"D.F.O. DALHOUSIE" Vol. I.

REVISED WORKING PLAN
DALHOUSIE FOREST DIVISION
(2013-2014 TO 2027-2028)

(VOLUME-I)

BY
ANJANI KUMAR, HPFS
DFO -cum- WPO Dalhousie

Himachal Pradesh Forest Department

GOVT. OF HIMACHAL PRADESH

FOREST DEPARTMENT

REVISED WORKING PLAN

FOR THE FORESTS OF

DALHOUSIE FOREST DIVISION

(2013-2014 TO 2027-2028)

VOLUME-I

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ANJANI KUMAR (HPFS)

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CONTENTS

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INTRODUCTION

1. This Working Plan revises T.D.Sharma's Dalhousie Forest division.
2. The area of Working Plans under revision as under :-
   Shri T.D.Sharma = 48900.74 ha.
3. The revised plan deals with R.Fs, D.P.Fs and U.P.Fs of Dalhousie Forest Division.
4. Geographical Area = 724.83 sq.kms.
5. Range wise breakup of the forest area is as under :-

RANGE WISE AREA

Sr. No.	Name of Range	Reserved Forests (in Ha.)	Demarcated Protected Forests (in Ha.)	Un-demarcated Protected Forests (in Ha.)	Total (in Ha.)
1.	Dalhousie	256.99	6000.34	4.00	6261.33
2.	Bakloh	197.88	8978.68	455.07	9631.63
3.	Chowari	397.09	11793.73	42.00	12232.82
4.	Bhattiyat	---	11785.94	39.50	11825.44
	G. Total	**851.96**	**38558.69**	**540.57**	**39951.22**

6. The revenue record of R.Fs, D.P.Fs and U.P.Fs was reconciled and detail has been given in Chapter-I of part - I of the plan.
7. The PWPR was written by Dr. Suresh Kumar (I.F.S) C.F.Chamba.
8. PWPR has been approved by A.P.C.C, F.Central Chandigarh vide letter No. 137(13)/9-Rec/1694 dated 29-02-2012.
9. An effort has been made to prepare the Working Plan based upon latest technique of inventory, analysis and application of computer for analysis of data.
10. Sh. Ram Paul Sharma, A.C.F of this division has done commendable job in compilation and preparation of this Working Plan.
11. The Field work of revision of this Working Plan was undertaken in March, 2012 and was completed in a period of about seven Months. It is expected that prescription of this working plan shall help in continuation of the process of forests conservancy.
12. **Constraints:** - During the preparation of working plan, enumeration in snow covered areas took long time to wait the snow melting for completion of enumeration results. However there were no any constraints relating to manpower, financial or adminiastrative. The territorial staff has contributed a lot for completion of draft working plan.

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EXECUTIVE SUMMARY

This Working Plan is the "9th revised Working Plan" of Dalhousie Forest Division. This Working Plan has included the tract of present Dalhousie Forest Division as covered in the Working Plan by Shri T.D.Sharma, IFS for the period 1993-94 to 2007-08 except Bhalei Forest Range which is presently being managed and covered under Churah Working Plan. This working plan comprises of 724.83Sqkm geographic area of Bhattiyat Civil sub division and part of Chamba Civil Sub Division of District Chamba HP. The Forest area of this division covered under present Working Plan is 399.51 Sq.Km comprising 4 territorial ranges Dalhousie, Bakloh, Chowari and Bhattiyat.

The history of these forests prior to the annexation of Punjab by the British Government in the year 1849 is practically unknown. Probably, except some of stray felling by neighboring villagers for their own consumption, nothing was done to these forests before 1850. It was in the year 1854 that the site of Dalhousie station was transferred by the Raja of Chamba to the British Government for the purpose of creating a sanatorium. In the wake of this arrangement there arose a demand for building timber for construction of barracks, private houses and numerous other public works. It was under the terms of a lease granted to British Government, in the year 1864, (and subsequently revised several times), the existing reserve forests were created and demarcated about that time. According to the rules added to the redrafted lease deed of 1872, all the forests, other than those declared as reserved were to be as such. These were to be demarcated at the option of His Highness the Raja of Chamba. The British Government assumed the exclusive control of the reserved forests, whereas other forests were to be managed by the state for the benefits of the ruler and to cater for such rights and privileges as would be granted by the State to its subjects. The first working plan for the reserves was prepared by Ribbentrop in 1871. The forests of present Dalhousie Forest Divisions were coverd previously under following working plans:

The 1871 Working Plan by Ribbentrop
The 1885-86 working plan by D'Arcy
The 1895-96 working plan by McIntire
The 1913-33 working plan by R. McIntosh
The 1934-54 working plan by Kartar Singh
The 1954-69 working plan by Sant Ram
The 1969-83 working plan by R.C. Sharma
The 1993-94 to 2007-08 working plan by T.D. Sharma

Due to the moratorium on green felling in state of Himachal Pradesh, only salvage removal has been carried out during the previous working plan. The Revised working plan has included the following Working Circles for the first time;

(i) Non Timber Forest Produce (over lapping) Working Circle

(ii) Joint Forest Management(overlapping) Working Circle

(iii) Wildlife Management (overlapping) Working Circle

(iv) Conservation cum Rehabilitation Working Circle

(v) Forest Protection (overlapping) Working Circle.

Besides above new Working Circles some more new items have been included in the Revised Working Plan as under:

(i) Human Animal Conflict management

(ii) Rescue and rehabilitation of wildlife

(iii) Decisions of Pricing Committee

(iv) Five Year plan

(v) Beatwise list of Forests

(vi) Cases of diversion under FCA approved since 1980

This working plan has been prepared by the territorial staff of the Forest Division Dalhousie and no special working plan officer and other staff engaged for this job. A list of all compartments has been prepared for each Working circle and 8 to 10% samples with minimum of atleast one sample have been selected for PB-I and PB-IV of Deodar and Chir working circle. While 5% samples with minimum of atleast one sample have been selected for PB-II and PB-III of Deodar, Chir working circle and Protection and Plantation working circles.The Random samples have been selected using Random Sample Tables. Keeping in view the more numbers of the compartments in Chir working circle, Protection working circles Rangewise samples has been selected to avoid the chance of selection of samples from a single Range which would have resulted into concentration of enumeration work in a single Range. Enumeration of sample compartments has been carried out as per traditional 10 cm diameter class basis. The abstract of further prescriptions is as under:-

Name of W.C	Silviculture System	Rotation Period	Expliotable Diameter	Regeneration Period	Annual Yield Prescribed in cum.		
					PB-I	PB-IV	PB-U
Chil	Indian Irregular Shelter Wood	120 years	60 cms at d.b.h	30 years	3000	1500	0
Deodar/ Kail	Indian Irregular Shelter Wood	120 years	60 cms at d.b.h	30 years	3000	400	0
Fir/Spruce	Indian Irregular Shelter Wood	120 years	60 cms at d.b.h	30 years	25	0	1400

RESEARCH PLOTS

There is need to establish some research/sample plots in Chil forests with the main objective study the effects of Rill method of resin tapping so that it is standarised with least adverse effe on the tree. These are proposed as under:-

S.N	Name of Range	Name of Forest
1	Bakloh	R.F. Mamul
2	Chowari	D.P.F. Talai

BUILDINGS The following buildings are proposed to be constructed. D.F.O may modify t according to administrative needs:-

S.No	Range	Name of Building	Location	Number
1	Dalhousie	Forest information Centre	Dalhousie	1
2		Fgd Hut	Dalhousie	1
3	Bakloh	Range office	Ghatasani	1
4		Class IV Quarters	Ghatasani	4
5		Fgd Hut	Tunhatti	1
6		Forest Fire Tower	Bara	1

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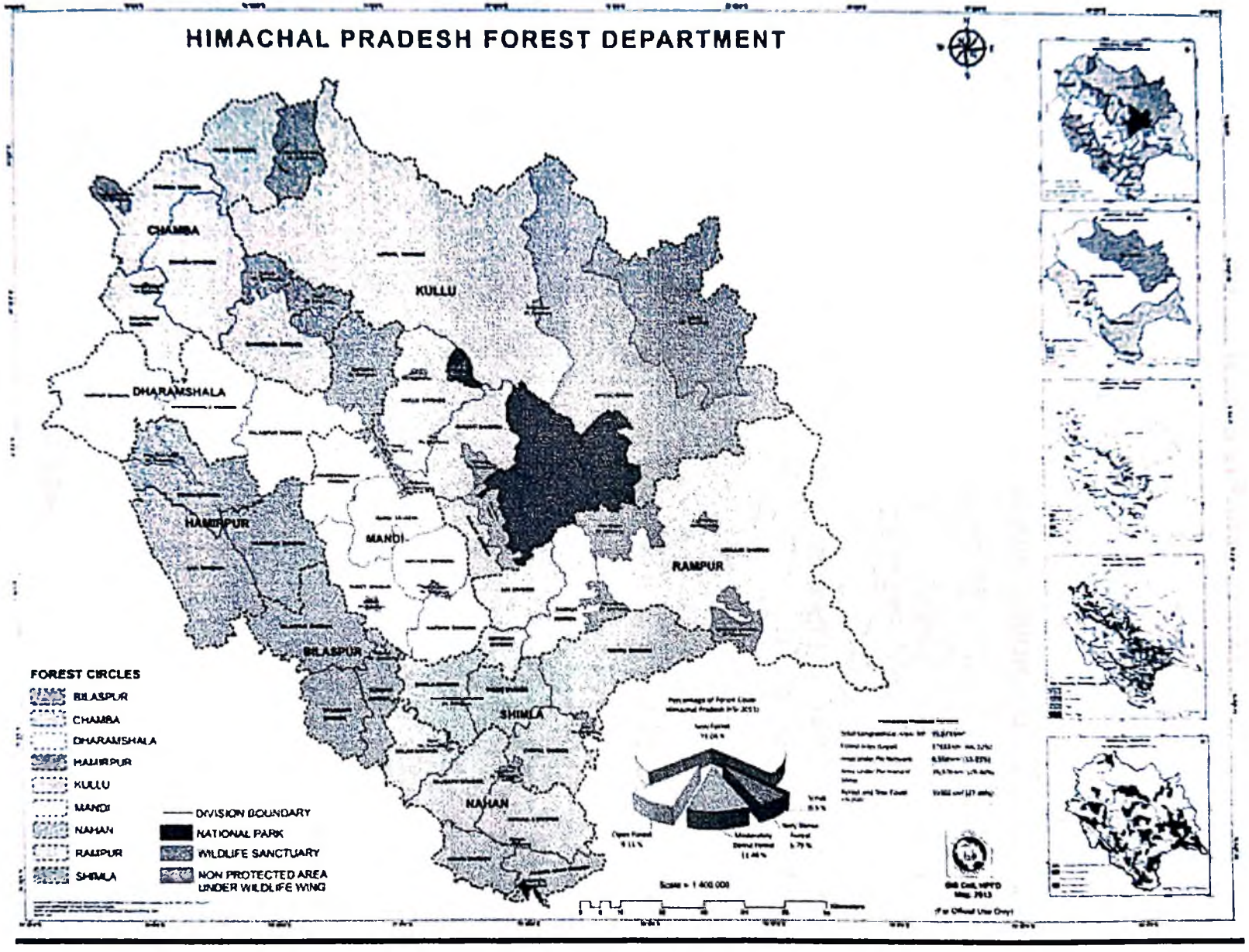
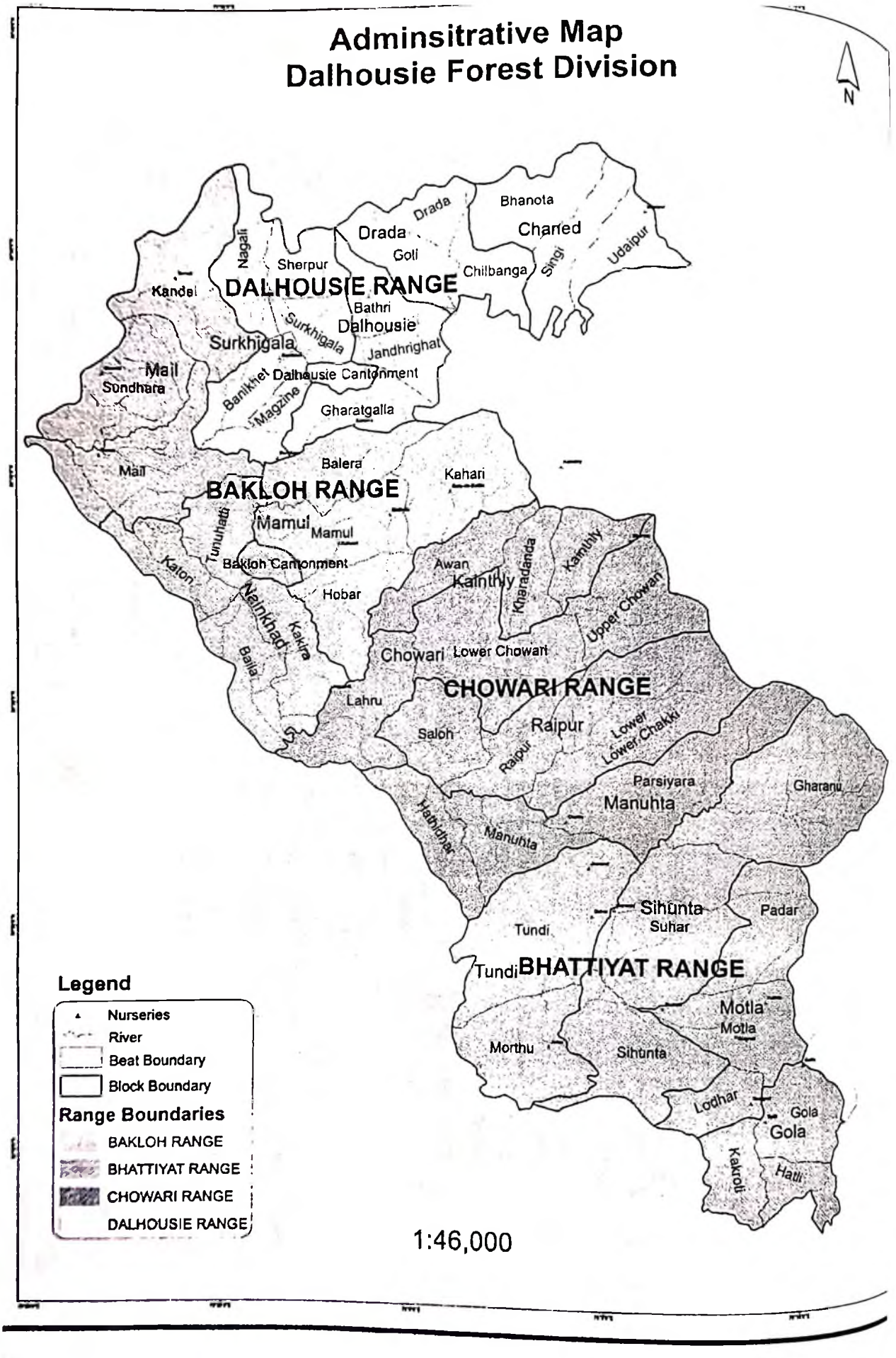
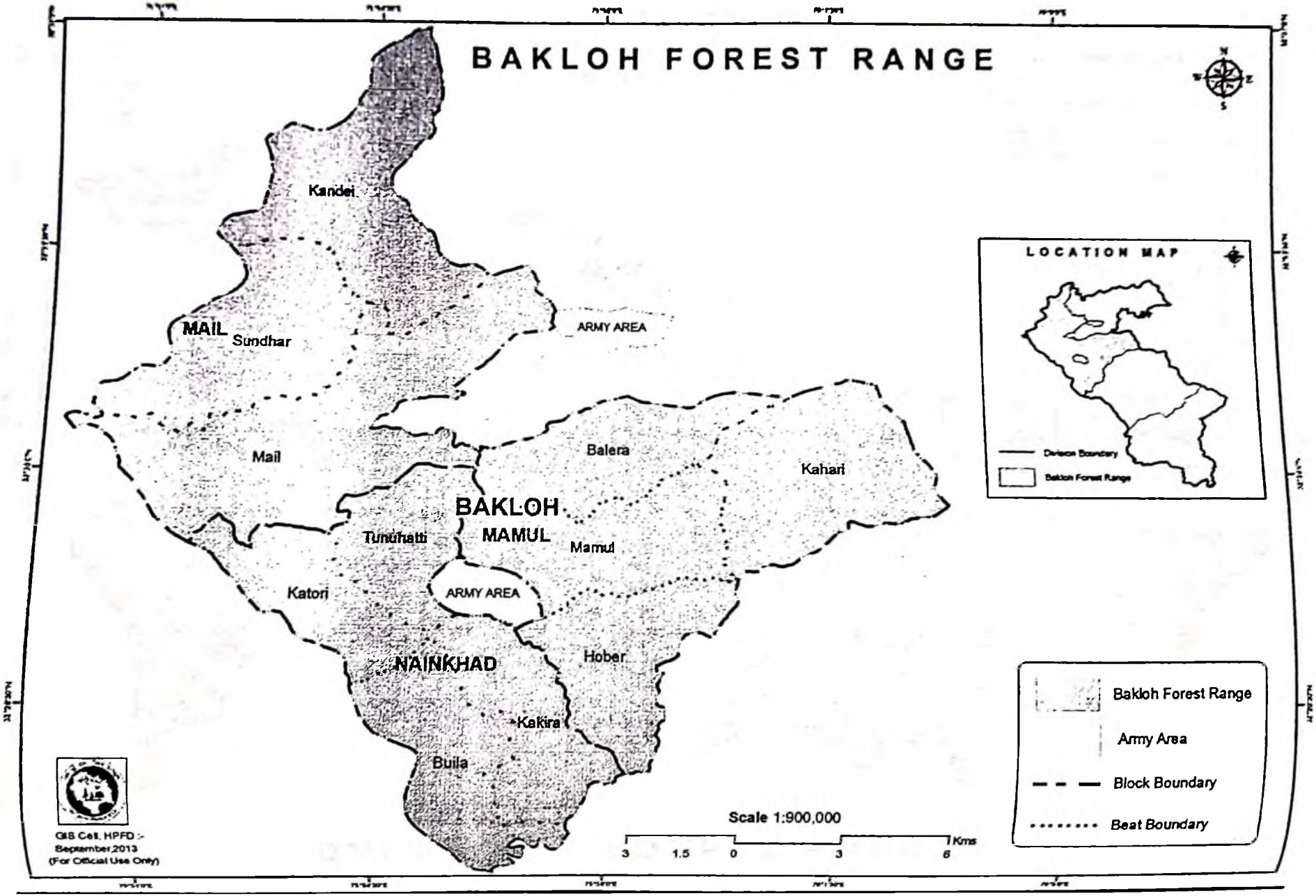
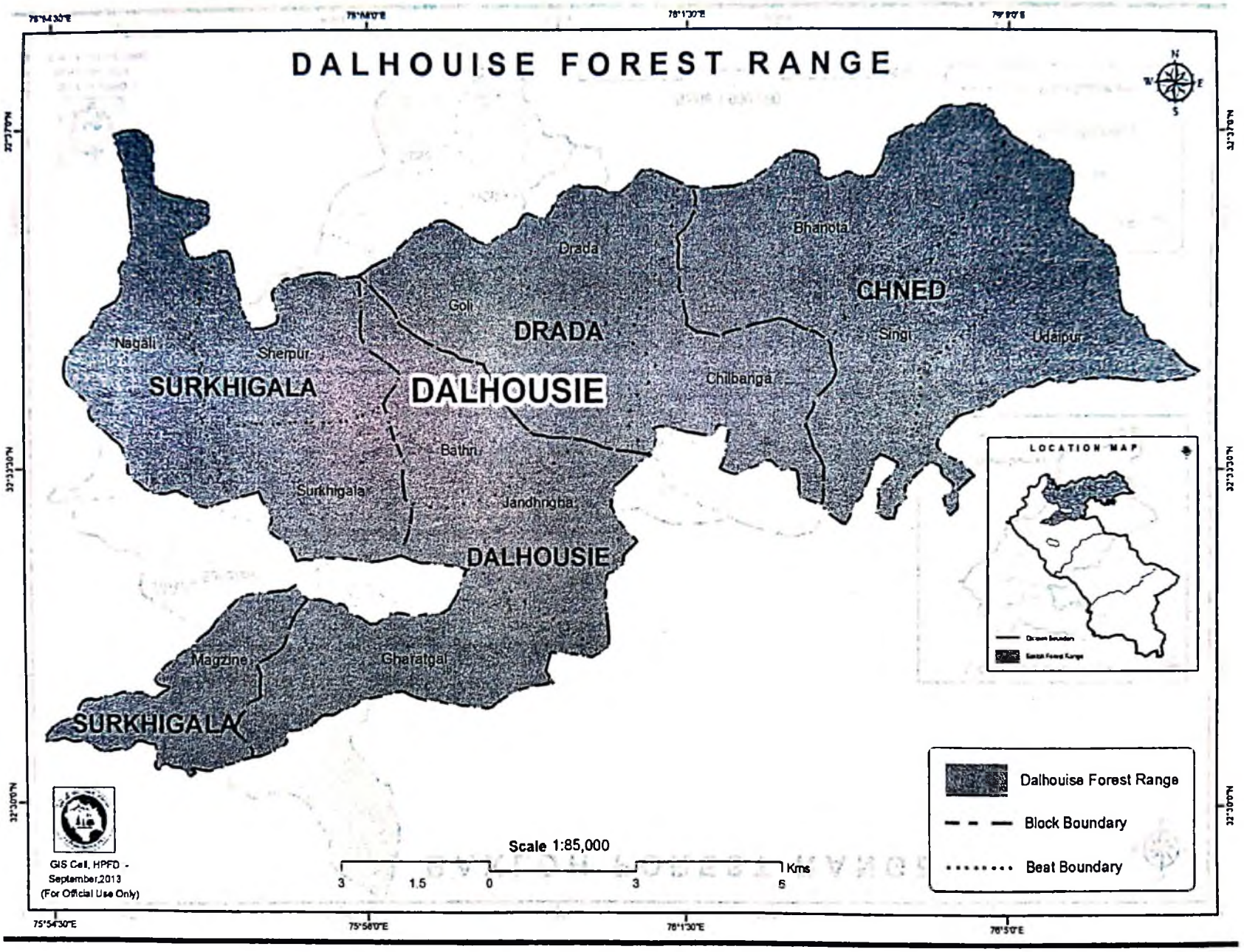
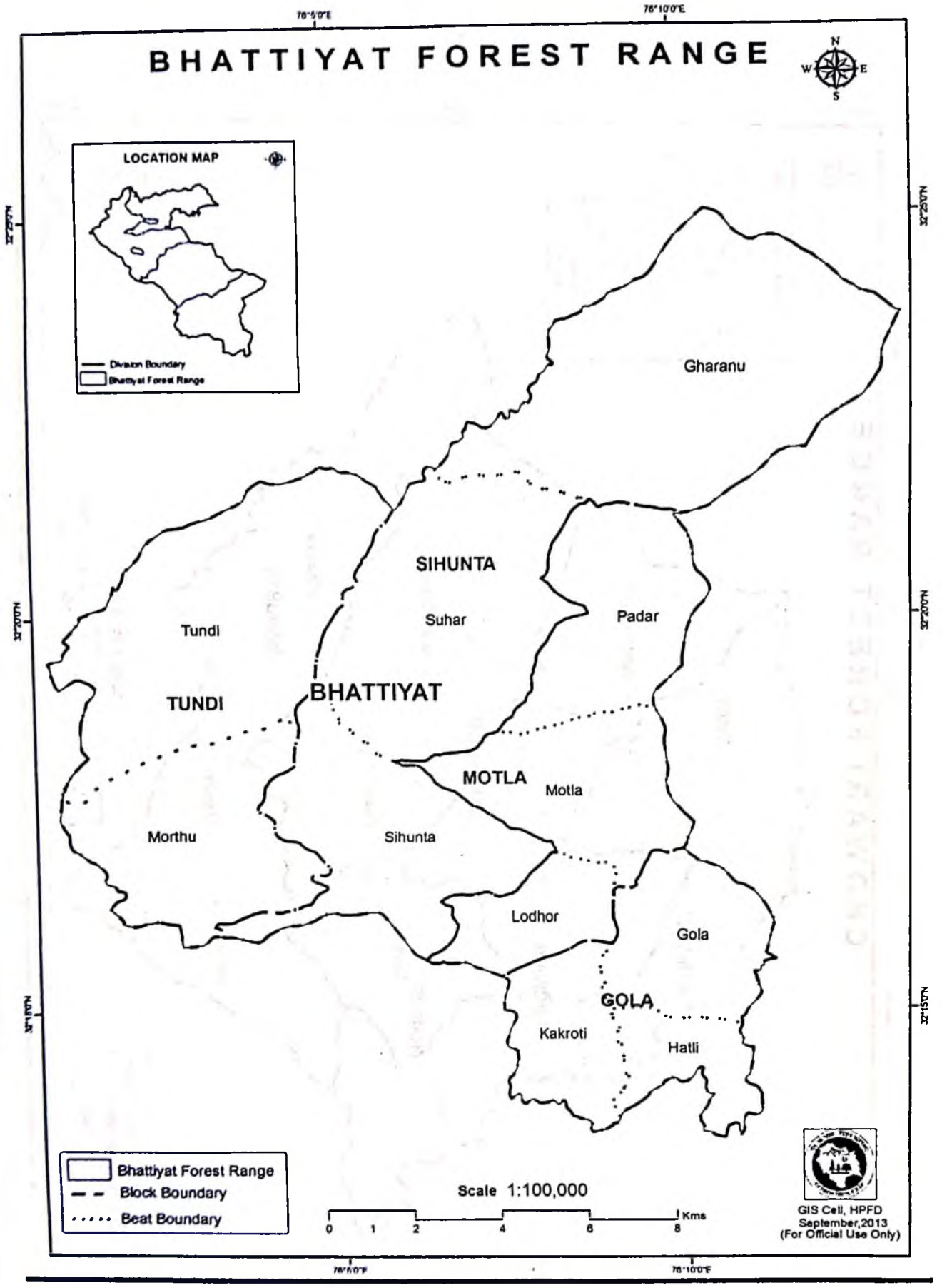
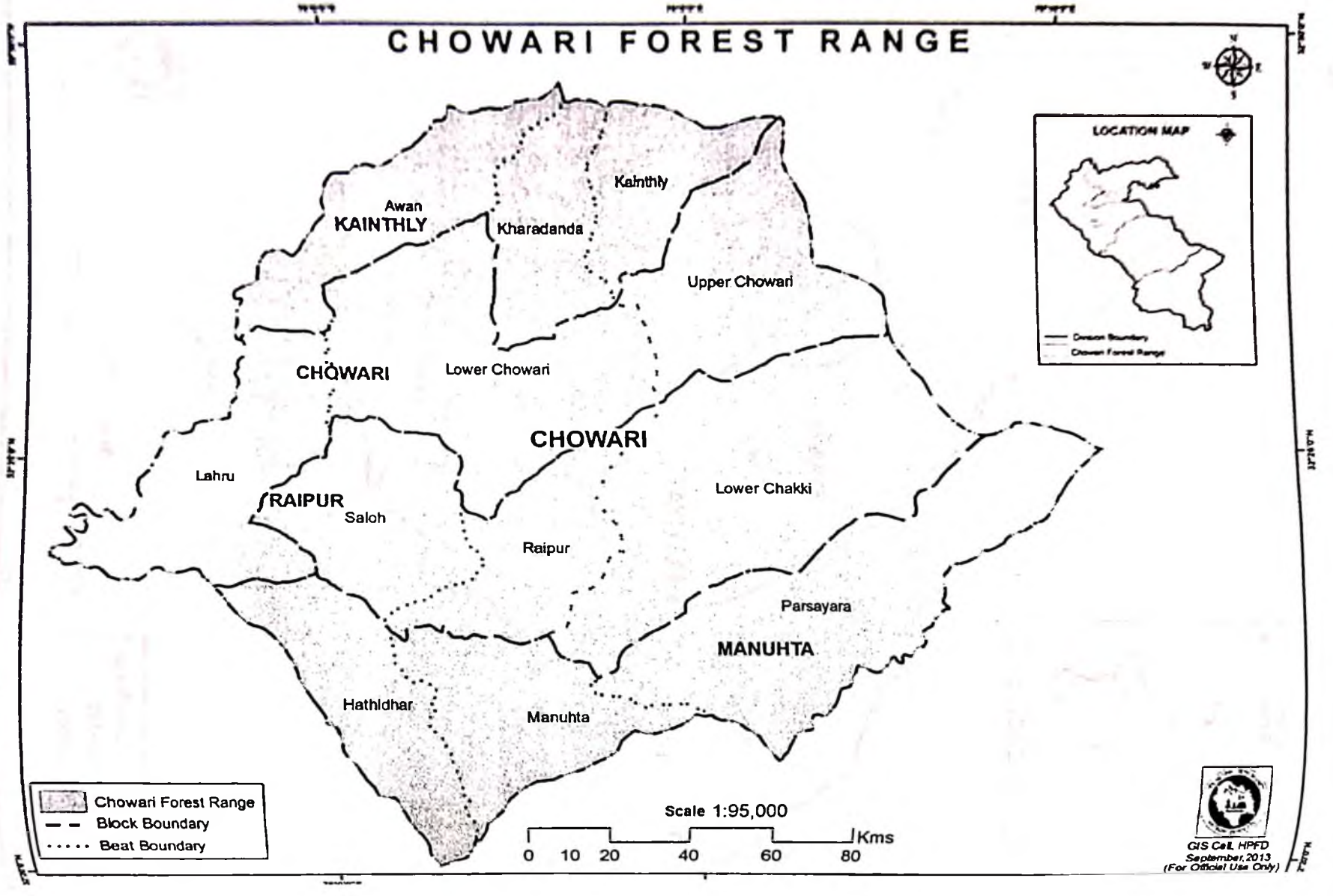

HIMACHAL PRADESH FOREST DEPARTMENT
CHAMBA
KULLU
DHARAMSHALA
HAMIRPUR
MANDI
RAMPUR
BILASPUR
SHIMLA
NAHAN
FOREST CIRCLES
BILASPUR
CHAMBA
DHARAMSHALA
HAMIRPUR
KULLU
MANDI
NAHAN
RAMPUR
SHIMLA
DIVISION BOUNDARY
NATIONAL PARK
WILDLIFE SANCTUARY
NON PROTECTED AREA UNDER WILDLIFE WING


Adminsitrative Map
Dalhousie Forest Division
N
DALHOUSIE RANGE
BAKLOH RANGE
CHOWARI RANGE
BHATTIYAT RANGE
Drada
Bhanota
Chanied
Udaipur
Singi
Chilbanga
Goli
Nagali
Sherpur
Kandel
Bathri
Dalhousie
Surkhigala
Jandhrighat
Dalhousie Cantonment
Banikhet
Magzine
Gharatgalla
Mail
Sundhara
Balera
Kahari
Mamul
Tunuhatti
Bakloh Cantonment
Hobar
Kalon
Nalnkhad
Kakra
Balla
Awan
Kainthly
Kharadanda
Kamuhly
Upper Chowari
Chowari
Lower Chowari
Lahru
Saloh
Raipur
Lower Chakki
Parsiyara
Manuhta
Gharanu
Hathidhar
Sihunta
Suhar
Padar
Tundi
Motla
Morthu
Lodhar
Gola
Kakroti
Hatli
Legend
Nurseries
River
Beat Boundary
Block Boundary
Range Boundaries
BAKLOH RANGE
BHATTIYAT RANGE
CHOWARI RANGE
DALHOUSIE RANGE
1:46,000


BAKLOH FOREST RANGE
Kandei
MAIL
Sundhar
ARMY AREA
Mail
Balera
Kahari
BAKLOH
MAMUL
Tunuhatti
Mamul
Katori
ARMY AREA
NAINKHAD
Hober
Kakira
Buila
LOCATION MAP
Division Boundary
Bakloh Forest Range
Bakloh Forest Range
Army Area
Block Boundary
Beat Boundary
Scale 1:900,000
3 1.5 0 3 6 Kms
GIS Cell, HPFD :-
September,2013
(For Official Use Only)


DALHOUISE FOREST RANGE
Drada
Bhanota
CHNED
Goli
DRADA
Singi
Udaipur
Nagali
Sherpur
SURKHIGALA
DALHOUSIE
Chilbanga
Bathru
Surkhigala
Jandhrigha
DALHOUSIE
Magzine
Ghatatgal
SURKHIGALA
LOCATION MAP
Dalhouise Forest Range
Block Boundary
Beat Boundary
Scale 1:85,000
3 1.5 0 3 6 Kms
GIS Cell, HPFD - September,2013
(For Official Use Only)
75°54'30"E
75°56'0"E
76°1'30"E
76°5'0"E


BHATTIYAT FOREST RANGE
LOCATION MAP
Division Boundary
Bhattiyat Forest Range
Gharanu
SIHUNTA
Suhar
Padar
Tundi
TUNDI
BHATTIYAT
MOTLA
Motla
Morthu
Sihunta
Lodhor
Gola
GOLA
Kakroti
Hatli
Bhattiyat Forest Range
Block Boundary
Beat Boundary
Scale 1:100,000
0 1 2 4 6 8 Kms
GIS Cell, HPFD
September,2013
(For Official Use Only)


CHOWARI FOREST RANGE
LOCATION MAP
Awan
KAINTHLY
Kharadanda
Kainthly
Upper Chowari
CHOWARI
Lower Chowari
CHOWARI
Lahru
RAIPUR
Saloh
Raipur
Lower Chakki
Parsayara
MANUHTA
Hathidhar
Manuhta
Chowari Forest Range
Block Boundary
Beat Boundary
Scale 1:95,000
0 10 20 40 60 80 Kms
GIS Cell, HPFD
September, 2013
(For Official Use Only)

PART - I

Summary of facts on which proposals are based

CHAPTER I

THE TRACK DEALT WITH

1.1 NAME AND SITUATION

This Working Plan is "9th revised Working Plan" of Dalhousie Forest Division. This Working Plan has included the tract of present Dalhousie Forest Division as covered in the Working Plan by Shri T.D.Sharma, IFS for the period 1993-94 to 2007-08 except Bhalei Forest Range which is presently being managed and covered under the control of Churah Forest Division.The revised plan deals with the Reserve Forests and the Demarcated Protected Forests, both old and new forests, falling within the jurisdiction of present Dalhousie Forest Division and in addition it also envisages taking up the Undemacated Protected Forests covered in the plan under revision, which by virtue of successfully raised plantations warrant a scientific management in future. Dalhousie Forest Division falls in Chamba civil district. Its jurisdiction extends over Dalhousie and Bhattiyat civil sub divisions complete and part of Chamba sub division.The headquarter of this division is at Dalhousie.

The geographical area of this division covered under present Working Plan is 724.83Sq.Km and Forest area 399.51 Sq.Km comprising 4 territorial ranges namely Dalhousie, Bakloh, Chowari and Bhattiyat. The change in geographical and Forest Forest area of the Working Plan under revision and proposed Working Plan is tabulated as below:-

Table-1.1

Particular	Working Plan under Revision	Revised Working Plan	Remarks
Geographical Area	883.68 Sqkm	724.83 Sqkm	158.85 Sqkm reduced due to exlusion of Bhalaie Range
Forest Area	489.0074 Sqkm	399.5122 Sqkm	89.4952 Sqkm reduced due to exlusion of Bhalaie Range
Reserved Forest Area	8.9676 Sqkm	8.5196 Sqkm	0.448 Sqkm reduced due to exlusion of Bhalaie Range
DPFs	474.6341 Sqkm	385.5869 Sqkm	89.0472 Sqkm reduced due to exlusion of Bhalaie Range
UPFs	5.4057 Sqkm	540.57 Sqkm	

The area of present division lies between 32° 10' and 32° 45' North longitude and 75° 50' and 76° 15' East longitudes. The area is covered under the survey sheet 52D/2, 52D/3, 52D/4, 43P/14 and 43P/15.

1.2 CONFIGURATION OF THE GROUND

It is a rugged mountainous tract in the mid and outer Himalayas which ultimately mingle with the Shiwaliks towards Punjab and Kangra District. The two prominent ranges in the mid and outer Himalayas traversing the area are Pir Panjal Range and Dhauladhar range respectively. Dhauladhar range marks the watershed between Ravi and Beas River. The elevation of the tract varies between 457m at Kairi and 2967m highest location at Purthijot. The tract is drained by a number of small nalls and khads prominent of which are Brahl khad, Kalm Khad, Dehar khad, Katlu Khad and Hobar Khad which form tributaries to the Beas River and Nanikhad, Kohlari Nala and Devidehra Khad which flow down to the Ravi River. The gradient by and large over the whole tract is steep with of course some precipitous ones encountered mainly in the high reaches and gentle to the lower. Towards the south-west i.e. Shiwaliks the rare gentler slopes are seen, but the loose and fragile geological formations being prone to erosion has resulted into a badly cut up terrains in the area.

1.3 GEOLOGY AND ROCK

The study of rocks in Chamba District was initiated by Mc. Mohan in as early as 1883. But it did not attract much attention till early sixties when the Geological Survey of India took up comprehensive programme of Geological mapping of the whole district. By now Geology of the area is well understood.

1.3.1 Chamba District is underlain by a wide variety of rocks including Sandstones, Conglomerate, Phyllite, Quartzite, Slate, Schist middle Proterozoic to upper Pliocene-pliestocene. Based on the lithostratigraphic succession exposed in the District, there are two groups viz. Shiwalik and Killar (vaikrita group) having the formation like glacial moraines terrace deposits, upper Shiwaliks middle Shiwalik, lower Shiwalik, Dharamshala, Subathu, Kalhel, Salooni, Panjal volcanics, Dalhousie, Dhauladhar/Pangi Granites, Bharmour, Manjeer, Chamba, Pindru, Dharwas, Khokhangahr, Basantpur, Sundernagar and Mandi Darla volcanics.

1.3.2. The different rock formation trend is roughly in NW-SE direction and is exposed as linear belts. An important structural feature of the area is a major syncline with its axis passing through village Kalhel, which has resulted in the repletion of rocks

of the Vaikrita Group and Manjeer, Katorigali, Salooni and Kalhel formations. The Southeastern part of the District is traversed by a number of thrusts which are weak planes. Areas below sach pass and Tikri Khas contain Micaceous Quartazite, Mica-Schists, Slate and Phyllites.

1.3.3 The South Eastern part of the area i.e. the area around Thalel, Morthu, Sihunta and Hathidhar is underlain by an alternating sequence of grey sandstone, red clay and boulder conglomerates (Middle & Upper Shiwalik Form), which further in the North Eastern direction is followed by a lithosequence comprising of purple brick red shales and grayish green to purple sand stone (Dharamshala form). Further in the north in Khairi, Sanjap, Kandei area is exposed a thin belt of green basic volcanic (Mandi Darla Volcanics). Which on its northern limit has detached exposures of white quartzite shale slate litho assemblage (Sundarnagar form) for example south of Baggi at Sansal, Tundi Khas and in Gagar Dhar area. In Thai, Lahad, Sherpur, Dundiara, Bakloh, Chowri khas area is exposed a characteristic interbedded shale-slate-phyllite-siltstone-limestone rock assemblage containing a few thin to thick horizons of black carbonaceous shale phyllite (Basantpur Form) which in turn is followed by a thick interstratified sequence of phyllite, siltstone and subordinate amount of quartzite (Khokhan Form) and (Pindru Form). Then a big stretch of area extending from Dalhousie Khajjiar to a little South of Chamba and through Lam Dal, Nag Dal, upto Singhar Pass is underlain by Granitoids and Granitic Gneisses (Dalhousie/Dhauladhar granite). From near Bhalei to further in the North West these granitoids/gneisses extend as a narrow belt. The area further in north i.e.Salooni-Sundla-Pukhri-Saho-Chamba-Rakh-Manda-Bharmour-Kugti-Kugtigalu-Kalichopass, is underlain by an interstratified phyllite, slate siltstone, subordinate quartzite sequence containing variable minor amount of limestone (Varikrita Group Manjir, Katorigali, (Salooni form). The Kalhel Silaghrat area in particular is dominated by limestone (of Kalhel Form).

1.3.4 Various formations are discussed below:-

1.3.4.1 Mandi-Darla Volcanics: - In Chamba District the volcanics are exposed from Kot to Chowari area. The chief rock types are basalt, diabase, spilites and schistose basic volcanic rocks. Chemically it shows gradation between tholeitic and alkali basalt. The volcanics show schistose and massive characters. These rocks are less resistant to weathering during water action.

1.3.4.2 Basantpur Formation: - It is exposed in Ravi reentrant at khairi to chowari areas. It consists of shale, slate phyllite with platy to massive limestone. The shale is Black, Brown, Grey, Green and Purple. Water may penetrate deep in the shally rocks.

1.3.4.3 Kullu Group:- The Kullu Group includes Gahr and Khokhan formation and comprises streaky banded gneiss, foliated and streaky and marks a sharp topographic break. At places it is interstratified with slates, Green, Phyllite and schists constitute a thick horizon. Being highly foliated rocks water may penetrate along foliation plane leading to leaching and weathering.

1.3.4.4 Chamba Formation:- The lithology of this formation is predominantly characterized by interbedded grey to green matasilt stone, quartzite, slate, phyllite and greywake. In Sangned area this formation is exposed in a series of low plunging anticlines and synclines with fold axes trending in NWSE direction. The slate bears limonitic encrustation due to leaching of ferruginous matter. The schist in general consists of quartz, sericite, biodite and chlorite. Chlorite at places is developed as an altered product of biotite. Because of highly fokiated and jouned rocks, water may penetrate leading to weathering and formation of soil.

1.3.4.5 Manjir Formation: - The formation is exposed in Langera Praun Sangned and Manjir area. It consists of pebbly phyllite conglomerate quartzite and slate The pebbles include grey and white quratzite vein quartz slate shale and grey limestone Owing to more advance stage of deformation the pebbles of slate and shale have been stretchd and flattened.

1.3.5.6 Salooni Formation:- This formation is exposed in Pandhar in Nalwar nalla, Dagili, Swanathith areas of Churah Tehsil. The rocks included are carboinaceous shale, phyllite, Quartzite, Calcareous sand stone and platy limestoe. The basal part immediately overlying the Manjir formation is more argillaceous as compared to upper part. The calcareous carbonaceous shale from Kharan area is composed of quartz, seticite, carbonaceous matter, calcite, muscovite and biotite. The shally and salty rocks with foliation plane and splintery nature, water may pertrate deep leading to macimum weathering resulting in the formation of soil.

1.3.5.7 Panial Volcanics: - These volcanics occur in Khoran, Maklunda. Bhith and Diunr areas. The volcanics form a thick sequenceof massive to bedded lava flows. In general, it is bottle green to dark grey and purple in colour. The volcanic have undergone netamorphism and alteration. It shows feeble foliation and schistose nature at the margins. The chance of weathering is very less.

1.3.5.8 Kalhel Formation: - This formation constitutes the youngest lithostratigraphic unit of the Chamba basin. The rocks of this formation are well exposed at Kalhel, Bhar, Kundi and Shriri and yellow crystalline limestone and dolomite interbedded with dirty

white and grey quartzite. The limestone is mainly siliceous valley Section, the limestone is interstratified with grey calcareous slate and phillite. The limestone is recrystallized and highly brecciated and jointed. The quartzite and massive limestone have less chances of weathering.

1.3.5.9 Dharamshala Formation: - The rocks of this formation are exposed in Ravi reentrant. It consists of purple and brick red shale and siltstone with alternating beds of grayish green and purple sandstone. The upperpart of the Dharamshala formation constitutes predominantly fine to coarse grained micaceous sandstone, green and rare purple shales. Water may penetrate deep in the shale weathering of sandstone of this formation is common.

1.3.5.10 Dalhousie Granite: - The granite principally consists of quartz, plagioclase, feldspar, biotite, muscovite and tourmaline. Water may penetrate through the foliation plane of gneissic rocks. The tract lies in inner western Himalayas and consists of metamorphic rocks mostly micaceous schists and chloritic schists with gneiss, granite, phyllites, slates, shale and quartzite. The rocks of Bhaira, Swera & Kingal basins are mostly micaceous schists and gneiss without crops of slate rock or quartzose shale. Some limestone and conglomerate are met with in Sangri area on western boundary, Upper shale limestones from the summit of Nagtikkar hill. The off-shoots from the main Hasbeshan-Narkanda ridge run south to north and are generally of gneiss and schists.

1.4 SOILS

No specific soil survey of the district has been carried out by the Geological Survey of India, however, following generalizations can be made regarding the possibility of formation of different types of soils. The area underlain by sandstone quartzite and siltstone yields sandy soil while those underlain by a limestone shale lithoassemblage yields a loamy soil. In the southern aspect the soil tends to be shallow and dry with numerous out crops of bare rocks. The soil caps on the Shiwalik hills are primary soils, generally shallow and immature and contain a good proportion of undecomposed mineral grains. They are highly porous and devoid of humus. In the broad valleys of these hills the soils are of alluvial or drift nature comparable with indogangetic alluvium. The northern slopes of Himalayan hills have deep somewhat podsolised soil. In the middle Himalayas, the soils are generally scanty, the southern slopes being often bare of any kind of soil mantle. Mixture of glacial fluviatile and rainwash soils cap the summits and the northern slopes of the mountains above 2000 m limit. Granite and other coarse grained igneous rocks disintegrate rapidly where the amplitude of

diurnal temperature variation is large. Hence granites are weak rocks on the mountain tops. Sandstone has greater resistance but if not tightly bound together in a quartz matrix it may yield rapidly to disintegration. Limestones are mainly composed of Calcium carbonate which is removed in solution and the residual soils are usually shallow and infertile being deficient in phsphorus and potassium. Argillaceous limestones may however yield deep and fertile soils. On steep hilly sides, the effect of topography may lead to differential insolation, precipitation, leaching erosion and deposition, it may be stated that the soil of these forests is fertile and of sufficient depth to support tree growth.

1.5 CLIMATE

The variations whatsoever in the climate are principally due to the altitudinal difference, aspect and disposition in relation to the mountain ranges. The temperate conditions are more prevalent in the higher elevations along the Dhauladhar and pirpanjal Range. Whereas down below towards Shiwaliks the climate is more akin to that of subtropic conditions. The difference in temperature is a result of differential insolation and is most marked between Southern and Northern aspects. Not only is the temperature on Southern aspects higher but the range is also greater. The effect of forest cover however makes the temperature regime more equable. The climates though predominantly temperate, there are well marked seasons. In higher reaches chill of the winter is felt right from November, but the real advent of winter is marked during December when the snowfall is experienced. The still and hibernating life with almost all activities dormant persists during the winter which genuinely extends upto Feburary, but not uncommonly intrudes over the early spring i.e. March as well when the heavy rains threaten to reverse the conditions. April invariably is bright and cool, the peak of spring, when temperature is more comfortable. Gradually it creeps into May and June when mercury is in hike, at times relentlessly particularly in Bakloh and Bhattiyat regions. June end or early July do bring some relief from the heat when the Monsoon which occasionally exhibits its ferocity in the floods and increased soil erosion/slides particularly in the Shiwaliks region. Belatedly the rains now continue even during the early September as well. October and November relatively are cool but pleasant. The monsoon brings a rapid fall in temperature in north which increases progressively as the monsoon penetrates inwards. At sufficiently high altitudes, the drop in temperature may result in precipitation taking the form of snow which accumulates to a depth and lies on the ground for a period depending on the prevailing temperature. Bulk of precipitation in the lower altitudes is received during monsoon rains. During winter the precipitation is in the form of snow in higher elevations

and sends some rain showers down below. Drought occurs during April, May, and June and again during October, November. Prolonged droughts adversely affect the plantations and establishment of young regeneration.

1.6 RAINFALL

The average rainfall in the Dalhousie Forest Division lies between 1800-2500mm. The rainfall data of various rain gauges installed in various locations of Division is analyzed and tabulated for future reference.

Table-1.2

Rain fall Data of Rain gauges installed in Dalhousie Forest Division in mm.

Year	Location	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Total
1994	Mamul	270	484	60	77	128	579	4190	2631	0	6	0	82	5808
1995	Mamul	47	249	78	26	30	132	1016	1240	606	9	50	8	3491
1996	Mamul	201	89	121	21	33	701	710	1087	274	35	0	28	3300
1997	Mamul	115	110	112	153	83	225	670	1135	292	251	240	294	3680
1998	Mamul	0	465	139	218	23	201	788	831	525	168	0	0	3358
1999	Mamul	254	24	30	0	218	214	795	1168	528	0	0	0	3331
2000	Mamul	140	254	126	11	62	279	1065	484	234	0	4	0	2659
2001	Mamul	36	10	105	238	80	352	1293	1078	140	0	29	30	3391
2002	Mamul	76	98	153	49	0	245	441	1200	448	0	0	0	2710
2003	Mamul	60	325	141	17	53	292	893	1174	533	0	35	117	3637
2004	Mamul	48	50	0	40	12	90	311	388	129	57	27	47	1199
2005	Mamul	99	260	287	0	0	96	969	719	388	0	0	0	2818
2006	Mamul	129	64	186	50	34	412	622	828	210	56	59	98	2758
2007	Mamul	0	207	636	0	26	344	974	426	310	0	0	100	3023
2008	Mamul	155	123	0	0	17	561	754	1184	31	33	0	0	2858
2009	Mamul	112	106	23	198	45	22.4	289.5	759.9	164.8	0	267	0	1987.10
2010	Mamul	8.3	134	15.24	6.7	43.04	102	1153	2143	721.3	37	14.4	75	4453.52
2011	Mamul	82.08	33.15	138.0	96	224	294	670	1020	376	13	0	7	2953.23
2012	Mamul	70	23	6	91	6	9	378	279	257	NA	NA	NA	1121
	Total	2020.08	3105.15	2358	1292	1117	5190	17982	19775	6167	665	725	886	61242.7
	Average	112.2	172.51	131	71.7	62.1	288.3	999	1098.6	342.6	39.1	42.6	51.1	3402.47
1995	Surkhigalia	55	2.59	112.5	49.17	66	0	573.4	754.85	248.4	0	62	0	1922.31
1996	Surkhigalia	85	0	135.2	0	0	371	995.4	936.02	136	0	0	31.1	2639.99
1997	Surkhigalia	10.3	10.3	73	256	38	197	554	758	71	288	76	36	2366.61
1998	Surkhigalia	10	363	346	238	55	124	263	217	231	218	0	0	2065
1999	Surkhigalia	251	0	41	0	90	40	185	402	178	0	50	0	1237
2000	Surkhigalia	162	162	45	55	53	354	454	447	160	0	12	0	1931
2001	Surkhigalia	18	27	110	205	109	293	664	463	115	0	34	25	2073
2002	Surkhigalia	60	344	182	116	96	113	163	331	363	0	0	0	1618
2003	Surkhigalia	118	491	160	93	26	137	557	606	519	0	39	136	3074
2004	Surkhigalia	5.15	121	0	197	92	170	453	376	55	166	38	189	2076
2005	Surkhigalia	47	461	339.2	22.6	41.2	27.1	622.3	353.29	190.3	0	0	0	2094.60

2006	Surkhigalla	144	87.1	223.1	0	0	0	356	338	281	0	22	132	1583.61
2007	Surkhigalla	0	264	361	19	80	245	280	233	274	0	0	70	1826
2008	Surkhigalla	194	0	0	117	103	331	394	377	56	43	0	29	1644
2009	Surkhigalla	132	109	94	179.1	69.06	57	180.2	262.2	185.1	44	236	0	1547.8
2010	Surkhigalla	11	156	7.02	20.01	35.01	83	550.2	455.17	152.1	40	25	96	1630.65
2011	Surkhigalla	10	225.19	117.8	94.16	60	196.02	416.05	506.05	177.04	14.03	0	19.01	1835.29
2012	Surkhigalla	118.6	124.9	41.0	133.7	24.1	59.3	141.02	436.03	454.5	0	20.2	51.0	1604.35
	Total	1666.6	2758.1	2381.8	1772.86	1037.4	2801.32	7772.07	8491.6	3846.54	813.03	614.2	814.01	34769.24
	Average	96.2	150	140.1	104.3	61	164.8	457.2	499.5	226.3	47.8	36.1	47.9	2045.2
	Overall Average	104.2	161.3	135.5	88	61.6	226.5	728.1	799.1	263.2	43.4	39.4	49.5	2723.8

1.7 WATER SUPPLY

The Dalhousie Forest Division forms the catchement area of Ravi and Beas river and drains through a numbers of small Khads and Nalas like Brahl khad, Kalm Khad, Dehar khad, Katlu Khad and Hobar Khad which form tributaries to the Beas River and Nanikhad, Kohlari Nala and Devidehra Khad which flow down to the Ravi river. The prerennial nalas and streams are mainly snowfall. There of course is no dearth of small tributaries particularly in the Shiwalik region which get a temporarily refill during the rains when there may even over flow their capacity causing serious erosion. To make the most of this otherwise waste flow of water it needs to be harvested properly so that the ground water is recharged. The denuded spurs due to least resistance lead to maximum runoff during rains. Irrigation facilities in respect of agricultural lands have been enhanced over the period of time.

1.7.1 On Ravi River Chamera hydro Electric Project with an installed capacity of 540 MW has been commissioned. Dam with a height of 129m above river and length of 285m at top have created reservoir full at 760m elevation. The gross storage of full reservoir is 39130 ha. The total catchment area involved is 4725Sqkm. The reservoir of the dam has become a tourist destination with fishing and boating facilities promoting local tourist thereby enhanced livelihood of local youths. The State Government has taken several initiatives to encourage private sector participation in small hydro power development. Himachal Pradesh is among the few States, which has streamlined and is continuously refining the various procedures/processes to minimize the bottlenecks. The process of exploitation of hydel potential in small hydro sector through private sector participation began during 1995-96. Since then, the allotment of project sites has been a continuous process. The various small hydel projects running in the Dalhousie Forest Divion are as under:-

1. Dehar I (Astha) Small hydro electric project on Dehar khad 2MW
2. Drinidhar Small hydro electric project on Brahl khad 5MW

3. Kalam Small hydro electric project on Chakki khad 2MW
4. Ubhara Small hydro electric project on Hobardi khad 2.4MW
5. Dehar II Small hydro electric project on Dehar khad 1.5MW

1.8 DISTRIBUTION AND AREA

The forests do not form a continuous and compact belt. These are scattered and honey-combed with cultivation in private agricultural lands. The area distribution under various legal categories of forests is as under:

Table-1.3

S.No.	Legal Classification of forests	Area in Ha.
1.	Reserve Forests (R.F)	851.96
2.	Demarcated Protected Forests (D.P.F)	38558.69
3.	Un-Demarcated Protected Forests (U.P.F)	540.57
	Total	**39951.22**

The above Forest area of the division is managed under control of 4 territorial Forest Ranges, 15 Forest Blocks, 48 Forest Beats assisted by Two Forest Check Posts.

1.9 STATE OF BOUNDARIES

In case of R.Fs and old DPFs, the boundary pillars are by and large intact. The existing pillars however require immediate attention for repairs and similarly the missing ones should be erected immediately. In case of newly demarcated protected forests, the boundary pillars are not in a satisfactory condition. Due to the neglect of necessary periodic repairs these have been even obliterated at places particularly in the vicinity of habitation. In some remote forest too, the condition is required to be necessary reviewed/ repaired. So far as the maintenance of Boundary registers is concerned, these have been maintained for Bhattiyat, Chowari, Bakloh and Dalhousie ranges. The periodic updating of these registers becomes imperative on account of changing ownerships of lands (Khasra Numbers) which form the location points in description of boundary pillar. The standing orders regarding construction and specifications of boundary pillars is annexured as an **Apppendix-III** at page 48 in Volume-II of the Revised Working Plan.

1.10 LEGAL POSITION

Apart from pre- notified RFs and DPFs, efforts should be made to demarcate and notify the left out UPF's and areas covered under 1952 Notification. It has previously been noticed that

many of the DPF's already notified are not entered into the revenue record, hence should be entered on priority. Forests are classified into three group's i.e RFs, DPFs and UPFs.

1.10.1 Reserve Forests: - Reserve Forests were demarcated and constituted during 1978-81 with simultaneous settlement. Subsequent revalidation was done under the Indian Forest Act by HP administration vide notification No. Ft-43-107/56 dated Shimla 15.03.1957.

1.10.2 Demarcated Protected Forests: - The old DPFs were demarcated and settled during 1912-15. Subsequently, these were declared DPFs vide Chamba Darbar Notification No 80/46 dated 15-06-1946 under section 29 of Indian Forest Act. Consequent upon the merger of the state and formation of HP all the property rights over forest areas have been inherited by HP Government. All forests and wastelands were declared as protected forests by the HP Government vide notification No. Ft-29-241/49 dated 25-02-1952. Subsequently through notification No Ft-774-1/63(M) dated 24-02-1964, these forests were to be demarcated, surveyed and rights determined. Consequent upon this the afoirementioned notifications were issued declaring these forests as DPFs. DPFs so created are yet to be entered in to the revenue record. The matter should be persued by DFO Territorial to get the necessary entries made.

1.10.3 Undemarcated Protected Forests:- UPFs comprise of the contract area which were transferred to the forest deparment under the Land Cealing Act in Bakloh Range and some areas brought under Chir Plantation during past. In view of the vicinity of some forest to the habitation and developmental works exigencies, the redemarcation of some newly demarcated protected forests is under review.

1.10.4 With the changing scenario and realizing the importance of biodiversity and ecology scope of forest has been extended even to the private lands in the state. HP Governement vide notification No. FFE-B-E (3)-31/2001-I dated Shimla 19-02-2011 has extended the definition of forests to the private lands. The abstract of notification are reproduced below:-

In compliance of Interim order dated 12.12.1996 of Hon'ble Apex Court in Writ Petition (C) 202 of 1995 titled- T.N. Godaverman Vs Union of India and others State Government constituted an Expert Committee has decided that 'compact wooded block' above 5 ha which are not recorded as 'forests' in the revenue record shall be treated as 'forests'. Central Empowered Committee constituted by Hon'ble Supreme Court suggested that the definition of 'Forests' as defined by the Sate of H.P. needs further clarification by way of certain definable parameters. Hon'ble Supreme Court has ordered the State of Himachal Pradesh to issue the appropriate notification in this regard. In compliance of the above order of the Hon'ble Apex Court, the definition of Forests is notified by Government of Himachal Pradesh on dated 19/02/2011. The excerpt of notification is reproduced below:-

1. *"If the private area is notified under Indian forest Act, 1927 or other Act or is entered as van/ban/vani/ jungle in the revenue record it will be treated as forest."*
2. *For other type of areas not recorded as indicated in point 1.*

There are two components under this definition:-

Compactness of the area above 5 ha and

Woodiness in this area above 5 ha

a) *Compactness of an area above 5 ha would be an area of private land with itself or in contiguity with other adjacent private khasras only*

b) *Woodiness in this area of above 5 ha would be as defined below:-*

Accordingly, the definition in different agro-climatic zones would be as under:-

i) ***Temperate areas:-*** *These areas consisting of conifer forests of deodar, fir, spruce, kail, and of oaks, rhododendrons and other broad leaved species will be defined as under;-*

"A compact wooded private area of more than five hectares constituted by itself or in contiguity with private khasras of one or more than one land owners and having more than 400 trees of natural origin and not of plantation origin per hectare of Class-III and above in this compact wooded block will constitute a forest."

ii) ***Sub- tropical areas:-*** *These areas consisting of Chil, Khair and other broad leaved forest species will be defined as under:-*

Chil forest:- *The above definition for temperate area will hold good in these forest.*

Khair and other broad leaved species: - *A compact wooded private area of more than five hectares constituted by itself or in contiguity with private khasras of one or more than one land owners and having more than 800 trees of natural origin and not of plantation origin per hectares of less than class III or for a mixed crop (mature and young) the trees being worked out by taking one mature tree equal to two young trees and vice versa in this compact wooded block will constitute a forest".*

1.11 RIGHTS AND CONCESSIONS

Rights in the the reserve forests were settled during 1979-82 and are annexured as **Appendix-IV** at page 51 in Volume-II of the Revised Working Plan. Rights consist of grazing, collection of fire wood, grass cutting, torch wood extraction lopping of oak trees for fodder and right of way etc. In accordance with the forest settlement, one third of the area of any forest burdened with rights can be closed to the exercise of all

such rights and privileges for regeneration purposes. The statement of privileges admitted in old DPFs demarcated and settled during 1912-15 are reproduced in the **Appendix-V** at page 57 in Volume-II of the Revised Working Plan. The rights and concessions allowed in the demarcated protected forests sttled during 1960-70 consist mainly of grazing, timber/firewood collention, wood and agricultural implementrs, Ghrats, Shrubs, fodder, frass, bamboos, fruits, roots, slates, stones right of way etc. the details of rights and concession is given in respective settlement files.

Though the RFs, old DPFs and some remote DPFs still maintain their old entity, but instances are not uncommon in new DPFs where the adverse effect of numerous types of rights has manifested itself clearly in the degradation of growing stock. The main burden has been in the form of T.D. which coupled with other natural calamities has rendered many forests particularly of Chil, to a highly degraded state. Similarly the collection of fuelwood and fodder has done conspicuopus damage to the forests. The relentless lopping has left Ban Oak badly amputated in many forests.

1.11.1 T.D :-The statement showing detail of timber granted to right holders under Timber Distribution scheme for the year 1993-94 to 2012-13 of Dalhousie Forest Division is as under:-

Table- 1.4

Year	Species									
	Deodar		Chil		Fir/Spruce		B /L		Total	
	No.s	Vol. (cum)	No.s	Vol. (cum)	No.s	Vol. (cum)	No.s	Vol. (cum)	No.s	Vol. (cum)
1993-94	77	193.35	835	1470.13	37	146.43	27	42.46	976	1852.37
1994-95	83	211.37	935	1646.2	46	182.05	28	44.04	1092	2083.66
1995-96	181	528.2	1559	2889.68	67	287.86	56	115.52	1863	3821.26
1996-97	306	925.18	1383	2793.22	73	291.51	52	91.31	1814	4101.22
1997-98	249	825.75	1817	3490.53	142	613.67	95	240.83	2303	5170.78
1998-99	236	689.43	903	1633.48	81	365.42	58	142.72	1278	2831.05
1999-2000	316	794.45	967	1667.43	43	202.95	53	139.42	1379	2804.25
2000-01	141	460.35	689	1062.67	57	190.4	28	48.25	915	1761.67
2001-02	218	685.28	1130	1854.2	75	496.31	32	62.08	1455	3097.87
2002-03	362	1067.6	672	1221.34	53	216.05	40	76.27	1127	2581.25
2003-04	259	866.97	455	953.53	94	417.98	29	80.55	837	2319.03
2004-05	185	356.07	553	932.76	73	300.35	16	35.11	827	1624.29
2005-06	139	458.36	562	1324.21	121	508.5	70	190.06	892	2481.13
2006-07	17	61.93	496	1089.2	61	259.46	37	106.82	611	1517.41
2007-08	0	0	0	0	0	0	0	0	0	0
2008-09	0	0	0	0	0	0	0	0	0	0
2009-10	0	0	0	0	0	0	0	0	0	0
2010-11	0	0	0	0	0	0	0	0	0	0
2011-12	0	0	0	0	0	0	0	0	0	0
2012-13	7	14.00	2	4.00	0	0	0	0	0	0
Total	2776	8138.3	12958	24032.58	1023	4478.94	621	1415.4	17369	38047.2

The TD has remained banned in the state during 2007-08 to 2011-12. The state has recen notified H.P. Forest (Timber Distribution to Right Holders) Rules, 2010 for the rationalization grant of timber which is enclosed as **Appendix-VI** at page 68 in Volume-II of the Revi Working Plan. The merits of TD rules 2010 as under:-

1.11.1.1 Merit of these rules over previous provisions of T.D. in various settlements

The advantage these rules have provision for grant of TD under various settlements are as unde

1. These Rules of TD have been integrated and unified for whole of the state.
2. Timber will be available in converted form and near to the place of residence of the peo helping them in saving precious time and money during this schedule.
3. The rules are forest centered as well as right holder centered based on the guiding principles HP Forest Settlement Rules, 1965 as indicated in point 3 which will help in conservation forests and so also catering to the demand of TD to the present and future generations.
4. The periodicity and quantity has been made based on optional requirement so that for remains and TD continues to be given in perpetuity.
5. Priority has been given to poor and needy (BPL) followed by other people who need wood in TD
6. A detailed procedure for grant is enshrined in the Rules itself which is time scheduled for the yea
7. People have been empowered as the application for needy will start from the Gram Sabha.
8. The right holder now has to simply give application duly authenticated by the Gram Sabha the Panchyat to the FG which will pass through the various Chanels of the Forest Deptt. and t applicants would get their converted TD at the earmarked depots between September December.

1.12 THE FOREST (CONSERVATION) ACT, 1980

In the year 1980 a new Act was promulgated which has made it mandatory to seek permission of the Central Government for diverting any forest land for non forestry purpose. During 1980-1981 to 2012-2013, total 377.0772 hac. have been diverted under the provisions of the Forest (Conservation) Act, 1980 and the details of the cases is as per **Appendix-VII** at page 72 in Volume-II of the Revised Working Plan.

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CHAPTER II

FLORA AND FAUNA

CHAPTER II A
Forest Flora

2A.1 OCCURENCE AND DISTRUBUTION OF FLORA

Though altitudinal variation has a substantial bearing upon the occurrence and distribution of flora, the edapho-climatic factors too play a significant role in delimiting the various vegetal/ arboreal groups. List of Forest Flora existing in this division is attached as per **Appendix-XXVI** at page 220 in Volume-II of Revised Working Plan. A few important species are discussed below with their specific domains vis-à-vis the factors interacting with them.

2A.1.1 Deodar:- Owing to its tremendous commercial value both as constructional timber and an eye soother to tourists deodar occupies prime position in the whole group of different species found in the tract. It occurs at elevations varying from 1600 m to 220 m, where it tends to be pure in composition. Towards lower elevations it occurs mixed with Ban Oak e.g. in Langha D.P.F whereas in the upper zone it is found mixed with Spruce. Deodar is also being introduced artificially in the zone of Ban Oak forests such as Malunda D.P.F of Chowari. It is also found mixed with Chil on one hand and spruce on the other. This can be said to depict the transitional zone as is in case of Kumarehi and Bhatoon forests of Chowari Range.

2A.1.2 Kail: - It is an equally important timber species. There is no significant representation of kail in the area covered under the plan. However there may be some rare singletons/groups in some forests e.g. Sarni of Dalhousie Range.

2A.1.3 Fir: - It has been a feeder to the packing cases and paper industry, though belatedly due to more conservation measures, it has escaped the wrath of axe. The specie occurs generally mixed with spruce at elevations ranging from 2200m to 2900m on northern aspects. It also extends into Kharsu zone upto 3300m and is present generally in depressions. So far as its natural regeneration is concerned particularly in Lower Chakki, Upper Chakki and Gharanu beats, it is far from satisfactory. It is generally being ousted by the Spruce regeneration which has more adaptations to the edapho-climatic factors. This regeneration problem is unlikely to halt since the Fir trees whatsoever present are invariably with tops dry and are incapable of being potential seed bearers.

2A.1.4 Spruce:- Its timber can be equated with that of Fir. Spruce generally occurs mixed with Fir but also forms pure forests and intrudes in Deodar forests also. It is usually present in association with Kharsoo Oak. Such Spruce forests are met in the Kainthly, Lower Chakki, Upper Chakki and Gharanu beats on all aspects. Due to its more adaptability the regeneration can be seen in plenty wherever the Canopy is adequately open.

2A.1.5 Chil:- This occupies the elevations ranging from 900m to 1800m and is mainly utilized as timber in addition to the resin extraction. Bhattiyat, Chowari, Bakloh, and Dalhousie Ranges have the major chunk of area under the coverage of this species. Chir pine which is remarkably indifferent to soil is found on an extremely wide range of rocks,, but in hills topography, adequate drainage is the chief essential for this species. Maximum area is occupied by the upper or stable type of Chil occurring between 1050m to 1700m. By and large, Chil (Pinus roxburghii) forms a pure crop. Exceptional fire resistance largely accounts for the purity of chir Pine forests and their occurrence in areas where otherwise adequate protection can bring up Oak, Deodar etc. classes are more in proportion, the dispersion of mature trees being deficient. Inspite of inimical factors of fire in young stage, grazing, needle collection etc, natural regeneration of this species is prolific almost everywhere, Except for the reserve forests and old demarcated forests of Dalhousie, Bhattiyat, Chowari and Bakloh ranges where canopy is fairly close, Chil occurs scattered in open crop elsewhere in all the newly demarcated protected forests. Due to indiscriminate lopping the trees are stunted and stagheaded particularly near habitations. The usual associates of Chil are *Quercus incana, Pieris Ovalifolia, Pyrus pashia, Mallotus phillipinensis Albizzia, Pistacia integerimma and Rhododendron arboretum. The principal shrubs are olea cuspidata, Carissa spinarum, Beerberis aristata, Dodonaea viscose, Woodfordia floribunda, Plectranthus rugosus, Colebrookia oppositifolia, Rubus ellipticus, Prinsepia utilis*, ans climbers like *Bauhinia Vahlii, Symplocos crataegoides and Rosa moschata.* The incidence of shrubs is however, light or even nonexistent in most of the pure Chil Forests.

Towards the upper altitudinal limit, Quercus incana which comes up naturally and spontaneously replaces Chil on moist and cool situations. The resin yield of these areas has been found to be very low due to cool conditions. Hence such forests may be exploited for the purpose of timber production only, as due to non exploitation of these forests for resin, quality of timber may be of high value. Instances are found in Surkhigalla and Banikhet reserves of Dalhousie Range, Bhatoon DPF, and Kalam DPF of Chowari Range. In other localities where aspect is northern and soil fairly deep, deodar replaces Chil. The examples of latter category are Drada, Naguin and Chahla DPFs and Surkhigalla and Banikhet RFs.

There are few Chil forests e.g. Manmasi, Bhadwan C4 of Bhattiyat Range, where either due to wind damage on account of faulty resin tapping in the past or heavy T.D. burden, the growing stock has degenerated to such an extent as leading to erosion and exhaustion of soil. Similarly there are some forests which show a tendency to develop into more of mixed broad leaved forests e.g. Rauni No. 1st of Bakloh Range and Kohlan Bhatti C.1 and Turiara No 1st of Bhattiyat Range.

2A.1.6 Ban/ Oak :- It is highly valued for its fuel, fodder and other uses such as agricultural implements. But unfortunately due to over exploitation on account of its multifarious utility, good Ban forests are now confined to the remote areas only e.g. Banud, Bankot of Chowari Range and Dhurisandhar of Bakloh Range which have escaped the indiscriminate lopping. Otherwise near the habitation these are generally in a pitiable condition due to the relentless lopping for fodder etc. thus leading to retrogression in the process of natural regeneration. In forests, it occurs pure as well as mixed with other species. Pure forests are met between elevations of 1000 m to 2400m.

2A.1.7 Kharsu/Mohru Oak :- These are also important from fuel and fodder point of view. Generally found mixed with other species very rarely, found in pure form. These are present on Northern aspects extending in elevation from 1200m. Representative forests e.g. Tressar Dhar, Jaliata Dhar, Gajour Dhar with an association of Spruce and Fir are in the Chakki and Gharanu belt of Chowari and Bhattiyat Ranges respectively.

2A.1.8 Other Broad Leaved Species:- There are lots of other broad leaved species which are found in association with aforementioned commercially important species. These broad leaved species find varied uses right from fuelwood upto sports, furniture, katha and other industries. The important ones in the lower elevations are Khair, Rhododendron, Shisham, Albizzia, Grewia etc. and the higher we go it is Ash, Maple, Chirindi, Walnut, Piak, Pistacia etc. Pansara (*Wendlandia exserta*) an equivalent of Piak is a very significant soil binder and pioneer species in fragile lower shiwalik areas. It generally colonizes on fresh landslips and comes up Shisham are important for Katha and furniture respectively. There are no pure stands of these but are found in mixture forming local consociations in the lower portions of the area covered under the plan. Albizzia and Grewia are of immense utility as fodder and for rope making predominantly growing in private lands. Walnut, Poplar and Aesculus though rare are also present in some forests of higher elevations mixed with coniferous species of deodar, fir and spruce.. Pistacea, a species known for its medicinal value likes hot places and is present on species of the tract is good for fuel. Kainth *Pyrus pashia*, a robust species is

good for fuel and agricultural implements. It also provides as stock for Nashpati grafting. The species occurs on both cold as well as warm aspects.

2A.2 COMPOSITION AND CONDITION OF THE CROP

There is a pronounced variation in the crop composition as we move from Shiwaliks upwards. In this altitudinal zonation we come across scrub forests, rarely comprising mixture of Khair, Shisham and other broad leaved species in the lower parts of Bhattiyat, Chowari, Bakloh, Dalhousie and Bhalai ranges, particularly on the Southern hotter aspects followed by Chil forests. As we move higher Chil gives way to Ban Oak which is the fore runner to Deodar and then Fir/Spruce which are more prominent on the colder aspects. The zonation culminates into Kharsu & than the sub alpine pastures.

2A.2.1 Different forest types found in the tract covered under this plan according to. A revised Survey of forest types of India by Champion and Seth are briefly discussed below:-

2A.2.1.1 Type 9/Cib Upper Or Himalayan Chil Pine Forests:- This type covering an area of about 12000ha has a major representation in Bhattiyat, Chowari, Bakloh and Dalhousie. The elevation ranges 1050m to 1675m. annual rainfall averages at 1800-3000mm. though there are some good forests of Chil but the overall quality is III having an average density of 0.5 with an average height of 23m. with adequate protection, the species regenerates naturally, profusely and easily anywhere in its ecological zone. Towards its upper altitudinal limit, *Quercus incana* which comes up naturally and spontaneously replace Chil on moist and cool situations. Instances are found in Surkhigalla and Banikhet reserves of Dalhousie Range, and Bhatoon DPF, Kalam D.P.F. of Chowari Range. In other localities where aspect is northern and soil fairly deep, deodar replaces Chil. The examples of latter category are Drada, Naghuin and Chahla DPFs and Sukhigalla and Banikhet RFs of Dalhousie Range. Characteristic feature of Chil is its tendency to form pure crops with rarely any other tree reaching the top canopy. Such purity can be noticed in some RFs and old DPFs of Bhattiyat, Chowari, Bakloh and Dalhousie ranges. In some forests, however, like Bheora, Bali, Adhwar, Turiara, Kohlan Bhatti of Bhattiyat edapho-climatic factors, a shift to the development of mixed broad leaved forests is noticed. In damp localities *Pieris ovalifolia Rhododendron arboretum* are the prominent associates. Ban Oak shares more towards higher elevations. Among other trees found are *Mallotus phillipenensis Albizzia stipulata, Grewia oppositifolia, Cedrella tona, Pyrus Pashia, Lannea grandis* etc. most common undergrowth comprises *Berberis aristata, Dodonaea viscosa, Woodfordia floribunda, Colebrookia oppositifolia, Rubus elllipticus, Prinsepia utilis, Plactranthus rugosus, Bauhinia Vahlii* the common climber and *Rosa moschata* etc.

2A.2.1.2 9/C1/Ds1 Himalayan Sub Tropical Scrubs:- At places in the zone of Himalayan Chir pine forests the tree cover is unable to come up either due to dry/shallow soil or excessive grazing pressure. In such places bushy scrub formations consisting of *Dodonea viscosa, Woodfordia floribunda, Lantana camara, Colebrookia oppositifolia* etc. are there.

2A.2.1.3 9/C1/Ds2 Sub Tropical Euphorbia Scrub:- Here Euphorbia (Thor) forms consociations, in the Himalayan Chir Pine zone. Limited area of this division is represented by this type.

2A.2.1.4 10/C1a Olea Ferruginea Scrub Forests:- It occurs at elevations ranging from 800m – 1400m. Annual rainfall averages to 1250 mm. *Olea ferruginea* (Kahu) in admixture with other broad leaved species is distributed in the tract mainly on the left bank of Ravi river in Chaned block of Dalhousie range and some portions in Bhattiyat, Chowari ranges and also on the right bank of Siul river. Other associates *are Pistacia integerrima. Dalbergia sissoo, Albizzia, Cedrella toona, Lannea grandis* etc.

2A.2.1.5 12/C2a Ban/ Oak Forests:-Ban/ Oak confines to the elevations are ranging from 1500m- 2000m. Where the annual precipitation varies from 1600m – 2500m. and winter snow fall is almost a regular feature. Because of its high utility as fodder, fuelwood and for agricultural implements, it occupies a unique position in the fabric of agricultural economy in this tract. Unfortunately the biotic interference over the area has always been of an increasingly high order which has resulted in the retrogression of this climax species. This can be seen in the vicinity of habitation where these trees face a ruthless lopping thus rendering the natural regeneration & propagation impossible. Many areas have simply dwarfish bushes of this important Oak due to indiscriminate lopping and browsing. There however are some good forests of ban Oak in Gharani, Lower Chakki, Upper Chakki and Chowari beats. These forests have escaped the wrath of biotic factors and consist of typical large, low branching, wide crowned trees. Natural regeneration in these forests is fairly good. The two chief associates of ban Oak, usually occurring below the main canopy are *Rhododendron arboretum* and *Pieris ovalifolia* both of which are unpalatable and have an equally bad calorific value as fuel. In damp situations intermingled are *Litsea umprosa, Machillus Spp. Eunonymus fimbriatus* etc. forming considerable part of the leaf canopy. Scattered trees of *Thes semialata, Symplocos crataegoides, Pyrus pashia* and groups of *Ilex dipyrena* are also found. There is generally a food deal of *Myrsina affricana, Rubus ellipricus, desmodium tiliaefolium, Indigofera sp, Rubus niveus, duetizia corymbosa, Berberis lyceum and Lonicera quinquelocularis* among climbers Vitis sp. And Loranthus are the most common.

2A.2.1.6 12/C1c Moist Deodar Forests:- This important type comes up in the altitudinal range of 1100 m – 2200m. Annual rainfall varies from 1250 m to 2250m most of which is received in the rainy season. But precipitation in the form of snow of snow during winter is considerable and important as well. Except for the regenerated areas where younger classes are more; otherwise there is more proportion of II and III class trees. The top canopy consists of nearly pure Deodar in its middle zone of altitudinal limits. But lower down Deodar occurs mixed with *Quercus incana.* In the upper zone, Deodar grows mixed with *Picea morinda* mainly and some *Abies pindrow.* The deciduous associates found especially in depressions are *Quercus dilatata, Litsea umbrosa, Celtis australis, Cedrella serratata, Populus ciliata, Carpinus faginea, Ulmus villosa, Cornus macrophylla, Prunus padus* etc. in damp *declivities Ulmus wallichiana, Juglans regia and Aesculus indica* are met with undergrowth just scanty. The most frequently distributed species in the undergrowth are *Viburnum Contininfolium, Indigofera species, Desmodium tiliaefolium Rubus ellipticus. Fragaria vesca, Lonicera quinquelocularis Berberis lyceum, Viola canescens, Artemisia vulgaris, Valeriana species, Jasminum officinale, Clematis Montana, Ainsliaea aptera, Galium asprifolium and Salvia glutinosa, Rosa moschata and Hedera helix* are commonly found.

At places such as Dadra RF and Naghuin DPFs Deodar extends below its natural altitudinal zone of occurance into Chil forests. This formation is characterized by pure and compact groups of poor quality and low crowned stands of deodar undergrowth are scanty. Chil is the common associate especially on warmer aspects.

2A.2.1.7 12/C 1d Western Mixed Coniferous Forests:- At elevations from 200 To 3500m. There are mixed coniferous forests mainly of Silver Fir and Spruce with some occasional admixture of Kail and Deodar. Pure Fir of Spruce forests are very nominal. Generally it is Silver Fir/Spruce combination. In depressions, Fir constitutes more proportion alongwith other broad leaved species whereas Spruce is more on gently/moderate slopes with fairly good exposure. Deodar is spurs and ridges. The sub type generally extends upto Kharsu zone e.g. in forests of Gharanu and Chakki beats. Regeneration of Spruce is seen quit profuse e.g. in Dhamdu forst of Chakki beat, whereas that of Fir is lagging behind and the old over mature Fir trees also are seen to be in their twilight age having dead tops. This situation is seen in the Gharanu and Chakki region. Associated with Fir/Spruce and frequently forming considerable bits of deciduous forests in depressions and nallas are the *Aesculus indica, Juglans regia, Acer sp. Celtis australis, Prunus padus, ulmus wallichiana, Fraxinus florinunda and Morus serrata.* The understory is generally absent. Bushy undergrowth of practically the same species as found in the Deodar type comes in and grows in varying

mixture and density depending upon the aspect, altitude, drainage, overhead light and mixture of species in the canopy.

2A.2.1.8 12/C1/Ds1 Oak Scrub:- Owing to heavy biotic interference many Ban Oak forests in particular have been reduced to mere scrub formation. The dwarfish stunted growth of oaks, attributed to heavy grazing indiscriminate lopping. Other inedible species like *Pieris ovalifolia, Rhododendron* etc. also come up in abundance.

2A.2.1.9 12/C1/Ds2 Himalayan Temperate Secondary Scrub:- In the elevation of 1000m – 2800m particularly on Southern aspects the tree cover is unable to develop due to dry conditions and shallow soil. Excessive grazing on these aspects due to concentrated habitation also impeded tree cover. Shrubs of *Berberis, Indigofera, Rosa* etc. are commonly found alongwith a few scattered trees of *Pyrus pashia* etc. But biotic interference if reduced can lead to the process of developing some vegetal cover.

2A.2.1.10 12/C2a Kharsu Oak Forests:- Beyond the domain of silver Fir and Spruce, there are Kharsu forests which quite often are found mixed with Fir Spruce particularly in depressions and on Northern aspects. The elevation ranges from 2700m – 3500m. with their characteristic brown tinged foliage, the Kharsu trees are generally festooned with mosses. As the elevation increases, the forests are interspersed with grass glades. The Coniferous trees gradually loose their grandeur and finally vanish giving room to the *Rhododendron campanulatum* and dwarf Junupers. With increase in elevation Junipers (*Junipers recurva*) is the only one that offers some resistance to the climatic vagaries and is left as black specks on some extensive grassy glades.

2A.2.1.11 12/Ds3 Himalayan Temperate Pasture:- Such portions are particularly near halting grounds of Gujjars. At places tree cover is unable to establish due to shallow soil and only grasses cover the area. Such lands are reduced to pasture status. They are found at elevations ranging from 1500m -3100m on all aspects.

2A.2.1.12 14/Ds1/ Sub Alpine Pastures:- In sub alpine zone, at places where tree cover cannot exist due to shallow soil or snow action, grasses/shrubs take possession of ground. Many important medicinal herbs are found here like Banafsha, Ban-Kakru, Mushkballa, Kuth etc.

2A.3 GENERAL DESCRIPTION OF THE GROWING STOCK

In the Chil zone i.e from the elevation 1050m to 1675m in the Bhattiyat Range, Chowari, Bakloh and Dalhousie Ranges, there are some good density forests particularly the RFs and old DPFs e.g. Talai, Mamul, Surkhigala etc. Picture is however not bright so far as the new DPFs are concerned. This difference is attributed to the exercise of rights which have

certainly been a heavy burden on the new DPFs as compared to the former. Also the faulty and heavy resin tapping with subsequent fire and wind damage lead the majority of forests to a state of degraded quality, low density, poor and exhausted soil. Typical examples are Manmassi, Padwal, Gudhal forests of Bhattiyat Range. This however appears to be duly compensated by the artificial plantations and rearing some natural regeneration to a stage where the growing stock of Chir can be said to have restored the lost richness. Plantations worth mentioning are many some of which are like Saned, Ralglota in Bhattiyat, Makolsu, Trimuth, Bounda in Chowari Range. Some Chil forests which must have of good density in the past have given way to more mixed type of composition probably due to excessive grazing, moist locations etc. e.g. in the forests like Rouni, Turiada etc of Bhattiyat Range. The growing stock is predominantly that of younger diameter classes and the overall density is about 0.50.

So far as Deodar is concerned there are limited forests in the area covered under persent Working Plan. Prominent among these are the Kainthly RF in Chowari Range and Dadra RF in Dalhousie Range. The overall position of the growing stock can be stated to be satisfactory particularly in Kainthly RF.

Steep precipitous portions along Nalas are devoid of trees growth because of snow action. Higher elevations support Kharsu/Alpine pastures. The Fir/Spruce, Kharsu forests have a relatively better growing stock/ha. Due to the bigger dia classes being proportionately more. Fir in the forests of Gharanu and Chakki beat unluckily carries dead top on mature trees which is not uncommon.

2A.3.1 Growth:- Deodar trees of dia classes upto IIB are more in proportion. It usually reaches a height of 30-35m. In case of Fir/spruce bigger dia classes are common in the forests. Chil is invariably of quality III. The bigger dia classes are rarely found, Vth to IIIrd dia classes being more common average height goes upto 23m. It is exceptionally so in the Nehar Nal and Bachaan Nal of Priungal. Per hectare growing stock is also less due to large scale salvage marking on account of fire and wind damage. The younger classes are rather predominant.

2A.3.2 Natural Regeneration:- Deodar and Chil if given protection against grazing and proper manipulation of canopy, regenerates satisfactorily. Solitary example of good regeneration of Deodar is Kainthly RF compartment No 2. Similarly Chil regenerates profusely when given proper exposure and protection against biotic interferences, grazing and fire damage in particular. Its regeneration in the most favourite altitudinal zone can be seen in the forests like Talai DPF, Kakroti DPF, Phagot DPF, Bara RF, Mamul RF, Surkhigala RF

etc. Fir regeneration appears to be a bit of problem to reckon with, but spruce comes up well in its zone and occupies open space comfortably as is seen in Dhampu Forest of Chowari Range. Among the important broad leaved species, Ban / oak finds it difficult to cope up with the impediments against regeneration particularly near the habitations. Some remote Ban oak forests however have the liberty to regenerate to their capacity. In lower elevations Khair, Shisham have to be supplemented by artificial planting.

In silvicultural practice particularly in such work as natural regeneration local failure is often primarily due to purely local unfavourable climatic conditions involving excessive insulation, frost etc. and other limiting factors like edaphic and biotic. In view of the increasing erosion menace *Pansara* would go a long way to form one of the best stabilizers. Its nursery technique however requires to be perfected. *Chirndi* in moist locations comes up in a prolific way.

2A.3.3 Normalcy:- In the tract dealt with under this plan, Chil is the major species that covers the maximum forest area and requires to be managed in a way so as to attain normal forests within a reasonable period keeping in view 60cm dbh as the exploitable diameter. The status of different dia classes distribution at this point of time shows that there is predominance of younger dia classes whereas the higher dia classes have a very nominal representation. Thus the forests are nowhere close to normalcy. On the contrary in case of Deodar, Fir/Spruce, though the area under theres is limited, the different dia class distribution is more or less near normalcy.

2A.3.4 Succession:- The community for the vegetation which finaly attains apparent stability on a site may be assured to be adopted to maximum sustained utilization of the environmental resources in the biological productivity. Climax is then interpreted as a partially stabilized steady state adapted to the whole pattern of environmental factors in which it exists. In the tract there are some locations which depict different successional stages and also help in anticipating the likely course of succession in the future. It is mainly the divergences in the later stage of succession due damage in moisture conditions, depth of the soil, soil texture, climate, and biotic influences etc. which very rare sites depicting the ideal primary succession. In the low lying area of Bhattiyat, Chowari and Bakloh Range the sites are invariably unfavorable due to the low available moisture supplies, refractory soil, and carry a type which is more xerophytic than corresponds to the general climate and can be denoted as a preclimax, peculiar features being Chirpine on ridges in broad leaved forests. There are some rare situations of post climax where cooler and moister conditions support a

more mesophytic type of vegetation. In the higher elevation Chil Forest on dry sites is often a stable subclimax to an oak climatic climax.

Riverine subclimax are also in Morthu side and the lower areas of Bakloh Range were due to any damage reducing the trees canopy increases grass growth and establishment o0f second stage species become increasingly difficult. The original colonizers like Khai, Shisham gradually die out and only a scattered growth of these hardy species is left. There are some examples of Ban oak forest showing retrogressional process like Banuni, Malunda etc, where biotic influences notably excessive grazing, lopping for fodder green manure or fuel etc. are operative. The destruction is often selective being concentrated on the Ban species most valued for several purposes. This often would lead to the virtual elimination of the desirable species like *Quercus incana* and persistence of unpalatable less fuel value trees like *Rhododendron, Pieris ovalifolia.*

Spruce is a colonizer of grassy/shrubby area in Kharsu/Mohru oak zone. Spruce regeneration is noted on all aspects but generally warmer and moderate slopes stand a better chance e.g. inh Dhadu forest of Chowari Range. Fir generally avoids Southern aspect and exists alongwith Spruce in some depressions and moist sites.

2A.4 INJURIES TO WHICH THE CROP IS LIABLE

The main agencies causing injuries to the forest crop during its various stages of growth can be classified into following sub heads:-

(a) Due to natural causes.

(b) Incidental to man.

(c) Wild animals and insects.

(d) Climbers and Weeds.

2A.4.1 Natural Causes:-

2A.4.1.1 Drought: - This is most dreaded of all the unfavorable factors. The pre-monsoon and post- monsoon drought period play an important role in the success of natural as well as artificial regeneration. The variation in annual rainfall influences the growth and development of forest species. Manus in bamboo clumps do not appear well if the monsoons are delayed. The pre-mansoon drought leads to forest fires. In years of severe drought groups of trees on thin soil, spurs, ridges and scattered individual trees have dried up. The mortality is not confined to old and resin tapped trees but pole and untapped trees have also died; This is believed to be due to steady desication which is proceeding in this tract. The heavy incidence of grazing and grass cutting aggravate bad effects of drought.

2A.4.1.2 Frost:- The frost is common in the subtropical area and cause severe damage to the young seedlings of khair, bamboos and even tender germination.

2A.4.1.3 Erosion :- The destruction of forests from excessive grazing, browsing and repeated forest fires and intense lopping has caused and continues to cause, erosion and denudation to an extent which seriously threatens the welfare of an overwhelmingly agricultural tract. The denudation of soil of once thickly forested area is being rapidly carried away and the hill sides are reduced to barren, stony wastes unless to both man and cattle. Old perennial streams are dry except during the monsoons when they become raging torrents. At the worst effected places *Carissa spinarum* has been replaced by its mixture with *Dodonaea viscosa* and Lantana or by a pure crop of the latter. On gravel sand stone and gravel loam formation erosion takes two different forms as soon as the vegetation is removed to permit the rainfall to impinge directly on the ground.

a) On the gravel sand stone (which includes pebby sand stone) heavy falls of soil occur at the heads of the nalas and rain water cuts deeper and deeper channels in the friable sand stone. The various stages of 'ravine and block' formations are met with in Mail, Tunuhatti and Katori beats.

b) On gravel loam areas landslips are frequent. The upper slopes of the water course are precipitous while lower down falling debris goes on accumulating and being washed away. The channel bed is broader than in (a) and is characterized by a rapid fall in its gradient and by being covered with quartizite stone and boulders.

On both these formations, erosion is for advances, the ridges are generally knife edged while their slopes are deeply cut by small nalas with precipitous sides, the entire slope being an alternating series of a depression and knife edged ridge.

2A.4.1.4 Wind:- Wind storms cause considerable damage to the standing trees particularly badly tapped chil trees and to roadside trees which are uprooted. The damage to chil trees has become a regular feature.

2A.4.1.5 Fire :- Fires cause maximum damage to the forest wealth. The forest fires are generally caused by men to get maximum fodder and grass for their cattle. In major part of the tract, with its low and rugged hills and the low crowns of the chil together with the dense undergrowth on which are suspended the dry and fallen needles, the damage is invariably great, the fire often developing into a crown fire and resulting in the death of large number of trees. The erosion in the fire burnt areas is so accelerated that wherever the soil has been washed or the rock exposed, the immediate cause has been found to be fire. Incendiarism encourages the recession and eradication of chil and stimulates the propagation of scrub. The

fires have also caused serious damage to scrub where *lantana camara* is spreading. Fire kills young poles and wipes out seedlings and saplings. These destroy the microflora fauna and thus impede soil forming processes. The chief predisposing causes of forest fires are drought, accumulation of pine needles, thick brush wood growth abundance of dry grass and felling debris. In majority of the cases, the fires are results of neglect of farmers burning their ghasnis and the passengers who throw the lighted cigarette ends. Sometimes the fires are vindictive in origin; at other times fires are lighted to drive out pigs from the forests with dense undergrowth. The fires have now become as annual feature. Fires effect fertilization and seed production to a considerable extent. An early summer fire interferes with fertilization of cones and thus reduces seed production while a late summer fire burns seed of the year and either kills or reduces the germination power of seed in the cones of succeeding years. Too close resin channels are another aggravating cause for the death of trees by burning of cambium all round the trees. The Forest fire rules in the state of HP are annexured as an **Appendix-VIII** at page 76 in Volume-II of the Revised Working Plan. for ready reference.

The incidences of forest fire in Dalhousie Forest Division during 1993-94 to 2012-13 are tabulated below:-

Table- 2A.1

Area affected during 1993-94 to 2012-13 due to fire in Dalhousie Forest Division						
Year	**Name of Range with area affected in Ha.**				**Total**	**Est Loss**
	Bhattiyat	**Chowari**	**Bakloh**	**Dalhousie**		
1993-94	*45.00*	*249.45*	*157.50*	*61.60*	513.55	0
1994-95	*6.00*	*35.00*	*137.00*	*0.00*	178.00	0
1995-96	*432.00*	*1514.78*	*399.50*	*712.26*	3058.54	0
1996-97	*0.00*	*0.00*	*37.50*	*0.00*	37.50	0
1997-98	*0.00*	*0.00*	*0.00*	*0.00*	0.00	0
1998-99	*9.00*	*25.00*	*20.00*	*8.00*	62.00	0
1999-2000	*116.00*	*156.00*	*574.25*	*38.98*	885.23	0
2000-01	*27.00*	*5.00*	*44.50*	*9.00*	85.50	0
2001-02	*0.00*	*0.00*	*0.00*	*0.00*	0.00	0
2002-03	*211.27*	*1096.01*	*331.00*	*546.00*	2184.28	0
2003-04	*0.00*	*49.00*	*48.00*	*14.00*	111.00	0

2004-05	19.00	0.00	0.00	6.00	25.00	0
2005-06	5.00	0.00	37.00	0.00	42.00	0
2006-07	0.00	15.00	5.00	24.50	44.50	0
2007-08	101.00	0.00	64.50	880.73	1046.23	0
2008-09	612.05	0.00	8.50	0.00	620.55	0
2009-10	0.00	0.00	87.19	4.00	91.19	0
2010-11	0.00	0.00	13.50	65.10	78.60	0
2011-12	0.00	0.00	0.00	8.25	8.25	0
2012-13	91.60	195.96	182.49	393.40	863.45	6,05,399

2A.4.1.6 Snow: Snow damage occurs chiefly at higher altitudes but exceptional heavy snowfall at low elevations also does considerable damage. The congested *Chir* crop is more susceptible to snow damage and many trees are uprooted, while several others are top broken, un-thinned deodar plantations also suffer heavily from snow break.

2A.4.1.7 Hail and storms: Hail and storms during summers do not do any appreciable damage in the forests. Strong winds after heavy snow or rain results in uprooting of large number of trees in these forests every year. Hail storms 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.

2A.4.1.8 Lightening: The damage due to lightening is not appreciable but solitary trees are sometime killed. In some cases the trees are not killed, top is broken and the bole splits up.

2A.4.2 Man induced causes:-

2A.4.2.1 Grass Cutting: - Careless grass cutting in Chil and Bamboo areas is most harmful. It has been one of the most important causes of general deficiencies of Chil regeneration in the reserves of this Division. The seedlings are cut in the process and also the ravages by monkeys and peacocks stimulated. Simultaneously young bamboos are also cut for fodder and ropes.

2A.4.2.2 Lopping: - This damage is mostly restricted to the vicinity of villages. Rules regulating the exercise of these rights are adequate, but enforcement generally lacks. Lopping in scrub forests is very heavy during winter and is chiefly done by gaddis. The broad leaved species lopped are Ban oak, *Bauhinia variegata, Bambax ceiba, Acacia catechu, Albizzia lebbek*, chil is lopped to a certain extent in undermarcated protected and unclassed forests.

The lopping leads to opening up of the canopy and exposure and degradation of soil and poor growth of the crop.

2A.4.2.3 Grazing and Browsing: - Unrestricted grazing by an excessive number of cattle, sheep and goats belonging to both the local people and gaddis has changed the very complexion of natural vegetation in the entire tract. The damage has caused the elimination of economic species and their replacement by weeds like *Carissa spinarum, Adhatoda Vasica, Lantana Camara* and lowering the moisture content of the soil, thus making the raising of climax type of vegetation difficult. It has prevented and continues to prevent any bamboo or valuable hard wood seedling reproduction on the cattle devours the few seedlings that appear during the closure in the rains. The bamboo clumps have deteriorated in quality and fail to produce large size culms. The congestion on the clumps sets in more rapidly as the new shoots are not produced at the periphery and the clump are choked with dry material.

2A.4.3 Wild animals, Insects:-

2A.4.3.1 Wild Animal:- Wild boar, Ghoral, porcupines, Monkeys and Langurs eat and damage young coppice shoots, germinating seeds and seedlings. Parrots, pheasants, rodents and squirrels eat a large quantity of seeds.

2A.4.3.2 Insects:- Only sporadic insect damage has been noticed in this division. *Ectropis deodarae* sometimes does appreciable damage to deodar. *Euzophere cedrella* attacks deodar poles and cause damage in the nurseries by cutting the seedlings at the ground level *Platypus biformis*, the shoot hole 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. *Ips longifolia* bores kail poles and makes irregular galleries which may result in snapping of these poles in case of sever attack. The area is infested with white ants. It causes severe damage in plantations, and attacks the new growing shoots. Insects attack on living trees is not common. But dead and fallan trees of Chir are attacked by shoot and pine hole borer (*Colytus monor*). Cut worm, Cock chaffers are the chief destroyers of nursery seeds and seedlings.

2A.4.3.3 Fungi:-

(i) *Trametes pinii*: This causes significant damage to kail in this division. The fungus causes decay mainly in the heart wood. The heart wood is stained light pink or brown or reddish, due to which the disease is known as 'red-rot'. *Trametes pinii* in fact, in Kail mainly attacks through trunk wounds caused during lopping which should be prohibited or controlled to minimize infection. In case of severe attack, the loss of timber in enormous.

(ii) ***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 trench around infected groups of poles, uprooting and burning the infected material will be helpful in controlling this fungus.

(iii) ***Peridermium companulatum & P. brebis*:** These fungi attack the needles of chil and kail respectively and kill them. Slight attack of these has been sporadically noticed in some chil and kail forests.

(iv) ***Fusarium* species:-** It attacks the roots of young deodar seedlings which consequently damp off. Bad drainage & poor aeration are the main causes of this disease. Deodar should, therefore, always be grown in well drained soils. Besides this, damping off in conifer seedlings is also caused by *Pythium, Rhizoctonia & Phytophthora* spp.

2A.4.4 Climbers, weeds and Parsites:-

2A.4.4.1 Climbers:- These are not very harmful except in scrub forests, where *Bauhinia vahlii* and *Pueraria tuberosa* envelops the trees completely and thereby retard their growth. The commonly found climbers in deodar forests are *Vitis semicordata, Rosa moschata, Hedera helix & Rubus* etc.

2A.4.4.2 Invasive Species :-Invasive species pose a very serious problem in all altitudes however their distribution in high hills is less. In the lower zone *Lantana camara* and *Ageratum* spp. are actively encroaching upon the open scrub forests and have caused serious threat to forest growth. The areas having new infestation need to be focused in order to make sure that this does not spread further. Parthenium has been reported mainly along roads and in *Ghasnis*. *Trifolium* and *Ageratum* is sparse in certain pockets. However, the main concentration is only agricultural fields. As these weeds normally confine to wastelands having grazing pressure they have not actually intruded deep into forests so far. However, they need to be managed now to check their spread and become a problematic weed.

2A.4.4.3 Parasites *Loranthus* and *Viscum*: - Parasites *Loranthus* and *Viscum* are commonly found parasites in this division. They do some damage in Ban oak and broad leaved forests of the lower zone.

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CHAPTER II B
Forest Fauna

2B.1 GENERAL DESCRIPTION OF FAUNA

2B.1.1 Wild animals:-

Varied climatic conditions and the resulting variation in the vegetation has a bearing upon the Wild Life occurence in the tract which supports a huge variety of Wild animals and birds. Though indiscriminate hunting had brought quite a few animals and birds at the threshold of extinction, the concern shown towards the preservation and conservation of Wild Life in the recent decade has halted this process. List of Forest Fauna is as per **Appendix-XXVII** at page 240 in Volume-II of Revised Working Plan.

The significance of the Wild Life in the ecobalance has been well understood since times immemorial but this issue, in reference to enormous biotic intervention acquires new conceptual dimensions in the present day context.

Himachal has remained abreast with the global and national developments as regards to the concern for Wild Life management. With this spirit, the Wild Life Protection Act, 1972 was adopted in the state on 2.4.1973.

Rationalization of Kalatop Khajjiar Wildlife Sanctuary:-

The process of rationalization of Kalatop-Khajjiar Wild Life Sanctuary has been initiated by Deputy Commisioner Chamba and Notice under section 21 of the Wild Life (Protection) Act, 1972 stand issued on 28.11.2011 mentioning therein that an area of 53.00 Sq. kmtr. comprising of 263 villages and 123 DPFs/RFs are being excluded from the existing Wild Life Sanctuary, stating therein that any persons claiming any right as per NAQSHA-HAQ-BARTAN/WAJIBULARZ can submit their written and oral claims and objections within stipulated period from the date of publication of such Notice either directly in H.Q or during the time of public hearing fixed on 17.12.2011 and 20.12.2011 at Forest Rest House at Khajjiar and Surkhigalla, specifying the nature and extent of such rights with necessary details and the amount and particulars of compensation, if any, claimed in respect thereof. In the public hearing dated 17-12-2011 & 20-11-2011, 78 persons of the areas concerned including Pardhan Gram Panchayat Panjoh, Osal, Ruliyani , Khajjiar, Padharotu, Pukhri, Kohlri, Manola Rinda, Up Pardhan Panjoh, Kohlari , Singhi and Ward and VDC Members have recorded their joint statement in the presence of Sub Divisional Magistrate Dalhousie, Divisional Forest officer Wild Life Chamba, Naib Tehsildar Dalhousie, Range Forest Officer Khajjiar and Dalhousie and other Forests and Revenue Officials stating therein that they have

no objection and claim about areas which are being excluded from existing Wild Life Kalatop Khajjiar Sanctuary. But residents of Panchayat Padhrotu of kalatop area have submitted their written objections and claims through their Panchayat Pardhan alongwith Panchayat resolution No 4 dated 19-12-2011 requesting the exclusion of Kalatop Abadi-deh. They further stated that their landed properties, Abadi-deh etc. (i.e. 27 Bighas 6 Biswa) as per their Revenue record are not being excluded from the existing Kalatop-Khajjiar Wild Life Sanctuary (i.e 16 sqmtr). The detail of Abadi-deh is as under in Table: 2B.1.

Table -2B.1

Panchayat Name	Mohal name of with DPF	Khata / Khatuni	Khasra Nos	Total areas (in Bighas	Remarks
Padhrotu	Kalatop	1/1	39,43,48,78 Kita =4	0-10-0	Under self cultivation
		2	40,44,Kita =2	0-11-0	-----do----
		3	42,53,56,Kita =3	1-8-0	-----do----
		4/4	47,78,79,83,Kita =4	0-14-0	-----do----
		5/5to 5/8	58,63,85,73,55,72, 75,84 Kita =8	4-11-0	-----do----
		6/9	41,45,54,57,64,77, 81,82,86,Kita =9	4-3-0	-----do----
		7/10,11	60,68,69,Kita =3	2-19-0	-----do----
		8/12,13	45,51,61,62,65,70, 74,80,36 Kita =9	10-7-0	-----do----
		9/14	66,67/1 Kita =2	0-19-0	-----do----
		10/15	9,Kita =1	0-5-0	-----do----
		11/16	49 Kita =1	1-4-0	Abadi- deh
		Total=	Kita =46	27-6-0	

Apart from above, Divisional Forest Officer Wild Life cum Executive Secretary Eco, Toursim Khajjiar Kalatop and Executive Secretary SADA and CEO Earth Station have objected for the exclusion of DPF Khajjiar/glade area from Kalatop-Khajjiar Wild Life Sanctuary. The public including public representatives who were present at the time of hearing have also strongly objected to the proposed exclusion of glade areas consisting of DPF Khajjiar (Khajjiar Jungle) Hadbast No 29 total areas measuring 3177-00-19 hectare as per Revenue records. The detail of this area is as under in Table: 2B.2.

Table -2B.2

Panchayat Name	Mohal name of with DPF	Khata / Khatuni	Khasra Nos	Total areas (in Bighas	Classification of land
Khajjiar	DPF Khajjiar	1/1	74/42	0-3-0	G.M.Shop/hotle
		2/2	45	0-2-0	--do--
		3	37	0-3-0	--do--
		5/5	48/2,19/1,19/2,30, 71/31,72/31,32,33, 42/1,47,48, 55,61, Kita -14	186-07-06	Charahgah Billa drakhtaan and Jai Safad
		5/6	44	0-2-0	G.M.Shop
		5/7	37/1,39,41,44, Kita =4	0-9-16	G.M. Temple
		5/8	47/1,57, Kita =2	49-9-15	G.M. Lake and well
		5/9	6,13 Kita =2	2-14-0	G./M.S.(Bandobasti)
		5/10	34,38,56,62 Kita =4	0-7-4	G.M.Store and quarter Forest Deptt.
		5/11	1,2,3,4,5,12,14,15,16, 65/17,66/17,67/17, 68/17,25,53,54,58, and 64 Kita =18	1923-11-0	Jungle and G.M
		5/12	7,8,9,10,11,18,20,22, 23, 26,27,28,29,35,40, 43,50,51,52,59,60, 63, Kita = 22	0-1-0	G.M. Shop
		5/14	69/17,21, Kita =2	1-18-0	Tourism Hotel and rest house
		5/15	49	0-5-0	Edu. Deptt. G.M.Y. Hostel
		5/16	70/31	0-9-0	Panchayat R/ House and shops
			Total =76	**2177-00-19(176-26-00 Hectare**	

Now keeping in view of the objections and claims filed by the public of the concerned areas, Divisional Forest Officer Wild Life cum Executive Secretary Eco, Toursim Khajjiar Kalatop and Executive Secretary SADA and CEO Earth Station and after examining the whole issue as per Revenue records and after taking all material facts in to account,

a predator and preys upon birds and their eggs and the young ones of deer antelope family found in tract. It is reported to chase big animals too at times.

7. **The Indian Porcupine:** - This destructive rodent abounds in all areas of this division upto an elevation of 2500m. It adapts itself to any type of land, but favours rocky hill sides. Where it lives in burrows dug by itself. The porcupines are characterized by the spines, borne on the neck, back and hind tubers. Besides being destructive to young plantation, they are very much harmful to field crops and gardens also when adequate food is not available in the forest. The young ones are usually born in spring.

8. **The Indian Hare:** - This rufous tailed animal is found all over the area in the lower elevation. Bhattiyat, Bakloh, and Dalhousie ranges are its favourite haunts. It likes bushy forest growth and generally lives in the neighborhood of cultivations and villages. Early wheat and other crops in the field are badly nibbled by it. It is believed to give young ones, one to two in number, in early winter months. The animal is hunted for its flesh.

9. **Flying Squirrel:-** It is found from an elevation of about 1000m to 3000m. It is nocturnal in habit. Flying squirrels are valued for their fur. They eat fruits of various forest tree species, and also the insects hiding under the bark. The damage they do to forest crop is thus compensated by the help they render by eating injurious insects.

2B.1.2 Birds:- Himalayan Griffon Vulture (*Gyps himalayansis*), Golden Eagle (*Aquila chrysaetos),* Cheer Pheasant (*Catreus wallichi*), Chikor(*Alectoris gracea*), Koklas (*Pucrasia macrolopha*), Kaleej Pheasant (*Lophura leucomelana),* Red Jungle Fowl (*Gallus gallus*),Western Tragopan (*Tragopan melanocephalus*), Black Partridge (*Francolinus francolinus*) , Wood Cock (*Scolopax rusticola).* The brief descriptions of common Birds are as under:-

1. **Chakor:-** Chakor is found throughout the tract mainly between elevations of about 1500m to 3000m , but descends down to lower elevation during winter in the vicinity of cultivated fields. It feeds on grain, tender shoots of grass and food crops and insects. It lives in small groups of four to five birds. It is moderate sized plump, pinkish grey brown partridge having conspicuous rib like bars on flanks in buff, blank and chestnut. The black band running across forehead through eyes and down sides of neck which meets in a necklace of the upper breast. The female is somewhat smaller, nesting ranges between April to June of even later sometimes. Seven to twelve eggs are laid at a time. Chakor is hunted for its meat.

2. **Koklas:-**The Koklas pheasant occurs between elevation of 2000m to 4500m. It likes coniferous forests. It lies flush to ground, keeping still and flies swiftly when disturbed as such it is hard to shoot. It relishes leaves and buds. The cock of species has dark green head

with the central crest of faron colour. The rest of body is streaked with black and grey. The hen is mottled with black and brown buff streaks above, eyebrows are buff and throat white. The breeding season is April to June.

3. **Chir Pheasant:-** It is a long tailed west Himalayan pheasant. It is buffy white and rusty brown, barred above and mottled below with black. The long narrow pointed laying down crest and the bright scarlet patch round the eyes confirms its identity. The hen is similar but smaller in size and with a shorter tail. It keeps in small convoys of five or six on precipitous hill sides or ravines covered with tall grasses scrub and oak forests. Shoots itself headlong downhill when first disturbed. Extremely difficult to flush a second time without dogs or until almost trampled on. The bird sails across ravines on open motionless wings.

4. **Blue Rock (*Columba Livia*):** - Commonly known as Kabutar has a slaty grey colour with glistening metallic green purple and magenta sheen on the neck and breast. It lives gregariously on rocky cliffs and precipices. It is found throughout the division in upper reaches. Large flocks regularly visit, cultivated field in search holes. It generally feeds on grass seeds, cereals, pulses etc. Nesting season is not well defined.

5. **Dove (*Streptopelia Spp.*) :-**

Commonly known as Ghugi, it is a commonly dove found in pairs or small parties in open places and cultivated fields. It approaches houses and even verandah if not scared. Its flight is straight and swift. It feeds on grass seeds on grass seeds grains and wild fruits. Its nesting season is also not well defined.

6. **Wood Pecker (*Picus Squanmatus*):-** This is a little scaly bellied green wood pecker, distributed throughout. It is easily observed as it works its way up the trunk of a tree. Now stopping to dislodge a piece of bark and then hammering lustily with its chisel like beak at a piece of grub- infested wood. Occasionally it feeds on the ground searching there for ants and termites. The nest hole is excavated in the trunk or branch of a tree and consists of a passage running down from 50 to 75 cm into the next chamber. It is a medium sized greenish bird with pale under parts scale with black which climbs, the trunks of trees in series of jerks, and moves from tree to tree with noisy undulating flight.

2B.1.3 Reptiles:- Important reptiles in the tract are Himalayan pit viper(*Ancistrodous Himalayanus*),Common Indian Krait (*Bungarus Caerules*),Indian Cobra(*Naja Naja*), Rat Snake (*Pyyas Mocosus*), Common Indian Monitor (*Varanus Monitor*), Rock Lizard *(Agamo Tuberculata*),Blood Sucker(*Techydrmous Spp.)*

There are many instances of wild animal entry into habitations causing conflict among the people Himachal Pradesh Department had issued guidelines for rescue and rehabilitation

of such wild animals which are discussed in detail in the Wildlife Working Circle. The human Wild Life conflict has also been discussed in detail in Wildlife Working Circle to tackle with such situations. Compensation given to victim is as per **Appendix-IX** at page 80 in Volume-II of the Revised Working Plan.

2B.1.4 Monkeys:- Amongst other common wild animals, Jackals, Langoors and Monkeys are found practically all over the division upto 9000 feet elevation.Recently Monkey cencus has been carried out in this division during June 2013, the result of which is as under:-

Table-2B.3

Monkey Census--2013

S.N	Range	Population of Monkeys		Total
		Adult	Infant	
1	Bhattiyat	2300	664	2964
2	Chowari	855	333	1188
3	Dalhousie	1338	403	1741
4	Bakloh	1864	647	2511
	Total	**6357**	**2047**	**8404**

2B.2 INJURIES TO WHICH THE FAUNA IS LIABLE

The fauna of the tract is decreasing due to reduction of the habitat as a result of ongoing development activities. The need of growing population is the cause of animal-human conflict. The normal living conditions of the wild life are disturbed which is a matter of concern. The following are the hazardous influences threatening the wild life:-

(i) **Man:-** Fauna has suffered the most at the hands of man since ancient days when fauna used to form the main source of food for the man living in the forests. With the pace of development and increasing biotic interference, the injuries to fauna increased manifold as the development activities comprised of destruction of habitate of wildlife and invention of new and powerful weapons added with the lust for monetary consideration. Man has thus, damage fauna both directly and indirectly.

(ii) **Fires:-**Fires play havoc with Wildlife. The wild animals get trapped in fire and killed. Most susceptible are the young ones. Fires destroy eggs, microfaunna and nests. There is considerable loss of habitat too.

(iii) **Epidemics:** - Epidemices amongst the wildlife is not a common feature, yet deer and antelopes are susceptible to diseases being transmitted through domastic cattle grazing free in forest.

(iv) **Atmospheric influences:**-The adults are seldom affected by the climatic disturbance but the young once suffer causalities mostly from frost. The hatching of birds is badly affected by heavy rains. Drought reduces the water sources and threat to wildlife increases.

(v) **Animals:** - The predator-prey relationship is responsible for maintaining ecological balance, however, man disturbs this. Carnivore preys on herbivore, retiles on birds and their eggs. Other destroys fishes and reptiles and small birds etc. due to indiscriminate shooting of harbivora like ghoral, Himalayan thar, Musk deer etc. There is a drastic reduction on the pray of leopards and other carnivores. Cases of cattle lifting have been reported and are on the rise.

2B.3 PROTECTION AND MANAGEMENT OF FAUNA

Following are the measures for protection of fauna

(i) Willife (Protection) Act, 1972 prohibits shooting and hunting of wild animals and trade in Animal articles and trophies.All the statutory provisions and regulatory provisions of the Act should be strictly enforced.

(ii) There are enough water streams and springs in the area and water shortage is not a major problem. Grazing by local animals however needs to be controlled / regulated so that the herbivores bet enough food especially in lean months.

(iii) Fires in summer in some localities and majority in winters (due to negligent panwi burning) cause considerable damage to the existing wildlife. Therefore effective fire protection measures and control of fires will help to a great extent in protection of wildlife.

(iv) Notice boards having useful information and restrictions should be established at prominent entry points at the boundaries of forests. These should be in Hindi.

(v) Wildlife and nature information centres should be established at Dalhousie and Banikhat. Tourists as well as local people can be educated about the importance of conservancy, ecological balance and threats to wildlife.

(vi) Cases of cattle damage by leopard, other carnivores and bear are often reported in the tract. This is due to shortage of prey in their habitats. Although compensation is paid for the losses, yet it is insufficient to cover the complete loss. This antagonises the local population towards wildlife. Effort should be made to provide timely and adequate compensation.

(vii) Bears and porcupinec cause damage tot the agriculture fields.There being no compensation available for such damage; people are often tempted to do away with the damaging animals. A suitable crop compensation policy/ crop insurance scheme is only likely to helpful to people.

(viii) Spreading of the massage of awareness and conservation can have good results. In this context celebration of wildlife week, organizing Nature clubs in schools and collages and involvement of N.G.O.'s is called for. The ultimate aim should be the involvement of local population in conservancy.

2B.4 GRANT OF RELIEF FOR DAMAGE

The loss of cattle due attacks by wild animals was drawing attention of the government for some time in view of public entreaties.The Government has decided to grant compensation for losses of domestic animals and human beings done by wild animals vide notification No. Ft. (F) 6-7/82 dated 25.2.1988 and revised vide notification No. Ft. (F) 6-7/82-Loose dated 9.4.1996, which has been recently revised vide notification No. Fts (F)-6-7/82-II dated 28 Aug. 2001 in which rates of relief for injuries/loss of life in case of human beings significantly rose. The revised rates for different categories are annexed as **Appendix-X** at page 82 in Volume-II of the Revised Working Plan.

As per guidelines in the National working plan code, 2004, this chapte has been vetted by P.C.C.F (Wildlife) cum Chief Wildlife Warden (H.P) vide letter No WL/Working plan-4509 dated 04-12-2012.

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CHAPTER III

UTILIZATION OF THE PRODUCE

3.1 AGRICULTURAL CUSTOM AND WANTS OF THE POPULATION

Economy in the tract has mainly an agro pastoral base Population, mostly rural, practices agriculture and rearing of sheep/goats and cattle. They supplement their income by finding casual employment in various developmental works run by the Govt. Luckily the pace of literacy has remained encouraging in the area covered under this plan, thereby giving more opportunities and avenues in Government services etc. However, phenomenal rise in the population undoubtedly has aggravated the problems of pressure on the forest land through granting of Nautors, exercise of various rights and other developmental activities like road construction etc.

Supply of packing cases for apples was another drain for the forests, but luckily, there has been an acceptable shift to the cardboard cartons for this purpose and now there is hardly any demand for this. The principal agricultural crops raised in the tract are wheat, Barley, Maize, rape seeds, Phullan etc. Among the horticultural crops apple, apricot, peach, Plum are noteworthy ones.

3.1.1 Form the forest point of view, there are two important tribes inhabitation this division, and both merit description in some details. They are the Gaddis and the Gujjars.

1. **GADDIS:-** Gaddis with all their cultural traditions are the most conspicuous tribal people of Chamba District. They live mainly in Bharmour Region, and to a lesser extent along the Southern slopes of Dhauladhar in Bhattiyat Tehsil. At the onset of winter, they move from these high lying areas to the low hills of Kangra. The cycle of movement is complete when they return to their native places in April and May. Rearing flocks of sheep and goat is their profession, and the flocks are their wealth. They graze their flocks in the high lying pastures in summer and in the low hills of Kangra during winter. Besides, trading in wool they also cultivate land; many of them possess land in Kangra District in addition to their holdings in Chamba District. Their flocks practically graze bare the pastures and to provide for their ample flocks, they ruthlessly lop the fodder species of trees and bushes leading to denudation and accelerated erosion.
2. **GUJJARS:-** They are professional graziers owning large herds of buffaloes and bullocks. They are nomadic and almost exxlusively Muslims. They arrive in Chamba

District with their cattle during the month of May, and find their way upto the high lying pastures which they leave with the onset of winter, for the plains near Pathankot. They trade in milk and milk products for their livelihood. They are very destructive in their habits and recklessly cut down fodder species like Oak, Mapple, birdcherry etc. a significant feature of their association with the high lying pasture land is that, the vegetation, be it coniferous or broad leaved has been disappearing gradually thus extending the areas of the pastures, which due to continuous excessive grazing are now being destroyed by erosion. Naturally the pressure of grazing of their animals is now being borne by the adjoining forests, which as said above, are slowly, though steadily, deteriorating.

Quite a good number of Gujjars have settled in Jolna and Morthu areas of Bhattiyat Range, summer grazing grounds for them are in Gharanu, Paddar and Chakki beats. During winter the already fragile and impoverished vegetation in Morthu Jolna areas bears the brunt of grazing.

Human population figures for the division as per 1961, 1991, 2001 and 2011 census are given below.

Table -3.1

S.No	Census Year	Tehsil	Male	Female	Total
1	1961	Bhattiyat	25223	22886	48109
		Bakloh and Dalhousie Cantt.	1001	858	1859
		Bharmaour	14105	11520	25625
		Chamba (part)	10977	8983	20960
	Total		**51306**	**45247**	**96553**
2	1991	Bhattiyat	45590	47359	92949
		Bakloh and Dalhousie Cantt.	1780	1465	3245
		Salooni (Part)	14175	17870	32046

etc. Dry fallen trees are also used as fuelwood. Due to these variations, it is not possible to devise any standard method to reach at come realistic figures regarding fuelwood availability. However, sufficient number of trees of Ban and other broadleaved species in the tract as estimated by total/partial enumeration are available to meet the fuelwood requirement of local people. Thus apparently the projected demand of 14, 06,066.18 Qtls. per annum should be easily met with. But due to the fact that such forests are invariably remote and away from habitation; their full capacity harvestation may not be possible. In such a situation it becomes imperative to give a major thrust on raising of fulwood plantations nearer the habitations. Simultaneously the fuelwood requirement can be reduced by popularizing fuel saving devices under various project proposals in the Division in future. Fuelwood extraction may be done departmentally or through Forest Corporation by extraction from these remote forests.

Fuelwood continues to be the predominant source of energy in rural areas of the Division. High density plantations of fast growing, short rotation and site specific fuelwood species will be raised on both forest lands as well as private lands. This will be one of the objectives for planning and managing the Community Forests. The village communities will have the first charge on dry fallen fuelwood trees and may be regulated and managed at the Panchayat level through the Gram Sabha. Efficiency in consumption through energy saving devices and substitution of fuelwood with alternative energy sources may be promoted especially in fuelwood scarce areas.

Strategies:-

- High density fuel wood plantations over government and private lands will be raised, particularly over degraded areas and community forests.
- No fuel wood lots for commercial purpose will be marked in forests contiguous to the villages to ensure availability of fuelwood to the local people.
- Non-conventional energy sources such as hydro-electricity, Biogas, solar and wind energy shall be promoted.
- Fuel efficient devices will be popularized. Thus for example smokeless chullahs, pressure cookers and improvised crematoria will be popularised.
- Low cost technologies for biomass based fuel such as lantana or pine needle briquettes will be encouraged.

3.2.2 Timber for Constructional Purposes:- Owing to the scarce use of other alternatives of timber on account of various factors, both socio-economic as well as peculiar geographical situation this demand has borne quite heavily on the forests. This demand was more realistic

		Chamba (Part)	4972	4717	9689
	Total		**66518**	**71411**	**137929**
3	2007	Bhattiyat	19573	19003	38576
		Sihunta (S.T.)	17528	18173	35701
		Dalhousie	21816	20249	42065
		Chamba (part)	9638	8896	18534
	Total		**68555**	**66321**	**134876**

These figures indicate the increase in human population after the preparation of working Plan under revision. In view of the people's general dependence on the forests for the multifarious utilities, this important resource has to be maintained in such a way as would ensure a sustained service from the forests without harming the whole system

3.2 PRESENT AND FUTURE PROJECTION OF DEMAND

The following paragraphs would discuss the present and future projection of demand for main tangible benefits such as timber, fuelwood and fodder.

3.2.1 Fuelwood Requirement:- People depend on fuelwood for cooking and heating. The average per head consumption of feulwood in rural areas has been assessed by the Forest Survey of India (NZ), Shimla. According to the Survey, the annual consumption of fuelwood/head is 11.39 Qtls. Out of which 9.26 Qtls. is procured from Government Forests and 2.13 Qtls. from Private lands. Besides this agricultural waste, kerosene oil and LPG are also used. Projected population with 12.58% growth rate of the above Tehsils is expected as 151843. Envisaging a uniform pattern of fuel consumption total fuelwood required from Government Forests during the plan period comes to 2, 10, 90,992.7 Qtls. Thus the annual average requirement will be 14, 06,066.18 Qtls. The average annual requirement assessed during previous working plan was 14, 76,817.78 Qtl. This may go down because of use of Pressure Cookers, Induction cookers, Cooking Gas, Electricity etc.

In the tract, Ban Oak is the main species, which is the best fuelwood, but due to remoteness its availability is limited, so other species like *Kainth, Pieris, and Piak* etc. though with a relatively low calorific value have to be used for this purpose. Besides these in the scrub forests, people use even some bushes like *Dodonaea, Berberis Lantana, Adhatoda, Carissa*

and legitimate during earlier times when the rights and obligations struck a balance. But in due course, the change in social and economic status has relegated the obligations to a large extent. The grant of timber to right holders in the revised Timber Distribution Policy may be continued alongwith registration of timber depots of imported timber may be encouraged to meet with the local requirement of area.

According to the rights mentioned in the settlements, people are entitled to have timber at concessional rate. TD Rights are currently given after recommendation by the Panchayat Pradhan, Revenue and Forest authorities in that order. The existing system may be further improved by ensuring more participation, collective responsibility and information. Hence, to ensure equity and transparency, instead of the current practice of recommendation by Panchayat Pradhan alone the system of granting of TD Rights will be decentralised through the institution of Gram Panchayat/Gram Sabha prior to sanction by the forest department.

The periodicity, quantity and rates for TD Rights may also be rationalized on the basis of sustainability of resources and site-specific environmental and socio-economic conditions.

Efficient use of timber, use of wood preservatives for increasing durability of timber and use of timber substitutes in construction may be encouraged and popularised.

Table -3.2

Trees granted under Timber distribution Scheme during 1993-94 to 2012-13					
Year	Deodar	Chir	Fir/Spruce	Other B/L	Total
	Vol (cum)	Vol (cum)	Vol (cum)	Vol (cum)	Vol (cum)
1993-94	193.35	1470.13	146.43	42.46	1852.37
1994-95	211.37	1646.2	182.05	44.04	2083.66
1995-96	528.2	2889.68	287.86	115.52	3821.26
1996-97	925.18	2793.22	291.51	91.31	4101.22
1997-98	825.75	3490.53	613.67	240.83	5170.78
1998-99	689.43	1633.48	365.42	142.72	2831.05
1999-2000	794.45	1667.43	202.95	139.42	2804.25
2000-01	460.35	1062.67	190.4	48.25	1761.67
2001-02	685.28	1854.2	496.31	62.08	3097.87
2002-03	1067.59	1221.34	216.05	76.27	2581.25
2003-04	866.97	953.53	417.98	80.55	2319.03
2004-05	356.07	932.76	300.35	35.11	1624.29
2005-06	458.36	1324.21	508.5	190.06	2481.13
2006-07	61.93	1089.2	259.46	106.82	1517.41
2007-08	0	0	0	0	0
2008-09	0	0	0	0	0

2009-10	0	0	0	0	0
2010-11	0	0	0	0	0
2011-12	0	0	0	0	0
2012-13	14.00	4.00	0	0	18.00
Total	**8138.28**	**24032.58**	**4478.94**	**1415.44**	**38065.24**

Strategies:-

- The government may review the periodicity and ceiling for TD for construction of a new house and for subsequent repairs.
- The quantum and allocation of TD Rights shall be determined after the consent of the Gram Panchayat, through the Panchayat resolution and further depending on the silvicultural availability and socio economic condition of the TD Right holder.
- A compilation of TD grantees in a year will be made and displayed at Panchayat and Division level. A computerised database of the TD grantees shall be maintained and updated at the divisional level and may be displayed on the Forest department's website.

3.2.3 Timber For Agricultural And Allied Activities:- Besides the constructional use there are other multifarious uses to which timber is put to e.g. utensil making, Beehive making, Agricultural implements etc. Consumption of timber for this however is not alarming in any way. Significant amount of this demand can be met out from the private agricultural lands and common lands. More emphasis may be made to promote more wood/ biomass production from private agricultural lands to reduce pressure on fringe forests.

3.2.4 Forest Grazing:- Unscrupulous exercise of grazing rights and occasional illicit grazing practices has done a substantial damage by impeding the natural regeneration and aggravating the soil erosion problems in the forests. Local cattle which are kept more for dung purposes rather than the milk production etc. find the already degraded forests as best exercise grounds since stall feeding has almost been a taboo. Even in the alpine pastures the nomadic graziers have least concern for the maintenance of grazing grounds. Though the number of permitted cattle had been frozen in 1971-72, but in real practice grazing continues to be increasingly more irrespective of carrying capacity of pastures and other forests. The pasture/ Ghasnis improvement programmes may be taken up to meet with the requirement of grazing in the working plan area.

Although the livestock population of the state has declined in the last decade, the availability of grazing land is still far below the optimum requirement. Regulating and controlling

grazing and improving the quality of both grazing as well as cattle will lead to stall feeding and reduce incidence of open grazing and thus improve the health of the forest.

Migratory grazing poses another significant impact on the forests as well as causes jurisdictional conflict with local grazing practices. This will be resolved through a consultative mechanism with the involvement of the Gram Sabha. Co-ordination between the Forest, Animal Husbandry, Agriculture and other concerned Departments may be increased to improve cattle breeds, augment fodder development, improve pasture lands and promote more livelihood opportunities.

Strategies:-

- The breed-upgradation programme for cattle may be intensified and the system of para-vets to facilitate the delivery of veterinary services at the doorsteps will be introduced by the Animal Husbandry department. Further programmes to discourage unrestricted breeding of less productive cattle will be undertaken.
- Plantations of fodder trees will be promoted in the community forests and fodder production will be increased on farm lands.
- An adequate budget for pasture improvement work will be ensured.
- Grazing permits to the migratory graziers may be issued for the actual number of animals and the existing grazing fee rates may be increased proportionally.
- A consultative mechanism with the involvement of the Gram Sabha to integrate migratory graziers and the local community to address grazing issues may be evolved.
- New forest areas for grazing to migratory graziers will be given by the DFO on the recommendation of concerned Gram Sabha and Forest Field Staff keeping in view the carrying capacity of the area.
- Programmes for augmenting the productivity of grazing lands including alpine pastures will be implemented through introduction of better quality nutritious grasses and legumes, rotational closures, and eradication of obnoxious weeds and shrubs. Alpine pastures will be improved through indigenous species interventions, keeping in view the ecological sensitivity of these pastures. The Forest Department may work in close coordination with the Animal Husbandry and Agriculture Department in this regard.

Cattle population as per different census years is as under:-

Table - 3.3

Year	Tehsil	Cows	Buffaloes	Sheeps	Goats	Others	Total
1961	Bhattiyat	51575	10372	21923	31060	130	115060
	Bharmour	15890	141	39616	36366	99	92112
	Chamba (Part)	26564	1430	27444	16492	24	71954
	Total	**94029**	**11943**	**88983**	**83918**	**253**	**279126**
1966	Bhattiyat	55522	11038	25190	27611	174	119535
	Dalhousie (Cantt area)	114	0	3	6	0	123
	Bharmour	17923	89	69708	35559	489	123634
	Chamba (part)	24510	1278	16872	8371	18	49049
	Total	**98069**	**12405**	**111773**	**69587**	**507**	**292341**
1991	Bhattiyat	39882	8865	19702	23003	0	91452
	Salooni	10583	2362	8458	5081	20	26504
	Chamba Part	4198	776	2585	1542	9	9109
	Dalhousie Cantt area	190	0	8	14	0	212
	Total	**54853**	**12003**	**30753**	**29640**	**28**	**127277**
2001	Bhattiyat	18971	4896	9302	8342	38	41549
	Sihunta (S.T.)	13876	5983	8874	9731	29	38493
	Dalhousie	7932	5987	3874	3672	56	21521
	Chamba (part)	3788	1209	2762	2785	72	10616
	Total	**44567**	**18075**	**24812**	**27530**	**195**	**112179**

3.3 MARKETS AND MARKETABLE PRODUCTS

Presently whatsoever removals from the forests are made, it is mainly conifers i.e.Chil, Deodar, Fir/Spruce by way of salvage markings. This is the major forest produce in different

assorted sizes that is finally carried to Bhadroya sale depot. The harvesting/sale is done by the H.P. State Forest Corporation. Carriage is mainly by rope ways and manual and then transportation by road.

The primary marketable products of this division are timber, resin, fuel wood etc. 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) Act, 1982 came into force and since then all commercial exploitation is being executed through the HPSFC. The timber extracted by HPSFC is being exported to Himkasth Sale depot Nurpur, Bhadroya and resin supplied to Resin & Turpentine factories at Nahan and Bilaspur.

3.4 DEMAND AND SUPPLY OF FOREST PRODUCE

3.4.1 Timber: - The demand of almost all forest produce is ever increasing and it definitely has huge pressure on forests. Although the state has imposed ban on green felling yet meeting requirements of the people is a challenge. All the forest produce like timber, fuel wood, NTFP are in great demand. The supply of timber requirement for construction/repair of houses has gone over Rs.10 to 15 crores whereas it was Rs.60-70 lac in 1985-86. The details of extraction of Timber for the last fifteen years are tabulated below:-

Table - 3.4

TIMBER YIELD

Detailed abstract of timber extracted during 1995-96 to 2012-13							
Year	Deodar	Kail	Fir/Spruce	Chir	Ban oak	B/L	Total
1995-96	207.34	0	1036.41	4198.01	0	380.85	5822.61
1996-97	84.77	0	962.61	4272.11	0	283.88	5603.37
1997-98	135.05	0	490.1	5966.01	0	0	6591.16
1998-99	272.62	0	342.06	4575.95	0	232.73	5423.36
1999-2000	569.41	0	628.78	3731.14	265.2	1199.57	6394.1
2000-01	451.62	0	728.42	3274.6	0	592.36	5047
2001-02	262.7	0	428.75	4252.1	0	471.68	5415.23
2002-03	0	0	3875.73	2079.23	283.88	296.79	6535.63
2003-04	24.35	0	391.61	4617.03	0	0	5032.99
2004-05	1234.86	7.78	5731.62	3082.13	278.97	537.65	10873.01
2005-06	7.42	0	1605.96	1956.97	0	0	3570.35
2006-07	0	0	0	1410.96	0	808.81	2219.77
2007-08	805.82	0	604.05	2087.86	0	236.63	3734.36

2008-09	0	0	4319.94	1041.99	0	958.38	6320.31
2009-10	1342.89	0	4983.35	587.31	238.7	36.82	7189.07
2010-11	61.31	0	0	7456.45	0	867.1	8384.86
2011-12	423.92	0	2237.42	1856.42	285.18	234.49	5037.43
2012-13	2.84	0	130.09	4165.70	3.64	156.62	4458.89
Total	**5886.92**	**7.78**	**28496.90**	**60605.97**	**1355.57**	**7294.36**	**103653.5**
Average annual yield	**327.05**	**0.432**	**1583.16**	**3366.99**	**75.30**	**405.24**	**5758.52**

3.4.2 Fuelwood and Charcoal: -The estimated requirement of fuel wood and charcoal in the division is estimated to be 5000 and 1200 quintals respectively for domestic use only. The LPG has significantly reduced the requirement of fuel wood but the villagers enjoy privilege of getting free fuel wood from forest and very often resort to heavy lopping and stripping of bark of Ban oak. Indiscriminate felling of Ban oak in the past has left little scope to fell more ban oak trees which is the main source of fuel wood and charcoal in the tract. Ban oak is completely protected species as notified vide letter No. Fts. (F) 13-38/84 dated 11.3.86.

3.4.3 Fodder and Grasses for Cattle Population: - For the population of 20364 numbers of all categories of cattle, some of them kept simply for manorial purposes, huge quantities of fodder are required. This fodder comes in the shape of lopping of Oak, grazing in the forests and pastures. The pressure of grazing is so high that one can hardly find natural regeneration in Fir and Spruce forests. Besides the lopping of trees for fodder, coniferous are also lopped for bedding of cattle and later on these beddings are used for manure. On the whole everything is not satisfactory on this fodder front and cattle populations need to be reduced drastically through introduction of better breeds of cattle.

3.4.4 Resin: - Resin has assumed special significance in the state. In this division, the Chill zone is quite extensive, thus has a sizeable contribution to revenue. Earlier the extraction was done by cup and lip method which proved to be disastrous for many forests. But better late then never, there has been a complete shift to the rill method of extraction which gives equally good yield as well as obviates the likely damage, by fire and wind. Since 1986-87 the resin extraction details in the division are given as under:-

Table -3.5

Year	Total No of resin blazes tapped	Total resin extraction (Qtls)	Average yield per 1000 blazes (Qtls)
1986	32069	684.57	21.34
1987	57563	1978.20	34.36
1988	63985	2258.34	35.29
1989	69827	2769.21	39.65
1990	66,129	2728.90	41.26
1991	101438	3804.62	37.50
1992	131413	NA	NA
1993	139530	NA	NA
1994	127430	NA	NA
1995	78483	NA	NA
1996	86639	2055.42	23.72
1997	52003	2262.62	43.50
1998	NA	NA	NA
1999	64946	2430.90	37.42
2000	60173	2324.55	38.63
2001	57406	2107.17	36.70
2002	68908	2356.65	34.19
2003	72051	2689.54	37.32
2004	77482	2863.04	36.95
2005	76493	2811.85	36.75
2006	69014	2779.00	40.26
2007	62806	2309.66	36.77
2008	75122	2806.53	37.35
2009	79689	3047.15	38.23
2010	81833	3018.10	36.88
2011	70866	2619.29	36.96
2012	67381	2483.87	36.86
Average	**76564**	**2508.60**	**36.26**

3.4.5 **Other Minor requirements:** - Spruce and Silver fir timber came into prominence

when its consumption for the packing case industry received a sudden spurt. Fir, timber has established itself not only as one suited to packing cases, but also as excellent timber for interior finish of buildings.

Some of the broad leaved species such as Ban Oak, high level Oak (Q. semicarpifolia), Horse chestnut, Birdcherry, Walnut, Maple and Ash are also saleable, but the main bottleneck in their exploitation is that means of transportation have not fully developed so far, in the interior valleys. However, this problem is expected to be overcome in the near future when the network of roads expands. Areas worth mentioning are those of Lower Chakki, Upper Beats and few areas in Bhalai Range wherefrom Ban Oak and other broadleaved species can be converted in to fuelwood or charcoal.

3.4.6 Medicinal Plants: - People have rights for collection and sale of medicinal herbs. The important medicinal herbs collected by the local people are Dhoop, Karoo, Kuth Guchhi and Banaksha etc.The detail of NTFP found in the division and its use is given in the NTFP (overlapping) working circle separately. Though Chamba as a whole still continues to be the repository for myriad of medicinal herbs, but the area covered under this plan is not a major contributor. Some of the important Minor Forest Produce are Viola odorata, Valeriana Wallichi, Morchella species, Discorea deltoids etc. Viola edorata (Banafsha) is collected by villagers during April, May. Mushbala (Valeriana Wallichi) occurs between 1200m – 2750m. Guchhi (Morchella) specie a prized delicacy is found in the Deodar Forests, Maintly above 1500m. Dioscorea deltoidea is one of the important herbs, which again exists in the forests of Deodar and Fir. Efforts for its further propagation are however yet to be given due attention. The collection and export of minor forest produce is regulated under the Chamba Minor Forest Produce Exploitation and Export Act. Land owners and their pangana on payment of Rs. 1.00. Other residents of the District can obtain permits on payment of Rs. 15/- and non residents of the District have to pay Rs.25/- for the same. Such permits are issued for specified localities and only for a period of 3 months. If permits are desired for more than one locality, separate fee for each locality has to be paid. Export is allowed on permits on payment of specified royalties by licensed dealers who are required to have a dealing license on payment of Rs.25/-. The season for extraction and collection of herbs lasts from the Ist September till snow fall August.

3.5 LINES OF EXPORT

The area has a good net work of roads and bridle paths. Though there are some khads like Dehar, Chakki, Ravi, but the carriage of timber and transport of timber whatsoever and the

resin is mainly by roads/bridle paths. For the purpose of checking, there are two forest check posts, one at Tunuhatti and another at Lahru situated. The transportation of Forest produce is mainly carried out by the HPSFC to its Him Kasht sale Depot at Bhadroya and Nurpur.

3.6 METHODS OF EXPLOITATION AND THEIR COSTS

3.6.1 Timber: - After the nationalization of forests in 1983 work of the timber extraction whatsoever is being done by the H.P. State Forest Corporation. Axe and Saw are the principal tools being used in extraction work. Carriage of timber is mainly by ropeway and manual carriage upto the roadside depots where from the further transport is through trucks upto Bhadroya depot for further sale. The rates of delivering the sawn timber from stump to market at Bhadroya are given below as per information supplied by the H.P. State Forest Corporation Ltd. Chamba.

As per record of H.P.S.F.D.C, approximate cost of extraction of sawn wood per cum for the year 2010-2011 excluding royalty are given below:-

Table -3.6

Exploitation of costs of Timber and Pulpwood

S.No	Name of Work	Timber cost Per cum (Rs.)
1	Lopping and felling	90.00
2	Sawing and Conversion	865.00
3	Carriage from forest to roadside	1098.00
4	Carriage by trucks	649.00
5	Contingency charges and establishment.	4252.00
	Total	**6954.00**

(Source:-HPSFDC)

3.6.2 Resin: - Resin blazes are sold annually to H.P.S.F.D.C. at royalty rates fixed by the H.P. Govt. for every year. Earlier the extraction was done by cup and lip method which proves to be disastrous many forests. Now there is complete shift to the Rill method for extraction of resin which gives good yield. Setting of crop commences in February/March every year. Extraction is required to be done as per instructions contained in Punjab Forest leaflet No. 13.

Table -3.7

Resin Extraction Cost Statement

S.No	Name of Work	Cost per quintal (Rs.)
1	Setting up of crop including collection charges	25.00
2	Resin Extraction upto R.S.D	1071.00
3	Store Consumed	---
4	Carriage Charges	45.00
5	Establishment Charges	4438.00
6	Miscellaneous Charges.	114.38
	Total	**5693.38**

(Source:-HPSFDC)

3.7 PAST AND CURRENT PRICES

So far as the general trend of market rates of timber is concerned it has shown gradual increases.

The Average royalty rates of timber obtained from the Forest Corporation during the year 1993-94 to 2012-2013 are tabulated as under:-

Table -3.8

Royality rates / Average rates per cum (Rs.)

Year	Deodar	Kail	Fir/Spruce	Chil
1993-1994	0	0	0	0
1994-1995	4611.00	2838.00	983.00	0
1995-1996	4934.00	3037.00	1012.00	0
1996-1997	5427.00	3341.00	1113.00	1738.00
1997-1998	5970.00	3675.00	1224.00	1899.00
1998-1999	8358.00	4961.00	1591.00	1519.00
1999-2000	8530.00	5760.00	1600.00	1519.00
2000-2001	8700.00	5930.00	1480.00	2200.00
2001-2002	3890.00	2640.00	770.00	480.00
2002-2003	3950.00	2430.00	770.00	400.00
2003-2004	3940.00	2190.00	740.00	380.00
2004-2005	3620.00	2380.00	720.00	450.00

2005-2006	4576.00	2833.00	800.00	568.00
2006-2007	4146.00	2817.00	835.00	484.00
2007-2008	4315.00	2388.00	677.00	431.00
2008-2009	4315.00	2388.00	677.00	431.00
2009-2010	5664.00	2944.00	836.00	626.00
2010-2011	5903.00	3098.00	790.00	572.00
2011-2012	5903.00	3098.00	1030.00	704.00
2012-2013	5357.00	3096.00	1123.00	739.00

(Source:-HPSFDC)

Table -3.9

The average royalty rates for Resin

Year	Royalty rates of Resin Average rates of resin per blaze (Rs.)
1993	27.00
1994	24.00
1995	27.00
1996	31.00
1997	32.00
1998	26.50
1999	26.00
2000	25.50
2001	27.00
2002	25.00
2003	23.00
2004	23.50
2005	24.00
2006	24.00
2007	23.00
2008	27.70
2009	33.70
2010	35.00
2011	65.00
2012	50.00

(Source:-HPSFDC)

The present average market rates of various Forest produce are tabulated as below:-

Table -3.10

Market Rates of green standing trees in cum

Year	Deodar	Kail	Chil	Fir/Spruce
1993-94	8679	7700	3163	3702
1994-95	9547	8470	3470	4072
1995-96	10502	9317	3827	4479
1996-97	11562	10249	4200	4927
1997-98	12707	11274	4630	5419
1998-99	13978	12401	5093	5961
1999-00	15375	13641	5603	6587
2000-01	16913	15905	6168	7212
2001-02	18608	18608	6779	7934
2002-03	20485	18156	7457	8728
2003-04	22511	19972	8203	9601
2004-05	24762	21969	9023	10561
2005-06	27238	24168	9925	11317
2006-07	29600	27600	10600	13200
2007-08	33389	32232	10600	13200
2009-10	44031	38044	15372	17271
2010-11	47624	38044	15372	17271
2011-12	47624	38044	18630	22437
2012-13	47624	38044	18630	22437

(Source:-Office record of DFO Dalhousie)

Compared to this trend there has been no increase in case of rates for right holders, and have remained static, though new subsidized rates have been fixed for TD under new Timber Distribution Policy whereas at the same time, there has been a manifold increase in the demand.

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4.5 CONDITION OF WORKING OF FORESTS BY THE HPSFC LTD. – BRIEF OF DECISIONS TATKEN BY THE PRICING COMMITTEE MEETINGS AND INSTRUCTIONS ISSUED BY THE DIRECTION OFFICE

4.5.1 Constitution & Jurisdiction of The Pricing Committee:- The H.P. Govt. vide Notification No 10-26/72 SF dated 18.05.1974 constituted a Committee namely "Pricing Committee" authorizing to decide terms and conditions as well as rates to be charged from HPDFC for vatious species. The decision taken from time to time by the Pricing Committee to regulate the Forest working as approved by the Govt. will be binding on the HPSFC.

1. **Preparation of Lots:-** Notifying lists of Forests to be marked.

Resin lots:-Enumeration to be completed by 1st week of December each year

Tree lots:- List of Forest marked to be intimated by the DFOs to Divisional Managers by 30th June each year.

The trees marked should bear *khudan mark.*

[Item No. XV dated 04.12.1986]

2. **Submission of Marking Lists:-**

Resin lots:-Final list of resin blazes to be supplied to HPSFC by the end January each year.

Tree lots:- Low lying Forests 15th September each year.

High lying Forests 15th December each year.

[Pricing committee Item No. XV dated 4.12.1986]

3. **Marking of Trees**

Salvage Marking:- After interim orders of the Hon'ble Supreme Court of India in CWP No 202 in T N Godaverman Vs Uol, no green fellings is allowed in Govt forests. Only salvage markings are done in accoroance with the qualitative and quantitative norms fixed by the Expert Committee, details of which have been communicated vide Memo No Ft.116-84/71 (S) Part, Addl. MOU dated 26.11.97 Vide memorandom dated 16.11.99 it has again been directed that all the trees that can be marked in salvage marking be marked and handed over to HPSFC for working and the DFOs are required to record a certificate that all the salvages trees as per norms fixed by the Expert Committee have been marked and no trees has been left out.

[Memo. No. Ft.112-2/71(S) part dated 16.11.1999 addressed to all CFs in HP]

All dry trees, standing or fallen will be marked. Fallen green trees; uprooted or base broken will also be marked [Memo. No. Ft.112-2/71(S) part dated 29.10.2002]

CHAPTER IV

ACTIVITIES OF H.P. FOREST DEVELOPMENT CORPORATION IN HARVESTING AND MARKETING OF FOREST PRODUCE

4.1 HARVESTING

H.P. State Forest Corporation Limited an undertaking of the HP Govt. which came into existence on the 25th of March 1974. This Corporation deals with the marketing of mainly Timber, fuelwood, pulpwood, bamboos, Khair, rosin, turpentine oil, subsidiary products (viz., phenyl, varnish, black Japan). In addition, a Fibre Board Factory at Baijnath is presently engaged in the joinery works, timber chemical treatment and timber seasoning for Government as well as private timber.

The Corporation has been mainly created with the following objectives:

- To carry out the extraction of timber and resin on scientific lines by adopting suitable modern techniques.
- To eliminate the Contractor's agency in respect of works of timber extraction and resin tapping.
- To obviate the chances of illicit felling of trees, illicit tapping of resin and other malpractices.
- To work the forests on commercial lines by recycling of funds for works and also by raising funds from financial institutions as per requirements.

The Corporation has got Expertise in the following:

4.2 TIMBER OPERATIONS

The Corporation has a long experience of timber harvesting and extraction operations and is in a position to provide expertise for the purpose.

4.3 RESIN TAPPING

Since the entire resin tapping work is being done by the Corporation, it has developed Modern techniques or resin tapping and expertise in this respect is available for training as well as execution of works.

4.4 RESIN PROCESSING

With the two rosin factories working for more than three decades, the Corporation has fully trained staff for this work and expertise in this respect is available for the purpose of resin processing.

inclusive of the supplementary marking, does not alter the working period of the total lot. Royalty will also have to revised according to changed intensity.

Where the work of the lot is already in progess, the issue of whether or not to carry-out supplementary marking will be decided after field inspections jointly by the ROs/A.Ms concerned subject to some element of verification/checkings by ACFs/SDMs, where available or DFOs/DMs, if the extent of supplementary marking is to be within 20% of the total volume originally marked, supplementary marking should be done. In case the volume of dry/fallen trees is more 20% of those originally marked a new lot be constituted.

In case of chill lots, where the felling operations are completed by 31st March, and other operations by 30th June, Markijng of new lots is done in August, after the fire season. Hence there is no justification for supplementary marking in such areas.

C) Checking of markings:- Marking needs to be checked and inspected before handing over of lots to the HPSFC.

Table -4.1

Quantum of minimum checking

Authority	Minumum checking required to be done
Range Officer	25%
ACFs	15%
DFO	10%
CF	5%

Felling/conversion/resin extraction/ carriage works need to be checked during the cuurency of respective lot period(s). The inspection by ROs should be minimum twice in a month, while the ACF should check at least once in a month. DFOs and CFs must make it a point to check lots that are being worked while on tour. [Memo No Ft 112-2/71(S) (B) dated 7.7.2004]

D) Checking of Resin Tapping Works:- In accordance with the HP Forest Manual Vol IV (Pages 68-81) cup and lip method to be substituted with rill method (P:13-63 of the HP Forest Manual vol.VI)

FG/BO/RO/DFO and also the CF to inspect the tapping areas. The discrepencies noticed during such inspections to be pointed out to the HPSFC and necessary damage bills raised accordingly, beside issuing notices for improving the working. While doing so the standard

As per order dated 12.12.1996 passed by the Hon,ble Supreme Court of India in CWP 202 of 1995, the dry standing and fallen trees can be removed/felled only departmentally of through State Forest Corporation. In case the HPSFC refuses to harvest the marked trees, it will be violative of above order of Apex Court. HPSFC is bound to take over Govt. lots whether economically viable or not, because felling, conversion, carriage and sale of forest produce from the Govt. forest has to be done solely through the State Agency. While every effort shall be made in the field to constitute economically viable lot, it may not always be possible. DMs/Directors, HPSFC not to refuse taking over of the lots.

[PCCF HP letter No. Ft 25-55/2000(S) dated 23.05.2001]

A) **Joint marking by Forest Department and HP State Forest Corporation staff:-** The committee approved that markings of salvage trees and enumerations of resin blazes should be done jointly by the representatives of the Forest Deptt and HPSFC and it was decided that PCCF HP will issue suitable instructions in this behalf to all concerned. Necessary instruction in this regard issued vide PCCF HP memorandum N Ft.21-713/85 (S) dated 27.6.2000. [Pricing committee decision dated 28.10.1999]

The ROs should intimate the dates of markings/ enumeration in a particular block/forest area to the respective AMs of HPSFC least 10 or 15 days in advance so that the AMs may depute their representative to associate in the Joint marking as scheduled. [Para of Memo No. Ft 112-2/71(S)(B) dated 7.7.2004]

B) **Supplementary markings:-**The Pricing Committee has already decided that where the work is already going on, supplementary markings should be considered as a part of original lot, irrespective of the quantity of volume marked. The working period should be according to the instruction issued vide CCF HPs memo No Ft/ 18-4/55 (S) Vol. II dated 22.6.1976. The intensity of such markings be worked out taking the volume marked in all accounts as per instructions contasined in CCF (T) letter No Ft.109-5/74 dated 2-3-1987.

[Item No. 11 of 5.12.1992 and Item No. 2 dated 16.5.1988]

It has again been decided/reiterated in the PC meetings dated 29.5.1997 (item No 14) that no supplementary markings for what so ever reasons will be allowed. Instruction issued by the PCCF HP vide his office memo No.Ft21-825(s) Part-II dated 30.11.99 regarding permitting supplementary markings in lots handed over to the HPSFC were ratified by the Pricing committee in its meeting dated 30.3.2001, which provides that:-

Where the HP State Forest Corporation Ltd has not commenced the working in a marked lot there is no harm in carrying out supplementary markings. However, in such a situation, the working period of the lot should not be changed, if the total marking in the lot,

resin lot agreement as used to be drawn with the resin tapping contractor prior to the nationalization of trade of resin required to be kept in view. [Memo No. Ft 1259-15/67(S) dated 16.7.1999.]

E) **Marking Hammers:-** Marking of trees for sale is required to be done with special marking hammers only and not by personal hammers. The requirement is to be assessed for a particular year properly before placing supply order. Marking hammers are required to be defaced/destroyed and written off from the stock as per time schedule fixed for the purpose.

Time Schedule for Marking hammers:- Submission of requirement of marking hammers by ROs to DFOs : Before 10th April each year. Procurement and supply of marking hammers by DFOs to ROs: Before 30th April each year.

Marking hammers after markings are required to be submitted alongwith marking lists in a sealed cover by ROs to DFOs as per following time schedule:-

Before 31st August each year in respect of low lying areas/lots.

Before 30th November each year is respect of high lying areas/lots.

Defacement and writing off of marking hammers:-

Before 15th October each (Low lying).

Before 15th January each (high lying).

[Memo No Ft 112-2/71(S)(B) dated 7.7.2004.]

4. **Handing over of Lots:- Resin lots** by 1st week of February each year.

Tree lots:-High lying coniferous Forests by 1st April each year.

Low lying coniferous Forest by 1st October each year.

[Item No.2 dated 1.3.1994]

Handing over of lots of Chir, Khair, Coppice Coups and other BL 15th October each year.

[CFs meeting dated 27-28November 1987]

Bamboo lot:- 30th September (w.e.f 2005-06)

[Item No. 4 of PC meeting dated 22.07.2003]

In case of late handing over of lot- to be treated as next year lot:-

The lots which will be haned over to the HP State Forest Corpn. for working after due dates. The HPSFC will take over the same lot in subsequent year and will be treated as received in the next year. The State Forest Corporation will have to pay royalty etc to the Forest Department as per the rates applicable for the next year lot.

[PCCF HP Memo NO. Ft 34-50/93(S) dated 21.5.2001]

Handing over of resin blazes: -Scheduled date 15th December. HPSFC calculates the pro rata reduction in royalty of 11% for loss of every month of delay in handing over all the blazes. In case of deductions, responsibility required to be fixed. PCCF asks to follow the time schedule.

[Memo dated 21.9.1998 addressed to all CFs]

Bamboo Lot: -As per decision of the PC dated 24.9.98 under item No 7 the Corpn. would accept the bamboo lots upto 30th September and pay the royalty @ 20% of gross sale proceed. In respect of the lots handed over after this date, 50% of the profit, if any, inclusive of sales tax would be paid to the forest department as royalty. It has also been decided that the HPSFC would not take over any bomboo lot after 15th October. The HPSFC requested that the same procedure may be approved for the year 1999-2000.

The Pricing Committee agreed to follow the same procedure for the year 1999-2000 as was approved for the year 1998-99. *The date of handing over of bamboo lots to the HPSFC will continue to be 15th September every year.*

It was decided that the bamboo lots will be handed over to the HPSFC before 30th September in future.

[Item No. 4 of PC dated 22.7.2004]

5. **Recounting Trees:**-That in case the Corporation wants to question the number of trees handed over, their measurement, classification as green and dry and by species involving a minimum of three percent of total volume of the lot, it should put it an application within thirty days of the handing over of the forests. On receipt of this application, the DFO shall immediately proceed or arrange to check. In case of re-checking of marking by the DFO the representative of the Forest Corporation will be informed by the DFO regarding time and date of rechecking, if they so desire. The determination by the DFO as a result of recheck shall be final and binding on the Corporation and the consolidated abstract of tress leased out shall stand no application for recheck of uprooted dry, snow damaged, wind fallen including salvage lots electric transmission lines and road alignment trees shall be entertained.

[Standard agreement deed of 1982]

6. **After Handing over of Lots to the Corn. Risk/Responsibility Lies with the Corporation:**-That the trees marked for felling will remain at the risk of the Corporation from the date of supplying the marking lists of the lots and Corporation shall be responsible for any damage to the forest crop on account of negligence on the part of the HPSFC.

[Standard agreement deed of 1982]

7. **Starting of the work by the Corporation:-**That in case the Corporation does not start or execute the work in any lot handed over during the year; the Corporation shall be liable to pay the royalty amount as per provisions and no plea for treating the lot as next year lots will be entertained.

[Standard agreement deed of 1982]

8. **Serial number and hammer mark to be kept intact:-** That the Corporation shall ensure felling of marked trees in a manner that serial No. and hammer marked remain intact and undue damage to the standing crop and regeneration is avoided. Cutting of creepers, lopping and ropping shall be responsibility of the Corporation.

[Standard agreement deed of 1982]

9. **Determination of Working Period of Lots & Schedule of Forest Operations :-**

Working period:-The working period is to be determined in accordance with the instructions issued vide letter No Ft 18-4/55 (S) Vol II dated 27.06.1976 which provide working period as under:-

(i) Lots having standing volume up-to and including 1 lac cft	1 year
ii) lots having standing volume of more than one lac cft and up-to 3 lacs cft	2 year
Lots having standing Volume more than 3 lacs and up-to 6 lacs	3 year
Lots having standing volume of more than 5 lac and up-to 10 lacs cft	4 year
Lots having standing volume over 10 lacs	5 year

[PC decision dated 5.12.1992 item No. 11 (supplementary marking)]

For Forest of Pangi Division, 15/20 area, Bara Banagal, Dodra Kawar and Bharmour su-Tehsil the working period will be 2 year more than the prescribed above.

For Chill lots the period of one year will mean two working seasons with no working from 1st April to 15th November except for carriage of timber. For example a lot sold in September/October, 1976 the period of one-year working will be reckoned up-to 31st March, 1978 with no working from 1st April, 1977 to 15th November 1977.

A note should always be added in all Chill/Kail lots that no resin tapping will be allowed in lots sold for felling and conversion by the lessee (s)

For Coppice Coupes, clear felling, Khair and Bamboo lots the working period will be restricted to one year and will expire on 31st March of the succeeding year. For example, a lot sold in September/October, 1976 the working period of one year will be accounted for up-to 31st March 1977.

[PC decision dated 5.12.1992 item No. 11 (supplementary marking)]

Schedule for Forest operations:-

a. **Coniferous lots other than Chil**:-The period of lease for one year lot shall be upto 31st March of the succeeding year and similarly for 2, 3 and 4 years lots upto 31st March of secceeding years respectively depending upon are period of lease with respect of felling, conversion and stacking at safe places inside/outside the leased area.

[Standard agreement deed of 1982]

b. **Chil lots**:-The period of lease shall be upto 30th June of the succeeding year. The Corporation will have to complete the felling, before the end of February and conversion carriage and stacking of cntire produce at a safe place inside or out side the leased area before 31st March of the succeeding year. No work will be allowed from 1st April to 30th June of the succeeding year except for carriage of extracted produce with the permission of Forest Officer Subject to such conditions as he may wish to impose at his sole discretion if he is satisfied that the fire protection measurers are not adversety affected.

[Standard agreement ded of 1982]

c. **Khair Trees**:-The period of lease shall be upto 31st May of the succeeding year. The Corporation shaqll have to complete the fellings by 28th February. Conversion and carriage of produced outside the leased area before 30th June of the succeeding year.

[Standard agreement ded of 1982]

d. **Coppice Coupe lots**:-The period of lease shall be upto 30th June of the succeeding year. The Corporation shall have to complete the felling before 28th February. Conversion and carriage of produced outside the leased area before 30th June of the succeeding year.

e. **Sal, Sain, Kokath and other Broad Leaved trees**:- The period of lease shall be upto 30th June of the succeeding year. The Corporation shall have to complete the felling before the end of February, Conversion, carriage and stacking of entire produce inside or outside the leased area before 31st March of the succeeding year. No work will be allowed from 1st April to 30th June of the succeeding year except for carriage of extracted produce with the permission of Forest Officer subject to conditions as he may wish to impose at his sole discretion, if he is satisfied that the fire protection measures and regeneration operations are not adversely effected.

will grant the 1st and 2nd extensions and thereafter the matter shall be sent to Pr.CCF HP for his decision.

[PC meeting dated 18.8.2001]

Exemption from payment of extension fee due to delay in award of works on account of unforeseen/unavoidable reasons e.g mass boycotting of tenders by LSMs.

The Pricing Committee desired that specific cases will be referred to PCCF by MD HPSFC which sould be decided on merit of each case.

[PC meeting dated 28.10.1999]

Enhacing of extension fee for 2nd, 3rd and further extensions:-

Principal CCF HP proposed to increase rate of extension fee to be charges on late completion of lot, when the extension is sought for 2nd & 3rd time. However MD HPSFC agreed that the corporation has to pay fee @2% per month on the unpaid amount of royalty which about to 24% PA. He further requested that since the current bank rates – come down to about 11-12%, the rate of extention fee is alos required to be reduced correspondingly. After detailed deliberation, it was decided to charge extention fee on the late completion of lots as under:-

Table -4.2

Particulars of	**If royalty paid**		**If royalty not paid**	
	Existing Rates	**Revised Rates**	**Existing Rates**	**Revised Rates**
For 1st extention	0.3% PM	0.2% PM	2% PM	1.5% PM
For further extention	0.3% PM	0.3% PM	2% PM	2% PM

It was also decided that in future the corporation shall pay extention fee for actual period for which a lot is worked beyond the stipulated lease period.

[PC meeting dated 18.8.2001]

DMs/ Director to apply for extension within 15 days of expiry of lease period.

Revised proforma for processing extension cases.

[Memo No. Ft 21-713/85(S) Vol II dated 20.10.2003]

Charging of Extension Fee on Loaded Lots:-Loaded lots are worked by HPSFC on behalf of Forest Department for supply of timber and fuel wood to local people for domestic use and on "no profit no loss" basis. No extension fee would therefore, be chargeable on loaded lots.

[Meeting dated 19.06.2001 under FC Fst.]

11. Fixation of Royalty Rates for Resin/Tree Lots of All Species:-The royalty rates are decided by the Pricing Committee on year to year basis which are circulated to all CFs/ DFOs

f. **Bomboo lots:-** The period of lease for Bamboo lots shall be upto 31st May of the succeeding year. The Corporation will have to complete the felling before 15th March of the succeeding year and shall complete the conversion and carriage of Bamboo outside the leased area before 31st May of the succeeding year.

[Standard agreement ded of 1982]

Powers to fix working period in view of peculiar circumstances on an individual lot:-

While deliberating on the issue of claiming of extension fee in the case in which the period of Working was extended to two working seasons against one year lot – matter pertaining of exploitation work in Pangi Forest Division, the Pricing Committee decided that the Principal CCF HP is fully competent to fix working period of any lot keeping in view the site and climatic conditions.

[Item No. XVI of PC meeting dated 22.7.2003]

10. **Extension in Working Period & Extension Fee:-** On the expiry of the lease period, the Corporation shall have no right on such trees as are left standing in the leased forest and the felled trees and any scattered stacked timber un-removed from the leased Forest provided the Committee constituted by the Govt. vide notification No. Fts (F) 12- 28/80 dated 05.12.92 (i.e. Committee of concerned CF, Director and adjoining CF) may extend the period of lease laying down such conditions as are necessary to safeguard the Forest working considering the facts of the case, on receipt of an application explaining reasons for no completing the work. Further, for all extension granted, extension fee @ 2% per month on the balance payable amount of royalty shall be levied.

Provided further that where the entire royalty has been paid extension fee at the rate of 0.3% per month shall be leviable on the total sale price (for the purpose of calculating extension fee this will be counted from the date of expiry of the exiting contract in continuity).

That further the extension granted will be subject to the condition that the date of payment of royalty instalments will not be effected.

[Item No 18 dated 1.3.1994]

Simplified procedure for consideration of extension cases:-

As per the decision of the Pricing Committee dated 5.12.92 under item No-14 a committee comprising of the concerned CF, CF of the adjouning circle and the counterpart Director, was to decide grant of extension in working period for HPSFC lots. This is a cumbersome procedure and it was, therefore, decided that in furure concerned territorial CF

for implementation. Brief of the specific decisions taken by the Pricing Committee regarding fixation of royalty rates are reproduced below:-

Simplilication of royalty calculations:-

It was decided in the Pricing Committee held on 11.07.2001 that for simplification of procedure for fixing the royalty rates of various species i.e. coniferous/ Broad leaved species, a committee be constituted for exploring the feasibility of fixing the rate on advalorem basis. The committee was to submit its report within one month of its constitution and place it before the next Pricing Committee for discussion/decision. Accordingly a committee was constituted vide notification No FFt-B-A(4)6-96-II dated 9.7.2001. This committee discussed the matter on 17.8.2001.

The royalty actually paid by the Forest Department for last 6 year from 1995-96 to 2000-01 and sale rate of timber in HSDs corresponding to these years were placed before the committee. After detailed discussion, it was decided that the rates on the basis of for the last 3 years may be considered in respect of Deodar, Kail, Fir, Spruce, Chill and other species. It was put forth by the Managing Director, H.P. State Forest Corporation that the royalty rates are required to be determined before the commencement of the financial year in order to pay the royalty and sales tax during the year and also to work out the budget and file advance tax returns whereas the sale rates for the year shall be payable after the close of financial year. In such a situation, it would not be possible to determine the royalty rates at the beginning of the year. It was therefore decided that the sale rate of preceeding financial year be taken into account for determining the royalty rates for the succeeding year.

It was accordingly decided by the committee that the royalty rates (per– standing volume) of different species as percentage of weighted average sale in HSDs of such species obtained during preceeding year be decided uniformly for the State (excluding Dodra Kawar) and shall be as follows:-

Table -4.3

Deodar	25%	Eucalyptus	25%
Kail	25%	Shisham/ Tun	30%
Fir/Spruce	13%	Sain	28%
Chill	12.5%	Sal	16%
		Khair (MG)	4%

In respect of Dodra Kawar, special concessional rates were fixed in the past in view of the difficult working condition and higher working cost of timber. Therefore, the rate shall now be in the same proporation over average rates for the state as was prevalent in the previous year. The percentage approved therefore, was 24% for Deodar, 28% For Kail and 31% for Fir/Spruce of rate fixed for the State.

The conditions governing the royalty rates were decided as below:-

The royalty rate shall be for all type of marking (salvage & green) and irrespective of intensity of marking per hectare.

The rates so determined shall be applicable uniformly through out the State except for the lots and trees marked in Dodra Kawar for which separate rates are to be fixed.

For evaluating and charging damages illicit felling etc. of green trees, the rate shall be increased by 100%.

(This condition reviewed in the PC Meeting dated 22.7.2003 and it was clarified that the provisions of clause 16 (a) of the standard agreement deed will be applicable for the illicit felled trees whether green on dry.)

Where royalty of the unfit (rotten) trees found after felling is concerned, the decision taken by the Pr. CCF H.P. vide this letter No Ft. 34-50-93 (S) Vol XI dated 4.10.99 under para 5 (a) (b) and also copy endorsed vide endorsement of even number dated 7.1.2000 which was subsequently approved by the Pricing Committee in its meeting lated 28.10.99 will continue to apply.

Royalty rates to be applied on half broken trees:-It was decided that for half broken tress 50% of the royalty rate fixed for the sound trees will be charged and all old future cases will be decided accordingly.

[PC dated 18.8.2001]

Comparison of prices obtained from Govt lots

Hon'ble Chairman suggested that in fixation of royalty rates comparsion of prices obtained from Govt. and private lots be done. The suggestion was noted by the MD HPSFC Ltd.

[PC meeting dated 3.7.2003]

Fixation of royalty rate for chilgoza species:-

It was decided that royalty rate of Chil trees for the year 2002-03 will be applicable to chilgoza trees handed over to HPSFC in the years 2001-02 and 2002-03. For subsequent years, the royalty rate will be determined on the basis of actual price received in auction by HPSFC.

[Item No XVII dated 22.7.2003]

Fixation of royalty rates for kokath and other broad leaved species on advalorem basis:-

The MD HPSFC has proposed that royalty rate for all types of marking of B.L. trees be also fixed on advalorem besis instead of on intensity factor. The matter was discussed in detail and it was decided that as the advalorem system of royalty calculation was already in vogue for conifer and commercial broad leaved species since 2001. The same system may also be adopted for fixation of royalty rate in respect of Kokath and other B.L. species fro 2004-05 onwards it was decided that the HPSFC will pay the royalty on advalorem basis @20% of the weighted average sale rate for the preceding year. The Advalorem rates will be applicable without intensity factor which has now been done away with.

[PC meeting dated 15.2.2005]

Royalty for bamboo lots for 2004-05 and onwards

The corporation will pay @30% of the gross sale relisation as royalty to the forest department for the year 2004-05 onwards.

[Item No 4 PC meeting dated 15.2.2005]

Royalty for fire burnt blazes:-It has decided that the blazes which dry up after fire, the rebate of 30% in royalty rates will be given.

The list of dried up blazes will be prepared jointly by the Forest Corporation and Forest staff and finalized before 31st August each year failing which it will be assumed that no blazes have dried up and full royalty will be charged for all blazes.

For the old cases, H.P. State Forest Corporation will pay for all the blazes handed over to them and no rebate will be allowed for blazes gone dry on account of fire incidence in the previous years.

[Item No III dated 4.12.1986]

Royalty of trees coming in the road alignments:- After clearance has been obtained for diversion of forest land under the Forest (Conservation) Act, 1980, the trees coming in road alignment schemes be handed over to the HP State Forest Corporation for working as regular lot instead of charging market rates from PWD. However, these instructions shall be applicable in case of HP PWD only. The PWD will pay cost of compensatory afforestation as usual. Permission for removel of such tree whether green or dry would not be required further once Govt. of India clearance has been received.

[Memo No Ft 48-66/83(M) dated 20.2.1995]

Royalty of dry taxus baccata trees:-

Principal Chief Conservator of Forest, HP was of the view that the royalty rate of dry *taxus baccata* be fixed at par with the royalty rates of Shisham M.D.HPSFC stated that it is not yet known the value of taxus baccata is at par with that of Shisham or not. After detailed deliberations, it was agreed that royalty can be decided on actual rate basis after deducting all expenses.

[Meeting 19.6.2001 under FC Ft]

Royalty of unfit/hollow/rotten trees:-Pricing Committee in its meeting dated 28.10.1999 has approved the recommendations of the meeting dated 2.9.99 held between the Pr.CCF H.P and the MD. HPSFC with regard to the hollow/rotten trees. In this meeting the criteria of conifers and B.L trees to be classified as fit or unfit were fixed on the basc of Memo. No Ft.112-2/71 (S) dated 22.7.93.

Corporation to pay royalty in advance for the entire volume and be given pro rata deduction for the hollow/rotten trees.

[Memo No Ft 112-2/71(S) dated 10.11.1993]

No royalty will be payable for hollow/rotten trees. Rotten/hollow trees of different species will be those which have 25% or more rot or hollowness at the stump cross section. This will be determinded by the joint inspection to be conducted by the respective SDM of HPSFC Ltd. ACF of Forest Department on the request of the HPSFC Ltd. within a period of 2 months after felling and such inspection will be conducted only if the volume of such rotten/hollow trees is more than 5% of the total marked volume.

[Item No IV of the meeting held between APCCF HP and ED on 2.9.1999]

The corporation will pay royalty for the entire volume and be given pro rata deduction for the hollow/rotten tree (volume).

[Ratified by the PC dated 28.10.1999]

Instructions issued by the PCCF HP for inspection of hollow/unfit tree:-

In case no SDM or ACF is posted, then concerned DMs/DFOs may carry in the joint inspection. If it is not possible for the DMs/DFOs then services of SDMs/ACFs of adjoining FWD and Forest Division be utilized.

Since no royalty is chargeable from HPSFC in respect of rotten/hollow trees, as such the joint inspection be carried out strictly according to decision/formula mentioned in item No II (5a) of Pricing Committee meeting held on 2.9.99. Therefore it is emphasized that the joint inspection report should be self-speaking containing all vital information and free from likely, Audit objection. The list of trees must contain original serial number of marking list name of Forest/Compartment and percentage of rot/hollowness at stump cross section.

[Memo No Ft 22-412/2000(S) dated 8.7.2003]

Inclusion of rates of pulpwood & fuelwood sold at roadside depots for fixing the royalty rates:-

The MD, HPSFC Ltd. pointed out that the average weighed sale rates supplied by him for the year 2003-04 also included the sale of pulpwood and fuelwood at roadside depots which had further reduced the rates. The members felt that this was not proper and it was decided to follow the practice of taking weighted average sale rates of Him Kasth Sale Depots of HPSFC Ltd. Accordingly, the final royalty rates for the year 2004-05 were approved as per the sale figure provided by the MD, HPFSC vide his letter No HPSFC/Wks/SKD-66/Vol0XII/25735 dated 14.2.2005.

[PC meeting dated 15.2.2005]

Sales tax:-

The HPSFC Ltd. will pay sales tax as is leviable under the relevant Sale Tax laws of the State on the sale value of the lots in addition.

No adjustment of sales tax dues paid in excess during particular year be made unless stipulations as laid down under. Section 18 of HP GST ACT 1968 and Rules 48 to 52 of HP GST Rules 1970 are got compiled with.

[Memo No. Ft 25-57/2001(S) Vol II dated 30.11.2004]

12. Due Dates for Payment of Royalty Installments of Resin/Tree, Bamboo Lots Etc.

(I) Resin lots.

50% by 15th September.

50% by 15th December.

[Item No 5 dated 4.12.1986]

(II) Tree lots.

a. High lying coniferous

i. One year lots.

½ of royalty by 30th November.

½ of royatly by 20th March.

ii. Two years lots.

1/4th of royalty by 30th November.

1/4th of royatly by 20th March.

1/4th of royalty by 30th November.

1/4th of royatly by 20th March. (Final)

iii. Three years lots.

1/6 of royalty by 30th November.

1/6 1/4th of royatly by 20th March.

1/6 of royalty by 30th November.

1/6 th of royatly by 20th March

1/6 of royalty by 30th November.

1/6th of royatly by 20th March (Final)

[Item No. V dt 4.12.86 and PCCF HP memo No Ft 34-50/93(S) Vol XVI dt 31.8.2004]

(B) Chir lots:-

1/3 royalty by 15th January

1/3 royalty by 20th March

1/3 royalty by 15th June

(C) Khair and coppice coupe lots B/L:-

1/3 royalty by 15th February

1/3 royalty by 15th March

1/3 Balance royalty by 15th June.

[Item No. XVI dated 4.12.86, Memo No Ft 31-42/92(S) Vol VII dated 5.2.2004]

(D) Bamboo lots:-

20% of the gross sale of bamboo lots payable 30th June of following year w.e.f. 1993-94 (to 2003-04). The sale tax in this respect will have to be paid by the Corporation in accordance with the provisions of sale tax act.

[Item No 15 dt 1.3.1994 and item No 9 dt 6.8.94]

(E) Supplementary markings:-The supplementary markings will be paid as earlier decided in the Pricing Committee meeting held on 04.12.1986 i.e. on the lease rate of the division approved by the Govt. on the recommendations of the Pricing Committee for the year in which such trees are actually handed over.

While deliberating on the issue of handing over of unscheduled supplementary marking by DFO Chamba in Lot No. 2/95-96 (Chamba) the committee decided that:-

The Committee feels that the royalty in respect of supplementary marking should be presumend to have fallen due on the date on which supplementary marking was handed over and interest on such enhanced royalty becomes payable only after 90 days. No extension fee to be charged for the supplementary markings. However, extension fee required to be paid for the left over trees of original lot.

[Item No 1 Meeting APCCFHP and ED on dated 2.9.99]

The Pricing Committee decided that royalty payment on account of supplementary marking will be paid pro-rata alongwith remaining royalty installment of lots after such trees have been marked and hand over to HP SFC.

[Item No 11 of PC meeting dated 28.10.1999]

In case last due date of payment happens to be a holiday:-

It was decided by the PC in its meeting dated 24.5.1995 (item No 17) that 15th and 16th April, 95 being holidays, the payment made by the HPSFC on 17.4.1995 be treated made within 90 days (being due on 15th April 95).

13. Penalty for Damage to Forest:-

(A) Resin Lots.

Penalty for illict/outshaped blazes.

1. **Illicit blazes:-**The Corporation will pay full royalty for illicit blazes detected during the year and the Department will be at liberty to remove the lips and cups and stop further tapping of such blazes.

The Corporation shall have to pay full royalty for the entire year even through the tapping may have been stepped by removal of cups and lips during the season.

In addition to above, the Corporation will pay a penalty of Rs. 4/- per blazes for illicit blazes.

[Item No 14 dated 16.5.88 and item No 12 dt 1.3.1994]

2. **Outshaped blazes:-**A penalty of Rs 2/- per blaze will be payable by the Corporation for all outshaped blazes for one or more defects. *It was also decided of responsibility for payment of penalty to the Department is that of Corporation and the Corporation may or may not recover the same from the mates who are allotted works. It was decided that Corporation will take suitable steps to black list mates who indulge in illicit tapping or defective tapping.*

[Item No 14 dated 16.5.1988 and item No 12 dated 1.3.94]

REVIEW OF RESING EXTRACTION WORK IN CHIL FORESTS PENALTY FOR DEFECTIVE RILLS AND ILLICIT BLAZES DECISION OF THE MEETING DATED 5.6.1996.

Penalty for rills more than the permissible limit:

Number of rills permissible during the resin tapping season being 32, it was decided that a penalty of Rs 25/- should be charged from the labour supply mate/labourers, if the number of rills are from 33 to 40. In case the number of rills is more than 40 Rs. 100/- will be changed per rill.

Penalty for defective width, depth and inter-distance between rills:-

In case, the depth of a rill exceeds the permissible limit of 4mm, width of blaze exceeds the permissible limit of 20 cm and distance between the rills is more than 5mm, Rs 10/- would be charged for each defect, separately.

Penalty for Illicit blazes:-

Would be Rs.100/- per blaze/

Penalty for concentration of acid more than allowable limit:-

Rs.500/- per offence.

Use of guide:-

It was also decided that use of guide with the rill knife by the tapper would be compulsory. Penalty for not using the guide would be Rs.10 per offence.

Penalty of illicit/ out shaped blazes:-

The entraced rates by the PC dated 1.3.1994 for illicit and out shaped blazed of Rs. 4 and Rs.2/- will be applicable from 1994 resin season.

[PC-25.4.95 P:132/Item No 19.]

Illicit/outshaped blazes:-

Enhancement of rates.

The PC decided penalty for rills, defective width and illicit blazes as approved by the BoD meeting held on 10.2.1997 as under:-

Rill 33-40	Rs 3/- per rill
41-50	Rs.50/- per rill
Above 50	Rs.100/- per rill
Width above 23mm	Rs. 10/- per rill
Depth more than 4mm	Rs.10/- per rill
Distance between rill more than 5mm	Rs. 10/- per rill

Tree lots:-

As per provisions of Standard Agreement Deed, the assessment of damages in tree lots is to be made as under:-

Illicit felling:-

The HPSFC shall be liable to pay the price of royalty on the prevailing market rates as fixed for the year whichever higher alongwith a penalty of 100% thereon.

[standard agreement deed of 1982 clauce 16 (a) and PC decision dated 22.7.2003]

Entangled Trees:-

That should any sold tree be arrested in its fall by an unsold tree in such a manner that the former can not be utilized without felling or injuring the latter, the HPSFC will be required to fell the unsold tree and to pay penalty at 25% of the royalty rate or prevailing market rate as fixed for the year whichever is higher in addition to the price of the tree at the royalty rate or the market rate whichever is higher. That should any sold tree in the course of its fall break or injure an unsold tree of Deodar, Kail, Chill, Fir/Spruce any tree of any other species, the HPSFC will be required to pay penalty as under:-

a. **Avoidable damage:-** Avoidable damage will be that which is caused due to the negligence or not taking due/proper precautions during fellings and other exploitation operations. For such avoidable damage penalty @50% of the royalty rate or prevailing market rate as fixed for the year whichever is higher shall be payable by the HPSFC.

b. **Unavoidable damage:-** No penalty will be charged for unavoidable damage. Provided that the damage trees which are unfit for survival will be handed over to the HPSFC and price thereof shall be charged @ royalty rate or prevalent market rate as fixed for the year whichever is higher.

c. **Felling of Un-hammered tree:-** The HPSFC shall not fell any tree without distinct carved marked number of hammer mark, and in case of double shall apply to the Forest Officer to get the same deciphered by him or any Gazetted Officer authorized by him in this behalf, who shall affix his personal hammer and only thereafter the trees shall be felled.

[Standard agreement deed of 1982]

d. **Bamboo lots:-** The damage bills for bamboo will be charged on 50 paise per culm in addition to royalty.

[Item No XXII dated 4.12.86]

Penalty for green felling after imposition of ban on green felling by Supreme Court:-

If green trees marked by negligence of the marking officer and handed over to the HPSFC for working functionaries of the HPSFC not to undertake felling of such trees and the matter to be brought to the notice of concerned DFO for getting such trees deblazed. In case green trees are found to have been felled by the Corpn the same will be treated as illicit felling by the HPSFC.

[Memo No. Ft 112-2/71(S) dated 1.1.2003]

14. **Raising of Damage bills for Coniferous and other Trees:-**The damage bill be submitted by the DFOs with in one month of expiry of lot in case of Chill, Khair, Coppice, Bamboo and other broad leaved lots.For high lying coniferous forest, bill will be furnished latest within two months of the expiry period of the lots. The period of presenting damage bills, may be extended with the approvel of Pricing Committee under special circumstances. In case of non-acceptance of damage bill within one month, these may be deemed to have been accepted by the Forest Corporation.

[Item XVIII dated 4.12.1986]

Instruction regarding issuance bills to the HPSFC:-The damage/illicit felling etc detected be immediately got acknowledged/signed by the regular staff viz; Fgd./B.O/A.M. of HPSFC. This document should contain full signatures name, rank and place of posting of officials signing such reports etc as per provisions of standard agreement deed and Pricing Committee decision dated 04.12.1986 (Item No.XVIII).

Regarding the damages/illicit felling observed during the currency of lease period (or extended lease period) of a lot by the HPSFC/LSM, necessary action be concluded promptly as per provision of clause-16 (a,b,c) of standard A.D decision of Pricing Committee and other instructions thereof.

The damage bill be prepared and sent to the Divisional Manager, HPSFC concerned alongwith attested photo copies of acknowledgement receipt given by the staff of HPSFC as per time frame laid-down vide Pricing Committee decision 04.12.1986 (Item No XVIII. The Divisional Manager be clearly requested to deposit the payment of damage bill within stipulated period. DFOs will also endorse copy of damage bill to the respective CFs, who in turn will intimate the same to the Direction Office also.

[Memo No Ft112-2/71(S)(B) dated 7.7.2004]

15. **Interest on Belated Payments:-**All old case of interest on belated payments prior to the year 1986-87 were decided to be charged according to the relevant provisions of standard agreement of 1982 or as may be otherwise decided by the Govt on the recommendations of the Pricing Committee, to charge the interest on lump-sum basis or otherwise, for the year 1986-87 and onward, the interest is chargeable @15% P.A. in the following manner:-

1. In case the payment is made within 90 days, no interest will be charged.

If the payment is made after 90 days, after its becoming due, the interest will be reckoned from the date on which the royalty was actually payable by the HPSFC and there will be no grace of 90 days. Further the rate of interest the belated payments were decided to be charged @ 16.5% P.A. w.e.f 1991-92 (i.e 01.04.1991 onwards).

The interest rate reduced at 11.5% instead of 16.5% which was being charged since 1991-92 owing to the reason that the current lending rate has been reduced ot 11.5%. The decision is to be made applicable w.e.f 01.4.2001. in the PC meeting dated 15.2.2005 this rate has further been reduced to 9% from the year 2004-05.

[PC dated 18.8.2001 and 15.2.2005]

16. **Interest on Interest, Extension Fee and Damage Bills:**-The HPSFC shall pay interest on interest on belated payments @ 15% P.A. w.e.f. 01.04.1983 onwards which will be calculated taking into total payable interest os on 30th June and 31st December every year. No interest on interest be charged from HPSFC for the year 1990-91 to 1991-92.

It was decided in the PC meeting dated 22.10.1994 vide item No 3 that no interest on interest will be charged for the year 1993-94 and onwards.

The extension fee and damage bills are itself a form of penalty as one time settlement. In view of this, the interest will continue to be payable on the belated payment of royalty and no interest will be payable on extension fee and damage bills.

[Item V(III) PC meeting dated 18.8.2001]

Interest on belated payment-Grace period:-

The PC decided to charge interest for 1 days on the belated payment of royalty paid on 29,2,1996 instead of 28.2.1996.

[Item No 15 dated 29.5.1997]

17. **Interest on Belated Payment on Account of Seized Timber:**-The Managing Director, HP State Forest Corporation Ltd. Informed that necessary instructions to the field functionaries of the HP State Forest Corporation Ltd stands issued to release to amount of sale of seized forest produce received in the auction to the respective DFOs within 90 days under all circumstances. The Committee has further decided that the payment on account of seized forest produce auctioned by the HP State forest Corporation Ltd. will be made within 90 days from the date of actual receipt of the amount by HPSFC and if the sale proceeds not deposited within stipulated period, the HPSFC will be liable to pay interest @12% per annum.

[Item VIII of PC meeting dated 22.7.2003]

18 **Breach of Terms and Conditions:**-That in the event of breach of the terms of conditions of this instrument by the HPSFC for which a special penalty or compensation has not been provided for, the HPSFC shall be liable to pay a forfeit as determined by the Forest Officer, which may extend to Rs. 250/- for each such breach or as the case may be.

[Standard agreement deed of 1982]

19. **Breaking of Fire in the forests:-**

(i) That in the event of fire breaking out in the forest or forest in which HPSFC is carrying on operations from any case whatsoever, the HPSFC, its employees and labourers employed on such operations or persent where these are being carried out shall at once proceed to the scene of the fire and shall do their best to extinguish or assist in extinguishing it.

(ii) That the HPSFC or employees and labourers are not permitted to smoke, take or kindle fire in the forests. In the event of any fire breaking out in the Forest through the negligence of the HPSFC shall be held responsible for the damage thereof.

20 **Deployment of the (Local) Labour:-**That subject to availability, the Corporation shall employ local labour as far as possible working of the leased forests at least up-to two-third of the manpower required. However, the Corporation will not deploy any labour disapproved by the Forest Officer.

[Standard agreement deed of 1982]

21 **Compensation to Labour:-**That the Corporation will pay compensation to the labour employed on work under Workmen's Compensation Act or under the Indian Fatal Accidents Act or under any law for the time being in force.

[Standard agreement deed of 1982]

22. **Progress Reports:-**That the Corporation will submit (lot wise detailed) monthly progress report to the Forest Officer concerned for progress of each lot in the proforma prescribed by the Pr. CCF to watch the progress of the work and facilitate issue/check of export permits.

DFOs must ensure that lot-wise upto date progress report of felling/conversion as well as that of resin extraction is obtained from respective A.Ms/D.Ms of HPSFC before 5th of following month. The progress report be checked properly and kept on record. Action on any discrepancies/short fall be taken simultaneously as per provisions of standard agreement deed and decision of Pricing Committee. The converted produce being exported by HPSFC must tally with quantity/volume mentioned in the progress report and should be in accordance with the permissible out-turn percentage. Random checking and comparison with the figures shown in the progress report and quantity exported may be done.

[Standard agreement deed of 1982, Memo No Ft 112-2/71(S)(B) dated 7.7.2004]

23 **Registration of Sale Depots:-**That the Corporation will get the sale depots registered as per H.P. Sales of Timber Act, 1968 and shall also maintain all records all records as required as per H.P. Sales of timber rules Act.

24 **Working in Khair Lots:-**That in case of Khair trees, no uprooting and whippings of Khair stumps will be permitted.

Any dispute in working of forest lots in future by HPSFC will be subject to decision of Pricing Committee.

25 **Signing of Agreement Deed by HP State Forest Corporations:-**Since the HP State Corporation is only an agency of the Govt for the purpose of exploitation of all forest working and the pricing committee has reviewed also all the clause of the standard agreement deed which regulate the forest working and took decision from time to time and approved by the Govt as well. Therefore, there is no necessity of signining of an agreement deed by the HPSFC. [Item No 15 of PC dated 6.8.1994]

26 **Reconciliation:-**

(a) Presenting of status paper regarding position of realization of royalty.

In order to review the position of outstanding as well as performance on account of realization of royalty and sales tax etc. the MD,HPSFC and the Forest department will present a status paper annually at the time of taking up the items relating to fixation of royalty of coniferous lots for the proposed year.

[PC meeting dated 24.5.1995]

b. Release of outstanding amount after reconciliation.

After detailed descussions, it was decided that the joint reconciliation of outstanding dues would be made on quarter basis at the level of D.Ms/DFOs and at the level of CFs/Director. Now onwards, based on reconciled figures, the HPSFC will clear the outstanding dues to Forest Department within 90 days of the date of reconciliation.

[PC meeting dated 15.2.2005]

c. Reconcilation of volume, royalty, Sale Tax and damage bills etc:-

To sort out the issues first at the level of DFOs and DMs and then at Director/CFs level after arranging the meeting with them. The unsettled issues may be referred to PCCF for sorting out them after calling a meeting with the MD.

[PCCF letter dated 11.9.98]

27 **Intensity Factor:-**It was decided that intensity factor shall be applicable in case of salvage marking of broad leaved species also on the same principles as applicable to coniferous species. As far as the application of intensity factor to khair salvage timber is

concerned, it was decided that, since measurement of khair is carried out in terms of MG, the royalty in respect of salvage khair trees will be charged as follows:-

At 60% of the royalty of green trees if the intensity of marking is 15 MG and above per ha considering total area of a forest or compartment.

At 50% of the royalty of green trees if the intensity of marking is 5 MG to below 15 MG per ha. At 30% of the royalty of green tree if the intensity of marking is below 5 MG per ha.

[Memo dated 15.7.1999 and PC dated 23.2.1999]

b. Shisham:-

It has been decided that in case volume factor of Shisham are not available in repect of the divisions in which markings have been done the volume factor prevailing in the adjoining divisions shall be applied. In case, no volume factor in respect of Shisham exists in any of the division of that Circle, the volume factor prescribed in Nahan Working Plan in respect of Shisham shall be applied for the calculation of royalty/ sale tax year 1997-98 and 1998-99 as well as therefore.

[Memo No Ft 112-2/71(s) PART FILE DATED 2.7.1999]

c. Dry trees marked along road side (Item No 5 of Pricing Committee meeting dated 28.10.99.

Since the rate fixed for 2001-02 are not based on intensity factor hence. The rate as fixed for coniferous and broad leaved species shall apply for 2001-02 without taking into account the intensity factor, it was suggested that for past cases 70% intensity factor will apply, as working and carriage from road side is much easier than in/from normal forests. However, after discussing it was decided by the Pricing Committee that 50% intensity factor to all apply in such cases.

28 Classification of Fit/Unfit Trees of All Species for Charging of Royalty:-

Coniferous:-

Markings lists of coniferous trees will be prepared in accordance with the PCCF HP memorandum No Ft. 112-2/71 (S) dated 22.7.1993. However the contents of para 2.2 may not be made applicable in respect of IV and Vth Class trees.

Trees of IV and V Class

If a tree can yield atleast one sound pole of 4 meters length and width girth of 45 cm at any end it may be classified as fit.

[Item No VI meeting APCCF Hp and ED on 2.9.99, PC meeing 28.10.1999]

The period of pointing out discrepancies regarding marking fit/unfit trees may be extended to 2 months in place of existing provision of 1 month from the date of felling.

For Sal, Broad-leaved species Shisham,Khair, Copices and Fuelwood lots,- classification of fit/unfit trees may be done along the guidance which were fixed in CFs meeting held on 23.11.93 and the same is reproduced below:-

Trees of IIB and above classes.

In case the trees can yield at least one sound log of 3 meters in length with a minimum mid-girth of 1.5 meters.

The trees of below IIB i.e. IIA and III classes. In case the trees can yield at least one sound pole of 4 meters length and with a girth of 1 meters at any end. Trees of IV class. In case the trees can yield at least one sound pole/log of 5 meters length and with girth of half meter at any end. Trees of V class. In case the trees can yield one sound pole of 3 meters length and with a girth of 45 cm at any end.

3) Shisham:-

i) For trees below 30 cm in diameter. In case the tree can yield at least one sound log of 3 meters in length with a minimum girth of 45 cm at any end it may be classified as fit.

ii) For trees 30cm to 50cm in diameter. In case trees can yield at least one sound log of 2.2 meters in length with a minimum mid girth of 0.9 meters they may classified as fit.

iii) For trees 50cm and above in diameter. In case the tree can yield atleast one sound log of 3 meters in length with a minimum midgirth of 1.25 meters may be classified as fit.

4) Khair:- Hollow and rotten trees which have 25% or more nor or hollowness will be classified as unfit. [Item No VI meeting APCCF HP and ED on 2.9.99, PC meeing 28.10.1999]

29. Supply of Fuelwood and Timber by the HPSFDC to the Existing Depots of the Forest Department:-It was decided that fuelwood and timber depot in non-tribal areas will be maintained by the HPSFC and those in tribal areas by the Forest Department. Accordingly, all establishment charges including watch and ward of timber/fuelwood depots imaintained in tribal area will be borne by Forest department and in Non tribal areas by HP State Corporation. All pending issues if any will be settled accordingly.

[Item No 10 PC dated 28.10.1999]

Losses due to driage of fuel wood supplied to tribal trees:- Matter regarding releasing payment in respect of the fuel wood supplied by HPSFC to the Forest Department for sale in tribal area has been hanging fire since long and reconciliation could not be done in the absence of clear cut decision whether driage in the sale depots of the Forest department is to be accounted for by the Deparment or by the HPSFC. The committee noted that the fuel

wood depots in the tribal areas are managed by the Forest Department and the HPSFC had been delivering the intended quantity of fuel wood was being done by the Forest Department throughout the winter season. It was decided that Forest Department will pay, by way of adjustment against dues, the cost of fuel wood and the transportation charges to HPSFC for the actual quantity handed over by HPSFC in the depots in the tribal areas. Part cases if any will be decided accordingly as well as future cases also. Driage in sale depots, if any, will be borne/written off be the Forest Deparment. This will apply to all old pending cases as well as in future. As decided earlier in the Pricing Committee meeting held on 28.10.99 watch and ward charges incurred on the depots will also be borne by the Forest Department.
[Meeting under FC (Forest) dt 19.6.2001]

30 **Department Charges on Sale of Fuel Wood in Tribal Area:**-Pricing Committee agreed that no deparment charges shall be charged from HPSFC on sale of fuel wood in tribal area. All the past case will be decided accordingly. [PC dated 18.8.2001]

31 **No Deduction from the Royalty on any Account:**-The Committee decided that HPSFC Ltd. will in future not make any deduction from the royalty on accont of any dues payable by Forest Department to the HP State Corporation Ltd.
[Item No X and XI oof PC dated 22.7.2003]

32 **To Suggest Ways and Means of the Department & the Corporation:**-The Committee further advised that the CCF (P&D) and Executive Director, HP State Forest Corporation Ltd will meet regularly to suggest ways and means in the best of the Forest Department and Forest Corporation Ltd.

33 **Timely Holding of the PC Meeting:**- Addl. Chief Secretary cum Secretary (Finance) suggested that the Pricing Committee meeting be held early preferably by May, June every year. It was decided that in future the meeting of the Pricing Committee would be held in the month of May and the Forest Corporation will ensure timely submission of relevant data to the Pr.CCF before 30th April every year. [PC dated 15.2.2005]

34 **Handing over of Back Possession of Lots:**-Possession of the concerned lot to be handed over back within 30 days after expiry of the original/exetended lease period of the lots. If back possession not handed over within the stipulated period, the HP SFC would lose all right on felled/Unfilled trees including un-removed converted produce which automatically as per rules reverts back to the Deptt. Govt. [Memo No Ft 112-2/71(S) part vol II dated 21.2.2005]

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CHAPTER V

FIVE YEAR PLANS

5.1 GENERAL

The forests of the division have been managed for getting sustainable yield. The silvicultural fellings were 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, fir, spruce etc. Growing demand of forest produce in the state especially that of timber resulted in focus on large scale plantations of commercially important species. Although the plantation programme started from first Five Year Plan but it gained momentum from third Plan onwards. The Plan wise management of forests is depicted as under:-

5.2 FIVE YEAR PLAN (1951-56 to 2009-2010)

5.2 I Five Year Plan (1951-56):- During 1951-54, the forests were worked as per the working plan by Shri Kartar Singh and from 1954 to 1956 by Sant Ram. The allotment of forests to two working circles, viz., Deodar Working Circle and Chil Working Circle was retained. Deodar Working Circle comprised the Kalatop and Dadra reserves with 2668 acres of area. A method of group selection coupled with concentrated fellings and concentrated fellings and concentrated works of regeneration were carried out. The Chil forests of Banikhet and Surkhigala reserves were proposed to be worked under combined selection and improvement fellings.

The year-wise revenue and expenditure of the erstwhile Dalhousie Forest division is tabulated as under:

Table -5.1

Expenditure and Revenue of Dalhousie Forest Division during First Five Year Plan

Year	Revenue(`Rs)	Expenditure(Rs`)	Surplus(Rs`)
1951-52	157033	25061	131972
1952-53	157305	26124	131181
1953-54	140355	29707	110647
1954-55	731939	175991	555947
1955-56	752884	249673	503211

(Source: WP by Sant Ram, R.C. Sharma)

5.2.2 II Five Year Plan (1956-61):- During this period, the Deodar forests of Kalatop, Kainthly and Dadra were worked under Indian Irregular Shelterwood Working Circle having an area of 792 hactares. The prescribed yield for deodar was 23678cum against the actual yield of 20171cum with 3507cum deficit, for Fir prescribed yield was estimated at 6074cum while the actual yield was 719cum with 1355cum deficit. For Chil working circle the prescribed yield was 29733cum while the actual yield was attained at 26375cum with deficit of 3358cum.

The year-wise revenue and expenditure of the erstwhile Dalhousie Forest division is tabulated as under:

Table -5.2

Expenditure and Revenue of Dalhousie Forest Division during Second Five Year Plan

Year	Revenue (Rs.)	Expenditure (Rs.)	Surplus/ Deficit (+/-)
1956-57	673476	277514	(+) 395962
1957-58	710908	381835	(+) 329073
1958-59	1316955	318985	(+) 997970
1959-60	1489214	407634	(+) 1081580
1960-61	2205802	644457	(+) 1561345

(Source: WP by R.C. Sharma)

5.2.3 III Five Year Plan (1961-66):- During this period forests were managed under the Working Plan by Sant Ram. The Deodar forests of Kalatop, Kainthly and Dadra were worked under Indian Irregular Shelterwood Working Circle having an area of 792 hactares. All the pure Chil forests having an area of 3605 ha were managed under Modified Shelterwood System. Table 5.3 gives the yield (in cum) of deodar, kail, fir, spruce and chil during the plan period.

Table -5.3

Yield (in m^3) of Conifers during III Five Year Plan

Year	Deodar	Kail	Chil	Fir/Spruce	Total
1961-62	4820	847	2213	31	7911
1962-63	1180	1618	1019	168	3985
1963-64	4088	79	4337	455	8959
1964-65	1998	704	4	776	3482
1965-66	2146	--	11715	--	13861
Total	**14232**	**3248**	**19288**	**1430**	**38198**

Table -5.6

Expenditure and Revenue of Dalhousie Forest Division during Fifth Five Year Plan

Year	Revenue (Rs.)	Expenditure (Rs.)	Surplus/ Deficit (+/-)
1974-75	4888758	2557436	2331322
1975-76	5501017	2539903	2961114
1976-77	4827722	3282292	1545430
1977-78	15031176	8651790	6379386
1978-79	11620012	3193160	8426852

(Source: WP by TD Sharma)

5.2.6 VI Five Year Plan (1980-85):- With the launching of social forestry programme, the focus shifted towards raising of fuel, fodder, small timber and grasses to meet the domestic needs of rural communities.

The year-wise revenue and expenditure of the Dalhousie Forest division is tabulated as under, the figure relating to the period of plan 1979-85 are inclusive of Bharmour Division and Upper Chamba Range of Chamba Division which were then a part of the then Dalhousie Division.

Table -5.7

Expenditure and Revenue of Dalhousie Forest Division during Sixth Five Year Plan

Year	Revenue (Rs.)	Expenditure (Rs.)	Surplus/ Deficit (+/-)
1979-80	6534308	3531161	2803147
1980-81	4929426	4033063	896363
1981-82	4920126	4004539	915587
1982-83	3665306	5489389	-1824083
1983-84	1850313	5472600	-3622287
1984-85	606565	6800127	-6193562

(Source: WP by TD Sharma)

5.2.7 VII Five Year Plan (1985-90):- The social forestry works were in full swing, main emphasis being on raising fuel, fodder, small timber and grasses to meet the domestic needs of rural communities. The departmental activities were carried out during this period on the expired working plan of R.C. Sharma.

The year-wise revenue and expenditure of the Dalhousie Forest division is tabulated as under, the figure relating to the period of plan 1979-85 are inclusive of Bharmour Division and

(Source: WP by R.C. Sharma)

The year-wise revenue and expenditure of the Dalhousie Forest division is tabulated as under:

Table -5.4

Expenditure and Revenue of Dalhousie Forest Division during Third Five Year Plan

Year	Revenue (Rs.)	Expenditure (Rs.)	Surplus/ Deficit (+/-)
1961-62	2334183	801042	(+) 1533141
1962-63	2437512	990839	(+) 1446673
1963-64	2228865	894026	(+) 1334839
1964-65	2656890	876346	(+) 1780544
1965-66	2268323	671652	(+) 1596671

(Source: WP by R.C. Sharma)

5.2.4 **IV Five Year Plan (1969-74):-** The year-wise revenue and expenditure of the Dalhousie Forest division is tabulated as under, the figure relating to the period of plan 1969-74 are inclusive of Bharmour Division and Upper Chamba Range of Chamba Division which were then a part of the then Dalhousie Division.

Table -5.5

Expenditure and Revenue of Dalhousie Forest Division during Fourth Five Year Plan

Year	Revenue (Rs.)	Expenditure (Rs.)	Surplus/ Deficit (+/-)
1969-70	3157629	1411649	1745980
1970-71	2605285	2828735	223450
1971-72	4182585	1837396	2345189
1972-73	5987846	2344745	3643101
1973-74	5838839	2702893	3135946

(Source: WP by TD Sharma)

5.2.5 **V Five Year Plan (1974-78):-** The year-wise revenue and expenditure of the Dalhousie Forest division is tabulated as under, the figure relating to the period of plan 1974-78 are inclusive of Bharmour Division and Upper Chamba Range of Chamba Division which were then a part of the then Dalhousie Division.

Upper Chamba Range of Chamba Division which were then a part of the then Dalhousie Division.

Table -5.8

Expenditure and Revenue of Dalhousie Forest Division during Seventh Five Year Plan

Year	Revenue (Rs.)	Expenditure (Rs.)	Surplus/ Deficit (+/-)
1985-86	1494800	6739259	-5244459
1986-87	864669	10115161	-9250492
1987-88	2627544	8412664	-5785120
1988-89	5971027	15391490	-9420463
1989-90	4653936	14505171	-9851235

(Source: WP by TD Sharma)

5.2.8 **VIII Five Year Plan (1990-95)** :-The JFM approach started in the division and the forestry activities were implemented under departmental schemes and under ODA project. As ban on green felling continued, the objective remained afforesting denuded/degraded forests. The constitution of forest development committees and their participation in planning and implementation was sought.

Table -5.9

Plantations raised from 1990-95 in Dalhousie Division

Year	Area planted (ha)	Nos of Plants planted
1990-91	203	223300
1991-92	180	198000
1992-93	222	224200
1993-94	195	214500
1994-95	408	448800
Total	**1208**	**1308800**

(Source: Office record DFO Dalhousie)

5.2.9 **IX Five Year Plan (1995-2000):-** The activities of ODA/DFID continued in the pilot phase and in the C & D phase. The works of afforestration, soil conservation, entry point activity started by the VFDCs and microplan process learnt and executed. Sanjhi Van Yojna started on the principles of JFPM. Here again the focus remained on restocking/regeneration of degraded forests.The year wise plantations raised in Dalhousie forest division are tabulated below.

Table -5.10

Plantations raised from 1995-2000 in Dalhousie Division

Year	Area planted (ha)	Nos of Plants planted
1995-96	813	934130
1996-97	940	1000110
1997-98	574.5	692250
1998-99	738.5	993945
1999-2000	782	1054960
Total	**3848**	**4675395**

(Source: Office record DFO Dalhousie)

5.2.10 X Five Year Plan (2000-2005):- Both the JFM programmes, DFID & SVY created mass awareness about forestry but the focus was again on raising plantations besides soil works and entry point activities. The contribution in works to the tune of 5 to 15 % was desired but could not be persued properly. Under CAT plan of Ranjit Sagar Dam many areas were treated and afforestated during this period in Bakloh Range. The year wise plantations raised in Dalhousie forest division are tabulated below.

Table -5.11

Plantations raised from 2000-2005 in Dalhousie Division

Year	Area planted (ha)	Nos of Plants planted
2000-01	599.1	622800
2001-02	328.8	333680
2002-03	399.23	393658
2003-04	389.74	367864
2004-05	509.08	443671
Total	**2225.95**	**2161673**

(Source: Office record DFO Dalhousie)

5.2.11 XI Five Year Plan (2005-2010) :- Besides various departmental schemes FDA Dalhousie has created many new plantations under peoples participatory mode. The year wise plantations raised in Dalhousie forest division are tabulated below.

Table -5.12

Plantations raised from 2005-2010 in Dalhousie Division

Year	Area planted (ha)	Nos of Plants planted
2005-06	1029.45	859165
2006-07	783.02	673997
2007-08	296.38	300238
2008-09	400.58	376538
2009-10	342	359100
Total	**2851.43**	**2569038**

(Source: Office record DFO Dalhousie)

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CHAPTER VI

STAFF AND LABOUR SUPPLY

6.1 STAFF

The following statement shows the present sanctioned strength and existing staff of various categories in the Dalhousie Forest Division:-

Table -6.1

Position of Staff:-

Designation	Sanctioned Posts	Existing Strength	Variation
1. DFO/ DCF	1	1	--
2. ACF	2	1	-1
3. Superintendent	1	1	--
4. Senior Assistant	3	3	--
5. Jr Astt/ Clerks	6	0	-6
6. Range Officers	10	5	-5
7. Dy Rangers	20	19	-1
8. Forest Guard	51	63	+12
9. Patwari	1	0	-1
10. Forest Worker	100	97	-3
11. Mali	4	3	-1
12. Chowkidar	8	7	-1
13. Khalasi	1	1	--
14. Peon	6	7	+1

There has been no increase in field staff strength as warranted by increase in quantum of work load and advancement in technology and introduction of new schemes and projects with time. List of D.F.Os who holds the charge of D.F.O. Dalhousie is given in **Appendix-XI** at page 86 in Volume-II of the Revised Working Plan.

6.2 EXECUTIVE CHARGES

There are 4 Ranges, 15 Blocks, 48 Beats and Two checkposts in the division at present and their detail alongwith headquarters is given in **Appendix-XII** at page 88 in Volume-II of the Revised Working Plan, and area statement of beats is as per **Appendix-XIII** at page 91 in Volume-II of the Revised Working Plan.

6.3 LABOUR SUPPLY

Generally adequate local labour is available in the tract for various forestry operations like raising of nurseries, plantation, cultural operation, enumerations, marking, repair of boundary pillars, construction and repairs of buildings, roads and paths etc. Slight scarcity is felt during monsoon planting season i.e in July and August which coincides with the agricultural activities. For resin extraction and timber exploitation, H.P.S.F.D.C are relying mostly on imported labour from Mandi, Kangra, Nepal, J&K and U.P.areas.

The work achieved in one man day i.e work done by an adult labourer in one working day for eight hours is as under:-

S.No	Name of Work	Quantity of Work
1	Soil working, picking 15 cms deep, digging trench 30 cms deep breaking clodes and pilling earth from trench over the 15 cms piked line forming a ridge and furrow for very hard soil.	7.08 cum
2	Soil working patches worked at 30 cms deep clodes broken	4.81 cum
3	Pit making 30x30x30 cms size	2.40 cum
4	Digging over completely to 30 cms depth (after this to make the dug up spil into actual beds needs about 150 labourers to do one ha. In one day)	2.97 cum
5	Broad cast sowing in the nursery	372 sq.M
6	Weeding in nursery(Ist and rain weeding)	93 sq. M
7	Weeding in nursery(2nd and rain weeding)	57.6 sq. M
8	Making root- shoot cuttings	400 Nos.
9	Planting cutting includes making and transport over 2.5 Kms.	80 Nos.
10	Weeding in patches in plantation weeding—Ist. weeding	30.6 sq.M
11	Weeding in patches in plantation weeding—2nd weeding	22.37 SQ. m
12	Grass cutting in March (Variable)	278.07 sq.M
13	Cilling i.e cutting grass in patches around plants.	278.07 sq.M

(Source:- As per Forester's companion)

6.4 LABOUR RATES

Govt of Himachal Pradesh vide Notification No. FIN-(PR)B(7)-33/2010 dated 25th August 2012 has revised the wage rates for daily wagers of various categories are given below:-

Table - 6.2

S.No.	Categories of Labour	Rates in Rs.
1.	Beldar(Mazdoor)/casual labourer	150
2.	Mate	150
3.	Cook	150
4.	Mali	150
5.	T. Mate (Electrical)	150
6.	Chowkidar	150
7.	Helper	150
8.	Sweeper	150
9.	Cleaner Swereman	150
10.	Khalasi	150
11.	Electrical Beldar	150
12.	Bhisti	150
13.	Store Attendant	150
14.	Laboratory Attendant (Under Matric)	150
15.	Pump Attendant	150
16.	Boat Man	150
17.	Process Server	150
18.	Whiter washer	150
19.	Syce	150
20.	Peon	150
21.	Frash	150
22.	Chainman	150
23.	Unskilled labourer	150
24.	Quarry Man	150
25.	Jumper Man	150
26.	Driller	150
27.	Sprayman	150
28.	Assistant Sawmill Operator	150
29.	Feller (Girani)	150
30.	Log Dresser (Pachani)	150

31.	Climper (Loper)	150
32.	Zoo Animal Attendant	150
33.	Fire Watcher	150
34.	Grinder for Chips Flooring	150
35.	Calliperman	150
36.	Miscellaneous labourer	150
37.	Charcoal burning labourer	150
38.	Pipe lineman	150
39.	Survey Khalasi	150
40.	Bill Distributor	150
41.	Ferro Khalasi	150
42.	Water Guard	150
43.	Stone Dresser Keyman	150
44.	Assistant Fitter	150
45.	Valueman	150
46.	Library Attendant (Class IV)	150
47.	Luskar	150
48.	Gauge Reader	150
49	Dhobi	150
50.	Dai	150
51.	Upholster	162
52.	Fireman	162
53.	Pump Opertaor cum Helper	162
54.	Plumber 2nd Class	162
55.	Field Assistant cum Operator	162
56.	Carpenter (Grade IV)	162
57.	Painter 2nd Class	165
58.	White Washer	165
59.	Bar Binder	165
60.	Sawyer (Chirani)	165
61.	Muleteer	165
62.	Cane man	177

63.	Security Guard	180
64.	Telephone Attendant	180
65.	Electrical Mistry	180
66.	Refrigerator Mechanic	180
67.	Fitter Grade II	180
68.	Fitter Grade I	180
69.	Turner	180
70.	Fitter Structural	180
71.	Black Smith	180
72.	Welder	180
73.	Mechanic	180
74.	Electrical Chargeman	192
75.	Pump Operator	192
76.	Sand Plant Operator	192
77.	Driver Oxygen Plant	192
79.	Hot Mix Plant Operator	192
80.	Plumber Grade II	192
81.	Plumber Grade I	192
82.	Mason Grade II	192
83.	Mason Grade III	192
84.	Painter Grade I	192
85.	Blastman Grade II	192
86.	Floor Finisher	192
87.	Pipe Fitter Grade II	192
88.	Mortar Mate Grade I	192
89.	Earth Work Mistry	192
90.	Work Inspector	192
91.	Ferry Inspector	192
92.	Store Munshi	192
93.	Forest Guard	192
94.	Receptionist	192
95.	Lab Assistant	192

96.	Electrician II	192
97	Electrician Auto	192
98.	Air Compressor Operator	192
99.	Operator	192
100.	Carpenter Grade III	192
101.	Complaint Clerk	192
102.	Assistant Operator	192
103.	Geneard Operator	192
104.	Telephone Operator	192
105.	Road Inspector	192
106.	Work Supervisor	192
107.	Store Clerk	192
108.	Store Keeper	192
109.	Water Works Clerk	192
110.	Patwari	192
111.	Cinema Projector Operator	192
112.	Computer	192
113.	Plumber	192
114.	Data Entry Operator	192
115.	Tailor	192
116.	Clerk	192
117.	Sawmill Operator	192
118.	Work Mistry	192
119.	Wireman	192
120.	Assistant Pump Operator	192
121.	Price Store Ledger Clerk	192
122.	Bill Clerk	192
123.	Meter Reader	192
124.	Assistant Store Keeper	192
125.	Laboratory Technician	192
126.	Instrument Mechanic	192
127.	Fitter Mechanic	192

128.	Loader Operator	192
129.	Chargeman	192
130.	Gatekeeper	192
131.	Steno-typist	192
132.	Library Assistant	192
133.	Book Binder	192
134.	Tabla Master	192
135.	Dark Room Assistant	192
136.	Library Attentant (Class III)	192
137.	Canal Inspector	192
138.	Irrigation Booking Clerk	192
139.	Complaint Attendant	192
140.	Ferro Printer	192
141.	Proof Reader	192
142.	Photographer	192
143.	Ledger Booking Clerk	192
144.	Laboratory Attendants (Matriculate)	192
145.	Driver (Tractor/Jeep/Car/Truck/Bulldozer/Road Roller)	205
146.	Driver Shawal	205
147.	Stone Chisler	205
148.	Carpenter 2nd Class (Forest Department)	205
149.	Mason 2nd Class (Forest Department)	205
150.	Painter Ist Class (Forest Department)	205
151.	Distemperer (Forest Department)	205
152.	Lineman	205
153.	Junior Draftsman (Tracers)	240
154.	Junior Scale Steno	240
155.	Agriculture Extension Officer	240
156.	Ship Modeling Inspector	240
157.	Surveyor	240
158.	Electrician Grade I	240
159.	Driller	240

160.	Assistant Driller	240
161.	Pipe Fitter Grade I	240
162.	Mason Grade IV	240
163.	Diesel Auto Mechanic	240
164.	Black Smith Grade IV	240
165.	Carpenter Grade II	240
166.	Junior Tailor Mistress	271
167.	Mason Ist Class (Forest Department)	271
168.	Carpenter Grade I	271
169.	Assistant Chemist	271
170.	Foreman	271
172.	Assistant Foreman	271
173.	Carpenter Ist Class (Forest Department)	271
174.	Investigators	299
175.	Auction Recorder	299
176.	Computer Operator	299
177.	Instructors	330
178.	Junior Engineer	360
179.	Draftsman	360
180.	Draftsman (Arch. Wing)	360
181.	Coach	360
182.	Hydrogeologist	420

6.4.1. Schedule of Rates:-The schedule of rates are applicable as Schedule of Rates of 2003-04 for Chamba Forest circle with admissible increase as these rates are based on daily wage rates of Rs. 60. On revision of these rates for Chamba Circle, same will be adopted for Dalhousie Forest Division. In case of absence of any item in schedule of Rates, the rates will be applied which are used by adjoining Dharamshala Circle. For special works, rates of PWD, IPH and Electricity may be used after obtaining permission from PCCF Shimla.

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CHAPTER VII

PAST SYSTEM OF MANAGEMENT

7.1 GENERAL HISTORY OF FORESTS

The history of these forests prior to the annexation of Punjab by the British Government in the year 1849 is practically unknown. Probably, except some of stary fellings by neighboring villagers for their own consumption, nothing was done to these forests before 1850. It was in the year 1854 that the site of Dalhousie station was transferred by the Raja of Chamba to the British Government for the purpose of creating a sanatorium. In the wake of this arrangement there arose a demand for building timber for construction of barracks, private houses and numerous other public works. It was under the terms of a lease granted to British Government, in the year 1864, (and subsequently revised several times), the existing reserve forests were created and demarcated about that time. According to the rules added to the redrafted lease deed of 1872, all the forests, other than those declared as reserved were to be as such. These were to be demarcated at the option of His Highness the Raja of Chamba. The British Government assumed the exclusive control of the reserved forests, whereas other forests were to be managed by the state for the benefits of the ruler and to cater for such rights and privileges as would be granted by the State to its subjects. The first working plan for the reserves was prepared by Ribbentrop in 1871.

7.1.1 From 1913 onwards the State forests came to be managed as two separate units the reserve and the undemarcated protected forests. The former were under the direct control of an officer designated as the Conservator of Forests who was lent on deputation from time to time by the Punjab Government. The latter, popularly known as 'Revenue Forests' were on the other hand managed by the State's Revenue Department and were under the control of an officer designated as the Superintendent of Revenue forests, in all other matter, the two units functioned quite independently of one another.

7.1.2 After the partition of the country in 1947, the erstwhile Chamba state merged with the centre was subsequently constituted into the civil district of Chamba as a part of the present state of Himachal Pradesh which came into being on April15, 1948. The two forests which till now continued to function independently as before were amalgamated on August 1, 1948, and placed under one management the Himachal Pradesh Forest Department. On the same date the forests of erstwhile Chamba State, were split into two territorial charges, viz Churah and Chamba Forest Divisions, each of which was further sub divided into five and six Ranges respectively.

7.1.3 Subsequently the Forest Department underwent a series of reorganizations leading to frequent changes that disturbed jurisdiction as well as nature of activities on account of introduction of some new schemes. It was in 1984 when the Soil and Conservation wing was abolished and the territorial jurisdiction of division readjusted by creating Churah Forest Division. Creation of Wild life wing also brought about some minor alterations in the extent of jurisdiction. The changed set up for Social Forestry Scheme which has lead to an increase in the jurisdiction of Dalhousie Forest Division. The latest change in the management of Dalhousie Forest division was due to inclusion of some of its area 2240 ha into Kalatop-Khajjiar Wildlife Sanctuary but the management of which still remained in the control of Dalhousie Territorial Forest Division. Recently, case of exclusion of some of villages from Kalatop-Khajjiar Wildlife Sanctuary is under consideration with Govt.

7.2 PAST SYSTEM OF MANAGEMENT

7.2.1. The past system of management of Dalhousie Forest Division working plan area can be traced from the previous working plans prepared for present Dalhousie Forest Division or its adjoining Forests. It will be relevant to discuss in details the past systems and prescription of previous working plans to arrive at the past system of management of these forests.

7.2.2. The 1871 Working Plan by Ribbentrop:- Prior to 1850 only fellings were made by villagers for their own requirements. In 1871 the Forest Department assumed the charge of forests and Mr. Ribbentrop prepared a working plan which proposed the conversion of the forests to regular high forests in a rotation of 100 years divided into 5 periods of 20 years each.

The conversion was to be accomplished by clear felling and planting. This plan was not given effect to, but between 1880-81 and 1885-86, 579 deoadr trees, yielding on an average 41cft of sawn timber per tree, were exploited under selection fellings in Kainthli Forests.

7.2.3. The 1885-86 working plan by D'Arcy:-

7.2.3.1 In 1885-86 D'Arcy prepared a working plan for a period of 10 years from 1886-87 to 1895-96. It proposed to continue Ribbentrop's proposals to the extent of completing, in a new preparatory period of 27 years. The Kainthli Forests was then included in this working plan and was treated in the same way as Kalatop forests. It was prescribed that 1519 out of 1800, I class deodar enumerated in 1885-86 were available for exploitation, but were only to be felled if the stock at Kalatop was not sufficient to supply the market. This prescription was laid down on account of the great cost of carriage to depot of timber cut in Kainthli and for the same reasons no felling of Fir was prescribed.

7.2.3.2. The Bakloh, Banikhet and Surkhgalla Chil Forests were reserved and demarcated in 1871 and 1874, but the settlement of rights was not completed until 1894-95. From 1870-71 to 1884-85, 2053 chil trees were felled under selection or unclassed felling in the Bakloh Forests resulting in an average annual net revenue of Rs.173. During the same period only wind fallen and dead trees were extracted from the Banikhet and Surkhigalla Forests and these Forests were worked an annual loss of Rs. 63/=. Under the Working Plan prepared in 1886-87, it was proposed to works these forests for timber, and that the existing stock of 574 trees over 18 inch in diameter should be exploited under selection felling any time within a period of 25 years.

7.2.4. The 1895-96 working plan by McIntire:-

7.2.4.1 In 1895-96 the Working Plan by D'Arcy was revised by McIntire for a period of 30 years and proposed to discontinue working on the supposition that regular high forest was to be ultimate condition of the crop. He realized that demand was limited and that only part of produce was worth exploiting. He therefore propose to cut out gradually in selection and improvement felling mature and detouring trees sufficient to meet the requirements of local market.

7.2.4.2. For Kainthly and Bakloh forests it was prescribed that as in case of Kalatop, the felling should be by selection and this gave a maximum of average yearly yield of 70 trees. No possibility was fixed for the Fir, as it was no anticipated that its exploitation would be profitable.

7.2.4.3 In the case of Banikhet and Surkhigalla Forests, it was proposed to fence as large an area has possible to regenerate this area in the 15 years by seeding fellings which were restricted by Inspector General of Forests to 10 exploitable of trees by a year. It was proposed that regeneration fellings should take place when crop had reached an age of 75 years but the Inspector General doubted the soundness of this proposal and suggested that the age of maturity probably corresponded to a much more advanced age. These prescriptions has been carried out and during the period 1895-96 to 1911, 663 trees above 18 inch in diameter in Bakloh, and 257 in Banikhet in Surkhigalla have been exploited. The numbers are in excess of the prescription in Banikhet and Surkhigalla, owing to a number of wind fallen trees having being counted against the prescription.

7.2.5 TREVOR'S PLAN (1911-1924):- In C.G. Trever's Plan again covering only RFs, Working circles were created on the basis of species and not on territorial units as was done in the earlier plans. Three working Circles were identified in the Working Plan as below:-

1. **Mixed Working Circle:-** This included the forests which could not give a sustained supply of Deodar. Selection system was adopted for its working. The exploitable size for Deodar and Kail was fixed at 30 inches diameter corresponding to an age of 140 and 100 years respectively.
2. **Deodar Working Circle:-** This circle was formed of areas suitable for a permanent supply of Deodar. The method of working was to be the Group shemterwood system. Corresponding to an exploitable diameter of 30" the rotation was fixed at 140 years.
3. **Kail Working Circle:-** This working Circle of 6499 acres comprised of the pure Kail forests of the Bharmour Range which could be worked on the Group shelterwood system. The rotation was fixed at 100 years divided into four periods of 25 years each.

A comparative statement showing the prescription of the plan and the actual working for the period from 1911 to 1924 is given below:-

Table -7.1

Working Circle	Particulars	Deodar trees				Kail trees	
Mixed	Prescriptions	12640	1820	0	1960	0	0
	Actuals	10659	1265	1165	1543	515	576
Deodar	Prescriptions	3920	4620	4620	0	0	0
	Actuals	2898	2768	5880	278	318	511
Kail	Prescriptions	350	420	980	1400	3080	7770
	Actuals	565	254	486	2871	2356	4556

7.2.6. The 1913-33 working plan by R. McINTOSH:-

7.2.6.1 McIntire's working plan was revised by R. McIntosh in 1913 in which he has not adhered to the constitution of working circles adopted in the working plan under revision. Considering two distinct types of Dalhousie Range forests, two working circle namely Deodar working circle and Chil working circles were recognized. Deodar working circle comprised Kalatop, Kainthli and Dadra reserves with 3649 acres and Chil working circle comprised Bara, Kuntla, Mamul, Chalama and Baila reserves (known as the Bakloh forests) and also Banikhet and Surkhigalla reserves with 1047 acres area.

7.2.6.2. The chief objects aimed for management of these forests were:-

(a) The regulation of their management so that not only may the local demand for deodar and fir timber and of fuelwood and charcoal be met, but also, so that these forests may yield the largest permanent supply of deodar and fir timber suitable for export as is compatible with their maintenance.

(b) The removal of the exploitable deodar and fir by selection fellings in groups in such a way as will ensure successful deodar reproduction and , at the same time, the improvement of the existing crop of young deodar by a series of thinning and improvement fellings.

(c) The exploitation of Chil forests, so as to provide the largest possible supply of fuel for the local market, and at the same time, ensure the regeneration of these forests.

7.2.6.3 Deodar Working Circle

The forests of this Circle were to be worked under selection fellings in groups instead of selection system, as it was considered difficult to obtained deodar reproduction under selection fellings. The plan proposes to remove exploitable Deodar and Fir only to such an extent annually as would suffice to meet the demands of local people. The balance of exploitable of Deodar and Fir was to be disposed off otherwise periodically after every seven years. The difficulty in securing reproduction of Deodar under selection system was believed to be overcome by exploitation of Deodar and Fir trees in groups and there by lightening the canopy to such an extent as would keep down the undergrowth and permit to Deodar regeneration to come in to desired extent. The exploit size for both Deodar and Fir was fixed as 24 inch diameter. Realizing the shelter afforded by Oak sapling and poles was highly beneficial to Deodar regeneration. It was proposed to discontinue cutting out the young Oak sapling and poles under improvement fellings to favour Deodar. Only those oak trees, which has attained a diameter of 24 inch and which were no longer required for regeneration purpose, were decided to be felled.

7.2.6.4 Chil Working Circle

Since Chil forests were considered not profitable as producer of timber it was decided to work these forests for fuel only. The exploitable size was reduced from 18 inch to 12 inch corresponding to the age of 42 years. The plan proposed to exploit these forests in a series of seed fellings with the main object of obtaining successful natural regeneration, the fellings being regulated by the area determined by the extend of each forests that could be close to grazing. It was assumed that a given area could be completely regenerated in 14 years, 3 seed fellings in 1st, 6^{th} and 11^{th} year of the plan were thus prescribed, the balance of the seed bearer were to be removed in 14^{th} year on adequate reproduction having been established.

7.2.7 KHOSLA'S PLAN (1928-1952)

The plan again covered the Reserve Forests only. It covered a period of 25 years and the following circles corresponding to applicability of various silvicultural systems were constituted.

7.2.7.1 Regular Working Circle:- Forests comprising predominantly Deodar and Kail situated in locations suitable for applicability of shelterwood system were allotted to this circle having rotation of 120 years both for the Deodar and Kail corresponding to a diameter of 60 cms. Number of regeneration fellings was to vary according to the extent and condition of existing regeneration.

The yield prescribed and actually obtained during the plan period i.e. from 1928 to 1952 is given in the table below:-

Table -7.2

Particulars	Deodar (Cum)	Kail (Cum)
Prescription	1,75,000	87,500
Actual	1,76,175	95,342

7.2.7.2 Selection Working Circle:- Mixed forests containing mostly Fir and Broad leaved trees and small quantities of mature Deodar and Kail situated on steep slopes were allotted to this circle. The forests of this Circle were to be manged under selection system except the Deodar and Kail confined to spurs and ridgdes where shelterwood system was to be applied. The rotations were fixed at 150 years and 120 years corresponding to the exploitable dia of 75 cm. and 60 cm for Doedar and Kail respectively.

The statement showing the number of trees prescribed for felling and actually felled during the plan period is given as under:-

Table -7.3

Particulars	Deodar (Nos)	Kail (Nos)
Prescription	13,375	8,250
Actual	9,307	5,715

7.2.7.3 Unregulated Working Circle:- Fir forests with an area of 5953 ha. Containing deciduous trees in depressions and isolated Deodar on spurs were allotted to this Circle. The forests were simply to be protected, except for meeting the demands of right holders.

7.2.8. The 1934-54 working plan by Kartar Singh:-

7.2.8.1 R. McIntosh's Working Plan was revised by Kartar Singh in 1934. The allotment of the forests in two working circles viz. Deodar Working Circle and Chil Working Circle was retained.

7.2.8.2 Deodar Working Circle:- The Forest of Deodar Working Circle were proposed to be worked by the selection in groups method, but at the same time serious affords to improve the condition of soil in areas covered with thick hums and heavy under growth by exposing it to Sun and air by means of sufficient openings in the overwood, by burning the

slash and shrub growth after cutting, and by letting in horned cattle to graze was proposed. To obtain Deodar adequate Deodar production, the canopy was to be opened fairly well. The exploitable size was fixed at 24 inch diameter for Deodar Fir and Oak.

7.2.8.3 **Chil Working Circle:-** The prescription of McIntosh's Working Plan were considered quite suitable and recommended to all the chief forests of except Bailla,Banikhet and Surkihgalla where the felling can be made on account of the local demand of firewood having decreased very considerably since the introduction of late plan and until the demand of firewood improved. The exploitable size of Chil 12 inch diameter was retained which corresponded to an age of 42 years. The regeneration period of Chil was fixed at 21 years instead of 14 years.

7.2.9 BALWANT SINGH'S PLAN 1948-69:-

The Reserved forests of Bakloh and Demarcated Protected Forests, of Bhattiyat and Bakloh Ranges were combined under this Working Plan for the first time. It was operative during the period 1948-49 to 1967-68, but subsequently extended upto 1968-69. The following Working Circles were constituted:-

1. Chil Working Circle.
2. Protection Working Circle.

7.2.9.1 Chil Working Circle:- This Working Circle comprised of all the Chil reserve forests, Demarcated Protected Forests and some un-demarcated protected forests. The total area of the working Circle was 9196 ha. The Punjab Shelterwood System was applied. Rotation was tentatively fixed at 120 years corresponding to 60 cms. diameter exploitable size. The forests were divided in to four Periodic Blocks. However, regeneration period was fixed at 20 years ending 1958, for it was felt that regeneration had been in progress for some time past and there was plenty of advance growth present. Forests with mature stock, or with deficient stocking were allotted to P.B.I. in addition to those with plenty of P.B.II. and the remainder to P.B.III. and IV. Allotments to all other PBs except P.B.I. was provisional and was to be revised. If necessary at the next revision. The forests allotted to PBs II, III and IV were to be revised, if necessary at the next revision. The forests allotted to PBs II, III and IV were to be subjected to "C" grade thinning, and improvement fellings. However, in P.B.II. no mature trees to be felled. Two felling series viz. Bakloh and Sinhunta, were formed. The yield was prescribed on the basis of the existing growing stock, and increment was altogether ignored, as it was felt that forests were under-stocked on the whole. Therefore, the annual yield for the whole working circle was fixed at 1274 cum which was to be obtained as 991 cum. from P.B.I. and 283 from other P.Bs. a deviation of +- 10% was allowed.

The yield actually obtained during the 21 years period from 1948-49 to1968-69 is compared with the prescription in the following statement:-

Table -7.4

	Yield of Chil Trees		
	P.B.I.	**P.B.Others**	**Total**
Prescriptions	20813 Cum	5947 Cum	26760 Cum
Actuals	16054 Cum	17619 Cum	33673 Cum
Excess or Deficit	(-) 4759 Cum	(+) 11672 Cum	(+) 6913 Cum

Seedling fellings were conservative in P.B.I. areas and proper thinning and improvement fellings were not carried out in the forests allotted to PBs III and IV. The regeneration on the whole is satisfactory in most of the forests.

7.2.9.2 Protection Working Circle:-This working Circle consisted of 1768 ha. Area and included low lying brush wood forests alpine pasture and undemarcated forests other than those of Chil. Commercial exploitation of these forests was considered out of question because of their already depleted stock. No enumerations were carried out. However fellings to meet right holders demands, thinning and improvement fellings wherever practicable were prescribed.

Though various other operations such as sowing, planting, soil conservation works in eroded areas, weeding, cleaning etc. were carried out during the currency of the Plan but there was much more left to be desired.

7.2.9.3 Results of The Past Working:- -The results of the prescriptions; contained in the earlier Working Plans since the inception of scientific management i.e. round about 1886, been touched briefly However the later period witnessed more vigorous and multipronged activities related to forestry operations whose manifestations have now almost outgrown those of the earlier ones and thus find a little more detailed description and analysis particularly in view of the increased biotic and abiotic interaction over a period of time.

Prior to the preparation of Ist Working Plan in 1886, it is recorded that 41805 deodar trees of best quality were felled during 1881-85. Besides this exploitation demarcation and settlement in respect of reserve forests was done.

7.2.10 GAUR'S PLAN (1954-55 TO 1968-69)

Gaur's plan for the first time included some of the protected Forests also in addition to Reserve Forests. These protected Forests were such as could be managed either in the shelter wood system or in the selection system. The plan also included high level pastures.

In conformity with the general objects of management Regular, selection, Chil Fuel and Protection working Circles were constituted.

7.2.10.1 Regular Working Circle:-The Circle comprised of the most important forest of the tract containing Deodar and Kail either pure of in majority and where the physical conditions were suitable for the application of the shelter wood system.

Here shelter wood system with suitable modification depending upon the local conditions was adopted. Groups of poles less than 40 cm. in dia and over 0.2 in extent were to be retained as part of future crop. The regeneration period was fixed at 30 years and four PBs were constituted on the basis of reduced areas for density alone. Yield was regulated by volume and was calculated separately for each P.B. the yield was reduced by 30% in case of Deodar and 20% in case of Kail as a safeguard against over fellings and fire insurances etc. Thinning in P.B.II and thinning cum improvement fellings in P.B.III were presctibed so that the remaining trees could put on more diameter increment. No yield was prescribed from P.B.II, however reasons were to count towards the annual prescribed yield from this working Circle as a safeguard against over fellings. In respect of P.B.III, only overmature stock of Deodar and Kail was considered for yield calculation 33.3% of Deodar and Kail trees over 70 cms. Dia respectively were prescribed to be felled in a period of 30 years. In P.B.IV, the forests contained established young crops with some overwood only 40% of the total I and II Class Trees silviculturally available were prescribed to be felled during the period of 15 years. The plan also suggested cleanings and other operations.

Total yield prescribed and actually removed in all the PBs during 15 years period of the plan is tabulated below:-

Table -7.5

Species	Particulars	P.B.I (Cum)	P.B.II,III & IV (Cum)
Deodar	Yield prescribed	79,800	40,740
	Yield removed	81,125	42,748
Kail	Yield prescribed	21,000	7,140
	Yield removed	21,173	7,661

7.2.10.2 Selection Woring Circle:- Predominantly Spruce and Fir Forests with slight admixture of Deodar and Kail situated on steep to precipitous terrain were allotted to this working Circle. Forests of this Circle were prescribed for working on a 30 years felling cycle, under the modified Punjab Selection System. Thinnings of immature groups and improvement fellings bearing heavily on Fir and Spruce in areas suitable for the growth of Deodar and Kail were prescribed. Natural regeneration of Deodar and Kail on suitable

grounds was to be augmented by sowing and planting. Exploitable size was fixed at 60 cms. and therefore trees of this size and above were considered as selection trees. The prescribed yield of selection trees was calculated by symthie's Formula.

The number of selection trees prescribed and actually removed during the plan period 1954-55 to 1968-69 is given below:-

Table- 7.6

Species	Prescribed	Removal
Deodar	4,650	4,774
Kail	1,850	1,646
Fir/Soruce	60,000	42,403

7.2.10.2 Chil Working Circle:-Chil forests were included with special objects of management of obtaining resin yield and providing grazing, timber and firewood etc. and to nurse the then existing immature crop and protect it from fire. No yield was prescribed for fellings.

7.2.10.3 Fuel Working Circle:- Ban Oak forests of Saho and Khajjiar Blocks were allotted to this circle for supply of fuel and charocoal to Chamba Town on a sustained yield basis. Silvicultural system adopted was the selection system. Felling cycle was kept at 15 years. Yield was regulated by Von Mantle's Formula.

7.2.10.4 Protection Working Circle:- Forests situated on precipitous slopes and all pasture lands not included in other working circles were allotted to this Working Circle. No commercial fellings were prescribed. Closures of badly eroded areas due to excessive grazing and indiscriminats fellings and lopping were recommended.

7.2.11. The 1954-69 working plan by Sant Ram:-

7.2.11.1 Kartar Singh's Working Plan was revised by Sant Ram after the draft plan of the D.D.Mehta for the period 1954-55 to 1968-69. This is the first plan where developing the normal forests was aimed at and more emphasis was made for preservation and conservation of forests on sustainable basis. To achieve the objects of management following for Working Circle were constituted.

7.2.11.2 The Indian irregular shelterwood Circle.

This Circle include all pure Deodar and predominantly deodar bearing areas of Kalatop, Kainthly and Dadra Forests with easier slopes was proposed under prescribed the Indian irregular shelterwood system. Corresponding to rotation of 120 years exploitation size was fixed at 24 inch diameter. The total area was divided into 4 periodic blocks namely PBI, PBII, PBIII and PBIV. The regeneration period of 30 years was proposed.

Compartments containing the largest numbers of mature trees were allotted to PBI.The number of regeneration fellings was not to exceed three, at an interval of 10 year depending upon the condition of the young crops .On steeps slopes marking were to be confine to the selection principle. Natural regeneration of Deodar was to be supplemented by artificial sowing and planting. Yield was controlled by volume. All forests which were approaching maturity were allotted to PBII and no yield were prescribed for it and only thinning alongwith diseased and fallen trees removal were prescribed on a cycle of 15 years. Compartments bearing young to middle age crop were allotted to PBIII. The forests that have been regenerated during the last Working Plan through concentrated felling and works of reproduction were allotted to PBIV.

7.2.11.3 The Selection Working Circle

This Working Circle consist of the mixed forests, chiefly Fir , with some admixture Deodar and Broad Leaved trees and which demand the maintenance of a continuous cover so that the soil and sub soil are not denuded or eroded through exposure to weathering agencies. The selection system of the management was adopted with the treatment of these forests confined to the removal of mature and over mature trees and tending of younger crop through judicious of regime of cleaning, thinning, improvement fellings favoring Deodar, and removal of the suppressed, diseased, malformed and dead and dying stock.

7.2.11.4 The Chil Working Circle

To this Working Circle were allotted all the chilpine reserved, demarcated and undemarcated protected forests were to be managed under modified shelter system. With a conversion period of 120 years and regeneration period of 30 years this circle was divided to 4 years periodic blocks. Of these, the allotment to PBI and II are definite at where the balance area collected termed as PB unallotted. Areas allotted to PBII and grouped as PB unallotted were to be managed entirely for meeting the right holders timber requirements under thinning come improvement felling respectively. The exploitable diameter was fixed at 24 inch.

7.2.11.5 The Protection Working Circle

Remaining two categories of fire namely contract areas and alpine pasture, occupying almost the extreme of altitudinal limits were allotted to this circle. The contract areas were low lying scrub forests composed on of an open crop of inferior broad leaved species, occasional Chil, local shrub and grasses. Being highly degraded due to grazing and local biotic pressure and reclamation work by way of partial and rotation closures in

conjunction with necessary sowing and planting was prescribed. The alpine pasture above the zone of tree growth which were the summer grazing grounds of the nomadic and local grazers with isolated groups of Fir, Kharsu, Rhododendron , Taxus bacata,Viburnum and cotoneaster etc. were prescribed for partial and rotational closures to grazing, eradication of obnoxious weeds, introduction of clovers and nutritious grasses and fodder trees planting.

7.2.12. The 1969-83 working plan by R.C. Sharma:-

R.C.Sharma prepared an integrated plan for all the forests of Dalhousie Forest Division formally covered by three working plan viz Gaurs, Upper Ravi Working Plan(Chamba Felling Series) Sant Ram and D.D. Mehtas Working Plan of Dalhousie Range Forests and Balwants Working Plans of Bhattiyat Forest Range in 1969. In addition to Reserved and Demarcated Protected Forests many newly demarcated protected forests were included. This plan was aimed at conversion of scrub forests and Deodar & Chil Forests and attains normal forests to obtain the maximum possible sustained annual yield of various forests products by proper exploitation of the forest resources in perpetuity.

7.2.12.1 To achieve the objects of managements following working circle was constituted:-

(i) Regular Working Circle

(ii) Selection Working Circle

(iii) Chil Working Circle

(iv) Fuel Working Circle

(v) Protection Working Circle

(vi) Plantation (Over lapping) Working Circle

7.2.13 KANG'S WORKING PLAN (1969-70 to 1983-84):-

Guar's Plan was revised by Shri Kang as an interim revision. This plan dealt with all the forests felling in Churah Division of the Guar's plan. It also included some of the undemarcated protected Forests in Chil an Fuel Working Cercle not covered in Gaur's Plan. 2585.23 and 1092.69 ha of undemarcated Protected Forests were added to Chil and Fuel working Circles respectively.

Thus the plan covered a fores area of 68,097.65 ha as against 1,12,779,37 ha dealt within Gaur's plan.

Following working Circles were constituted:-

7.2.13.1 Regular Working Circle: The plan adopted the same silvicultural system as was in Gaur's Plan. Allotment of various PBs were also retained. In case of P.B.I. where the felling according to requirement of silvicultural system. Regarding yield in P.B.I. it was

Species	Particulars	PB.I 40 cm & over (Cum)	P.B.II & P.B.III 60 cm & Over	P.B.IV 40 cm & over (Cum)	Total(Cum)
Deodar	Yield prescribed	90000	2850	75000	167550
	Yield removed	95914	117249	53665	160828
Kail	Yield prescribed	22500	1050	12000	35550
	Yield removed	19384	4809	6198	30391

reduced by 20 percent in case of Deodar and 15 percent in case of Kail and Fir during remaining 15 years as against the figures of 30 and 20 in case of Gaur's Plan. Regarding yield from P.B.IV. the plan estimated 50 perecent of the I and II Class trees available for felling during remaining 15 years as against 40 percent in case of Gaur's Plan.

Following is the position of yield prescribed/removed during the plan in this working Circle:-

The Plan prescribed maximum number of three fellings in P.B.I. areas as in case of Gaur's Plan. In case of improvement felling, as against Gaur's Plan, the plan did not prescribe removal of inferior trees i.e. Spruce and Silver Fir in favour of Deodar and Kail. Regarding control of yield, the plan prescribed excess and deficit shall be brought forward every year in Control Forms and deviation statements.

The enumerations were carried out in P.B.I and P.B.IV only, down to 10 cm. dia class. In case of P.B.III, no enumerations were carried out but the results were obtained by subtracting fellings from the enumeration results of Gaur's Plan. Stock maps were prepared only for P.B.I. and P.B.IV and old maps of P.B.II and P.B.III were retained as such.

7.2.13.2 Selection Working Circle:- The forests allotted to the Selection working Circle in Gaur's Plan were retained and same silvicultural system was followed.

Yield was calculated by Smythei's Formula as was done in case of Gaur's Plan, value of t and z were kept 35 years and 25 percent for all species. But while calculating yield of Kail 20 percent reduction was applied based on past experience. Yield prescribed and removed during the plan period 1968-69 to 1983-84 was as under:-

Table -7.7

Species	Prescribed (No)	Removed (No)	Deviation (No)
Deodar	4500	4863	(+) 363
Kail	1500	2356	(+) 856
Fir/Spruce	25500	23182	(-) 2368

No enumerations were carried out, rather the data was taken as such from Gaur's Plan for churah Felling series for which this plan was prepared.

7.2.13.3 Chil Working Circle:-The pure Chil forestsin lower parts of Tikkri, Lower Chamba, Tissa and Bhandal ranges were allotted to this Working cercle. These were managed under Pujab shelterwood system modified to suit local conditions.

Rotation and conversion was fixed at 120 years and regeneration 30 years. Because of irregularity of crop only P.B.I and P.B.II were allotted and remaining forests were allotted to PB un-allotted. Felling cycle was kept at 15 years. Calculation of yield was linked with availability of I and II Class trees in P.B.I. area. There was no volume control of yield from thinning marked in intermediate fellings.

Following is the position of yield prescribed and removed during the plan period:-

Species	Prescribed (Cum)	Removed (Cum)
Chil	18000	32,892

7.2.13.4 Fuel Working Circle:-The plan covered all Ban and Kharsu forests. The plan changed the system of working from selection System (modified to suit local conditions) to coppice with standard system. Rotation was fixed 40 years for coppice and 80 years for standard corresponding to 22 and 30 cms. d.b.h. respectively. The yield was to be controlled by area. While felling, 40-50 standards/ha were to be retained. Closure for 30 years was also prescribed.

7.2.13.5 Protection Working Cirle:- Forests allotted to this working Circle were to protect hills form denudation an erosion, conservation of moisture and regulation of flow of water in nallas an streams, and to meet demands of local right holders entirely on silvicultural pricipales. No extensive fellings wereto be done.

Miscellaneous Regulations:- In the chapter for miscellaneous regulations, the plan prescribed new roads, paths building to be constructed.

Control And Records :- The plan prescribed maintenance of Compartment History Files, Control Forms, Register of roads, paths and Buildings, Forest Guard manuals Plantation/Soil Conservation Journals Research Journal, Fire records and records of profit and loss for facilitating proper working and carrying out prescriptions of the plan.

7.2.14. T.D. Sharma Plan(1993-94 to 2007-08):-

T.D.Sharma has revised in 1993 part of Sh.R.C.Sharma's Plan and Sh.I.S.Kang's Plan for Dalhousie and Chamba Forest Divisions respectively which were expired during 1983-84. This Working Plan in general aimed at nurturing rich heritage of Biodiversity, maintenance of ecobalance and in particular at increasing proportion of

profitable species as for as silvicultural considerations indicate to be desirable in consonance with National Forest Policy,1988. T.D Sharma's working plan has proposed following seven working circles:-

(i) Deodar Kail working circle

(ii) Fir/Spruce working circle

(iii) Chil working circle

(iv) Protection working circle

(iv) Plantation working circle

(v) Pasture Development (overlapping) working circle

(vii) Soil and Conservation (overlapping) working circle

7.2.14.1 Deodar Kail Working Circle:-

This working circle comprised of deodar predominating forests fit for managing under the Indian Irregular Shelterwood System aimed at:-

1. To continue the conversion of irregular crop into more or less even aged one with more stem density.
2. To gradually proceed towards normalcy by obtaining normal age class distribution and thereby a normal increment.
3. To induce maximum natural regeneration supplemented with artificial regeneration wherever necessitated.
4. To have an adequate broadleaved mixture.
5. To provide for bonafide requirements of the public particularly of timber and fuel.
6. Consistent with above to ascertain a continuously increasing yield in perpetuity.

With a conversion period of 120 years and 30 years as regeneration period, the area in this working circle is divided into 4 periodic blocks. In addition to few forests suitable for seeding fellings supporting mature to mature trees which were left unfelled or with sufficient canopy were included in PB I. The forests assigned to PBII were those areas which were approaching maturity and would be fit for felling within 30 years. PBIII comprise the forests having old to middle age trees or having an irregular crop. PBIV areas were forests having young crop with and without over wood.

The seeding felling were proposed to PBI areas to promote natural regeneration and at the same time young regeneration is secured fully from the injuries due to drought, frost, weed growth etc.

7.2.14.2 Fir/Spruce Working Circle:- The forests included in this working circle were mixed forests having predominately Fir/Spruce Crop with a fair admixture of Broad Leaved species and Oaks. The Working Plan was aimed at:-

1. To improve the stocking of forests rating conditions for natural regeneration.
2. To achieve normal forests with normal growing stock and normal increment.
3. To ensure continuously sustained yield.
4. To improve the soil of the forests.

The Indian irregular shelter wood systems with floating PB were adopted. Only PBI were allotted remaining areas were termed as PB unallotted. In PBI artificial regeneration with specific species was proposed to be carried out after fellings. For artificial regeneration, nursery raised plants were proposed. No direct sowing except for spruce, Aesculus was advocated. In PB unallotted no operations were proposed accept removal of dead dying and deceased trees. The forests being irregular and unevenaged, shelter wood system conversion period of 150 years and exploitable diameter of 60 cms was fixed with 30 years as the regeneration period for getting an established regeneration.

7.2.14.3 Chil Working Circle: - This working circle covered the major area of Dalhousie Forest Division under Chir pine forests of 10014.36 ha. The special object to manage such forests was:-

1. To bring normalcy in the forests by getting normal age distribution and normal increment.
2. To help the natural regeneration grow to its best capacity by undertaking thinning and other necessary operations.
3. Consistent with the present age class distribution to regulate the grant to right holders.
4. To plan and programme resin tapping for an optimum sustained extraction in the long run.
5. Consistent with above to optimize yield on a sustained basis.

These forests were managed under Irregular Shelterwood System. Regeneration, Cultural and tending operations were proposed after felling in these areas. An advance growth of poles upto 40cm dbh over an area not less than 0.2ha proposed to be retained to finally merge with future crop to avoid unnecessary sacrifice of young crop. The exploitable diameter of 60cm dbh and 120 years of rotation was fixed with 30 years of regeneration period. The area of this circle was divided into 4 periodic blocks.

7.2.14.4 Protection working circle:- The forest areas which compulsorily to be kept out of any perspective commercial harvesting were included in this Working Circle which were in

highly eroded and degraded state. The primary objective of these forests were to be protected the hills from denudation and soil erosion and maintain a reasonable vegetation cover by regulating grazing and protecting oak and other broad leaved species. No felling was proposed but tending and conservation of species was advocated.

7.2.14.5 **Plantation Working Circle:-** This Working Circle comprised blank or degraded forests which require artificial plantations to meet a growing demands of human and cattle population by raising multitier plantations with participatory approach.

7.2.14.6 **Pasture Development (overlapping) working circle:-** This Working Circle comprised of subalpine pasture and local grazing grounds in low lying areas overlapping with other working circles proposed to regulate grazing enhance the leaf biomass production and encourage the habit of stall feeding with replacement of inferior cattle breads.

7.2.14.7 **Soil and Conservation (overlapping) working circle:-** Problem of soil erosion was realized all over except well stock forests. This working circle overlapped with protection working circle in particular but in general objective and prescriptions were applicable to areas in other working circles which also need some specific treatment for soil and water conservation. The objective of this working circle was to arrest abnormal erosion by improving soil status, moisture regime, restoring the vegetation cover and to ensure equitable flow of water in streams/rivers. Depending upon the nature/intensity of erosion, altitudinal zonation and the status of growing areas were classified into three categories viz. high moderate and low intensity areas.

7.3 RESULTS OF THE PAST WORKING

The results of the prescriptions; contained in the earlier Working Plans since the inception of scientific management i.e. round about 1886, been touched briefly However the later period witnessed more vigorous and multipronged activities related to forestry operations whose manifestations have now almost outgrown those of the earlier ones and thus find a little more detailed description and analysis particularly in view of the increased biotic and abiotic interaction over a period of time.

Prior to the preparation of Ist Working Plan in 1886, it is recorded that 41805 deodar trees of best quality were felled during 1881-85. Besides this exploitation demarcation and settlement in respect of reserve forests was done.

7.3.1 **D.Arcy's Plan:-**During this plan Kalatop and Kainthly were some prominent forests where deodar plantation yielded some noticeable results that too where Oak was left standing as shelter in the clear felled areas. In blanks and glades the planting was not successful.

7.3.2 Mc. Intircin His Working Plan;-Wellnigh repeated the proposals of Mr. D. Arcy. Nothing appreciable could be achieved so far as the artificial regeneration of Deodar was concerned.

7.3.3 Trevor's Working Plan :-Initially the Group Shelterwood technique adopted did not yield good results. Then further fellings were done to open the canopy which resulted in profuse regeneration. During the currency of Mr. Khosla's Planthe prescriptions made under shelterwood system yilded good results so far as the natural regeneration was concerned. About 70% of area has been recorded to have had an established regeneration. Natural reproduction of Kail was relatively more than that of Deodar for which artificial means made a major contribution. Further as not in consonance with the prescriptions; thinning in P.B.II. were conservative and there was removal of bigger classes, leading to reduction in average crop dia.

In case of mixed forests of coniferous and broadleaved species selection trees were removed. During the period of Ist 10 years of the plan sowing and plantings were done to supplement the scanty natural regeneration. Later on this aspect was getting the regeneration.

7.3.4 Gaur's Plan;-Modified shelterwood system was applied in the predominantly Deodar and Kail Forests. On the whole However regeneration fellings were very much on the conservative side thus resuting in deficient regeneration. This was probably due to the yield prescribed being too much on the conservative side.

In the forests of Fir and Spruce allotted to the Selection Working Circle, more mature trees were removed and the forests already under stocked became more open. Natural regeneration of Fir and Spruce did not establish itself over these areas due to heavy weed growth, thick layer of humus fellings debris and excessive grazing.

7.3.5 I.S. Kang Plan 1969-70 To 1983-84:- In P.B.I. areas of the Regular Working Circle corrective seeding fellings were carried out in the forests not adequately opened up in the Gaur's plan. It rmproved the progress of natural regeneration.The forests coming under the present plan are Nagali Saroula and Bhadka of Bhalai Range. Nagali and Bhadka appeared in the statement of fellings under P.B.I. and P.B.IV. respectively whereas in Saroula, Reserve Forest no seeding fellings prescribed and it was earmarked for meeting the local demands.

In the Nagali forest young regeneration has come up which is in a congested form and requires immediate thinnings. Final fellings can be done at the next revision. In Bhadka forest the overwood has partially been removed and the remaining crop is mostly young of IIIrd Class. Saroula Reserve Forest hawever presents a dismal picture due to heavy grazing pressure coupled with some degree of undesirable lopping as well. Results of Selection

working Circle are not discussed since the areas do not fall in the present plan jurisdiction.The forests allotted to Chil working circle e.g. Rinda Pavin, Hutta Chaura, Chhapri of Dalhousie Range as were seed felled in part of whole have a good regeneration. In P.B. unallotted areas e.g. Badhel Kharaphat, Jutar of Bhalai range the removal of mature trees has left these forests with a young to middle aged crop of reasonably good density.

There were some areas which were recommended for plantation of Chil. Out of the forests falling under this plan Fogla, Bhing of Bhalai Range etc. show good results of the plantation wherein Chil has reached young pole stage.

7.3.6 Results In Deodar Forests:-Though the major Deodar forests of Kalatop Khajjiar included in the erstwhile Dalhousie forest Division stand transferred to the Wild Life Division but still the striking features in respect of results obtained in other forests are indicated briefly below:-

During 1850-1870 there were some unclassed fellings from Kalatop forests. Ribben Trop in his working plan laid down some prescriptions aiming principally at restocking by planting. But the prescriptions were not followed and selection fellings of Deodar continued.

In D.Arcy's Plan some good results were obtained in clear felled areas.Mc. Intire's Plan yielded profuse natural reproduction of Deodar on warm well drained slopes with a sufficiently open canopy. Effective closure of Chil forests after selection cum seeding fellings also resulted in satisfactory reproduction e.g. the forests of Banikhet and Bakloh areas.

Mc Intosh noticed that shelter afforded by Oak saplings to Deodar young regeneration was very beneficial thus cutting of young Oak was discontinued, but no noticeable results could be obtained. Selection cum seedling felling in Chil forests however continued giving good results.

During Kartar Singh Plan thinning were neglected in the Kainthly forests which resulted in a congested lanky young crop. Seeding felling in Chil forests were also of a conservative nature thus impeding the growth of natural regeneration.

During D.D. Mehta and Sant Ram's Plan P.B.I. areas of Deodar forests were subjected to light seeding fellings resulting in unsatisfactory regeneration. In the Fir forests regeneration however, has come up from seedling to sapling stage at a number of places.

7.3.7 Bhattiyat Region (Results of Past Working)

7.3.7.1 So far as the Bhattiyat Region is concerned, forests principally comptised that of Chil. The area was covered under Regular Plans from 1895-96 onwards. On the whole the regeneration of Chil did not pose any serious and gave almost satisfactory results.

Shri R.C. Sharma's Working Plan remained operative from 1969-70 to 1983-84 with main objectives of management as under;-

1. To arrest denudation of hill sides by conserving and promoting the vegetal cover, and there by also to ensure perennial water supply in the rivers and streams.
2. To provide for the bonafide requirements of the local population for timber, firewood, grass and grazing consistent with the capacity of each forests.
3. To attain normal forests.
4. To convert srub forests into Chil and Deodar forests.
5. To abtain maximum resin yield of sustained basis.
6. To regulate grazing in pasture lands of scientific lines.
7. Consistent with the above, to abtain the maximum passible sustained annual yield of various forest resources in perpetuity.

It included most of the newly demarcated forests for the first time to be worked under scientific management;-

The plan contained the following working circles;-

1. Regular Working Circle.
2. Selection Working Circle
3. Chil Working Circle.
4. Fuel Working Circle.
5. Protection Working Circle
6. Plantation (over lapping) Working Circle.

The revision however excluded the present Bharmour Division and the area transferred to wild Life Division, Chamba which were earlier covered by this plan.

7.3.8 Regular Working Circle:-Though bulk of the forests allotted to this working Circle do not come under the purview of this revision on account of the para above; but still the prescriptions and results achieved would be useful for the whatsoever forests of this type are left in the present divisional jurisdiction.

Forests with Deodar and Kail as the predominating species fir for working under Irregular Shelterwood System were included in this working Circle. Nature of the felling was to be suitably modified according to the terrain. Gentle slopes were to be worked under uniform system whereas in the steep portioin selection principles were to be applied. Groups of trees below 40 cm. dia down to 0.2 ha. in extent were to be retained as advance growth. Artificial sowing/planting were to immediately follow the fellings. Thinning and Improvement fellings were prescribed for the P.B.IV and P.B.III. Whereas only dead, dry and fire burnt trees were

Fir/Spruce	6480	3269.00	(-) 3211.00
P.B.IV			
Species	**Total yield to be removed cum**	**Actually removed cum**	**Excess/Defficit Cum**
Deodar	14400	2465.89	(-) 11934.11
Kail	14400	5068.65	(-) 9331.65
Fir/Spruce	8640	722.37	(-) 7917.63

The above deviations have been worked out keeping in view the Govt. 's cut imposed on the prescribed yield which was to an extent of 25% for the year 1980-81 and 10% from the year 1981-82 onwards. The deviation is on + side in case of fir in all P.Bs. This is due to snow damage from which fir is the most vulnerable due to heavy snow fall. The removals in case of deodar and kail are on + side in case of P.B.II and III. This is mainly due to T.D. In case of fir, the excess removals can also be attributed to the determination of an order of priority of fellings for seed bearers in which deodar and kail were preferred to fir/spruce.

The major forests of this working circle are either is the present Bharmour Division Jurisdiction or stand transferred to the wild life Division, Chamba. The regeneration assessment has, however, beem made in the remaining forests i.e. Kainthly RF. C-2 and Jagnalla DPF, C-1 which indicates that the regeneration has not kept and steady pace due to conservative seeding felling and lack of proper cultural operations.

7.3.9 Selection Working Circle:- Fir and Spruce foreats with little admixture of Deodar and Kail condined to steep/precipitous area were allotted to this working Circle. Majority of such frests again are either in the Bharmour Division or the wild life Division, Chamba. Now there are only few forests in the upper reaches of Dalhousie, and Chowari Ranges. The forests in the upper the modified Punjab Selection System. Regarding choice of species there was no binding from commercial value point of view rather, natural occurrence and suitability were to be followed. Artificial regeneration works for the sizeable blanks were prescribed under Para-298.60 cm. d.b.h. was fixed as exploitable dia for all the coniferous species with 15 years as the felling cycle. Yield was regulated by number of selection trees calculated by Smythies Formula subject to the percentage control and silvicultural availability. The prescribed maximum annual yield of Deodar Kail and Fir was 150, 500 and 1500 number of trees respectively.

All the Ist Class trees felled counted towards the prescribed yield. On account of the uneven distribution of Deodar and kail and Vallleywise felling programme, prescribed annual yield could not be stuck to. Therefore, yearly excess of deficit was to be brought forward in control

to be removed from P.B.II areas. 60 cm d.b.h. was retained as the exploitable dia, with a conversion period of 120 years. Regeneration period based on the past experience was fixed at 30 years. The working Circle was thus divided into 4 PBs.

The areas under regeneration, some selection forests suitable for the shelterwood system and few newly demarcated Protected Forests were included in P.B.I. P.B.II. consisted of forests approaching maturity.

Yield was to be regulated by volume for P.B.I. III and IV whereas no felling was provided in P.B.II. except for some hygienic nature of fellings as per requirement.

In P.B.I. only two regeneration fellings viz. seeding/corrective seeding felling and secondary fellings were prescribed. Final fellings were to be carried out when the hygienic were allotted to P.B.IV. For yield calculations in P.B.I. only I and II Class trees were taken into account. To meet the silvicultural requirements and other exigencies such as fire and other damages the yield was reduced by 20% in case of Deodar and Kail and 30% in case of Fir. The annual yield was fixed at 3000 cum. for Deodar and Kail each and 3500 cum for Fir.

In P.B.IV. yield was based on volume of I and II Class trees ignoring the increment as a safeguard against fire, drying up, uprooting etc. Keeping in view the silvicultural requirements and the crop composition only 50% of I and II Class trees were made silviculturally available in the prescribed yield. The annual yield worked to 2000 cum. for Deodar and Kail and 1200 cum. for Fir.

In case of P.B.III. Volume control was enforced only in respect of trees of and above I Class. Any removal of IInd Class would count towards prescribed yield. Due to excess removal of Ist Class and above trees earlier the estimated availability was reduced by 25% and accordingly the yield was fixed at 500 cum. 550 cum and 900 cum. for Deodar, Kail and Fir respectively.

From P.B.II. no felling were envisaged however any removal of I and II Class trees counted towards the prescribed yield of this Working Circle. The total prescribed yield for this working Circle worked out to 550 Cum. 5550 cum and 5600 cum in respect of Deodar, Kail and Fir respectively. As a safeguard against averfellings the T.D. removals, meeting of Govt. Demands were to count against the prescribed yield. On account of irregularity of stocking in some forests different age class distribution and localized distribution of Deodar and Kail excess or deficit was to be brought forward every year in control forms and deviation statements and the yield was to be adjusted at the end of every five years when it should have checked with in +- 10% of combined annual yield for the whole working circle. Based on the above the prescribed yield and actual removals during the Plan period are as under:-

forms and deviations adjusted at the end of every 5 years when it checked within +- 10% of total prescribed yield for the period. As per Para-318/319 1500 ha were prescribed for artificial regeneration workings in the working circle and accordingly a reclamation programme was framed. However maximum area of this working circle does not fall in the present Plan jurisdiction. The few forests left do not show any considerable impact of the artificial regeneration measures.

The yield prescribed for the working circle vis-à-vis actual removals during the plan period are as under:-

Table -7.10

	Deodar	**Kail**	**Fir**
Prescribed	2163 trees	7225 trees	24565 trees
Actuals	2847 trees	11539 trees	24765 trees
Excess or Deficit	(+) 684 trees	(+) 4314 trees	(+) 200 trees

Removals from 1984-85 to 1991-92 are as under:-

Table -7.11

Species	**Total yield to be removed cum**	**Actually removed cum**	**Excess/Defficit Cum**
Deodar	1080	1796	(+) 716
Kail	3600	18241	(+) 14641
Fir	12240	6405	(-) 5835

Above deviations have been worked Circle have been in excess in case of Deodar and Kail. Whereas in case of Fir/Spruce it has been in deficit. Excess removals are attributed to Salvage and T.D. markings.

7.3.10 Chil Working Circle:-This working Circle comprised pure Chil forests. Almost 50% area of this working Circle was contributed by the newly demarcated protected forests which were taken up for the first time to be managed scientifically. The forests were managed under shelterwood system modified to suit the prevailing local conditions. To prevent unnecessary sacrifice advance growth upto an extent of 0.2 ha comprising pole crop upto 30 cms dia with a density of 0.7 was to be retained as a part of the future crop.

60 cm. d.b.h. was fixed as the explotitable size with a rotation and conversion period of 120 years. Regeneration was envisaged to be completed in 30 years period thus making 4 PBs Forets with mature stocking, or with sparse over wood plenty of blanks and incipient

regeneration were allotted to the P.B.I. It also included some forests which were under regeneration in the earlier Plan but were yet to have as established regeneration.

P.B.II. included the forests approaching maturity.

Unevenaged mostly middle aged forests of IV and III Class trees were allotted to P.B.III. where from thinning and improvement felling were prescribed.

P.B.IV. contained the forests mostly with young crops.

Yield was prescribed by volume from the PBs I, III & IV.

Trees of 30cm d.b.h. and above were counted for calculation of yield in P.B.I. After keeping a 10% margin to meet the exigencies like fire damage etc. the annual yield was prescribed as 40000 cum.

From P.B.IV. the annual yield was fixed at 900 cum. which would come from IInd Class and Ist Class trees. Trees were the trees which mostly interspersed as aver wood over the established regeneration. Yield from P.B.III. was to come from the thinning, and improvement felling taking into account IInd class and above trees. Annual yield o;f 600 cum. was prescribed from this P.B. No. yield was prescribed from P.B.II. only hygienic felling were to be done.

In P.B.I. all III to Ist Class trees Regular were to count against the prescribed yield, whereas I and IInd Class trees were counted against the prescribed yield, total prescribed yield in case of P.B. II, III, & IV. The excess and deficit as in case of Regular Working Circle was to be brought forwarded every year in the control form and deviation adjusted at the end of every five years when it would check within +- 10% of the total prescribed yield of the working Circle.

On the principle enunciated above the prescribed yield vis-vis-vis the actually extracted one, for the working Plan period from 1969-70 to 1983-84 is detailed in the following statement.

Table -7.12

YIELD POSITION OF CHIL WORKING CIRCLE				
	P.B.I.	**P.B.II & III**	**P.B.IV.**	**Total**
Prescribed	57800	8670	13005	79475
Actual	56667.14	52420.92	13427.75	122515.81
Ecesse Of deficit	- 1132.86	+ 43750.92	+ 422.75	+ 43040.81

Removals from 1984-85 to 1991-92 are as under:-

Table -7.13

P.B.I.			
Species	**Total yield to be removed cum.**	**Actually removed cum**	**Excess/deficit cum.**
Chil	28800	13708.35	- 15091.65
P.B.II & III			
Species	**Total yield to be removed cum.**	**Actually removed cum**	**Excess/deficit cum.**
Chil	4320	29343.36	+ 25023.36
P.B.IV			
Species	**Total yield to be removed cum.**	**Actually removed cum**	**Excess/deficit cum.**
Chil	6480	6569.07	+ 89.07

Deviations have been worked out as per the conditions discussed in Para 5.7.5.2.

Actual removals have in excess on the whole. This is mostly in P.B.II. & III areas whereas in P.B.I. and P.B.IV. during the plan period this is within permissible limits. As mentioned earlier in Para 2.4.8.1 there have been fire incidents of unprecedently high intensity during the years 1978-79, 1984-85 and 1988-89. These have done tremendous damge to the Chil crop which was also being resin tapped by old method. Thus leading to massive salvage removals to which this excess can be attributed. Further T.D. removals have also contributed to a considerable extent.

In P.B.I. two regeneration felling viz seedling felling and final felling spaced at an interval of 15 years depending upon the progress of regeneration were prescribed under Para 357 artificial sowings and planting were prescribed for some refractory localities.

As a measure for fire protection a triennial programme of controlled butnnig was framed with the guidelings that regeneration area should be control burnt as soon as the regeneration attains a height of 1.5 m. Besides this maintenance of fire was stressed in Para 367.

7.3.11. Fuel Working Circle:-11 forests having Ban Oak as the main species and accessible by road were allotted to this working Circle, with and objective to augment supply of charcoal and fuelwood to Dalhousie and Chawari. Coppice with standard" system was adopted as the silvicultural system for these forests. Since apart from the standards, remaining trees were to be coppiced therefore no exploitable dia was fixed. a rotation period of 35 years and 105 years was fixed for the coppices and standards respectively.

Table -7.8

	P.B.I.		
	Deodar (cum.)	**Kail (cum.)**	**Fir (cum.)**
Prescribed	43350	43350	50575
Actual	42542.79	39585.08	63822.50
Excess or Deficit	(-) 807.21	(-) 3764.92	(+) 13247.50
	P.B.II & III		
	Deodar (cum.)	**Kail (cum.)**	**Fir (cum.)**
Prescribed	7225	7947.50	13005
Actual	17834.08	20518.36	24644.09
Excess or Deficit	(+) 10609.08	(+) 12570.86	(+) 11639.09
	P.B.IV.		
	Deodar (cum.)	**Kail (cum.)**	**Fir (cum.)**
Prescribed	28900	28900	17340
Actual	16662.63	22811.17	23084.71
Excess or Deficit	(-) 12237.37	(-) 6088.83	(+) 5744.71
	Deodar (cum.)	**Kail (cum.)**	**Fir (cum.)**
Prescribed	79475	80197.50	80920
Actual	77039.50	82914.61	111551.30
Excess or Deficit	(-) 2435.50	(+) 2717.11	(+) 30631.30

The removals from 1984-85 to 1991-92 and the deviations are as under:-

Table -7.9

P.B.I.			
Species	**Total yield to be removed cum**	**Actually removed cum**	**Excess/Defficit Cum**
Deodar	21600	1414.98	(-) 20165.02
Kail	21600	1796.42	(-) 19803.58
Fir/Spruce	25200	2987.10	(-) 22212.90
P.B.II & III			
Species	**Total yield to be removed cum**	**Actually removed cum**	**Excess/Defficit Cum**
Deodar	3600	4738.71	(+) 1138.71
Kail	3960	7444.28	(+) 3484.28

7.4.1.1.1 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 9632.23 hac. The forests on the whole are under stocked, vastly variable in density and normal distribution of age class is lacking except PB-IV and PB-III areas. Young to middle aged trees predominate and mature trees are rather scattered in them.The whole area of this working circle was stock mapped on 4"=1 mile scale. General site quality is II & III. The density varies from 0.2 to 0.6. Partial 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 60 cm.

7.4.1.1.2 Method of Treatmemt:-The forests were to be managed under Punjab Irregular Shelter wood system. The marking was to 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.

7.4.1.1.3 Calculation and 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 4.14.5, the annual prescribed yield for was 7100 cum. The removals from PB-II, PB-III will count towards PB-I.

7.4.1.1.4 Regeneration Fellings:-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. in addition to it salvage marking has been carried out.

7.4.1.1.5 Sowing and Planting:-The plantation programme has only been prescribed for PB-IV areas as a special treatment.

7.4.1.1.6 Regeneration Status:-The regeneration status in the forests which were worked during plan period is satisfactory.

7.4.1.1.7 Cultural Operations:-Subsidiary Silvicultural Operation were suggested in PB-I 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 a safeguard against fire hazards. Control burning was followed and fire lines maintained as per availability of funds as per recommendations.

7.4.1.1.8 Control Burning:-The control burning was followed and fire lines maintained as per availability of funds as per recommendations.

7.4.1.1.9 **Results of Implementation of the Plan:-**

i) The yield position as it stood on 31-3-2012 is deficit in PB-I and PB-IV due to general moratorium on green felling and removal of TD. Thus the deficit position is due to the ban on green felling of trees.

ii) No green felling in PB-I to PB-III and PB-IV were carried out during the plan period.

iii) There are large number of regenerated Chil areas in PB-I and PB-IV in the working circle, which require immediate removal of the over wood. However, this silviculture requirement remained wanting for allowing regeneration to set in these patches.

iv) The Chil forests prescribed under PB-III should be left to meet the demand of right holders and unfilled PB-I areas as per the provision of settlements. No thinning cum improvement fellings programme therefore needs to be prescribed for PB-III areas.

v) Resin tapping by rill method should be adopted as per recommendation of Resin Advisory Committee, where tap able diameter has been suggested to be kept at 40 cm and above and also dilution of acid concentration has been increased.

The total volume removed from this working circle during the plan period was 56446.27 m^3 and position of deviation as on 31.03.2012 is as under: -

Table -7.14

Species	Yield Prescribed	Volume removed	Variation (+/-)	Remarks
Chil	106500	56446.27	(-) 50053.73	Due to ban on green felling, only salvage removal has been done.

7.4.1.2 **(ii) Deodar Kail Working Circle:-**All the forests having more than 60% deodar and kail on easy slopes have been allotted to this working circle. The forests are not even aged. The forests will be managed under Indian irregular Shelter Wood System. The emphasis will be laid on natural regeneration supplemented with artificial regeneration.

7.4.1.2.1 **General Constitution, Character and Valuation of Crop:**-Nearly all pure crops of deodar and kail ore having 60% more of these species were allotted to this working circle and area was 800.28 hac. 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, kail & important B.L. Species were carried out in 10 cm dia classes down to 20 cm d.b.h. for whole working circle.

7.A.1.2.2 **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 principal along steep & 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 re-generation period of 30 years was therefore adopted.

7.A.1.2.3 **Calculation and Control of Yield:** - Yield in the circle was calculated on the basis of Hufnagel's formula. The yield will be controlled by volume. All dia classes' conifers felled for whatsoever purpose will count towards the yield. The yield will be PB wise.

7.A.1.2.4 **Regeneration Fellings:** - 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. in addition to it salvage marking has been carried out.

7.A.1.2.5 **Cultural Operations:** - 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. This is very important and to regeneration, and as Subsidiary Silvicultural Operation must be carried out soon after the felling have been completed.

7.A.1.2.6 **Results of Implementation of the Plan: -**

i) The yield position as it stood on 31.03.2012 is excessive in PB-I and deficit in PB-IV due to the removal from PB-II and PB-III counted towards the yield from PB-I on account of salvage marking and removal of TD to meet the demands of the local people. However, the over all removal from the PB's is deficit during the plan period because of non-marking of green trees 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 & incompliance of the Supreme Court's order.

Corresponding with rotation of coppice 35 years was the felling cycle. Yield was to be regulated by area. Thus fixing the size of annual coupes at 12 ha. Artificial sowings and planting were also prescribed – Nurseries at Bankot and Kainthly were to be started.

7.3.12 **Protection Working Circle:-**Forests located on steep, precipitous terrain, degraded forests and the high lying dhars (alpine pasture) were included in this working Circle. These forests were to be protected and optimally utilized. Main objectives were to prevent denudation, and maintenance of equitable flow of water in streams and rivers by improving the soil conditions and the vegetal cover Regulation of Grazing Norms were emphasized in Para 407.

7.3.13 **Plantation over Lapping Working Circle:-** Overlapping with the protection and Chil Working circle, areas with young crop needing protection and the blanks were included in this working circle with and area of 15489.63 ha. Regarding choice of species emphasis was laid on the commercially important species like Chil, Shisham, Khair, Deodar Kail, Walnut, Fir/Spruce and Ash.

7.3.14. **Miscellaneous Regulations:-**Under the miscellaneous regulations petty felling right holders and non right holder's demands, revision of concessional rates was a significant proposal but nothing has been done in this respect.

Maintenance of temple groves, creation of sample and preservation Plots was also stressed. Further emphasis was laid on the fire Protection respect.

7.4 RESULTS OF THE WORKING PLAN UNDER REVISION

7.4.1. T.D. SHARMA WORKING PLAN's (1993-94 to 2007-08)

Under T.D. Sharma's Plan, the forests were divided into Seven working circles as under: -

i) The Deodar Kail working circle.

ii) The Fir/Spruce working circle.

iii) The Chir working circle.

iv) The Protection working circle.

v) The Plantation working circle.

vi) The Pasture Improvement (Overlapping) working circle.

vii) The Soil and Conservation (Overlapping) working Circle.

7.4.1.1 **(i) The Chil Working Circle: -** This includes all reserved, demarcated and un-demarcated protected forests containing chil as pure crop. These forests shall be worked under Indian Irregular shelter wood System. Regeneration will be obtained naturally, supplemented with artificial regeneration.

iii) There are large numbers of regenerated Deodar areas in PB-I & PB-IV areas 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.

The total volume removed from this working circle during the plan period was 5884.08 m^3 & the position of deviation as on 31.03.2012 are as under: -

Table -7.15

Species	Yield Prescribed	Volume removed	Variation	Remarks
Deodar	40500	5884.08	-(34615.92)	Due to ban on green felling, only salvage removal has been done.

7.4.1.3 **(iii) Fir/ Spruce Working Circle:-**The forests which predominately support Fir & Spruce have been 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 gives a look of PB-I area. Felling done in the past in the majority of the areas has not been followed by regeneration.

7.4.1.3.1 **General Constitution, Character and 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 637.36 hac. The forests are very much under stocked and there is preponderance of mature to over mature trees. Natural regeneration in these forests is very poor and artificial regeneration is also inadequate. The whole area of this working circle was stock mapped on 4" = 1 mile. The average crown density is 0.3 to 0.4 & the crop is irregular. The UPF's areas have not specific boundaries.

7.4.1.3.2 **Method of Treatmemt: -** The forests of this working circle were managed under the Indian Irregular shelter wood system. Rotation period 120 years was adopted and the whole working circle has been divided into 4 fixed periodic blocks. Therefore the regeneration period of 30 years was adopted.

7.4.1.3.3 **Calculation and Control of Yield: -** Yield in this working circle was calculated on the basis of Hufnagel's formula. As prescribed in the para 3.18.2, the yield of the working circle will be controlled by PBs but all the species taken together. Removals

were included in this circle. The detail of plantation carried out under departmental plantation is as below:-

Table -7.17

Year	Area in hac.	Year	Area in hac./
1996-97	940	2005-06	1029.45
1997-98	574.50	2006-07	783.02
1998-99	738.50	2007-08	296.36
1999-00	782	2008-09	400.58
2000-01	599.10	2009-10	342.00
2001-02	328.8	2010-11	350.00
2002-03	399.23	2011-12	359.00
2003-04	389.74	2012-13	
2004-05	509.08		

7.4.1.4.1 **General character of the vegetation:** - It included the young plantation and other blank areas and all areas which are under stocked. No separate compartments or sub compartments have been formed in this working circle. No commercial felling was prescribed.

7.4.1.4.2 **Method of treatment:** - No definite silvicultural system was prescribed. Cultural able blanks areas were to be planted with suitable species. In the vicinity of habitation, species capable of yield fuel fodder and fruit trees were suggested. The year wise plantation programme was suggested Range wise.

7.4.1.4.3 **Results of implementation of the plan:** -

i) The various prescriptions & suggestions were made in the working plan were not followed in practice due to administrative & financial problems.

ii) Neither list of successful plantation had been prepared & listed nor has any prescription for established plantation have given and are required to be transferred to respective working circle been identified.

iii) No norms & methodology was prescribed to access the survival percentage of plantation carried out during the plan period.

iv) Effective closures of the plantation were suggested but how can be effective it was not prescribed. It needs to be incorporated in the plan under revision keeping in view of the provision given in Indian Forest Act, 1927.

v) No participatory approach model under JFM programme for the protection & maintenance of plantation were suggested, it need to be incorporated in the plan under revision.

7.4.1.5 The Protection working circle: - This working circle includes all the forests which were not included in other working circles described above. These forests are on steep and precipitous slopes where concentrated felling is not advisable due to environmental hazards and regeneration problems. The blanks and other degraded areas are to be rehabilitated by planting species suitable to the areas.

7.4.1.5.1 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 compartments 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 was 23753.99 hac

7.4.1.5.2 Method of treatment: - No definite silvicultural system was prescribed. However, salvage marking was suggested.

7.4.1.5.3 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. The position of volume of different species removed in this working circle as on 31-03-2012 as under:-

Table -7.18

Species	Yield Prescribed(cum)	Volume removed(cum)	Variation(cum)	Remarks
Fir/Spruce/ Deo/Chil	0	8366.81	(+) 8366.81	Excess is due to salvage removals

7.4.1.5.4 Miscellaneous Regulations:-

(i) Boundaries:-No separate compartments or sub-compartments have been formed in this working circle.

(ii) Fire Protection:-The existing fire lines were maintained and cleared according to availability of Budget.

(iii) Resin Tapping:-Resin tapping in this Division is being done by HPSFC Ltd. by adopting Rill method.

(iv) Salvage Lots:-The salvage lots have been handed over to HPSFC for exploitation during the last working plan period.

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CHAPTER VIII

STATISTICS OF GROWTH AND YIELD

8.1 GENERAL

A comprehensive analysis of the comparison of local statistical data collected during earlier Plans, with the one appearing in FRI Publications shows a remarkable proximity. However growth and statistics data in respect of some commercially important species based on various observations and applied during the earlier Plans has yielded satisfactory results. In view of this, it was not felt necessary to collect this data afresh.

The statistics of growth and yield so obtained in respect of different species, and average value thereof which will be used during the currency of present Working Plan are indicated below:-

8.2 DEODAR

The volume of Deodar adopted in the revised working plan is as under

Table -8.1

DBHOB (cm)	Age (years)	Total Volume (Cum)	Volume table adopted for this Plan (Cum)	Current annual increment (Cum/year)	Current annual increment percent
10	21		V=0.22	0.02316	10.53
12.5	24				
15.0	27				
17.5	31				
20	40	0.140	IV=0.28	0.02380	8.5
22.5	43	0.190			
25.0	47	0.280			
27.5	50	0.364			
30	53	0.448	III=0.57	0.04116	5.88
32.5	57	0.588			
35.0	60	0.700			
37.5	64	0.868			

from PB-II & PB-III will count towards PB-I. The annual prescribed yield for Deodar, Kail, Chil & Fir-Spruce for PB-I is 4280 cum and 425 cum in PB-IV.

7.4.1.3.4 Regeneration Fellings: - Annual sequence of felling has laid down in this working circle. No regeneration felling has been under taken due to ban on green felling in compliance of the Supreme Court's order. However, salvage marking of dead, drying, 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-I areas was remained un-felled owing to change in Policy of the Government.

7.4.1.3.5 Regeneration Status: - The regeneration status in the forests which were worked during the plan period is inadequate.

7.4.1.3.6 Results of Implementation of the Plan: -

i) The yield position as it stood on 31.03.2012 is deficit in PB-I is excess and deficit in PB-IV due to the removals from PB-II and PB-III counted towards the yield from PBs together. The reason for the excess deviation is account of 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 incompliance of the Supreme Court's order.

ii) No green felling in PB-I to PB-IV was carried out during the plan period.

iii) The various prescription & suggestion made in the working circle were not followed in practice owing to change in Policy of the Government and large areas could not be regenerated due to lack of fund. This is for the reason that felling as prescribed, were not done with the result opening in the canopy not carried out, with the result all the area were not properly regenerated.The total volume removed from this working circle during the plan period was 28366.81 m^3 & the position of deviation as on 31.03.2012 is as under: -

Table -7.16

Species	Yield Prescribed(cum)	Volume removed(cum)	Variation(cum)	Remarks
Fir/Spruce	22000	20360.81	(-) 1639.90	

7.4.1.4 (V) Plantation working circle: -

(i) Departmental afforestation:-The working circle included areas which are blank and poorly stocked but are suitable for raising plantation of valuable and economically important species. The plantation raised in the UPF's in the past has not fully established

40	68	0.064	IIA=1.42	0.05292	3.64
42.5	72	0.260			
45.0	76	0.456			
47.5	81	1.736			
50	86	2.016	IIB=2.55	0.05936	2.21
52.5	91	2.324			
55.0	97	2.716			
57.5	104	3.108			
60	111	3.528	IA=4.11	0.04452	1.05
62.5	118	3.864			
65.0	128	4.256			
67.5	145	4.578			
70			IB=5.38		
72.5					
75.0					
77.5					
80			IC=6.80		
82.5					
85.0					
87.5					
90			ID=8.50		
92.5					
95.0					
97.5					
100			IE=10.45		
102.5					
105.0					
107.5					

8.3 KAIL

The area covered under this Plan has a very nominal representation of Kail. Hence the volume factor for this species are of an academic interest only. However, the results obtained from graphic relationship of volume and diameter with age of the species, regarding statistics of growth and yield as per Gaur's Plan are as under.

Table -8.2

DBH (Cm)	Age years	Total Volume in the round (cum)	Average volume by standard dia. Classes (cum)	Current annual increment (cum)	Current increment percent
10	14		V=0.22	0.03143	14.29
12.5	18				
15.0	21				
17.5	25				
20	28	0.17	IV=0.25	0.0252	9.89
22.5	30	0.20			
25.0	33	0.28			
27.5	36	0.36			
30	38	0.42	III=0.84	0.04900	5.81
32.5	41	056			
35.0	44	0.70			
37.5	47	084			
40	50	1.01	IIA=1.39	0.06524	4.68
42.5	54	1.26			
45.0	58	1.51			
47.5	62	4.82			
50	68	2.18	IIB=2.67	0.05852	2.19
52.5	72	2.46			
55.0	78	2.86			
57.5	84	3.19			
60	91	3.53	IA=3.89	0.03836	0.99
62.5	100	3.92			
65.0	110	4.26			

The volume table adopted in previous plan as above i.e. plan under revision will be used in current plan for calculation of volume.

8.4 FIR/SPRUCE

The statistics of volume for these two species, adopted in the working Plan under revision are reproduced as under. This is based on the results obtained in Gaur's Plan:-

Table -8.3

Dia class	Dia	Volume (cum)
V	10-20 cm	0.24
IV	20-30 cm	0.43
III	30-40 cm	1.13
IIA	40-50 cm	2.12
IIB	50-60 cm	3.26
IA	60-70 cm	4.96
IB	70-80 cm	6.94
IC	80-90 cm	8.78
ID	90-100 cm	10.62
IE	Above 100 cm	12.40

The above volume factors would be used during the currency of this plan.

8.5 CHIL

The volume factors adopted in the previous Plan will be used during the currency of this Plan are reproduced below:-

Table -8.4

Dia class	Volume (cum)
V	0.10
IV	0.28
III	0.71
IIA	1.27
IIB	1.84
IA	2.83
IB	4.25
IC	5.88
ID	7.62

The data of F.R.I. for total wood (OB) average for all height classes would be used in the current plan. It is reproduced below. Here the volume factor of IC and ID are added after reading from graph of the other classes data.

Table -8.5

Dia class	Volume (cum)
V	0.13
IV	0.45
III	1.05
IIA	1.87
IIB	2.90
IA	4.01
IB	5.21
IC	6.57
ID	8.16

8.6 BROAD LEAVED TREES

Local volume tables in respect of B/L Species were prepared during the completion the working plan of Kullu Forest Division by Shri DP Kapoor is incorporated in the current working plan. The Volume table of Ban is taken from FRI data .

Table -8.6

Species	V	IV	III	II A	II B	I A	I B	I C	I D	I E & Above
Ban	0.13	0.45	1.05	1.87	2.90	4.01	5.21	6.57	8.16	12.40
Shisham	0.127	0.368	0.835	1.77	3.03	4.587	6.385	6.385	6.385	6.385
Kharsu	0.15	0.30	1.0	1.8	3.0	4.6	6.3	8.0	9.6	12.2
Horse chest nut	0.15	0.3	0.8	1.7	2.7	3.9	5.6	7.1	9.0	12.0
Akhrot	0.1	0.2	0.8	1.5	2.5	3.8	5.1	7.2	8.9	11.3
Acer spp.	0.1	0.2	0.7	1.3	2.1	3.3	5.1	6.9	8.5	11.2
Paza	0.05	0.1	0.7	1.4	2.2	3.2	4.3	5.6	6.9	9.6
Bhojpatra	0.15	0.3	0.9	1.6	2.3	3.3	4.4	5.4	6.6	8.0
Capinus spp.	0.15	0.3	0.9	1.5	2.4	4.0	6.0	7.8	9.7	12.6
Poplar	0.15	0.3	0.7	1.4	2.8	4.9	6.8	9.0	11.1	14.5
Dhoury	0.25	0.5	1.0	1.8	2.8	4.4	6.0	8.0	9.0	13.3
Misc. B/L	0.15	0.3	0.7	1.3	2.2	3.3	4.6	6.3	8.0	11.1

8.7 KHAIR

The diameter, total volume, heartwood, Katha as adopted in the Working plan of Nurpur Forest division by Sh. R.C.Kang (which is adjoining to Dalhousie Forest Division) is also being relied upon in the current working plan and relation is reproduce as under:-

Table -8.7

Diameter (cm)	Height (m)	Volume (cum)	Heartwood vol (cum)	Wt. of heartwood for Katha(kg)	Wt. of Katha (kg)
10-15	8.30	0.02570	0.011220	11.2	--
15-20	10.10	0.06860	0.03100	31.6	2.5
20-25	11.80	0.11810	0.05760	50.6	5.0
25-30	12.90	0.216970	0.10960	78.7	8.0

30-35	13.40	0.25280	0.17570	128.3	14.0
35-40	13.40	0.25280	0.17570	128.3	14.0
40-45	13.40	0.33310	0.24060	197.4	23.0
45-50	13.40	0.5680	0.38980	280.1	29.0

8.8 ESTIMATION OF GROWING STOCK

8.8.1 Chil Working Circle:- A list of all compartments of Chil Working Circle have been prepared and 10 % with minimum of one sample has been selected for PB-I and PB-IV. While 5 % with minimum of one sample has been selected for PB-II and PB-III. The random sample have been selected using random sample table.The average growing stock of Chil Working Circle comes out to be 135.51 cum per ha.The total growing stock of Chil working circle is given below:-

Table -8.8
Chil Working Circle

Species	No. of stems	Volume in m3	% stems	% Volume
Chil	2109357	1002048.20	75.15	75.82
Buras	123901	51099.17	4.41	3.87
Ban/Oak	129490	124866.27	4.61	9.45
Ailan	47542	11894.58	1.7	0.90
Deodar	63232	48886.11	2.25	3.70
Fir/ Spruce	3399	2912.97	0.12	0.22
B.L	329912	79868.69	11.76	6.04
Total	**2806833**	**1321575.99**	**100.00**	**100.00**

8.8.2 Deodar Working Circle:- A list of all compartments of Deodar Working Circle have been prepared and 10 % with minimum of one sample has been selected for PB-I and PB-IV. While 5 % with minimum of one sample has been selected for PB-II and PB-III. The random sample have been selected using random sample table.The average growing stock of Deodar Working Circle comes out to be 469.55 cum per ha.The total growing stock of Deodar working circles is given below:-

Table -8.9
Deodar Working Circle

Species	No. of stems	Volume in m3	% stems	% Volume
Deodar	221684	265088.28	49.75	61.27
Ban/Oak	50179	51106.89	11.26	11.81
Chil	72825	35859.33	16.34	8.29
Fir/ Spruce	37939	64066.32	8.51	14.81

Ailan	423	57.00	0.1	0.01
Buras	3310	749.09	0.74	0.17
B.L	59225	15746.36	13.3	3.64
Total	**445585**	**432673.27**	**100.00**	**100.00**

8.8.3 Fir/Spruce Working Circle:- A list of all compartments of Fir/Spruce Working Circle have been prepared and 10 % with minimum of one sample has been selected for PB-I . While 5 % with minimum of one sample has been selected for PB-U. The random sample have been selected using random sample table.The average growing stock of Fir/Spruce Working Circle comes out to be 164.25 cum per ha.The total growing stock of Fir/Spruce working circles is given below:-

Table -8.10

Fir/Spruce Working Circle

Species	No. of stems	Volume in m3	% stems	% Volume
Fir/Spruce	200345	208236.16	97.19	98.48
Buras	154	45.28	0.08	0.02
Ban/Oak	4718	2967.63	2.29	1.41
B.L	915	190.38	0.44	0.09
Total	**206132**	**211439.45**	**100.00**	**100.00**

8.8.4 Conservation cum Rehabilitation Working Circle:- A Rangewise list of all compartments of Conservation cum Rehabilitation Working Circle have been prepared and 5 % with minimum of one sample has been selected for this Working circle in each range .The average growing stock of this Working Circle comes out to be 138.80 cum per ha.The total growing stock of this working circles is given below:-

Table -8.11

Conservation cum Rehabilitation Working Circle

Species	No. of stems	Volume in m3	% stems	% Volume
Deodar	9518	11174.64	0.25	0.34
Chil	452708	158314.70	11.98	4.81
Fir/Spruce	388614	1149510.00	10.28	34.94
Buras	397818	393255.40	10.53	11.95
Ban/Oak	174814	365584.80	4.63	11.11
Khair	12315	1164.37	0.32	0.04
Shisham	24909	6196.05	0.66	0.19
B.L	2318942	1204587.00	61.35	36.62
Total	**3779637**	**3289786.96**	**100.00**	**100.00**

8.8.5 Plantation Working Circle:- A Rangewise list of all compartments of Plantation Working Circle have been prepared and 5 % with minimum of one sample has been selected for this Working circle in each range .The average growing stock of this Working Circle comes out to be 32.38 cum per ha.The total growing stock of this working circles is given below:-

Table -8.12
Plantation Working Circle

Species	No. of stems	Volume in m3	% stems	% Volume
Chil	468286	108338.00	69.79	76.56
Fir/Spruce	519	157.00	0.08	0.11
Khair	15643	1633.00	2.33	1.15
Shisham	2161	434.00	0.32	0.31
B/L	184428	30942.00	27.48	21.87
Total	**671036**	**141503.00**	**100.00**	**100.00**

8.9 COMPARATIVE GROWING STOCK

The comparative Growing stock of the present plan to the plan under revision is as under:-

Table -8.13

S.N	Name of Working Circle	Total Growing Stock (cum)		Variation
		Expired W.P	Current W.P	
1	Chil	1021984.50	1309921.54	(+) 287937.04
2	Deodar	310447.92	435274.08	(+) 124826.16
3	Fir/Spruce	269999.40	211435.44	(-) 58563.96
4	Conservation cum Rehabilitation	-----	3289786.96	----
5	Plantation	-----	141503.00	----
	Total		**5387922.09**	

8.10 OUT-TURN

The conversion % of different species as per Punjab Forest Manual is as under:-

Species	Percentage
Deodar	49
Chil	45
Fir/Spruce	30

The conversion % of different species as per latest figures of HPSFDC is as under:-

Species	Percentage
Deodar	60
Chil	35
Fir/Spruce	40
Ban	4.00 qts./ cum

The conversion factor of solid volume, stacked volume and weight of Ban is as under:-

Ratio of solid volume/stacked volume =1:2

Air-dry weight/cum solid volume = 8.0 qtls.

Air-dry weight/cum stacked volume =4.0 qtls

Charcoal conversion per cum = 2qtl

The conversion factor of solid volume, stacked volume and weight of fuelwood and miscellaneous B/L species are as under:-

Ratio of solid volume/stacked volume =1:2

Air-dry weight/cum solid volume = 7.20 qtls.

Air-dry weight/cum stacked volume = 3.60 qtl

8.11 STOCK MAPS

Stock Maps on 1:15000 scale has been prepared for each compartment.

8.12 REGENERATION SURVEY: - Regeneration assessment survey of PB-I areas should be carried out every third year as per para 32 of the National Working plan code, 2004.Reasons for failure should be detailed and corrective measures taken. If the regeneration does not keep pace with fellings, then fellings should not be carried out till the problem is resolved.

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CHAPTER IX

ESTIMATE OF THE CAPITAL VALUE OF THE FOREST

9.1 CAPITAL VALUE OF LAND UNDER FOREST

An estimate of the capital value of the forests based on NPV rates for eco class V & VI class has been applied. The capital value is however subject to variation.

Table - 9.1

Gradation of Land	Total Forest area in ha.	App. Cost of land per ha. in Rs.	Total cost in Crores
R.F	851.96	991000	84.42
D.P.F	38558.69	845000	3258.20
U.P.F	540.67	657000	35.52
Total	**39951.22**		**3378.14**

9.2 CAPITAL VALUE OF THE GROWING STOCK

The capital value of the growing stock has been worked out on the basis of out-turn percentage given in para 8.6 in Chapter-VIII and market rates given by HPSFDC for the year 2012-2013

Table -9.2

S.N	Species	Standing volume in cum	Rates	Value in Crores
1	Deodar	325149.03	5936	193.00
2	Ban/ oak	544522.47	300	16.33
3	Chil	1301562.43	739	96.18
4	Fir/Spruce	1427483.17	1123	160.30
5	Khair	2797.37	794	0.06
6	Shisham	6630.05	2928	1.94
7	Buras	436494.09	300	13.09
8	Allian	11951.53	300	0.36
9	Other B/L	1331332.5	300	39.94
	Total	**5387922.64**		**521.20**

9.3 VALUE OF MINOR FOREST PRODUCE

The main minor forest produce are resin, Medicinal herbs, Guchhi and grass and their values are as under:-

Table -9.3

S.N	Type of Produce	App. Estimated value in Crores
1	Resin	2.13
2	Medicinal herbs,Grasses	0.50
	Total	**2.63**

9.4 TOTAL CAPITAL VALUE OF FORESTS

Thus the total value of the Forest works out to be Rs 3901.97 Crores. The detail is as under:-

Table -9.4

S.N	Capital Value of	App. Estimated value in Crores
1	Land	3378.14
2	Growing Stock	521.20
3	MFP	2.63
	Total	**3901.97**

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PART-II

FUTURE MANAGEMENT

DISCUSSED AND PRESCRIBED

CHAPTER I

BASIS OF PROPOSALS

1.1 GENERAL OBJECTS OF MANAGEMENT

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

i) To conserve & improve the quality and density of the existing forests for the protection, preservation, improvement, prevention of erosion and maintenance of an equitable flow of water in the streams and rivers.

ii) To develop the sustainable management of forests, watershed, wild life & biodiversity and to rehabilitate the degraded forests & habitat through plantation of native species, habitat improvement, assisting of natural regeneration and taking up soil & water conservation measures.

iii) To protect and conserve the forest biodiversity including total protection of endangered species of flora and fauna consistent with environmental considerations, to increase the proportion of more valuable species while conserving biodiversity etc.

iv) To bring the growing stock to a condition nearer the normal forest, as far as possible.

v) To meet the bonafide requirements of the local population for timber, fuel, agricultural implements, grazing & other forest produce for enhanced livelihood of the local people.

vi) To aware and educate local people through participatory forest management about importance of biological diversity & their role to human ecology and environment and also seek their co-operation and participation in its management.

1.2 STATE FOREST POLICIES

Himachal Pradesh Government have also formulated a Forest Policy for the Pradesh vide letter No.Fts.(8)17-5/10 dated 3rd September,1980. Important feartures of this policy are as under:-

i) To have 50% of the geographical area of the state under Forest by 2000 A.D and to raise this percentage to 60% ultimately.

ii) To do fellings strictly in accordance with the prescriptions of sanctioned working plan and to count all removals from the forests towards the prescribed yield.

iii) To do fellings subject to coming up of regeneration.

iv) To undertake Forest and Revenue Settlements simultaneously and to regulates an Act of Legislation.

v) To meet the requirement of local right holders judiciously keeping in view the conditions of forests.

vi) Managements of watersheds to be given due importance.

vii) To undertake afforestation in the waste blank stretches in the productive waste land under Social Forestry Programme with appropriate involvement and co-operation of the people especially youth and school children.

viii) To plant fast growing fuel and fodder species near habitations to meet the requirements of the local people.

ix) To reduce cattle population rationally, fixing norms of grazing under comprehensive legislation.

x) To promote tourism alongwith improvement of forest vegetation.

xi) To ban shooting of Big and Small game in the Pradesh for the development of wildlife and to establish sanctuaries all over the state.

xii) Not to grant the lease for the extraction of minerals without the prior consent of Forest Department.

xiii) To create research facilities in the forest department to solve problems of applied nature.

1.3 CONSTITUTION OF WORKING CIRCLES & METHOD OF TREATMENT

To achieve the above objective of management, the following Working Circles will be constituted: -

i) Chil Working Circle

ii) Deodar Working Circle.

iii) Fir / Spruce Working Circle.

iv) Conservation cum Rehabilitation Working Circle

v) Plantation Working Circle

vi) Pasture Improvement (overlapping) Working Circle

vii) JFM (overlapping) Working Circle

viii) Wild Life Management (overlapping) Working Circle

ix) NTFP (overlapping) Working Circle

x) Forest Protection (overlapping) Working Circle

xi) Soil and Water Conservation (overlapping) Working Circle.

1.4 WORKING CIRCLES—AREA STATEMENT & DISTRIBUTION

The Rangewise area of different working circles is tabulated below (in hectares):-

Table -1.1

Range	Deodar W.C (Ha)	Chil W.C (Ha)	Fir/Spruce W.C (Ha)	Conservation cum Rehabilitation W.C (Ha)	Plantation W.C (Ha)	Total (Ha)
Dalhousie	456.57	3529.64	42.90	1490.76	741.46	6261.33
Chowari	470.43	2460.39	429.31	7946.45	926.24	12232.82
Bakloh	---	1499.00	815.06	6205.68	1111.89	9631.63
Bhattiyat	---	2177.45	----	8058.84	1589.15	11825.44
Total	**927.00**	**9666.48**	**1287.27**	**23701.73**	**4368.74**	**39951.22**

The areas suggested to be constituted in these Working Circles are given below (in hectares):-

Table -1.2

S.No	Name of Working Circle	Area in ha.			Total
		R.Fs	D.P.Fs	U.P.Fs	
1	Chil	422.50	9142.48	101.50	9666.48
2	Deodar	429.46	497.54	---	927.00
3	Fir/Spruce	---	1287.27	---	1287.27
4	Plantation	----	4368.74	---	4368.74
5	Conservation cum Rehabilitation	---	23262.66	439.07	23701.73
	Total	**851.96**	**38558.69**	**540.57**	**39951.22**

1.4.1 Chil Working Circle: - This includes all R.Fs, D.P.Fs and U.P.Fs containing chil as pure crop.These forests shall be worked under Indian Irregular shelterwood System. .Regeneration will be obtained naturally, supplemented with artificial regeneration.

1.4.2 Deodar Working Circle:-All the forests are having more than 60% deodar and kail on easy slopes have been allotted to this working circle. The forests are not even aged. The forests will be managed under Indian Irregular Shelterwood System. The emphasis will be laid on natural regeneration supplemented with artificial regeneration.

1.4.3 Fir/Spruce Working Circle:-The forests which predominately support Fir and Spruce have been allotted to this working circle. Due to heavy fellings in the past for apple packing cases, most of the forest allotted to this working circle gives a look of PB-I area. Fellings done in the past in the majority of the areas have not been followed by regeneration.Emphasis will be laid to regenerate PB-I areas by artificial means in a time bound manner

1.4.4 Conservation cum Rehablitation Working Circle: - This working circle contains all the forests which are not included in other working circles described above. These forests are on steep and precipitous slopes where concentrated fellings are not advisable due to environmental hazards and regeneration problems. The blanks and other degraded areas are to be rehabilitated by planting species suitable to the area.

1.4.5 Plantation Working Circle:- This working circle includes areas which are blank and poorly stocked but are suitable for raising plantation of valueable and economically important species.The plantation raised in U.P.Fs in the past which are not fully established are also included in this circle.

1.4.6. Pasture Improvement (overlapping) Working Circle:- This Working Circle comprised of subalpine pasture and local grazing grounds in low lying areas overlapping with other working circles proposed to regulate grazing and enhance the leaf biomass production and encourage the habit of stall feeding with replacement of inferior cattle breads.

1.4.7 JFM (overlapping) Working Circle:-The degraded U.P.Fs near to the habitations, D.P.Fs close to habitations which are facing fast natural resource depletion are prime candidates to be taken up for JFM.

1.4.8 Wild Life Management (overlapping) Working Circle:-This Working Circle is constituted for emphasizing the necessity of conservation of wildlife and collection of information for better management of wild life. The whole tract has a variety of wild animals and birds since the forests are distributed from low elevation to the high snow bound areas. Therefore, this working circle overlaps all other working circles.

1.4.9 **NTFP (overlapping) Working Circle:-**This would be an overlapping working circle covering all the working circles and is constituted to ensure systematic development and exploitation of non timber forest produce species that occur in the Division. The main Non Timber Forest Produce found/extracted in the Division are Resin, Medicinal plants, grasses.

1.4.10 **Forest Protection (overlapping) Working Circle:-** This working circle covers all the Reserve Forests, Demarcated Protected Forests and Undemarcated Forests situated on comparatively moderate slopes with Chil/ Deodar as the principal or predominant species.

1.4.11 **Soil & Water Conservation (overlapping) Working Circle:-** Problem of soil erosion was realized all over except well stock forests. This working circle overlapped with Protection Working Circle in particular but in general objective and prescriptions were applicable to areas in other working circles which also need some specific treatment for soil and water conservation. The objective of this working circle was to arrest abnormal erosion by improving soil status, moisture regime, restoring the vegetation cover and to ensure consistent flow of water in streams/rivers. Depending upon the nature/intensity of erosion, altitudinal zonation and the status of growth areas were classified into three categories viz. high, moderate and low intensity areas.

1.5 BLOCKS AND COMPARTMENTS

Division of the forests into compartments and sub compartments as adopted in the previous plan has been maintained as such in majority of the forests. There are however few cases where nature of the crop or erosion problem etc. has necessitated a change in the compartment boundary. Further the inclusion of established plantation areas has also led to the change in the compartment/ sub compartment boundaries.

1.6 FELLING SERIES

Taking the whole division as one unit of control, there will be only one felling series.

1.7 PERIOD OF WORKING PLAN

The plan is prepared for a period of 15 years commencing from 1-4-2013 to 31-03-2028. The working plan under revision expired on 31-03-2008.There were no silviculture fellings and the salvages removal made during 2008 to 2012-2013 has been duly accounted in the Divisional control forms based on the prescription of previous plan.The other operations like plantation under State scheme, CA, CAT, Control burning, repair of B.P etc. were done on the basis of annual plan operations. Hence there is no problem in making the plan operative prospectively.

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CHAPTER II

CHIL WORKING CIRCLE

2.1 GENERAL CONSTITUTION OF WORKING CIRCLE

All the pure chil forests or the forests containing chil as 60% or more in composition have been including in this working circle. The total area of this working circle is 9666.48 ha.

2.2 GENERAL CHARACTER OF VEGETATION

The overall condition of the vegetation is that the forests are poorly stocked and mostly blanks with heavy biotic interference like grazing, fire, breaking up land for agricultural use especially in U.P.Fs. Defective resin tapping of trees for extraction of resin and uprooting of trees by wind and snow have caused a vast destruction of the crop.

2.3 FELLING SERIES AND CUTTING SECTIONS

There will be one felling series

2.4 AREA STATEMENT

Total area of this working circle is 9666.48 ha.which works out to be 24.19 % of the total area of the division.

Table -2.1

Range	R.F	D.P.F	U.P.F	Total in ha.
Dalhousie	224.62	3301.02	4.00	3529.64
Chowari	---	2418.39	42.00	2460.39
Bakloh	197.88	1285.12	16.00	1499.00
Bhattiyat	---	2137.95	39.50	2177.45
Total	**422.50**	**9142.48**	**101.50**	**9666.48**

2.5 BLOCKS AND COMPARTMENTS

Division of the forests into compartments and sub compartments as adopted in the previous plan has been maintained as such in majority of the forests. There are however few cases where nature of the crop or erosion problem etc. has necessitated a change in the compartment boundary. Further the inclusion of established plantation areas has also lead to the change in the compartment/ sub compartment boundaries.

2.6 SPECIAL OBJECTIVES OF MANAGEMENT

The special objects of the Management will be as under:-

i) To check retrogression in chil forests by fires, to maintain the tempo of regeneration and improve the environment thereby.

ii) To improve stocking of low density chil forests.

iii) To convert irregular forest into a regular one to the extent possible under the prevailing conditions.

iv) To restock the poorly stocked and blank areas through artificial regeneration.

v) To obtained maximum possible yield of resin and timber on sustained basis

2.7 ANALYSIS AND VALUATION OF THE CROP

2.7.1 **Stock Map**:-All the forests in this working circle have been stock mapped on 1:15000 scale and filled in the concerned C.H files.

2.7.2 **Density:-** The crown density of the compartments have been estimated ocularly and has been recorded in respective compartments history files. However average density for the working circle is 0.4 to 0.5.

2.7.3 **Age Classes:** - The crop is very irregular. The overall age condition is as under:-

Table-2.2

	Young, 10-29 cms.	**Middle aged, 30-cms**	**Mature /over Mature 60 &above cms.**	**Total**
Stems (nos.)	1513737	544664	50954	2109355
Volume (cum)	273394.2	192313.50	536341.30	1002049.00

2.7.4 **Enumerations:-** A list of all compartments of Chil Working Circle have been prepared and 10 % with minimum of one sample has been selected for PB-I and PB-IV. While 5 % with minimum of one sample has been selected for PB-II and PB-III. The random sample have been selected using random sample table.The average growing stock of Chil Working Circle comes out to be 136.72 cum per ha.The total growing stock of Chil working circle in PBs wise are given below:-

Table-2.3
Volume of Chil Working Circle

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Volume In cum
PB-I											
Chil	26415.00	49397.00	35923.00	26026.00	26084.00	22283.00	13392.00	7038.00	2347.00	38.30	208943.3
Baras	1400.00	1258.60	4335.00	7352.00	5955.00	593.60	8742.00	7.05	0	0	29643.25
Ban/Oak	1661.40	4094.60	4938.20	4797.00	2633.00	1953.00	26.05	91.98	40.20	0	20236.03
Ailan	647.11	697.55	1240.10	331.50	294.50	0	0	0	0	0	3210.76
Deodar	1133.60	378.91	350.62	645.00	892.90	875.10	432.8	257.40	0	0	4966.33
Fir/ Spruce	0	6.10	10.69	10.03	15.43	0	0	0	0	0	42.25
B.L	14024.00	8966.10	16956.00	9346.00	2037.00	173.50	53.37	46.70	26.69	0	51629.36
Total	**45281.1**	**64798.8**	**63753.6**	**48507.5**	**37911.**	**25878.2**	**22646.2**	**7441.13**	**2414.49**	**38.3**	**318671.28**
PB-II											
Chil	24197.00	29876.00	61929.00	53866.00	45615.00	40436.00	22588.00	23489.00	18529.00	0	320524.70
Baras	6511.80	2345.70	6361.00	2067.00	1426.00	571.40	244.90	179.60	163.30	0	19871.42
Ban/Oak	5122.40	9040.30	17301.00	15005.00	14170.00	10911.00	10256.00	9433.00	12661.00	0	103900.30
Ailan	1834.90	1617.80	1692.40	942.10	426.50	81.63	32.65	65.31	0	0	6693.24
Deodar	3212.20	1796.10	2508.00	2844.00	9891.00	5330.00	1433.00	0	0	0	27015.08
Fir/ Spruce	150.06	129.45	300.94	270.00	0	0	0	0	0	0	850.45
B.L	1023.60	726.23	3469.10	2708.00	500.00	179.60	81.63	130.60	146.90	0	8966.08
Total	**42052.00**	**45532.00**	**93562.00**	**77703.00**	**72029.00**	**57511.00**	**34635.00**	**33298.00**	**31500.00**	**0**	**487821.27**
PB-III											
Chil	7711.20	30997.00	62252.00	52757.00	29087.00	16621.00	8238.00	1890.00	964.80	74.22	210592.20
Baras	55.71	34.09	561.80	847.50	49.48	0	0	0	0	0	1548.56
Ban/Oak	74.70	135.87	102.27	0	28.25	0	0	0	0	0	341.09
Ailan	206.39	141.81	730.89	814.50	61.85	0	0	0	0	0	1955.40
Deodar	1133.50	785.43	3147.90	8229.00	2881.00	280.20	0	66.23	0	0	16523.72
Fir/ Spruce	142.59	125.65	836.47	867.20	0	48.31	0	0	0	0	2020.27

2.9 ROTATION AND CONVERSION PERIOD

The roration of 120 years has been adopted. The general quality class of the tract is II/III FRI.

2.10 EXPLOITABLE DIAMETERS

Exploitable diametere fixed is 60 cm.d.b.h due to better out turn in the form of sleeper size which fatches better price in the market.

2.11 REGENERATION PERIOD

Regeneration period is fixed as 30 years. Efforts will be made to regenerate the area naturally supplemented with artificial planting.

2.12 FELLING CYCLE

Corresponding to the plan period the felling cycle will be of 15 years.

2.13 DIVISION INTO PERIODS AND ALLOTMENT TO PBs

With 120 years as rotation and 30 years for regeneration there will be 4 Periodic Blocks. As the crop generally of younger age classes with very few middle aged-mature trees, so PBs can not be divided on text book pattern. Yet every attempt is made to allot areas to befitting PBs depending on dia classes available. The allotment is discussed as under:-

PB-I:-

Forests with generally blanks & having majority of mature trees are alloted to this PB. No fellings were generally done in the plan under revision in PB-1. Some closures for artificial regeneration were, however done in PB-I areas. All such areas have been put in PB-1. No change is made in PB-1 area of the plan under revision. The area generally support young chil crop either scattered or in groups.

PB-II:-

Area with pre-dominance of middle aged treees have been alloted to PB-II as in the plan under revision.

PB-III:-

Forests comprising chil pole crops with fair proportion of middle aged and mature trees have been allotted to PB-III as in the plan under revision. No change has been made therein.

PB-IV:-

All the compartment having young poles with scattered mother trees have been allotted to PB-IV as in the plan under revision. No change has been made therein.

The allotment of the areas to different Ranges is as under:-

B.L	5777.70	1989.50	1952.70	803.50	420.60	164.80	0	41.20	0	13.73	11163.60
Total	15102.00	34210.00	69584.00	64319.00	32528.00	17115.00	8238.00	1997.00	964.80	87.95	244144.84
PB-IV											
Chil	29928.00	74873.00	81978.30	46830.00	13994.00	7676.00	4596.00	1303.00	810.50	0	261988.8
Baras	32.84	3.10	0	0	0	0	0	0	0	0	35.94
Ban/Oak	114.66	191.46	74.45	8.28	0	0	0	0	0	0	388.85
Ailan	10.37	9.92	14.89	0	0	0	0	0	0	0	35.18
Deodar	318.84	48.39	2.52	0	11.30	0	0	0	0	0	381.05
Fir/ Spruce	0	0	0	0	0	0	0	0	0	0	0
B.L	2211.30	1284.40	1916.04	1563.00	878.10	206.20	6.25	18.75	25.00	0	8109.04
Total	32616.0	76410.2	83986.2	48401.2	14883.4	7882.2	4602.25	1321.75	835.5	0	270938.86
										Total	1321575.99

2.7.5 Total growing stock per ha. Works out as under:-

Table-2.4

P.B	Area in ha.	Vol. in cums	Vol./ha.in cums
I	2576.18	318671.28	123.70
II	2555.87	487821.27	190.86
III	2235.50	244144.84	109.21
IV	2298.93	270938.86	117.85
Total	**9666.48**	**1321575.99**	**136.72**

2.8 SILIVICULTURAL SYSTEM

The forest allotted to this working circle will be managed under the Indian Irregular Shelter Wood System. The marking will be done on selection principle along steep slopes, nallas and broken ground. Efforts will be made to regenerate the area naturally with effective closure. Artifical planting will only be resorted where natural regeneration fails to come up in a reasonable time.

Table-2.5

Range	PB-I	PB-II	PB-III	PB-IV	Total in ha.
Dalhousie	695.25	854.45	1065.21	914.73	3529.64
Chowari	697.50	957.35	192.67	612.87	2460.39
Bakloh	427.28	232.73	434.07	404.92	1499.00
Bhattiyat	756.15	511.34	543.55	366.41	2177.45
Total	**2576.18**	**2555.87**	**2235.50**	**2298.93**	**9666.48**

2.14 CALCULATION OF YIELD

2.14.1 Yield from PB-I area:-

Volume of V Class chil trees has to be ignored for calculation of yield.

$$\textbf{Annual Yield} = \frac{C1V1 + C2V2}{P}$$

where

C1V1 = Constant x Vol.of I & II Class Tree
C2V2 = Constant x Vol. of III & IV class tree
P = Regeneration period in years–30 years

$$= \frac{(0.5 \times 97208.30 + (0.5 \times 85320)}{30}$$

$$= \frac{48604.15 + 42660}{30} = \frac{91264.15}{30}$$

= 3042.13 cum or **say 3000 cum**

Whereas:-

C1 = A constant to represent the fraction of volume of I and II class trees which will be available for felling during Plan period–0.5

$$= \frac{\text{Volume of class II \& I}}{\text{Total Volume of Class IV \& Above}} = \frac{97208.30}{182528.30} = 0.5$$

C2 = A constant to represent the fraction of volume of III and IV class trees which will be available for felling during the plan period – 0.5.

$$\frac{\text{Volume of class IV \& III}}{\text{Total Volume of Class IV \& Above}} = \frac{85320.00}{182528.30} = 0.5$$

V1 = Volume of I and II class trees–97208.30 m3

V2 = Volume of III and IV class tree– 85320 m3

P = Plan period in years–30 years.

2.14.2 Yield from PB-IV Area:-

Only 30 % of the volume available in II A and above class of all PB-IV area be removed and rest retained for fire insurance reasons.

The yield of PB-IV thus comes as under:-

$$Y = \frac{CV}{P}$$

C = A constant to represent thefraction of volume of I and II class trees which will be available for felling during Plan period–0.3

$$\frac{\text{Volume of class II \& I}}{\text{Total Volume of Class IV \& Above}} = \frac{75209.50}{232060.8} = 0.3$$

V = Volume of I and II class trees–75209.50 m3

P = Regeneration period in years–30 years.

$$Y = \frac{75209.50 \times 0.3}{30} = \frac{22562.85}{30} = 752.09 \text{ cum or } \textbf{say 750 cum}$$

2.14.3 Yield from PB-III Area:- Forests in this PB comprise of pole to middle aged crop. Yield in this PB will by way of thinning and improvement fellings. While the bigger dia. classes i.e IIA and above would be removed only if silviculturally so desired. In case of younger crops the removal will depend upon the grade of thinnings suitable to the crop.

Therefore the prescribed annual yield from this PB is as under

The yield of PB-III thus comes as under:-

$$Y = \frac{CV}{P}$$

C = A constant to represent thefraction of volume of I and II class trees which will be available for felling during Plan period–0.5

$$\frac{\text{Volume of class II \& I}}{\text{Total Volume of Class IV \& Above}} = \frac{109632}{202881} = 0.5$$

V = Volume of I and II class trees–109632.00 m3

P = Regeneration period in years–30 years.

$$Y = \frac{109632 \times 0.5}{30} = \frac{54816}{30} = 1827.20 \text{ cum or say } 1800 \text{ cum}$$

To be on the safer side annual yield is fixed at **1500 cum**

2.14.4 Yield from PB-II Area:- No yield is prescribed in respect of forests allotted to this PB. Only dead, fire burnt, and fallan trees shall be removed. In case there is fire out break in any forest of this PB that forest will be allotted to PB-I and equal area from PB-I shall be excluded from felling. Any removal in this PB on whatsoever grounds will count towards the yield of this working circle.

2.14.5 Prescribed annual yield:- The annual yield from this working circle is thus fixed as under:-

Table-2.6

Species	PB-I (cum)	PB-IV (cum)	PB-III (cum)	Total
Chil	3000	750	1500	5250

2.14.6 **Control of Yield:-**All removales of whetever nature down upto Vth class count for the yield of this working circle. The removal from the PB-II will count towards PB-I. The yield should not exced by 15% of the annual prescribed yield (5250) in a year and will further be checked by every fifth year when the cummulative deviation should be within +/- 10%.

2.14.7:- **Annual Increment:-** The annual increment of the working circle in respect of Chil, the main constituent comes as under(CAI % as given in T.D.Sharma's plan has been used to find out total increment for which FRI figure have been taken) :-

Table-2.7

Dia. Class	V	IV	III	IIA	IIB	Total
No. of Trees	852510	661227	340962	141322	62380	**2058401**
Vol. factor	0.10	0.28	0.71	1.27	1.84	
Volume	85251.00	185143.56	242083.02	179478.94	114781.04	**806737.56**
CAI %	10.00	5.11	2.39	1.50	0.36	
Increment	8525.00	9460.83	5785.78	2692.18	413.21	**26877.00**

Thus against increment of 26877 cum of Chil alone only 5250 cum yield is prescribed.

2.15 TABLE OF FELLING

The green felling proposed in this working circle is subject to the directions and guidelines of the Hon'ble Supreme Court of India, Hon'ble High Court of H.P and Ministry of Environment and Forests, Govt. of India.The felling programme for PB-I,PB-III & PB-IV areas is as per **Appendix-XIV** at page 117 in Volume-II of the Draft Working Plan.The abstract of felling programme is as under:-

Table-2.8

S.N.	Year	Name of P.B	Area in Hac
1	2013-2014	PB-I	158.25
		PB-III	100.37

		PB-IV	98.6
2	2014-2015	PB-I	113.55
		PB-III	101.32
		PB-IV	82.37
3	2015-2016	PB-I	55.73
		PB-III	184.46
		PB-IV	64.65
4	2016-2017	PB-I	110.01
		PB-III	211.30
		PB-IV	173.69
5	2017-2018	PB-I	102.03
		PB-III	242.78
		PB-IV	172.05
6	2018-2019	PB-I	97.74
		PB-III	122.85
		PB-IV	82.34
7	2019-2020	PB-I	108.44
		PB-III	168.10
		PB-IV	142.06
8	2020-2021	PB-I	176.48
		PB-III	162.28
		PB-IV	126.01
9	2021-2022	PB-I	135.56
		PB-III	125.08
		PB-IV	309.21
10	2022-2023	PB-I	129.06
		PB-III	66.69
		PB-IV	92.38
11	2023-2024	PB-I	136.49
		PB-III	107.24
		PB-IV	233.62
12	2024-2025	PB-I	128.22

		PB-III	55.94
		PB-IV	211.44
13	2025-2026	PB-I	134.16
		PB-III	87.13
		PB-IV	54.26
14	2026-2027	PB-III	135.57
15	2027-2028	PB-III	191.01

2.16 METHOD OF EXECUTING THE FELLING

2.16.1 In PB-I Areas:-

i) The number of seed bearers retained will be 20-25 per ha.

ii) Marking should be heavier in area with favourable soil conditions and lighter in areas with heavy soils, dense undergrowth, bed fire records and no hot aspects.

iii) Seed bearers retained should be in 40-60 cms. d.b.h. range free from twist with well formed bole well formed crown, free from disease, free from all kind of malformations, free from rot, sound at tapping height. If required number of seed bearers in the d.b.h. range of 40-60 cms is not available, preference should be given to tree of 30-40 cms. d.b.h. instead of trees over 60 cms d.b.h.

iv) Number of seed bearers should be more on ridges than on lower slopes.

v) Number of seed bearers should be more when available trees have under developed feathery crowns instead of well developed crowns.

vi) Seed bearers should be as evenly distributed as possible. However, quality of seed bearers should not be compromised for the sake of spacing.

vii) Compact groups of well grown poles with average 30 cms d.b.h. and not less than 0.1 ha. in area should be retained as advance growth to form part of future crop. Such patches of advance growth should be thinned to *C* Grade of thinning along with marking in the area.

viii) Scattered saplings expected to merge with future crop can be retained but scattered poles not likely to merge with future crop should be marked for felling.

ix) Only selection-cum-improvement marking will be carried out in 10 m wide belt on either side of main roads for road protection.

x) In case of serious fires, heavy wind damage in PB-I areas under exploitations, marking should be revised.

xi) All IV class and over trees of broad leaved species will be marked for felling to extend chil unless some are required to be retained for protection purpose.

xii) On steep and broken ground, marking should confirm to selection principles.

xiii) Secondary felling be made when the young regeneration has attained a height of 1-2 m and has been properly tended.

xiv) Final fellings will be made when young regeneration has attained a height of 2m and has been adequately spaced and control burnt twice.

xv) Marking should be carried out by an officer not below rank of F.R. and at least 50% of the marking should be checked by a Gazetted officer.

2.16.2 In PB-II & PB-III Areas: - No fellings have been prescribed in these PBs in order to safe guard future yield. The yield removed from these PBs shall be counted for yields towards the yield of the working circles.

2.16.3 In PB-IV Areas:-

i) Only 30 % of overwood shall be marked for fellings unless required on silvicultural ground.

ii) Mother trees will be removed in two installments depending upon the condition of young regeneration. Young crop will be cleaned and thinned. Thinning will be plan period. Mother trees likely to damage young crop be lopped before felling them.

iii) All malformed, dead, deceased and dry trees shall be removed to improve the crop.

2.17 SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING

Following subsidiary silvicultural operations are prescribed:-

i) **Site clearance**: - In areas allotted to PB-I, seeding felling will be carried out as per felling sequence. After seeding felling every year, disposal of refuge is essential to obtain hospitable seed bed. Some of the refuge reduce site clearing cost and to meet right holders demand for fuel and earn their goodwill. In areas where regeneration already exists and secondary fellings are being carried out, no attempts at burning the felling debris should be made. In situations debris should simply be collected and dumped into nullas.

Following points should be kept in view during the course of above operations.

- The operation shall be carried out in winter only.
- Branches of trees and climbers should be cut, left over logs rolled away from seed bearers and slash stacked in open away from mother trees but close to the thickets of bushes
- Slash heaps should be burnt from top downwards.

All above operations must be carried out in the presence of Range Officer to avoid accidental fires. Instructions contained in Punjab Forest Leaflet No.6 should be kept in view.

ii) **Sowing and Planting:-** After site clearance, sowing and planting be done as under:-

- After seeding felling and site clearance in PB-I pits of 30 cms x 30 cm x 30 cm size shall be prepared at a spacing of 2.5 m x 2.5 m during pre-monsoon showers.
- After site clearance and preparation of pits during pre-monsoon showers, planting will be done using minimum 25 cms. tall chil plants raised in polythene bags as per standard nursery technique.

Areas planted should be securely fenced with barbed wire.These closed areas shall be jealously protected and maintained for 15 years to ensure regeneration of PB-I areas.

iii) **Weeding and Bush Cutting**: This is most important because of high incidence of grasses and bushes. There should be two weedings-ones during March and second during September in the first year and one weeding in Sept. every year for 3 years. Bushes will be cut twice once in March and once in Sept. every year till plants have out grown normal bush canopy and thereafter one during spring every year till the plantation is grown to a minimum height of 3m and is control burnt. Cut material should be disposed by using it to reinforce barbed wire fence or by burning it safely outside the plantation area to reduce fire hazards.

iv) **Cleaning and Climber cutting:-** Cleaning should start at the age of 3 years and cut material should be carried out side the grass under regeneration and burnt or thrown into nullahs. Vigorous and healthy seeding should be spaced upto 2.5 m apart. No pruning is to be done. Climber cutting is necessary.

v) **Mechanical Thinning:-** In PB-IV areas when the crop is in the young pole stage (3m-5m height & 10-20 cm dia), it will be subjected to stock thinnings. The technique has been given in Punjab Forest Leaflet No.1 and 1A. If cleaning mentioned in the preceding paragraph are carried out, the necessity of mechanical thinning may be obviated.

vi) **Control burning:-** All chil areas shall be control burnt once in every two years except the regeneration area where regeneration is less than 1.5, meter height. Recently pine needles have found use for industrial purposes.There is huge demand for pine needles in Ambuja cement factory, Katha factory Gagret and in Hoshiapur. Keeping in view this industrial use, it is recommended that scheduled control burning will be done. The rates of pine needles are Rs. 2/kg.

a) **Direct Measures:**

i) **Maintenance of existing fire lines:** - All existing fire lines be maintained by control burning and bush cutting during winters as given in **Appendix-XV** at page 128 in Volume-II of the Revised Working Plan.

ii) **Cleaning of roads and paths:** - All roads and paths criss- crossing forests should be kept swept clean so that there is no inflammable material. Labour be engaged under MNREGA scheme.

iii) **Timely completion of forest extraction operations:**- Extraction operations in all govt. forest must be completed before March.

iv) **Control burning along roads and paths:-** A belt of 1.5 width on up hill side and 3m width on the down hill side of every road should be control burnt annually during winter.

v) **Application of IFA 1927:-** Provision of IFA-1927 concerning right holders in case of fires should be applied tactfully and in a reformative spirit. Habitual and mis chievious offenders should, however, be dealt with sternly after proper enquiry through Deptt. or police.

vi) **Timely salvage operations**:- Salvage removals must be carried out regularly to exclude fire hazards.

vii) **Disposal of felling refuge:-** Immediately on close of felling operations , felling refuge should be collected and control burnt at safe points inside or outside the operations area so that fire hazards are reduced.

viii) **Display of educative slogans and warnings:-** Sign boards carrying educative slogans and warnings should be displayed at conspicuous points all over for information of the general masses.

ix) **Maintenance of fire record:-** All fires should be properly documented. A detailed fire report in prescribed proforma along with location map in respect of every fire should be submitted by R.Os to DFO within a week. A fire cases register should be maintained by R.Os.

b) **Indirect Measures:-** With the object of preventing fires by winning the goodwill of right holders and general public living in the vicinity of forests, should meet their reasonable demands for fuel, grazing, grass cutting and by intelligent enforcement of closures etc.

i) **Resin Tapping:** - Following broad guidelines should be followed:-

ii) Method of tapping in force should be continued.

2.18 ARTIFICIAL REGENERATION

For artificial regeneration, following points should be kept in mind:-

i) Chil seedlings should be raised in Polythene bags. They should be 9 months old at the time of planting.The plants should be at least 20 cms in height and possess good vigour.Such plants should be planted out in the field with the onset of the monsoons in pits and size 30 cm x 30 cm x 30 cm at a spacing of 3 m x 3 m.

ii) Collection of seeds and raising of seedlings in the nurseries should be scientifically and carefully done as success depends on the plants planted in the field.

iii) **Pre-Sowing treatement**:- Seed should be soaked in cold water at least 24 hours before sowing.

iv) The adoption of the proper technique and the time bound programme for planting is must.

v) Before planting/sowing, area should be closed to grazing by fencing.

Planting programme has been given in Plantation Working Circle.

2.19 OTHER REGULATIONS

2.19.1 Fire Protection:- Chil forests are vulnerable to risk of fire. Most of the damage from fires occurs during pre-monsoon summer months of April to June when lot of inflammable material is present on the forest floor.

Fires can be accidental caused by sparks from falling stones lightening charcoal burning, fires by travelers, Shikaries, Honey hunters, labourers and throwing away of burning cigarette butts. Such fires can be controlled if detected in the starting stage. Other fires can be deliberate due to business rivalry between people engaged in forest working, political reasons un-controlled burning of Ghasnis to induce nascent growth of grass, kindling of fires to drive away wild animals or to cover evidence of forest crimes. In such cases of incendiarism, results are really destructive over extensive areas and it is very difficult to control such conflagrations.

General instructions on forest fire protection, prevention, detection and fighting are amply explained in Punjab Forest Leaflet No.8 and CCF.HP standing Order No.5 dated 03-05-80 which must be followed religiously and treated as an integral part of the prescriptions of this working plan. The Govt. has made Himachal Pradesh Forests (Protection from Fire) Rules, 1999 as per **Appendix-VIII.** at page 76 in Volume-II of the Revised Working Plan. Following fire protection measures are prescribed:-

iii) Punjab Forest leaflet No.13 should be strictly adhered to.

iv) No resin tapping should be carried out in PB-I areas under regeneration.

2.19.2 Control Burning: - The programme of Triennial control burning is given as **Appendix-XVI** at page 130 in Volume-II of the Revised Working Plan. The abstract of Triennial control burning is as under

Table-2.9

S.N	Area in Hac.	Years
1	3129.90	2013-14,2016-2017,2019,2020,2022-2023,2025-2026
2	2884.651	2014-2015,2017-2018,2020-2021,2023-2024,2026-2027
3	3352.78	2015-2016,2018-2019,2021-2022,2024-2025,20267-2028

2.19.3 Planting: - Planting of Chil be done in felled PB-I areas after waiting for three years for natural regeneration.

2.19.4 Weeding:-It is an essential and most important activity that young regeneration should be properly weeded by freeing it from thick grasses and over head shade of bushes.

2.19.6 Cleanings:-It should be attended to as early as possible in order to produce healthy stems and minimize fire hazards.

2.19.7 Closures:-All PB-I areas shall be closed immediately after felling work is over.The duration will be about 30 years or till such lesser period when plants attain a height of more than 3 meters.

2.19.8 Grazing and grass cutting:-Grass cutting will be prohibited in all PB-I areas after the commencement of regeneration operations till the young crop is beyond damage i.e 75 cms and above.Grass cutting shall be allowed under strict supervision in order to avoid damage to young seedlings.Grazing shall be strictly prohibited in regeneration areas during the closer period.

2.19.9 Regeneration Survey: - Regeneration Survey shall be carried outonce in every fifth year in all the PB-I areas as per para 32 of the National Working plan code, 2004.Reasons for failure should be detailed and corrective measures taken. If the regeneration does not keep pace with fellings, then fellings should not be carried out till the problem is resolved.

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CHAPTER III

DEODAR WORKING CIRCLE

3.1 GENERAL CONSTITUTION OF WORKING CIRCLE

This Working Circle includes all the Deodar predominating forests fit for managing under the Indian Irregular Shelterwood system of all the Reserved and Demarcated Protected Forests.The total area of this working circle is 927.00 ha.

3.2 GENERAL CHARACTER OF VEGETATION

The forests have been described in detail in chapter- 2 part-I. The forests tend to be pure to a great extent, though there is an admixture of Spruce towards higher elevations and various broadleaved associates in the moist depressions.At places in the lower limits, there may be some Chil sprinklings as well. All the age classes have a fair distribution.

3.3 FELLING SERIES AND CUTTING SECTIONS

There will be one felling series.

3.4 AREA STATEMENT

Total area of this working circle is 927 ha. This works out to be 2.32 % of the total area of the division.

Table-3.1

Range	R.F	D.P.F	Total in ha.
Dalhousie	32.37	424.20	456.57
Chowari	397.09	73.34	470.43
Total	**429.46**	**497.54**	**927.00**

3.5 BLOCKS AND COMPARTMENTS

Existing boundaries of the forests and compartments have been retained as such. Invariably the natural features like ridges, Nallas and paths form the boundaries.

3.6 SPECIAL OBJECTIVES OF MANAGEMENT

1. To convert uneven aged forest to normal forest.
2. To obtain maximum sustainable yield of timber.
3. To restock PB-I areas as soon as possible by artificial regeneration.
4. To have an adequate broadleaved mixture.
5. Consistent with above to ascertain a continuosly increasing yield in perpetuity.

3.7 ANALYSIS AND VALUATION OF THE CROP

i) **Stock Maps:-** The stock maps on 1:15000 scale have been given in respective compartment history files.

ii) **Compartment Description:-** The crop has been described and posted in the relevant compartment history files.

iii) **Site Quality:-**This has been described for each compartment and posted in the relevant compartment history files.The average quality for Deodar is II.

iv) **Density:-** The density as based on ocular estimates has been recorded in compartment history files. The average crown density is 0.7.

v) **Age Classes:-** The crop is irregular. All age classes are represented.

vi) **Enumerations:** - A list of all compartments of Deodar Working Circle have been prepared and 10 % with minimum of one sample has been selected for PB-I and PB-IV. While 5 % with minimum of one sample has been selected for PB-II and PB-III. The random sample have been selected using random sample table.The average growing stock of Deodar Working Circle comes out to be 466.66 cum per ha.The total growing stock of Deodar working circles in PBs wise are given below:-

Table-3.2
Volume of Deodar Working Circle (in cum)

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Volume In cum
PB-I											
Deodar	866.05	1075.00	2520.90	9248.00	19209.00	30361.00	23271.00	11567.00	7436.00	0	105554
Ban	379.08	1137.2	2041.2	1454.00	1973.00	1754.00	1393.00	1437.00	2379.00	0	13947.48
Chil	0	0	0	0	0	0	0	0	0	0	0
Fir/ Spruce	909.79	1839.00	6260.70	1470.00	7763.00	13981.00	12142.00	5120.00	5677.00	0	55162.49
Ailan	28.43	28.57	0	0	0	0	0	0	0	0	57
Buras	151.63	174.86	272.16	0	0	0	0	0	0	0	598.65
B.L	1669.20	1729.60	3233.30	2087.00	561.70	390.60	178.20	27.41	109.60	0	9986.61
Total	4004.20	5984.30	14328.00	16858.00	29507.00	46487.00	36984.00	18152.00	15602.00	0	185306.23
PB-II											
Deodar	7182.00	2015.50	6196.10	13018.00	24956.00	24035.00	12030.00	4152.00	1974.00	1528.00	97086.52
Ban	0	0	0	0	0	0	0	0	0	0	0
Chil	615.76	732.03	1135.70	2119.00	2453.00	1801.00	1243.00	0	65.53	0	10164.34
Fir/ Spruce	26.83	0	9.71	0	0	0	0	0	0	0	36.55
Ailan	0	0	0	0	0	0	0	0	0	0	0
Buras	0	0	0	0	0	0	0	0	0	0	0
B.L	0	0	0	0	0	0	0	0	0	0	0
Total	7824.60	2747.50	7341.60	15137.00	27409.00	25836.00	13272.00	4152.00	2039.00	1528.00	107287.41
PB-III											
Deodar	3552.7	3014.6	3670.4	4856.00	4415.00	1953.00	1220.00	683.90	291.00	0	23656.29
Ban	1850.60	5671.10	6433.20	5559.00	2929.00	6582.00	7504.00	421.80	209.50	0	37159.41
Chil	1544.40	3984.10	4337.90	4819.00	1697.00	1157.00	300.10	163.60	32.61	0	18035.24
Fir/ Spruce	542.36	574.20	928.59	694.10	620.90	159.20	118.80	93.95	136.40	0	3868.52
Ailan	0	0	0	0	0	0	0	0	0	0	0
Buras	19.47	8.99	14.38	14.51	0	0	0	0	0	0	57.35
B.L	1468.90	1143.90	1512.40	945.50	176.70	0	0	0	0	0	5247.32
Total	8978.40	14397.00	16897.00	16887.00	9839.00	9850.00	9143.00	1363.00	669.60	0	88024.29

3.11 REGENERATION PERIOD

Regeneration period is fixed as 30 years. Efforts will be made to regenerate the area naturally supplemented with artificial planting.

3.12 FELLING CYCLE

Corresponding to the plan period the felling cycle will be of 15 years.

3.13 DIVISION INTO PERIODS AND ALLOTMENT TO PBs

With 120 years as rotation and 30 years for regeneration there will be 4 periodic Blocks.. The allotment is discussed as under:-

PB-I:-

Forests containing mature crop fit for seeding felling in PB-I areas which have not yet been fully established and need immediate restocking have been allotted to this periodic block.

PB-II:-

Area with pre-dominance of middle aged to mature crop have been alloted to this periodic block.

PB-III:-

Forests which have irregular crop and predominantly young to middle aged classes have been alloted to this periodic block.

PB-IV:-

All the forests where the regeneration is fully established and the forests carrying mostly young crop in sapling to pole stage with a few scattered maturing and mature trees have been alloted to this periodic block.

The allotment of the areas to different Ranges is as under:-

Table-3.3

Range	PB-I	PB-II	PB-III	PB-IV	Total in ha.
Dalhousie	48.16	132.70	118.11	157.60	456.57
Chowari	207.57	145.90	69.62	47.34	470.43
Total	**255.73**	**278.60**	**187.73**	**204.94**	**927.00**

3.14 CALCULATION OF YIELD

3.14.1 Yield from PB-I areas:-

The yield is calculated as under:-

Volume of V Class chil trees has to be ignored for calculation of yield.

$$\text{Annual Yield} = \frac{C1V1 + C2V2}{P}$$

Where

PB-IV											
Deodar	4450.70	4920.8	8219.00	10000.00	7529.00	2978.00	628.70	0	66.22	0	38791.47
Ban	0	0	0	0	0	0	0	0	0	0	0
Chil	724.47	1505.00	2057.50	1385.00	1018.00	970.00	0	0	0	0	7659.75
Fir/ Spruce	966.58	1480.60	1399.60	1007.00	76.19	0	0	68.40	0	0	4998.76
Ailan	0	0	0	0	0	0	0	0	0	0	0
Biarai	3.04	6.54	13.08	70.42	0	0	0	0	0	0	93.09
B.L	202.54	39.26	270.47	0	0	0	0	0	0	0	512.27
Total	6347.40	7952.20	11960.00	12463.00	8623.00	3948.00	628.70	68.40	66.22	0	52055.34
										Total	432673.27

3.8 SILIVICULTURAL SYSTEM

The forest of this working circle will be manged under Indian Irregular Shelter Wood system which is described in Para 30 of Punjab forest leaflet No. 2.This system allows felling according to the nature of the ground and also permits certain amount of irregularity so as to avoid sacrifice of immature pole crop that are unavoidably included in PB-I. Protection of steep and precipitious slopes is done by carrying out markings on selection principles.

3.9 ROTATION AND CONVERSION PERIOD

Rotation period is fixed at 120 years, based on age at which trees will attain d.b.h. of 60 cms. The conversion was going on since 1928 in haphazard manner in some of the forests. Only a few forests have been converted so far. Moreover, there are some which give a look of converted ones. Taking these factors into considerations, the conversion period is fixed 60 years.

3.10 EXPLOITABLE DIAMETERS

Keeping in view the general market trend and out turn of sleepers, it has been fixed at 60 cm d.b.h

C1V1 = Constant x Vol.of I & II Class Tree
C2V2 = Constant x Vol. of III & IV class tree
P = Regeneration period in years–30 years

$$= \frac{(0.9 \times 101092.00 + (0.1 \times 3595.90)}{30}$$

$$= \frac{90982.8 + 359.6}{30} = \frac{91342.40}{30}$$

= 3044.74 cum or **say 3000 cum**

Whereas:-

C1 = A constant to represent thefraction of volume of I and II class trees which will be available for felling during Plan period–0.9

$$\frac{\text{Volume of class II\& I}}{\text{Total Volume of Class IV \& Above}} = \frac{101092}{104687.95} = 0.9$$

C2 = A constant to represent the fraction of volume of III and IV class trees which will be available for felling during the plan period –0.1

$$\frac{\text{Volume of class IV \& III}}{\text{Total Volume of Class IV \& Above}} = \frac{3595.90}{104687.95} = 0.1$$

V1 = Volume of I and II class trees–101092.00 m3

V2 = Volume of III and IV class tree– 3595.90 m3

P = Regeneration period in years–30 years.

3.14.2 Yeild from PB-IV Area:-

The crop density in lower classes is low therefore removal has been prescribed for high classed. 60 % of the volume available in II A and above class of all PB-IV area be removed and rest retained for fire insurance reasons.

The yield of PB-IV thus comes as under:-

$$Y = \frac{CV}{P}$$

Whereas:-

C = A constant to represent thefraction of volume of I and II class trees which will be available for felling during Plan period–0.6

$$\frac{\text{Volume of class II\& I}}{\text{Total Volume of Class IV \& Above}} = \frac{21201.92}{34341.42} = 0.6$$

V = Volume of I and II class trees -- 21201.92 m3

P = Regeneration period in years–30 years.

$$Y = \frac{21201.92 \times 0.6}{30} = \frac{12721.15}{30} = 424.00 \text{ cum or say } \mathbf{400 \text{ cum}}$$

3.14.3 Yield from PB-II & PB-III areas: - For conservative reasons no yield is prescribed from PB-II &PB-III areas. The removals therefrom will however be counted towards PB-I

The yield of the working circle is thus as under which will be controlled by PBs, but for all the species taken together.

Table-3.4

Species	PB-I,PB-II & PB-III	PB-IV	Total
Deodar	3000	400	3400

3.14.4 Annual Increment:-

The annual increment of the working circle in respect of Deodar, the main constituent comes as under(CAI % as given in R.C.Sharma"s plan has been used to find out total increment for which FRI figure have been taken):-

Table-3.5

Dia. Class	V	IV	III	IIA	IIB	IA	Total
No. of Trees	72961	39378	36152	26142	22003	14435	**211071**
Vol. factor	0.22	0.28	0.57	1.42	2.55	4.11	
Volume	16051.42	11026	20607	37121.64	56108	59328	**200241**
CAI %	10.53	8.50	5.88	3.64	2.21	1.05	
Increment	1690.21	937.20	1211.67	1351.22	1240	622.90	**7053.23**

Thus against increment of 7053.23 cum of Deodar alone only 3400 cum yield is prescribed.

3.15 CONTROL OF YIELD

The yield will be controlled by volume. All dia. classes conifers felled for whatsoever purpose will count towards the yield.The combined yield of Deodar, Fir, Spruce and Chil in the year should not be exceed 20 % and in a slab of 5 years should not exceed 10 %. The volume of trees in salvage removals or for any purpose will count the yield of the working circle. The yield will be PB wise.

3.16 TABLE OF FELLING

The green felling proposed in this working circle is subject to the directions and guidelines of the Hon'ble Supreme Court of India, Hon'ble High Court of H.P and Ministry of

	Chowari	Kainthly RF		63.96	PB-I	removal
	Dalhousie	Naghuin sbi	C.2	30.53	PB-III	Seeding felling
2024-25	Dalhousie	Panjiyara		52.00	PB-IV	Thinning Thinning overwood removal
	Chowari	Kainthly RF		63.96	PB-I	Seeding felling
2025-26	Chowari	Bhatoon No,I	C.2	20.23	PB-IV	Thinning overwood removal
2026-27	Chowari	Kumradi		27.11	PB-IV	Thinning overwood removal
2027-28	Chowari	Kainthly RF		63.96	PB-I	Seeding felling
	Chowari	Bhatoon No,I	C.2	20.23	PB-IV	Thinning overwood Removal

3.17 METHOD OF EXECUTING THE FELLING

3.17.1 **PB-I areas:** - There will be only one felling i.e. seeding felling in PB-I and fellings/removal of overwood will be done in PB-IV.

Marking Rules:-

1. Marking will be done under Indian irregular Shelterwood System.

i) In seedling fellings in case of pure crop of deodar 30-40 trees shall be retained per ha. as seed bearers.

ii) In case of the seedling felling if the trees of diameter classes of deodar is not available for retention, the trees of the high diameter to retained uniformly spaced all over the area. This number will vary depending upon the steepness of altitude and aspect.

iii) The seed bearers should be evently spaced and will be of quanity trees with clean boles, with healthy growth and possessing well developed crowns.

iv) Compact group of healthy and vigorously growing poles up to 30 cm d.b.h. with density not less than 0.5 in extent shall be retained as of future crop. Thinninig will be done.

5. On steep and broken slopes and along nallas marking conform to selection principals.

6. All trees standing over established regeneration should be lopped before felling.

7. Broad-leaved species should also be marked on selection on selection principal alongwith principal spp.

8. A note on advance growth retained areas where marking done and status of regeneration will be by marking officer alongwith map and marking and filled in the concerned C.H. file.

Environment and Forests, Govt. of India. Following sequence of fellings in PB-I, PB-III & PB-IV will be followed:-

Table-3.6

Year	Range	Name of forest	Comptt No.	Area (ha.)	Allot ment	Nature of Fellings
2013-14	---	---	---	--	--	Only Salvage marking
	Chowari	Kainthly RF	C.2	22.26	PB-I	Corrective seed felling
	Chowari	Kainthly RF	C.3	8.30	PB-III	Thinning
2014-15	Dalhousie	Sarni		38.04	PB-IV	Thinning overwood removal
	Chowari	Kainthly RF	C.10	52.61	PB-I	Seeding felling
	Dalhousie	Dhamgran		87.60	PB-III	Thinning
2015-16	Dalhousie	Gutadi No.I		35.21	PB-IV	Thinning overwood removal
	Chowari	Kainthly RF		52.61	PB-I	Seeding felling
	Chowari	Kainthly RF	C.8	23.88	PB-III	Thinning
2016-17	Dalhousie	Gutadi		26.30	PB-IV	Thinning overwood removal
	Chowari	Kainthly RF		52.61	PB-I	Seeding felling
	Chowri	Kainthly RF	C.4	36.84	PB-III	Thinning
2017-18	Dalhousie	Chehli	C.2	6.00	PB-IV	Thinning overwood removal
	Chowari	Kainthly RF		63.96	PB-I	Seeding felling
	Dalhousie	Naghuin sbi	C.2	30.53	PB-III	Thinning
2018-19	Dalhousie	Panjiyara		52.00	PB-IV	Thinning overwood removal
	Chowari	Kainthly RF		63.96	PB-I	Seeding felling
2019-20	Chowari	Bhatoon No,I	C.2	20.23	PB-IV	Thinning overwood removal
2020-21	Chowari	Kumradi		27.11	PB-IV	Thinning overwood removal
	Chowari	Kainthly RF	C.2	22.26	PB-I	Corrective seed felling
	Chowari	Kainthly RF	C.3	8.30	PB-III	Thinning
	Dalhousie	Sarni		38.04	PB-IV	Thinning overwood removal
	Chowari	Kainthly RF	C.10	52.61	PB-I	Seeding felling
	Dalhousie	Dhamgran		87.60	PB-III	Thinning
2021-22	Dalhousie	Gutadi No.I		35.21	PB-IV	Thinning overwood removal
	Chowari	Kainthly RF		52.61	PB-I	Seeding felling
	Chowari	Kainthly RF	C.8	23.88	PB-III	Thinning
2022-23	Dalhousie	Gutadi		26.30	PB-IV	Thinning overwood removal
	Chowari	Kainthly RF		52.61	PB-I	Seeding felling
	Chowri	Kainthly RF	C.4	36.84	PB-III	Thinning
2023-24	Dalhousie	Chehli	C.2	6.00	PB-IV	Thinning overwood

3.17.2 PB-II & PB-III areas: - No fellings of any kind and magnitude will be done in P.B. II and PB-III areas. However, salvage marking of dead and dry trees will be done to clear these forests from fire.

3.17.3 PB-IV areas: - Apart from removal of overwood, thinnings shall be carried out in the congested young crop. The following guidelines shall be observed by the marking officer at the time of marking in PB-IV areas.

(i) C grade thinning will be carried out in young crop. Where the resultant material may not be saleable, it fence should be removed and used departmentally for fence posts etc.

(ii) Isolated trees of II and III classes which will not likely merge with future crop and are likely to be potential wolf trees shall be removed.

(iii) All I and II class trees not required silviculturally shall be drastically removed and while doing so, blanks to the extent of 0.01 ha. will be ignored.

(iv) Marking shall aim at fresing the existing established regeneration from suppression rather than inducing fresh regeneration.

3.18 SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING

The role of subsidiary operation to helping seedling to establish them can not be over-emphasized and successful natural regeneration greatly depends upon that. It is, therefore, prescribed that the following subsidiary silvicultural operations will be carried out as soon as possible after the felling:-

1. **Removal of unfit trees of inferior species:-**All deodar, spruce and fir marked in the main marking or in thinning and left unfelled by the purchasers of the coupe, should be felled, provided the slash resulting from such fellings can be disposed of. In places, where heavy shade from other species is preventing or interfering with the devolpment of deodar regeneration, it must be lessened by felling or looping, as the circumastances indicate. No attempt should however be made to reduce mixture of Broad-leaved species, which should be retained to provide side shade and removed only where it is essential to give overhead light to the deodar regeneration.
2. **Slash disposal:-**Slash disposal should follow the main felling as closely as possible, and aim should be to complete it by November of the year of felling. So as to be in a position to be take full advantage of any seed that may fall. As in the case of chil, slash disposal is not await the corporation completion of the whole compartment, but should commence as soon as practicable in any part of the area where felling and convertion has been completed and if burning can not be done while the corporation is still working the coupe.

it is always possible to collect into heaps so that burning may commence as early as possible afterwards. During burning, all heaps should as far as possible be reduced to ashes as a really severe burn produces conditions very favourable for the regeneration of seed and the establishment of seedling by reducing raw humus and weed growth. The heaps should be as large as possible without causing harm to adjacent regeneration or seed bearers during burning, because the bigger the heap the more severe is the burn. As the fellings will be in and around groups and patches of advance growth, the destruction of the debris will be a difficult matter, as the burning may endanger regeneration, while its removal to places where it can be safely burnt will be expensive, but in all such patches the collection of debries into small heaps and burning in safe places must be done regardless of cost. In damp and cold places it may even be necessary to burn slash two or three times.

3. **Removal of thick Humus layer:**-A thick layer of partially decomposed humus has been found to be one of the main causes of failure of natural regeneration. This is more so in case of those spruce and fir areas which have been brought under concentrated regeneration. Wherever humus layer is found to be thick, it should be disturbed sufficiently to expose the mineral soil. This is a very important and to regeneration, and as this must be carried out soon after the felling have been completed, and in any case before November of the year of fellings so as to give full benefit to any seed that may fall on them. Wherever possible slash burning must be followed by hoeing up of the humus layer mixing it up with the ash and exposing the mineral soil.

4. **Shrub Cutting:**-Wherever shrubs and weeds are found to be a menace and interfering with regeneration, shrub-cutting will be carried out in the year of subsidiary operations and repeated as and when necessary.
5. **Cleaning and unsaleable thinning:**-Cleaning and unsaleable thinning shall be carried out regulary in the crops. All cut material shall be removed from the area of burnt in order to avoid fire hazareds.
6. "D" Graded thinning shall be carried out in young pole crops retained as part of the new crop.

3.19 **ARTIFICIAL REGENERATION**

Areas of the felled PBI areas will be gone over for planting after about five years of felling to fill in the blanks. Planting programme has been given in Plantation Working Circle.

3.20 **OTHER REGULATIONS**

3.20.1 Fire Protection:-The areas are prone to fire during May and June.Intensive patrolling coupled with regular cleaning of fire lines and inspection paths should suffice to keep the incidence of fires under control.

3.20.2 Cleanings:-It should be attended to as early as possible in order to produce healthy stems and minimize fire hazards.Best and vigorously growing stems should be retained. All forked, crooked, sickly and damaged stems should be removed in cleanings so as to provide growing space to better stems.

3.20.3 Closures:-All PB-I areas shall be closed immediately after felling work is over.The duration will be about 30 years or till such lesser period when plants attain a height of more than 3 meters.Closures shall be notified under IFA, 1927.

3.20.4 Grazing and grass cutting:-Grass cutting will be prohibited in all PB-I areas after the commencement of regeneration operations till the young crop is beyond damage i.e one meter and above.Grass cutting shall be allowed under strict supervision in order to avoid damage to young seedlings.Grazing shall be strictly prohibited in regeneration areas during the closer period.

3.20.5 Regeneration Survey: - Regeneration assessment survey of PB-I areas should be carried out every third year as per para 32 of the National Working plan code, 2004.Reasons for failure should be detailed and corrective measures taken. If the regeneration does not keep pace with fellings, then fellings should not be carried out till the problem is resolved.

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CHAPTER IV

FIR /SPRUCE WORKING CIRCLE

4.1 GENERAL CONSTITUTION OF WORKING CIRCLE

All the Fir, Spruce forests having pure crop or 60% or more in composition in a compartment, and suitable for working under concentrated regeneration felling have been allotted to this working circle. The total area of this working circle is 1287.27 ha.

4.2 GENERAL CHARACTER OF VEGETATION

The detailed description of the forests is given in chapter-2 part I. The forests are very much under stocked and there is preponderance of mature to overmature trees. Natural regeneration in these forests is very poor and artificial regeneration is inadequate. Heavy grazing and indiscriminate felling in the past have caused great damage to these forests.

The forests are covered with snow for several months in the winter. Abies pindrow and A.spectabilis the low and the high level silver fir together from a high level forest belt throughout the wet zone with much of the same distribution as that of spruce.

4.3 FELLING SERIES AND CUTTING SECTIONS

There will be only one felling series.

4.4 AREA STATEMENT

Total area of this working circle is 1287.27 ha. This works out to be 3.22 % of the total area of the division.

Table-4.1

Range	R.F	D.P.F	U.P.F	Total in ha.
Dalhousie	--	42.90	---	42.90
Bakloh	---	815.06	---	815.06
Chowari	---	429.31	---	429.31
Total	---	**1287.27**	----	**1287.27**

4.5 BLOCKS AND COMPARTMENTS

By and large the existing sub divisions have been retained.

4.6 SPECIAL OBJECTIVES OF MANAGEMENT

1. To improve the forests cover for water and soil conservation.
2. To replace mature and over mature growing stock within the conversion period.
3. To obtain maximum progressive sustained yield.
4. To restock the areas deficient in regeneration either naturally or artificially.
5. To protect these forests from damages caused by various agencies.

6. To improve the biodiversity of the areas.

4.7 ANALYSIS AND VALUATION OF THE CROP

i) **Stock Maps:-** The stock maps on 1:15000 scale have been given in respective compartment history files.

ii) **Compartment Description:-** The crop has been described and posted in the relevant compartment history files.

iii) **Site Quality:-**This has been described for each compartment and posted in the relevant compartment history files.

iv) **Density:-** The density as based on ocular estimates has been recorded in compartment history files. The average crown density is 0.4 to 0.5.

v) **Age Classes:-** The crop is irregular. All age classes are represented.

vi) **Enumerations:-** A list of all compartments of Fir/Spruce Working Circle have been prepared and 10 % with minimum of one sample has been selected for PB-I . While 5 % with minimum of one sample has been selected for PB-U. The random samples have been selected using random sample table. The average growing stock of Fir/Spruce Working Circle comes out to be 164.25 cum per ha.The total growing stock of Fir/Spruce working circles is given below:-

Table-4.2

Range	PB-I	PB-U	Total in ha.
Dalhousie	--	42.90	42.90
Bakloh	--	815.06	815.06
Chowari	32.00	397.31	429.31
Total	**32.00**	**1255.27**	**1287.27**

The enumeration results PB wise is as under:-

Table-4.3

Volume of Fir/Spruce Working Circle (in cum)

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Volume In cum
PB-I											
Fir/Spruce	168.50	220.16	962.80	1925.00	1249.00	1746.00	451.1	921.90	2496.00	0	10140.46
Buras	10.01	5.32	14.56	9.04	6.35	0	0	0	0	0	45.28
Ban	103.20	40.95	185.70	130.90	84.10	64.16	15.63	13.14	97.92	0	735.7
B.L	64.48	12.46	37.52	27.12	8.89	2.82	2.82	0	0	0	156.11
Total	**346.20**	**278.89**	**1198.00**	**2092.00**	**1348.00**	**1813.00**	**469.60**	**935.00**	**2594.00**	**0**	**11077.55**
PB-U											
Fir/Spruce	20718.00	19740.00	31761.00	40646.00	24075.00	23319.00	17281.00	11662.00	7251.00	1643.00	198095.70
Buras	0	0	0	0	0	0	0	0	0	0	0
Ban	212.00	415.79	502.90	755.90	108.40	95.35	141.60	0	0	0	2231.93
B.L	26.50	2.85	0	0	0	0	4.79	0	0	0	34.14
Total	**20956.00**	**20159.00**	**32264.00**	**41402.00**	**24184.00**	**23415.00**	**17427.00**	**11662.00**	**7251.00**	**1643.00**	**200361.87**
										Total	211439.42

4.8 SILIVICULTURAL SYSTEM

The Indian Irregular Shelterwood system with floating PBs shall be adopted. Only PB-I will be allotted and the remaining areas will be termed as PB unallotted. The trees growing on precipitous slopes and rocky out crops shall not be subjected to concentrated fellings.Groups of poles below 40 cm. d.b.h. and at least 0.2 ha.extent will be retained as part of future crop. In PB-I middle aged trees will preferably be retained as shelter.In addition V and IV class isolated trees of Fir will not be felled to avoid sacrifice of young crop.Thus rigid uniformity in the crop would not be possible. In PB-I artificial regeneration with specific species will be carried out immediately after fellings. The natural regeneration will be well protected. In artificial regeneration, Nursery raised plants will be planted. No direct sowings except for Spruce, Aesculus etc. would be resorted to. In PB-Un-alloted, no operations are proposed except removal of dead dying and diseased trees.

The deviation from earlier selection system to Indian Irregular Shelterwood System has been made in the plan under revision with specific objective to make more concentrated efforts in specific sites for getting regeneration rather than make mere selective fellings. The same approach shall be adopted in the present plan.

4.9 ROTATION AND CONVERSION PERIOD

The conversion period is fixed at 120 years. Since the forests allotted to this working circle are in the course of conversion, the rotation period is of little significance.

4.10 EXPLOITABLE DIAMETERS

In view of the prevalent market trends, it is fixed at 60 cm d.b.h

4.11 REGENERATION PERIOD

Regeneration period is fixed as 30 years. Efforts will be made to regenerate the area naturally supplemented with artificial planting.

4.12 FELLING CYCLE

Corresponding to the plan period the felling cycle will be of 15 years.

4.13 DIVISION INTO PERIODS AND ALLOTMENT TO PBs

Floating PB system is followed. Only PB-I is identified and the remaining area is named as PB-un-allotted (PB-U).

4.14 REGULATION OF YIELD

The yield is to be regulated by volume and calculated for PB-I only.

4.15 CALCULATION OF YIELD

The yield is calculated as under:-

4.15.1 From PB-I areas:-

The yield is calculated as under:-

Volume of V Class chil trees has to be ignored for calculation of yield.

$$\text{Annual Yield} = \frac{C1V1 + C2V2}{P}$$

Where

C1V1 = Constant x Vol.of I & II Class Tree
C2V2 = Constant x Vol. of III & IV class tree
P = Regeneration period in years–30 years

$$= \frac{(0.9 \times 8789) + (0.1 \times 1182.96)}{30}$$

$$= \frac{7910.1 + 118.29}{30} = \frac{8028.39}{30}$$

= 267.61 cum or **say 250 cum**

Whereas:-

C1 = A constant to represent the fraction of volume of I and II class trees which will be available for felling during Plan period–0.9

$$\frac{\text{Volume of class II \& I}}{\text{Total Volume of Class IV \& Above}} = \frac{8789}{9971.96} = 0.9$$

C2 = A constant to represent the fraction of volume of III and IV class trees which will be available for felling during the plan period –0.1

$$\frac{\text{Volume of class IV \& III}}{\text{Total Volume of Class IV \& Above}} = \frac{1182.96}{9971.96} = 0.1$$

V1 = Volume of I and II class trees–8789.00 m3

V2 = Volume of III and IV class tree– 1182.96 m3

P = Regeneration period in years–30 years.

4.15.2 From PB-U areas:-

It is observed during field inspection that keeping in view the precipitous slopes, broken ground and advance growth to be retained, 50 % of the volume available in II A and above class of all PB-U area shall be removed.

The yield of PB-IV thus comes as under:-

$$Y = \frac{CV}{P}$$

Whereas:-

C= A constant to represent thefraction of volume of I and II class trees which will be available for felling during Plan period–0.7

$$\frac{\text{Volume of class II \& I}}{\text{Total Volume of Class IV \& Above}} = \frac{125877}{177378} = 0.7$$

V = 50 % Volume of I and II class trees– 125877.00 m3

= 62938.50 cum

P = Regeneration period in years–30 years.

$$Y = \frac{62938.50 \times 0.7}{30} = \frac{44056.95}{30} = 1468.56 \text{ cum or } \textbf{say 1400 cum}$$

Table-4.4

Species	PB-I	PB-U	Total
Fir/Spruce	250	1400	1650

4.15.3 Annual Increment:-

The annual increment of the working circle in respect of Fir/Spruce, the main constituent comes as under(CAI % as given in R.C.Sharma"s plan has been used to find out total increment for which FRI figure have been taken):-

Table-4.5

Dia. Class	V	IV	III	IIA	IIB	IA	Total
No. of Trees	87027	46419	28959	20081	7768	5053	
Vol. factor	0.24	0.43	1.13	2.12	3.26	4.96	

Volume	20886.48	19960.17	32723.67	42571.72	25323.68	25062.88	
CAI %	3.73	4.59	2.92	2.05	1.28	0.84	
Increment	779.06	916.17	955.53	872.72	324.14	210.53	**4058.15 cum**

Thus against increment of 4058.15 cum of Fir/Spruce alone only 1650 cum yield is prescribed

4.16 CONTROL OF YIELD

All removals of all age classes and for all purposes shall count towards the yield. The deviation in a year should not exceed 25 % and a slab of 5 years will not exceed + 10 % of the prescribed yield. No commercial felling will be undertaken until there is a stand by nursery of required age of planting stock. If regeneration is not keeping pace with fellings, removal will be curtailed.

4.17 TABLE OF FELLING

The green felling proposed in this working circle is subject to the directions and guidelines of the Hon'ble Supreme Court of India, Hon'ble High Court of H.P and Ministry of Environment and Forests, Govt. of India. Following sequence of fellings in PB-I and PB-U is as under:-

Table-4.6

Year	Range	Name of forest	Comptt No.	Area (ha.)	Allot ment	Nature of Fellings
2013-14	Dalhousie	Ahla	--	42.9	PBU	salvage marking and improvement felling
	Bakloh	Dhamgram	--	174	PBU	salvage marking and improvement felling
		Dhuri sandhar	--	271.5	PBU	salvage marking and improvement felling
2014-15	Bakloh	Reyali Rakhed	--	369.5	PBU	salvage marking and improvement felling
	Chowari	Tarsul	--	87	PBU	salvage marking and improvement felling
2015-16		Bharua	I	32	PBI	Salvage marking and regeneration fellings
	Chowari	Kalm	--	247.1	PBU	salvage marking and improvement felling
		Bharua	III	63.2	PBU	salvage marking and improvement felling
2016-17	Dalhousie	Ahla	--	42.9	PBU	salvage marking and improvement felling
	Bakloh	Dhamgram	--	174	PBU	salvage marking and improvement felling

		Dhuri sandhar	--	271.5	PBU	salvage marking and improvement felling
2017-18	Bakloh	Reyali Rakhed	--	369.5	PBU	salvage marking and improvement felling
	Chowari	Tarsul	--	87	PBU	salvage marking and improvement felling
2018-19		Bharua	I	32	PBI	Salvage marking and regeneration fellings
2019-20	Chowari	Kalm	--	247.1	PBU	salvage marking and improvement felling
		Bharua	III	63.2	PBU	salvage marking and improvement felling
	Dalhousie	Ahla	--	42.9	PBU	salvage marking and improvement felling
2020-21	Dalhousie	Ahla	--	42.9	PBU	salvage marking and improvement felling
	Bakloh	Dhamgram	--	174	PBU	salvage marking and improvement felling
		Dhuri sandhar	--	271.5	PBU	salvage marking and improvement felling
2021-22	Bakloh	Reyali Rakhed	--	369.5	PBU	salvage marking and improvement felling
	Chowari	Tarsul	--	87	PBU	salvage marking and improvement felling
2022-23		Bharua	I	32	PBI	Salvage marking and regeneration fellings
	Chowari	Kalm	--	247.1	PBU	salvage marking and improvement felling
		Bharua	III	63.2	PBU	salvage marking and improvement felling
2023-24	Dalhousie	Ahla	--	42.9	PBU	salvage marking and improvement felling
	Bakloh	Dhamgram	--	174	PBU	salvage marking and improvement felling
		Dhuri sandhar	--	271.5	PBU	salvage marking and improvement felling
2024-25	Bakloh	Reyali Rakhed	--	369.5	PBU	salvage marking and improvement felling
	Chowari	Tarsul	--	87	PBU	salvage marking and improvement felling
2025-26		Bharua	I	32	PBI	Salvage marking and regeneration fellings
	Chowari	Kalm	--	247.1	PBU	salvage marking and improvement felling
		Bharua	III	63.2	PBU	salvage marking and improvement felling

viii) Before undertaking any forest for seeding fellings it shall be ensured that nursery stock is ready to for planting and subsequent beating up immediately after the timber has been extracted from the forest. In case neither the nurseries have been raised nor the stock is available, no marking/felling shall be done.

4.19 SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING

These operations are indicated mainly for establishing regeneration and would be as follows:-

i) Removal of damaged and unfelled marked trees.

ii) Slash disposal by heaping into nallahs or by control burning

iii) Bush cutting and removal of humus are the important operations to be carried out in PB-I areas.

4.20 ARTIFICIAL REGENERATION

Since the natural regeneration has failed in Fir/Spruce areas, reliance has to be placed on artificial regeneration. The techniques of raising nurseries have been given in H.P Forest Manual Vol.IV in detail. In their natural zones, Spruce occupies lower belt and Fir in upper belt.Fir prefer cooler,moist and shady location in Spruce belt.Where as in Fir zone,Spruce occupies the raised groundand exposed Spruce leaving depression. Planting programme has been given in Plantation Working Circle

4.21 OTHER REGULATIONS

4.21.1 Fire Protection:-These areas are generally not fire prone. However the areas should be still be protected from fire.It is recommended that all inspection paths be kept free of inflammable material during May and June and from October to December.Fire watchers should be deployed during this period.These measures are enough for this working circle and no fire lines is required to be constructed.

4.21.2 Closure:- The felled areas should be closed to grazing for at least 30 years.The notification of closures shall be issued under IFA,1927.Action for the issue of closures notification should be initiated well before the areas to be felled.

4.21.3 Weeding:- Growth period of Fir is only five months starting from April to August. The plants should be kept free from weeds during this effective growing period.Timely weeding results in healthy plants growth.This operation should be continue till plants are beyond the weeds competition.Two- three weedings are normally required every year for a period of five years at least.

4.21.4 Regeneration Surveys:- Regeneration Survey of felled PB-I areas shall be carried out as per para 32 of National Working Plan Code,2004 once every five years as the progress of regeneration is directly linked with fellings.

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4. To protect important Oak forests and encourage their propagation alongwith other broadleaved species.

5.4 BLOCKS AND COMPARTMENTS

Existing sub-divisions have been retained as such.

5.5 FELLING SERIES

There will be no felling series since no yield has been prescribed.

5.6 ANALYSIS AND VALUATION OF THE CROP

5.6.1 Stock Maps;-

The forests have been stock mapped afresh in-corporating relevant details on 1:15000 scale based on the old stock maps. The stock maps so prepared have been filed in the respective compartment s History files.

5.6.2 Enumeration:-

With the aim of assessing and making estimates of the growing stock in these forests, partial enumeration was done. The process involved stratified random sampling of forests based on their composition, elevation, soil status etc. The results of forests so selected and enumerated were applied to the other areas falling in conformity with a particular stratum. Stock maps were taken into consideration while estimating the growing stock. The results so derived have been recorded in individual compartment History files.

Table-5.2

General Abstract

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Total Tr
Deodar	4550	2519	894	244	209	139	104	209	650	0	9518
Chil	265520	119773	27868	17840	10284	6535	3018	685	186	0	452708
Fir/Spruc	77523	57350	57292	49260	41634	31060	26730	24711	23052	0	388614
Ban/Oak	22634	39052	34638	66973	15089	52713	12063	9941	1711	0	174814
Khair	8438	3668	209	0	0	0	0	0	0	0	12315
Shisham	16702	6662	1312	139	93	0	0	0	0	0	24909
Buras	33625	30387	28298	267263	23423	14752	46	23	0	0	397818
B.L	824503	476171	341846	295174	227160	52227	61189	19622	21050	0	2318942
Total	1254496	735582	492357	646893	317892	127427	103152	55191	46648	0	3779637

5.6.3 **Growing stock:-** The growing stock assessed in this working circle as under:-

Table-5.3

Species	No. of stems	Volume in m3
Deodar	9518	11174.64
Chil	452708	158314.70
Fir/Spruce	388614	1149510.00
Buras	397818	393255.40
Ban/Oak	174814	365584.80

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CHAPTER V
CONSERVATION CUM REHABILITATION WORKING CIRCLE

5.1 GENRAL CONSTITUTION

The forest areas which are compulsorily to be kept out of any perspective commercial harvesting have been included in this working Circle and are broadly classified into two categories. These areas are generally either located on presipitous slopes, at the source head of various streams/khads where their protective role is of tremendous significance or else these may be in a highly eroded and degraded state e.g. in Shiwalik region, requiring effective protection against grazing etc. Ban forests have also been included in this Working Circle. Total area of this working circle is 23701.73 ha as per table given below:-

Table-5.1

Range	R.F	D.P.F	U.P.F	Total in ha.
Dalhousie	--	1490.76	--	1490.76
Chowari	---	7946.45	---	7946.45
Bakloh	---	5864.25	341.43	6205.68
Bhattiyat	----	7961.20	97.64	8058.84
Total	----	**23262.66**	**439.07**	**23701.73**

5.2 GENRAL CHARACTER OF VEGETATION

The area located at source of streams like Chakki Khad have a good cover of vegetation comprising Fir/Spruce with Kharsu Oak in higher extremities and other broadleaved associates in the moist places. On the contrary low lying areas of Shiwalik belt are very sparsely clothed having only bushy vegetation of Dodonea, Carissa etc.

5.3 SPECIAL OBJECTS OF MANAGEMENT

These are enumerated as under:-

1. Prime objective being that of protecting the hills from denudation and to check the menance of soil erosion by undertaking soil conservation measures.
2. To maintain reasonable vegetation cover near stream source to ensure smooth water flow and moisture conservation.
3. To regulate grazing consistent with the optimum land use management and within the limits of carrying capacity.

4. To protect important Oak forests and encourage their propagation alongwith other broadleaved species.

5.4 BLOCKS AND COMPARTMENTS

Existing sub-divisions have been retained as such.

5.5 FELLING SERIES

There will be no felling series since no yield has been prescribed.

5.6 ANALYSIS AND VALUATION OF THE CROP

5.6.1 Stock Maps;-

The forests have been stock mapped afresh in-corporating relevant details on 1:15000 scale based on the old stock maps. The stock maps so prepared have been filed in the respective compartment s History files.

5.6.2 Enumeration:-

With the aim of assessing and making estimates of the growing stock in these forests, partial enumeration was done. The process involved stratified random sampling of forests based on their composition, elevation, soil status etc. The results of forests so selected and enumerated were applied to the other areas falling in conformity with a particular stratum. Stock maps were taken into consideration while estimating the growing stock. The results so derived have been recorded in individual compartment History files.

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Total	1254496	735582	492357	646893	317892	127427	103152	55191	46648	0	3779637

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Ban/Oak	174814	365584.80

Khair	12315	1164.37
Shisham	24909	6196.05
B.L	2318942	1204587.00
Total	**3779637**	**3289786.96**

5.7 METHOD OF TREATMENT

Any operation in these areas should aim at their amelioration and enhancing the productivity. In high lying areas the forest cover has to be maintained/improved to an extent that it provides an effective protection against denudation and erosion of soil. But for salvage removals there should be no felling. So far as the Ban Oak forests are concerned these should be tended properly, particularly near habitations. Spruce regeneration which at many places has shown good response should be encouraged. The sub alpine pastures in these areas also need a proper attention. Due to unscrupulous grazing excessive to the carrying capacity these have been rendered quite a hapless lot. Thus grazing requires to be regulated and in the meanwhile the impoverished soil base has to be helped restore its normal productivity. This can be achieved by rotational closures supplemented with soil conservation works.

In the second category i.e. low lying areas these are wallnigh devoid of any proper vegetation. These badly cut up areas are mostly confined to the. Mail beat and Tunu-Hatti beat of Bakloh and Lahru beat of Chowari Range. Few areas are there in the Motla beat of Bhattiyat Range. Such areas deserve a complete relief with some soil conservation measures and broadcasting of seeds of Shisham Sandan, Pansra, some suitable grasses etc.

5.8 METHOD OF EXECUTNG FELLINGS

There has to be no felling in these areas, except removals of dead, dying, diseased trees which can be marked to right holders for their bonafide domestic requirements.

5.8.1 Lopping:- Ruthless lopping irrespective of age, species has done considerable damage which manifests more in the areas adjacent to habitations where fuelwood and fodder both are scarce. Ban Oak is the prominent victim because of its multifarious utility. At places it has been badly amputated and is not allowed to grow beyond a bushy form. Wherever it is no available falls on other species including conifers like Chill, Deodar.

In view of the degraded state of crop, prudence would dictate a complete ban on lopping. But this directive inevitably would be honoured more in breach than observance. Therefore, with due regards to the crop status, lopping can be permitted only where the trees are capable of yielding some fodder. In such permissions lopping rules as laid down below shall be enforced.

1. Conifers wherever found in these forests shall not be lopped.
2. The top two third portion of the crown of a tree shall not be lopped.
3. No tree below 30 cms in diameter at breast height shall be lopped.
4. Branches over 8 cms in girth shall not be cut.

5.9 INVASIVE WEED SPECIES MANAGEMENT

5.9.1 Control of Weeds:- When selecting a control method, it is important to note that different species respond differently to each method. The most efficient programs will have an integrated control plan that includes both prevention and one or more of the following control methods:

a. Mowing / Cutting: - Effective for perennial weeds. Careful monitoring and proper timing are necessary for this to be a viable option. If a site is mowed over several years, well-developed root systems can eventually be depleted. Weeds should not be mowed once seed set has occurred, as this will aid in spreading seed.

b Hand Pulling - Effective for annual or biennial weeds, especially when dealing with small infestations or individual plants. Hand pulling may have to be done annually (before seed set) for several years, as dormant seeds in the soil may continue to germinate. If any weeds are pulled when in flower, they must be bagged and burned, as they will set seed if they are left on the ground.

c Herbicide Application - Very effective but will not guarantee 100% control. Sites may have to be revisited again the next year for follow-up treatments. Several herbicides are effective for each weed species. Chemical selection should be determined by site, weed species, existing desirable vegetation, and whether or not a residual effect is wanted.

d Biological Control - This method of control is the introduction of insects or diseases that attack or infect a specific weed species. Biological control agents can be difficult to obtain, and in some cases they are in the testing phase to determine effectiveness.

In 1902 the first attempt at biological control of a weed targeted lantana in Hawaii. In Australia biological control agents were first introduced in 1914; so far, 30 species have been introduced.

Research into biological control is ongoing, and several agents are currently being examined for suitability of release. Of the 16 species that have established, four insects have had a major impact on lantana. They are:

- a sap-sucking bug (*Teleonemia scrupulosa*) (Sydney to northern Queensland).
- a leaf-mining beetle (*Uroplata girardi*) (northern Queensland to Sydney).

• a leaf-mining beetle (*Octotoma scabripennis*) (Sydney to south of Rockhampton).

• a seed-feeding fly (*Ophiomyia lantanae*) (southern New South Wales to northern Queensland).

The biological control agents vary in their effectiveness against the many different types of lantana. For example, lantana can drop its leaves when stressed, depriving some agents of their food.

5.9.2 Treatment of Areas infested:- Biological invasions in forests is one of the anthropogenic mediated ecological perturbations, are threatening native biodiversity, preventing natural ecological succession and changing the community structure and composition, besides impacting ecosystem services. *Lantana camara* is perhaps one of the most important invasive alien plant species (exotic weed) in forest ecosystems of Division. Other alien invasive plant species with significant impact on the forests of Dalhousie Division include *Parthenium hysterophorus*, *Eupatorium* (*Chromolaena*) *adenophorum*, and *Ageratum conyzoides.* Whereas the incidence of *Parthenium* popularly known as *'Congress Grass'* is largely restricted to degraded and newly opened drier sites along roads and forest fringes, the other three invasive alien species tend to occupy all possible vacant places even under tree canopy. Even as *Eupatorium* and *Ageratum* show a clear preference for moister locales and show gregarious occurrence, at many places these share the niche and grow in an intimate mix with *Lantana.*

Strategy for rehabilitation of forests infested with these four most noxious exotic weeds is dealt in detail as under:

5.9.3 Core Principles of the Strategy

- **Contain Further Spread** : *A close watch over the spread of exotic weeds will be kept through biennial monitoring mechanism and necessary corrections in the program will be made to remove the recent infestations on priority basis.*
- **Complete Rehabilitation of Infested Areas:** *It will involve shift from 'one time removal of weeds' to 'complete rehabilitation' of the treated areas by competing/ shading out exotic weeds. All noxious exotic weeds on any given area will be tackled simultaneously.*
- **Reliance on only Mechanical/Manual Methods:** *In view of their environmental/ ecological concerns, the rehabilitation measures will NOT employ any Chemicals/ Biological methods of exotic weed control.*
- **Natural Resilience of Native Flora to be the basis of Rehabilitation Action:** *The natural regeneration of indigenous plant species on treated sites will be encouraged and*

facilitated to establish towards better environmental and ecological services, including fodder, fuel, water recharge, etc.

- **No Exotic Species to be used to Rehabilitate Treated Sites** *No potentially invasive exotic species – (viz. Leucaena leucocephala, Prosopis juliflora, Jatropha curcus, Tecoma stans, Tectona grandis, etc.) - will be used for plantation in the areas under rehabilitation, because of their deleterious effect on the native flora.*
- **Rehabilitation to start from Low Intensity Infestation Areas and to progress towards areas with Heavy Infestation:** *Rehabilitation activities will start from the fringes of infestation zone with lower intensity infestation and will progress towards the heavily infestation areas. This approach will (i) allow tackling larger areas with the given financial resources and result in creating quick visible impact, and (ii) help in containing further spread of exotic weeds.*
- **Selective Priority Rehabilitation of Heavily Infested Critical Habitats:** *Rehabilitation of heavily infested areas as starting point will be taken up only in limited number of carefully selected* ***critical habitats*** *like grazing grounds near habitations. Such sites will then act as nucleus from where rehabilitation activity will radiate to adjoining areas of high infestation.*

With the above mentioned core principles of the strategy, the approach/ plan to implement the strategy will be as under:

(a) Management of *Lantana* With the major focus of the management strategy on 'containing further spread', a two pronged approach, as described below, will be followed in tackling *Lantana* menace on forest lands.

- **Approach-I (for areas with low infestation intensity)** More than 60% of the forest areas recorded to be under *Lantana* have been infested with this exotic weed within the past 10 years and have less than 25% intensity of infestation. Under this approach, these areas will be tackled on priority basis for the reasons that (i) with the given financial resources, it would be possible to rehabilitate larger areas for creating significant impact, and (ii) further spread of this exotic weed would be contained.

The rehabilitation activities will be started from the fringes of infestation zone with low intensity infestation and will progress towards the high infestation areas. Major activities under this approach will be manual cutting of *Lantana* bushes and encouraging establishment of local species, including grasses or augmenting populations of native species through plantation.

➢ **Approach-II (for areas with heavy infestation)** Under this approach, critical areas under heavy infestation, especially the grazing grounds near habitations, will be identified and treated.

The rehabilitation activities will start from the selected critical area that will act as nucleus, and will radiate from this nucleus to cover adjoining areas of high infestation. Major activities under this approach will be manual cutting of *Lantana* bushes, encouraging establishment of local species, including grasses and planting the areas with tall plants of fast growing species to quickly shade out *Lantana.*

The methodology to implement the above two approaches will be as follows:

- Method of cutting *Lantana* will be Cut Root Stock (CRS) method i.e. cutting the bushes below the soil to prevent coppicing.
- Forest beat will be the unit for rehabilitating *Lantana* infested sites. Financial resources available under various schemes will, therefore, be converged towards this end.
- Local people, through existing community groups, will be encouraged to participate in rehabilitation of *Lantana* infested areas. Stake of local people will be built into this initiative under the available JFM instruments.
- The following will be, based on local practices, standardized for effective implementation of *Lantana* management initiative:
    - Cutting tools/ techniques
    - Calendar of rehabilitation activities
    - Cost models
- A three year active maintenance of the treated areas and triennial follow up thereafter will form integral part of the rehabilitation program till the areas gets fully rehabilitated. During this period, constant vigil will be maintained on any opportunistic springing back of sprouts/ seedlings of the invasive alien species and the same will be immediately removed. At the same time, progress of establishment of the native species will be actively monitored and encouraged.
- An average of 150 hectares of *Lantana* infested areas will be taken up for rehabilitation per year.

Method for removal of Lantana

Removal of adult clumps using 'Cut Root Stock' (CRS) method: This method involves cutting the main tap root of *Lantana* plant beneath the 'coppicing zone' (transition zone between stem base and rootstock). This method of removal involves

engagement of 2–3 individuals to work in a group for the removal of *Lantana* if the clumps are too large to be handled by one individual after the rootstock is cut. The steps involved in the cut rootstock method are:

(i) The person, who engages in removal of *Lantana*, is positioned in a way that he stands near centre of the *Lantana* clump with his back facing the clump and holding the handle of digger (kudal)

(ii) Using the specially designed digger, the person cuts the main rootstock of *Lantana* 3–5 cm below the soil surface by hitting the rootstock 3 or 4 times; while hitting the rootstock the blade of the digger gets lodged into the main tap root, and at this point it is useful to move the handle of the digger in the forward direction away from the body of the person so as to severe the connection of the clump with the main tap root. In case the clumps of *Lantana* form impenetrable thickets, it is advantageous to cut the rootstocks of 3–4 contiguous clumps to make the removal operation convenient. It may be noted that the branches of *Lantana* clumps should not be slashed/cut to gain access to the centre of the clump for its removal by cut rootstock method. The branches of *Lantana* thicket formed by more than one clump should be lifted and tipped over from one end by using a wooden or bamboo pole of about 1.5–2.5 m long and diameter 5–6 cm which is inserted just below the branches from one side and rolled over easily by two workers holding the pole at either end and pressing it so as to reach the centre of the clump Such manual handling of impenetrable thicket is possible because of the umbrella type of canopy which makes it difficult to reach the centre of clump easily. Such physical maneuvers minimize or prevent regeneration from rooted cut branches when they fall on the ground.

(iii) Lift the clump/s and place the clump/s upside down. If the clump is not placed upside down, the prostrate rooted branches and the aerial old branches having aerial roots at nodes may develop into adult plants when they come in contact with the soil. Therefore, the upside–down orientation of cut clumps is critical in the prevention of regeneration of *Lantana* from cut clumps. It may be noted that *Lantana* does not produce root suckers.

After drying the clumps, the clumps may be used as fuel or burnt at the same site or all the dried clumps may be collected at one place and then burnt. The best time for removal of *Lantana* is just before rainy season, i.e. when the plants are not in flowering and fruiting.

ii. After about 1.5-2 months of cutting when cut parts of Lantana have regenerated and there is enough tender foliage, spray of Glyphosate (Glycel 41 SL) 1% solution should be done. The foliage should be fully wet while spraying. Spraying should be done in October-November for excellent results. This herbicide translocates upto roots and rootlets of the Lantana and kill them. Once the above two operations are done successfully, there is no chance of regeneration of Lantana as root and shoot systems are completely destroyed.

iii. After spray and killing of Lantana, the area should be put under grass/fodder trees to avoid further invasion of Lantana or nay other weed.

iv. In case some bushes appear again, spot application of glyphosate can be done on that plant only to kill it or it can be uprooted.

The cut Lantana can be used as fuel wood. The tender leaves and twigs can be composted alongwith dung for making manure or these could be spread in fields to act as mulch and then incorporated in soils organic matter.

The approximate cost excluding the value of fuel wood obtained may come to about Rs. 3000/- per hectare in case Lantana thickets are continuously spread.

5.10.2 Grazing and Grass Cutting:- Though the area taken up for plantation would remain closed to any sort of grazing but grass cutting has to be permitted so that people are benefitted right from Ist year and fire hazard can be reduced alongwith it will become easier to locate the further infestation of Lantana.

5.10.3 High density crops:- Three tier crop productions with high density can be a better option to suppress the further infestation of weeds in rehabilitated areas.

5.10.4 Fire Protection:- Methods of fire protection and control burning suggested in area shall be followed to avoid excessive damage in event of a fire incidence.

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CHAPTER VI

PLANTATION WORKING CIRCLE

6.1 GENERAL CONSTITUTION OF WORKING CIRCLE

Human population has increased manifold and is further increasing day by day. Their requirements for fuel-wood, fodder, timber, NTFP and water has also increased manifold thereby putting pressure on traditional forests which in turn are degrading day by day. Now, time has come when each and every corner of earth (land) is put to use economically as per land capabilities. This working circle comprises the area of previous working plan. Only such areas will be included which have site factor favourable for raising plantations, closure is possible, in view of the fact that not more than one third area of a forest can be closed at a time and where the resultant plantations will be economically viable. The areas adjacent to village habitations where the species of local requirement of fodder and fuel can be raised are also included in this working circle. The depleted scrub forests and the plantations raised in the plan period but not fully established are also included in this working circle. Focus will be on restoring the species composition from timber centric to other useful species for fuel, fodder, NTFPs. Total area of this working circle is 4368.74 ha.

6.2 GENERAL CHARACTER OF VEGETATION

Since the forests assigned to this working circle are situated in different altitudinal zone, therefore, the vegetation varies. However the major coverage is in the lower elevation and vegetation whatsoever present conforms mainly to the following forests types:-

1. 9/C1B Upper or Himalyan Chil pine
2. 9/C1/DS1 Himalyan sub tropical Scrubs
3. 9/C1/DS2 Sub tropical Euphorbia Scrubs
4. 10/C1 Olea Ferruginea Scrub forests.

6.3 PLANTATION SERIES

There will be only one plantation series, the division being the unit for the purpose of control.

6.4 AREA AND ALLOTMENT

The distribution of area in this working circle in different ranges is given below:-

6.7 ANALYSIS AND VALUATION OF THE CROP

i) **Stock Maps:** - Stock Maps of all the compartments of this working circle have been prepared on 1:15000 scale. These stock maps have been placed in the respective compartment history files

ii) Enumeration: - A Rangewise list of all compartments of Plantation Working Circle have been prepared and 5 % with minimum of one sample has been selected for this Working circle in each range .The average growing stock of this Working Circle comes out to be 32.38 cum per ha.The total growing stock of this working circles is given below:-

Table-6.2

General Abstract

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Total Trees
Chil	324354	96636	31268	10275	3640	1642	317	154	0	0	468286
Fir/Spruc	384	125	10	0	0	0	0	0	0	0	519
Khair	9853	4926	864	0	0	0	0	0	0	0	15643
Shisham	1498	663	0	0	0	0	0	0	0	0	2161
B.L	131111	41169	9843	2209	67	0	19	0	10	0	184428
Total	**467200**	**143518**	**41985**	**12484**	**3707**	**1642**	**336**	**154**	**10**	**0**	**671036**

iii) Density: - Density has been ocularly estimated and recorded in compartment history file.

iv) Growing stock: - The growing stock assessed in this working circle as under:-

Table-6.3

Species	No. of stems	Volume in m3
Chil	468286	108338.00
Fir/Spruce	519	157.00
Khair	15643	1633.00
Shisham	2161	434.00
B/L	184428	30942.00
Total	**671036**	**141503.00**

6.8 SILIVICULTURAL SYSTEM

As the main objective is to raise plantations, no silvicultural system is prescribed. The plantations will be raised by artificial means. However, as and when plantations are

Table-6.1

Range	R.F	D.P.F	U.P.F	Total in ha.
Dalhousie	--	741.46	--	741.46
Chowari	---	926.24	---	926.24
Bakloh	---	1111.89	---	1111.89
Bhattiyat	----	1589.15	----	1589.15
Total	----	**4368.74**	----	**4368.74**

6.5 BLOCKS AND COMPARTMENTS

No change has been made in the boundaries of forest allotted in this working circle

6.6 SPECIAL OBJECTIVES OF MANAGEMENT

1. To manage the degraded, sparsely stocked and blank forests on scientific basis to increase the area under forest cover, thereby, reducing the pressure on traditional forests.
2. To augment the resources of timber, fodder and fire wood, to meet the increasing demand of local people in the vicinity of these forests.
3. To check denudation and soil erosion.
4. To raise compact plantation to make available raw material for wood based industries
5. To rehabilitate degraded areas by planting fodder trees and high yielding varieties of grasses.
6. To increase tree cover of valuable species so as to increase supply of fuel-wood and fodder to meet with demand of local community.
7. To increase employment opportunities (wage earning) to rural man folk
8. To make people aware about better management of forest resources and to inculcate habit of tree planting among the masses.
9. To train staff and labour regarding planting techniques and also that of nursery techniques.

established, areas as per crop composition will be allotted to respective working circles in next working plans

6.9 ROTATION

There is no need for prescribing rotation at this stage

6.10 CHOICE OF SPECIES

The success of plantation works depends on the choice of species. The correct choice of species would give productive and praise worthy results where as wrong choice of species always brings adverse publicity for the forester. In short, adequate care must be taken while selecting the species to be planted keeping in view the land capability, terrain and the demands of the local people. The species to be planted altitude-wise are suggested as under. However, Divisional Forest Officer is at liberty to change/add/raise new species suitable to a particular site.

Table-6.4
Suggested list of species to be planted

Altitude	Species suggested for plantation
Up to 1000 metres	Shisham, Bamboo, Khair, Ritha, Toon, Bihul, Siris, Khirk, Kachnar,Daru, Harar, Bahera
1000 to 1500 metres	Robinia,Bihul,Toon,Ritha,Kachnar, Willow, Leucaenia,Bamboo,Khair,Khirk, Kikker, Daru, Hill Poplar
1500 to 2500 metres	Deodar, Walnut, Hill Poplar, Willow, Robinia, Ban Oak, Horse Chestnut
2500 to 3000 metres	Silver Fir, Maple, Walnut, Moru Oak, Bird Cherry, Ash, Hill Poplar

6.11 CALCULATION OF YIELD

Since blank areas have been prescribed for afforestation and density of the growing stock is below 0.2, therefore no felling has been prescribed in this working circle and so there is no question of yield.

6.12 TABLE OF PLANTING

The detail of Plantation programme is attached as per **Appendix-XVII** at page 147 in Volume-II of the Draft Working Plan. The year wise abstract is as under:-

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6.12 TABLE OF PLANTING

The detail of Plantation programme is attached as per **Appendix-XVII** at page 147 in Volume-II of the Draft Working Plan. The year wise abstract is as under:-

Table-6.5

S.N	Year	Area in Hac.
1	2013-14	159
2	2014-15	150
3	2015-16	175
4	2016-17	265.34
5	2017-18	172
6	2018-19	197
7	2019-20	156
8	2020-21	189
9	2021-22	174
10	2022-23	166
11	2023-24	110
12	2024-25	90
13	2025-26	224
14	2026-27	168
15	2027-28	190

6.13 TREATMENT OF EXISTING PLANTATION

All existing young plantations must be strictly protected and tended properly. Maintenance operations such as fence repair, weeding, bush cutting, beating up of failures etc. should be carried out for a period of at least 5 years after the planting.

6.14 NURSERIES

It is axiomatic that the degree of survival of plantations is directly linked to the quality of nursery stock raised in nurseries. More so, when we are faced with increasing swings in seasonal fluctuations, both in terms of erratic rainfall and rising temperatures. These recent changes in weather patterns exacerbate our historical woes of compacted soil, damage by fire and cattle and general lack of interest (and therefore concern) of local communities in our plantations. Vastly improved nursery stock can in a major way address most of these impediments coming in the way of establishing successful plantations in and outside forests.

Few important qualities of any good nurseries would include:

a) It should be large in size (atleast 0.5ha) so that it is cost effective and also proper infrastructure including water supply, germination chamber (poly-house), Mali-hut, soil mixing yard, vermicompost etc can de developed.

b) Adequately trained, dedicated staff should be available in each nursery. Mali and laboureres should be trained and guided from time to time about raising of quality stock.

c) Each nursery should specialize in 5-6 species suited to the area and have large stock of each species, which is graded from time to time so that only quality stock goes for planting.

d) Soil mixture is most vital componenet for raising quality stock. Thus care must be taken not to compromise with quality of soil mixture (ideally 1:1:1 of soil:sand:vermicompost)

There are 39 nurseries in Dalhousie (as on June 2012) having a stock of 1267004 plants.Thus average numbr of plants per nursery is 32487 which can further be increased (and the average plant cost reduced) with development of infrastructure in more nurseries.The schedule rates of nursery works is as per **Appendix-XVIII** at page 156 in Volume-II of the Revised Working Plan..

6.14.1 Tall Planting:- One of the main reasons for faiure of plantations is grazing / trampling by cattle.Also drought, fire hazards contribute to failure. Thus, to overcome pressure of grazing and drought, planting of tall plants (above grazing height) with well developed root system and good collar girth is desirable. Such plants will be able to cope with droughts owing to their well developed spread out root system, will be above grazing height and thus will survive grazing pressure and their good collar girth will help them withstand trampling. Such plants can be raised in nurseries for which month-wise operation activity has been given here.

Table-6.6
Raising of Deodar in Nurseries

Month	Activities for Raising Deodar
Nov-Dec	1. Sow seeds in trays filled with only Vermicompost. Keep the trays in polyhouse. (1 kg deodar seed contains 8000-10000 seeds approximately)
March (1st Year)	1. Prick in 6"x4"bags or in root trainers with potting mixture of 1:1:1 of sand :soil: vermicompost.
July (1st Year)	1. Transfer to 9"x5"bag alongwith ball of earth, add some more soil at bottom and sides
July (2nd Year)	1. Transfer to 15"x7"bag alongwith ball of earth, add some more soil at bottom and sides
July (3rd Year)	1. Plant 90% of the good quality plants 2. Retain10% best plants from among the quality plants for production of **'Tall Plants'** and shift them in bags of size 20"x12"
July (4th Year)	1. Shift these plants to cement bags or such other alternatives.
July(5th Year)	1. Plant out these plants in pits of size 60x60x60cm

Similarly month wise activity chart for raising Ban is given here:

Table-6.7
Raising of Ban/Oaks in Nurseries

Month	Activities for Raising Ban/Oak
Nov	1. Sow seeds in fresh cowdung immediately after collection as oak seeds are viable only for 7-14 days.
Jan (1st Year)	1. Prick the germinated seedlings in 9"x5"bags with potting mixture of 1:1:1 of sand :soil: vermicompost.
July((1st Year)	1. Transfer to 15"x7"bag alongwith ball of earth, add some more soil at bottom and sides
July (2nd Year)	1. Transfer to 20"x12"bag alongwith ball of earth, add some more soil at bottom and sides
July (3rd Year)	1. Plant 90% of the good quality plants 2. Retain10% best plants from among the quality plants for production of **'Tall Plants'** and shift them in cement bags
July (4th Year)	1. Plant out these plants in pits of size 60x60x60cm.

Tall plants of other deciduous species will also be raised in a similar way as that of Oak, sowing time and technique will be as per species requirement. For deciduous tall plants, root-shoot cuttings will be raised in production nurseries while sowing will be done in mother nurseries. Nurseries larger than 0.25 ha but smaller than 0.5 ha, that have been closed can be used as **Mother Nursery** for production of root-shoot cuttings of deciduous broadleaved species. Thus, all deciduous broadleaved species like Robinia, Chulli, Walnut, Horse Chest Nut, Daru, Drek, Ritha etc will not be grown from seed in production nurseries but their root- shoot cuttings will be made in Mother Nurseries. Month wise activity chart for such nurseries is given below:-

Table-6.8

Mother Nurseries for Production of Deciduous Broadleaved Species

Month	Activities
Nov-Dec	1. Plough the field, add compost and broadcast seeds, level to cover the seeds 2. Flood irrigation to the field
March to June (Next Year)	1. Flood irrigation 2-3 times depending on rainfall and temperature 2. Weeding twice- once before and once during monsoon (these plants will not be shown in nursery return)
Nov' (Next Year)	1. Uproot plants that are >2', transport to production nurseries 2. Make root-shoot cutting retaining 4" of root and 4" of shoot 3. Plant in polybags of size 15"x7" (Now they will be shown in the Nursery Return of May'13 under age group 1.5 years)
Nov-Dec' (2nd Year)	1. Plant 90% of the quality plants 2. Retain10% best plants from among the quality plants for production of 'Tall Plants' 3. Make root shoot cutting of these 10% retained plants by cutting the

	shoot at 2' height (retaining only one shoot) and shift alongwith the soil to bags of size 20"x12"
Dec'(3rd Year)	1. Plant out these plants in pits of size 45x45x45cm

6.15 NEW PLANTATIONS

The technique of "Forest Nursery work" and "Artificial Reproduction" in hills has been dealt with in the Technical Orders No. 3 & 4 contained in the Punjab Forest Manual, Vol-III. The general principles to be followed for planting are given below:-

Site Selection:- The areas to be planted have been identified and discussed and described above.The blanks to be planted have been shown in the stock-maps. However, while selecting the area for plantation the requirement of grazing and grass-cutting of the right-holders must be given due consideration.

6.15.1 Notification of Closures :- Every area to be taken up for plantation should be notified for closure one year in advance.The period of closure may be 15-20 years.

6.15.2 Plantation Practices:- Under the current departmental policy a mixture of species in departmental plantations is required in the following proportion:-

30% medicinal trees suitable for the area, 20% wild fruit trees suitable for the area and the remainder to be the main species of the forest type either conifers or broad leaved. It has, therefore, to be ensured that for plantation programmes sufficient diversity of tree species is grown and available in the nurseries. It is also prescribed that wherever deodar is being planted the plants should be atleast two and half years old. Similarly broad leaved species should be atleast 1 year old. Deciduous broad leaved species are to be planted during winter while conifers are to be planted during the rainy season.

6.15.4 Plantation Journals :- It is essential that whenever a site is selected for plantation a proper hard bound nursery journal is prepared for that site. The nursery journal must have a large sketch may be of the area showing boundaries and other details like nallas, rocky out crops, existing patches of trees etc. It is important that GPS coordinates of atleast 6 to 8 points around plantations are recorded and entered in the plantation journal along with the altitude of the area. Details of all works carried out must be entered in the plantation journals and signed by the concerned officials showing date of signature. All inspecting officers are to record their visits and comments/observations in the plantation journals. Once a plantation journal is complete i.e. in the fourth and fifth year of the plantation, it should be transferred to the division office and kept properly in record there.

6.15.5 Fencing :- Fencing needs to be done around plantation sites only where it is necessary. Fencing along their steep slopes cliffs, should be avoided where it serves no purpose. However, it is advisable to plant bio-engineering species suitable for the area along three strand barbed wire fencing especially in areas where grazing incidence is high. Fencing work should be taken up during the rainy season along with live fence support even for area which is to be planted in the ensuing winter. Where economical, and especially along roads, treated bamboo posts should be used for fencing. Where adequate live fence material is planted, only 2 strands of barbed wire may be sufficient. Tall plants of broad leaved species (6 -8 ft high) wherever available can also be planted along the fence.

6.15.6 Site Clearance: - In the past it has been a practice to cut and remove all bushes & shrubs from the plantation area. This practice is to be discontinued as shrubs & bushes help prevent soil erosion and add in moisture retention. However, if the area has exotic weeds/ aliens' species like lantana, Parthenium etc. then these are to be removed when the area is fenced.

6.15.7 Advance earth work: - Pits of the standard size (30cm x 30 cm x30 cm for chil and 45cm x45cm x 45cm for broad leaves) should be dug out about 3-4 months in advance and the soil be heaped on the lower side of the pit. This helps in weathering and improvement of the soil.

6.15.8 Weeding:-Bush cutting and weeding of plants shall be done in accordance with the practice for each species, preferably in the rainy season. For chil and deodar two weedings in the month of July and August will be done.

6.16 LAND BANK

The following areas have been taken up for land bank:-

Table-6.9

S.N	Name of Range	Name of area	Comptt. No.	Areas in ha.
1	Bakloh	DPF Tikker Balera	1 and 2	20.00
		DPF Bedal	whole	20.00
2	Dalhousie	DPF Khirdidhar	whole	10.00
3	Chowari	DPF Parri	whole	15.00
		DPF Dobhu-Kharadabda	whole	20.00
		DPF Godhra	whole	20.00
		DPF Kulera Utali	whole	20.00
		DPF Dharsana		20.00
		DPF Nadal Sloh	whole	10.00
4	Bhattiyat	DPF Budhiban	whole	10.00

		DPF Katah	whole	25.00
		DPF Tau	whole	100.00
		DPF Kathla	whole	20.00
		Total		**310.00**

6.17 OTHER REGULATIONS

1. Grazing:-

All plantations areas shall remain closed for grazing for 15 to 20 year's period depending upon the progress of the new crops. The closure should be effective and for the minimum possible time, so that least hardships is experienced by right holders. However, depending upon the progress of the young crop, particular area may be thrown open for grazing even before the period of closure expires. This will be especially in the case of Chil plantations when after 8-10 years of effective closure, the young crop will be nearly 2m in height and cattle grazing will also minimize damage by fire.

2. Grass Cuttings:-

No grass cutting shall be allowed except under strict supervision of the forest guard. Removal of grass reduces competition and also mortality due to overhead shade.

3. Lopping:-

Trees standing in the plantation areas shall remain prohibited for lopping during the closure period.

4. Fire Protection:-

All the old and new plantations area will be strictly fire protected. Young Chill plantation should receive special attention in this behalf. The methods of fire protection and control burning suggested in Chil Working Circle shall be followed.

5. Plantation Paths:-

A Path should be aligned in each plantation area in March -April after slash clearance in the area is over. This will facilitate planting work as well as supervision and inspection.

6. Plantation Records:-

Plantation journal will be maintained for each plantation area on the standard form prescribed for the purpose. A location map on 1: 50,000 scale should also be prepared and prefixed to the journal.

i) Plantation boards should be put at prominent places, and written in Hindi, giving name of plantation, area, year of commencement, and other details of work. A simple small wooden / tin board; written in Hindi by staff will be sufficient instead of commercial type of high priced one.

ii) Notes on germination, establishment, casualties' etc.be given regularly by the Range Officer, and inspection notes of visiting Officers are incorporated in the journal.

iii) A detailed map showing various species and its extent should be prepared on 1:15,000 scale and placed in plantation journal.

iv) At present no proper record of plantations is kept which gives apprehensions that planting is done on papers. It is, therefore, very much important that proper check is kept by DFO himself, otherwise, it may lead to scandalous proportions which may lower image of the department in addition to irreparable loss to the programme of planting. Plantation once done be made successful by all means, otherwise, should not be done. This should be the principle. In case of failures, defaulters are dealt with strictly and losses be made good from the defaulters. No one should be spared; otherwise, it will be too late.

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CHAPTER VII

PASTURE IMPROVEMENT (OVERLAPPING) WORKING CIRCLE

7.1 GENERAL CONSTITUTION

As mentioned in earlier chapters, grazing is exercised in almost all the forests. However focus of attention would be more on the sub alpine pastures and the local grazing grounds in low lying areas. Hence this working circle will overlap the protection forests in particular and in some cases may also intrude upon Working Circles.

7.2 GENERAL CHARACTER OF VEGETATION

Since it is an overlapping Working Circle, therefore, no species mention of vegetation is felt necessary. This however has been indicated in different working circle.

7.3 SPECIAL OBJECTS OF MANAGEMENT

These are as under:-

1. To maintain and improve the existing pastures areas.
2. To regulate grazing on rotational basis giving due consideration to the carrying capacity.
3. To enhance the leaf biomass production by raising fodder plantations in low lying areas.
4. To inculcate and encourage the habit of stall feeding.
5. To make integrated efforts for replacing large number of inferior cattle breed with lesser number of better cattle breed.

7.4 TYPE OF GRAZING

Besides the Gaddi and Gujjar graziers as discussed in Chapter-III of Part-I local grazing in the vicinity of habitations has also been a major contribution to the process of degradation of forest areas.

7.5 REGULARTION OF GRAZING

There are broadly speaking two categories of Protection Forests. One which is low lying areas and others are the high lying areas. The former do have some potential to support grazing which at present is quite excessive. But to the dismay of very concerned, the low lying areas despite of their pitiable eroded, impoverished condition have to support the local

graziers. Grazing right is exercised almost everywhere and in an unrestricated manner. This incredibly high grazing pressure has lead to the deterioration of majority of pastures. Erosion and land slide are a common scene.

To determine the incidence of grazing the standard of equivalent units adopted and the earlier plan is suggested which is as under.

Table- 7.1

Sheep	1
Goat	2
Kine	3
Buffaloes	6

The pasture areas as mentioned above can be classified into normal, sub-normal and badly eroded. Due to continued excessive grazing pressure the condition of all the aforementioned classes has worsened in the course of time. There is a negligible area which can be said to be normal. On the whole the areas have been degraded to sub-normal and badly eroded. The number of animals to be allowed in normal areas should be one unit per 0.4 ha. And similarly it is one unit per 0.6 ha. And one unit per 0.8 ha in sub-normal and eroded pastures areas respectively.

As per census figures recorded in Para 3.1.11.3 of Part-I cattle population is 134876. When converted into animal units as per standard described above, the total animal units come to 326694. Since normal pasture areas are not too many so taking the average of sub-normal and eroded pastures, one unit would require 0.7 ha. Thus the area for grazing required comes to 228685.80 ha. which is far in excess than the area available. Thus there is a dire necessity of improving the pasture lands and at the same time reducing the cattle population.

Keeping in view, the above, permissible animal units for some pastures in high lying areas are fixed as under:-

Table- 7.2

Sr. No	**Name of Pasture**	**Area in ha**	**Carrying capacity in units**	**Incidence of grazing in equivalent units.**
	DALHOUSIE RANGE			
1.	Gharat Galla Dhar	41.28	59	192
2.	Talai Dhar	59.89	86	56
3.	Kikar Galla Dhar	57.87	83	810
	TOTAL	**159.04**	**228**	**1058**
	CHOWARI RANGE			

1.	Rikhund Dhar	107.65	154	63
2.	Mandhar Dhar	89.03	127	174
3.	Pirthu Dhar	50.53	72	0
4.	Dibri Dhar	44.92	64	24
5.	Tressar Dhar	445.14	636	156
6.	Kuprani Dhar	182.10	260	228
7.	Sappar Goth Dhar	118.57	169	184
8.	Kalasan Dhar	202.34	289	57
9.	Gaddan Tappa Dhar	24.68	35	0
	TOTAL	**1264.96**	**1806**	**886**
	BHATTIYAT RANGE			
1.	Banagru Dhar	97.07	133	231
2	Jhanda Dhar	117.36	168	99
3	Kanjal Dhar	175.64	251	367
4	Tibba Dhar	72.44	103	114
5	Nadal Dhar	145.68	208	204
6	Lodhar Dhar	158.23	226	137
7	Khor-Goth Dhar	72.84	104	228
8	Gowal Khola dhar	156.20	223	213
9	Kandlu Dhar	283.87	406	36
10	Jhangru Dhar	95.91	137	135
11	Banga Nal Dhar	234.71	335	333
12	Gowal Guni Dhar	93.07	133	90
13	Mathli Dhar	133.14	190	258
14	Khata Nal Dhar	250.90	358	281
15	Bangoli Dhar	158.64	227	84
16	Marala Dhar	271.14	387	78
17	Makroti Dhar	315.65	451	0
18	Jaliata Dhar	101.57	145	87
19	Gajour Dhar	74.86	107	39
	TOTAL	**3004.92**	**4292**	**3014**

Grazing Fee:- In the Working Plan under revision some increase was proposed in the grazing fees charged at that time. Since then there has been a tremendous rise in the price index and items like milk, ghee etc. have accordingly gone high in cost. In view of this, it is necessary to revise the grazing fees so that there is some conformity with the prices prevalent at this point of time and some revenue so obtained can be ploughed back for the improvement of these pastures.

Following increase is suggested:-

Buffaloe	Rs. 20 / head / season
Kine	Rs. 5 / head / season
Sheep	Rs. 1 / head / season
Goat	Rs. 2 / head / season
Horse	Rs. 10 / head / season

Issue of Permits:- A very meticulous approach has to be adopted while issuing permits. These should not be issued just for the sake of it, but an effective check has to be kept over the permitted units.

Registration of Graziers:- This is again a measure which should be effectively used to check the graziers so that the pastures are not grazed beyond their carrying capacity.

Fixation of Routes and Rahdari Check Posts:- This provision of routes and check posts is basically to prevent the entry of animal units which are in excess to the permitted number. These routes are followed not only by the graziers holding permits for Dalhousie Division, but also by those who take their flocks to graze in the pastures of other divisions of Chamba Circle.

The following routes and check posts are however suggested for only those graziers who graze their flocks/cattle in Dalhousie Division:-

Table- 7.3

Sr. No	Particular of Route	Check Post
1	Jaunta to Gharanu-Chakki Via Morthu	Morthu
2	Nurpur to Gharanu-Chakki Via Morthu	Lahru

There are permanent check posts like Tunuhatti, Lahroo and one established recently at Hatli. However, for the purpose of checking the permitted number of cattle etc it is suggested that in addition to the aforementioned check posts. DFO should organize some temporary mobile check posts to make intermediate check during the transit period.

Method of Treatment:- Before prescribing any treatment, it is obligatory to acquaint with the present status, floristic composition production potential of pastures etc.

Grass Lands owned by Farmers (Ghasni):- General health of these grass lands is comparatively better. These remain in closed to grazing during April-May in higher hills and June-July in the lower zone. Hay is prepared from these areas form mid August to Mid September in higher hills and October to December in lower areas. Production potential of these areas is between 20-30 q/ha. in lower hills and 10-20 q./ha. in higher hills. In these areas low fertility and absence of legume component in the natural flora is conspicuous.

Pastures Under the Control of Forest Department:- These pastures are subjected to heavy continuous grazing pressure. As a result good palatable grasses have selectively been grazed and eliminated leading to dominance of unpalatable and unproductive grasses. Due to

depletion of grass cover barren patches have developed over vast areas and soil erosion has become a serious problem. Production from these pastures is only 5-10 q./ha.

Production potential of these lands can be significantly improved through management strategies, as introduction improved through management strategies, as introduction of improved grasses and legumes, fertilization, proper herbage harvesting, closure for a specific period, soil conservation works etc. these are briefly described in the succeeding paragraphs.

7.6 INTRODUCTION OF IMPROVED GRASSES & SEED PRODUCTION

In the lower Shiwalik zone, for introduction and seed production, following grasses are suggested:

1. **Sabi Grass (Urochloa Mosambicensis):-** It is a perennial creeping stoloniferous drought resistant plant.
2. **Gunia Grass (Panicum Maximum):-** It is a tall growing perennial grass with dense tussocks. Roots system is deep dense and fibrous which enables the plant to survive long drought periods. It is shade tolerant and can grow under trees and bushes. It can be harvested 3-4 times in a season.
3. **Glycine (Neonotonia Wightii):- Malawi** cultivar is the only pasture legume which performs well in the Shiwalik Zone. It is perennial in nature with long trailing stems which root freely from nodes.

In the sub tropical climate some important spps as under:-

1. Sentaria anceps (Timothi grass).
2. Panicum Maximum.
3. Macrotyloma axillare. It is a perennial legume well adopted to Shiwalik Zone.
4. White clover (Trifolium repense).

It has less vernalization requirements:

In temperate climate the following species qar important:

1. Orchard grass (Dactylis glomerata).

   It is obligate in its vernalization requirement for reproduction.
2. Phleum pretense (Trimothy grass).

   It is also obligate in its chilling requirements.
3. Red clover (Trifoluim pretense).

   It is a cross pollinated crop which has vernalization requirement therefore it can be grown well in cold temperate condition.

Seed Production:- Lower Shiwalik rages are frost free and are ideal for seed production. Seed should not be sown deeper than 2 cm. and in lines 60 cm. apart.

Technique to judge the time of harvest is as under;-

1. Rub the seed in the palm of hand. If a gritty sandy noise is heard and seed feels hard then usually it is mature.
2. If the seed can be pinched out of the spikelets then it is ready for harvesting.
3. When the colour of seed changes from green to grey/brown it is mature for harvesting.

Fertilizer Application:- Generally no fertilizer is added to grass lands except what is dropped as excreta by the grazing animals.

Harvesting of Herbage from the Grass Lands:- Harvesting of herbage at prebloom stage after about 60 days interval after the initiation of vegetative growth results in higher nutritive forage, very good regeneration and second cutting becomes available in the fag end of season.

Silvipastoral Improvement:- In hills number of fodder trees both deciduous and non-deciduous is a source of fuel wood and green fodder. Important of these are Albizzia, Morus, Grewia, Olea, Quercus etc. Priority should be given to introduction of high quality grasses as well as legumes into native pastures. Useful combination of grasses and fodder trees should be adopted as per the locality factors e.h. Setaria anceps has shown good results under shaded conditions of Alnbzzia stipulate. This aspect is significant in case of improving the local pastures in particulars.

Clousures and Rotational Grazing:- In view of the depleting grass cover it becomes imperative to close part of the pastures particularly in the subalpine and alpine zone. Minimum one third of a pasture area should be closed to grazing for two seasons and opened in the third season when it should have recouped to a considerable extent. In this way the rotational closures should be imposed.

This resolution is an attempt to evolve a proactive and people friendly framework for meaningful implementation of the programme, though the detailed operational modalities to translate these concerns have not been spelt out. There are various schemes and projects, initiated by the H.P. government and some financed through External agencies e.g. externally aided projects, that lay emphasis on people's involvement in forestry. The Sanjhi Van Yojana is a H.P. government and Forest Development Agency is Goverenment of India scheme. The Government of Himachal Pradesh has issued a notification no. Fts-II (B)15-10/87 dated 23rd August 2001, called the Himachal Pradesh Participatory Forest Management Regulations, 2001. These rules shall be applicable to such government forests and lands, including common lands, where participatory management is envisaged.

8.3 SPECIAL OBJECTS OF MANAGEMENT

These will be

(i) To inculcate in the people or right-holders a direct interest in forests development, conservation, protection and to make them aware of the values of the forests to the mankind.

(ii) To involve people / communities in the treatment of degraded forests through protection planning, afforestation, pasture development, soil and water conservation so as to arrest their further degradation and for sharing of usufructs.

To achieve these objectives it is suggested that all activities, as far as possible, should be carried out after involving local people. However, the general prescriptions of the working plan be adhered to. It is also suggested that species of local importance be preferred in afforestation activities. Such species should have economic value and should be fast growing, high yielding and of multiple use. Species that provide raw material for local industry, craftsmanship should be encouraged. Quick growing and high yielding grasses and legumes e.g. Hybrid Napier, provide immediate alternatives to fodder demand and should be introduced along with tree species to sustain people's interest in the closed areas. Bamboos should be planted in gullies, nalas and moist pockets as these would serve the dual purpose of soil conservation and fuel and fodder replenishment as these are relatively quick growing. An all out effort should be made to involve a "Community-State Partnership".

8.4 STEPS INVOLVED IN JOINT FOREST MANAGEMENT

Community participation is an important aspect of any joint management plan. The process of community involvement starts from identification of the village to problem analysis and in monitoring and evaluation of the programme. The sustainability of any such

CHAPTER VIII

JFM (OVERLAPPING) WORKING CIRCLE

8.1 GENERAL

This working circle will be overlapping working circle and includes both degraded forests as well as healthy forests, which needs immediate treatment through protection, afforestation, pasture development, soil and water conservation etc. Treatment plan and memorandum of understanding will be different for degraded and healthy forests. As in other parts of Himachal Pradesh, most of the rural populace in Dalhousie Forest Division uses significant quantities of forest benefits both tangible and intangible from the forest areas. There is lot of pressure on the forests, apart from the usual demand for fuel, fodder and timber. The other rights enjoyed by the right holders as per the provisions of the Settlements, also are a major stake in the forests besides the livelihood issues.

8.2 THE NEED FOR JOINT FOREST MANAGEMENT

To address the long standing problems of deforestation and land degradation, the approach of involving local communities in an effective and meaningful manner, is gaining acceptance significantly. Even the present National Forest Policy, 1988 emphasizes on participatory management and common property management. It also specifically mentions that to achieve the objectives of the Policy, a massive people's movement should be created, especially involving women. Consistent with the NFP of 1988, the Government of India, on 1st June 1990, issued policy instruction to all state governments supporting greater participation of village communities and NGOs in regeneration, management and protection of the forests. In keeping with the above notification, the Government of Himachal Pradesh has formulated a policy vide No. Forest (c) 3-4/80-V dated 12-05-1993, supporting Joint management arrangements. Ever since village communities are being involved by the Forest department to further the aim of protection and management of forests and continuation of forest cover. The recognition of the link between socio-economic incentives and forest development has been singularly responsible in eliciting community participation. A new resolution of the Ministry of Environment and Forests dated February 21, 2000 has further strengthened the JFM programme and this circular interalia contemplates:

(a.) Legal back up to the JFM committees;

(b.) 50% members of the General Body should be women;

(c.) Extension of JFM in good forests areas, with sharper focus on activities concentrating on NTFP/NWFP management.

practice or activity depends on the level of participation. Participation fosters ownership of the people over the resources being managed by such joint activity and ensures better results. Participatory planning helps in

- building the "we" feeling;
- involve and ensure the community's participation
- transparency
- brings clarity; and
- sustainability

8.5 APPROACH TO BE ADOPTED IN IMPLEMENTING JFM SCHEMES

- Educate people on the aim and objectives of the programme/scheme before launching the programme/ scheme;
- Make extensive and intensive use of PRA techniques to formulate the plan and share the derived information with the people;
- Draw up a working scheme/ Microplan with the active involvement of the local people, ensuring representation of the heterogeneity of the group;
- Execute works and use PRA techniques for monitoring as well;
- Exemplify spirit of participation by well defined, lucid usufruct sharing mechanisms and transparency in accounting the expenditure on the works.

8.6 PAST EXPERIENCES IN PARTICIPATORY APPROACHES

The Social Forestry Umbrella project was a pioneering effort in which, perhaps, for the first time people were associated with forestry works and forestry was taken outside forest areas to village lands. This Project ended in 1993. A new scheme "Van Lagao, Rozi Kamao" was launched in 1992 in which plantation over 2 ha land was awarded to a person belonging to Antodaya category and in lieu of protection and care of this area, the beneficiary was to be given remuneration depending upon the survival percentage of the plantation.

8.7 SANJHI VAN YOJANA

Sanjhi Van Yojana, a community based afforestation scheme was launched in Himachal Pradesh on 25th December 1998. Under this scheme the communities as well as the NGOs are to be involved in the protection of the existing forest wealth as also to participate in holistic rural development. The main objectives of this scheme are -

(a) Involvement of grass-root level institutions e.g. gram panchayats, mahila mandals, yuvak mandals, schools, VFDCs, NGOs etc. in eco-restoration.

(b) Regeneration of degraded forest areas through community involvement.

(c) Creation of social assets for the benefit of the communities.

(d) Increasing the productivity of the forest areas by improvement of nursery stock through adoption of modern nursery techniques.

(e) Re-orientation of forest staff for facilitating community participation.

(f) Generation of employment opportunities in rural areas.

(g) To bring more area under tree cover by encouraging rehabilitation/ plantations of private wastelands on cost/ benefit sharing basis.

No specific duration for the scheme has been proposed and depending upon its success in the initial years, the scheme would be adopted as a model for natural resource management by the State Forest Department.

In order to execute the scheme, a Village Forest Development Society (VFDS) is to be constituted in the villages situated on the periphery of the forests. The VFDS will be a registered, non-political body representing almost all families of the village, migratory graziers, Antodaya/ IRDP and other landless families who are dependent on forests for their livelihood. The society will be registered by the DFO (T) under the Societies Act and the process of formation of VFDS will be assisted by the DFO or his representative, not below the rank of Range Forest Officer. The executive committee will have 10-15 members and the local Forest guard will be the Member Secretary till such time the VFDS is enabled to handle its own affairs. For this the forest guard will pick up a co-secretary from amongst the literate persons in the village to acquaint him with the process and facilitate taking over soon.

8.8 RESPONSIBILITIES AND DUTIES OF THE VFDS

(a.) Assist the Forest department in planning, protection, afforestation etc. as per the approved Microplan;

(b.) Judicious use of all existing rights and their equitable distribution;

(c.) Inform the department about forest offenders;

(d.) Help the Forest department in extinguishing forest fires;

(e.) Persuade villagers to give available area for plantations

(f.) Fair and just distribution of usufructs;

(g.) Settlement of disputes between VFDS members;

(h.) Protect the assets created by the VFDS;

(i.) Honour all the commitments made with the department and the members of the VFDS.

(c) Creation of social assets for the benefit of the communities.

(d) Increasing the productivity of the forest areas by improvement of nursery stock through adoption of modern nursery techniques.

(e) Re-orientation of forest staff for facilitating community participation.

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(i.) Honour all the commitments made with the department and the members of the VFDS.

8.9 RESPONSIBILITIES AND DUTIES OF THE FOREST DEPARTMENT

(a.) To recognise the VFDS and give full weightage to its recommendations;

(b.) To explain the contents of the Microplan to the VFDS members;

(c.) To provide technical know-how to the Executive body to carry out its responsibilities.

(d.) To honour the commitments made with the VFDS.

The areas taken up under the SVY scheme would primarily be degraded forests, government lands, existing poorly stocked plantation. These would be notified under Section 38 of the IFA. The area should not overlap with any other scheme and those with minimal conflicts would be given priority. The microplan would cover a period of 5-7 years and would contain 60% of the total activities for afforestation component and NTFPs. To ensure participation through creation of stakes of the communities to encourage their owning up the assets created by them, the VFDS will contribute 1% of the total cost of the microplan in cash and 4% as "shramdaan" (Voluntary labour) for the various works to be executed under the microplan.

8.10 DETAIL OF JFMCs OPERATING IN DALHOUSIE FOREST DIVISION

Various JFMCs are working in Dalhousie Forest Division to undertake various activities under FDA, Green India Mission, and National Medicinal Plants Board etc are being carried out with their active participation.

Forest Development Agency Dalhousie was formed in 2004 as a federation of 47 Joint Forest Management Committees in the jurisdiction of Dalhousie Forest Division. In 2004, a project proposal of Rs 417.17584 Lacs was formulated and submitted to Govt. of India for the period 2004-05 to 2008-09 covering an area of 2077 ha.

The Govt. of India conveyed approval of above project vide letter No. MOEF(NAEB) 35-10-1/2004-B-II dated 13th of September, 2004 to the tune of Rs. 2,32,12,000/- for 1300 ha treatable area. Subsequently, Govt. of India released the amount of Rs. 2,07,01,000/- for the year 2004-05 to 2007-08. The released amount was utilized to raise plantations of 1300 ha.

A fresh action plan had been prepared in 2009-10 with the motive to increase the area of operation to the fringe villages dependent on the forest resources for their livelihood. In addition to the earlier formed 47 JFMCs, 23 new JFMCs have been formed in this Division totaled to 70 JFMCs. Maintenance of old plantations carried out by various JFMCs during previous action plan to the tune of Rs. 52,88,000/- has been incorporated in this action plan. 23 new JFMCs has been identified in this Division for increasing the area of operation of the

FDA Dalhousie to treat the area and to address the livelihood issues of local peoples of fringe villages dependent on forest resources. In addition some left out treatable areas of old JFMCs are also proposed in this project proposal. The total cost outlay of the project is proposed to the tune of Rs. 4,93,49,233/- which includes creation of 1960 hactare plantations & its maintenance and 1300ha maintenance of old plantations carried out during 2004-05 to 2005-06. The names & details of JFMCs is as under:-

Table- 8.1

S.No.	Name of JFMC	Old/New
DALHOUSIE RANGE (16)		
1	Rinda	Old
2	Gandhiar	Old
3	Bhadini	Old
4	Guniala	Old
5	Basdi-da-kut	Old
6	Bainska	Old
7	Chehli	Old
8	Baderu	Old
9	Mandhiar	Old
10	Sherpur	Old
11	Nagali	Old
12	Baily	Old
13	Chil Bangla	New
14	Kohlari	New
15	Tipri	New
16	Singhi	New
BAKLOH RANGE (14)		
17	Taragarh	Old
18	Khadeda	Old
19	Dhamgran	Old
20	Dungari	Old
21	Kuhri	Old
22	Delag	Old

23	Suagalu	Old
24	Kakira	Old
25	Katori	Old
26	Mail	Old
27	Behdal	Old
28	Siharu	Old
29	Chhamber	New
30	Rauni	New
CHOWARI RANGE (24)		
31	Gullad	Old
32	Lanoh	Old
33	Dhadu	Old
34	Bhallada	Old
35	Baloh	Old
36	Rathbhaura	Old
37	Chhatril	Old
38	Kumahrka	Old
39	Parsiyara	Old
40	Bhablehad	Old
41	Chulha Luhni	Old
42	Banni	Old
43	Barla	New
44	Bharwa	New
45	Banet	New
46	Luhani	New
47	Awan	New
48	Raipur	New
49	Chakki	New
50	Saloh	New
51	Surpara	New
52	Khadet	New
53	Suin	New

54	Bihali	New
BHATTIYAT RANGE (16)		
55	Golla	Old
56	Bhangaie	Old
57	Dugred	Old
58	Nahana	Old
59	Sukhiyad	Old
60	Kathiadu	Old
61	Chhalara	Old
62	Bharari'	Old
63	Morthu	Old
64	Suhar	Old
65	Balana	Old
66	Kamla	New
67	Suned	New
68	Rajain	New
69	Jassur	New
70	Dug	New

8.10.1 Potential Activities of JFM Committees

The JFM/PFM committees are the future agencies of forest development, conservation and expansion. The potential activities to be executed through JFMCs can be:-

i) Afforestation activity (both departmental and MNREGA)

ii) Soil & water conservation through treatment of macro and micro watersheds in a catchment.

iii) Recharging of water bodies like boulies, ponds and underground water.

iv) Minor construction works of road, paths, and buildings.

v) Awareness programme for forest protection, fire protection ,propagation of medicinal herbs on a larger scale

vi) Livelihood options like bee keeping mushroom cultivation, vermicomposting, cutting & pruning etc. through effective training.

vii) Collection, value addition and marketing of NTFP.

8.11 FUTURE SCOPE

There is tremendous scope for the JFM activities in the division. All the forests allotted to the plantation and protection working circles are suitable/ potential sites for afforestation, soil conservation, grassland improvement, NTFP development besides other forests.

Identification of JFM Areas:- The degraded forest areas as well as common village land located in the vicinity of the villages are potential sites for JFM implementation. The deficiencies and strengths of these areas with regard to soil condition, water availability, grazing pressure, fuel wood production and requirements need to be understood.

Non Timber Forest Produce: - JFM can play an important role in collection, marketing and propagation of NTFPs. Many villagers are dependent on the collection of NTFP to sustain their livelihood. They usually collect various medicinal herbs and sell it to the middleman who further sells in the market. The various medicinal herbs that are found or can be introduced in the tract, their method of cultivation, collection, harvesting have been discussed in Chapter X.

8.12 CONSTRAINTS TO PARTICIPATORY MANAGEMENT

There is a general lack of enthusiasm in embracing the idea of shared management in the forestry sector by the people and though some inroads have been made with the communities, a lot more thrust needs to be given to popularise the concept among the masses. The main causes for this lack of encouraging response among people are:

(a) There is a general apathy of the youth to participatory programmes related to rural sector because with acquiring college education all youth strive for white collared jobs and anything that keeps them back in villages does not enthuse them.

(b) Lack of proper education of the government programmes and insufficient extension activities of the department.

(c) Long gestation period of forestry activities.

(d) Too much dependence of the public on government and subsidy, cost sharing in such activities is generally not accepted.

(e) Reluctance of government functionaries to hand over control of resources to people or even partially share their "power" with the people.

(f) Lack of proper legislation on participatory management and usufruct sharing.

(g) Need to promote income generating activities under JFM programmes.

(h) Frequent changes in schemes and discontinuation of old schemes which leads to mistrust of people in government.

8.13 MONITORING AND EVALUATION

The monitoring of the progress and performance of the activities taken under this working circle under different schemes should be done at the Divisional level. Evaluation of the schemes should be planned at an interval of three years.

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CHAPTER IX

WILDLIFE MANAGEMENT (OVERLAPPING) WORKING CIRCLE

9.1 GENERAL CONSTITUTION

This Working Circle is constituted for highlighting the necessity of conservation and collection of the data for better management of Wild Life. The whole tract dealt under this Working Plan is ideally suited for a variety of wild animals and birds since the forests are distributed from low elevation to the Alpine pastures. Therefore, this Working Circle overlaps all other Working Circles. This Chapter has been vetted by PCCF (Wild Life) as per letter No. 4878 dated 8.10.2013.

9.2 IMPORTANCE OF WILD LIFE

Faunal and Floral life (Biodiversity) play a significant role in maintaining the balance of nature. The value and importance of it from scientific, aesthetic, economic and recreational points of view is immense and is recognized the world over and therefore, adequate protection, and the scientific management of it is a absolute necessity. In wider perspective, it is Biodiversity conservation and development and also its further research, which makes it more important.

Forests provide an excellent opportunity to man to study living beings in their natural environment. In addition to this, there are material considerations as well, especially ecological. These animals and plants through the intricate food web maintain the delicate balance of nature and any breach in this chain can cause over- population of any one species, which may prove detrimental to human interests. Wild Life is a source of sport and enjoyment to people and fetches revenue to the State as well. If the people are led to know the importance and worth of Wild Life they will appreciate it as an asset and put in efforts to conserve them.

9.3 DISTRIBUTION OF WILD LIFE

The distribution of Wild Life has been described in details in the beginning of Part-I of the Plan.

9.4 SPECIAL OBJECTS OF MANAGEMENT

1. To identify problems of Wild Life management in the tract and try to formulate guide lines for its development consistent with the requirement of forestry and environment.

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Forests provide an excellent opportunity to man to study living beings in their natural environment. In addition to this, there are material considerations as well, especially ecological. These animals and plants through the intricate food web maintain the delicate balance of nature and any breach in this chain can cause over- population of any one species, which may prove detrimental to human interests. Wild Life is a source of sport and enjoyment to people and fetches revenue to the State as well. If the people are led to know the importance and worth of Wild Life they will appreciate it as an asset and put in efforts to conserve them.

9.3 DISTRIBUTION OF WILD LIFE

The distribution of Wild Life has been described in details in the beginning of Part-I of the Plan.

9.4 SPECIAL OBJECTS OF MANAGEMENT

1. To identify problems of Wild Life management in the tract and try to formulate guide lines for its development consistent with the requirement of forestry and environment.

(h) Frequent changes in schemes and discontinuation of old schemes which leads to mistrust of people in government.

8.13 MONITORING AND EVALUATION

The monitoring of the progress and performance of the activities taken under this working circle under different schemes should be done at the Divisional level. Evaluation of the schemes should be planned at an interval of three years.

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9.6 WILD LIFE MANAGEMENT PROBLEMS OF THE DIVISION

The Dalhousie Forest Division also faces the problems of animal depredation. Such incidents are consistently increasing and pose a great challenge in Wild Life management. The following four problems are the most pressing and demand immediate tackling.

a) **Leopard problem:** There have been many cases of damage to cattle by leopards in the division, who target these cattle in the forests or grazing lands. Instances of cattle lifting from cattle sheds are also no uncommon. Though injury and casualty in case of human beings has not been reported during the last 8-10 years, there have been a few instances when a leopard has created panic by venturing into the dwelling houses in villages and had to be captured by setting traps and cages.

b) **Monkey Problem:** Monkey population has increased manifold in the division and there are a lot of complaints of crop depredation by them. All along the Nanikhud State highway, monkeys can be seen in herds and pose a threat to tourists and passersby. They have left the interiors of the forests and are seen biding their time for "doles" from tourists, many of whom feed them generously with bread, chanas, bananas, food etc. Some steps to curb and cull the monkey population are urgently required and Wild Life management practices need to be enforced.

c) **Wild Boars:** These animals also pose a nuisance both in agricultural fields as well as forests areas, especially plantations. In the forest areas, they dig out the plants, while in the fields they destroy standing crop and vegetables. Sometimes, Wild Boars attack human beings. A lot of complaints are received for the elimination of this animal.

d) **Black/Brown Bears:** These animals also pose threat to human beings as these animals attack human beings in the forests or even in the agriculture fields as they do come to agriculture fields for feeding on agriculture produce. These animals also destroy pole crops of Deodar as they suck deodar oil from the wounds of Deodar trees and often they girdle the tree in the process and tree virtually dry up.

9.7 ACTS AND RULES REGARDING WILD LIFE MANAGEMENT AND CONSERVATION

Wild Life protection has been included in Article 51-A as a fundamental duty of citizens of the country. In pursuance of this constitution directive, in 1983 the Government of India,

2. To ensure collection of scientific data for the maintenance and development of viable population of fauna for scientific, aesthetic, cultural, ecological and economic purposes.

3. To protect and improve upon (develop) habitat for the Wild Life conservation and its development.

4. To educate staff and public in the management of wild life.

5. To protect and improve upon existing population of endangered species of Wild Life both faunal and floral found in the tract.

6. To mitigate the problem of human Wild Life conflict.

9.5 WILD LIFE PROBLEMS OF THE TRACT

9.5.1 There is evidence to show that in the good old days, placid recesses of these mountains used to be dwelt by a rich fauna. But the increase of human population and multifarious development activities that took place in the region, had affected the existence of Wild Life. Indiscriminate poaching had brought many species of wild animals and birds on the verge of extinction. Due to inadequate staff, it has become difficult to protect wild life especially outside the sanctuary area.

9.5.2 Problems faced by Wild Life outside Sanctuaries:

Wild Life does not get the same priority and significance in areas outside Sanctuaries and National Parks as it does in the notified Wild Life areas. As a result they remain an invisible part of forest ecosystem and whenever forests are subjected to any activity the impact of such activities on them is either undermined or ignored altogether. Habitat loss, due to diversion of forests land for other purposes, frequent forest fires, excessive lopping and hacking etc. is one of the prime impacts and as a result, the animals are either pushed deep into the forests or are left with no option but to venture out into villages. In the latter case, the carnivores resort to cattle lifting and at times pose a threat to human life too. In this process they render themselves also vulnerable to being poached and killed. This interface has led to a genesis of man-animal conflict and has not served the cause of Wild Life protection. Poaching of animals for meat and sometimes as trophy in the division is not very common, if the numbers of cases registered are the criteria to go by. However, un-noticed cases of poaching cannot be ruled out.

through its Wild Life Action Plan, formulated by the Ministry of Environment, laid down several sets of actions by which wildlife should be conserved.

The new National Forest Policy of 1988 also contains a number of references on wildlife and on bio-diversity for conserving the natural heritage by preserving the natural forests that are storehouses of a variety of flora and fauna. The main legislative measure adopted for the protection of wildlife was the enactment of Wild Life (Protection) Act. 1972.

The Wild Life (Protection) Act 1972 is being enforced in Himachal Pradesh since its promulgation by the Government of India. It came into force in the State in the year 1973 vide Notification No. G.S.R. 190(E), dated 2.4.1973, Gazette of India, Extraordinary, Part II section 3(I) page 517. The H.P. Wild Life (Protection) Rule of 1975 provides shooting and hunting rules, which are applicable to all the Reserved and Demarcated Forests in the State (Vide Notification No. 6-9/73-SF dated 24.2.75). Hunting of any wild animal specified in schedule II, III and IV is prohibited. However there is a complete ban on hunting in the state since 1983 notified vide No. 6-2/73-SF-II dated 24.5.83. About a year later, the State Govt. vide its notification No. 6-2/73-SF-IV dated 21.6.84, has allowed hunting of a few identified species, which have been declared vermin or cause damage to crops in cultivate fields, in accordance with the provisions of the Wild Life (Protection) Act, 1972.

9.8 TRADE IN WILD ANIMALS, ANIMAL ARTICLES

Every person is bound to declare in his control, custody or possession any animal, article or trophy to the Chief Wild Life Warden or an officer authorized on his behalf, who in turn will issue a certificate on ownership after proper enquiry. The DFOs have been declared authorized officers for this purpose. Application for license to commerce or carrying on business as a manufacturer or dealer in animal articles has been completely banned and any earlier practice has been discontinued.

9.9 COMPOUNDING OF OFFENCE

The Chief Wild Life Wardens and all the Wild Life wardens and DFO in the rank of DCF are authorized to compound the offences and rates of compensation are fixed or revised every year by the competent authority. Incidents of poaching and other wild life offences are not very common in the area.

9.10 GRANT OF RELIEF FOR DAMAGE

The loss of cattle due to attacks by wild animals was drawing attention of the government for some time in view of public entreaties.The Government has decided to grant

compensation for losses of domestic animals and human beings done by wild animals vide notification No. Ft. (F) 6-7/82 dated 25.2.1988 and revised vide notification No. Ft. (F) 6-7/82-Loose dated 9.4.1996, which has been recently revised vide notification No. Fts (F)-6-7/82-II dated 28 Aug. 2001 in which rates of relief for injuries/loss of life in case of human beings significantly rose. The revised rates for different categories are annexed as **Appendix-X** at page 82 in Volume-II of the Revised Working Plan.

The details of compensation paid for losses to animals and human beings done by Wild Animals for the period 2008-2009 to 2012-2013 is given below: -

Table -9.1

DATA REGARDING NUMBER OF HUMEN/DOMESTIC ANIMALS KILLED/INJURED BY WILD ANIMALS PER ANNUM DURING LAST FIVE YEARS

Sr.No.	Year	Humen injured/killed	Animals Killed	Compensation amount given to victim	Attack by Wild animal	Name of Forest Range
1	2	3	4	5	6	7
1	2008-09	0	2-Sheep 1-Goat	1125-00	Leopard	Chowari
		1	0	33000-00	B/Bear	Dalhousie
		1	0	5000-00	Monkey	Dalhousie
		1	0	5000-00	Monkey	Dalhousie
		0	2-Goats	750-00	Leopard	Chowari
			2-Cow	1250-00	B/Bear	Chowari
		1	0	5000-00	Languor	Dalhousie
		1	0	5000-00	Languor	Dalhousie
		0	3-Goats	1125-00	Leopard	Chowari
		0	1-Sheep 3-Goat	1600-00	Leopard	Chowari
		0	3-Goat 2-Kids	1750-00	Leopard	Chowari
		0	2-Goat	750-00	Leopard	Chowari
	Total:-	**5**	**7**	**61350-00**	**0**	**0**
2	2009-10	0	3-Goat	1125-00	Leopard	Chowari
			15-Kids 3-Lambs	3384-00	Leopard	Chowari
	Total	**0**	**2**	**4509-00**	**0**	**0**
3	2010-11	**0**	Bull- 1	1500-00	Leopard	Dalhousie
		1	0	5000-00	B/Bear	Dalhousie
		1	0	5000-00	B/Bear	Dalhousie
		0	Sheep-3	1200-00	Leopard	Chowari
		1	0	5000-00	Monkey	Dalhousie
		0	Goat- 1	1025-00	Leopard	Chowari

			Cow-1			
		1	0	33000-00	B/Bear	Chowari
		1	0	1000-00	Monkey	Dalhousie
		1	0	5000-00	Monkey	Chowari
		0	Cow-1	1500-00	Leopard	Chowari
		0	Cow-1	1500-00	Leopard	Chowari
		1	0	5000-00	B/Bear	Chowari
		0	Ox-1	1500-00	Leopard	Dalhousie
	Total:-	**7**	**6**	**67225-00**		
4	2011-12	0	Cow-1	1500-00	Leopard	Chowari
			Hourse-1	1500-00	-do-	-do-
		0	Sheep-1 Goat-2	938-00	-do-	-do-
		0	Bull-1	250-00	-do-	-do-
	Total	**0**	**4**	**4188-00**		
5	2012-13	1		5000	Leopard	Dalhousie
		1		33000	Beer	Chowari
		4		14000	Monkey	Dalhousie
			Goat=4	1500	Leopard	Bhattiyat
			Sheep=5	940	Leopard	Bhattiyat
			Cow=1	1500	Leopard	Dalhousie
			Cow=1	625	Leopard	Bhattiyat
			Ox=1	1250	Leopard	Dalhousie
	Total	**6**	**12**	**57815**		

To ensure and encourage the reporting of offences under the Wild Life Protection Act, provision has been made in the H.P. Wild Life Protection Rule, 1972 to give rewards to informers, giving bonafide information about the offences. Such rewards may extend up to the amount of fine imposed by the Court. Government servants are not debarred from receiving such rewards.

9.11 STUDY MEASURES AND DATA COLLECTION

With a view to facilitate identification of various parameters for basing future management, the following study and data collection measures are being prescribed to be carried out by the Wild Life wing of the department: -

i) **MUSK DEER:** - Data regarding existing number of musk deer by census, their feeding behaviors and other habits etc. should be collected to evolve steps for their protections and increasing the number.

			Cow-1			
		1	0	33000-00	B/Bear	Chowari
		1	0	1000-00	Monkey	Dalhousie
		1	0	5000-00	Monkey	Chowari
		0	Cow-1	1500-00	Leopard	Chowari
		0	Cow-1	1500-00	Leopard	Chowari
		1	0	5000-00	B/Bear	Chowari
		0	Ox-1	1500-00	Leopard	Dalhousie
	Total:-	**7**	**6**	**67225-00**		
4	2011-12	0	Cow-1	1500-00	Leopard	Chowari
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		0	Bull-1	250-00	-do-	-do-
	Total	**0**	**4**	**4188-00**		
5	2012-13	1		5000	Leopard	Dalhousie
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i) **MUSK DEER:** - Data regarding existing number of musk deer by census, their feeding behaviors and other habits etc. should be collected to evolve steps for their protections and increasing the number.

ii). **PANTHERS:** - The existing number of each and other predator species along with their prey population should be assessed. Cases of damage to the captive animals if any should also be listed. Prey-Predator ratios for these animals should be worked out periodically and steps should be taken out to keep it to the optimum level.

iii). Most of the animals and birds move to the lower elevation during winter. Seasonal migration of these animals and birds should be studied and recorded.

iv). Breeding seasons of animals and period of hatching in case of pheasants should be observed and recorded.

9.12 SCOPE FOR SCIENTIFIC STUDY AND RESEARCH

The idea of population study and game management is relatively new for Himachal Pradesh. Population study has to be done on the basis of the peculiar habitat of the animals or birds and the existing extent of the habitat available for the particular animals or the birds. After studying their habitat, the population can be assessed by devising suitable sampling technique, which takes care of the habitat. As in case of pheasant, the calling at particular time and season of the year and then sex ratio can be studied and used for computing the population in the available habitat for pheasants. Similarly for animals the population can be computed by scientific study of their habitat. Efforts should be made to make study for the disease occurring to the wild animals and bird population for helping the future management of the wild life.

9.13 HUMAN WILDLIFE CONFLICT RESOLUTION

Human-Wildlife conflict (HWC) is fast becoming a critical threat to the survival of many globally endangered species. The numerous cases from countries all over the world demonstrate the severity of human-Wildlife conflict and suggest that an in depth analysis is essential to understand the problem and support the conservation prospects of threatened and potentially endangered species. According to the World Conservation Union, HWC occurs when Wildlife's requirements overlap with those of human populations, creating costs to residents and wild animals. Direct contact with Wildlife occurs in both urban and rural areas, but it is generally more common inside and around protected areas, where Wildlife population density is higher and animals often stray into adjacent cultivated fields or grazing areas. HWC has far reaching environmental impacts. Species most exposed to conflict are also shown to be more prone to extinction because of injury and death caused by human, these can be either accidental, such as road traffic and railway accidents, capture in snares set for other species or from falling into farm wells, or intentional, caused by retaliatory

depredation. Langurs, Porcupines and monkeys, being opportunists, can also exploit food crops, fruit and even young horticultural crops or wheat, maize stems chewing it for the juice extracted, and spitting out the spent fibre, as people would do chewing on sugar cane.

9.13.2.2. Predation on domestic animals:- Another adverse effect of HWC is the killing of domestic animals by Wildlife. The number and type of domestic animals killed by Wildlife varies, depending on the species, time of year, and availability of natural preys. In the savannah and grasslands where pastoralism remains the livelihood and main asset of many people, predation on livestock becomes an issue. At a national level the losses are hardly significant but to the individual stock owner, they can be catastrophic. To a small scale stock owner, losses to predation can mean the difference between economic independence and dire poverty. Leopards are the principal culprits in the Dalhousie Forest Division which attacked mainly cattle and did so at night.

9.13.3. Transmission of diseases to livestock and/or man:- Important diseases are known to be transmitted by Wildlife to domestic livestock or possibly man (i.e. rabies). Scavengers and predators, such as spotted hyenas, jackals, leopards and vultures, play a role in the dissemination of pathogens by the opening up and dismembering and dispersal of infected carcasses. That is notably the case for anthrax the spores of which they ingest together with the tissues of the carcasses and then widely disseminate in their faeces.

9.13.4. Others:- Monkeys and Langurs raid gardens, agricultural fields and food in houses and camping areas and can be an immense nuisance in small urban settlements if left unchecked. In urban area of Dalhousie where they are not actively controlled, monkeys and Langurs are a major menace pulling and intimidating people to take food items directly from the hands, bags and tables. In Dalhousie town, black bears generally attracted to garbage of hotels and hostels of schools and frequently visit the habitations, thereby, restricting the human activities.

9.13.5 Causes of HWC:- A set of global trends has contributed to the escalation of HWC worldwide. These can be grouped into human population growth, land use transformation, species habitat loss, degradation and fragmentation, growing interest in ecotourism and increasing access to nature reserves, increasing livestock populations and competitive exclusion of wild herbivores, abundance and distribution of wild prey, increasing Wildlife population as a result of conservation programmes, climatic factors and stochastic events.

9.13.6 Human population growth:- Demographic and social changes place more people in direct contact with Wildlife as human populations grow, settlements expand into and around

shooting, poison or capture. Such human-induced mortality affects not only the population viability of some of the most endangered species, but also has broader environmental impacts on ecosystem equilibrium and biodiversity preservation.

Human-Wildlife conflicts also undermine human welfare, health and safety, and have economic and social costs. Nuisance encounters with small animals, exposure to zoonotic diseases, physical injury or even death caused by large predators' attacks have high financial costs for individuals and society in the form of medical treatments to cure and prevent infections transmitted from animals through human contact.

Humans can be economically affected through destruction and damage to property and infrastructure (e.g. agricultural crops, orchards, grain stores, water installation, fencing, pipes), livestock depredation, transmission of domestic animal diseases, such as foot and mouth. Negative social impacts include missed school and work, additional labour costs, loss of sleep, fear, restriction of travel or loss of pets. Such broad environmental, human health and safety, economic and social impacts suggest that governments, wildlife managers, scientists and local communities need to recognize the problem and adopt measures to resolve it in the interest of human and environmental well being.

9.13.1. Typology of HWC

9.13.1.1. Human deaths and injuries

Human deaths and injuries, although less common than crop damage, are the most severe manifestations of HWC and are universally regarded as intolerable. Leopard and Black Bear are responsible for numerous fatal attacks on human. Langurs and monkeys are seldom, if ever, dangerous to humans, though being capable of inflicting serious wounds to dogs. On the other hand, they will intimidate mainly women to get to food where they co-inhabit urban areas. Finally, human death and injury can be the result of road accidents caused by Wildlife.

9.13.2.. Destruction of crops and predation on domestic animals

9.13.2.1. Destruction of crops:- Crop damage is the most prevalent form of Human-Wildlife Conflict across the Dalhousie Division. The occurrence and frequency of crop raiding is dependent upon a multitude of conditions such as the availability, variability and type of food sources in the forests, the level of human activity on a farm and the type and maturation time of crops as compared to natural food sources. A wide variety of vertebrate pests come into conflict with farming activities in division including birds, rodents, primates, antelopes, bats, and wild boars. Himalayan Black Bears are able to destroy a field in a single night raid. The important damage made in the departmental plantations by monkey, Langurs and porcupines through uprooting of newly planted saplings and tender sprouts is another form of crop

protected areas as well as in urban and sub-urban areas. Human population growth has lead to encroachment into Wildlife habitats, constriction of species into marginal habitat patches and direct competition with local communities.

9.13.7 Land use transformation:- This driving force is very much associated with the previous one, as the transformation of forests and other ecosystems into agrarian areas or urban agglomerates is a consequence of the increasing demand for land, food production, energy and raw materials. In many areas with abundant Wildlife conflict is intensified by land use fragmentation and the development of small-scale farming. These crops create favourable habitats for predators and play a major role in influencing the natural distribution and abundance of Wildlife communities.

9.13.8 Species habitat loss, degradation and fragmentation:- Species habitat loss, degradation and fragmentation are also interconnected with population growth and land use change.

9.13.9 Growing interest in ecotourism and increasing access to forest:- Recreational activities and growing public interest in Wildlife have increased the human presence in protected areas and raised concern about capacities to manage and regulate public access and large-scale use of protected areas. Associated with the four global trends is a fifth cluster connected to alteration of natural food and water availability.

9.13.10 Increasing livestock populations and competitive exclusion of wild herbivores:- Growing densities in livestock populations can create an overlap of diets and forage competition with wild herbivores, resulting in overgrazing and decline or local extinction in wild herbivore populations. Under these circumstances, livestock becomes an important source of prey for predators.

9.13.11 Abundance and distribution of wild prey:- Many experts recognize that when native prey is abundant, wild predators consume it in preference to livestock and that impoverishment of prey populations is one of the major causes of carnivores shifting their diets to livestock. Clearly, this is due to the ease of capture and limited escape abilities of livestock.

9.13.12 Increasing wildlife population as a result of conservation programmes and effective implementation of Wildlife Protection Act:- Effective protection and habitat management in the forests Wildlife population has been increased tremendously and the social organization, habitat and prey requirements of the species are difficult to accommodate within the human-defined home range, and resulted in many wildlife straying out of the forests into local villages.

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9.13.13 Climatic factors:- Although not often mentioned, perhaps because they cannot be controlled, climatic trends are an important cause of HWC. Seasonal changes are directly correlated with predation intensity. High snowfall in upper reaches compels wildlife to move to plains which resulted into poaching and hunting by the villagers. Attacks of black bear are common in rainy seasons when they frequently visit the maize fields in cloudy weather.

9.13.14 Management of conflict situations and different approaches:- Considering the actual population growth rate of humans, increasing demand for natural resources and the growing pressure for access to land, it is clear that the human Wildlife conflict will not be eradicated in the near future, however it needs to be managed urgently. A wide range of different management tools has been developed worldwide to address HWC, but most of these are strongly site and species/genera specific and are not widely or easily accessible.

An overview of some of the most common management practises, describing their applications, examining how the methods were tested, highlighting lessons learned and successful local solutions, which could be replicated under similar conditions.

9.14 PREVENTIVE STRATEGIE

9.14.1 Artificial and natural barriers (physical and biological):- Barriers have the function of preventing spatial overlapping among wild animals and local communities; they are usually man-made, but natural barriers such as rivers, mountain ranges may occur along a forest boundary. Spatial separation has been proved to be a successful stretagy when physical barriers enclose a large area.

9.14.2 Fencing:- If they are properly designed, constructed and maintained, fences can be almost completely effective in preventing conflict between people and wild animals. Several types of fences are used for various purposes. Some types of fences used to protect crops are :-

(i) Traditional barriers:- Plant hedges of various spiny species like Agave, Yucca, Berberis, Muskrose, Ruspberry etc. have the positive aspects of being a low cost solution effective with both carnivores and ungulates. Fences made of dead thorny branches and bushes are erected as *Bara* are good for keeping away wild animals from cattle and crops. Trenches covered or not, can be used as an effective measure to deter wildlife from fields. Stone walls have been used to exclude wildlife from invading cultivated areas.Farmers can simply run bark or climber ropes from tree to tree or using long poles placed apart and hang bushes and branches in intervals. Even cloths can be placed conjunction with grease and other irritating material, which, when applied to can causes irritation to any animal making contact with the fence.

9.14.6 **Waste management systems that restrict wildlife access to refuse:-** Good standards of waste management are important to avoid attracting wild animals to human settlements and to prevent wild populations being augmented and artificially sustained by human induced food availability. Each stage of waste handling should be addressed, from collection to transportation to disposal.

9.14.7 **Restriction on feeding to Wildlife:-** There should be restriction on feeding to wild animals especially Monkeys and Langurs in urban areas and temples by tourists and local people.

9.14.8 **Deterrent methods:-** Deterrent methods aim at repelling the animals from the targeted resource. They can be grouped into several categories according to the sense they regard: hearing, sight, smell, taste, touch. Some deterrents which can be used are:-

They are based on noises which are able to deter wildlife, either by the shock value of an unexpected loud noise, or by specific sounds that are known to scare wildlife.

Traditional methods are widely used by the farmers are mainly (i) beating drums, tins and trees; (ii) whips in addition to shouting, yelling and whistling; (iii) explosive devices like "bamboo blasters" using calcium carbide or fertilizers, "pipe bombs". Etc. Disturbance shooting (firing of gunshots over the heads of crop-raiding animals) has been a long standing deterrent.

Alarm systems established at the boundary of the farms and set off by a tripwire (e.g. electric sirens) or set up directly on fences (e.g. cowbells) alert farmers to the presence of wild animals, but also have some deterrent effect.

At last, some more sophisticated techniques using tape recordings can scared off animals. To scare monkeys and Langurs, the use of shots, cannon noise or predator sounds can be used.

9.14.9 **Visual deterrents: -** Visual deterrents are traditionally used. Brightly colored cloths and plastic may be hung from a simple fence at the edge of the fields. Scare crows could have a potentially deterrent effect. Fires lit on the boundaries of fields or carried as burning sticks by the farmers can deter Wildlife by the flames and the smoke. Burning tyres produces a very lasting and noxious smoke which affecting both visual and olfactory senses, increases the deterrent effect.

9.14.10 **Olfactory deterrents:-** Chemical compound(s) with potential deterrent capabilities may prove an effective way to deter animals, either as an unpleasant or painful smell, or as a targeted compound such as a hormone, which creates fear. In the first group, the capsaicin, resin extracted from chilli peppers (Capsicum sp.) causing an extremely unpleasant irritation

(ii) Wildlife fences:- Wildlife fences using strong (artificial) material like barbed wire can be set up when possible.

(iii) Electric fencing:- Electric fencing can be considered as a more sophisticated and efficient solution: (i) it is more durable, due to the reduced physical pressure from animals; (ii) it deters a wider range of species and (iii) it is more aesthetically appealing. However, the cost of installation is higher compared to the simple fences.

There are a few crops that are less palatable to wildlife and notably that animals appear not to eat. Alternative crops such as, lady's finger, ginger and chilli may be encouraged around the field which is generally not eaten by monkeys and porcupines.

Other agricultural practices like changing the timing when a crop is planted or harvested can also result in a decrease in crop-raiding. This can be done through the use of special varieties like open pollinated maize varieties which can be harvested earlier than other food crops and consequently be less vulnerable to crop damage which tends to occur late in the growing season.

In addition, by intensifying agriculture, increasing inputs and boosting yields, farmers could maximize their returns from smaller plots of land which would also be much easier to defend against crop-raiding animals. Intensification would be facilitated through the introduction of practical, environmentally sensitive practices such as mulching, organic fertilizers and liquid dung.

9.14.3 Guarding:- Monitoring herds and active defence are essential features of animal husbandry, where human herders are effective and fearless in warding off predators.

The utilization of domestic guard dogs appears to be a successful strategy for managing monkey, Langurs and porcupine attack on fields and even predation risks from Black bear, Leopards and jackals etc.

9.14.4 Alternative high-cost livestock husbandry practices:- Movement activated guard (MAG) devices and electronic training collars (EC) are deterrent systems based on aversive stimuli, they are very high-cost and cutting edge techniques. The first one relies on disrupting a predator's attack through stimuli that disturb the animal's normal behaviour; these stimuli can be gustatory (chemical), visual (light), olfactory or auditory (siren) and are activated by the animal approaching protected resources. Local arrangements like beating of drum, tins, plates etc could be a possible alternative.

9.14.5 Relocation: voluntary human population resettlement;- Where alternative land and incentives are available, relocation of local communities to areas offering better access to natural resources and socio-economic opportunities can be an adequate solution to HWC.

scientific monitoring that ensures sustainable harvests and it needs to be regulated by policies that address the timing, location and methods of hunting, as well as the distribution of benefits to all stakeholders.

9.15.6 Wildlife Translocation:- Translocation consists of moving a certain number of animals from a problematic zone to a new site. In spite of seeming to be the least sensible of the solutions listed above and the risk of exporting the problem to another site, it may be a practical and acceptable approach in some cases and where there is the availability of a suitable habitat with territorial vacancies. Translocation works well when isolated individuals are unable to survive or reproduce because they are too distant from the main population and need to be moved back to their own group; or when a high density population needs to be reduced through the relocation of the individuals.

9.15.7 Conclusion:- Although, the management practices described above is by no means exhaustive, it nevertheless encompasses a wide range of taxa and management options, which have been applied in diverse economic and cultural contexts. Some invaluable lessons can be learnt from each of the cases described in the previous chapter and practical recommendations can be inferred in order to design better interventions and to improve existing conflict management practices. Therefore, following points suggest and discuss potential areas of improvement.

9.16 EDUCATION FOR LOCAL POPULATIONS

Education and training activities at different levels, for instance in schools or in adult education arenas such as farmer field schools, would have the objective of disseminating innovative techniques, building local capacity in conflict resolution and increasing public understanding of HWC. Educating rural villagers in practical skills would help them to deal with dangerous wild animal species and to acquire and develop new tools for defending their crops and livestock. Over time it would result in a change of behavior amongst local populations and would contribute to reduced risks, improvements in local livelihoods and a reduction in their vulnerability. In an optimistic scenario, education and training would promote commitment towards conservation, raise awareness on the essential role of Wildlife in the ecosystem functioning and its ethical and economic value, as well as its recreational and aesthetic importance.

9.16.1 Better definitions and prediction of hot spots, data collection and evaluation of the impact:- There are currently no national summary statistics defining the magnitude of the damage caused by different Wildlife species. Good-quality and high-value information could be gathered through archival records, questionnaires, and interviews with women,

and burning is the most efficient and widespread. Actually, repellents based on this resin have been used to alter animal behavior for a variety of species, including bears, ungulates, dogs, and humans.

Tobacco is also efficient as a deterrent either in conjunction with chilli or alone.

9.14.11 Taste deterrents:- The use of unpalatable crops like Chilli, ginger lady's finger is also an effective deterrent.

9.14.12 Contact deterrents:- Traditional methods can be quoted in this category which regards the sense of touch. Farmers throw rocks, burning sticks and, occasionally, spears at crop-raiding animals. Beehives can be placed on the edge of the fields and the bees are conditioned to react to approaching animals.

9.15 MITIGATIVE STRATEGIES

9.15.1 Compensation systems:- HWC carries significant economic costs to humans and compensation is a measure which aims to alleviate conflict by reimbursing people for their losses. Compensation systems rely on giving out monetary payments or licenses to exploit natural resources, allowing the hunting of game or the collection of fuel wood, timber and fodder from inside protected areas.

9.15.2 Insurance programmes:- Livestock and crop insurance is often proposed as an innovative solution to mitigating the impact of HWC, but it is yet to be experimented broadly. It covers crops and livestock from the risk of Wildlife attacks and involves the villagers and local governing bodies paying a premium share of the insurance and allows rural inhabitants to make a minimum annual cost and to be refunded in the event of crop or livestock losses.

9.15.3 Incentive programmes:- Incentive programmes are based on subsidies. They offset the cost of conservation and demand the adoption of conservation-friendly practices, creating tolerance towards Wildlife through the exchange of benefits.

9.15.4 . Community based natural resource management schemes (CBNRMS):- A CBNRMS can be established, where the eco-tourism industry and hunting concessions are potentially valuable for developing a local economy based on Wildlife related revenues. This scheme entails a system of returning benefits to rural communities in order to motivate them to protect Wildlife outside protected areas and to discourage poaching.

9.15.5. Regulated harvest:- In many regions, HWC is managed by hunting. This is a low cost technique and has the potential to raise public tolerance towards Wildlife. The money raised from the sale of licenses can fund Conservation activities and the protection of human settlements. To be viewed as a legitimate management practice, hunting needs to be based on

community groups, village leaders, household heads, local government officials and other seasonal forest users. The challenge would be to develop and maintain an updated database containing the broadest array of records documenting the type and location of the incidents. Such a database would provide a detailed overview of the impact on local populations, better identify which geographical zones are more vulnerable to HWC and which species are commonly involved in the conflict. As a result, it would ensure adequate use of resources, help identify high-risk areas and allow effective responses to emergencies.

9.16.2 Better sharing of information:- The development of a web-based portal including conflict databases, remedial technologies, good management practices, innovative solutions and their outcomes would be beneficial. The portal should also provide educational material, information on high-risk areas and links to other relevant and useful web sites. It would provide valuable support to different partners dealing with the problem, granting access to information, recommendations and effective management principles.

9.16.3 Promotion of dialogue and cooperation among different stakeholders:-The success of Wildlife conservation and HWC reduction largely depends on the ability of managers to recognize, embrace and incorporate differing stakeholder values, attitudes and beliefs. The commitment and coordination of different stakeholders, local government, wildlife Services or Forestry Departments, non-governmental organization (NGOs), conservation organizations, Wildlife managers, the scientific community, tour operators and the tourism industry, rural villagers and other participants, is expected to enhance the participation, contribution and support of each counterpart. Encouraging the creation of partnerships and diverse stakeholders' compliance and collaboration will make any strategy more successful, will foster mutual assistance and strengthen the possibility of resolving the HWC issue.

9.16.4 Better commitment by governments to address the problem:

9.16.4.1 Improved policy:- In many situations, strategies or methods for addressing the HWC issue are often constrained by local, national or international regulations, laws or treaties. Moreover the ineffectiveness of some of the management practices is directly dependent on the establishment and application of policies and guidelines on a wide range of human activities. In various countries, existing Wildlife policies are outdated, contradictory and require clarification, in particular those regarding land development planning and its impact on Wildlife habitats. Policies on land tenure, controlled utilization of Wildlife through hunting and the trade of wildlife products, game farming, tourism development and

compensation schemes should be strengthened and made to conform to the present national state of affairs and population requirements.

9.16.4.2 Better control of hunting: limitation of persecution and poaching:- Hunting is undertaken as a means to supplement household food consumption, for financial gain through the sale of animal products (meat skin, furs, ivory etc.) or for retaliatory killing. The latter is a real problem where HWC occurs. Persecution by humans in response to a problematic coexistence with large carnivores has been the cause of the elimination of several species from a large part of their former home ranges, this is true for species such as the tiger (*Panthera tigris*), lion (*Panthera leo*) and the snow leopard (*Uncia uncia).* A satisfactory solution would involve the protection of the principal prey that wild carnivores depend, by preventing poaching and the commercial harvest of natural prey. This would maintain adequate populations and restore the natural balance between predator and prey thus preventing carnivores from relying on a diverse diet that includes domestic livestock. In addition, hunting concessions could be sold to operators organizing game safaris and the money invested in protected areas.

9.16.4.3 Better sharing of income from tourism:- Wildlife is a generator of income through tourism and in many developing countries it is one of the most significant sources of national revenue generation. The tourism industry can increase employment within local communities by creating additional job opportunities. This approach would compensate the cost of maintaining wildlife and contribute to changing local people's negative perceptions of conservation.

9.17 RESCUE AND RELEASE OF WILDLIFE

Besides these human Wildlife conflict resolution proposals Government of Himachal Pradesh has issued guidelines for rescue and release of wild animals vide notification No FFE-B-F (1)-3/2010 dated 02-06-2010, which is reproduced below:-

9.17.1 Rescue and Release Guidelines for Wild animal in HP Forest Department

1. Introduction:-

Himachal Pradesh, a north western Himalayan state falls within one of the biodiversity Hotspots is also an important Western Himalayas endemic bird area. The state has immense importance in terms of conserving Wildlife. Because of the high forest cover in the state and interdispersal of forest and human habitation human Wildlife interactions are inevitable.

Commonly Wildlife species like black bear, leopard, and rhesus macaque come into conflict with people requiring Forest Department's intervention. Every year there are numerous cases of animals and bird species that are found orphaned, sick, injured, displaced, trapped, abandoned and/ or lying in illegal possessions.

In the absence of any state level guide lines for rescue and release of such animals that are often healthy and fit, they remain in the Zoo/rescue centers for their rest of the life. In captivity the general well being of these animals is compromised and created an unnecessary drain on financial resources of the government. The objective of these guidelines is to provide a good assessment on the requirement of wild animals which are in need of medical/supportive care and those involved in conflict situations and devise appropriate strategies to deal with them.

2. Rescue:-

2.1 Definition:-

Rescue of wild animals is only take in to control and animals that cannot survive on its own in the wild. This includes injured, snared animals and those trapped in the people's habitation in cases of conflict. Wild animals that are only encountered or seen "do not fall under the purview of this definition. For example a black bear encountered in an abandoned shed does not need rescue. It should be allowed to escape after making sure that no person can cause harm to it.

2.2 Legal provisions:-

Amendment to section 11 of the Wildlife Protection Act states "Provided Amendment that no such captured animals be kept in captivity unless the Chief Wild Life warden is satisfied that such animals cannot be rehabilitated in the wild and the reasons for the same are recorded in writing." In Himachal Pradesh, all Divisional Forest Officers of Wildlife & Territorial Divisions have been declared Wildlife wardens under section of Wildlife (Protection) Act, 1972. The responsibility of rescue & release of wild animals rests with Wildlife wardens in their respective jurisdiction.

3. Guidelines:-

The following guidelines are framed to provide to field functions direction for adopting rescue procedures in Himachal Pradesh. These guidelines are formulated using presently available knowledge and shall be periodically reviewed for further improvement. The guidelines shal be applicable for all wildlife species encountered in the state.

3.1 Rescue Teams:-

i) There shall be one rescue team comprising of four forest guards, constituted in each Wildlife and Territorial Forest Division.

ii) Each rescue team shall be imparted initial rigorous training by the wildlife veterinarian, experienced managers from the State and NGO personal involved in rescue.

iii) Each rescue team shall also be given six monthly periodic training.

iv) The training curriculum shall be drawn up with the help of local Wildlife scan veterinarian and NGO. The syllabus shall become part of these guidelines ones completed.

Duties of rescue teams:-

i) The rescue teams shall be provided with phone numbers that are displayed in the panchayat offices and police chowkis of their divisions.

ii) The rescue team shall receive or gather any information related to the Wildlife species which are in dire need of help.

iii) The rescue team shall keep proper records of information received or so gathered.

iv) The rescue team shall also render advice with regard to safety precaution to be taken for handing the rescue wild animals.

v) The rescue team shall immediately transfer the received or gathered information to the respective Wildlife Warden.

3.2 Conducting rescue:-

The rescue team shall first assess, if the wild animal in need of help is sick injured orphaned, trapped, abandoned, displayed and or in illegal possession as defined in the Wildlife Protection Act, 1972. In case of young animals which are found without the parent, the team shall make sure that it is not just a case of the mother leaving the young in order to get food. Only after due monitoring and ensuring that the young one has been abandoned, the young animals shall be rescued/collected. In case, young animals are found by any villager, all attempts shall be made to leave the young back where found so that they can be re-united with then mother. If it is a feathered bird fallen out of nest, it shall be picked up carefully and out back in the nest.

euthanasia shall be recommended euthanasia is the act or practice of ending the life of and individual suffering from a terminal illness or and incurable condition by lethal injection. The wildlife warden shall take this decision waith the consultation/recommendations of the rescue and local veterinarian.

In serious cases only, the animal or the bird shall first be transported t nearest recognized rehabilitation centre/zoo of the State i.e. Rescue & Rehabilitation Centre Tutikandi / Himalayan Nature Park Kufri/Gopalpur/Shr Renukaji Zoo. The respective Wildlife Warden shall consult with the concerned Zoo Directors in this behalf. The rescued animals which are in dire need of care should not be allowed to suffer in a cage owing to procedural delays. The welfare of the animal should be the TOP PRIORITY.

For safe transportation the animal or bird shall be placed in an appropriately sized box with padding inside (padding not recommended for large carnivores) it possible having proper air holes for ventilation. The box/eage should be kept in a warm dark and quiet place until ready to transport. Transportation of rescued animal/birds is recommended in dark hours. If it is essential to transport in day light the cage shall be covered with a dark cloth having holes.

3.4 Housing of the Rescued Animals:-

Appropriate housing/enclosures should be made keeping in mind the biological requirements of the species.

The Wildlife wardens shall need to distinguish rescued animals that will be held temporarily in captivity and animals that shall require long-term care. The former shall be called "temporarily displaced" and the latter "permanently displaced" or disadvantaged Wildlife.

Breeding of rescued animals shall not be permitted. Only endangered species having approved conservation breeding programme in place or included in approved collection plans can become part of the founder stock after subjected to proper quarantine and detailed health screening.

3.5 Rescue of Non-Native Species:-

Any non-native/alien species, if found in the jurisdiction of any Wildlife warden, for any reasons like illegal custody, straying free ranging etc shall be rescued. In no circumstances such animals should be released in the wild in the State such animals shall be sent to the nearest Rescue and Rehabilitation Center for check up and transit stay. However, the wildlife warden and Zoo Directors will make efforts to send such animal/bird, etc, to relevant rescue zoo in the country in consultation with the Central Zoo Authority.

Every rescue team will have proper emergency kit-equipment and medicine etc. Each rescue team in the Forest or Wildlife Divisions shall have blow pipes other equipments and medicines for chemical immobilization. The tranquilizing guns being few shall be kept at strategic locations in the state all such time their availability is ensured with each rescue team so that it can be moved quickly to the zone where rescue operations are to be carried out.

The recue team shall take adequate precautions while rescuing large carnivores e.g. leopard, horned mammals like adult antelope etc. as adult animals can cause harm to the rescuers, observers and public, therefore, the recue team should adopt chemical immobilization procedure on such animals from a safe distance using blow pipes/tranquilizing guns particularly with leopards in snares. A leopard visiting a village/town frequently, and causing nuisance cannot be caught by chemical means. A cage trap would be the workable choice in such situations.

Standard pre-defined species prescriptions for administering chemical dosage shall be followed. This shall be made available to each rescue teams. The rescue team shall also take opinion of the Department Wildlife Veterinarian telephonically or any other local Veterinarian if needed. The Department shall also take all possible steps to enable wildlife. Veterinarian to render their advice in such circumstances telephonically.

Immobilization procedure shall be adopted after ensuring that the spot and its surrounding are free of public and crowd. The local Forest Department staff and police may be requested to control the crowd while rescuing large carnivores locally available barriers like ropes or colored tapes etc may be used to cordon the area.

The Wildlife wardens shall make efforts to develop rapport with the local police to solicit their support to control crowd during rescue operations of carnivores particularly leopards to ensure safety of both the public and the animal. The crowd management be emphasized as the most important point in addressing the welfare of an animal in distrees in a conflict situation. Handing large wild animals without training and equipment shall be strictly prohibited as the same may be fated to both the rescuing team as well as to the animals.

3.3 Treatment, Recording, Morphometry and Safe Transportation:-

Once the animals is immobilized, it should be thoroughly examined by a veterinarian for any external injuries, wounds, recording morphometry, body measurements including weight etc, and even undertaking treatment, it needed. The animals may also be marked for identification by way of implanting transponder microchip making and ear notch etc. if resources permit. In case of birds, they may be ringed for their identification. In exveptional circumstances, when it is realized that animals are beyond recovery e.g. seriously injured and permanently disable

4. Capturing and dealing with Man-Eater Leopards:-

The Wildlife wardens shall follow following criteria to deal with capture of naturally free ranging leopards and eliminating man eaters.

a) Mere sighting of leopards in the vicinity of a village or in an inhabited area and ensuing political pressure, media attention shall not qualify for its capture/elimination.

b) When a human killing is reported, the concerned Wildlife warden must visit the site immediately. Leopard attacks on humans are of two types. (i) Accident attacks where the person and animal by mistake bump into each other and the leopard injuries the person and runs away. (ii) Intentional Attacks the leopard intentionally attacks the person and drags/kills/ feeds in the body. Attempts should be made to establish the type of attack so that appropriate management action can be carried out. In the cases of intentional attacks, all attempts should be made to remove the animal preferably be by trapping and tranquilisation and shooting only as a last resort. In a human dominated handscape, the decision should be taken as soon as possible because any delay in this regard by the Department may lead to antagonisra, towards the administration in case of a human death. In case of accidental attacks, the situation should, however, be monitored.

c) Leopards captured as man-eaters shall not be released back into the wild and also shall not be kept on display in a zoo. It can be kept in off-display facility in the zoo or recue centre.

d) There is no way to identify the killer animal unless it has been seen while killing. Observations by scientists indicate that many animals use the same area and even if a leopard kills, another could come to feed later, Studies also show that many individuals use the same paths and areas on the same night. They are also not as solitary as it is thought and are often found sitting near each other and would be aware of what has happened to the other. Following measures are suggested to handle the situation of a human killing by a leopard.

e) Instead of shooting the leopard, efforts shall be to catch the animals or immobilize it by tranquilizing. The immobilized animal shall be moved to a rescue centre preferably after it has been tranquilized. The caught animal shall not be released after

a human attack but permission from the CWLW to euthanize the animals if recommended will be sought immediately. It shall be ensured that the villagers of the affected village/ Panchayat are present during the capturing operation.

f) Following an intentional attack on a person shooting of the leopard shall be the last resort as it has the following problems associated with it: (I) if animal is injured then it could become even more dangerous to the lives of the people around,(II) it may not necessarily be the culprit, (III) trapping and subsequent euthanasia of a leopard that was most likely the man eater (all attacks stopped after its trapping) implies that the management action would be in control of the Forest Department. However, it is important that some member of the village where the human was killed are present during any euthanasia procedure.

g) The local people shall be made aware of the problems that illegal poaching of leopards can create for them (there are many cases in Uttarakhand where illegal trade in leopard skins and bones has been detected). They are to be told that random removal of individual leopard can create potential conflict e.g. a mother killed and has a sub adult who is not very capable of hunting could result in the young animals going to the village for food.

h) The wildlife wing of Forest Department shall commence a research project for comparing leopard ecology, n relation to conflict, in an area with history of human attacks and another similar area with no such attack. For this, many leopards shall have to be collared. Within a couple of years, a lot of information shall be available to better deal with the man-leopard conflict situations. The local people should be involved at all stages of this research activity and preferably a few of them from each of the local villages should be part of the project. This shall make the villagers also more open to the ideas and recommendations that will come out of the project/study.

5. Release Guidelines:-

5.1 Rationale

It is imperative to clearly understand that zoo or rehabilitation centers are not the proper places for keeping the rescued wild animals for the rest of then lives until or unless it is so warranted from the conservation standpoint. Wild animal live much diminished lives in captivity in spite of tremendous efforts to keep them healthy and happy. Therefore the

priority shall be to release these rescued wild animals in the wild. The H.P. Forest Department shall plan a release of the rescued animal if the exercise shall also be released when the species is not required to form a part of the founder stock of wild origin in any approved ongoing or proposed conservation breeding programme of CZA in the State.

5.2 Release Criteria:-

5.2.1 Fitness of Candidate Animal:-

The animal shall be subjected to proper quarantine before transporting to a release site. An animal found to be infected or tested positive for pathogens shall not be considered for release until placed in strict quarantine for a stable period and is cleared for release.

The concerned Wildlife wardens, Zoo Veterinarian and zoo Director shall jointly ensure before release that the candidate animal is behaviorally competent and does not suffer from any aberrant behavior or human imprinting. They shall also ensure that the animal to be released has the potential and ability to survive the wild.

5.2.2 Choice of Release Site:-

The release of the animal shall take place essentially within the home range of the species and preferably within near surrounding of the rescue site if it falls within home range. The near surrounding shall comprise of the areas within 2 & 3 km radius of the rescue site in case of large mammals and for the smaller mammals it can be much less say within a km radius of rescue site., the release site shall be inspected beforehand and it shall be ensured that there is enough habitat and food resources for the animal to survive. The rescued animal/bird shall never be released in an inhabited area. The most temporarily displaced Wildlife would be "hard" released (directly released back into wild) and most permanently displace Wildlife would be "soft-released" (released into large temporary enclosures within the release site with supplementary feeding etc and eventually released back into wild after the animal has acquired necessary skills and adopted to the surroundings.

5.2.3 Attitudes of Local People:-

The attitude of the local people needs to be taken into account towards release of animal. The attitude of the local people is found unfavorable awareness-cum education programme should be under taken to improve their attitude.

5.2.4 Marking of the Candidate Animal:-

The candidate animal should be properly marked through implanting transponder microchip or metallic rings in case of birds before release, if resources permit.

5.3 Releasing animals:-

Release site should have enough area free from habitation have ample vegetative cover to provide immediate refuge to the animal to be released. The release of the animals is recommended in dark hour. Early or late hours are the best depending on the ecology of the animals for large carnivores like leopard the might hours shall be the most appropriate. At the time of rescue the animal/birds which are fit and healthy and found to be well enough to take care of themselves shall be released back within the surroundings of rescue site by the rescue team and shall submit report of the circumstances and need of rescue to the Wildlife Warden later on. The decision of the rescue team to release the animal entirely in the interest and for benefit of the animal/birds and local people. It shall be ensured that the rescue site is within the natural home range of the animal/birds in question. It is once again emphasized that if the rescue site is within the inhabit area the animal/bird shall be released in the nearby surroundings having enough cover to provide immediate refuge. The leopards which are accidentally trapped while chasing livestock or dogs inside the houses or cowshed in the village situated in the vicinity on the forest shall be allowed to escape during dark hours. If the rescue team is of the opinion that it is site to do so in the interest of the animal and the local people. The Himalayan Ungulates (fawn & juveniles) are sometimes reported to meander with sheep/goat herds and fall in custody of shepherds. These shall be released back in to the wild to unite with their co-specifics, ones it is established that the animals question is well enough to take care for itself and shall be able to survive on its own without any supportive care. The shepherds need to be educated of the need to release these young ungulates.

5.4 Monitoring of released animals:-

The Wildlife warden shall consider putting radio collars on leopards which are captured near human habitations and then released, if recourses permit and availability of expertise. This shall help to better understand the behaviour of the animals and study whether it turns into a habitual strayer.

The released animals shall be monitored by the local staff to assess the success of failure of the release. The post release monitoring can be direct (radio collars etc.) depending on resources and expertise availability on indirectly (e.g evidence like faeces, kills etc.). Proper records of the monitoring shall be kept by the local forest staff in respect of each released animals

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CHAPTER X

NTFP (OVERLAPPING) WORKING CIRCLE

10.1 GENERAL

Earlier, the management of forests was based on production of timber and earning of revenue. The non timber forest products were considered to be much lesser importance. After 1980, the earning of revenue from forests and there management for commercial production of timber has been removed from the policy framework and objects of management. The 1988 National Forest Policy emphasizes on in situ conservation of natural eco-systems. Conservation and propagation of non-timber forest products and their contribution towards local/ tribal economy has also been given importance in the policy.

This would be an overlapping working circle covering all the working circle and is constituted to ensure systematic development and exploitation of non timber forest produce species that occur in the division. The main non timber forest produce found/extracted in the division are Resin, Medicinal plants, grass. The main emphasis/focus would be on medicinal plants and Resin.

10.2 BLOCKS AND COMPARTMENTS

The entire tract of the division will be covered by taking beat as a unit.

10.3 AREA STATEMENT

The working circle is overlapping, no area statement is required.

10.4 SPECIAL OBJECTS OF MANAGEMENT

The State has formulated Himachal Pradesh Forestry Sector Medicinal Plants Policy, 2006 which is aimed at conserving and strengthening medicinal plant resource base in forest areas as well as outside for use towards enhancing health and livelihood security of the people of the State on sustainable basis. The special objects of management would be:-

i) To conserve and augment existing non timber forest produce including medicinal plants resource in its natural habitat.

ii) To encourage cultivation of commercially important species of medicinal plants on private lands

iii) To develop a system of pricing the wild harvest so as to reflect both the conservation costs and the community benefits.

iv) To encourage public-private-community partnership for building capacity for cultivation, value addition and processing of raw material before export from the state.

v) To promote the use of commercially viable medicinal plants by the state owned and private pharmaceutical units and subsidiaries engaged in value addition.

vi) To maximize yield of medicinal plants through sustainable natural and artificial regeneration and scientific exploitation.

10.5 ANALYSIS AND VALUATION OF THE CROP

10.5.1 The entire tract is rich in many useful shrubs, herbs, fungi which have been exploited from time to time. The area produces large quantities of Banafsha, Kakar singhi, Anardana, Guchhi, Rakhal, Lichens, Berberis roots etc. A list of commonly used or economically extracted medicinal herbs, plants occurring naturally are as under:-

Table -10.1

Medicinal Plants of Dalhousie Forest Division

Botanical Name	Common Name	Habit	Occurrence Zone	Parts Used
Aconitum heterophyllum	Mithi Patish	Herb	Sub alpine	Root
Acorus calamus	Barian	Herb	900 to 2000m	Rhizome
Angelica glauca	Chora	Heb	Above 2200m	Whole plant
Artimisia nilagirica	Siski	Herb	1500-2500m	-do-
Asparagus adscendens	Sufed Musli	Shrub	Upto 1800m	Root
Berberis spp.	Rasaunt	Shrub	1800-3200m	Root
Cannabis sativa	Bhang	Herb	Up to 1600m	Leaves
Cinnamonium tamala	Tej patta	Shrub/Tree	Up to 2200m	Leaves
Dioscorea detoidea	Shingli mingli	Climber	Upto 2200m	Tuber
Ephedra spp.	Bhutshur		Above 2200m	Roots
Heracleum candicans	Patlain	Herb	2000-2500m	Roots
Mallotus phillipinensis	Kemal	Tree	Up to 1000m	Roots
Morchella esculenta	Guchhi	Fungus	1500-2500m	Fruiting body
Myrica nagi	Kaphal	Tree	1000-2100 m	Fruit
Dactylorhiza hatagirea	Salam Panja	Herb	Above 3000m	Roots
Picrorhiza kurrooa	Karoo	Herb	Above 3000m	Roots

Pistacia integerrima	Kakarsinghi	Tree	Up to 1500m	Fruit
Podophyllum emodi	Bankakri	Herb	Above 2200m	Rhizome
Polygonatum vaticilatum	Salam Mishri	Herb	2300-3000m	Leaves
Potentilla fulges	Bajardanti	Herb	1500-3000m	Roots
Rhododendron arboreum	Cheo	Tree	1200-2400m	Leaves
Rhododendron compaulatum	Saranger	Tree	Sub alpine	Flower
bergenia ligulata	Pathar Tor	Shrub	1800m & above	Whole plant
Swertia chrata	Chiryata	Herb	Sub alpine	Flower
Taxus wallichiana	Rakhal	Tree	2400-3000m	Leaves
Thumus surphyllum	Banajwain	Herb	1200-1800m	Seeds,leaves
Tinospora cardifolia	Gall	Heb	1500-2200m	Leaves
Viola serpens	Banafsha	Herb	1000-3000m	Flower
Valeriana wallichii	Mushbala	Herb	2100-3000m	Root stock
Valeriana hardwickii	Nihani	Herb	1200-3600m	-do-

10.5.2 Stock Maps:- As the medicinal plants are mostly herbs and shrubs found on annual or perennial basis, stock mapping is not possible.

10.6 CALCULATION OF YIELD

No yield can be prescribed as the most NTFPs are extracted through right holders. However, proper record of all the NTFPs exported through Panchayats and the department, should be maintained annually and entered in respective compartment history files.

10.7 SUBSIDIARY SILVICULTURAL OPERATIONS

As no silvicutural system is prescribed, no specific operations are proposed. However, when the medicinal plants are raised in the nurseries or plantations, the regular operations like closure, weeding, bush cutting, protection from fire, grazing etc. are to be carried as in case of tree species.

10.8 ARTIFICIAL PROPAGATION AND CONSERVATION

Keeping in view the economic importance and demand of medicinal herbs, it is desirable to encourage naturally occurring medicinal plants in suitable localities. The demand of medicinal plants has picked up with setting up of pharmaceutical industries in the state. The existing germplasm of different herbs needs to be conserved. Following measures are suggested for the conservation, protection and propagation of medicinal plants:-

- Heavy grazing and destruction of medicinal herbs should be checked as these species do not produce sufficient seeds/vegetative form of regeneration.

- ..., drug farms should be developed through various research institutes like HFRI, UHF, Nauni, HPKVV Palampur, CSIR Palampur, Ayurveda department who are engaged in medicinal and aromatic plants .
- Medicinal plant collectors should be educated and provided proper information or guidelines so that there is continuous regeneration of medicinal herbs.
- The community based organizations like Mahila Mandals, Yuvak Mandals, VFDCs and other rural co-operatives should be involved in the development, protection, propagation and conservation of medicinal plants.

10.8.1 Propagation Techniques The technique of propagation and harvesting of some important plants is as under:-

Table -10.2

Method of Propagation of Medicinal Plant

Name	Method of Propagation	Harvesting/Collection	Uses
Artemisia nilagirica	The seeds are minute. The sowing is done in Feb./March. Seedlings are transplanted in June-July in pits at a spacing of 0.5m×0.5m.	The crop is harvested in October when the plants flower.	The flowers are used in extraction of drug used as wormicide.
Acorus calamus	The species is propagated by sowing as well as planting rhizomes at 15cm deep at 30cm×30cm spacing during Feb.-March. If direct sowing is decided, then the soil is worked up to a depth of 15 cm. Sowing is done in patches which may be spaced at 30cm×30cm.	Harvesting is done after one year during Nov.-Dec.	The dried zhizome is generally used in the form of infusion. It produces best results in case of dyspepsia and chronic diarrhoea.
Aconitum heterophyllum	The species is propagated by direct sowing in patches at 30cm×30cm during Feb.-March.	Roots are dug out in the month of Oct.-Nov.	Roots are used as astringent, tonic and in diarrhoea, cough.
Angelia glauca	The species is easily propagated by sowing in patches at spacing of 3′×3′. Sowing is carried out in Feb.-	Collection/harvesting is done in Sep.-Oct.	Roots, fruits used for flavouring. Used in medicines for

	March.		digestion, heart burn, flatulence.
Dioscorea deltoidea	It is propagated by planting rhizomes in 15cm deep pit at the spacing of 60cm×45cm during March. About 15-18 Qtls. Of rhizomes are required for one hectare area.	Tubers are dug out in Nov.-Dec.	Tubers yield steroidal sapogenin which is a source for manufacture of oral contraceptive.
Heracleum candicans	The species is propagated by seeds and root cuttings. Seeds @ 10-15 Kg/ha are required. The root cuttings 2.5cm to 4 cm long should be planted in 30 cm deep pits at a spacing of 75cm×50cm in March-Apr.	After one year, the roots/tubers are dug in Oct.-Nov.	Roots are source of xanthotoxin, a furocoumarin which is used in treatment of leucoderma, fruits as aphrodiasic & nervetonic
Podophyllum emodi	The rhizomes are planted in 15cm deep pits in the zone of natural occurrence. The seeds germinate in about 3 years but if sowing is done in bores at low altitudes, it can germinate in 6 months, then the seedlings can be taken to sub alpine region and transplanted.	The rhizomes are collected when fully developed.	
Picrorhiza kurrooa	It is easily propagated by planting rhizomes in 15 cm deep pits at a spacing of 60cm×60cm during Nov.-Dec.	Collection is done after 3-5 years when rhizomes are fully developed.	Roots are used as stomachic, tonic, improve appetite and stimulate gastric secretion.
Swertia chirayita	It is propagated by sowing of seeds in patches at a spacing of 30cm×30cm during Feb.-March.	Harvesting is done in following November-December.	The dried plant yields drug used as tonic, stomachic, bronchial asthma & liver disorders.
Valerina wallichii	The species is propagated by direct	Rhizomes are dug out after 3-5 years when fully developed.	Dried rhizomes are

	sowing or planting rhizomes in 15 cm deep pits at spacement of 30cm×30cm during Feb.-March. About 25-40 Qtls.of root stock is sufficient for one hectare.		employed for hair and perfumes, as incence and in drugs for hysteria and nervous problems.
Viola serpens	The species is propagated by sowing or planting root suckers at a spacing of 15cm×15cm during June-July.	Flowers are collected in Feb.-March in low lying area and in April-May in higher reaches.	Used for lung trouble, eye and ear diseases. Also used as blood purifier.

10.9 OTHER NON TIMBER FOREST PRODUCING PLANTS/PRODUCTS

10.9.1 Gucchhi:- Gucchhi is a highly valued morel mushroom that grows over wide swathes of the countryside under deodar or mixed coniferous forests. It grows in March or early April (depending upon the altitude) and is collected by local people (men, women and children) as soon as one is spotted. This has led to extant free riding and consequently, gucchhi collections are said to be dwindling all over the state. Another reason for the decline is the manner in which the morel is collected. It is wrenched off the ground, possibly also yanking out the substrate mycelium as well. There is neither time nor patience to allow the mushroom to shed its spores. So the next crops are getting less and less. If locals can be organised and trained to do two simple things, gucchhi might have a chance to bounce back. One, the species needs to be collected after it has shed its spores. This might vary according to weather and altitude, but the local people know when. Secondly, a simple training to get the collectors to use a blade to cut the mushroom stem (instead of yanking it out) is all that is needed to help the species recover. Of course to do this apparently simple job, there is a need to find out some good NGO or trainers who can take up this with the collectors (who are numerous) and sort of organise them into monitoring collection methods as well.

The royalty or export permit fee rate on gucchhi is high: Rs 10,000 per quintal. While a quintal of gucchhi is a lot and given the current market rates (between Rs 5000 to 7000/kg), they might seem reasonable; but people are not tuned to paying such taxes on forest produce (agriculture income is tax free). This high rate is a reason why much of the gucchhi trade seems to have gone underground. There is, therefore, a need to

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review these export permit rates for gucchhi and bring about a more transparent system in its trade.

10.9.2 Resin: - Resin tapping is confined to small area in this division.The resin is extracted by Rill method. The resin blazes are frequently outshapped and cover more area than prescribed.This has damage the Chil trees.These blazes were earlier being tapped under the French method.The pace of healing and occlusion is slow.The forests should now be given rest for a period of five years for recovering and healing.The detail of resin extracted by H.P.S.F.D.C has already given in sub para 3.4.4 in Part- I.The yield of resin should be fixed 35 quintals per 1000 blazes so that there is no over exploitation of Chil trees for resin leading to their dry up. At present rill method of resin tapping is being followed. The standards of tapping as developed by FRI are not being maintained in the field. The notable deviations are as under –

i. The length and width of blazes is often more than 38 cm and 20 cm, respectively.

ii. The depth of rills is more than prescribed 2 mm.

iii. The distance between two rills is not always as per standards and quite often the rills inter-mingle with each other because the labour does not use the guide with the knife.

iv. The proportion of nitric and sulphuric acid in the solution to be applied to the rills is not as per guidelines. The amount of sulphuric acid is kept more than required and excessive quantity of acid solution is applied in order to extract more resin.

v. The minimal distance between two parallel resin blazes is not being maintained at 3 inch. In some trees no distance has been left between two blazes. The trees are being practically girdled and no cambium is left for healing in future.

The above defects in the resin tapping are causing immense damage to the chil trees. The first three defects are exposing more than required surface area of trees. This leads to increase in fire hazards. The excessive application of acid solution and more proportion of sulphuric acid causes drying of the chil trees, sometimes as early as after 3-4 years of starting resin tapping. The last defect causes long term damage to the chil trees. In the absence of any healing distance between two blazes there is little healing if after several years of tapping.

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The field staff should be made conversant with the standards of rill method. They should be asked to report the defective tapping as soon as it is detected in the field. They should also raise damage bills immediately and should not wait till the end of tapping season. The concentration of acid solution should be frequently checked. Wrong concentration of acid or excessive application should be treated as a defect to be penalized each time it is detected.

10.10 COMPAIGN FOR CONSERVATION AND PRESERVATION OF OTHER ENDANGERED SPECIES OF THE STATE

10.10.1 Threats to Taxus and Berberis

1. **Lack of Inventorisation** We know next to nothing about the approximate number of trees of *Taxus wallichana*, their regeneration status and their pockets of occurrence across the appropriate altitudinal zone in the division.
2. This tree, though on the List of THREATENED TREES (IUCN, RED LISTING FOR HP), is not enumerated as part of the enumeration done in forests. There appears to be no nursery stock grown nor are there any efforts for planting this species in appropriate locations.
3. Though collection and export of *Taxus* leaves has been banned since 1994 and still continues, there are reports of its illegal collection and export, either as it is or in the name of Talis patra (*Abies pindrow* leaves), which is permitted and under present regulations export of which can be allowed by the Panchayat Pradhan.
4. *Taxus wallichiana* is a very slow growing tree and unless successful plantations of it are raised annually, in the long term, this tree will eventually disappear.
5. Berberis as one can see is being extracted in huge quantity. It is not clear how this is done, but there must be implications for soil conservation.

10.10.2 Urgent Action on Taxus wallichiana:-

1. There is an urgent need to locate pockets / distribution of this tree in the forests of Dalhousie, map these sites using GPS and inventory the trees class wise there.

2. A suitable nursery to be identified and stock of *Taxus wallichiana* raised from cuttings (done in February using rooting hormones). One lakh such cuttings to be raised in poly bags every year for the next 5 to 6 years. The nursery stock has to be retained for two and half to three and a half years in the nursery before planting out. Since this is a long term,

cyclic affair with a long nursery period, it is important that cuttings are raised on the recommended scale annually.

3. If we have sufficient well grown stock of *Taxus*, it is feasible to grown live hedges of or with the species around our closed areas and also to encourage farmers to use this as a live hedge. A practice that can be incentivized in suitable areas through PES.

4. In view of 2 above, a planting schedule for *Taxus* can be developed after 3 to 4 years. But this must continue every year for a long time to come; across the next many future management plans.

5. In recent years, some private companies have introduced *Taxus* plants in Himachal imported from the North East. These are apparently being grown by farmers on their private land and then exported. It is important that this stock is not introduced in forests of the state, unknowingly or by design.

In order to avoid unrestricted heavy removal of leaves, the Govt. of HP has formulated policy regarding grant of permission for collection of *Taxus* leaves and export thereof vide letter No. FFE-B-F (13)-2/95 dated 4th June, 1996, which is reproduced as under:-

1. The export permission for each year outside the state (within country) for the export of *Taxus wallichiana* will be issued by the Govt. after proper scrutiny.

2. The collection permission of *Taxus wallichiana* leaves by the right holders will be allowed by the Principal Chief Conservator of Forests, HP after the prior approval of the Govt.

3. No collection of *Taxus wallichiana* be allowed in the forests where the right of collection of these leaves has not been admitted in the Forest Settlement and revenue records.

4. The leaves will be allowed to be collected only from trees with more than one metre girth at breast height and restricted to lower 1/3rd of the tree.

5. The collection of leaves will be allowed by plucking. In case a branch is cut on silvicultural consideration, it should not exceed a finger in thickness. No damage whatsoever be allowed to be caused to the trees. The privilege is not an absolute right and, therefore, may be withdrawn by the Govt. in the event of abuse.

6. The collection be allowed to the right holders in the presence of forest guard and the representative of traders and no labour be allowed to be engaged for the purpose.

7. The *Taxus wallichiana* leaves which are collected from the areas by plucking in a particular year are to be kept under reserve for four years and their next turn for collection of leaves will come in the fifth year.

8. Four years collection programme will be prepared for collection of these leaves and in case due to some reason the plucking is not done in fifth year, the deviation permission from the Govt. like 10 year felling programme is necessary.

9. The collection of Taxus *wallichiana* leaves will be allowed from April to December every year in accordance with 4 years cycle. The plucked material would then have to be disclosed by the parties and export permission sought from the Govt. from April to December and shall have to complete the export by 31st January next.

10. The storing of Taxus *wallichiana* leaves be allowed at a depot specified by the DFO.

11. No removal of leaves be allowed from the depot without valid permission for export and realization of export permit fee of Rs. 600/- per quintal fixed vide this department notification of even no dated 17.8.93. The movement within Divisions/Circles will be regulated under the relevant transit rules.

12. The right holders have tendency to remove bark which shall not be allowed.

13. Since the leaves are used for preparing medicine and the collection and sale is remunerative, it should be allowed in scientific manner. It should be ensured that no damage is caused in collection and also no illicit collection and its export be allowed to take place. Collection by right holders may be allowed with against permission and forests be inspected during collection as endeavor to ensure collection on scientific basis only.

14. The quantity extracted from the various forests be entered in compartment history files and details also furnished on the close of season in February to the Govt.

10.10.3 Action on Berberis Conservation:-

1. A study to answer the questions raised must be commissioned soonest possible.
2. A PAR (Participatory Action Research) study be undertaken to evolve and adopt and monitor non destructive ways of harvesting this species.
3. *Berberis* should be raised in large numbers in nurseries, as it is a very versatile species for use in Bio-engineering.

10.10.4 Policy on Introduction of Medicinal Trees in Forests:- It is now the state policy that in different plantations of the forest department about 30% of the trees being planted need to be of medicinal value and also native to the tract where plantation is being done. There is thus a need to identify and grow suitable medicinal trees for different altitude zones in a particular forest division. While most trees may be technically "medicinal", it is important that species like deodar, kail, chil etc. which are normally grown in forest

plantations are not reckoned as medicinal trees. In Dalhousie Forest Division, the low lying nurseries i.e. < 1200 mts. need to grow species like Amla, Harar, Behra, Bel (bil) etc. in sufficient numbers. It is important that these species need to be grown as tall plants in the nurseries before being planted out. Similarly, between 1200 and 2400 mts. Species like *Myrica nagi* (kaphal), *Pistachia integerrima*, walnut, bird cherry, hazelnut etc. need to be grown in nurseries. Above that altitude the choice species for Dalhousie would be Taxus wallichiana, of course.

10.11 MISCELLANEOUS REGULATIONS

This includes extraction or collection and export of NTFP's. The collection of NTFPs is allowed strictly as per provisions of Settlement report. The export is allowed under HP Forest Produce Transit (Land Rout) Rules, 1978 against payment of specified export permit fee.

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CHAPTER XI

FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE

11.1 FIRE

11.1.1 General: - Fire is a major factor that causes considerable damage to the forests of this division. The fires both accidental and incendiary are very common in this tract due to the reason that majority of forests are easily approachable by roads/Paths and State Highways, other roads. Also most of the forests lie in dry/hot areas. As most of the forests are either chil or scrub forests, any incident of severe fire has a considerable adverse effect not only on the vegetation but it also deteriorates the habitat.

Fire has an adverse effect on soil, water and ecological balance of the affected area. Soil becomes vulnerable to soil erosion and its structure gets affected, thereby retarding plant growth. The soil building micro-organisms are destroyed and the area is ultimately rendered susceptible to erosion and decreasing productivity. The young regeneration is wiped out, growth of surviving vegetation is adversely affected, the yield of forest produce is immensely reduced and the vegetation damaged by fire becomes vulnerable to insect and fungal attack. The high salvage removals are attributed to this. In the fire burnt forests change in crop pattern takes place, resulting in mixed crop in the forests. Many ban oak areas have now been invaded by fire resistant species like chil as a result of repeated fires. A mention of fire as a factor that causes injury to the forest crop has already been made in Chapter II A and II B "Flora and Fauna" of Part I of this plan. The Chil forests in this division are highly susceptible and are subject to frequent fires in the months of April to June. Because of all these reasons prevention and control of forest fire assumes great importance in Dalhousie Forest Division and there is an urgent need to take effective steps to counter the menace of forest fires, with the aim of:-

a) Protecting forests from damaging fires by taking up all preventive measures like administrative, technical, social, legal etc.

b) Preparing adequately and taking appropriate action for controlling, suppressing and extinguishing forest fires, in order to minimize the loss caused by them;

c) Educating local people about fire damage and eliciting their cooperation in preventing, controlling and extinguishing fires.

11.1.2 Causes of Forest Fires: -The main causes attributable for the out break of fires are various and can be summarised as under:-

11.1.2.1 Natural: - This is caused due to lightening, friction between quartzite stones and dry bamboo culms. Such fires are rare.

11.1.2.2 Accidental: - Such fires are more common and are caused due to

i) Charcoal burning and control burning the forests.

ii) Gross carelessness of the passersby, smokers, graziers, hikers, campers, hunters, wood collectors, honey collectors, labourers working in the forests etc.

iii) Burning of refuse in the cultivated fields by the people without suitable precautions or supervision.

11.1.2.3 Incendiarism: -

i) People set fire to forest under the false belief, that the resultant grass growth will be better and more abundant.

ii) Fires are started for scaring away wild animals for poaching.

iii) Fires are caused to destroy the evidence of crimes committed or damage caused to forest property.

11.1.3 Detail of Forest Fire Incidences: - The details of fire incidents in this Division during previous plan period has been discussed under para 2A.4.1.5 of chapter II (part-I)

11.1.4 Factors Contributing To Fire Damage: - Fire is the product of fire environment, which has mainly following components:

(i) High temperature
(ii) Low humidity
(ii) Inflammable material

(i) High temperature: - With the increase in temperature during summer season, the possibility of fire increases. In this area 37^0c is considered the critical temperature, above which the cases of fires keep on increasing with increasing temperature. The detection of fire danger day can be assessed with the help of thermometer.

(ii) Low humidity: - This factor also contributes towards spread of fire. The areas which are more humid are less prone to fire, than the areas, which have low humidity in summers. This is the reason that the casual rain-fall reduces the fire risk for a few days.

(iii) Inflammable material: - In most of the forests, grasses, chil needles, resin, fallen trees, bushes etc., make ample inflammable material. The possibility of forest fire depends upon the quantity of inflammable material on forest floor. To reduce the inflammable material in forests, control burning is done.

11.1.5 Fire Season: - The greatest danger of fire occurrence is during summer months from April to early July, up to the commencement of monsoon rains. During autumn, normally the danger of forest fire is less but occasionally the fires do occur in this period also.

11.1.6 Special Fire risk zones: - The areas burnt during previous years indicate that the following blocks of forests are especially prone to fires:

Showing Fire Prone areas

Highly Sensitive Areas:- These areas comprise the Chir Pine forests highly vulnerable to forests fires during the dry seasons having an area of about 9666.48ha.The detail is attached as **Appendix-XIX.** Special attention is required for the above forest zones during the fire season.

11.1.7 Management of Fire Protection: - The following steps will prove effective in fire management.

(a) Fire prevention measures
(b) Timely detection of forest fires and information to concerned staff.
(c) Process of fire control and fire fighting.
(d) Penal provisions and a system of rewards

11.1.7.1 Fire Prevention measures: - "Prevention is better than cure", and this holds good in case of forest fires too. Prevention of fire is more beneficial and cost effective than fighting the fire. For this effective steps should be taken well in time, such as summarised below:-

11.1.7.1.1. Earning good will of local people: - The forests cannot be protected against fire without winning the good will and co-operation of the local people. This can be done by making regular contact with local villagers and meeting the reasonable bonafide demands of right holders well in time. Also, the closures made should be affected for the minimum required period.

11.1.7.1.2. Education and publicity: - Wide publicity especially in villages nearby forests should be given against the harms caused by forest fires. For this, timely action should be taken for distribution of pamphlets and other educative material during the fire season well in advance, so as to acquaint the villagers/local people through Panchayats. The staff should hold regular meetings with local villagers in their areas to create awareness. Also hoardings, notice boards and banners should be displayed at prominent points to make aware the tourists and local public regarding the damage caused by fires

11.1.7.1.3. Restriction on tarring of roads: - During fire season, tarring of roads in forest areas should be banned, as P.W.D staff/labour burns fire underneath drums of bitumen leading to wild fires.

11.1.7.1.4. Concept of Joint forest management: - Joint Forest Management may help in preventing and controlling fires. For this active participation of local villagers should be sought by involving people in forestry activities.

11.1.7.1.5. Removal of pine needles: - Local villagers should be allowed and encouraged to collect and remove the fire needles, before hand, for domestic purposes and use as packing material for fruits and vegetables, fire brickets and other alternate uses. The strategy to collect, bundle/baling, and transport pine needle from forest areas be chalked out in participation with VFDC,s / JFMC,s / local people of the area and collaborating with manufacturers. This will reduce the fire hazard to a great extent.

11.1.7.1.6. Cleaning and thinning in regeneration areas: - All regeneration areas, should be isolated by cleaning a strip of 3 metre width all around from the inflammable material like leaves, bushes etc. Early cleanings and thinning in young regeneration should be done to give a spacing of 1 metre.

The pruning of trees which have attained a height of 1.5 metres, should be done upto $^{1}/_{3}^{rd}$ of their height and debris should be collected at suitable Nallah/place and control burnt.

11.1.7.1.7. Fire protection staff: - Divisional Forest Officer will engage sufficient number of firewatchers in consultation with the Conservator of forests during the fire season. Fire watchers (preferably the local villagers) will patrol the areas extensively for detection and protection against fires and will ensure all preventive measures with the local forest field staff. During fire season, fire fighting squad be formed out of the daily waged who have been regularised. This squad should always be ready at every Range/Block H.Q. and as soon as any intimation of fire occurrence is received, they be rushed on "Fire Pick up Van" to that spot.

11.1.7.1.8. Fire Protection Equipments: - The field staff (near the fire prone forests) should be provided with sufficient fire fighting equipments such as brooms, shovels, slashers, axes, hatches, forks, buckets, gunny bags etc, so as to meet any emergency and for facilitating the speedy extinguishing of fire. Field staff should be imparted training for effectively controlling forest fires.

11.1.7.1.9. Fire Lines: - The existing fire lines be properly maintained and kept clear of all bushes, needles etc. to avoid any chance of fire. This division has a very good network of State Highways, link roads, bridle/inspection paths passing along or through the majority of forests. Hence, no new fire lines are proposed. It is laid down that all such roads/paths should be kept clear of all inflammable material especially during the fire season, so as to act as fire lines. The detail of existing fire lines are as per **Appendix-XV.**

11.1.7.1.10. Costruction of Watch Towers: - A net work of watch towers, at suitable commanding locations, should be developed. These should be permanently manned by fire watchers/Forest Workers during the fire season. The fire watcher will immediately come to know and report to the beat guard, any out break of fire that may occur. The beat guard will take further necessary action for fire fighting. Fire watch towers, may be constructed wherever considered necessary. However following fire watch towers are proposed to be constructed in Dalhousie forest division.

Table -11.1
List of proposed fire watch towers

Sr. No.	Range	Place	Remarks
1	Bakloh	Bara	Near F.R.H Mamul
2	-do-	Dan Kund	Near I/Hut Dhamgram
3	Bhattiyat	Lodhargarh	Near Lodhargarh fort

11.1.7.1.11 Control Burning: - The Chil forms a thick bark at an early age, by virtue of which it can resist the effects of slow fire and this property is of great advantage and development of control burning. The burning should be thoroughly planned and organised and should be carried out under the supervision of competent officials.

All the forests must be isolated by clearing a strip of 1 metre width, of all inflammable material, leaves, bushes etc. to act as fire barrier during the fire season. Grazing by cattle should be permitted in order to reduce inflammable material in the forests.

It is most essential that forests allotted to Chil Working Circle are adequately protected against fire. The control burning is the most important operation and should never be neglected. The triennial programme for control burning is the most important operation and should never be neglected. The forest areas have been prescribed in full, however it is laid down that all the forest areas planted should not be controlled burnt, until the plants attain a height of 1.5 Meter. The detailed instructions on control burning are contained in the H.P. Forest Manual Vol. IV and are summarised as below: -

(1) The control burning should always be done during winters in January-February.

(2) Burning should progress from uphill to down hill in calm weather and special care should be taken to keep the line of fire as straight as possible and under control.

(3) The fire should start along the ridge, a cleared path or especially cleared lines.

(4) Chil needles and other inflammable material should be fully raked to ensure control burning.

(5) In forests under resin tapping, it must be ensured that all chips, fallen resin, needles, etc. are cleared about 1.5 m away from the base of the trees by the resin labourers.

(6) Cleanings and early thinning in young regeneration areas must be completed before the control burning.

(7) Burning shall be done always under strict supervision and control of the executive staff and shall never be left to the engaged labour.

(8) The existing fire lines should be properly maintained and kept clear. The roads, bridle and inspection paths etc. must be kept clear of all inflammable material, so as to act as fire lines.

(9) Sufficient number of trained fire watchers should be employed during the fire season to help the field staff and provided with necessary equipments. No felling operations, even to the right holders, should be allowed during the fire season.

It is, however to be noted that areas under regeneration should not be control burnt, until the regeneration reaches a height of about 2.5 m. In such areas, the grass cutting/needle collection by right holders is encouraged.

The control burning will also form a part of control forms and deviation reflected therein should be explained very clearly giving valid reasons.

11.1.7.1.12. In order to protect the forests, against fire risk, burning, and to maintain the sanitation of the forests, the following guidelines/steps are laid down:-

(1) The inflammable/fire hazard material, from the forests should be collected and disposed off during the winters.

(2) The job should be got done preferably, through the regular forest workers of concerned ranges.

(3) Collection of humus and other inflammable material should begun by raking from top of the forest and working down hill.

(4) Stack in moderate heaps in open places or suitable Nallahs.

(5) Burn the heaps down hill so that the smoke does not interfere with men working below and reduces the risk of fire.

(6) Burn the heaps in rotation to reduce the heat.

(7) Burning operation should be carried out under the supervision of forest guard concerned.

(8) Steps should be taken to make it mandatory for right holders and Forest Corporation, to collect the felling refuse after felling trees into heaps or its removal from the forest should be specified.

11.1.7.1.13. Fire Fighting: - When a fire is observed, Forest Guard or the fire watcher should at once inform the Block Officer (Dy.Ranger) and the Range Forest Officer. He should also inform the President of the local Panchayat immediately, as well as the staff of the Government Offices or institutions situated in the vicinity and seek their help in the fire fighting operations. In case of alarming situations, immediate help of various organisations like Army Cantonment Head Quarters, Fire Brigade, N.C.C., N.S.S., situated near the vicinity of each range can be availed. District Administration may be requested for immediate help, as and when required. Beating with a broom of green bushes normally controls the fire.

Fire fighting methods have been given in the Punjab leaf let No-8 and practical forest management by Trevor and Smythies. For guidance of field staff, the method is given in brief here. The Senior Officer will present immediately to take command of the operations. He should know the local geography and have some idea of labour force. The labour force should be organized in sections of suitable strength each under the order of one man and given definite task. A couple of men should be kept in waiting to take messages and instructions to the various sections. In case the fire goes beyond control, it is necessary to localize it by counter firing. Counter firing should only be done under order of a senior officer in charge of operations and attempted from a defined line such as road or ridge or fire line. A line is formed along the ridge by clearing the forest floor and cutting bushes and from this fire is started, so as to consume the fuel in advance of the on coming fire. Wind direction and gradient should always be kept in mind, while counter firing. After the fire has been brought under control, the smoldering stumps should be extinguished by putting the dug earth on them and strict vigilance be kept till all dangers of fire spreading are taken care of. Arrangement for the transport of food, water and adequate fire fighting tools are essential. The rolls of right holders who helped to fight the fire should be kept in record, so that the rights of defaulting right holders can be suspended.

11.1.7.1.14. Preparation of Annual Plan: - Preparation of an exhaustive annual plan for the fire protection is also recommended.

11.1.7.2. Administrative Measures: -

(i) Administrative aspects are also very important in connection with fire protection efforts. Encouragement should be given to good staff, while negligent staff should be punished appropriately so that the officials remain vigilant and cautious in their work. The concerned Chief Conservator of Forests can give suitable reward, in case of exemplary work done by any official or any other person. So that temptation is more towards the fire fighting operations.

Pr.CCF., Karnataka to enquire into causes of forest fires, the extent of damage to forest wealth and to formulate a strategy to prevent the occurrence of such large scale fires in future and suggest measures for their control.

11.2 ILLICIT FELLING AND SMUGGLING

11.2.1 General: - With development of good network of roads, there has been an increase in incidences of illicit felling. The high price of timber in the market has attracted/created tendency to become rich overnight and hence the smuggling of timber takes place more than often. The illicit felling and smuggling are both related, many times organized. The incidences of smuggling have, however, reduced after the amendment in Indian Forest Act (H.P.2nd Amendment 1991) vide which DFO has been designated as Authorized Officer to hear the cases pertaining to illegal transportation of Govt. property i.e. timber, resin, khair-wood and katha and may order confiscation of forest produce, vehicle and tools involved in smuggling of said forest produce. The detail of Damage Reports issued and action taken for the last eight years in Dalhousie Forest Division is as under :-

Table -11.2

Showing status of Damage Reports as on 31.3.2013

Year	Opening balance	Damage Reports added during the year	Total Damage Reports.	No.of Damage Reports Compounded.	Balance Damage Reports.
2005-06	19	29	48	20	28
2006-07	28	14	42	15	26
2007-08	26	26	52	25	27
2008-09	27	29	56	30	26
2009-10	26	41	67	40	27
2010-11	27	139	166	137	29
2011-12	29	113	142	95	47
2012-13	47	81	128	72	56

(Source: Dalhousie Forest Division.)

11.3 ENCROACHMENTS

11.3.1 General: - In recent year encroachment of forest land has emerged as a big threat to forest land. This is more so in Un-delimited Protected and un-classed forests. However in DPFs also the incidence of encroachment is not uncommon. Thus the boundary pillars of forests must be maintained regularly, if any shifting is noticed, action must be initiated immediately under IFA, 1927 and H.P. Public (Eviction of Un-authorized occupants) Act, 1971. All Divisional Forest Officers in H.P. have been delegated powers of Collectors under

(ii) Regarding Government common land and other forests, which are not under the direct control of the forest department, the D.F.O. should write to the revenue department authorities or the concerned authorities to take fire protection measures during fire season, as the fire gets spread in to Government owned forests from these areas.

(iii) The D.F.O. should also make it known to the district revenue authorities that the staff and vehicles of the forest department should not be deployed for any work other than forest protection during fire season.

11.1.7.3. Legal Action/Punitive Measures: - All cases of incendiarism should be properly investigated and punitive measures should be taken against the culprits. H.P. Govt. has framed rules regarding fire protection known as Himachal Pradesh Forests (Protection from fires) Rules, 1999 vide H.P. Govt. Notification No. FFE-A(C) 7-1/96-11 dated 17-11-99.

11.1.8. Assessment of Loss Cause by Fire: - Fire causes tangible and intangible damages to the forests and Wild Life. Loss of timber, resin, etc. is tangible, where as loss of soil fertility and soil constituent are intangible. Fire damage leads to increase in rate of soil erosion and causes drying up of water sources. Fire causes adverse effect on regeneration and destroys under growth leading to invasion by weeds. Natural succession goes into retrogression. Wild animals and birds are killed. Being afraid of disciplinary action, the loss caused by forest fire is often not actually recorded by field staff and is also under estimated because of which calculation of exact magnitude of loss is hardly possible. The offenders responsible for causing fire are also rarely caught and punished for which concrete and sincere efforts are required.

11.1.9. Fire Record: - All cases of fires are to be registered with police for investigation and bringing the culprits to book soon after the outbreak of fire. The fire reports on prescribed proforma are prepared, immediately after controlling the fire, highlighting cause of fire, extent of area burnt and damage done, suggestions for the treatment of area and safe guards for future incidences. The fire reports should contain a map of the area burnt. All the fire reports are sent to higher authorities and follow up action taken accordingly.

A complete record of fires will be maintained both in Range as well as in Divisional Offices. Maps of the forests showing the area burnt by fire will be filled in the compartment history files along with other relevant details regarding fire.

11.1.10. Khosla Committee Report: - The Govt. of India, vide No.A-34011/6/95-FF, dated 11th July 1995, from Sh. Sarveshwar Jha, Jt. Secy.,Ministry of Environment and Forests, constituted a team consisting of Sh. R.P. Khosla, IAS (Retd.) former Chief Secy., U.P. and former Secy., Ministry of steel, G.O.I., and Sh. S. Parmeswarappa, IFS (Retd.) former

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H.P. Public (Eviction of Un-authorized occupants) Act, 1971 in respect of forest land. All cases of such encroachments detected should be dealt with immediately as per procedure laid down.

A huge number of encroachment cases were emerged during the HP Government policy for regularization during 2002. Out of 1675 cases in Dalhousie Forest Division, 11 FIRs have been registered in compliance to Hon'ble High Court directions in Yoginder Singh VS Sate case in 2011. Rests of the cases are mostly on the land which is covered under 1952 notification, the same are being demarcated and challaned under HPPP Act in DFO cum Collector court and Tehsildar courts accordingly. The power of DFO as a Collector has been notified which is annexed as **Appendix-XX** at page 175 in Volume-II of the Revised Working Plan.. The forest area encroachment cases trialed and under trial in DFO cum Collector court are tabulated as under:-

Table -11.3

Total Nos of cases under trial since 2003	**Area in Ha**	**Evicted since 2003**	**Area in Ha**	**Balance undertrial**	**Area in Ha**
85	2.51	55	1.86	30	0.65

11.3.2 Preventive/Remedial Measures: -

(i) The forest officials must be well conversant with boundaries of the forests under their jurisdiction. The Range Officers, Block Officers and Forest Guards must check the boundary pillars frequently and in case of damage to boundary pillars, immediate legal action to punish the guilty and repair work should be undertaken on priority. DFO/ACF should also inspect the boundary pillars while inspecting forests, plantations and other forestry works.

(ii) The old stone masonry pillars should be replaced with cement mortar after proper demarcation. The new boundary pillars of only cement mortar should be constructed in future.

(iii) The field staff should be made accountable and sensitive towards the ever increasing menace of encroachments. The forest guard must initiate legal action as soon as the encroachment is noticed by him. He should chalk out the damage report and report the matter to range officer through block officer. The block officer should immediately seek demarcation and challan the case in the appropriate court. Range

officer must act quickly to file the case in the court; the laxity at any level must be dealt with under CCS (CCA) Rules,1964.

(iv) All the encroachment cases on forest land recorded as forest and in possession of Forest Department are within the jurisdiction of DFO as collector of the division under H.P. Public Premises and Land (Eviction and Rent Recovery) Act, 1971. Range officers should challan all such cases before collector or relevant court for speedy trial.

(v) The powers of carrying out demarcation are vested with the revenue officers under H.P. Land Revenue Act, 1954 and as such, many times, the demarcation of forests is delayed due to their pre-occupation. It is therefore, suggested that the Tehsildar, Kanungo who are on deputation with the forest department be delegated the powers of demarcation of forests to process encroachment cases expeditiously.

11.3.3 Strategy:

(i) Repair all existing boundary pillars and construct more boundary pillars close to habitation. For this areas need to be identified that are prone to encroachments.

(ii) As a deterrent, FIRs should be registered as soon as an encroachment is detected.

(iii) Latitude, longitude and altitude readings of all Boundary Pillars (old and new) to be recorded in the BP register and database in the Division office.

11.3.4 Annual Programme for Boundary Pillars:-Statement showing time schedule for checking / repair of Boundary Pillars for R.Fs and D.P.Fs is given as per **Appendix - XXI** at page 176 in Volume-II of the Revised Working Plan.

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CHAPTER XII

SOIL & WATER CONSERVATION (OVERLAPPING) WORKING CIRCLE

12.1 GENERAL CONSTITUTION

Problem of soil erosion is compant almost all over except for the well stocked forests. However, it is more acute in the low lying areas in the Shiwalik Zone and is quite prominent in the high altitude pastures as well.

In the Shiwalik region, for several reasons (Primarily, geological, climatic and hydrological) the ecosystem is fragile with a tendency towards degradation. Its land surface consists of sand stone, grits, conglomerates, clay and silts. Most of the Shiwalik Soils are sandy. However, sandloam, loamy sand and siltloam are also found. Due to their unconsolidated nature, the soils excessive run off which also leads to high velocity discharges in nallas (gullies) etc.

Hence this working circle overlaps the Protection working circle in particular but in general the objectives and prescriptions are applicable to areas in other working circles which also need some specific treatment for soil and water conservation.

12.2 SPECIAL OBJECTS OF MANAGEMENT

These are as under:-

1. To arrest the abnormal erosion, tackle land slips/slides and assist nature in improving soil status.
2. To restore the vegetation cover, to provive adequate cover to prevent further spread of the manace.
3. To improve the moisture regime by recharging ground water through water harvesting structures.
4. To ensure equitable flow of water in streams/ rivers.

12.3 AREA DISTRINUTION

Depending upon the nature/intensity of erosion, altitudinal zonation and the status of growing stock, the areas have been classified into three catefories as below:-

1. **High Intensity Area:-** These are generally located in the Shiwalik zone where rill and gully erosion of quite high intensity is encounted.
2. **Moderate Intensity Areas:-** These are the areas in high lying pastures where excessive grazing has resulted in extreme stage of sheet erosion over large expanses.

3. **Low Intensity Areas:-** In this category the soil loss is in the form of sheet erosion which if not halted can lead to more severe erosion. This type is again commonly seen in lower elevations.

Based on the above the areas with specific soil conservation treatment have been indentified and listed in Appendix-XXII at page 206 in Volume-II of the Revised Working Plan.

Rangewise distributionof area is given below:-

Range	Area in hectares
1. Dalhousie	214.48
2. Bakloh	4011.18
3. Chowari	1398.89
4. Bhattiyat	1736.31
Total	7360.86

12.4 TYPES AND CAUSES OF EROSION

Erosion in this region is mainly due to water which manifests its ferocity during torrential down pours when the run off is increased and so is erosive capacity. This erodibility however is more due to the fragile nature of geological formation in the area.

Various types of erosion are as under:-

1. **Sheet Erosion:-** It involves the gradual removal of almost a uniformly thick top soil layer which can normaly go unnoticed in the initial stag. Results become perceptible only when it is in advanced stage. This affects limited areas in forests due to the fact that there is some cover of unincorporated organic matter.
2. **Rill Erosion:-** This implies the formation of small channels in the land surface. It represents an intermediate stage between sheet and gully erosion. In forest area this type of erosion is generally seen along the extraction paths and in fire burnt areas. The heavily grazed areas also get affected by this type of erosion.
3. **Gully Erosion:-** This refers to the formation of large channels or gullies. This develops I situration where concentrated ruin off attains sufficient volume and velocity to cut deep into the soil body, Gullies have their origin in rills, skid roads roads, trails, cattle treads or natural depressions. Gullying commonly proceeds by waterfall erosion at its head. If the material is easily eroded, the gullies tend to be deep and narrow but if the substratum is hard, the gullies are shallow with sides gently sloping. As a rule, gullies carry water only during or immediately after the rains.

12.5 FACTORS EFFECTING EROSION

The various factors affecting erosion may be grouped as (i) Climate (ii) Soil (iii Slope (iv) Vegetation (v) Agricultural practicesand (vi) Developmental Works.

(i) Climate:- The most important factors are precipitation and temperature. With increase in intensity, duration and frequency of rainfall there is corresponding increase in the severity of erosion. Erosion in the southern and western parts of the division is severe because of torrential rains.

(ii) Soil:- All the soil characteristics infilteration capacity is the most important. The higher this capacity the less the run off and the lesser the erosion. Soil characteristics such as depth, granular structure, fine texture and high organic content favour infiltration. Areas heavily grazed or soils otherwise compacted have poor water holding capacity and hence are most succeptible to erosion. Soils with a high proportion of silt and sand are more easily eroded than clayey soil

(iii) Slope:- The length and steepness of the slope have a direct bearing on the amount of surface run off and consequent erosion. Velocity of run off depends on the degree of slope but its volume chiefly depends on the extent of drainage area. Long slopes tend to shed more water and thus increase erosion.

(iv) Vegetaion: - The most effective agent of conservation is vegetation. Under vegetational cover soil porosity tends to be high. Therefore water infiltration is increased. The foliage of trees and shrubs and unincorporated organic matter break the impact of rain and thus keep the percolating matter free of suspended impurities. Infilteration is also favoured by reduced velocity of surface run off and delayed melting of snow during spring. In addition, the root systems of the plants hold the soil mechanically thus hindering its removal. Serious erosion is definitely related to the destruction of native vegetation or the biotic disturbances which decrease plant cover and damage the soil. The pernicious paractive of burning the grass lands or "Ghasnis" so as to get an early flush of tender grass during spring is thus an important, cause of erosion in the vicinity of villages. Excessive grazing reduces plant cover and produces soil changes that lead to increased run off and erosion. The worst eroded areas are thus the village grazing grounds, locally know as "Bartan" where concentrated grazing continues all the year round. Similarly fellings of trees on private lands, or the so called "mazruha fellings" have in several places, resulted in serious erosion, this is particularly true of steep slopes brought under cultivation.

(v) **Agricultural Practices:** - The most serious soil erosion probably occurs on agricultural lands. The cultivated fields are poorly leveled and inadequately terraced with serious soil losses that follow. Nautors for cultivation were granted very liberally especially after the amended Nautor Rules of 1969 came into operation. Conversely with an increased area under cultivation people tend to keep more cattle for manuring purposes which again leads to increased grazing pressure and consequent erosion.

(vi) **Developmental Works:** - Road construction in particular disturbs the geology and angle of repose which initiates directly into rill erosion. There is quite heavy network of roads, B/paths in the division. But except for the few main roads other remain neglected and unmaintained without any proper drainage system which aggravates the problem.

12.6 TREATMENT

Prevention is said to be better than cure. In view of this, issue of foremost attention is the proper land use. So far as the forest areas are concerned, it is mainly the grazing in excess to the carrying capacity, which leads to this pernicious problem. In order to avoid this it becomes most imperative to reduce the grazing pressure by way of minimizing the cattle population and enforcing rotational grazing and stall feedings. Vegetation cover is the ultimate savior of soil. Therefore this has to be brought to a status where it can effectively cover the soil. The species of trees/bushes ought to be selected with an objective to manage several problems emanating from the fragility, marginality and diversity charactersing hilly areas.

In the lower elevations Chil Shisham, Khair are the suitable species for plantation. There may be some portion where due to steepness planting may not be possible. In such areas seed broadcasting of Shisham, Khair and some bushes like Dodonaea Carissa in the initial stage would go a long way in restoring some green cover. In lower elevations on the fresh soils exposed due to land slides/slip, Pansra (Wendlandia exserta) is the best colonizer and can be an effective foothold for the soil. Though sowing gives reasonably good results but its (Pansra) nursery technique should also be perfected. In the higher elevations Robinia, Ailantnus etc. are the suitable stabilizers. While taking up closures for plantation, the already existing vegetation be it in tree form or bushy form should not be promiscuously removed. But only necessary clearance should be done. Since any vegetation type in such areas, contributes towards protection.

Vegetal Brakes: - An effective method to break the velocity of run off on steep slopes is to create a number of vegetal brakes. Planting be done along contour lines which may be spaced 3 to 10 meters, apart, depending upon the extent or erosion, slope, soil conditions, and existing vegetal cover, species such as Agave, Yucca, Euphorbia and Lannea can be used for this purpose.

12.7 CONTROL OF EROSION ALONG ROADS

The erosion hazard is increased when the roads maintenance goes unattended. The retaining walls, breast walls drainage channels should be constructed and maintained so that there is no uncontrolled water flow. The excavated material should be safely dumped instead of simply rolling down the slope. Avenue planting would not only control erosion but also add to the scenic beauty. Among other mechanical measures in the forest area are check dams, drop structures etc. These masonry walls, breast walls, drainage channels should be constructed and maintained so that there is no uncontrolled water runoff, help in accumulation of some soil and ultimately to facilitate recouping of vegetation.

In land slides/slips it is necessary to construct the diversion channels to divert the run off.

12.8 WATER CONSERVATION

For this purpose, the check dams serve a lot. However in some suitable places bigger water harvesting structures can be constructed to store water which can be used by the public during drought period.

Besides this in the hot area of Shiwaliks on southern and western aspects along with plantation, soil moisture is required to be improved. This twin objective can be achieved by adopting Trench Planting in a staggard fashion which can establish a continuous countour vegetation barrier of shrubs and/ or legumes and grasses. This would grow in to a thick hedgerow which can check run off and soil loss effectively. Spacing of trenches and the dimensions would depend upon the slope and depth of workable soil. However as a precaution these may not be adviseable for slopes more than 30 degree. Ideal size of a trench can be 30×30 cm. and 2.5 m long spaced at 3 to 6 m a part.

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CHAPTER XII+1

GENERAL FINANCIAL FORECAST AND FINANCIAL PLAN OF OPERATION

XII+1.1 FUTURE REVENUE AND EXPENDITURE

An estimate of revenue and expenditure, based on present market rates has been made. It is very difficult to make an accurate financial forecast for a considerable long period in view of fast changing market trends.

XII+1.2 EXPECTED REVENUE

The expected annual revenue based on the current prices is as under for the year 2013-14 is as under:-

Table- XII+1.1

FUTURE REVENUE

S.N	Particulars	Amount
	Timber and other forest produce	
1	Deodar 3400 cum @ 5903 per cum	20070200
3	Chil 5250 cum @ 572 per cum	3003000
4	Fir/Spruce 3150 cum @ 790 per cum	2488500
5	B/L 300 cum @ 326 per cum	97800
6	80800 resin blazes @ 65.00 per blaze	5252000
7	Misc.	200000
	Total	**31111500**

To assess the revenue for subsequent years, 10 % increase be given annually.

XII+1.3 FUTURE EXPENDITURE

The expected annual expenditure is as under:-

Table -XII+1.2

FUTURE EXPENDITURE

S.N	Particulars	Amount
	Establishment	
1	Pay of staff	46043900
2	T.A	280000
3	Office expenses	600000
4	Uniform and liveries	125000
5	Rent and Taxes	10000
6	Pay to contingent staff	200000
7	Motor vehicle	210000
8	Other charges	95000

	Sub Total	**47563900**
	Conservancy and Development	
1	Regeneration of Forests	500000
2	Plantation of Waste Land	9300000
3	Roads & Buildings Cost	1500000
4	Repairs of Boundary Pillars	100000
5	Fire Protection	300000
6	Material & supplies	200000
7	Stores, Tools & Plants	100000
	Sub Total	**12000000**
	Total	**59563900**

XII+1.4 COST OF WORKING PLAN

Table -XII+1.3

S.N	Item	Amount
1	Cost of enumeration works & field work	1696000
2	Moter vehicle expenses	210000
3	Machinary	100000
4	Material and supply	125000
5	O.E	168000
	Total	**2299000**
	Cost of working plan for brought under Management (R.Fs,D.P.Fs & U.P.Fs) per ha.	**Rs. 57.54**

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CHAPTER XII+2

MISCELLANEOUS REGULATIONS

XII+2.1 PETTY FELLING

Felling of petty nature, as detailed below may be treated as prescriptions of this working plan:-

1 Dry or green trees for ordinary departmental use or given to other Government department.

2 Dry or green trees to meet the special free grant for construction of houses destroyed by natural calamities like fires, lightning etc as per settlement provisions or as per Government orders.

3. Trees falling along prospective road alignments, electric, and telephone transmission lines, water channels etc. However, no felling will be allowed till approval for transfer of forest land for non forestry purpose under the provisions of Forest Conservation Act, 1980. Special care must be taken while carrying out alignment of road to avoid unnecessary cutting of trees.

All the trees and poles marked for such purpose shall be recorded in the respective compartment History Files and such felling will appear in Control Forms.. Silvicultural principles shall be strictly adhered to while carrying out such marking.The Petty fellings to be approved by the competent authority and removal to be accounted towards main yield prescribed.

XII+2.2 DEVIATIONS

Any large or unusual felling operation not prescribed in the working plan will be a deviation requiring prior sanction of the competent authority. The deviations may be due to:-

1. Large scale damage by fire and wind storms.
2. Special fellings to meet the sudden unexpected heavy demand of particular industries or for defense purposes.
3. Large scale felling of trees falling in the alignment of major roads and electric transmission lines.

XII+2.3 DEMARCATION OF FOREST

The boundaries of U.P.Fs are not properly defined and delimited on the ground. The boundary pillars are not properly serially numbered and maintained creating confusion at all stages.This is a specialized job. Special task force comprising of A.C.F, Rangers and Deputy Rangers be constituted which will carry out complete checking and repair of boundary pillars.

XII+2.4 BOUNDARY REGISTER

Boundary register for each forest shell be maintained separately. Also register containing tracing of forests shall be maintained separately range wise.

XII+2.5 MAPS

Comprehensive stock maps of 1:15000 scale for all the forests have been prepared and pasted in the individual C.H.Files. By and large this is an updating of the old stock maps. However since these were not available for some forests, hence revenue (settlement) maps were used by reducing them with the help of Pentagraph.

XII+2.6 RAIN GAUGES

3 Rain gauges have been installed in this Division. It is recommended that rain gauges should be installed at Sundhara, Raipur stations and maintained properly.

XII+2.7 FIRE PROTECTIONS

Even the primitive methods of fire protection are not being taken care of. The budgets under fire lines and controlled burning have been almost finished. There is need to maintain fire lines, fire watchers in the fire prone areas. Publicity and Extension for education of local population regarding fire protection needs to be done.

XII+2.8 ENCROACHMENTS

Encroachments have become a rule rather then an exception. Due to Non-Demarcation of UPF's the hunger of land is slowely bringing down the forest area. Special task force consisting of Forest, Police and Revenue officials to be constituted to tackle the menace of encroachments.

XII+2.9 RESEARCH PLOTS

There is need to establish some research/sample plots in Chil forests with the main objective to study the effects of Rill method of resin tapping so that it is standarised with least adverse effect on the tree. These are proposed as under:-

Table -XII+2.1

S.N	Name of Range	Name of Forest
1	Bakloh	R.F. Mamul
2	Chowari	D.P.F. Talai

XII+2.10 ROADS, PATHS, & BUILDINGS

XII+2.10.1 Roads: - The construction of a large number of roads has already been under taken by P.W.D. department in the tract dealt within this plan. These will suitably open forests rather

any further construction of roads will affect the forests adversely. So there is no need to construct any new motorable road on the forest area.

XII+2.10.2 Paths: - Number of bridle and inspection paths covering all important forests has been constructed in the past. The existing roads and paths are detailed in **Appendix-XXIII** at page 211 in Volume-II of the Revised Working Plan.. These should be kept well maintained. The inspection path should be constructed as far as possible along contours in such a way that whole of the forest is covered.

XII+2.10.3 Buildings: Buildings have been constructed in the past. The existing buildings are detailed in **Appendix-XXIV** at page 214 in Volume-II of the Revised Working Plan. There are Inspection Huts and Forest Reast Houses in this Division. The detail is as per **Appendix-XXV** at page 219 in Volume-II of the Revised Working Plan.The following buildings are proposed to be constructed. D.F.O may modify this according to administrative needs:-

Table -XII+2.2

S.No	Range	Name of Building	Location	Number
1	Dalhousie	Forest information Centre	Dalhousie	1
2		Fgd Hut	Dalhousie	1
3	Bakloh	Range office	Ghatasani	1
4		Class IV Quarters	Ghatasani	4
5		Fgd Hut	Tunhatti	1
6		Forest Fire Tower	Bara	1

XII+2.11 BAN ON GREEN FELLINGS

The govt. of H.P. had imposed a complete ban on green fellings from the year 1983-84 in high conifer forests.This resulted in complete stoppage of regeneration fellings and thinning. The ban has since been lifted by a cabinet dicision during 1997, yet due to an order of the Hon'ble Supreme Court of India in S.L.P. No 202 of 1995 titled as T.N. Godavarman v/s Union of India, there remains a complete ban on green felling till date.

XII+2.12 MID TERM REVIEW OF THE WORKING PLAN

Apart from the annual and periodic monitoring by the State authorities, various provision of this working plan shall be subject to a mid term reviews by the Government of India after every five year interval.

XII+2.13 GO-SADANS

XII+2.13.1 Problem of Stray Cattle: -

Ever increasing number of cattle in general and cow and its progeny in particular, roaming on the streets of towns cities and in forests as stray cattle is a serious menace to the environment, transport system and general living of people. It is a serious threat and challenge to society, which needs no elaboration. It is a country-wide problem, spreading from rural areas to metropolitan cities. It is also the crucial issue, generally put forward whenever the question of total ban on cow slaughter arises. Time and again, it has been said that stray cattle are indication of the fact that these are unfit and their rearing is uneconomic. That is why the owners just push them out on the ultimate journey to the slaughter-house. Thus, first, it is desirable to examine whether these so called 'useless' cattle are really useless. It has to be recognized that, in the general field of agriculture 70% of farmers are made up by small and marginal farmers, landless labourers and they have access to a total of 30% of the land in this country. By force of circumstances 67% of these people own livestock. The general pattern of this activity is that these livestock units are distributed in twos or threes, which are financially non-viable with their traditional ways. These are the persons who get rid of their cattle. The day these people come to understand the economic viability of their cattle - of even dry cows and old oxen -the problem of stray cattle will start vanishing.

XII+2.13.2 Strategies for dealing with stray and 'so-called' useless or dry cattle:-

In this background, the strategies to tackle the problem of Stray Cattle have to be implemented at all levels and as a combined effort of various agencies. The following strategies are recommended for the purpose of establishment of Village gosadans. Village Gosadans should be established in the manner proposed below:

1) Each village should have one Gosadan to take care of the stray cattle of the area. Also the seasonal left-outs can be accommodated therein.

2) The Gosadan has to be managed by the village community, with full involvement of the Village Panchayat. A 'Gosadan Committee' can be constituted in the meeting of Gram Sabha comprising persons from all walks of life. Technical persons such as from agriculture and veterinary side should invariably be co-opted on this committee. The State governments are required to make provisions regarding constitution of 'Gosadan Committees' in their respective Panchayati Raj Acts.

3) As per availability of land be attached to the Gosadan. Gram Panchayat can do it as in most of the States; grazing lands (gochar bhumi) are within their jurisdiction. This land can

serve not only as the grazing ground but also as the source of green and dry fodder to some extent.

4) The problem of unauthorised occupations on the 'Charagah' or Gochar lands can be taken care of by 'fast track courts.'

5) In the villages where 'charagah' land is not sufficient, the wastelands can be converted for development of grass and fodder trees. Waste lands could be converted into fertile lands by various convergent natural nutrients prepared by 'gobar-gomutra- chhach, Amritpani' etc.

6) While arrangement of such land should be the responsibility of the revenue agencies, maintenance part may be entrusted to the Village Panchayat. Some sort of mechanism should be developed for linking the maintenance of Charagah land with the grants-in-aid given to a particular Gram Panchayat.

7) As the Gosadan will take care of the stray cattle, which otherwise could have caused damages to the standing crops of the village farmers, it should be mandatory for every farmer to donate one trolley of fodder and one bag of cereals to the Gosadan at the crop harvesting time. Of course, it can be in proportion to the agricultural land area possessed by the village farmers.

8) The Go-sadan, so established, can be developed into breeding centre of good local indigenous breeds. It can also develop good breed bulls, meant for service of the whole village.

9) To augment its resources, the go-sadan can prepare bio-fertilizers and bio-pesticides, which can be sold to local farmers at very concessional rates. Thus, there would not be any problem of marketing for the products of Gosadan.

10) Go-sadan can have a bio-gas plant of a suitable size to take care of its energy requirements for fuel, light and water pumping. Agencies like K.V.I.C., DRDAS and Non-Conventional Energy Development agencies can assist these Go-sadans in establishing Bio-gas plants.

11) No cash subsidy should be given to these Go-sadans. Instead H.R.D. training and provision of infrastructure should be there. In fact, it should be an independent enterprise. Let the village own it after having a considered view on the importance of the Gosadan in their village economy.

12) In the proposals prepared at Gram Panchayat and Block level, plans for organisation of Gosadans included in the district plans, should be taken up on priority.

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CHAPTER XII+3

ESTABLISHMENT AND LABOUR

XII+3.1 ESTABLISHMENT

The list of existing Ranges, Blocks and Beats is given in **Appendix-XII**. The position of sanctioned staff and existing staff has been given in Chapter-VI of Part-I is satisfactory and need no further division. The beats, Blocks and Ranges are small and administratively convenient. So no further reorganization of beats, Blocks and Ranges is suggested. The range officers have per force to devote more time in the office at the cost of field works. The office work at Range level increased considerably. Therefore all Range officers should be provided Range Clerk. Services of all the permanent Forest Workers should be utilized in nurseries and for miscellaneous forest protection and regeneration operations.

XII+3.2 LABOUR

The position of labour supply has been discussed in Chapter-VI of Part – I. All the exploitation and harvesting works are being done by H.P.S.F.D.C.and labour supply mates of Forest Corporation, for carry out exploitation of Forests have to import labour from Mandi and Kangra Districts. The present rate of unskilled daily wage labour is Rs. 150 per day which is likely to be revised from time to time.

Many developmental schemes are in operation in the tract under various departments, thus there is some shortage of labour.

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CHAPTER XII+4

CONTROL AND RECORDS

XII+4.1 SYSTEM OF CONTROL

It has been unfortunate that some of the prescription of working plan under revision were not given a serious trial while others were completely ignored. Obviously, the objects of management as set out could not be fully realized. Some of the forest journals do not contain complete information about various operation carried out in the past while some entries are not accurately recorded. Control should be considered as an integral part of plan and record of all operation must be maintained.

XII+4.2 CONTROL FORMS

To exercise proper check and control on the prescription and suggestion made in this working plan, control forms will be prepared every year by D.F.O who will submit before 30th April every year the control forms 2(a), 2(b), 4 and C together with the deviation statement as laid down in chapter X of National Working Plan code, 2004.

XII+4.3 COMPARTMENT HISTORY FILES

Compartment wise compartment history files have been prepared in duplicate for all RFs, DPFs and UPFs on standard pattern laid down in chapter chapter-IX of National Working Plan code, 2004. The summary of the works carried out and results there of during the preceding working plans have been recorded in the history files. Inspecting officers will invariably write inspection notes on the standard proformas prescribed in this chapter, copies of which will be placed in the concerned compartment history files.

It is prescribed that one set of history files shall remain in the office of D.F.O and second set in the office of concerned R.O. It will be responsibility of D.F.O and R.O to maintain and post each and every compartment history file in his own office.

XII+4.4 DIVISIONAL NOTE BOOK

This is mainly a record for use DFO which shows auction results, estimation of out turn of coupes, result of experiments carried out if any , records of annual seeding of important species, injuries to crop, divisional statistics notes on the trial of exotics and their

performance and any other important information regarding divisional works. This record can be very useful and handy at the time of working plan revision.

XII+4.5 FIRE RECORDS

A complete record of fires will be maintained in the compartment history files both in the Range office and Divisional office. Maps of forests burnt showing extent of area burnt will be filled in the compartment history files concerned along with relevant date such as place from which fire originated, nature of fire, damage caused by fire, duration of fire and how it was fought and brought under control.

XII+4.6 GUARD BOOK

Guard book and forest guard book Manual is an important and handy record of beat statistics and activities like details of forests, forest boundaries included cultivation encroachments record of right/ concession sowing/ plantation, nurseries seed collection, beat maps showing forests, boundary forest roads and paths etc. Rights and concessions allowed, R.Os standing instruction and market rates etc. Every Forest Guard should maintain it for his beat and D.F.O will check these manuals during field tours and ensure that these are properly maintained.

XII+4.7 REGISTER OF BOOKS AND MAPS

Register of books and maps will be maintained at Range and Divisional level and kept upto date. All roads, bridle paths, inspection paths and buildings constructed during the year should be shown in maps in April every year.

XII+4.8 REGISTER OF R.Fs AND D.P.Fs

Register of Reserved and Demarcated Forests will be properly maintained and all changes in the area or boundaries recorded every year giving reference of Government orders and notifications.

XII+4.9 REGISTER OF ROADS AND BUILDINGS

Register of roads and buildings will be maintained at Range and Divisional level and kept upto date. All roads and buildings constructed during the year should be entered in April every year alongwith cost of construction.

XII+4.10 NURSERY JOURNALS

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.

XII+4.11 PLANTATION JOURNALS

Plantation journals will be maintained for all the plantation areas according standing instructions on the subject and contained the following informations:-

(i) Location, legal status, boundaries, configurations, aspect, slope, rock, geology and soil, drainage and deapth of soil.

(ii) Soil suitability and treatment map.

(iii) Map showing prominent natural features.

(iv) A statement showing area planted and cost of planting item wise for each year.

(v) A critical note on success or failure of plantation and corrective steps if any required to be taken for the success of plantation.

XII+4.12 RESEARCH JOURNAL

The research journals should be maintained in the division and relevant research activities conducted/undertaken should be entered.

XII+4.13 DIVISIONAL FCA CASES REGISTER

This will contain data regarding diversion of forest land allowed and compensatory afforestation details and trees permitted by GOI to be felled in the area concerned and CAT Plan details, if there is any.

XII+4.14 INSPECTIONS

Performa as for recording field inspection of important categories of works have been devised as under which only be used by officers to report field inspection.

I) Performa for reporting field inspections

Plantations (outside working plan area)

(A) Basic information

i) Date of inspections
ii) Name of plantation
iii) Year of planting
iv) Exact location
v) Approach indicating on foot journey
vi) Nearest rest house and staff quarter
vii) Distance from nearest habitation

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I) Performa for reporting field inspections

Plantations (outside working plan area)

(A) Basic information

i) Date of inspections
ii) Name of plantation
iii) Year of planting
iv) Exact location
v) Approach indicating on foot journey
vi) Nearest rest house and staff quarter
vii) Distance from nearest habitation

viii) Altitude: General Aspect
ix) Boundaries: N S E W
x) Scheme under which planted
xi) Closure notification No.
xii) Detailed description of original vegetation

(B) *Works done*

i) Plants planted
ii) Spacing followed
iii) Vegetative works done
iv) Engineering works done
v) Sowing done
vi) Fencing done & fencing material used
vii) Inspection path made
viii) Misc. works done

(C) *Detailed observations:*

i) Reg. choice of species
ii) Reg. growth of plants
iii) Reg. survival percentage
iv) Reg. Spacing
v) Regarding natural regeneration
vi) Regarding advance growth
vii) Regarding grasses and bushed
viii) Regarding inspection paths
ix) Regarding fencing
x) Regarding biotic interference
xi) Regarding climber cutting, weeding, cleaning pruning
xii) Regarding thinning
xiii) Regarding vegetative works
xiv) Regarding engineering works
xv) Regarding misc. works.

D *Directions*

III Performa for reporting field inspections

Plantations (Inside working plan area)

A. Basic information

i) Date of inspection
ii) Name of plantation
iii) Prescribed year of planting
iv) Year of planting
v) Exact location
vi) Approach indicating of foot journey

vii) Nearest rest house and staff quarter
viii) Distance from nearest habitation
ix) Altitude
x) General aspect
xi) Boundaries: N S E W
xii) Scheme under which planted treated:-
xiii) Closure notification No.:
xiv) Working Circle Series:
xv) Series
xvi) PB:
xvii) Working plan para:
xviii) Prescribed treatment:
xix) Detailed description of original vegetation:

B. *Works done*

i) Plants planted:
ii) Spacing followed:
iii) Vegetative works done:
iv) Engineering work done:
v) Sowing done
vi) Fencing done and material used
vii) Inspection path made
viii) Misc. work done.

C. *Detailed observations*

i) Reg. Whether treatment carried-out as per prescription:
ii) Reg. choice of species
iii) Reg. growth of plants
iv) Reg. Survival
v) Reg. spacing
vi) Reg. Natural re-generation.
vii) Reg. advance growth
viii) Reg. grasses and bushes
ix) Reg. inspection path
x) Reg. fencing
xi) Reg. biotic interference
xii) Reg. climber cutting, weeding, cleaning and pruning
xiii) Reg. thinning
xiv) Reg. vegetative works.
xv) Reg. engineering works
xvi) Reg. misc. works

D *Directions:-*

III Performa for reporting field inspections

PBI AREA

A *Basic information:-*

i) Date of inspection
ii) Working Circle
iii) Series:
iv) Forest
v) Compartment
vi) Area (ha)
vii) Altitude
viii) General aspect:
ix) Boundaries:- N: S: E: W:
x) Exact location:
xi) Approach indicating on foot journey:
xii) Actual year of treatment:
xiii) Detailed description of Crop:

B. *Prescribed treatment*

i) Para under which treatment prescribed:
ii) Prescribed year of treatment:
iii) Details of prescribed treatment

C. *Treatment carried–out*

i) Marking done
ii) Felling done:
i) Debris disposal done:
ii) Closure done:
iii) Planting done:
iv) Spacing followed:
v) Fencing done and material uses:
vi) Vegetative works done:
vii) Engineering works done:
viii) Sowings done:
ix) Inspection path made:
x) Misc. works done:

D. *Detailed observations:-*

i) Whether treatment carried out as per prescription:
ii) Reg. markings:
iii) Reg. Fellings:
iv) Reg. debris disposal:
v) Reg. bush cuttings:
vi) Reg. plants growth:
vii) Reg. sowings:
viii) Reg. spacing of planning and sowing:
ix) Reg. survival percentage:

x) Reg. natural re-generation:
xi) Reg. inspection path:
xii) Reg. fencing and material used:
xiii) Reg. biotic interference:
xiv) Reg. vegetative works:
xv) Reg. engineering works:
xvi) Reg. misc. works:

E. Directions

IV PROFORMA FOR REPORTING FIELD INSPECTIONS

PB IV Areas

A. Basic information:-

i) Date of inspection
ii) Working Circle:
iii) Series:
iv) Forest:
v) Compartment:
vi) Area (ha.)
vii) General aspect:
viii) Boundaries: N S E W
ix) Exact Location:
x) Approach indication on foot journey:
xi) Scheme under which treated:
xii) Actual year of treatment:
xiii) Detailed description of crop:

B. Prescribed treatment

i) Para under which treatment prescribed:
ii) Prescribed year of treatment:
iii) Details of prescribed treatment:

C. Treatment carried out:-

i) Felling done:
ii) Thinning done:

D. Detailed observations:

i) Reg. fellings done:
ii) Reg. thinning done:
iii) Reg. misc. observations

E. Directions

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CHAPTER XII+5

SUMMARY OF PRESCRIPTIONS

XII+5.1 SUMMARY OF PRESCRIPTIONS AND SUGGESTIONS

The following is the summary of prescriptions and suggestions.

HEADINGS	PRESCRIPTIONS	PARAGRAPH OF THE PLAN
CHIL WORKING CIRCLE		
Silvicultural System	Indian Irregular shelterwood system	2.8
Rotation & Exploitable diameter	120 years rotation and exploitable diameter of 60 cm d.b.h has been fixed.	2.9 & 2.10
Regeneration Period	30 years	2.11
Division into Periodic blocks	Four periodic blocks have been formed	2.13
Precribed annual yield	The prescribed annual yield in cum is as under:- **Period Block** — **Yield in cum** PB-I — 3000 — 2.14.1 PB-II — -- — 2.14.3 PB-III — 750 — 2.14.3 PB-IV — 1500 — 2.14.2	
Sequence of felling in PB- I & PB-IV areas	Felling programme has been laid down	2.15
Method of executing felling in PB-I areas	General priniciples laid down	2.16.1
Method of executing felling in PB- IV areas	General priniciples laid down	2.16.3
Treatment of PB-II areas	No commercial fellings precribed	2.16.2
Treatment of PB-III areas	No commercial fellings precribed	2.16.2
Subsidary Silviculture operations in PB-I	Works to be carried out to general principles given	2.17
DEODAR-KAIL WORKING CIRCLE		
Silvicultural System	Indian Irregular shelterwood system	3.8
Rotation & Exploitable diameter	120 years rotation and exploitable diameter of 60 cm d.b.h has been fixed.	3.9 & 3.10
Regeneration Period	30 years	3.11
Division into Periodic blocks	Four periodic blocks have been formed	3.13
Calculation of yield	Yield has been calculated from PB-I and	3.14

	PB-IV	
Precribed annual yield	The prescribed annual yield in cum is as under:- **Period Block** **Yield in cum** PB-I 3000 PB-II --- PB-III ---- PB-IV 400	3.14.1 3.14.3 3.14.3 3.14.2
Control of yield	Control of yield by volume, all diameter classes to count towards yield. Annual deviation +/- 20% and for blocks of five years 10%	3.15
Sequence of felling in PB- I & PB-IV areas	Felling programme has been laid down	3.16
Method of executing felling in PB-I areas	General priniciples laid down	3.17.1
Method of executing felling in PB- IV areas	Overwood removal and D grade thinnings	3.17.3
Treatment of PB-II areas	No green commercial fellings precribed	3.17.2
Treatment of PB-III areas	No green commercial fellings precribed	3.17.2
Subsidary Silviculture operations in PB-I	Works to be carried out to general principles given	3.18
Artificial regeneration in PB-I	This is to be carried out supplement natural regeneration after about five years	3.19
Regeneration Survey	Every third year in felled PB-I areas.	3.20.6
FIR-SPRUCE WORKING CIRCLE		
Silvicultural System	Indian Irregular shelterwood system in which regeneration will be mainly with artificial regeneration	4.8
Rotation & Exploitable diameter	120 years rotation and exploitable diameter of 60 cm d.b.h has been fixed.	4.9 & 4.10
Regeneration Period	30 years	4.11
Division into Periodic blocks	Four periodic blocks have been formed	4.13
Calculation of yield	Yield has been calculated from PB-I and PB-IV	4.14
Precribed annual yield	The prescribed annual yield in cum is as under:- **Period Block** **Yield in cum** PB-I 25 PB-U 1400	4.15.1 4.15.2
Control of yield	Control of yield by volume, all diameter classes to count towards yield. Annual deviation +/- 20% and for blocks of five	4.15

	years 10%	
Sequence of felling in PB I & PBIV areas	Felling programme has been laid down	4.16
Method of executing felling in PB-I areas	General priniciples laid down	4.17.1
Method of executing felling in PB- IV areas	Overwood removal and D grade thinnings	4.17.3
Treatment of PB-II areas	No green commercial fellings precribed	4.17.2
Treatment of PB-III areas	No green commercial fellings precribed	4.17.2
Subsidary Silviculture operations in PB-I	Works to be carried out to general principles given	4.18
Artificial regeneration in PB-I	This is to be carried out supplement natural regeneration after about five years	4.19
Regeneration Survey	Once every five year in felled PB-I areas.	4.20
Special treatment to PB-IV	Plantation programme	
CONSERVATION CUM REHABILITATION WORKING CIRCLE		
Felling Series	No felling series	5.5
Method of treatment	Measure to improve growing stock discussed	5.7
Method of executing fellings	Only restricted removals of dead, dying, diseased trees	5.8
Lopping	Restriced as per rules	5.8.1
Boundary Pillars	Annual programme for repair of B.Ps prescribed.	5.8.2
PLANTATION WORKING CIRCLE		
Silvicultural System	No silviculture system prescribed. Plantation will be raised by artificial planting and sowing	6.8
Choice of species	Species best suited for the site conditions and climate be planted	6.10
Sequence of planting	Planting programme laid down	6.12
Land Bank	Land bank areas prescribed	6.16
PASTURE IMPROVEMENT (OVERLAPPING) WORKING CIRCLE		
Regulation of Grazing	Incedence of grazing, carrying capacity, grazing fee, issue of permits etc. discussed	7.5
Introduction of Improved grasses and seed production	Improved grasses and seed production discussed	7.6
JFM (OVERLAPPING) WORKING CIRCLE		
Responsibilities of VFDS	Responsibilities of VFDS discussed.	8.8
Responsibilities of	Responsibilities of Forest Department	8.9

Forest Department	discussed.	
WILDLIFE MANAGEMENT (OVERLAPPING) WORKING CIRCLE		
Human- Wildlife Conflict	Human- Wildlife Conflict resolution discussed	9.13
NTFP (OVERLAPPING) WORKING CIRCLE		
Medicinial plants of this Division	List of Medicinial Plants discussed	10.5.1
Calculation of yield	No yield is prescribed	10.6
Subsidary Silviculture operations	Not prescribed	10.7
Propagation Techniques of Medicinial Plants	Method of Propagation of Medicinial Plants discussed	10.8.1
FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE		
Fire		11.1
SOIL & WATER CONSERVATION (OVERLAPPING) WORKING CIRCLE		
Area distribution	Erosion intensity wise classification	12.3
Treatment	Improvement in vegetation cover, vegetal brakes, control of erosion along road discussed.	12.6
GENERAL FINANCIAL FORECAST AND FINANCIAL PLAN OF OPERATION		
Expected Revenue	Estimated renenue from Timber, Resin and other miscellaneous sources	XII+1.2
Future Expenditure	Projection based on the past expenditure	XII.1.3
Cost of working plan	Actual cost for the preparation of working plan	XII+1.4
MISCELLANEOUS REGULATIONS		
Petty fellings	Defined	XII+2.1
Deviations	Regulations made	XII+2.2
Demarcation of Forests	Demarcation of DPFs and UPFs needs finished within five years of currency of plan	XII+2.3
Boundary register	To be maintained and brought upto date	XII+2.4
Maps	To be maintained and posted upto date	XII+2.5
Rain Gauges	Station for new rain gauges	XII+2.6
Fire protection	Effective steps suggested for better prevention	XII+2.7
Encroacments	To be traced out and ejectments to be made	XII+2.8
Research plots	Research plot suggested	XII+2.9
Roads, Paths & Buildings	Maintenance of existing roads and buildings and construction of new buildings prescribed	XII+2.10
Ban on green fellings	Ban on green fellings	XII+2.11
Mid- term review of the W.P	Mid- term review suggested	XII+2.12
Go-sadans	Strategies for dealing with Stray cattle	XII+2..13

ESTABLISHMENT AND LABOUR		
Establishment	Necessity to increase of the staff is suggested due to work load	XII+3.1
Labour	Permanent labour gangs for nurseries advised	XII+3.2
CONTROL AND RECORDS		
System of control	Record of all operation be maintained	XII+4.1
Control forms	Control form for fellings,subsidiary operations and regeneration and plantation works,as well as deviation statements prescribed	XII+4.2
Compartment History files	Proper maintenance and upto date posting prescribed	XII+4.3
Divisional note book	To be maintained as per order of C.F	XII+4.4
Fire records	To be maintained in Ranges and Divisional office	XII+4.5
Guard book	To be written up and provided to each beat guard	XII+4.6
Register of books and maps	To be maintained in Ranges and Divisional office	XII+4.7
Register of R.Fs and D.P.Fs	To be maintained in Ranges and Divisional office	XII+4.8
Register of roads and Buildings	To be maintained in Ranges and Divisional office	XII+4.9
Nursery Journals	To be maintained in Ranges and Divisional office	XII+4.10
Plantation Journals	To be maintained according to standing orders	XII+4.11
Research Journals	To be maintained in Ranges and Divisional office	XII+4.12
Divisinal FCA cases register	To be maintained in Ranges and Divisional office	XII+4.13
Inspections	Performa for inspection prescribed	XII+4.14

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PHOTOGRAPHS OF FLORA/LANDSCAPE OF DALHOUSIE FOREST DIVISION

भारत सरकार
पर्यावरण एवं वन मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FOREST

जहां है हरियाली।
वहां है खुशहाली।।

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NORTHERN REGIONAL OFFICE
BAYS NO.24-25, SECTOR 31-A
DAKSHIN MARG, CHANDIGARH-160030

F. No.13-7(13)97-ROC

Dated : Wednesday, November 13, 2013

To

The Principal Secretary (Forests),
Government of Himachal Pradesh,
Civil Secretariat, Shimla,
Himachal Pradesh.

Sub.: Approval to the Working Plan of Dalhousie Forest Division for a period of 15 years w.e.f. 1st April, 2013 to 31st March, 2028 – *regarding*

Ref: Letter No. WP/Mandi/1697 dated 25th October of Addl. PCCF (Working Plan & Settlement), Mandi, HP.

Sir,

The Working Plan for the forests of **Dalhousie Forest Division** (2013-14 to 2027-28) has been examined in accordance with the provisions of the Forest (Conservation) Act, 1980 as amended till date, National Working Plan Code, guidelines issued by Government of India, Ministry of Environment and Forests, New Delhi from time to time, National Forest Policy 1988 as well as orders dated 12th December 1996 of Hon'ble Supreme Court of India in PIL WP(C) 202 of 1995 read with WP(C) 171 of 1996 and in other IA's under this WP(C).

2. After careful consideration of the draft Working Plan, approval of the Central Government is hereby conveyed under the Forest (Conservation) Act, 1980 subject to observance of the following conditions :-

a) The approval shall be effective for a period of 15 years w.e.f. April 01, 2013 to March 31, 2028.

b) All the provisions of the Forest (Conservation) Act, 1980 and various Rules & Guidelines issued under the Act and the latest Hon'ble Supreme Court's order in this respect shall be strictly enforced.

c) Yield obtained from dead, dry & salvaged timber will from part of prescribed yield and in case prescribed yield has been achieved from dead & dry volume, no further felling will be carried out. Yield from dead, dry & salvaged timber must not exceed the prescribed yield in the working plan ;

d) All the fellings must commensurate with regeneration and no fellings would be permitted unless funds for regeneration are available. In this regard, orders of Hon'ble Supreme Court of India will be strictly compiled with;

e) Intensive protection measures against fire, biotic interference and encroachment in forests shall be taken up;

f) Al the prescriptions prescribed in the working plan regarding plantation, protection and development of the forest area will be strictly followed and any change in the prescriptions

(S.B.Islam)
PCCF (Wild Life), Shimla

(R.K. GUPTA)
Principal Chief Conservator of Forests

(TEJINDER SINGH)
Addl P.C.C.F Working Plan & Settlement

(Dr. SUNIL KUMAR)
Deputy Commissioner
Chamba

(A.R.M.REDDY)
Chief Conservator of Forest, Chamba
Distt. Chamba

(ANJANI KUMAR)
Working Plan Officer
cum
Divisional Forest Officer,
Dalhousie

will be treated as deviation for which prior approval of competent authority will be obtained;

g) Sufficient budgetary allocations be ensured for timely implementation of various prescriptions regarding protection, regeneration and development of the forests;

h) Mid-term review of the Working Plan will be taken up on expiry of 5th year of the plan period i.e. in the year 2018-19; and

i) The work on revision of Working Plan shall be taken up well in advance so that the revised plan is ready before expiry of Working Plan.

3. *The following suggestions/observations are also made:*

(i) Record of the plantations raised during the year 2010-11, 2011-12 and 2012-13 shall also be incorporated in the final document;

(ii) A few photographs of the flora/landscape of the Division taken at a few designated sites at regular intervals shall also be incorporated and sufficient blank papers incorporated for inserting photographs at regular intervals to assesses changes taking place in landscape;

(iii) In Volume II below the Appendix number, along with para number of the text at which it has been referred to, the page number can also be mentioned for still easier location of reference;

(iv) Assigning continuous page numbers to Volume II document after Volume I can also be considered;

(v) Care should be taken to accordingly change the page numbers at all places when the document id finally printed (on both sides of paper) and **hard bound;**

(vi) A copy of MoEF's approval letter should also be incorporated in the final document;

(vii) A copy of the final printed version of this document after effecting all necessary modifications along with soft copy (in the form of CD inserted inside the back cover) may be forwarded to this office for reference and record.

4. The Central Government reserves the right to review/modify or withdraw this approval at any point of time depending upon the management needs and any other guidelines of the Ministry of Environment and Forests, Government of India or Hon'ble Supreme Court of India.

Yours faithfully,

(Ishwar Singh)
Conservator of Forests (Central)

Copy to:

1. The Principal Chief Conservator of Forests, Govt. of Himachal Pradesh, Forest Department, Talland, Shimla.
2. The Chief Conservator of Forests, Working Plan and Settlement, Government of Himachal Pradesh, Forest Department, Purani Mandi, District Mandi, HP.
3. The Chief Conservator of Forests, Working Plan and Settlement, Government of Himachal Pradesh, Forest Department, Mist Chamber, Khalini, Shimla, HP.
4. The Divisional Forest Officer, Dalhousie Forest Division, Dalhousie, HP.
5. Guard File.

H. P. Forest Department Printing Press, Kalaghat, Solan

2026-27	Dalhousie	Ahla	--	42.9	PBU	salvage marking and improvement felling
	Bakloh	Dhamgram	--	174	PBU	salvage marking and improvement felling
		Dhuri sandhar	--	271.5	PBU	salvage marking and improvement felling
2027-28	Bakloh	Reyali Rakhed	--	369.5	PBU	salvage marking and improvement felling
	Chowari	Tarsul	--	87	PBU	salvage marking and improvement felling
		Bharua	I	32	PBI	Salvage marking and regeneration fellings

4.18 METHOD OF EXECUTING THE FELLING

The marking shall be carried out by the D.F.O or A.C.F and invariably checked by the C.F.The technique of carrying out regeneration marking is described in Punjab Forest leaflet No. 2. In addition the following broad guidelines are laid down for the marking officer:-

4.18.1 PB-I Areas:-

i) Mother trees should be uniformly distributed all over the area and tall, well grown healthly trees with superior poles and well developed crown should be selected as mother trees.These should be preferably of class II A and II B.

ii) As far as practicable, mother trees selected should be of Fir and Spruce.When these are not available then economically important B/L species may be selected as mother trees.The number of mother trees per ha. should be 50-60 in case of Fir and 25-30 in case of Spruce.

iii) Vigorously growing samplings and poles upto 30 cm. d.b.h compact groups with area exceeding 0.1 ha. and density exceeding 0.5 shall be retained as advance growth.

iv) No marking shall be done on slopes exceeding 40 %.

v) On broken and precipitous ground the marking shall be of selection type.Only those trees shall be removed the removal of which will not result in creating a permanent gap in the canopy. Further trees/poles standing on steep slopes shall not be marked.All natural regeneration shall be retained and tended.

vi) Wherever B/L trees are found creating excess overhead shade to Fir and Spruce, these should be marked. However no attempt should be made to introduce Fir and Spruce in areas suitable for B.L species.

vii) Trees standing over established regeneration should be lopped before felling.

(b) Management of other Invasive Alien Species (*Parthenium, Ageratum, Eupatorium*) The spread of these three species is largely restricted to the open lands including forest fringes, degraded pastures and areas having soils that are recently exposed due to landslips, erosion, soil cutting or muck dumping. The reconnaissance has shown that the there is a large overlap of areas under different invasive alien species with these three noxious weeds also occurring, though each of these occupying different niches, in most of the forests that are infested with *Lantana*.

The basic approach to rehabilitate areas infested with these three invasive species will be as under:

- **Approach-I (areas where infestation overlaps with *Lantana*):** Such situation occurs under Chil, miscellaneous broad-leaved and scrub forests. In such areas removal of these three exotic weeds will be taken up simultaneously with removal of *Lantana* and the treated areas rehabilitated with fast growing native species/ grasses.
- **Approach-II (areas where there is no or little *Lantana* infestation):** Such situation usually comes across in pastures, degraded forests and recently exposed sites. In such areas, manual uprooting of these exotic weeds just on the onset of monsoon, when the soil is moist, will be employed.

5.9.4 After care of treated areas:- Cutting the bushes and then uprooting the entire root system from the soil. The operation can be taken up during January-February when after rains the soil is wet to facilitate up-rooting. While taking out the root system, care should be taken to pull out all the roots and rootlets for effective control. This operation is to be repeated in 2nd year again as about 25-30 per cent infestation may occur again. During second year, frequent chopping up of regenerated shoots should be done to exhaust the food reserves of the root system. In third year, three may be only few shoots (not more than 10 per cent of the total population) of Lantana appearing here and there and can be uprooted easily.

In this method of control, another important aspect is that just after uprooting operation is completed, the areas should be planted with tall and fast growing species.

5.10 MISCELLANEOUS REGULATIONS

5.10.1 Chemically Lantana can be controlled by following steps:

i. Cutting of bushes 2"-3" above the ground level. The cutting is preferred in the month of September for best results though it can be done earlier also.