly the best method of raising certain species, such as chil, chilgoza, Eucalyptus and other species particularly under adverse conditions of moisture and/or

soil. The plants, with ball of earth should be carefully taken out, after tearing away the Polythene bag and inserted into the pits. Soil is then put around, and pressed well to avoid sinking after heavy rains.

7.10.5 Tending

To guarantee success in artificial regeneration both sowing and planting, it is absolutely essential that the plants should be properly weeded and cleanings and thinnings, carried out as and when required.

(i) Weeding:

Thorough weeding should be carried out in both sowing and plantings. Where weeds are excessive on cool slopes and moist areas, weeding should begin on 1st June and should be repeated in August. In places where undergrowth is not aggressive, one weeding early in the rains is sufficient. Chil seedlings are not harmed by grass, especially in the lower limits and are best left unweeded except in cases of exceptional herbaceous weed growth in burnt areas. Tall weeds like *Strobilanthes* and *Balsam* in deodar, kail, spruce and silver fir areas must to be cut back in the rains from the upper side of the plants to a distance equal to about their height, so that they may not be flattened over the plants by snow, if this happens the plants will be smothered. Weeding will generally be required for 3 to 4 years. It is most essential that proper weeding should be carried out thoroughly during the first year.

(ii) Cleaning:

Cleanings are essential to keep the stock in full vigour and health. The surplus plants should be removed from dense sowing in 2nd or 3rd year. Cleanings should be carried out so that the plants are spaced approximately 1.25 x 1.25 inch when 15 cm high.

(ii) Thinning:

This operation is carried out when the crop has crossed the sapling stage. Early thinnings may be carried out by mechanical method.

7.11 RAISING NURSERY FOR PLANTATION:

The first and the most important thing for successful plantation is raising of genetically superior and healthy plants in the nurseries. There are major nurseries in each forest block which caters to the need of seedlings in that block. So it is very important that the nursery stock consists of all the species naturally available in the whole forest block. The nursery should cater to the need of each plantation area in its vicinity. Enough stock for each year should be made available through the nursery. For that the nurseries should be raised keeping in view the requirements of the coming years. Special attention should be given to the nurseries at high altitude to raise stocks of Fir, Spruce, Kharsu Oak, MoruOak, Taxus, Walnut, etc. which are available at that altitude to improve the stocking in those forests. In all other nurseries, Deodar must be raised with other species naturally occurring in the forest block.

The existing nurseries in the division in which nursery stocks of different species need to be raised are given in following table:

(Table No. 2)

Name of Range	Nurseries	Annual stock to be raised	Species
Nachan	Bassa	1,00,000	Ban, Deodar, Khanor, Banni, Willow, Mulberry, Kaphal, Khirk, Ritha, Paja, Semal, Silver Oak
	Tunna	70,000	Deodar, Ban, Kharsu Oak, Moru Oak, Fir, Spruce, Walnut
	Chail-Chowk	25,000	Deodar, Ban, Banni, Willow, Mulberry, Kaphal, Khirk, Ritha, Paja, Semal, Silver Oak
	Keolidhar	50,000	Deodar, Ban, Kharsu Oak, Moru Oak, Walnut
Pandoh	Tawa	1,00,000	Deodar, Ban, Jamun, Harad, Bhehda, Chulli, Khanour, Kachnar, Tunhi, Banni, Willow, Mulberry, Kaphal, Khirk, Ritha, Paja, Semal, Silver Oak
	Badhanu	80,000	Deodar, Ban, Jamun, Harad, Bhehda, Chulli, Khanour, Kachnar, Tunhi, Banni, Willow, Mulberry, Kaphal, Khirk, Ritha, Paja, Semal, Silver Oak

	Kamera	50,000	Rakhal, Deodar, Fir, Spruce
Seraj	Nihri	80,000	Deodar, Khanour, Walnut, Rakhal, Ban, Kharsu Oak, Moru Oak, Fir, Spruce
	Baila	35,000	Deodar, Khanour, Walnut, Rakhal, Ban, Kharsu Oak, Moru Oak, Fir, Spruce
	Bijahi	50,000	Deodar, Khanour, Ban, Fir, Spruce, Walnut, Kharsu Oak, Moru Oak
Thachi	Ghatgarh	25,000	Deodar, Khanour, Ban, Fir, Spruce, Walnut, Kharsu Oak, Moru Oak
	Neli/ Gagal	30,000	Deodar, Fir Spruce
	Naraingarh	35,000	Deodar, Ban

7.12 PLANTING PROGRAMME:

- a) The blanks and under stocked areas will be identified on the ground each year and definite programme of sowing and planting will be laid down keeping in view the difficult terrain, limited growing season, difficulty in growing stock and labour problem. Planting of Deodar, Chil, Oaks and other B/L species including NTFP plants will be done as per suitability of the location.
- b) Existing plantations will be given required treatment on basis of requirement. The cleaning, pruning operations will be done each year.
- c) Existing plantation will be inspected and present position will be recorded. Failure plantations will be prescribed for re-plantation with specific improvement etc.
- d) Efforts shall be made to improve the economic and social value of the forests adjoining habitations by planting species of local importance including NTFP plants that are also suitable to the site.

7.13 MISCELLANEOUS REGULATIONS:

i) **Effective Closure:**

All the area taken up for plantation should be closed for grazing and other biotic influences under the provision of Indian Forest Act, 1927.

ii) **Grazing, Lopping And Grass Cutting:**

All plantations will remain closed to grazing and lopping until they are fit to be thrown open to grazing and lopping. In all the plantation areas, grass cutting will not be permitted till the seedlings grown well above the level of grass.

iii) **Fire Protection:**

The whole of the working circle shall be protected against fire; Preventive measures should be taken in advance. Maintaining cordial relations with the local people through participatory management, educating them properly and posting of fire watcher are some such measures. Even in spite of this if fire break out timely action to extinguish will be taken through the help of right holders and Joint Forest Management Committees. The offenders will be booked under the Indian Forest Act, 1927, H.P. Panchayati Raj, Act, 1994, and under the provisions of Indian Penal Code etc.

iv) **Demarcation:**

Each plantation will be properly demarcated and will have signboards showing the name of area, year of plantation, area, number of plants species-wise and geo-coordinates.

v) **Joint Forest Management:**

The concept of Joint Forest Management has been discussed in detail in JFM working circle. There is need for adopting JFM approach in participatory management mode in consonance with the National Forest Policy, 1988 and Himachal Pradesh Forest Sector Policy and Strategy, 2005. The technique such as PRA (Participatory Rural Appraisal) is to be followed for monitoring the impact of JFM activities. The degraded forest areas as well as common village land are to be identified vis-à-vis villagers depending upon these and their willingness of collaborating working under JFM programme. Strategies for implementation of participatory management are as under: -

- i. Involvement of NGO's.
- ii. Training of field staff & JFM Committees.
- iii. MOU between the local community and the Forest Department.

No separate and exclusive working circle will be proposed in this plan, under which the JFM activities are to be confined, it is suggested that all the activities as far as possible should be carried out after involving the local people.

vii) **MNREGA:**

Scheme launched by the Govt. of India & forestry activities started since 2010. Some of the forestry works like plantation, removal of weeds species, repair of old paths, Fire Lines, removal of Chir Pine Needles from the forest will be carried out under this scheme as well.

viii) **Plantation Journals:**

Plantation journals will be maintained for each plantation area on the prescribed proforma. The details of the plantation area viz. name, area, scheme, species wise detail, expenditure, and a geo-reference map of the plantation area will be mandatorily maintained by the concerned field staff.

CHAPTER-VIII

GRAZING (OVERLAPPING) WORKING CIRCLE

8.1 GENERAL CONSTITUTION:

This Working Circle covers whole of the geographical area of the Division.

8.2 GENERAL CHARACTER OF VEGETATION:

It is discussed in detail under different Working Circle. List of important fodder, grasses, shrubs and trees occurring in the area are given below:

(Table No. 1)

A	Grasses
	<i>Andropogon species</i>
	<i>Aristida depressa</i>
	<i>Arundinaria Spathiflora</i>
	<i>Arundinaria falcata</i>
	<i>Arundinella brasiliensis</i>
	<i>Avena Aspera</i>
	<i>Bothriochloa intermedia</i>
	<i>Bromus species</i>
	<i>Chrysopogon mantanus</i>
	<i>Cymbopogon martini</i>
	<i>Cynodon dactylon</i>
	<i>Cyperus niveus</i>
	<i>Erianthus fulvus</i>
	<i>Heteropogon mentanus</i>
	<i>Ischaemum angustifolium</i>
	<i>Panicum flaccidum</i>
	<i>Panicum spicatum</i>
	<i>Phleum asperin</i>
	<i>Poa annua</i>
	<i>Setaria glauca</i>

	<i>Setaria viridis</i>
B	Shrubs and Herbs
	<i>Berberis species</i>
	<i>Cotoneaster bacillaris</i>
	<i>Cotoneaster microphyllus</i>
	<i>Desmodium tiliaefolium</i>
	<i>Jasminum species</i>
	<i>Rubus niveus</i>
	<i>Salix flabellaris</i>
	<i>Spiraea canescens</i>
	<i>Viburnum species</i>
	<i>Zizyphus species</i>
C	Trees
	<i>Acer species</i>
	<i>Albizia species</i>
	<i>Alnus species</i>
	<i>Bauhinia variegata</i>
	<i>Cedrela serrata</i>
	<i>Cedrela toona</i>
	<i>Celtis australis</i>
	<i>Carylus columbia</i>
	<i>Ficus palmata</i>
	<i>Grewia optiva</i>
	<i>Morus serrata</i>
	<i>Olea cuspidata</i>
	<i>Pyrus pashia</i>
	<i>Quercus incana</i>
	<i>Quercus dilatata</i>
	<i>Robinia pseudocacia</i>
	<i>Quercus semecarpifolia</i>

8.3 BLOCKS AND COMPARTMENTS:

This being an overlapping Working Circle, no sub-division is required.

8.4 SPECIAL OBJECT OF MANAGEMENT WILL BE:

- i) To meet the legitimate requirements of right holders and other graziers as laid down in the orders of Government of Himachal Pradesh regarding grazing.
- ii) To improve the quality and quantity of fodder so as to ensure continuous supply of different types of fodder to local right holders, in consistence with productive capacity of different areas (Private land as well as Govt. forests).

8.5 AREA TREATMENT:

The area which will be available for grazing to the graziers is the total area of the Division except those areas which will be closed for grazing as mentioned in other working circles.

8.5.1 The detail of permit holders is given below:

(Table No. 2)

Sr.No	Name of Grazier	Name of the Forests	Area in Ha.	No. of animals allowed to graze during 2013-14			
				Goats	Sheep	Kids	Total
1.	Roopdass S/o Sukaru R/o Burahta Tehsil ChachiotDistt. Mandi(H.P)		NA	16	12	0	28
2.	Yousuf S/o Kairbox R/O Garyala (Chairakhud) Tehsil KarsogDistt. Mandi (H.P)	Diber UF	NA	11	13	2	26
3.	Yousufdeen S/o	Binjh UF	NA	0	20	4	24

GRAZING (OVERLAPPING) WC

	BajuSuleman S/o RoshanGulzar S/o Roshan Sultan s/o Ibrahim Fattu, Satterdeen s/o baju R/o Pandali Tehsil KarsogDistt. Mandi (H.P)						
4.	Sheru, Nuru, yousuf s/o Alfu R/o Badanu P.O. Jaral Tehsil &Distt. Mandi (H.P.)	-do-	NA	16	0	3	19
5.	Dittu S/O Masardeen R/O Sambal Tehsil SadarDistt. Mandi(H.P)	GirjanooShodhanal	NA	4	22	0	26
6.	Pakhiru S/o Krimbox R/o Guryala Tehsil KarsogDistt. Mandi(H.P.)	Dibber DPF	NA	11	13	3	27
7.	AlisenMilsen, Sherali, jusuf, Gouri s/o Smile R/O Nag Tehsil KarsogDistt. Mandi (H.P.)	Tungasi DPF	NA	18	40	13	71
8.	Sheru s/o Krimbox R/o Guryala Tehsil	Dibber UF	NA	10	14	3	27

GRAZING (OVERLAPPING) WC

	KarsogDistt. Mandi (H.P.)						
9.	Chet Ram S/O Naain R/O Khanyar P.O. Segali Tehsil ChachiotDistt. Mandi(H.P.)	Khadoun Magrugala Partran& Part of Halsigad	NA	100	20	0	120
10.	Dheem Singh S/O Karmi R/o Khauli Sub-Tehsil Bali ChowkiDistt. Mandi (H.P.)	Tungasi DPF	NA	10	80	0	90
11.	Mani Ram S/o Bhagat Ram R/o KandhiP.O.Saroa, Tehsil ChachiotDistt.Man di (H.P.)	Bhekhalikhad Baniyad, Bunali, Chadoun Lohagad, Kholnal. Malora	NA	109	3	0	112
12.	NandLal s/o Todar Ram R/o Kasan Tehsil ChachiotDistt. Mandi(HP)	Bhulah, Solangar, part of Khadunjidhar, Part of Raigarh, Malyanigad, Sakora, Jamnapather, KaShimlidhar&Shod ahkhud	NA	120	0	0	120
13.	Led Ram s/o Budhu Ram BachanCahnd S/o	Tungasi DPF &Shirthi gar	NA	20	60	0	80

GRAZING (OVERLAPPING) WC

	Nar singh r/o Bhekhali PO Janjehli Tehsil ThunagDistt. Mandi (HP)						
14.	NarainDass s/o Narad R/O KhdoolIllaquaDaha r	Swardhar and Jammu DPF	152.06	40	43	22	105
15.	Kahan Singh S/o Jawahar VPO Jahal Tehsil ChachiotDistt. Mandi (HP)	ThandaPani UPF	NA	32	196	0	228
16.	Govind Ram S/o Luhar R/O Balhari Tehsil ChachiotDistt. Mandi (HP)	SakrohaTarourMovi Kashan	NA	64	34	0	98
17.	Uttamchand S/o Luhar R/O Balhari Tehsil ChachiotDistt. Mandi (HP)	SakrohaTarourMovi Kashan	NA	64	33	0	97
18.	Prem Singh S/O Urjan R/o Sunam Tehsil Pooh Distt. Kinnaur (HP)	Jasan DPF, Kathuala, MassiandharChailkh ud	NA	150	29	65	236
19.	Besar Ram S/o Bhadru R/O Katad	Doffa New DPF	NA	41	10	0	51
20.	Girdharilal S/o	SakrohaTarourMovi	NA	64	33	0	97

GRAZING (OVERLAPPING) WC

	Luhar R/O Balhri	Kashan					
21.	Fatu S/o Late sh. Jaman R/O Kotla PO BehaliKarsogDistt. Mandi (HP)	DPF BAgra, Delan C2,C3 in parts	35 ha.	11	14	0	25

8.6 SILVICULTURAL SYSTEM:

Forest area will be managed in accordance with the prescription of concerned Working Plan Circle to which they are allocated. This Working Circle is concerned with the management of grazing, grass cutting and lopping etc.

8.7 CATTLE POPULATION:**(Table No. 3)**

Sr.No.	Animal	Number
1.	Cattle	30935
2.	Buffaloes	1217
3.	Sheep	11398
4.	Goat	7906
5.	Mule	494
6.	Donkeys	4
Total		52140

Source: Department of Animal Husbandary, Gohar Sub-Division

8.8 GRAZING INCIDENCE:

In order to determine the grazing incidence, the number of cattle will be converted into sheep unit. For this purpose norm will be followed as recommended by the Grazing Advisory Committee.

(Table No. 4)

Sr.No.	Name of Animal	No.of Unit Assigned to each
1.	Sheep	1
2.	Goat	1.5
3.	Donkey	3
4.	Cattle	4
5.	Mules	5
6.	Buffaloes	6

The grazing area of 0.5 ha. per unit has been considered as bare minimum in grazing policy of the Pradesh. Accordingly the local area required for the above number of cattle population both local as well as migratory/nomadic works out as under:

(Table No. 5)

Sr.No	Type of Animal	No. of animal	Total No. of Unit	Total area required for grazing in ha. @ 0.5 ha. per unit.
1.	Cattle	30935	123740	61870
2.	Sheep	11398	11398	5699
3.	Goats	7906	11859	5929.5
4.	Mules	494	2470	1235
5.	Donkeys	4	12	6
6.	Buffaloes	1217	7302	3651
Total		52140	156781	78390.5

8.9 METHOD OF TREATMENT:

The rural population depends on the forests for their daily requirements of timber and grazing etc. At the same time the functions of forests are manifold. They conserve soil and water, prevent erosion and control floods, reduce siltation of reservoir and lengthen the life of hydroelectric project etc. The rearing of livestock by rural population

has been continued as indispensable chief source of livelihood next only to the agriculture in this hilly region since time immemorial. The essential life requirements of the poor people of these mountains could not be overlooked where we talk in terms of national interests with special reference to floods, dam and irrigation channels etc. Moreover the national interests are involved in animal husbandry also. The forests as well as livestock are essential but there is a clash of interest between the two i.e. grazing in hilly areas vis-a-vis preservation of forests. Grazing is one of the principle recognized rights of the rural population which stand admitted in the settlement. Therefore, the wisdom and skill as to minimize the conflict and produce optimum net result of good to the community and the State.

8.9.1 THE FOLLOWING SUGESTIONS ARE MADE TO CONTROL AND REGULATE GRAZING AND FOR IMPROVEMENT OF PASTURE:

- a) Local people will be educated and persuaded to keep less number of cattle of good breed. They will be dissuaded from keeping non-working cattle for manure purpose only.
- b) A list of grazing run will be prepared for the whole Division and their grazing capacity assessed at the rate of 0.5 ha. per unit. No further increase in the number and migratory animals who visit this Division for grazing during summer will be allowed. Further, these migratory graziers should be educated and persuaded to reduce their hands.
- c) People will be educated and persuaded to adopt stall feeding and substituting of grazing by grass cutting in hilly slopes.
- d) Afforestation through Silva-pastoral system will be adopted in forest area and local people will be encouraged to adopt it in their private Kharyater with this they will get fodder as well as improved grasses for stall feeding from their own land with the result burden will be reduced on the natural forests.
- e) Chemical manure on subsidy will be provided for some years under the scheme of pasture improvement to prepare people for the change. Needy persons should be provided with loans and subsidies for purchase of feed etc. under this scheme.
- f) Permanent or periodic closure will be enforced in areas under erosion, gully formation or slips, allowing grass cutting as soon as the soil condition permits.

- g) Rotation closure will be enforced for giving rest to the pastures and increasing their productive capacity.
- h) Obnoxious weeds and unpalatable grasses like lantana, Ageratum will be eradicated and more nutrient fodder, grasses suited to the locality will be introduced.
- i) Suitable areas development under Silva-pasture system will be taken up as demonstration plots where the beneficial effect of rotational grazing, closures production grasses from high yielding varieties could be explained to the people.

8.10 GRAZING RIGHTS AND FEES:

(a) Local

The right of free grazing and free grass cutting have been admitted in all the protected forests. No fees are realized.

(b) Migratory

The rates for migratory graziers are as follows:

Sr.No.	Descriptions of Animals	Rates per animal in Rs.
1.	Horse, Ponies and mules	2.00
2.	Donkeys, Ass	1.00
3.	Sheep	0.20
4.	Goats	0.40
5.	Buffaloes	8.00

8.11 CONTROL OF MOVEMENT OF MIGRATORY AND NOMADIC HERDS AND FLOCKS:

(i) Registration and Enumeration:

The most important prerequisite for the control of migratory and nomadic herds and management of pastures grazed by them is the correct enumeration of these flocks and registration of their owner registration, implies the list of graziers together with the grazing grounds and pastures showing also the recorded rights. So far as the migratory and nomadic graziers are concerned nowhere their grazing in summer and winter pasture

has been recorded as a right. No doubt, in a majority of cases, a particular pasture of grazing run has been made use of by a particular individual and his dependents by simple usage and not by any recorded right to do. On the basis of grazing done during the year 1952, the Divisional Forests officer will carry out registration of these graziers in the following proforma:

(Table No. 6)

Sr.No	Name of Grazier	Name of Grazing Ground	Summer Grazing Ground	Winter grazing Ground	Area	Kind & No. of Animals in the year 1952/1996	Remarks
1	2	3	4	5	6	7	8

Great vigilance is required for the correct registration and enumeration to be prepared in the above manner. By doing this exercise good control can be exercised over these grazier for controlling and reducing their present number.

(ii) Records of the Grazing Grounds and Pasture:

The grazing done by the graziers will be spread over the following four kinds of area summer pasture, winter grazer runs, private individual land and areas through which flocks move from summer pasture to winter runs and vice versa. This shows that migratory or nomadic flocks graze in all grasses of the forest. In order to find the correct grazing incidence and to make its satisfactory distribution, it is essential to have a record of all the pastures and private land with respect to their situation, area and grazing capacities. The record will be maintained in the Divisional office.

(iii) Imposition of Restrictions on the Movements of Migratory and Nomadic Graziers:

After recording of the runs and fixation of rates what remains to be done is to exercise control over the movement of herds and vice versa. It is during these movements that maximum damage is done to the forests enroute. The grazers pass through the territory of a forest Division for two objects. Either they pass through to the grazing grounds situated in some other Division or they pass through the Division to reach the pasture situated in

the same Division. In the former case they pay only Rahdari fee and in later case full grazing fees. To control the movement of the animals in both the cases, the following restrictions will be imposed: -

1. Date of entry should be fixed.
2. The owner of all the flocks and herds entering the territory of the Division must get a permit from the Beat Guard concerned before entering the Division. Those who enter for grazing will get grazing permits.
3. Each permit will bear the period of transit. Any over stay should be treated as trespass under the Forest Act.
4. Minimum period of transit through the Division should be fixed. The grazers should not be allowed to halt their herds and flocks for longer than one night at any single halting place in a forest in which they have not a right of grazing. Halting place should be at least 12 Kms. apart. Halt may be granted for two days at one place if there has been heavy rain or if salt has been given to the animals.

All the herds and flocks must stick to the fixed routes and will not allow a deviation of more than half km. on each side of the route.

CHAPTER-IX

SOIL CONSERVATION (OVERLAPPING) WORKING CIRCLE

9.1 GENERAL CONSTITUTION:

This Working Circle overlaps all other Working Circle. Apart from this it also includes all the UPF's, other Govt. lands and also all categories of private lands falling in this Division. The entire tract is drained into River Beas by its tributaries like Bakhli, Thirthan, Chouri and JiuniKhad etc.

9.2 GENERAL CHARACTERS OF THE VEGETATION:

It has already been discussed in detail under respective Working Circle. The Deodar, Kail, Chil, Ban Oak, Mohru Oak, Bihul, Kachnar, Oie, Morus species, Prunus species, Ficus Species etc. occur scattered in private lands.

9.3 BLOCKS AND COMPARTMENTS:

This being an overlapping Working Circle, no sub-Division is required.

9.4 SPECIAL OBJECTIVE OF MANAGEMENT:

The objects of soil conservation and watershed management area: -

- i) To prevent land degradation by adoption of multidisciplinary integrated approach in the catchments.
- ii) To improve the land capability and moisture regime in the watershed and thereby reduce runoff and providing engineering structure where ever necessary so as to ensure stabilization and perennial supply for irrigation and drinking purpose.
- iii) To promote the land use to match land capability.
- iv) To involve the people in the management of catchment and also to upgrade the skills in planning and execution of land development.
- v) To improve the ecology of area.

9.5 MANAGEMENT UNIT:

The management unit has been kept as recommended in the previous working plan. The treatment of watershed will be planned as per micro watershed-wise for a total period of five years. For this purpose, the All India Soil and Land Use Survey Organization (AISLUS) has delineated and detailed soil survey for guiding the treatment of degraded areas and improving land capabilities. By employing the silt yield index (SYI) method, AISLUS has been able to categorize watershed as micro watershed according to the magnitude and criticality of degradation into very high, high, medium, low and very low area. According to latest guidelines, Government of India has stressed that the treatment measure for soil and moisture conservation and afforestation must be planned in synchronized manner in priority areas of very high and high intensities. Thus the unit of management of soil and moisture conservation purpose is a micro watershed where multidisciplinary approach will be adopted. The list of micro watershed of different intensities is given below:

(Table No. 1)

Beas Catchment

Sr.No.	Sub-Watershed Code	Area in Ha.	Sediment Yield Index	Sr.No. Of Sub-Watershed	Relative Priority
Very High					
1.	BPa3a	1996	1342	29	24
2.	BPa3d	1420	1296	32	49
3.	BPalm	932	1287	10	56
4.	BPa2g	2260	1301	19	47
5.	BPd2g	1376	1260	75	75
Total		7984			
High					
1.	BPd3b	1596	1226	77	101
2.	BPa2b	1156	1203	15	115
3.	BPa2a	1212	1186	14	127

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4.	BPd1a	1028	1182	62	131
5.	BPalf	948	1224	5	103
6.	BPa1j	1317	1232	8	95
7.	BPa1h	1148	1233	7	92
8.	BPa2h	2228	1248	20	82
9.	BPa2p	2048	1160	25	114
10.	BPd2b	2488	1227	71	99
11.	BPd1c	1604	1233	64	93
12.	BPa1d	1460	1230	164	96
13.	BPa2c	1560	1240	16	89
14.	BPa2q	1296	1179	26	134
15.	BPa2c	1560	1240	16	89
Total		21089			
Medium					
1.	BPa3c	2532	1149	31	152
2.	BPa1b	1084	1121	2	177
3.	BPa1a	2468	1089	1	179
4.	BPa2d	1464	1100	17	189
5.	BPa2m	1488	1133	23	167
6.	BPa2f	2188	1147	18	156
7.	BPa2n	1580	1079	24	202
8.	BPa1p	1260	1095	57	194
9.	BPa1a	2396	1088	11	198
10.	BPa2k	2244	1136	22	163
11.	BPa2j	1816	1129	21	169
12.	BPd2c	1636	1113	72	184
13.	BPa2s	1616	1118	27	178
14.	BPd2d	5232	1109	73	185
15.	BPa2r	256	1104	28	186
16.	BPa1q	2648	1148	13	155

Total		31908			
Low					
1.	BPalc	2048	995	3	216
2.	BPalk	1132	1044	9	208
3.	BPalg	1136	1018	6	213
Total		4316			

(Table No. 2)

Abstract for Beas Catchment

S.No	Category of Micro Watershed	No.	Total Area in Ha.
1.	Very high	5	7984
2.	High	14	21089
3.	Medium	16	31908
4.	Low	2	4316

9.6 SELECTION OF AREA FOR TREATMENT:

The area for treatment under soil and moisture conservation measures will be selected having regard to the following criteria:

- (i) Very high and high priority watershed must first qualify for treatment.
- (ii) Watershed to be treated should be in contiguity for consolidating the measures of treatment.
- (iii) Annual programme must cover whole micro watershed.

9.7 PROJECT FORMULATION (WORK PLAN):

For individual micro watershed selected on priority basis, the preparation of work plan is of utmost importance. The area intended to be treated under soil and moisture conservation are to be identified and surveyed in micro watershed as per the latest revised guidelines issued by Govt. of India. Therefore, before actual treatment of the micro watershed, their work plan will have to be prepared and the work plan will only be

prepared for the areas falling under very high erosion intensities. The job of the preparation of a work plan is very laborious and time consuming but timely action has to be taken for its preparation for the micro watershed which is going to be treated under each centrally sponsored soil conservation schemes. The work plan shows the different work to be carried out in a micro watershed in a phased manner. Thus a detailed survey is carried out and areas are pin-pointed to be treated under different modes of soil conservation.

As a matter of fact, seriously eroded and high degraded areas taken up for afforestation are also supplemented by minor engineering structures. Similarly, dams, silt detention dams, farm ponds and big spurs put up on the flood prone areas to save agricultural lands, life and property around the village threatened by natural calamities will be included in the Work Plan. These structures will go a long way in benefiting the farmers directly and provide them water for irrigation and cattle during the lean period of the year.

9.7.1 Four Work Plans of the micro-watershed falling in Nachan Forest Division have been prepared. The list of these Work Plans is given below:

(Table No. 3)

Sr.No	Name of Micro water shed	Code No.	Area in Ha.
1.	Bakhali	BPa2g	2260
2.	-do-	BPa2b	1156
3.	-do-	BPa2a	1212
4	Kholanal	BPa3a	1996

These Work Plans have been prepared as per instructions laid down in guidelines issued by Govt. of India for Integrated Water shed Management in the catchments of flood prone rivers. These Work Plans have been approved by Govt. of India, as such the Work Plan for sub-water-shed BPa2g may be considered as a sample Work Plan for the future.

9.8 SATURATION OF MICRO WATERHSED:

With the regular flow of funds, considerable investment has been made in the catchment areas and some of the micro-watersheds have reached saturation point. As soon as the treatment works on a micro-watershed are completed i.e. saturation point has reached it will have to be shed off.

9.9 EVALUATION OF EFFECTIVENESS OF SOIL CONSERVATION WORKS:

Evaluation of soil conservation works in the micro-watershed will be gauged by:

- a) Analysis of rain fall, run off and sediment data. In order to ascertain flow of benefit through works carried out under various soil conservation scheme, monitoring of silt discharge is important to gauge the rate of silt in the catchment area.
- b) Irrigation potentials created and utilized.
- c) Employment opportunities generated.
- d) Over-all benefit cost analysis.
- e) Protection provided by structures and storage works.
- f) Return from areas treated.
- g) Summary findings of evaluation by team report.

9.10 ANNUAL PROGRAMME OF SOIL CONSERVATION WORKS:

From 1995-96 onwards the works will be concentrated in the following micro water sheds:

(Table No. 4)

Sr.No.	Name of Micro water shed	Total area (ha.)	Area to be treated (ha.)
1.	BPa2g	2260	300
2.	BPa3a	1996	250
3.	BPa3d	1420	400
4.	BPd2g	1376	450
5.	BPa1m	932	150
6.	BPa2h	1560	425
7.	BPa2h	2228	500
8.	BPa1h	1148	350

9.	BPa1f	948	325
10.	BPa1j	1317	400

The work Plan of the above mentioned sub water shed except at Sr.No.1 and 2 may be prepared and treated subject to the budget provision under various centrally sponsored schemes.

9.11 PUBLIC PARTICIPATION:

Watershed management needs the local community's active involvement in the planning, project formulation and participation in the execution and maintenance of assets. The people's participation will be ensured by:

- i) Consulting local people in identifying treatment measures.
- ii) Securing local communities consent and commitments to the protection and maintenance of common resources.
- iii) Discussion with the local community on the problems in the watershed.

9.12 TREATMENT OF NON-PRIORITY WATERSHED:

With a view to derive benefits from the available resources, the implementation of the programme is presently confined only in the very high and high priority watershed as non-preventive measures are not taken up immediately. The territorial DFO should therefore take steps to ensure adoption of proper land use and land conservation practices in such non priority water shed.

9.13 SOURCES OF FUNDS:

The funds required for the Soil and Water conservation works will be met from the Budget Head 2402 Soil Plan and Non –plan and Demand no. 15 BASP scheme. The Soil and Moisture conservation works will be proposed in the APO in advance and budget will be allotted accordingly. These works will simultaneously be carried out under MGNREGA scheme by preparing shelves by the Nodal Officers.

CHAPTER- X

JOINT FOREST MANAGEMENT WORKING CIRCLE

10.1 GENERAL:

This Working Circle includes demarcated forests and UPFs near to habitations which have become degraded. Besides these DPFs and UPFs, it also includes the UPFs which are in small bits, honeycombed surrounded by cultivations and are left out after demarcation and settlement. Furthermore, these categories of area are heavily encroached upon and it will be a very good attempt to manage these forests through people's participation approaches.

10.2 ESSENTIAL FEATURES OF JFM WC:

- (i) Reorientation and training of forest staff and local communities.
- (ii) Formation of local community based institutions like Joint forest management committee (JFMC) which will work together with the forest staff in Forest Planning and Management.
- (iii) Identification of areas of forest land near to settlements where JFMWC will be introduced to satisfy local needs.
- (iv) Collaborative preparation of micro plans by the local people and the forest staff providing for the sustainable management of such lands for the provision of local needs.
- (v) Agreement on the rules and regulations covering responsibilities and the sharing of benefits.
- (vi) Preparation of formal agreements between forest staff and the local forests land.

10.3 SPECIAL OBJECT OF MANAGEMENT:

1. To strengthen forestry institutions. An indirect objective is to ameliorate the environment in all its aspects.

2. To involve local people in the management of forests.
3. To create awareness among the local people and make them stakeholders in the protection of forests.
4. To develop healthy relationship between forest department and the local communities.
5. To meet the bonafide requirements of the local people.

10.4 NECESSITY OF PEOPLE'S PARTICIPATORY APPROACHES:

The depletion of forests is going on due to ever increasing demand of the fast growing population for fuelwood, timber and grazing. The Government of India and the state Govt. including Himachal Pradesh have been aware of the alarming situation and special efforts have been made to raise plantations under participatory forest management schemes with the involvement of local people.

Now, it is generally felt that the cause of depletion of forests is not only the fast growing population but lack of awareness about the forest among the masses also contribute towards this. To create awareness among the masses, the Government of HP has started a participatory forest management under the centrally sponsored scheme of Forest Development Agency (FDA).

10.5 FOREST DEVELOPMENT AGENCY (FDA):

As per the notification of HP government No.Fts.II(B) 15-10/87 dated 23/08/2001, Forest Development Agencies were formed in each Division under the State Forest Development Agency at state level. The project was formulated under centrally sponsored National Afforestation Program (NAP) executed by the FDAs through Joint Forest Management Committees (JFMC) registered at village level. The FDA is in force since 2001 and all the participatory works are carried out through FDAs in the state. The detail regarding FDA is given below:

10.5.1 COMPOSITION OF FDA

- a) General Body: Chairman

Chief Executive Officer

Member of Zilla Parishad

President of JFMCs

b) Executive body: Chairman

Chief Executive officer

Member of Zilla Parishad

c) Members of JFMCs

10.5.2 Constitution of JFMCs:

There shall be JFMC in each Gram panchayat ward. There is an elected President, Vice-President, Four members and Member Secretary elected by the general house of the JFMCs.

Following JFMC's are in function in the division.

(Table No. 1)

Sr. No.	Name of Range	Name of JFM
1.	Pandoh	Pandli
2.		Sumanidhar
3.		Taryambla
4		Ladutungar
5		Bhella
6		Chandeh
7		Behlaidhar
8		Koot
9	Nachan	Bagga
10		Bhangroh
11		Fangluire
12		Narhali
13		Dharot
14		Bajrohroo
15	Seraj	Saran

16		Gadahar
17		Bagsaid
18		Dhanshal
19		Jawal
20		Ghulach
21		Badin
22		Shodhadhar
23		Gher
24		Jugandh
25		Gumrala
26		Bhalwar
27		Kathyala
28		Dadoun
29		Baga
30		Chohat
31		Choadhar
32		KandhiKalwara

10.5.3 Broad objectives:

Integrated village afforestation and eco-development in the project area.

10.5.4 Project components:

- a) Aided natural regeneration
- b) Artificial natural regeneration
- c) Pasture development
- d) Bamboo plantation
- e) Mixed plantation of trees having MFP and those having medicinal values
- f) Regeneration of perennial herbs and shrubs of medicinal value
- g) Micro planning
- h) Soil and Moisture conservation

- i) Entry point activities

10.5.5 Execution of Work:

FDA will sign an MOU with the JFMCs indicating mutual obligations, rights and roles. FDA shall be responsible for guidance, coordination, supervision, periodical reporting and monitoring the implementation of the project by their constituent JFMCs. The works under various components will be carried out by the JFMCs.

10.5.6 Usufruct sharing:

The JFMCs are entitled to the following benefits:

- a. To collect the yield such as fallen twigs, branches, lopping, grass, fruits, flowers, seeds, leaf fodder and non-timber forest products free of cost.
- b. To sale the proceeds of all intermediate harvest, subject to protection of forest and plantations for at least 3 years from the date of agreement.
- c. To organize and promote vocational activities related to forest produce and land; and other activities such as promotion of self-help groups which may provide direct benefits, including micro lending to women.
- d. Recorded rights over the forest shall not be affected by these benefits.
- e. The government shall charge no royalty on the forest produce within the selected areas.
- f. After 5 years JFMC may expand the area, on the basis of fresh agreement deed, by inclusion of adjoining or nearby areas.
- g. After 20 years from the date of agreement and based on the principles of sustained management, 75 percent of net sale proceeds from the selected areas shall be put into the account of the JFMC and the remaining 25 percent of the net sale proceeds shall go to concerned Gram Panchayat.
- h. To utilize at least 40 percent of the sale proceeds on forest regeneration activities including soil and water conservation activities.

10.6 RECOMMENDATIONS FOR IMPROVEMENT:

- a. The existing policy for participatory management shall continue to be in force.

- b. The JFMCs shall be made responsible for implementation of all the rules and regulations prescribed in the Forest acts in the concerned areas.
- c. They shall be made responsible for control of illicit felling, lopping and encroachments in the concerned areas.
- d. In past few years the funding for the FDA has decreased considerably. The funding for participatory management should be adequately arranged so that there is consistency in the works carried out by the JFMCs.
- e. The funding for livestock improvement and management should be made available to the JFMCs which will help to reduce the pressure on forests for fodder in the long run.
- f. Systematic utilization of funds for growing medicinal plants of economic value can help the JFMC members to improve their living.
- g. JFMCs should be educated and made aware about the importance of wild life in the forest areas. They should be actively involved to protect the wild life from hunting etc.

CHAPTER XI

WILD LIFE MANAGEMENT(Overlapping) WORKING CIRCLE

11.1 GENERAL:

Very varied and interesting wild life is found in the forest of this division as a result of great variation in altitude, topography, Climate and vegetation. The wild life in this tract is however, decreasing fast due to deforestation, poaching and other biotic pressures. As a result of this, in some areas, the very existence of some unique species like Musk deer and Monal which is on the brink of extinction has been threatened.

11.2 IMPORTANCE OF WILD LIFE:

(i) Wild life is an integral part of a forest eco-system. The role and importance of wild animals with regard to the maintenance of balance in nature and future mankind has been realized. The future of mankind is inextricably linked with the preservation of nature and survival of human beings would be in peril in a situation where wild life cannot exist. All forms of the life in a biosphere are so closely linked that a disturbance in one, affects the other and causes imbalance in the entire system.

(ii) Preservation of all of life is a part of our religion and culture. Vedas are full of hymns in veneration of wild life. Our sacred and legendary books are full of love for wild life. Kautilya's Arthshatra provides severe punishment for entrapping, killing and molesting, deer bison, birds and fish in protected areas. Ashoka's fifth pillar edict of the 3rd Century BC depicts of giving protection to fish, animals and forests. The wild life finds mention throughout our mythology, art and literature which would otherwise be dull if all these are omitted from there.

(iii) The value and importance of wild life from the cultural, aesthetic, economic and recreational point of view is immense and is recognized all over the world. The beauty of wild animals and birds fascinates the bird watchers, sport enthusiasts, photographers, animal and bird ecologists, biologists and tourists from within and outside the country. Preservation of wild life can help increase the tourist trade appreciably and thereby can yield good revenue to the state and income to the people.

11.3 The important animals and birds which are met with in the tract have already been described in detail in chapter-II of part-I. Through with increased human activities in the forests, construction of roads in interior, poaching etc. have reduced the population of animals and birds, nevertheless, a few of them are seen in some sheltered place.

11.4 SPECIAL OBJECTIVES OF WILD LIFE MANAGEMENT:

The special objectives of scientific wild life management are listed below:

- (i) To maintain biological diversity in nature by establishing the viable, healthy and productive population of wildlife for conserving genetic resources.
- (ii) To ensure collection of scientific data for the maintenance and development of viable population of fauna for scientific, aesthetic, cultural, ecological and economic purposes.
- (iii) To identify the problems of wild life in the tract, which in term will help in formulating the guidelines for their development.
- (iv) To increase the population of fauna by providing special food and ideal habitat especially for Musk deer, Serow, Goral and barking deer.
- (v) To create important spots for the general public.

11.5 MANAGEMENT OF WILD LIFE IN GENERAL:

The scientific wild life management is based on the biological characteristic of a species. Other considerations such as economic, political, social, humanitarian and sentimental are equally important. Apart from these, the following points need to be considered before prescribing the management.

(a) Demographic Studies:

Since the exact number of various animals found in the tract is not known, the fundamental need is to carry out a detailed survey and population census of species in this Division. The earlier periodic census carried out were mainly confined to the cat family only, therefore, information regarding the exact number of various animals found in the tract is not available. Such information is a prerequisite for devising and implementing the conservation and protection programs. However, the population of fauna is decreasing on various accounts viz. lack of ideal habitat, food, shelter, water and natural calamities. Herbivorous animals like Ghoral, Musk Deer, Barking Deer and Serow has suffered a lot.

(b) Causes of Depletion:

The causes for the depletion of fauna can be described under the following steps:

- (i) Poaching, hunting, trapping and killing of wild animals by local inhabitants.
- (ii) Biotic interference by man and his cattle especially near the habitation coupled with clearing of forest lands for agricultural purposes.
- (iii) Depletion in the food of herbivorous animals because of lopping of fodder trees by the graziers and local people.

- (iv) Natural calamities like drought, storms, heavy snow fall and repeated forest fires, etc.
- (v) Continuous predation has also caused the depletion of animals. This affects both herbivorous and carnivores.

As mentioned in the special objectives the management will consists of protection, as well as ideal habitat for wildlife. These measures can be divided into following subheads:

(a) Protective Measures:

The protection of wild life can be afforded by adopting preventive and control measure. The existing arrangement of protection is unsatisfactory and inadequate and is therefore, unsuccessful in controlling the poaching and hunting effectively. Some of the important measures which should be adopted for the preservation and propagation of wild life are:

- (i) The people of the area are not fully aware of the biological and ecological constraints which the fauna of the tract is facing. The needs of the hour is to educate the student and people through the media of speech, TV, Radio, etc. in order to create the awareness and love for wild life amongst themselves.
- (ii) Crop protection licenses should be issued only where these are absolutely necessary. Whenever such a gun owner is found shooting animals and birds outside the fields, the license be cancelled and the gun confiscated.
- (iii) The license of a poacher be cancelled and gun confiscated for this offence.
- (iv) Chowkidar may be appointed on a part time basis to assist the forests staff in detecting and apprehending the poachers during hunting and mating season.
- (v) Protection from forest fires should be ensured by creating fire lines, construction of fire watch towers at strategic places and posting of fire watchers during fire reason. Field office with a wireless set to provide an immediate help for combating the fire in the area.
- (vi) Predators should be kept under control to maintain the natural balance.
- (vii) Periodic inoculation of domestic animals in the surrounding area should be done to prevent cattle borne diseases being carried out to wild life.
- (viii) Anyone furnishing information about the game offenders and helping in apprehending the offender should be duly rewarded.
- (ix) For controlling, detecting and punishing the offenders various Rules and Acts in force can make use of.
- (x)

(b) Development Measures:

Since conservation is not the ultimate aim of management, so it becomes necessary to improve the condition for their development. The following measures may have to be taken for the development of the fauna:

(i) Habitat Management:

Since all animals in nature live in a complex web of linkages with other organisms, the proper evaluation of habitat of each species following by its proper management is very important. The plant life provides congenial home to wild life. Therefore, the habitat of wild life is to be improved so that a proper multiplication takes place. For this bushy and thick forests are to be maintained. Winter hide-outs and shelters should be constructed for affording protection to game animals, birds which descend to lower elevation during winter seasons.

(ii) Food:

Shrubs producing food for wild animals and birds should not be indiscriminately cut, but should be encouraged at places to provide food for wild life. The bushes and plants which bear foliage when the majority of forest species are leafless deserve special attention. Most of the wild life found in the tract depends upon broad leaves species for their food. Adequate broad leaved species, viz. Walnut, Bird-cherry, *Punica* species, Maple, Chestnut etc. should be maintained. No grass should be removed. The blank area in various forests especially in higher reaches along ridges should not be planted with timber species but these areas be maintained as pasture land by sowing and planting palatable grasses. Suitable agricultural crops depending upon the climatic conditions may be grown where deficiency of food is feared. Besides, salt licks should be provided at suitable places.

(iii) Water:

Though a number of perennial rivers and streams are there in this Division, yet the nallas feed the water only in rainy season, therefore, sufficient water holes are to be provided so that fauna does not suffer for want of water in drought periods. These water hole can be constructed wherever their number is less.

11.6 Eco- Tourism Developments:

The areas adjoining Devidarh, Jinjehli, Kamrunag can be developed under Eco-tourism. This will attract locals as well as tourists. In such areas the visitors should be supplied with literature regarding wild life. This will create general awareness and love for wild life amongst them. Tourism is necessary to educate the public about wild life and to enjoy the pleasure of being in wilderness.

11.7 Ecology of wild life:

Study of animals ecology involving the knowledge of inter-dependence of plants and animals, population fluctuations, food chains, propagation and succession is very

necessary for proper management of wild life. Hardly any information has so far been collected on this aspect for this tract.

The field staff both of Wild Life Wing and of territorial wing should collect data about wild life ecology so that it may be of help in planning proper wild lifemanagement in the tract.

11.8 Management of Eco-sensitive zone around Shikari Devi Wildlife sanctuary:

The new areas have been added to the division on account of re-organization of Beats and Blocks due to denotification of areas from wildlife sanctuaries viz, Shikari wildlife sanctuary vide No. FFE-B-F(6)11/2005-II/Shikari Devi dated 07-06-2013. The total area taken over from Shikari Wildlife Sanctuary is 2445.57 ha. The important animals and birds met within the areas are as follows:-

ANIMALS : Musk Deer, Serow, Barking Deer, Goral, Black Bear, Leopard etc.

BIRDS : Monal, Koklas, Kalij pheasant, Tragopan etc.

Now the Eco-sensitive zone is proposed around Shikari Devi wildlife sanctuary which falls within two divisions viz. Nachan and Karsog. These areas will be managed by the Territorial divisions concerned in concurrence with the co-operation of the local people. There is a list of activities which are permitted/prohibited/regulated in the ESZ proposed in consultation with the local people and the Panchayats.

11.9 Management of Human-Leopard conflict:

There have been many instances of human-leopard conflict in the division in the past. There is a sizeable population of Leopards in the division around dense habitations. Every year there are many instances of Leopard killing cattle, sheep, and goats. In Thunag there was havoc when a leopard killed human beings. Nawab from Hyderabad was called to kill the Leopard. The main reason for Leopard invading in human territory is that there is sharp decline in prey population in the forest due to hunting of herbivores, pheasants by the local people. There have been instances in Seraj range of killing of Leopard cubs which makes the Leopard furious and attack humans.

There is a need to sensitize the people about hunting and strict vigil by the forest department against offenders. Usually the staff of territorial divisions is unaware of the acts and provisions related to wildlife. The territorial staff should be imparted knowledge about wildlife and trained in dealing with wildlife crime cases. The gun licenses for crop protection should be cancelled immediately if license holder is caught hunting any wildlife. Appropriate compensation for attack by wild animals be given to the sufferer as

per latest revised rates of compensation of the state government. Precautionary measures should be taken in areas where there is occurrence of Leopards like not moving alone at night hours, not disturbing the areas where there are cubs, etc.

11.10 Management of Monkey Menace:

The nuisance of monkeys in the division is not so great except in the season when there is ripening of crops. Himachal government has come up with sterilization technique to control the population of the monkeys in the state. Every year Alpha monkeys are captured and sent to Monkey sterilization centres for sterilization and released in the same area from where captured. Though the technique is effective but the results will be visible only after 25-30 years which is a long time. There are many difficulties in capturing the monkeys by the field staff. There is also thinking in place to declare monkeys as vermin. Monkey capturing cages can be staged in places where there is monkey menace to fear them away. Every division should be provided with Tranquilizer guns to tranquilize monkeys which are causing trouble in the region.

11.11 Study on population of Pine Martin in the division:

Interestingly there is handsome population of Pine Martins in the Chil forest of this division. The DFO should conduct a study with the help of field staff and WII, Dehradun to document the population of Pine Martin in the division. Special funds should be allotted for the study of this unique creature.

11.12 Documentation and publication of Flora and Fauna:

The division is rich in bio-diversity. There are a number of unique birds and animals which should be documented and publicized to create awareness among the staff and the local people. There is large variety of flora occurring in the area which should also be documented and published. Special funds for this should be allotted.

CHAPTER-XII

NTFP WORKING CIRCLE

12.1 NTFP

BACKGROUND:

Forests are a complex, natural system which must be sustainably managed and appropriately conserved for their multiple uses ranging from protective to productive functions. Among the functions performed by the forest systems, medicinal plants and other Non-Timber Forest products (NTFPs) are a relatively lesser understood area, especially their contribution towards rural economy and lives of local people. In the earlier years the policy and practice focused on production of quality timber and these smaller but significant forest products were termed as Minor Forest Products (MFPs) but with the change in National Forest Policy and recognition of their role, these important products are now rightly termed as NTFPs. With the people-friendly and conservation oriented policy, the practices should now change to focus attention on the development, conservation and their management and these should not be allowed to be continued as by –products of tree-focus forestry. Apart from biological resources, slate, sand and *bajri* are also found and extracted from the area for local use as well as other developmental activities. The present chapter makes an attempt towards this aim.

12.2 GENERAL CONSTITUTION:

This chapter includes all areas of the tract except private tilled lands where agricultural crops are grown.

12.3 SPECIAL OBJECTS OF MANAGEMENT:

1. To ensure scientific harvesting of NTFP by enforcing control of methodology of harvesting NTFP species found in the tract.
2. To develop the resources by natural or artificial means wherever and to the extent possible.
3. To promote ex-situ and in-situ cultivation and conservation of important NTFP species.
4. To improve the quality and quantity of NTFPs in the area for sustainable management so as to ensure continuous supply of these products consistent with the capacity of the land resource.
5. To maintain and improve the gene pool for biological diversity and conservation.

12.4 AVAILABLE NTFPS:

Although tract is known to have about 100-125 species of known medicinal value, 39 such species are regularly extracted and exported for their commercial value (Detail of exports is given in a tabular form in Part I chapter III). Chief non timber forest products other than medicinal herbs are Resin, Mushrooms, Wild fruits and Vegetables, Incense and Condiments. The single most important factor governing the distribution of NTFPs is the altitude with low value high volume species occurring at lower elevations and high value species are extracted in smaller quantities at higher altitudes. The main species found in the area are tabulated below:

(Table No. 1)

Local/Trade Name	Botanical Name	Plant Type	Altitude (above m.s.l.)	Habitat	Part used	Use
1.	2.	3.	4.	5.	6.	7.
Lower & Middle	Montane Zone					
Amaltash	<i>Cassia fistula</i>	Tree	Upto 1000m	Sub-Tropical forest	Fruit	Ayurvedic/Unani medicines
Amla	<i>Embelicaofficinalis</i>	Tree	Upto 1000m	-do-	-do-	-do-
Anardana/Daru	<i>Punicagranatum</i>	-do-	Upto 1300m	-do-	Seed	Spice
Arjun	<i>Terminaliaarjuna</i>	-do-	Upto 1000m	-do-	Bark	Ayurvedic/ Unani medicines
Basuti	<i>Athatodavasica</i>	Herb	Upto 1600m	-do-	Whole herb	Alkaloids and essential oil
Behara	<i>Terminaliabellirica</i>	Tree	Upto 1600m	-do-	Fruit	Ayurvedic / Unani medicines
Brahmi/ Minaki	<i>Centelliaasiatica</i>	Herb	Upto 1500m	Open Grass slopes	Whole herb	Ayurvedic medicines
Chil Pine	<i>Pinusroxburghii</i>	Tree	800-1500m	Sub-tropical pine forests	Resin Extract	Resin, turpentine
Dharaphool	<i>Woodfordiafruiticosa</i>	Shrub	Upto 1000m	Scrub	Flower	Ayurvedic medicine
Galoi/Gulchhe	<i>Tinosporacordifolia</i>	Shrub	Upto 1000m	Waste lands around habitations	Whole plant	-do-
Harar	<i>Terminaliachebula</i>	Tree	Upto 1000m	Sub-Tropical Forests	Fruit	Ayurvedic medicine
Kamala	<i>Mallotusphilippensis</i>	Tree	Upto1000m	Sub Tropicalforests		
Languli	<i>GloriosaSuperba</i>	Climber	Upto 1000m	Sub-Tropical forests	Root	Ayurvedic

Pudina	<i>Mentha longifolia</i>	Herb	Upto 1500m	Around springs	Leaves	Flavouring/essential oil
Shara	<i>Prunus</i>	Seed	4000' & above		Tree	
Tejpatta	<i>Cinnamomum tamala</i>	Tree	Upto 1500m	Sub-tropical forests	Leaves, bark	Flavouring
Reetha	<i>Sapindus mukorossi</i>	-do-	Upto 1000m	-do-	Fruits	Soapnuts
Tirmara	<i>Zanthoxylum armatum</i>	-do-	1000-1500m	Forests/farm borders	Fruits	Medicinal
Wild Marigold	<i>Tagetes minuta</i>	Shrub	Upto 1500m	Sub-tropical forests	Flower	Essential oil
Kohu	<i>Oleaceuspidata</i>	Seed	Upto 1200m	Sub-tropical forests and farm borders	Tree	Oil
Temprate Zone						
Bach/Barre	<i>Acorus calamus</i>	Herb	Upto 2000m	Marshes and stream banks	Rhizomes	Calamus oil
Banafsha	<i>Viola serpens</i>	Herb	Upto 2000m	Oak-Conifer forests	Flower	Medicinal
Banajwain	<i>Thymus serpyllum</i>	Herb	1600-3500m	Open forests	Leaves, stem	Medicinal
Bhang	<i>Cannabis sativa</i>	Deciduous shrub	Upto 3000m	Waste lands around habitations	Whole plant	Fibre, medicinal, marijuana
Chora	<i>Angelica glauca</i>	Herb	Between 2500-3500m	Upper temperate forests	Root	Medicinal
Chraita	<i>Swertia chirayita</i>	Herb	1600-3000m	Grazing land, scrub	Whole plant	Medicinal
Daruharindr/Kashmal	<i>Berberis aristata</i>	Shrub	Upto 2000m	Sub-tropical scrub	Root	Medicinal
Deodar	<i>Cedrus deodara</i>	Tree		Deodar forests	Stem/cones	Cedar wood oil,

						torches decorative
Gucchi	<i>Morchellaesculenta</i>	Fungus	Above 2000m	Deodar forests	Mushroom	Edible mushroom
Jharka	<i>Atropa belladonna</i>	Hurb				
Kail	<i>Pinuswallichiana</i>	Blue pine	Above 1500m	Mixed coniferous forests	Cones	Decorative
Kakarsinghi	<i>Pistaciaintegerrima</i>	Tree	1000-2000m	Oak-Pine forests	Galls	Medicinal
Kapoorkachri	<i>Hedychiumacuminatum</i>	Herb	Upto 2500m		Root	-do-
Lichens	<i>Parmelia spp.</i>	Lichen	1000-3500m	On trees, rocks	Lichen	-do-
Mamira	<i>Thalictrumfoliolosum</i>	Herb	1500-2500m	Oak-Conifer forests	Root	-do-
Mushkbala/Nihani	<i>Valeriana wallichii</i>	Herb	1500-3000m	Temperate valleys	Root	-do-
Nirbisi	<i>Delphinium denudatum</i>	Herb	1500-2700m	Grass banks, farm slopes	Root	-do-
Pshanbhed	<i>Bergeniaciliata</i>	Herb	1800-4300m	Forest, rock ledges	Root	-do-
Rakhal/Talispatra	<i>Taxusbaccata</i>	Herb	2000-3000m	Forest understorey	Leaves, bark	-do-
Shinglimingli	<i>Dioscoreadeltoidea</i>	Climber	1500-3000m	Temperate valleys	Rhizome	Alkaloid

12.4.1 During last three years export of following quantity of NTFP/Medicinal Herbs have been made from Nachan Division.

Detail of Medicinal Herbs/Minor Forest Produce for the years 2010-11,2011-12 & 2012-13 are tabulated as under:-

(Table No. 2)

Year 2010-11

S.No.	Name of Species	Quantity		
		Qtls.	Kg	Grams
1.	Kail cones	0	-	-
2.	Charyata	0	0	0
3.	Berberis roots	6542	95	0
4.	Marry Gold	90	0	0
5.	Horse Chest Nut (Khanor)	0	0	0
	Total	6632	95	0

(Table No. 3)

Year 2011-12

S.No.	Name of Species	Quantity		
		Qtls.	Kg	Grams
1.	Kail cones	0	-	-
2.	Charyata	26	0	0
3.	Berberis roots	300	0	0
4.	TaxusBacatta	7	70	0
5.	Marry Gold	410	0	0
	Total	743	70	0

(Table No. 4)

Year 2012-13

S.No.	Name of Species	Quantity		
		Qtls.	Kg	Grams
1.	Rakhal	35	-	-
2.	Charyata	0	0	0
3.	Berberis roots	600	0	0
4.	Horse Chest Nut (Khanor)	180	0	0
5.	Marry Gold	200	0	0
	Total	1015		

12.5 COLLECTION MECHANISM:

The right holders have the right of collection of these medicinal and aromatic plants which are then exported outside through a chain of middlemen after obtaining permits from the DFO after paying export fee which is notified for each species by the government from time to time. In the tract dealt with, Bali chowki, Janjehli and Chail Chowk are the major collection catchments from where 90% of these are exported to Amritsar, Haridwar and Delhi. The seasonal pattern of collection varies considerably with the bulk of collection concentrated between March and November and coinciding and interspersed with farming and livestock activities. Although local people have knowledge of various plants, their usable part, distribution, but competition for resource does lead to uncontrolled and unscientific extraction leading to degradation of the root stock and species diversity. The classic example is that of *Taxus baccata* which has been extracted to such an extent that it is now rarely available in the forests. As a result of that the collection of *Taxus* from wild is banned by the Government. The best way for collection is by the local people by forming JFMCs which will collect and sell the NTFPs to the middleman or directly to the buyers. These JFMCs will also be responsible for sustainable extraction and their regeneration. They will help to protect the forests from illegal extraction. Only few blocks will be open for extraction in a cycle and others will be given rest so that there is adequate regeneration of NTFPs after proper notification by the DFO.

The method for extraction of perishable and non-perishable items is carried out under four year cycle programme and ten year felling programme approved by Govt.

12.6 CONTRIBUTION TO INCOME AND QUALITY:

NTFP collection for sale is an age old practice and contributes significantly towards rural economy. A study conducted under ODA funded project reveals that villagers in similar altitude and agro climatic zones (with more orchards) had an average annual income of Rs.6000 to Rs. 18,250 per family in high altitude villages and Rs. 1,500 to Rs.4,500 per family per year in lower altitude villages. Within a household, women and children are more active collectors of these products and income from such sales form a very handy income in poorer households (e.g., for meeting education and recreational needs during local fairs and festivals).

Apart from purely economic benefits, NTFPs are used in every aspect of daily life in rural life. The list includes nutrition (fruits, tubers, leafy vegetables, mushrooms, spices, cooking oil), personal hygiene (toothbrush, soaps, detergents, hair dyes, massage oil), household goods (bedding, utensils, baskets, storage bins, leaf plates, brooms), farming (implements, leaf manure, sticks, stakes, baskets, pesticides, fencing), livestock care (fodder, bedding, ropes) and many other products of varied uses. The forests thus

contribute significantly to consumption levels and the overall quality of life in the area. But since these are not monetized, the value of NTFP consumption from forests equals to Rs.3,125/family/year and if fodder and firewood values are added, it comes to be Rs.40,150/family/year.

12.7 SUGGESTED INTERVENTIONS:

12.7.1 ORGANISED EXTRACTION:

Out of all the forest products, it is the NTFPs which directly influence peoples' life and contributes directly to incomes at household levels and thus their management has to be directed at improving their status by directly involving local users. If the unorganized individuals are organized through some common forum with shared objectives and benefits, they can turn into managers of NTFPs as despite all checks, the extraction still remains an invisible and unmanaged activity. As the market for NTFPs remains a fluctuating activity and involves a chain of middlemen, therefore, the idea of peoples' cooperatives for extraction and marketing should only be tried on pilot scale using JFM approaches. As an immediate measure, the forest officers and field staff can protect local collectors from the whims, fancies and dictates of the middlemen by ensuring them minimum fixed rates approved and notified by the government, which are based on recommendations of the collectors' organizations, such as VFDCs and co-operatives or an Advisory committee.

12.7.2 TRAINING AND SENSITISATION OF COLLECTORS:

The JFM experience have shown that if a constructive dialogue is continued and followed by supporting activities, then people forget individual gains and do think of resource regeneration through collective efforts. It is thus advisable, that the local people, who collect NTFPs, should be sensitized and trained in appropriate technologies using local knowledge and skills. NTFP management is emerging as one of the possible post-formation supports for the VFDCs. The sensitized communities have a better chance of practicing established methods of rotational, deferred or cyclic extractions.

12.7.3 EXTRACTION CYCLES:

Four year extraction cycle should be devised by the DFO and after approved, should be put to practice for all the NTFPs in the concerned area.

12.8 NTFP REGENERATION PLANS:

Over the year, NTFP development has remained low on the agenda while formulating plantation programmes (APOs) but with Government of HP and India now focusing on their rehabilitation through specific schemes (e.g., MFP schemes), the emphasis is shifting slowly but surely towards their regeneration. DFO should formulate special

NTFP rehabilitation schemes and request for financial and technical support from concerned agencies. The JFM micro plan can become another vehicle for taking these efforts forward in the right direction. The divisional strategy should clearly suggest remedial measure for their regeneration and management.

12.9 MINING ACTIVITIES:

BACKGROUND:

The mining in the tract dealt with is carried out to extract the following products for local, development (roads and buildings) and commercial use:

- Stones
- Bajri
- Stones
- Soil

The abovementioned products are utilized mostly locally by the villagers for construction of houses as most of the inaccessible villages use slates for roofing purpose and stones and soil for rest of construction work. All the mines in the area are in the possession of Department of Industries (detail are given in chapter III of part I) and their auctions are conducted every five years.. No lease or auction has taken place since the judgement of Hon'ble Supreme Court of India.

12.10 REHABILITATION PLAN:

DFO territorial will prepare the rehabilitation plans for all the mines in the area with the objectives of reclamation and rehabilitation of the mined/quarried areas. The conditions laid down by the centre and State Governments should be mentioned in the rehabilitation plans. It should be made mandatory for the lessee/department of industries to provide funds for the respective Rehabilitation plans.

**GENERAL FINANCIAL FORECAST
AND FINANCIAL PLAN OF OPERATION**

CHAPTER XIII

GENERAL FINANCIAL FORECAST AND FINANCIAL PLAN OF OPERATION

13.1 GENERAL: Due to all round development of the region, rise in the living standards of the people and improvement in the means of communications, the prices of the forest commodities have registered a steep rise during the past years. This trend is likely to continue in the future also. Therefore, the usual fluctuations, made it very difficult to prepare a financial forecast that is likely to be accurate for the whole period of the plan. Similarly, it is equally difficult to correctly assess the expenditure likely to be incurred in carrying out the prescription of this working plan. An attempt has therefore been made to estimate the future surplus based on the current price of the forest produce and the present cost of carrying out various operations prescribed in the working plan.

13.2 PAST REVENUE AND EXPENDITURE: The details regarding Past Revenue and Expenditure is given as under:-

(Table No. 1)

Year	Revenue in (Rs.)	Expenditure in Rs.		Total	Excess
		Non plan	plan		
1992-93	620519	3722169	4824759	8546928	7926409
1993-94	725555	3283141	8877669	12160810	11735255
1994-95	1839457	4024242	10162142	14186384	12346927
1995-96	827166	9495800	9980200	19476000	18648834
1996-97	849356	7690260	9537960	17228220	16378864
1997-98	2037726	7462400	9004600	16467000	14429274
1998-99	1692514	10475390	15686000	26161390	24468876
1999-2000	2637679	10715570	893120	11608690	8971011
2000-01	3293883	10792030	13702250	24494280	21200397
2001-02	3922328	10016440	8996600	19013040	15090712
2002-03	2716421	10375210	1620500	11995710	9279289
2003-04	3256166	17874775	3401565	21276340	18020174
2004-05	1517540	19102500	2491170	21593670	20076130
2005-06	21780687	8875635	10053995	18929630	+2851057
2006-07	1757267	21506630	23332615	44839245	43081978
2007-08	2629947	33262163	536304	33798467	31168520
2008-09	3159937	32737663	6905605	39643268	36483331
2009-10	12065844	36179335	7963100	44142435	32076591
2010-11	4187189	44250582	5081594	49332176	45144987

**GENERAL FINANCIAL FORECAST
AND FINANCIAL PLAN OF OPERATION**

13.3 FUTURE YIELD: The Annual expected yield of different species in each Working Circle is as under:-

(Table No.2)

S.No.	Working Circle	Expected annual yield in number	Rate	Amount
1.	Deodar and Kail Working Circle	43307		
2.	Chil Working Circle	9949		
3	Fir and Spruce Working Circle	56001		
4	Oak Working Circle	8000 cum		
5	Protection Working Circle	No yield		
6	Plantation working Circle	No yield		
7	Grazing Working Circle	No yield		
8	Soil and water Conservation Working Circle	No yield		
9	JFM Working Circle			
10	Wildlife Management Working Circle			
11	Non-Timber Forest produce Management Working Circle			

13.4 FUTURE REVENUE AND EXPENDITURE :

13.5 REVENUE: Based on current market prices, the anticipated annual revenue is as under:-

(Table No.3)

S.No.	Produce	Expected Annual yield M3	Rate per Cum (Rs.)	Amount in Rs.
1	Royalty from standing trees in Chil, Deo/Kail, Fir/Spruce WC:			
	Chil	242.23	693/-	167865
	Deodar	569.36	5555/-	3162795
	Kail	102.95	3145/-	323778
	Rai	2959.33	1156/-	3420985
	Tosh	2468.65	1156/-	2853759
2	Grazing Fees.	-	-	-

**GENERAL FINANCIAL FORECAST
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3	Timber & other Forest produce removed from Forests consumer other than HPSFC.	2362.8 qtls	-	390620
4	Compensation & penalty from damage of Forest produce.	555 Nos	-	1085754
5	Rent of Buildings.	-	-	-
6	Receipt from Registration fee.	5 Nos	1000/-	5000
7	Export fee.	47 Nos	25/-	1175
8	Other Misc. Resin etc	85857 Nos.	58/-	4979706

13.6EXPENDITURE: The estimates of annual expenditure are as under:-

(Table No.4)

S.No.	Particulars	Estimated Expenditure (Rs.)
A	Establishment	
1.	Salary of staff	74196385
2.	T.A.	641684
3	Medical Expenses	860591
4	Uniform /Liveries	247000
5	Contingency and Other expenses	250000
B	Conservancy Works	
1	Marking & Numbering	250000
2	Demarcation & maintenance of boundaries.	300000
3	C/O Building	13800000
4	C/O Roads	500000
5	Repair of Building	1730000
6	Repair of Road / paths	4107500
7	Repair of Forest Compound	-
8	Fire protection of forests	229000
9	Repair of plantation & subsidiary operation.	650000
10	Maintenance of old plantation.	1496000
11	Material & supply	2072000
12	Removals of forests produce from	200000
	Total	101530160

**GENERAL FINANCIAL FORECAST
AND FINANCIAL PLAN OF OPERATION**

Assessment of expected revenue, estimated expenditure for the implementation of the Working Plan is as under:

(Table No. 5)

Year	Revenue in (Rs.)	Expenditure in Rs.		Total	Excess
		Non plan	plan		
2011-12	2057553	48144037	9003560	57147597	55090044
2012-13	16415916	58134286	10145333	68279619	51863703
2013-14	4679686	60848362	10112115	70960477	66280791
2014-15	5853720	11631087	54621442	66252529	60398809
2015-16	5640000	49070000	34000000	83070000	77430000
2016-17	6050000	48560000	27000000	75560000	69510000
2017-18	8560000	57290000	19000000	76290000	67730000
2018-19	8470000	46070000	35000000	81070000	72600000
2019-20	6280000	67050000	21000000	88050000	81770000
2020-21	5970000	58430000	19000000	77430000	71460000
2021-22	6580000	65880000	23000000	88880000	82300000
2022-23	8070000	46570000	31000000	77570000	69500000
2023-24	8690000	38090000	39000000	77090000	68400000
2024-25	7870000	47000000	28000000	75000000	67130000
2025-26	8790000	52000000	24000000	76000000	67210000
2026-27	6670000	48000000	39000000	87000000	80330000
2027-28	8560000	53000000	28000000	81000000	72440000
2028-29	9870000	49000000	32000000	81000000	71130000
Total	135076875	904767772	482882450	1387650222	1252573347

Funding to execute Plans and Non plan works is from Govt. of HP and GOI. There is no possibility of funding from other sources.

CHAPTER XIV

MISCELLANEOUS REGULATIONS

14.1 PETTY FELLING

Felling of small nature are also be carried out as prescribed in Rights and concessions and as per order of H.P. Govt as per detail given below:

(i) Department Demand:

Annually FGD huts and B.O. Quarters are constructed in the Division and timber is required for the construction detailed as under:

- (a) B.O. Quarter = 2 No. = $6.0\text{m}^3/\text{each}$ = 12.0 m^3
(b) FGD huts = 3 No. = $405\text{m}^3/\text{each}$ = 13.5 m^3
= 25.5 m^3

(ii) Research:

For research purpose approximately timber required is = 7.0 m³

(iii) Special Grant:

Special grant granted to right holders due to naturally calamities for the year 2014-15 is detailed as under:

(Table No. 1)

Year	Species	Total No. of trees	Volume in m ³
2014-15	Deodar	18	55.35
	Kail	18	42.57
	Chil	7	15.91
	Rai	3	10.1
	Tosh	1	1.800
Total		47	125.73

(iv) Roads:

Roads are constructed by H.P. Govt and passes forests also after the approval/clearance under FCA 1980 from GOI. Felling of trees depends upon length of road. Approximate trees felled in the construction of one on two road annually are 60-70 m³.

(v) Electricity Transmission Lines:

There are Hydro-projects in the state. Some times transmission lines passes through forest areas. Trees are felled under these lines after the approval of GOI under FCA 1980. Approximately volume felled per annum is = 40.50 m³

14.2 DEVIATIONS

As per settlement report and new T.D policy of HP Govt. Notification No.FFE-B-E(3)-43/2006-Vol.II Date 26-12-2013. Large numbers of trees are granted to the right holders which constitutes a deviation. The detail of trees granted to right holders in respect of this division is as under:

(Table No. 2)

Year	Species	Total No. Of Trees	Volume in m³	Remarks
2012-13	Deodar	Converted timber	35.5	
	Kail	-do-	20.0	
	Chil	-do-	4.0	
	Rai	-do-	11.0	
2013-14	Deodar	27	70.775	
	Kail	18	48.450	
	Rai	Converted timber	4.0	
	Kail	-do-	29.5	
	Deodar	-do-	37.5	
2014-15	Deodar	167	399.775	
	Kail	20	46.23	
	Chil	36	63.96	
	Rai	9	24.175	
	Tosh	1	1.800	

14.3 RIGHTS AND CONCESSIONS

Forest settlement was carried out in 1917, when the rights concessions of the local people admitted in the forests were recorded.

State Govt. has permitted certain kinds of usages/ (Bartan) on waste land whether high forests, scrub forests or grass land to meet the reasonable domestic and agricultural requirements of the people in the matter of grazing and forest produce, and such wages will be maintained in so far as they are compatible with a system of forest conservancy suited to the requirements of the state and the people. The bartans (rights) are appended to cultivated land assessed to revenue on the revenue of which has been assigned and which are situated in the village recorded as having bartan in the forest concerned. The bartan can be exercised only in regard to the village for which it is recorded and the timber granted at privileged rates can be used only in that village for which it is recorded and that timber granted at privileged rates can be used only in that village and cannot be taken to any other place even if the bartandar is residing there. The timber obtained by the bartandars at privileged rates cannot be sold or bartered.

Certain conditions have been attached with the bartans granted to the villagers. One of these conditions is that the bartandars will be responsible for the protection of the forests in which the bartan are exercised i.e. they are responsible that no trees are fell without permission, the forest are protected against fire and that no outside grazing is done. Where the bartandars fail in their protective duties, the rights can be curtailed or suspended.

The rights of the bartandars as recorded in the settlement report and record of bartan are as follows:

- (a) Grazing of domestic and agricultural cattle: (buffaloes, sheep and goats and cattle for whole year unless otherwise stated).
- (b) The use of timber for building puposes on payment of the prescribed fees, with permission of the Forest Officer.
- (c) Right of way for men and cattle along footpaths and roads to villages, highland pastures, watersprings, cremation grounds or grounds used for holding fairs.
- (d) To cut brushwood and thorny shrubs.
- (e) To collect fallen coniferous needless for bedding and manure; provided no iron rakes are used for scraping.

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- (f) To collect dry and fallen wood and felling refuse for firewood; and to remove all dry standing or fallen trees except deodar and kail provided that no such trees may be removed without permission from any area which has been burnt within two years.
- (g) To lop trees of broad leaved species for fodder and bedding for cattle.
- (h) To cut grass.
- (i) To collect fruits. Edible seeds, flowers, medicinal, roots and leaves, for the preparation of dyes and honey for their own use and for sale.
- (j) To collect nirgal bamboos.
- (k) To cut and collect torchwood and extract resin from:
 - (i) All dry standing trees, except deodar;
 - (ii) All green and dry fallen trees, except deodar;
 - (iii) Malformed pine trees, especially marked for the purpose;
 - (iv) Stumps of all felled trees, provided the marks, if any, applied by the forest department are left intact.
- (l) To extract and collect slates from existing quarries and to sell the same within the limits of the state.
- (m) To cut and remove for burning the dead 2 trees not more than one hath in girth at 4 feet 6 inches from the ground and 2 trees not exceeding 2 haths in girth at 4 feet 6 inches from the ground, for the construction of biers and for cremation respectively, provided that deodar may be used only in places where other trees are not available, and that oak and other inferior trees are to be used wherever possible through a few small branches of deodar may be mixed with the fuel where deodar is available. Notice of all fellings made for this purpose to be given to the Forest Guard or Rakha within 15 days.
- (n) To collect each for plastering purposes and store for building puposes, and to sell the same within the limits of the State.
- (o) To burn the dead on the recognized burning grounds.
- (p) To keep Sheep and goats on the thaches included in the forest.
- (q) To cut oak and other broad leaved trees for the preparation of ploughs and other agricultural implements and conifers not exceeding 1 hath in girth at 4 feet 6

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inches from the ground for plough handles and rick poles. Agricultural implements may be sold within the limits of the State.

- (r) To lop spruce and silver fir for manure, litter, and firewood and spruce, silver fir and chil pine for charcoal for the manufacturing and repair of agricultural implements, no tree under 2 haths in girth at 4 feet 6 inches from the ground being lopped and the lopping being restricted to the lower half of the tree.
- (s) To cultivate fields situated within the forest boundaries and admitted at the time of the forest settlement.
- (t) To maintain and repair existing water channels running through the forest and to obtain trees for the repair of the same without fees, but with the previous permission of the Forest Officer.
- (u) To obtain trees for the repair of temples without fees, but with the permission of the Forest Officer.
- (v) To remove the bark of broad leaved trees for tanning, provided that it is done in such a way that the life of the tree is not endangered; and to remove the bark of coniferous trees marked for felling.
- (w) To cut trees for religious festivals and ceremonies, according to existing custom.

A short resume of principle rights which have a direct veering on forest management are discussed in the following paragraphs. The sale, transfer or bartan and forest produse obtained at bartandari rates is prohibited. Vide H.P. Govt. Notification No.22-11/71 S.F. dated 23rd July 1973 and no. 6-2/69-SF-11 dated 24-09-1975, the rates, only for migrated graziers have been fixed as under:

Grazing:

Sr.No.	Descriptions of Animals	Rates per animal in rs.
1.	Horse, Ponies and mules	2.00
2.	Donkeys, Ass	1.00
3.	Sheep	0.20
4.	Goats	0.40
5.	Buffaloes	8.00

Timber:

The trees can be given to right-holders for repair and construction of their houses at bartandar rate. These are sectioned to meet their legitimate domestic and agricultural recruitments. In case of building destroyed by fire and other natural calamities like flood, earthquake etc trees can be granted to the right holders. Vide H.P. Govt notification No. FFE-B-E(3)-43/2006-Vol-II Dated 26-12-2013(Appendix-XIV, Page No. 202-206 has introduced new policy accord H.P.Forest timber distribution to the Right Holders rule 2013. As per policy, upto 7 cu standing volume can be granted to right holders once in fifteen years for the new constructions and 3 cu. m. standing volume for repair and addition or alteration once in 5 years. Rates shall be charged Rs.500 per cu. standing volume for Deodar and Rs.250 per cu standing volume for other species. Right holders suffering from natural calamities shall be given trees free of cost. Rate once fixed shall remain valid for five years.

14.4 ROAD, PATH, BRIDGES AND BUILDING:

The entire tract is mountainous with gently. Sloping areas only near Gohar. The attitude varies from 750 mtrs. to 3371 mtrs. climate of the area is generally cold and depend upon the attitude. During winter season, approximately 70% of area remains under snow cover. Road facilities are not available also. Beat headquarter and B.O Head Quarter are generally near the forests for better management. Keeping in view above facts following building roads and paths are suggested to be constructed for better management of forests of their Division as per detail below:

(Table No. 3)

Sr. No.	Name of Range	Name of Building/Road/Path	Location/Headquarter	Amount required
NACHAN RANGE				
1.	Nachan	Forest Guard hut Halinoo	Kelodhar	10 Lac
2.	-do-	Forest Guard hut Bassi	Bassi	10 Lac
3.	-do-	Forest Guard Hut Kotlu	Kotlu	9 Lac
4.	-do-	Forest Guard Hut Deodhar	Deodhar	9 Lac
5.	-do-	Forest Guard Hut Dalogi	Bahwa	9 Lac
6.	-do-	Forest Guard Hut Machhrot	Ghanyari	9 Lac
7.	-do-	Forest Guard Hut Kharsi	Kharsi	9 Lac

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8.	-do-	Forest Guard Hut Chachiot	Phangiar	10 Lac
9.	-do-	Forest Guard Hut Jeog	Jeog	9 Lac
10.	-do-	Forest Guard Hut Kamrunag	Dhangiar Galu	10 Lac
11.	-do-	Forest Guard Hut Budhragh	Budhrag	10 Lac
12.	-do-	Forest Guard Hut Jahal	Jahal	10 Lac
13.	-do-	Forest Guard Hut Tandi	Bhatha	9 Lac
14.	-do-	Forest Guard Hut Chailchowk	Near FRH Chail Chowk	9 Lac
15.	-do-	BO Quarter Tuna	Tuna	10 Lac
16.	-do-	Inspection hut BaiNal	BAiNal	15 Lac
17.	-do-	Inspection Hut Jhaur	Saryach	15 Lac
18.	-do-	Roads	Got Galu to BaiNal via ChhainMegal 4 Km.	12 Lac
19.	-do-	Roads	Jhaur to Saryach 3 Km.	10 Lac.
20.	-do-	Bridle path	Bassa To Dughal 3 Km.	3 Lac
21.	-do-	-do-	Kuthehar to Mahunag temple 3 Km.	3 Lac
22.	-do-	-do-	Segli to Bhangroh 3 Km.	3 Lac
23.	-do-	-do-	Kelti to batand via khanyari 3 Km.	3 Lac.
24.	-do-	-do-	Dharot to Mandap 2 Km.	2 Lac
25.	-do-	-do-	Devidarh to Kutvillage 4 Km	4 Lac
26.	-do-	-do-	Babag to Kathla 4 Km.	4 Lac
27.	-do-	Bridge	C/O Bridge at Rehara	5 Lac
28.	-do-	Bridge	C/O Bridge over Kharkhankhad near Ganai	5 Lac
SERAJ RANGE				
29.	Seraj	BO Quarter	Bagsiad	10 Lac
30.	-do-	BO Quarter	Keolinal	12 Lac
31.	-do-	Forest Guard Hut	Keolinal	8 Lac
32.	-do-	Forest Guard Hut	Riyara	9 Lac
33.	-do-	Forest Guard Hut	Nihri	9 Lac
34.	-do-	Forest Guard Hut Chiuni	chiuni	9 Lac
35.	-do-	Forest Guard Hut	Bara	8 Lac

PANDOH RANGE				
36.	Pandoh	BO Quarter	Karthach	10 Lac
37.	-do-	Forest Guard Hut	Dalikar	9 Lac
38.	-do-	Forest Guard Hut	Chhaprahan	8 Lac
39.	-do-	Forest Guard Hut	Kalhani	9 Lac
40.	-do-	Bridle Path	Tawa to Thach via Beghan=8 Km	5 Lac
41.	-do-	Bridle Path	Jagar to Choara via Mrhran= 10 Km	16 Lac
THACHI RANGE				
42.	Thachi	Forest Guard Hut DeharGhat	Ghat	8 Lac
43.	-do-	Forest Guard Hut Boong	Gagan	8 Lac
44.	-do-	Forest Guard Hut Devthach	Sathew	8 Lac
45.	-do-	Forest Guard Hut Kalipri	Salwad	8 Lac
46.	-do-	Forest Guard Hut Bassan	Bassan	8 Lac
47.	-do-	Road	C/O approach road to I/Hut Jamech= 1 Km	4 Lac
48.	-do-	Road	C/O Approach road to Gang hut to Gadagussaini = 1 Km	4 Lac

14.5 Demarcation and Survey: All the demarcated and un-demarcated protected forests are well demarcated and brought on 1:15000 scale survey sheets by the Survey of India. The area is also covered by 1:50000 scale maps.

The boundary registers are not properly maintained. The position of boundary pillars is not shown properly. The forward and backward bearings of the boundary pillars have not been shown. Although settlement works have been completed in the tract, but the position of boundary pillars of demarcated protected forests is far from satisfactory especially along the cultivated lands. Some of the boundary pillars are missing also. So proper demarcation, identification of the DPFs on ground, proper recording of the forward and backward bearings of boundary pillars is required. The use of Geographical Positioning System (GPS) is strongly recommended for recording the forest boundaries accurately.

14.6 Forest Boundaries: The state of boundaries of forests is not satisfactory. The boundary registers are not maintained properly. The boundary pillars are not maintained on desired lines. As already recommended, the use of Geographical Positioning System (GPS) is the need of the hour for correct positioning of boundary pillars. The field staff must check the forest boundaries frequently. It is recommended that the forest guard will conduct complete annual checking of the

boundaries of all forests and make a report to the block officer who in turn shall check at least 20% forests of his block complete in all respects at least once a year and make report to the range officer. Similarly the range officer will conduct complete checking of 20% forests in his range in a year and shall make a report to the DFO.

14.6.1 A quinquennial programme for the repair and checking of boundary pillars and chak pillars have been prepared and appear in **Appendix- XII, Page No. 199 is in Volume-II.**

14.7 Maps: The demarcated and un-demarcated protected forests have been stock mapped on 1:15000 scale. The stock maps have been filed in compartment history files. Regeneration maps of all felled PB areas have been prepared on 1:3750 scale and placed in compartment history files. The management map on 1:50000 scale has been prepared by making use of survey sheets.

14.8 Meteorological Data:

(a) Snow Gauges: All though two snow gauges are installed at Bijahi and Baila (Janjehli) by BBMB but the tract requires more snow gauges at:

1. Devi Darh
2. Shikari Devi
3. Thachi
4. Gada Gosaini

Correct measurements should be taken at each of these stations and data supplied to Divisional Office regularly.

(b) Rain Gauges: Rain gauges are present in Janjehli, Bijahi, Saroa, Panjai, Thachi, Nachan. New rain gauges at Gadagosaini, Gilhibagi and Rahkot Devidarh, Tuna are required to be installed.

Rainfall data should be supplied to the DFO office regularly.

(c) Temperature and Humidity: Temperature and humidity data is not available. Immediate steps should be taken for installing maximum/ minimum thermometers and hygrometers at the following stations.

1. Nachan (Bassa)
2. Chail Chowk
3. Tuna
4. Devidarh
5. Pandoh
6. Bali
7. Thachi
8. Janjehli
9. Saroa

Correct reading to be taken and data supplied to Divisional Office regularly.

14.9 Preservation plots and seeds stands: No preservation plot and seed stand has been established in this division so far. The forests which were recommended for the establishment of preservation plots in the plan under revision are proposed again and also for seed stands. The name of forests is:-

(Table No. 5)

Proposed Preservation Plots and Seed Stands

Species	Name of Forests	Beat
Deodar	OD-357 Halinu OD-310 Tungrasni	Halinu Budhrag
Chil	OD-384 Mahithana	Karshi
Kail	OD-424 Kandhi	Kamrunaag
Fir/Spruce	OD-416 Golan	Kamrunaag
Oak	ND-436 Dopha ND-435 Jawal	Chachiot

14.10 Preserved and Monumental trees: Such historical, large sized/giant trees of important conifer and broad leaved species if found should be declared preserved and recorded, photographed, provided with a sign board giving its basic information.

14.11 Temple Groves: All the temple grooves should be preserved irrespective of the species. No tree shall be felled from the temple groove.

14.12 Timber for Right Holders: The genuine demand of right holders should be met as per provisions of settlement report, Govt. orders/instructions.

14.13 Voluntary Closures: Now with the adoption of Participatory Forest Management and with adequate persuasion and motivation by the staff, people will come forward with more voluntary closures and more area will be available for carrying out the prescriptions of Working Plan. The particulars of closed areas should be available in suitable registers in the division and range offices. The closure cases should be prepared regularly every year and got notified to avoid legal complications at a later stage.

14.14 Rehabilitation of Degraded Areas: There are many seasonal nallas which were not tackled for reducing erosion in the past under state and central funded schemes. The territorial staff may enlist & highlight such areas and prepare 2 to 3 year plan for carrying out soil and water conservation works from top to bottom for better retention of rain water. Besides this, there are accidental damages to forest property due to natural calamities very often. One must tackle such problems immediately and on priority. A short term rehabilitation plan is to be prepared by the territorial staff for tackling such areas consisting of soil conservation measures and planting of

soil conservation species. District Collector may be approached for funding such areas in the public interest.

14.15 Ecological Assessment: The plant communities are basically indicators of the total environment. These communities respond not only to one environmental factor but also to an interacting group of factors. The plant communities integrate these influences and react sensitively to change in balance of the environmental stresses being primary producers in the ecosystem. Efforts are therefore required to conserve biodiversity at all levels.

14.16 Encroachment: The forest staff must be vigilant against encroachment and hence it is at most essential that there must be close coordination of the forest staff with revenue staff like patwari and kanungoo. The list of encroachment cases in Nachan Forest Division is in **Volume-II, Appendix-X, Page No. 163-197.**

14.17 THE SCHEDULED TRIBES AND OTHER TRADITIONAL FOREST DWELLERS (RECOGNITION OF FOREST RIGHTS) ACT 2006, NO. 2/ OF 2007 DATED 29TH DEC, 2006

Vide ministry of Tribal Affairs (MOTA), GOI letter No. 23011/15/2008-SG.II dated 18 May, 2009 the procedure for seeking prior approval for diversion of forest land for non-forest purpose for facilities managed by the Government under section 3(2) of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 has been laid down (Detailed procedure is in **Volume-II, Appendix- XV, Page No. 207-211.** With the implementation of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 in the State of Himachal Pradesh from the year 2012 onwards, the provision of section 3(2) are applicable on case to case basis. This provides for diversion of forest land for certain facilities managed by the Government as under:

- a) School;
- b) Dispensary or hospital;
- c) Anganwadis;
- d) Fair price shop;
- e) Electric and telecommunication lines;
- f) Tanks and other minor water bodies;
- g) Drinking water supply and water pipelines;
- h) Water or rain water harvesting structure;
- i) Minor irrigation canals;
- j) Non-conventional source of energy;
- k) Skill upgradation or vocational training centers;
- l) Roads;
- m) Community centers.

Subject to the condition that this does not involve falling of trees exceeding seventy five trees per Ha and provided that such diversion of forest land shall be allowed only if:

- 1) the forest land to be diverted for the purposes mentioned above is less than one hectare in each case; and
- 2) the clearance of these developmental projects shall be subject to the condition that the same is recommended by the Gram Sabha.

Hence it is recommended that the Divisional Forest Officer concerned and Range Forest Officers should implement the provision of the Act with letter and spirit following the conditions/ rules as laid down in the letter of MOTA and Act strictly.

14.18 Fire Protection: There has been great damage to Chil forest and Chil plantation due to fire in hot months. To ensure the protection from fires, there should be a network of paths and fire lines. The construction of paths and fire lines should be done by the DFO territorial according to the situation and sufficient funds should be proposed in APO every year for maintenance of exiting fire lines and construction of new fire lines. The beats should be categorized as highly sensitive, sensitive, and moderately sensitive and management strategy should be framed accordingly. The Nachan and Pandoh Ranges should be prioritized for management of forest fires. The villagers should be educated through films, lectures, pamphlets, posters and talks about the benefits of forests and the loss due to fire. The list of fire cases in Nachan Forest Division is in **Volume-II, Appendix-IX, Page No. 160-162.**

14.19 Un-demarcated Protected Forests: The total area of the tract under UPFs is 523 ha. This area however small in extent needs to notified as Demarcated Protected Forests. UPFs are more prone to encroachments being situated near habitation and human greed hence prompt action is needed to declare them as DPFs.

CHAPTER XV**ESTABLISHMENT AND LABOUR****15.1 STAFF POSITION:**

The detail of staff required for Nachan Forest Division is as under:

(Table No. 1)

Sr.No	Designation	Staff required	Remarks
1.	DFO	1	
2.	ACF	1	
3.	Forest Rangers	5	
4.	Deputy Rangers	20	
5.	Forest Guard	70	
6.	Draughtsman	1	
7.	Patwari	1	
8.	Kanungo	1	
9.	Superintendent Grade II	1	
10.	Senior Assistant	3	
11.	Clerk	7	
12.	Peon	15	
13.	Chowkidar	9	
14.	Mali	8	
15.	Sweeper	4	
16.	Jeep Driver	1	
17.	Forest Worker	90	

15.2 LABOUR SUPPLY

Adequate labour is available locally for our forestry and allied works such as construction of road and buildings. The prevailing rates in the area for the year 2011-12 are as under:

Labour rate:**(Table No. 2)**

Sr.No.	Designation	Rate per day (w.e.f. 01-09-2012)
1	Beldar (Mazdoor) Casual Labourer	150
2	Cook	150
3	Mali	150
4	Chowkidar	150
5	Sweeper	150
6	Electrical Beldar	150
7	Store Attendant	150
8	Process Server	150
9	Whiter Washer	150
10	Peon	150
11	Unskilled Labourer	150
12	Quarryman	150
13	Jumper Man	150
14	Driller Man	150
15	Fire Watcher	150
16	Carpenter (Grade –IV)	162
17	Painter 2 nd Class	165
18	White Washer	165
19	Plumber Grade –II	192
20	Mason Grade – II	192
21	Painter Grade –II	192
22	Store Clerk	192
23	Store Keeper	192
24	Patwari	192
25	Data Entry Operator	192
26	Clerk	192
27	Carpenter 2 nd Class	205
28	Mason 2 nd Class	205
29	Painter 1 st Class	205
30	Distemper	205
31	Junior Draftsman (Tracers)	240
32	Mason 1 st Class	271
33	Carpenter Grade -1	271
34	Carpenter (1 st Class)	271
35	Computer Operator	299
36	Draftsman (Arch. Wing)	360

CHAPTER XVI

CONTROL FORM AND RECORDS

To ensure the proper implementation of the prescriptions of the plan, the following record will be maintained in the division:-

16.1 Compartment History Files: The compartment history files of all the demarcated and un-demarcated protected forests have been prepared afresh. The un-demarcated protected forests have been described for the first time. The new descriptions, enumeration results, allotment, prescriptions stock maps have been filed in the division as well as range copies of compartment history files.

16.2 Control Forms: To exercise proper check and control on the prescriptions of the working plan, the Divisional Forest Officer will submit the control forms 2a, 2b, 4 and C annually to the Conservator of Forests in accordance with the instructions laid down in Punjab Forest Leaflet No. 11. The control forms must be completed and submitted in the first quarter of the following year.

FORMATS OF CONTROL FORMS:

16.3 Coupe Control Form:

For the control of all silvicultural operations such as felling, subsidiary cultural operations, cleaning, thinning, burning etc., which may be prescribed or suggested to be carried out in a given coupe for the duration of the working plan.

(Table No. 1)

Working Circle-		Felling- Series- Cutting- Section-	Localities prescribed Localities suggested	Coupe control form	
				Coupe No.	Page
Prescription In brief	W.P. Para	Year Due	As Carried out	Excess (+) or Deficit (-)	Remarks &

CONTROL FORM AND RECORDS

									Sanction
			Year	Block/ Comptt.	Area	Volume in m ³	Area	Volume in m ³	

16.4 Felling Control Form:

For controlling and maintaining a record of all trees marked for felling and trees retained as seed bearers or to safe guard future yield.

(Table No. 2)

Working Circle- Periodic Block-		Felling- Series- Cutting- Section-		Localities prescribed Localities suggested				Coupe control form	
								Coupe No.	Page
Block & Compt t	Are a	Specie s	Diamete r Class	Trees Marke d	Unit Facto r	Volum e Marked in m ³	Trees Retaine d	% Trees Retaine d	Remark s
1	2	3	4	5	6	7	8	9	10

The DFO will annually make entries in his copy of the control forms and send them together with the deviation statement in triplicate to the Working Plan Conservator through the Territorial Conservator. After the entries have been checked and approved, the Working Plan Conservator will first get his copy completed and then send the DFO's copy to the territorial Conservator. The later will then complete his copy and finally return the DFO's set for deposit in the latter's office till next year. The working Plan Conservator will send three copies of deviation statement

to the PCCF for sanction. After the sanction, one copy each will be sent to the Territorial Conservator and the DFO for their record and the working Plan Conservator will retain the third copy for his set of control forms.

The control forms should be submitted by the DFO to the Territorial Conservator on or before December 1 and the latter should send them to the Working Plan Conservator concerned on or before January each year.

DEVIATION STATEMENT:**STATEMENT SHOWING DEVIATIONS FROM WORKING PLAN PRESCRIPTIONS**

Year..... Division.....

(Table No. 3)

Serial No. Of Deviation	Control book name, form no. page	Reference to Working Plan		Nature of deviation requiring PCCF's sanction
		Paragraph	Nature of Prescription	

The DFO will forward through the territorial Conservator typed copies of this form in triplicate yearly with his copy of control forms. No explanatory remarks are required on this form, but these should be given in the forwarding letter. One copy of the statement will be returned to the DFO and another to the Territorial Conservator after the deviations have been sanctioned by the PCCF. If the PCCF or the Working Plan Conservator's sanction has been obtained in advance, the sanction number and date should be quoted in the last column.

All deviations, which permanently alter the basis of management laid down in a working plan, will require prior sanction of the PCCF. All and with the necessity of which he agrees, may be approved and sanctioned by the working plan Conservator on behalf of the PCCF. In case where there is difference of opinion between the Working Plan Conservator and the Territorial Conservator, the former will refer them to the PCCF for instructions. The PCCF/CFWP, as the case may be, will countersign the deviation statement.

Minor deviation can be sanctioned at the level of the CF Working Plan or the PCCF as the case may be; but the PCCF, before sanctioned the major deviations of following nature, will necessarily take prior approval of the Regional CCF of the Ministry of Environment & Forests:

- (i) Change in Silvicultural System;
- (ii) Clear felling of Natural Forest;
- (iii) Formation of new felling Series; and
- (iv) Large scale felling due to natural calamities, which cannot be adjusted against future yield.

16.5 Register of Roads, Paths and Buildings: The register of roads, paths and buildings existing as well as new constructions will be maintained showing the year of construction, cost and other important details.

16.6 Forest Guard Manual/ Beat Blocks: The range officers shall see that all the beat guards keep and carry copies of maps of forests of their beats and other record mentioning various details like area, allotment, prescriptions, and particulars of rights of local people forestwise, order issued from time to time and other important details of the beat. The further instructions as laid down in Punjab Forest Manual II shall be kept in mind.

16.7 Research Journal: The research journals should be maintained in each division and relevant research activities conducted/undertaken should be entered.

16.8 Plantation/ Soil Conservation Journal: Wherever sowing, planting and soil conservation works have been carried out, journals shall be maintained indicating the details of works done from time to time along with cost.

16.9 Nursery Journal: A nursery journal for each nursery shall be maintained wherein the details of all the nursery operations like sowing, germination, weeding, pricking etc. shall be incorporated along with cost.

16.10 Fire Records: A record of fires be maintained according to the standing orders in force from time to time.

16.11 Records of Capital Expenditure: A record of capital expenditure on roads, buildings and other works shall be maintained in the prescribed form.

16.12 Rainfall/ Snowfall Records: This record shall be maintained in a consolidated form at the divisional level for various stations where snow and rain gauges have been installed.

16.13 Forest Settlements Files: All the forest settlement files should be well preserved and kept under the safe custody of ACF/Superintendent of the division.

SUMMARY OF PRESCRIPTIONS

CHAPTER XVII

SUMMARY OF PRESCRIPTIONS

HEADING	PRESCRIPTIONS	PARAGRAPH	PAGE
DEODAR-KAIL WORKING CIRCLE			
Silvicultural system	Selection System	2.7	119
Exploitable diameter	60 cm	2.8	121
Felling cycle	15 years	2.9	121
Calculation of yield	Yield is calculated in terms of no. of trees Deodar- 24057 Kail- 14829 Spruce- 3636 Silver Fir- 0 Chil- 785	2.10	121
Method of executing fellings	Dead, dying, undesirable, above exploitable diameter and silviculturally available trees are removed	2.11	125
Annual coupes	15 annual coupes with avg. area 545 ha.	2.12	126
Subsidiary silvicultural operations	Prescribed as per general principles of management	2.13	133
Miscellaneous regulations	Prescribed in detail	2.14	137
CHIL WORKING CIRCLE			
Silvicultural system	Selection system	3.7	143

SUMMARY OF PRESCRIPTIONS

Exploitable diameter	60 cm	3.8	143
Felling cycle	15 years	3.9	143
Calculation of yield	Yield is calculated in terms of no. of trees Chil- 7580 Kail- 1337 Deodar- 603 Spruce- 429	3.10	143
Method of executing fellings	Dead, dying, undesirable, above exploitable diameter and silviculturally available trees are removed	3.11	146
Annual coupes	15 annual coupes with avg. area 330 ha.	3.12	147
Subsidiary silvicultural operations	Prescribed as per general principles of management	3.13	152
Resin tapping	Above 35 cm as prescribed in HP forest manual	3.14	154
Miscellaneous regulations	Prescribed in detail	3.15	155
FIR-SPRUCE WORKING CIRCLE			
Silvicultural system	Selection system	4.7	163
Exploitable diameter	60 cm	4.8	163
Felling cycle	15 years	4.9	163
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