EXECUTIVE SUMMARY

This Working Plan is the "7th revised Working Plan" of Seraj Forest Division. This Working Plan has included the tract of present Seraj Forest Division as covered in the Working Plan by Shri R.P. Jaiswal, PFS for the period 1986-87 to 2001-02 except the area transferred to GHNP which is presently being managed and covered under Management Plan of GHNP. This working plan comprises of Banjar Civil Sub Division and part of Kullu Civil Sub Division of District Kullu HP. The Forest area of this division covered under present Working Plan is 27044.80 Ha. comprising 3 territorial ranges Banjar, Tirthan and Sainj.

1894-97 First Working Plan by C.P. Fisher

1919-20 Second working plan by G.C. Trevor

1934 Third working plan by W.H.C. Samler

1947-48 Fourth working plan by K.L. Aggarwal

1961-72 Fifth working plan by D.P. Kapoor

1986-87 Sixth working plan by R.P. Jaiswal

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 (overlapping) Working Circle
(ii) Joint Forest Management(overlapping) Working Circle
(iii) Wildlife Management (overlapping) Working Circle
(iv) Protection (overlapping) Working Circle

This working plan has been prepared by the territorial staff of the Forest Division Seraj 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 100% enumeration in PB-I and PB-IV and 20% sample enumeration is done in PB-II and PB-III. Enumeration of sample compartments has been carried out as per traditional 10 cm diameter class basis. The Annual Yield for each working circle for major species is calculated by different formulas and is prescribed on safer side in Deodar Kail Working Circle and Fir/Spruce Working Circle. The abstract of further prescriptions is as under:-

Name of W.C.	Silviculture System	Rotation Period	Exploitable Diameter	Regeneration Period	Annual Yield Prescribed in cum.	
					PB-I	PB-IV
Deodar/ Kail	Indian Irregular Shelter Wood	120 years	60 cms at d.b.h	30 years	8500	1800
Fir/Spruce	Indian Irregular Shelter Wood	120 years	60 cms at d.b.h	30 years	12400	27100

RESEARCH PLOTS

There is need to establish some research/sample plots in Deodar forests with the main objective to study the growth in site quality I and poor site quality. These are proposed as under:-

S.N	Name of Range	Name of Forest	Site Quality
1	Banjar	D.P.F. 16 Baloo Cll	I (One)
2	Banjar	D.P.F. 39 Chaliyala Dhar	Poor

In addition to it and extensive study has been conducted by Dr. Rinki Sarkar in Banjar and assessed decadal changes in socio-economic attributes of local population and their dependants on forest resources as well as the condition of forest. She has published a book in which she has explained in detail.

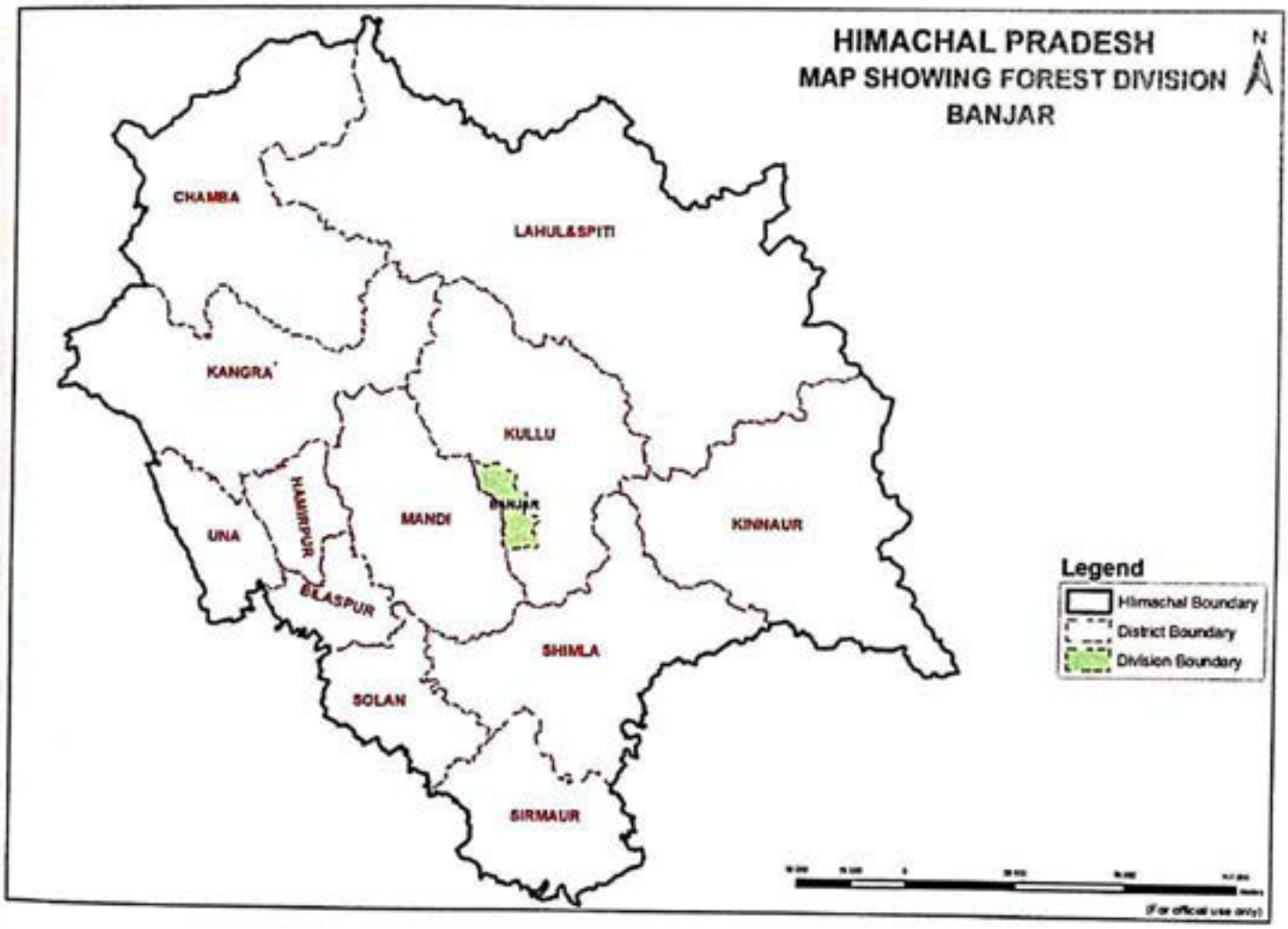
BUILDINGS The following buildings are proposed to be constructed. D.F.O may modify this according to administrative needs:-

S.No	Range	Name of Building	Location	Number
1	Banjar	Range Office	Banjar	1
		Fgd Hut	Chaihani	1
2	Tirthan	Fgd Hut	Plach	1
		Fgd. Hut	Chaunon	1
3	Sainj	Fgd Hut	Kanaun	1

****


INDIA
JAMMU & KASHMIR
HIMACHAL PRADESH
HIMACHAL PRADESH
PUNJAB
UTTRANCHAL
ARUNACHAL PRADESH
HARYANA
DELHI
SIKKIM
UTTAR PRADESH
RAJASTHAN
ASSAM
NAGALAND
BIHAR
MEGHALAYA
MANIPUR
TRIPURA
GUJARAT
JHARKHAND
MIZORAM
W.BENGAL
MADHYA PRADESH
CHHATISGARH
MAHARASHTRA
ORISSA
ANDHRA PRADESH
GOA
KARNATAKA
TAMIL NADU
KERALA


HIMACHAL PRADESH
J&K
CHINA
Chamba
Keylong
Lahul & Spiti
Dharmasala
Kangra
Kulu
Hamirpur
Una
Mandi
Kinnaur
Kalpa
Bilaspur
Shimla
Himachal Pradesh
Solan
Kasumpti
INDIA
UTTARANCHAL
Sirmaur
PUNJAB
Nahan


HIMACHAL PRADESH
MAP SHOWING FOREST DIVISION
BANJAR
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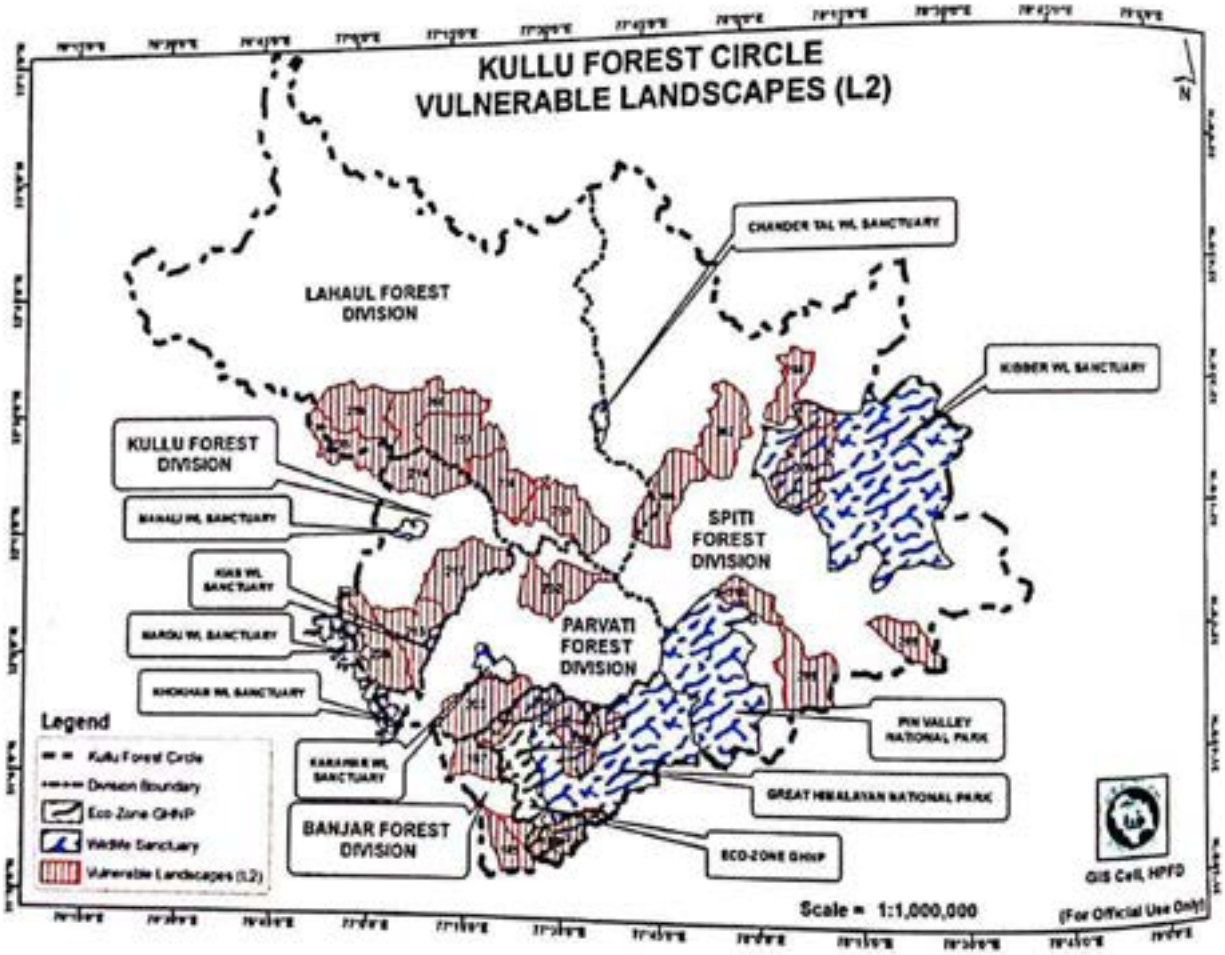
CHAMBA
LAHUL&SPITI
KANGRA
KULLU
BANJAR
MANDI
HAMIRPUR
UNA
BILASPUR
KINNAUR
SHIMLA
SOLAN
SIRMAUR
Legend
Himachal Boundary
District Boundary
Division Boundary
(For official use only)


KULLU FOREST CIRCLE
VULNERABLE LANDSCAPES (L2)
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KIBBER WL SANCTUARY
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SPITI FOREST DIVISION
PARVATI FOREST DIVISION
BANJAR FOREST DIVISION
PIN VALLEY NATIONAL PARK
GREAT HIMALAYAN NATIONAL PARK
ECO-ZONE GHNP
Legend
Kullu Forest Circle
Division Boundary
Eco Zone GHNP
Wildlife Sanctuary
Vulnerable Landscapes (L2)
GIS Cell, HPFD
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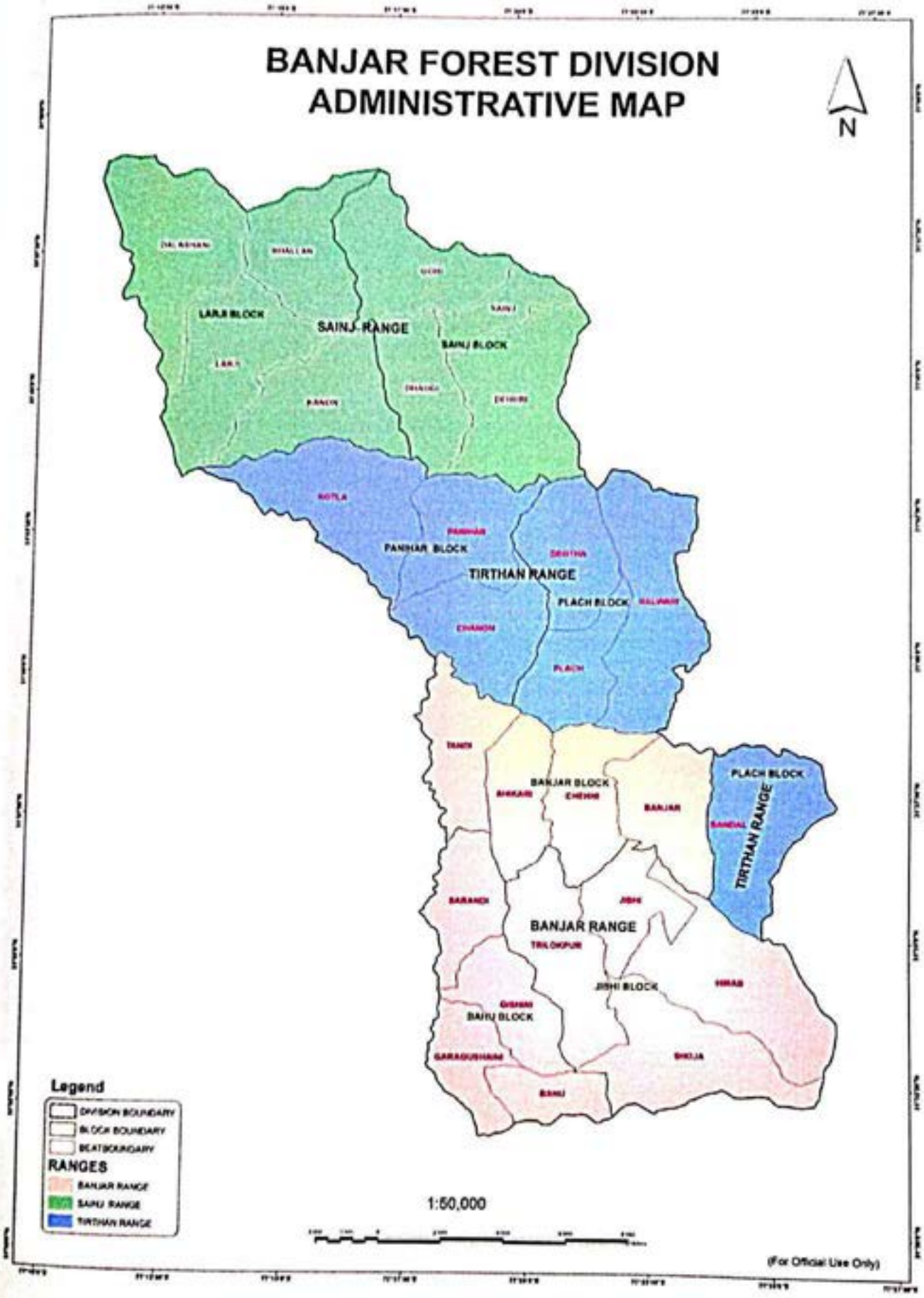
Scale = 1:1,000,000


BANJAR FOREST DIVISION
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SAINJ BLOCK
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TIRTHAN RANGE
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SUMMARY OF FACTS

ON WHICH PROPOSALS ARE BASED

----- Seraj Forest Division is covered by 1:50,000 scale survey sheet nos 53E/1, 53 E/2, 53 E/6, 53 E/6, 53 E/9, 53 E/10, 53 E/13 and 53 E/14, major portion lies in 53 E/5 and 53 E/6.	1.1
----- Minimum elevation from sea level is 820 meters near Larji and maximum elevation 6127 meters on Rakti Dhar	1. 3
--Main rock formations are, Larji formation, Banjar formation, and Jotog formations	1.4
---- Majority of soils of the tract are podsols	1.4
---- About 50,000 m3 of fire wood is consumed by people in Seraj Division.	1.13
---- There are 16 gujjars in the Forest Division permitted to graze Buffaloes.	1.13
---- There are numerous religious places	1.25
-----National Forest Policy envisages 2/3 of land in the hills under forest cover and the H.P state Forest Policy envisages 50% area to be brought under forest by 2000 AD.	1.1
-----Area under plan is 27044.80 ha.	1.5
---- - Period of plan is 15 years from 2013-14 to 2027-28	1.9

DEODAR AND KAIL WORKING CIRCLE

----Area under Deodar and Kail Working Circle is: -

Name of the Range	Area under Deodar & Kail W.C.
I. Banjar	1537.41
2. Tirthan	570.36
3. Sainj	1285.31
Total:	3393.08

----Average quality of the forest is I/II F.R.I. quality.

----Regeneration period is 30 years.

----Exploitable diameter is 60 c. m d. b. h. and rotation is 120 years.

----P. B. wise area allotment is

Area in ha.					
Name of Range	P.B.I	P.B.II	P.B.III	P.B.IV	Total
Banjar	305. 56	230.68	804.92	196.28	1537.41
Tirthaii	295.01	35.61	115.50	124.24	570.36
Sainj	185.75	846.63	165.11	87.82	1285.81
Total :	786.32	1112.92	1085.50	408.34	3393.08
Normal area	848.27	848.27	848.27	848.27	3393.08

----Total annual prescribed yield (m^3) P. Bs wise

Spp.	P.B.I	P.B.III	P.B.IV	Total
Deodar	6000	-	1000	7000
Kail	2500	-	800	3300
Total:	8500	-	1800	10300

FIR WORKING CIRCLE

---- Area Range wise and P.B. wise: -

P.Bs (Area in ha.)

Name of the Range	<---------- Area under F.W.C (ha) ---------->				
	P.B.I	P. B. II	P. B. III	P. B IV	Total
1. Banjar	991.81	329.36	586.44	1068.40	2976.01
2. Tirthan	137.58	359.14	84.17	169.47	750.36
3. Sainj	-	341.15	275.97	390.54	1007.66
Total:	1129.39	1029.65	946.58	1628.41	4734.03

----Punjab Irregular shelter wood system followed

----There are 4 fixed periodic blocks with 30 years regeneration Period and 120 years of rotation.

----Exploitable diameter is 60 cm d.b.h. and rotation 120 years.

----Annual yield (m^3) is

Yield Species	Yield (M3) P.B.I	P.B. IV	Total
Spruce	5800	13900	19700
Fir	6600	13200	19800
Total	12400	27100	39500

----Only 0.74% yield of total growing stock prescribed for removal annually.

PROTECTION WORKING CIECLE

Table - 3

Name of Range | Area of forests

	R.Fs.	DPFs.	UFs.	TOTAL
Banjar	482.80	2663.27	2954.57	6100.64
Tirthan	-	895.19	4683.45	5578.64
Sainj	96.31	657.61	6418.74	7172.66
Total :	579.11	4216.07	14056.76	18851.94

GLOSSARY OF LOCAL TERMS

Local term	English equivalent
Bahan	Floating
Balhi	Round unsown timber used in the houses as rafter post.
Bartan	Rights of user.
Bartandar	An individual who enjoys rights of user in the forest.
Begar	Free labour.
Behal	The river sides.
Bigha	A unit of land measurement 12.5 Bigha equals 1 hac.
Chak	Included cultivation within a forest.
Chowkidar	Watchman.
Dandasa	Trade name of bark of Walnut roots used for cleaning teeth.
Deota	The local deity.
Dhar	A ridge or spur.
Dhaugris	Professional labour which undertake charcoal burning.
Dhulan	Land carriage.
Dhulani	Labour engaged for land carriage.
Dimdima	Any odd size of wood roughly dressed by axe and of cross section ranging from 25cmx30cm with length less than 1.82 meters.
Doghri	A small farm house on the land usually away from the main village.
Gad	A small stream with perennial water.
Garhwali	Inhabitants of garhwal (U. K.).
Ghall	Timber floating in stream of river.
Ghallu	Labour engaged on floating of timber
Ghasni	Grass land where from the grass is cut
Gujjar	Nomadic buffaloe graziers.
Gorkha	A native of Nepal.

Geltu	A piece of round timber of small size.
Hakris	Small triangular split up pieces of wood usually less than 1.5 meter in length.
Illaqua	Area.
Karies	Scantlings.
Khad	A water stream.
Kharif	Rainy season crop.
Khatis	Small pits carved out near water source in hill sides to store water.
Kothi	Revenue unit having fixed boundaries consisting more than one phati.
Khudan mark	The engraving on tree stumps etc.
Lamberdar	The village headman.
Mali	The man employed on raising and maintenance of nurseries.
Mala	A ravine or depression with or without water.
Nautor	Land granted for fresh cultivation.
Negis	Headman of kothi.
Panchayat	Village council.
Paragna	A unit comprising of several villages.
Patwari	Revenue official incharge of patwar circle (small revenue unit)
Phat	The grazing land.
Phati	A revenue unit called revenue village.
Rabi	Winter crop.
Rakha	Watcher.
Ruta	Grass land preserved for growing grass for fodder
Rahdari	A fee levy on cattle passing through a tract.

Sarpanch	The chief arbitrator.
Suhr	The leaf mould.
Tehsil	Sub division of a district.
Tehsildar	Revenue Officer incharge of a tehsil.
Thatch	Small grassy blank in Alpine forests used as a halting place by graziers
Tibba	Peak.
Zamindar	Cultivator or farmer.
Zamindari rate	Concessional rate meant for owner of the land.

CHAPTER — I

THE TRACT DEALT WITH

1.1 Name and Situation

This Working Plan deals with the Reserved, Demarcated Protected forests of Seraj Forest Division. This plan revises the Working plan by R.P. Jaswal expired in 2001-02, The Division falls in Kullu district of Himachal Pradesh.

The present boundaries of Seraj Forest Division falls between 31° 30' 0" N to 31° 50' 0" latitudes and 77° 10' 0" E to 77° 27' 30" E Longitudes and are covered by survey sheets, on 1:50,000 scale, number 53E/1, 53E/2 53E/5, 53 E/6, 53 E/9, 53 E/10, 53 E/13 and 53 E/14. The major portion of Seraj Forest Division falls in sheet numbers 53E/5 and 53 E/6. The boundaries of Seraj Forest Division are as described below.

1.2 Boundaries

North:

Parbati Forest Division of Kullu district separated by Laru Dhar Kasol, Dhar Kalli dhar--Kanda dhar Jaajaun dhar—Mathaun dhar ridge originating at 6127 meters its peak on Rakti dhar and terminating near Tharas Village (1040 Meters)

East:

In the east G.H.N.P and Anni Forest Division of Kullu District Separated by Srikhand Dhar.

South :

A Dhar originating from Srikhand Mahadev (5527m) on the eastern boundary traversing towards West,passing through Basleo and Jalori Pass and Jogruglu dividing the water sheds of Beas and Satluj Rivers.

West:

Manglore jad--Tirthan khad and Beas River.

The Headquarters of the Seraj forest Division is at Banjar, 55 kms towards east from Kullu, the district headquarter. An offshoot road from aut on the National High Way No.21 joins Banjar.

1.3 Configuration of the Ground

The tract is hilly and undulating and lies between elevations ranging from 920 meters at Sikli dhar nursery near Larji and 6127 meters, highest point on Rakti dhar situated in N-E of the tract from the mean sea level. The N-E portion of the tract is facial above 4000 meters elevation. The tract is in the form of rhombus. The area is traversed by several prominent ridges dividing the catchments of Sainj, Tirthan and Beas rivers. While sainj and Tirthan khads drain from North East and east to North West and west and meet at Larji, Beas drains from west to east and also makes a confluence with Sainj and Tirthan rivers at Larji.

The main dhars are given below:

(a) Panu dhar--Bunga dhar, Deon dhar--Bahli dhar--Rahli dhar in the north is the water-shed between Jeewa Nal khad and the Sainj khad. The dhar originates from Javaun dhar a5180 metres point and decends down to Karehla near the confluence of Jiwa Nal and Sainj khads.

(b) Dhar originating near Chakri on Sri-khand dhar on the eastern boundary at 5159 metres and named as Thartha dhar, Cargarasan dhar--Babli dhar at various places ending at Larji, separates two mighty khads of Sainj and Tirthan.

(c) Another dhar originating from Sri-khand (Mahadev (5527 mtrs.) on Srikhand dhar in the east and meeting at Gusaini and known as Bimu dhar separates the Tirthan and Plachan gads.

(d) Sakiran dhar originating from southern boundary at (3621mtrs) and ending at Khundan bridge near Banjar divides the watersheds of Tirthan and Jibbi khads.

(e) Dhar originating from the southern boundary at 3306 metres, known as Nagri dhar, and descending down to Manglore divides the watersheds of Jibbi and Manglore khads.

(f) Bithu Kanda dhar divides the watersheds of Beas and Sainj rivers.

1.3.1 The whole of the tract drains into Beas River. A small portion of the tract between Tharas village and Aut, drains directly into the river Beas, the rest of the area drains into river Beas through two major rivers of the tract viz. Sainj and Tirthan.

River Sainj has another tributary i.e. Jiva Nal which joins the main river at Siund about 4 kms from Sainj town up stream.

Tirthan is also a big river having its origin in snow capped mountains and has Jibbi khad as its tributary which joins it near Banjar town, the headquarters of Banjar tehsil.

Another small khad known as Mangalore khad at the confluence with Tirthan khad near Mangalore marks the boundary with Nachan division in Mandi district and flows south to north.

The slope of the terrain varies from gentle to precipitous and the tract is well drained.

1.4 Geology, Rock and Soil

Geology rock and soil effect, the vegitation of a place by influencing the moisture regime, structure, texture and drainage of the soil. Therefore the study of geology, rock and soil is very important from the point of view of forestry management.

The geological formations found in Seraj forest division are (1) Larji formation (mainly Permian) (2) Banjar formation (Devonian to Carbon ferrous and (3) Jatog Formation (Precambrian to Silurian).

The underlying rocks are quartzites, schists, phllites, dolomites, lime stones, shales, slates, gneisses and qranites which are responsible for a variety of coniferous and broad leaved vegitation.

Quartzites produce sandy soil after disintegration, while granites, schists, shalles and gneisses produce loamy and sandy loam soils.

1.4.1 The information regarding geology, rock and soil of Seraj forest division has been obtained from Geological Survey of India, Himachal Pradesh Circle, Chandigarh and is as follows:

Stratigranhic sequence of the Kullu-Rampur belt

Alluvium

		Basic Intruxive
Aut member (1,000 Mtres)		(1) Coarse grained conglomeratic and gritty detrital dolomite. (2) Grey dolomite showing algal structure (3) Cream and pink coloured limestone. (4) Grey massive dolomite. (5) Pink and cream coloured lime stone. (6) Thick fine grained grey dolomite.
Larji formation (mainly) Perman. highly,	Hurla member (200 mtrs.)	Pink white and greyish, jointed massive quartzite with dark purple and grey shale-slate partings at places calcareous.The quartzite shows passage into Larji dolomite.
	Naraul member (2,000 mtrs.)	Slate and phylitte, massive quarzite.at places grading into calcareous quartzite and calcareous slates with lenticular bands of limestone and dolomite.
	Bandal Granite (Post Carboniferous)	Fine to coarse grained, massive and folliated porphyritie granite migmatite and augen gneiss with bands of greenish basic schists and roof pendants and bands of quartzite.
	Bhallan	Slates and phyllite with basic schists and grey massive and flaggy quartzites, at places showing ripple marks.
Banjar Formation (Devonian to Carboniferous	green Bed member (1,000-1,500 mtrs.) Carboniferous)	Green basic schists, massive traps and greenish phyllites with bands of massive quartzite phyllites and graywacke.
	Manikaran quartzite (2,000 mtrs) (Devotion)	Vary thick band of white, grey and banded massive quartzite, at places schistose with basic flows and sills.
	Khamrada member	Carbonaceous and ash grey slate-phyllite and quartz schists at

	(200-600 mtrs) (Silurian)	places garnitiferous, with lenticular band and lenticles of grey and cream coloured, intricately folded platy and massive limestone.
Jutog formation (Precambrian to Silurian)	Gahr member (100 to 500 mtrs.)	Quartzose, streaky.banded and augen gneisses at places showing ptygnatic folding.At places it occurs interbedded with over lying khamrada member and also with underlying Kullu member.
	Kullu member (3,000 mtrs)	Phyllite, quartz-chlortie and quartzbiotite schist, garnetiferous chiorite schist,quartz-sericite and garnetiferous tremolite schists.
	Centtral gneissos and schists	Interbanded gneisses and schists with bands of quartzite, stratified migmatites, injection gneisses and pegmatitiesand garnetiferous kyanite silimanite schists.

1.4.2 Central Gneisses and Schists

These rocks have been mapped in Sainj Valley in Bakti dhar and Khande dhar areas. The Central gneisses and schists comprise interbanded gneisses and schists with bands of quartzite, stratified migmatites, injection gneisses and pegmatites, which range from very fine grained to vary coarse grained. The gneisses, migmatites and pegmatises invariably carry grains of ruby garnet which is one of the most important distinguishing characteristic feature of these rocks. The pegmatises comprise quarts, large crystals of buff as well as white felspars, books of biotite and muscovite and sizable crystals of black tourmaline and translucent ruby garnet.

1.4.3 Kullu Gahr Khamrade Formation

Kullu

Comprises chlorite phyllite, quartz schists, garnetiferous chlorite and biotite schists, with bands of quartzite which latrally grade into quartz schist and garnetiferous quartz chlorite schist. This type of formation is found along left bank of Manglore khad.

1.4.4 Gahr

It comprises of a band of quatziticgneiss. It consists of quartzose and streaky gneisses, which at places laterally grade into well bedded and highly jointed greyish white massive quartzite. The banded and streaky gneisses are highly foliated to massive and at places show augen structure.

1.4.5 Khamrade

In its type locality it consists of carbonaceous, ash grey and bleached slates, phyllite and schists with lenticular bands of dark grey platy limestone. The carbonaceous slate phyllite invariably

carry encrustations of white yellow and redish colour. These contain borax and sulphur. The limestone is thinly bedded and platy.

Manikaran quartzites

Manikaran quartzite forms a very thick lithostratigraphic unit and has been named after Manikaran village where it shows the typical and maximum development. Because of resistant nature and great thickness, it forms high ridges and peaks and stands like walls, cliffs and escarpments as seen in Nai-Lapah-Suged area in Sainj valley.

Important peaks formed by Manikaran quartzite are at 11,783 feet (3593 mtrs.)on Sakiran dhar 12,570 feet(3831mtrs)peak south east of Dawaranali and Manjni Kot, 12,685 feet(3866mtrs) in Plachan gad in Tirthan valley.

Manikaran quartzite is a white massive quartzite of but-Right, geeriish, grey arid banded -types are also seen at, places. It, breaks with subconchiodal fracture yielding sharp edges. The banded types carry the streaks of haematite which occur as thin laminae and bands. At many places in Sain,} valley the quartzite carries flakes and patches of greenish micafuchsite, which occurs along its beending planes. The quartzite is well bedded and highly jointed. Generally the beds are several meters thick but at places laminated which yield big size thin slabs of varigated colour which are extensively quarried for paving and roofing purposes as seen in sainj valley.

1.4.6 Green Bed Member

Massive traps, green sheeny phyllites and greenish basic schists form an extensive horizan to the west of Manikaran quartzite and has been traced from Shat in Parvati valley to Tiklech in the Sutlej valley, Because of their greenish colour and basic nature these rocks have been called the green Bed member. These rocks show their typical development in Raila-Ziwa Kartah-Zigiri area in Sainj valley and around the town in Ban jar and Ghhaht in the Inner Seraj valley.

The green Bed rocks consist predominantly of massive traps, greenish phyllites and greenish basic schists and at places contain inter bedded bands of greenish and white massive quartzite and grey phyllite.

1.4.7 Bhallan Member

Bhallan member consists of slates, phyllite inter bedded with massive quartzite, greenish, sheeny phyllite and greenish basic schists. These rocks show well development around the village Bhallan in Sainj valley and hence named after it. In this area slates are conspicuously absent. The phyllites are of silver white brown and greenish colour. The silver white and grey phyllities are well exposed on the western side of the village on Bhallan Danala path which the greyish and greenish phyllites are well exposed in Bhallan Kandi galu section.

1.4.8 Bandal Granite

It is an extensive body of granite which is surrounded by Manikaran quartzite and is present from Garsah valley in Parvati Forest Division in the north to south of Sarahan in Sutlej valley. These granite show their best and typical development in Shainshar, Shangarh and east of Bandal areas.

It has got maximum outcrop width of about 12 kms in shainshar area in Sainj valley. The granite body occurs in the form of an elongated dome with higher elevation rising up to 3600 meters in the central part and 2000 meters in marginal portions in the north and south. The axis of the dome corresponds to the regional tectonic axis of the area.

Important peaks formed by granite are (1) 11,977 feet (3650mtrs.) one kilometers north of Kundar (2) Peak 10,789 (3288 mtrs) one km NW of Kashiari (3) peak 11,977 (3650 mtrs) one km WE of Thani (4) Peak 12,006 (3659 mtrs) on Sara dhar near Lapah, and peak 11,359 (3462 mtrs) of Gushaini.

Bandal granite body is rimmed all around by Mariikaran quartsite and the former sends several tongues and apophyses in the laters, Two small bosses of granites have intruded in the Green bed member in Deoli Sarahan area east of Sainj. Several superjacent downward projecting islands of the country rock of varying sizes occur within the granite body as roof pendents as seen in Shainsar and Shangarh areas of Sainj valley which is the central and higher portion of the dome and where erosion has not completely stripped off the roof cover.

Bandal granites which are generally foliated, though at some places massive, are by and large porphyuritic with marginal zone of migmatites along their contact with the country rock. The porphyritic granites in themselves show a great variation in granularity from fine grained to coarse grained.

1.4.9 Naraul Formation

It is formed of conglomerate, conglomeratic quartzite and greywacke, massive quartzite, shale, slate phyllite and calcareous quartzite. The rocks of this formation are folded as seen at lalgi thach and Bare thach north and south of Chashani, along other members of Larji formation, into several plunging anticlines, and synclines. This formation contains copper minerals.

The startigraphic sequence among the different lithological units belonging to the Naraul member is as below.

Top

(5) Calcareous quartzite and silicified limestone grading into shale slates with lenticular bands of limestone and calcareous slates.
(4) Shale-silt stone and slate phyllite interbedded with bands of massive quartzite.
(3) Massive quartzite.
(2) Boulder,cobble and pebble beds,conglomerate and conglomerate quartzite,greywacke and gritty phyllite.

Bottom

(1) Quartzitic slates and silstones with lenticular bands of conglomerates.

1.4.10 Hurla Formation

Hurla quartzite is the most important marker horizon of the brji formation and has folded into tight overturned plunging anticlines and synclines and is typical near Hurla gorge in Hurla.Ley of Parvati Fortest Divisions, hence the name as Hurla formation.

Hurla quartzite is fine to coarse grained and consists primarily of quartz grains. The quartzite is of pink purple, white and grey colour and at. places shows colour banding . The quartzite is

thickly bedded and the thickness of beds varies from 20cms to more than a meter. Along the bedding planes the quartzite is micaceous. It is highly jointed and splits in quartzite bricks with very clean and smooth joint surfaces. These bricks are extensively quarried for building purposes.

At many places it contains calcareous shale slate partings. At places these limestone bands assume conglomeratic appearance as seen on Largi-Sainj road near Behali. At many places the slaty partings have developed slaty cleavage.

1.4.11 Aut Formation

It is a thick sequence of interbedded dolomite and limestone conformably overlies the Hurla quartzite with a gradational parses and forms, alongwith the members of Larji formation. Aut member forms the top most litho stratigraphic unit of the Larji formation. The dolomite bands are very thick and comprise mostly of dark grey, grey and buff colour. The dolomite are mostly fine grained and massive but at places they are coarse grained, gritty and conglomeratic.

Dolomites are generally very well bedded and highly jointed but at some places bedding becomes obscure and the rocks become massive.

1.5 Soil

Different types of soils are formed under different climatic and vegitational conditions. The underlying rocks play an equally important role in the formation of soils. While the physical contents of the soil are made after weathering of the underlying rocks,the mineral and organic contents of soil are influenced by climatic conditions, vegitational cover and host of other factors and in turn the type of soil determines the type of vegitation in a broad climatic zone.

Alluvial soils are formed due to erosion mainly by water and land slips. In the process the weathered material is transported and deposited at a place other than its origin. In such cases the underlying rocks have little role to play in influencing the vagitation on alluvial soils. Such soils are found deposited in the basins of the rivers and along the banks of the rivers.

1.5.1. Podsols

Podosolic soils are developed in temperate climates and generally hold the conifers in the Himalayas. It is formed under coniferous vegetation. The soil is covered with thick layer of humus which remains undecomposed due to low temperature and short summer. Humic acid is formed. The leaching medium is acidic because of presence of humic acid. The micro biological activity is very low. The PH of soil is acidic. The chloride, sulphates, alkali and alkaline earth substances get leached . These become degraded soils because of break of nitrogen cycle in temperate coniferous forests. These soils can be improved by a mixture of broad leaved species and heavy canopy opening.

1.5.2 Brown forest soils

Such type of soils are formed in temperate climatic under broad leaved vagitational cover. There is no accumulation of thick humus on the top and the humus is of neutral type. The PH reaction varies form 5 to 7.

The underlying rocks influence the structure and the texture of the soil as some rocks

on disintegration give rise to fine grain ed material and others coarse grained material which affects the water, holding, capacity of the soil and consequently influences the type of vagitation which can come up on various types of textures and structures of the soils.

Deodar can not regenerate on calcareous parent rock. It requires heavy soil with good moisture retaining capacity while Chil requires coarse grained sand particles having good drainage. Therefore Chil prefers the soils formed out of quartzites and Deodar is happy on the soils formed due to disintegration of granites.

Kail requires shallower soils with boulders in the subsoil and Silver Fir and Spruce come up on all soils and can tolerate more acidic conditions. Cupress tree loves to be on the calcareous soils.

The soil of almost entire tract has been formed insitu and belongs to podsolic group. The soil of some of the nurseries in the tract was got analysed from the soil testing laboratory of agriculture department at Kullu. The status of PH, Nitrogen, Phosphorus and Potash is indicated against each nursery.

S.No.	Name of the nursery	pH value	N	P	K
1.	Gadagosani	6.0	L	H	L
2.	Shojha	6.0	H	M	L
3.	Trilokpur I	5.9	H	L	L
4.	Deori Beat	6.3	H	L	H
5.	Maniyashi	6.9	M	H	H
6.	Dalashni (Moul)	5.9	M	L	M
7.	Damothi	5.4	M	L	H
8.	Kaluini	5.9	M	H	M
9.	Bashehri	6.6	M	M	M
10.	Chera	6.5	M	H	H
11.	Panihar	6.3	M	M	H
12.	Ghartgad	5.6	H	L	M
13.	Kandhari	6.2	H	M	L
14.	Shira	5.8	M	L	H
15.	Ruhan	5.9	L	M	H
16.	Jual	6.3	L	H	M
17.	Bihali	6.5	H	L	L
18.	Dhuchugad	5.7	H	M	M
19.	Kanon (Siah Bihal)	6.8	H	L	M
20.	Shanauli	5.5	M	H	L

Note: - H = High, M = Medium, L = Low.

1.6 Climate

Broad zones of vegetation have been divided based on climatic conditions which mainly are, temperature and rain fall and its location with respect to equator. The climate is typical of temperate zone above 1000 mtrs, elevation in the tract. Generally April to June and October to December are dry periods. The major precipitation is received in the months of July and August while snow and rain lash the area from January to March each year. Snow fall occurs above 1600 stays for long below 2200 meters.

Autumn is generally very cold and May and June are very hot j at low elevations.

Localized cloud bursts cause great havoc to the soil and results in severe floods and loss of human life and damage to the forests.

As there is no meteorological station in this division so that data of nearest station Bajuara is taken for temperature.

Bajaura Station

Year	January		February		March		April		May		June	
	Max	min	Max	min	Max	Min	Max	min	Max	min	Max	Min
1995	10.1	-1.3	11.6	0.9	17.4	4.0	20.7	6.7	28.9	11.4	31.5	15.6
1996	12.2	-0.3	14.9	1.9	16.3	4.8	23.5	8.6	24.9	10.5	13.0	15.7
1997	12.8	-0.3	13.6	0.2	17.3	4.7	20.3	7.9	23.8	8.3	26.3	12.6
1998	10.7	-0.5	11.8	1.0	14.9	1.8	22.7	8.0	27.0	15.6	28.1	20.7
1999	10.0	3.8	15.2	7.0	18.5	8.4	25.0	13.4	25.7	15.6	27.8	17.7
2000	11.6	3.9	10.0	2.1	16.1	6.0	24.3	12.1	27.5	16.4	27.9	18.2
2001	13.6	3.0	17.1	5.7	15.4	7.8	18.3	11.1	26.6	15.8	26.9	19.1
2002	12.0	2.8	7.1	3.4	18.8	9.0	22.5	11.5	26.6	14.9	28.6	18.3
2003	14.0	3.6	13.1	4.3	16.4	5.8	22.2	11.7	24.9	11.9	26.9	16.1
2004	11.4	3.6	13.6	4.9	23.2	10.2	23.9	12.6	28.4	14.7	20.9	16.3
2005	8.6	2.7	9.1	3.5	16.2	8.3	20.6	10.2	23.3	11.4	28.0	16.6
2006	11.3	4.1	17.8	9.1	16.2	9.1	20.8	11.1	26.9	16.2	26.2	17.4
2007	12.6	3.7	11.8	4.9	16.4	6.9	25.9	14.1	25.6	14.8	28.3	18.4
2008	7.6	2.7	12.2	4.1	20.7	9.5	21.1	11.3	24.9	15.5	26.7	19.0
2009	11.8	6.6	13.8	7.7	17.7	9.2	21.8	11.8	24.6	13.9	28.1	17.6
2010	14.0	5.0	13.2	5.3	21.0	10.5	23.2	13.7	25.3	15.4	26.8	16.0
2011	9.9	2.5	10.8	4.3	18.2	9.1	20.3	10.6	25.8	15.3	26.5	17.7

Year	July		August		September		October		November		December		Annual	
	Max	min	Max	Min	Max	Min	Max	min	Max	min	Max	min	Max	min
1995	29.8	17.5	25.6	17.0	26.8	12.2	23.7	7.6	20.1	2.3	13.0	1.2	21.6	7.9
1996	28.4	17.5	27.8	18.0	18.3	14.2	24.3	7.3	20.1	4.0	16.9	-2.0	20.0	8.3
1997	27.7	16.3	25.5	14.3	25.7	13.0	20.3	6.4	15.1	2.4	11.4	1.4	20.0	7.3
1998	29.6	23.6	29.1	20.7	26.9	17.2	23.3	12.9	20.4	17.5	17.3	5.6	21.8	12.0
1999	28.7	20.3	27.2	20.6	27.7	18.2	25.3	11.8	20.8	7.3	15.9	4.4	22.3	12.4
2000	25.8	19.9	28.9	19.8	27.1	15.8	25.8	12.3	18.1	8.4	15.8	6.2	21.6	11.8
2001	28.9	21.9	28.8	21.7	29.1	15.8	25.9	12.5	20.0	8.8	14.4	4.5	22.1	12.3
2002	30.5	20.9	27.1	20.7	25.0	11.6	24.6	10.6	20.9	7.0	15.2	5.4	21.6	11.3
2003	28.2	20.9	28.1	20.2	26.4	17.5	24.7	9.5	18.8	6.6	13.7	4.4	21.4	11.0
2004	28.7	19.9	26.5	19.4	27.5	17.7	20.2	9.8	18.3	7.7	13.5	5.1	21.3	11.8
2005	26.2	20.0	28.0	19.9	25.7	18.0	23.8	11.2	18.9	5.6	15.4	3.7	20.3	10.9
2006	26.7	21.4	27.5	20.1	25.1	17.4	22.6	12.1	18.6	7.4	13.6	5.1	21.1	12.5
2007	26.8	20.2	27.5	19.2	22.5	18.9	23.8	11.9	19.7	9.2	13.1	4.8	21.2	12.2
2008	27.2	21.7	25.8	20.2	24.3	16.4	22.0	12.5	19.7	8.2	15.9	8.1	20.7	12.4
2009	28.8	20.0	27.9	20.9	25.7	18.6	23.4	11.7	17.3	7.5	13.3	6.1	21.2	12.6
2010	24.8	19.6	25.7	21.4	24.7	18.0	22.9	12.7	19.9	9.8	14.7	4.5	21.3	12.6
2011	26.1	20.3	25.4	20.2	25.2	18.2	22.9	11.8	19.7	8.5	14.6	4.4	20.4	11.9

The rainfall data for Sojha, Banjar, Larji and Sainj Station is given below

Station	Jan	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Sojha	221.06	154.76	128.82	64.80	67.08	157.94	310.00	231.00	71.78	28.00	0.40	9.06
Banjar	52.25	62.70	92.80	65.56	65.07	74.66	161.90	139.56	77.36	22.29	26.07	33.21
Larji	58.45	53.83	97.22	78.05	86.25	101.17	171.93	136.52	66.62	34.20	27.80	32.58
Sainj	54.40	54.28	74.19	58.00	83.85	36.51	100.90	95.32	37.19	32.80	16.83	33.08

Average Total number of rainy days in each month

Station	Jan	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
Sojha	8.9	7.8	8.0	6.2	6.00	12.6	17.8	17.4	6.2	3.6	0.2	1.2
Banjar	6.6	8.2	11	8.3	9.01	8	18	14.7	9.4	3.6	2.6	3.4
Larji	6.2	7.4	11.4	9.4	10	9.3	17.5	14	8.6	3.1	2.7	3.6
Sainj	6.7	6.8	10.0	8.6	9.04	8.4	14.7	12.8	9	2.6	2.2	4.0

The Annual rainfall data for Sojha, Banjar, Larji and Sainj Station is given below: -

Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Sojha	1394.3	1781.1	764.1	2243.6	1039.9	-	-	-	-	-	-
Banjar	-	-	-	-	-	866.4	1530.5	834.5	575.5	623.7	752.2
Larji	-	-	-	-	-	1018.3	1495.9	891.1	672.3	821.4	1021.0
Sainj	-	-	-	-	-	1122.3	1344.9	639.8	551.3	1416.5	1358.4

Year	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Banjar	1153.2	587.6	981.5	878.0	787.7	318.63	201.23	262.42	228.93	234.20	287.61
Larji	1065.8	415.3	1107.0	1064.5	1890.9	560.75	233.50	262.13	242.64	174.55	56.75
Sainj	1110.8	586.0	1004.4	1384.0	1404.0	375.12	371.98	266.72	218.96	306.21	244.01

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Banjar	431.96	404.09	471.88	400.92	301.28	276.84	353.43	203.98	267.34	90.00	-
Larji	360.61	203.67	218.71	707.50	363.76	214.60	276.73	187.66	-	-	-
Sainj	423.22	444.50	311.35	598.62	186.62	1243.78	350.37	193.72	400.07	-	-

Year	2005	2006	2007	2008	2009	2010	2011	2012			
Banjar	950.00	770.00	-	-	-	-	-				
Larji	-	295.2	272.4	459.72	330.2	458.1	209.15				
Sainj	1070.3	522.29	373.17	464.40	335.25	469.37	280.47				

Source: Seraj Forest Division.

After 2002 the data of rainfall was requested from Chief Engineer BBMB Sunder Nagar but they refused to supply the data without the prior approval of Secretary BBMB at Chandigarh .The request has been sent to the secretary BBMB Chandigarh but approval is still awaited. The same was asked from meteorological department they answered that their data is online. Hence the details after 2002 is not entered here for Pandoh rain gauge station.

Snow fall is recorded from December to March; but the information about the snowfall data is not available.

1.7 Water Supply

Two main rivers of the tract viz Sainj and Tirthan originate from hill ranges which are covered with snow during major part of the year. Water supply in the two rivers is perennial. These rivers have thick forests of Silver Fir, Spruce, Deodar and Kail in their catchments which help to maintain the perennial flow in the rivers. Timber floating operations are possible in Jibbi, Tirthan, Sainj and Manglore khads while are the small tributaries to these khads. Generally telescopic floating is possible because of rugged terrain in some tributaries and scarcity of water during winter when most of the floating work is generally undertaken. However now a days river floating is rarely resorted to due to construction of roads in the interior and also due to high percentage of loss by way of theft of limber during floating operations.

Numerous water springs are there in the tract and a number of drinking water supply schemes have been implemented by the government for supply of potable water to the villagers. Sufficient water is also available for the forest nurseries. However, the slopes devoid of vegetation growth or having scarce vegetation experience scarcity of water. The left bank area of Beas river

between Tharas and Aut has very sparse vegetation and is generally dry. Similarly areas on both sides of river Sainj between Larji and Sainj are also dry and experience shortage of water during summer. The area draining directly into Thirthan khad between Larji and Khunnan Bridge is almost devoid of vegetation and is dry.

Generally, period from October to December every year goes dry without rain and the bulk of forest fires take place during this period. Data for discharge for the same period is also awaited. A hydroelectric project at Larji for generating 126 M.W. power based on the water of rivers Sainj, Tirthan and Beas has been constructed with total investment of 16, 885 lacs. One 45.30 meter high dam is constructed at the confluence of Sainj, Tirthan and Beas rivers near Larji with a storage of 230 ha.m and maximum water level at 970.5 meters, normal at 969.5 meters and minimum at 960 meters. Cost of generation is 29.46 paise per unit at the power house and 40 paise per unit to the consumer.

The total catchment area of this project (including Beas, Sainj and Tirthan, the last two falling in Seraj forest division is 4921 m^2. The maximum average daily discharge is contemplated at 945.1 m^3/sec.

Another gigantic hydroelectric project known as Parvati project for producing 1900 M.W. of power are being constructed which involves Parvati, Hurla and Sainj rivers with a total cost of Rs.1000 crore and three power generation units, at Nakthan 400 M.W in Parvati Forest Division on Parvati river and two generating units of 400 M.W and 520 M.W. at Sainj and Larji respectively.

1.8 Distribution and Area

The area of the tract has been calculated from 1:50,000 scale survey sheet and 8964 ha is assessed to land revenue and is under private control. The rest of the area is under the control of the Forest Department. The total area of reserved forests is 1015.74 ha. and that of demarcated protected forests is 11972.3 ha. while the rest of the area comes under III class forests which include snowcapped mountains, Alpine Pastures devoid of any tree growth, and road rivers etc. III class, area given below shows only culturable lands.

The Range wise distribution of the area is as follows:-

	Area in ha			
Range	Reserved Forests.	D.P.F Forests	IIIrd class or UFs.	Total
Banjar	588.41	7023.48	2954.57	10566.46
Tirthan	261.01	2067.86	4683.45	7012.32
Sainj	166.32	2880.96	6418.74	9466.02
Total	**1015.74**	**11972.3**	**14056.76**	**27044.8**

There is a decrease in the area of IIIrd class forests over the previous plan by R.P.Jaswal because of creation of GHNP by taking some area of Seraj Forest Division. The figures pertain to the reorganized Seraj Forest Division.

1.8.1 i) Reserved Forests

Generally the Reserved forests are either situated in places away from habitation where nobody ever goes, or consists of small areas of Deodar forests in the vicinity of villages from which it

has been possible to exclude rights. The former class of Reserved forests usually lie in steep ground and at fairly high elevations in remote and gloomy valleys, the reputed haunts of evil spirits, the later forests are generally groves of ancient trees still considered in parts as sacred to local deities.

1.8.2 ii) First class protested Forests

These are the forests which are situated with in the zone of human habitation and are scattered all over the tract. They are often surrounded or bounded by cultivation, vary great in size and elevation, and are the area's most used by the people for grazing, fire wood, building timber and minor forest produce. The rights of users are less extensive in these forests and more clearly defined.

These forests are not only useful from the peoples point of view but in fact more important from the Forester's point of view also because these contain the most valuable part of the growing stock.

The forests contains mostly Chil, Deodar and Kail crops and are situated on comparatively easier slopes and medium elevations, lower portions being occupied by Chil forests, in the Deodar and Kail forests, the higher reaches are covered with pure or generally mixed crop of Spruce and Fir. In the cooler aspects pure Spruce and Silver Fir occur in the higher portions. Important broad leaved trees also ocrur in the depressions in such forests. In short, these are the forests from which the local people are supplied with the greater preparation of their requirement, and most, of the Deodar and Pine timber for supply to non right holders, other departments, industries and markets in the plains.

Now with the increasing pressure of the population, combined with overall development of the area and change in the living conditions and financial position of the population, and consequential effect on standard of leaving of the people, these forests bear the brunt of all such pressures including encroachments.

The lucrative business of raising orchards has tempted the people to make encroachments as far as possible. In such cases the boundary pillars are either shifted or altogether removed by the people.

1.8.3 iii) Second class forests

These forests, with some exceptions, lie above the first class forests. They are remote, away from the habitation and occupy higher elevations. But now with the construction of net work of roads, most of the second class forests have become accessible by motor roads. These forests mostly consist of Spruce and Silver Fir and as the elevation increases, grassy glades are interspersed with bands of Fir forests until the limit of aborscent vegetation is reached and the forests give place to Alpine pastures which is of much value to shepherds .These forests are typical temperate forests and are covered with snow during the winter. These supply large quantities of Fir timber to local requirements and export and are also used as summer grazing grounds.

Usually only the lower line of the forests has been demarcated, so these forests contain large areas of pasture land rocks and snow as they extend to the main ridges, More than half of the area of this class of forests is forest only in name sake but by including it within the limits of the demarcation, it has been possible to define the rights of pasturage and so to mitigate the interminable quarrels as to who may graze in certain pastures. The grazing rights are very clearly defined in these forests.

Because of extensive cultivation of Apple and other fruit now, the Fir and Spruce forests have been felled for preparation of fruit packing cases. Most of the timber is used mainly for packing cases and only the pulp wood and the fuel wood is taken out to markets for sale.

1.8.4 The Un-demarcated or III class forests

These consist of all government lands other than those notified as 'Reserved' and 'Demarcated Protected' forests and the private land. These are of considerable value to the people. The wooded area provides building timber and fire wood to the neighbouring villages while the grass land is either grazed or carefully divided into fields. Demand of nautors is also met with from these undemarcated protected forests. Apart from some wooded areas, small in extent, this category of forests contains the barren-grassy land occupying the southern, western and south western aspects which are generally devoid of trees. Natural regeneration of Chil, Kail and even Deodar comes up profusely in these areas other than refractory ones, but such regeneration is not allowed to be established due to heavy grazing pressure and demand for poles by the local people.

Plantations under various schemes of the State and Central government are being raised in such III class forests which are found extensively.

Major portion of the IIIrd class forests is honey combed with private cultivation. The nautors granted subsequent to the settlement operations has made the III class forests worst sufferers because no policy has been followed in deciding the location of the nautors by the revenue officers. Nautors have been granted anywhere and everywhere according to the convenience of the grantee during seventies and eighties.

Plantations are being raised in such areas after taking the consent of the public and then notifying it in the official gazette bringing out clearly the acts prohibited in the planted area.

By now extensive areas of barren land have been brought under green cover by active cooperation of the people. The success of plantations in III class forests would have been more but for the extensive damage done by fires,monkeys and porcupines in the plantations from poor conditions of soil and moisture and grazing damage.

1.9 Acquisition of land in Demarcated Protected forests

There are some included cultivations inside the boundary of the demarcated protected forests. These chaks were left as such at the time of settlement. Subsequently earlier working plan officers after the settlement operation prescribed to acquire the included chaks by way of purchase or exchange but not much has been done in the past. Now with the development of horticulture in the area such chaks have become valuable and people are not inclined to dispose off such lands because of non-encroachment in the forests. Moreover such included chaks pose direct problem to closure of the forest for regeneration and other managemental problems.

1.10 Re-Numbering of compartments

The serial number to forests were assigned area wise at the time of creation of G.H.N.P.Now with the reorganization of forest divisions and ranges the position of range and forest division boundary has undergone change. This has necessiated change in the serial number of the

forests according to the present boundary of the Seraj Forest Division. Moreover the pattern adopted earlier for the nomenclature of the forest compartments and sub compartments does not conform to the instructions issued in this behalf in the working plan code of the department.

Para 133 of the forest settlement of Kullu states that one of the objects of the division of demarcated protected forests into two classes was that the 2nd class and undemarcated forests should be managed through the agency of the Negis (headmen)of the Kothis who would be responsible for their proper management, while forest, department would merely control the action of the Negis, the latter would grant trees to the people in accordance with rules, assisted by rakhas who are paid by the Kothis. It is intended that the first class forests will be managed exclusively by the officials of the forest department.

In the light of above observations of the forest settlement the classification of demarcated protected forests into 1st class and 2nd class has become redundant, since all the classes of forests are now under the direct control of the forest department, the agency of Negis is now nowhere. This also makes a case for renumbering of all the forests in the division irrespective of their classification.

Therefore, the serial number of the forests has been redone taking the whole forest division as a unit instead of a particular area as earlier. Similarly the nomenclature for numbering the compartments and sub compartments has been brought strictly in accordance with the instructions contained in the working plan code. The serial number together with the old corresponding numbers of the forests has been given in Appendix-II.

1.11 State of Boundaries

The boundaries of the reserved and protected forests were marked at the time of forest settlement by Anderson and according to the settlement report the boundary register was deposited with the then Divisional Forest Officer at Kullu. However now this boundary register pertaining to the Serai Forest Division is not traceable. No boundary records were available either at the headquarter of the Divisional Forest Officer Seraj or their range headquarters making it difficult to check the position of the boundaries. Whatever forests were declared as reserved and protected I class and IInd class were not entered in the revenue records as such either. The III class forests were not demarcated at all during the settlement operations. In the absertaining to the Seraj forest division is not traceable. No boundary records were available either at the headquarter of the divisional forest officer Seraj or their range headquarters making it difficult to check the position of the boundaries. Whatever forests were declared as reserved and protected I class and IInd class were not entered in the revenue records as such either. The III class forests were not demarcated at all during the settlement operations. In the absence of boundary register and mention about the boundaries of the forests in the revenue records of the district, the only option left, for checking of the boundaries of the forests, was with the help of 4"=1 mile survey sheets.

The detail of observations about the state of boundaries has been recorded in the compartment history files of the forests. While constructing the new cement concrete boundary pillars the GPS locations are being recorded and details of these is being written in boundary register

From the field inspections it is observed that only a few number of boundary pillars were erected at the time of settlement and some intermediate boundary pillars were corrected

subsequently but their record is not available now.

The III class forests have not been surveyed so far and no boundary for them exists. All the wastelands in the tract excluding the cultivations/private land over which the government has proprietary rights have been declared as III class forests. The area of the III class forests mentioned in previous and this working plan is based on ocular estimates. Similarly the boundaries of such forests shown in maps are on the basis of ocular estimation.

1.12 Legal Position

The settlement of Kullu forests began in 1866 and was carried at a time when the Indian Forest Act was passed in 1878. By that time some area had been demarcated and rules which had been drawn up by Mr Duff, the then Forest Officer Kullu under the provision of the rules of 1855 were in force. After the passing of the Forest Act, the first notification with a view to effecting the settlement of the forests under Chapter-II of the Act was issued in July, 1880. In 1883, orders were issued by the Punjab government that bulk of the forests were to be treated as protected; only small and special areas being constituted as 'reserves'.

Soon after the issue of these orders the work of settlement was commenced by Mr. Alexander Anderson, the Assistant Commissioner, assisted by Mr. Gisborne Smith, the local Forest Officer.

The settlement report was submitted in 1886 and the proposed 'reserves' were gazetted as such in 1895 and after considerable alterations had been made in the record of rights, and in the proposed rules for the protected forests, the necessary notifications concerning them were issued in 1896.

The final result of the settlement was to create four classes, of forests of which the first constituted the ' reserved' under chapter-II of the Forest Act while the others were placed under the provisions of chapter IV of the, Act.

The 'Protected forests were divided into demarcated forests of 1st and 2nd classes and undemarcated forests also termed III class forests. The general difference between 1st and 2nd classes is that in the former the rights of user are less extensive and more clearly defined than in the latter, a difference which was made because the first class forests were more valuable both for the people and for producing timber for export. The 2nd class forests differ from the undemarcated forests in having the grazing rights in them more clearly defined and also in being intended to be preserved from being broken up for cultivation.

Though the boundaries of the 'reserved' and demarcated protected 'forests were defined and notified in the gazette by the government of Punjab, yet these forests have not been entered as such in the revenue record of the district. The result is that in the past a number of 'nautors' have been granted by the revenue officers in the demarcated forests. For them all classes of forests created and notified through the forest settlement is nothing more than wasteland. This is a situation where the revenue department is working against the interest of forest department. The government of Himachal Pradesh has now decided that all the forests notified as 'reserved' and 'demarcated protected' forests should be entered in the revenue record as such and the process of entering in revenue records has been initiated.

It is being experienced now that such entries cannot be made unless a joint revenue and forests settlement is undertaken and record is prepared of such forests after proper demarcation along with the private lands.

It is relevant here to add that during revenue settlement in the Kullu district only the private holdings were measured and record thereof made, rest of the area comprising government land was categorized as waste land and grazing land.

With the enforcement of "Forest Conservation Act' 1980, the revenue department and other departments are finding it difficult to parcel away to a third party or even government department even the areas under III class forests, as no forest area can be put to a non-forestry use any where, without the approval of the government of India.

1.13 Rights and concessions

The rights were inquired into and recorded at the time of the forest settlement. These rights are recorded in the record of rights register. The rights were recorded in each forest separately and form Appendix-XII of the plan. The general conditions for exercise of rights were also laid down and form a part of the Appendix.

According to para 33 of the settlement report dealing with reserved forests and para 43 dealing with protected forests and condition number 4 of the general conditions for, Ist,IInd and III class protected forests, the 'rights 'are appended to the cultivated land, assessed to revenue, including cultivated land recorded at the last assessment of the revenue as waste belonging to private persons upon which, this is liable to assessment, no revenue was charged in the internal distribution(bachh), and also land brought under cultivation since last assessment of the revenue with the permission the Assistant Commissioner, and they are acquired and alienated only with such land. They are exercised only for the confide agricultural and domestic purposes of right holders.

The rights thus have been recorded by villages and hamlets and not by individuals name. The rights can be acquired or alienated only with the land.

For non-agricultural residents' i.e. residents who are neither Proprietors nor cultivators of land, some concessions have been allowed in IIIrd class forests. Para 60 of the settlement report lays down that such non-agricultural residents have been allowed to graze their cattle, sheep and goats, to collect dry fuel and to cut grass in the undemarcated areas subject to withdrawal in case of abuse. The general conditions are laid down in notification No. 282 dated 1st June 1896 for undemarcated forests.

Punjab government, however appointed a commission of inquiry beaded by Mr. Carbett after some representations were made regarding the administration of rights, particularly right to trees. On the recommendation of the commission, Punjab government vide notification 1590-Ft dated 2.6.1941 changed the definition of right holders and forbade the transfer of rights of land was alienated. However, during this notification was cancelled vide Punjab government notification No. 4117 dated 26.4.1948 and old definition of right holders was retained conferring rights with the alienation of land.

The Government reiterated condition number 10 of the general conditions for the exercise of rights in various forests which is Reproduced below

"To all rights admitted are subject to the limitation that they may not be exercised to an extent that may endanger the existence of the forest, a limitation must be placed on the exercise of those rights over which the rights are admitted. If the exercise of the rights as admitted would endanger the existence of the forest and in that case the extent of the rights of right holders interest

shall be proportionate to the revenue assessed or that might be assessed in respect of the land to which the right is appended.

Para 67 of the settlement laid down that tree at, 'Zimindari' rates was not- available to a person who has acquired a land by purchase, for construction of a house on the acquired land if seller of the land has already got a house and thus new settlers are required to buy trees at market rate.

The details of rights recorded and a restriction placed on their exercise is found in the record of rights and various paragraphs of the forest settlement of Kullu.

The salient features of the rights of various types of forests is that there are very few or no rights in the reserved forests, very defined and few rights the in first class forests and comparatively more rights in second class forests. In third class forests the permission has been made for the exercise of certain concessions to the non-agricultural residents in addition to the exercise of rights by the right holders.

The rights may be suspended in cases of willful neglect to extinguish fires. The important rights are dealt with in the following paragraphs: –

1.13.1 New TD Policy

The administration under its executive orders has been prescribing the procedure to be adopted for the grant of the timber to right holders. The latest notification have been issued by the Govt. of H.P. vide No. FFE-B-E (3)-43/2006-Volume-I dated 13/10/2009 reproduced below.-

The case was examined by the government at length and some policy decisions have been taken. In view of the multiplicity of orders on the subject, it is necessary to consolidate the same and to make them applicable uniformly all over the state. Following instruction are issued in this regard for strict compliance with immediate effect:-

1. **Short title: -** These rules shall be called the Himachal Pradesh Forest (Timber Distribution to the Right Holders) Rules, 2009.
2. **Definition: -** (1) In these rules, unless the context otherwise requires: -
   (a) 'Government' means the Government of Himachal Pradesh;
   (b) The term 'below poverty line' shall have meaning as assigned to it by the Department of Panchayati Raj, Himachal Pradesh.
   (c) 'Right Holder' means a person entitled to exercise rights recorded in the 'record of rights' as per the Forest Settlement Report of the area concerned;
   (d) 'Record of right' means, right records in the Forest Settlement Reports;
   (e) 'Timber Distribution' means the policy of distribution of timber to the right holders as per record of rights recorded in the Forest Settlement Reports; and
   (f) 'Timber Distribution Rights' means right of a Right Holder having cultivable lands for grant of timber for construction of residential house and cow shed etc. for bonafide domestic use of the Forest Settlement Reports; and
   (2) All other words and expressions used but not defined in these rules shall have the meaning assigned to them in the Indian Forest Act, 1927.
3. **Entitlement: -** Timber shall be granted to the Right Holders who have their recorded rights in the concerned Forest Settlement Reports for grant of Timber Distribution for construction/maintenance of residential house, cow shed etc. for bonafide domestic use:

Provided That: -

(i) No timber Distribution shall be granted in urban area;

(ii) No Timber Distribution shall be granted if trees to meet the requirement of timber for construction of residential house, cowshed etc. are available on the land holdings of the Right Holder concerned. However, he shall have the right to fell trees from his own land as per the provisions of the Himachal Pradesh Land Preservation Act, 1978 and rules made there under;

(iii) No Timber Distribution shall be granted for 10 years if the right holder has sold trees yielding timber for construction of houses from his private land holding;

(iv) In case right holder has land holding at more than one place, he shall have option of getting Timber Distribution at one place only. For this purpose a Right Holder shall submit an affidavit clarifying therein his rights of Timber Distribution at different place and his place of option for getting Timber Distribution. Option once exercised shall not be allowed to be changed.

(v) With effect from the date of notification of these Rules, no Timber Distributions shall be granted to a land owner who has purchased land after obtaining the permission of the Government under section 118 of the Tenancy and Land Reforms Act, 1972, irrespective of the date of purchase of such land.

(vi) Timber Distribution shall not be granted for the construction/maintenance of buildings to be used for commercial and hiring purposes;

(vii) Timber Distribution shall not be granted to the head of the family as per the revenue records;

(viii) Timber Distribution shall not be granted to the Right Holders, if trees for the purpose are not available silviculturally in the forest where concerned right holders have Timber Distribution right;

(ix) Timber Distribution Rights shall be subject to cooperation and participation of Right Holders in forest conservancy. In case any Right Holder fails to perform his duties for apprehending offenders, extinguishing fire or commits any forest offence as contained in the Forest Settlement Report, his right of Timber Distribution shall be suspended upto 10 years; and

(x) Timber Distribution Right of a Right Holder shall be suspended up to 10 years if he is found to have mis-utilized the timber Distribution grant or committed any forest offence until he is eligible again for Timber Distribution.

4. Quantity: - (1) Timber Distribution shall be granted in converted form from the depots to be specified separately as per scale fixed below: -

(i) for construction of new house = 3 cubic meters; and

(ii) for maintenance = 1 cubic meter.

(2) Timber Distribution shall be given from salvage (fallen, dry standing), silviculturally available green trees in the order of preference.

5. Periodicity: - The periodicity for grant of Timber Distribution to the Right Holders will be as under: -

(i) for new construction once in life time or 30 years whichever is later;

(ii) for additions/alterations – once in 15 years; and

(iii) sufferers of natural calamities/fire sufferers: as per actual requirement as recommended by the Sub Divisional Officer (Civil) and after personal verification by the ACF/DFO concerned subject to the grant not exceeding the maximum limit prescribed under rule – 4.

6. Rates: - The rates to be charged from the different types of Right Holders for grant of Timber Distribution will be as under: -

(i) Right Holders above poverty line- 30% of the rates at which timber is sold by the Himachal Pradesh State Forest Development Corporation Ltd commercially;

(ii) Right Holders below poverty line- 10% of the rates at which timber is sold by the Himachal Pradesh State Forest Development Corporation Ltd. Commercially; and

(iii) Right Holders suffering from natural calamities – free of cost.

7. Priority for grant of Timber Distribution: - Priority for grant of Timber Distribution shall be given to the Right Holders belonging to Below Poverty Line. Right Holders above poverty line shall be granted Timber Distribution on first come first served bases.

8. Procedure for grant Timber Distribution: - Application for grant of Timber Distribution, on the form appended to these rule as 'Annexure-I' shall be submitted by Right Holder (s) to the Panchayat concerned after getting necessary remarks from the patwari concerned. The Panchayat after ascertaining genuineness of the requirement of the Right Holders shall pass resolution in the Gram Sabha of the Panchayat indicating actual quantity of recommending grant of Timber Distribution of the individual (s) concerned. After resolution recommending grant of Timber Distribution is passed by the concerned panchayat, right holders shall submit his Timber Distribution application to the Forest Guard of the area who shall enter the same in the register maintained for the purpose and issue receipt of the application to the Right Holder. He shall send his recommendations to the Block Officer after recommendations to the Range Officer. After receipt of Timber Distribution application from the Range Officer, the Divisional Forest Officer shall take action for sanction of the Timber Distribution after satisfying himself about the genuineness of the requirement and silvicultural availability of trees/ timber in the concerned forest and intimate his decision/ Timber Distribution grant to the Right Holder concerned on the Performa appended to these rules as 'Annexure-II'. A schedule for grant of Timber Distribution shall be framed and notified for publicity to all panchayats and other functionaries in the Forest Division by the Divisional Forest Officer.

9. Time schedule for grant of Timber Distribution: - The right holders shall apply for grant of Timber Distribution through concerned Panchayat to the concerned forest guard by 31st March of each year. The application shall be processed and Timber Distribution shall be given to eligible right holders between September to December of the year as per procedure under rule 8 and no Timber Distribution shall be granted thereafter for that year;

10. Jurisdiction of the use of Timber: - Timber granted under these rules shall be allowed to be carried within revenue estate without obtaining any permission and affixing of Timber Distribution hammer and if the timber is to be carried out from one estate to another, the Right Holder shall have to obtain a permission from the Range Officer concerned for this purpose. Timber granted shall be utilized by the Right Holder within a period of maximum one year. In case, Timber Distribution grant could not be utilized within the specified period, concerned Divisional Forest Officer shall grant extension for its use based on the genuineness of the case. The Divisional Forest Officer shall ensure through his staff that the Timber Distribution grant is used for the purpose for which it was sanctioned. In case Timber Distribution grant is not utilized during the permissible period, the same may be seized by the Forest Department and the decision taken by the Divisional Forest Officer relating to grant of Timber Distribution shall be final.

11. Depot: - The depots from where Timber Distribution in converted form shall be supplied to the right holders shall be notified by the Divisional Forest Officer every year. Any change during the next year in the place of these depots shall also be notified. These notifications shall be widely circulated up to the Panchayat level by the Divisional Forest Officer.

12. Size and dimensions of Timber Distribution timber: - The Timber Distribution timber shall be converted and sold in different sizes other than standard sizes made by Himachal Pradesh State Forest Development Corporation Ltd. For commercial purpose.

13. Monitoring of data base and checking: - The data regarding details of right holders, options exercised by the right holders, Timber Distribution granted, utilized, etc. shall be maintained and monitored panchayat and range wise by the Divisional Forest Officer concerned. This data shall be further be monitored and evaluated by Chief Conservator of Forest (Monitoring and Evaluation) at Sundernagar and annual report sent to Principal Chief Conservator of Forest, Himachal Pradesh.

14. Penalty and Punishment: - The right holders who: -

(i) Misuse of Timber Distribution for commercial purposes;
(ii) Sells Timber Distribution;
(iii) Transports timber outside the jurisdiction of Revenue estate without permission;
(iv) Utilizes Timber Distribution after the time schedule given in permit has expired; and
(v) do not participate in the duties enshrined in the Forest Settlement Report alongwith rights,

Shall be penalized as per relevant provisions of Indian Forest Act, 1927, in addition to suspension of their rights for such period as may be determined by the concerned Divisional Forest Officer.

15. Repeals and savings: - (1) The existing rules, notifications, directions and instructions framed and issued by the Government or Himachal Pradesh Forest Department concerning the Timber Distribution to the Right Holders are hereby reappeared and rescinded.

(2) Notwithstanding such repeal or recession any action taken or anything done under the rules so repealed and notifications, directions and instructions framed and issued so rescinded shall be deemed to have been taken or done under the issued so rescinded shall be deemed to have been taken or done under the corresponding provisions of these rules.

1.13.2 Right to Timber

Right holders have a right to get timber at concessional rates for the construction/repair of the house and cattle shed etc. meant for non-commercial use. Right holders are also entitled to remove all Kail, Chil and Fir trees uprooted by snow or otherwise and can remove for the purposes mentioned in the record of rights in each forest for a particular village. But the right holders are not entitled to sell or barter or apply to any but the purpose for which it was required. The timber thus obtained can be used for the construction of dwelling house within the limits of the kothi where the cultivated land on account of which the trees are given is situated.

However, the right holders have now been allowed to take timber from one kothi to the other by the government of Himachal Pradesh. All broad leaved trees except Walnut, Ash and Box wood are granted free to the right holders.

All dry fallen wood except Deodar, Walnut, Box and Ash can be taken without permission. Right to Deodar tree in first class forests has not been allowed in the settlement, (para 46 of settlement). Deodar can be granted from second class forests on the payment at reduced rates. (para 56 of the settlement report). Deodar should normally be granted for doors and windows only (para 13) of the forest settlement report), but it is seen that the right holders manage to get Deodar for whole of the building.

The demand for timber has been increasing in the past at a rapid pace. One reason is the partition in the family and increase in population in the area. The second reason may be attributed to the development of the people in their financial position and purchasing power due to development of horticulture and a good return on fruit crop. The third reason is the absurdly low rate at which trees are granted to the right holders as compared to the prevailing market rate. The timber thus obtained on so called concessional rates was in some cases misutilised by the right holders through sale to non-right holders and city dwellers at nearby towns. But after T.D was banned by the orders of Hon'ble High court in the year 2006 and new T.D policy was made by the Govt. The administration under its executive orders has been prescribing the procedure to be adopted for the grant of the timber to right holders. The latest notification have been issued by the Govt. of H.P. vide No. FFE-B-E (3)-43/2006-Volume-I

dated 2/1/2010

The zamindari or concessional rates at which a right holder gets timber are reproduced below:-

Rates for right holders (Rs.)

Tree	Cost per Sleeper of standard size for right holder above poverty line	Cost per sleeper of standard size for right holders below poverty line
Deodar	717	239
Kail	449	150
Fir	298	99
Chil	200	67
Sal	291	97
Sain	223	74
Kokath	111	37
Walnut	386	129
Eucalyptus	170	57
Shisham	293	98
Neem	144	48
Mango	124	41
Poplar	202	67
Siris	141	47
Khair	748	249
Tuni	194	65
Sagwan	520	173
Ohi	186	62

1.13.3 Procedure for grant of timber to right holders

The procedure for grant of timber to the right holders has been undergoing change right from the forest settlement. In the good old days the local population was small, their means scarce, and demand used to be low because of poverty. The trees at right holders rate were used to be sanctioned by the negis in the second and third class forests and the negis were controlled by the Forest Officers. The Divisional Forest Officer and the Assistant Commissioner used to sanction the trees on zamindari rates alternatively by going round the villages and deciding the demand of the people on the spot after due verification. The timber also, except that of Deodar, was not valuable either. There used to be hardly any market demand for the timber species other than deodar.

7) Forest Guard will personally verify the genuinessess of the demand and make his remarks/recommendations accordingly. He will also mention the grants which were made during the last 5 years to the applicant and indicate the timber which may be available in his house. The recommendation of the sarpanch of the Panchayat will also be obtained by the forest guard.

8) Ordinarily grant will be made once in 5 years. In case of natural calamities like fire, flood, landslips, earthquakes etc, grants can be made at less frequent intervals also.

9) The forest guard will submit his report to the block officer concerned. The block officer in turn after verification and mentioning about silvicultural availability of trees in the forest from which "the grant is to be made, will submit his report to the Range Officer.

The Range Officer will scrutinise the recommendations of block officer and make his recommendations to DFO. The grants will be made by the DFO during his tours after discussing each application with the Finger Officer, Block Officer and the Forest Guard concerned.

10) Timber distribution will be done by the DFO once a year. He will draw up a programme for each Range in his jurisdiction. The present practice of granting trees to right holders throughout the year must stop.

11) No timber distribution will be done by the DFO in his office. This distribution will be done in the field in the presence of other right holders so that any discrepancy in the demand is also pointed out during such meetings.

12) Block Officer will be personally responsible for marking trees strictly in accordance with silvicultural availability and the provisions of the sanctioned working plan. Marking must be done within a month of the grant of trees by the DFO. Since a large number of spurious hammer marks have been used, a facsimile of the hammer mark will be affixed on all the three copies of the permit.

13) The extraction of timber shall have to be completed within 3 months of markings of trees by the Block Officer. The Forest Guard will record the timber extraction on the back of the permit and affix T.D. Hammer mark on each piece of the timber so extracted.

14) The right holders may be permitted to carry the timber within a revenue estate without obtaining any permission after affixation of T.D.hammer.

15) Any right holder who has sold trees in private sale from his holdings should not be granted trees for 10 years in T.D. A register should be maintained by each Block Officer giving the names of the persons who have sold trees in private sales.

16) If any right, holder is found to have indulged in illicit felling, grant of trees at zamindari rates should be refused for five years.

17) Any misuse of timber granted under T.D. grants amounts to cheating the government and future grants should be refused for at least 5 years.

18) Every Block Officer and Range Officer will check the marking, felling and utilization of trees given at zamindari rates during their tours. The Block Officer will check at least 50% and Range Officer 25% of the grants made and its utilization by right holders. The DFO will .also check the marking, felling and utilization of trees given at zamindari rates during their tours. A mention of said checking by Block Officer, Range Officer, ACF and DFO will be made in their tour diaries.

19) It will b© the personal responsibility of the DFOs to ensure that the prescribed TD registers are maintained in each beat of their division as per standard proforma and the same are checking by them personally as well as through their ACFs/ROs when on tour.

20) To guard against excessive grant and misuse of T.D timber, it is laid down that the houses for which standing trees are granted at concessional rates built according to the actual bonafide domestic requirements of the right holders and not meant for commercial purpose and the trees so granted are used only for purpose for which these are sanctioned.

21) The T.D. application will be sanctioned only on receipt of a clear cut report from the Range Officer that trees previously granted(within the last 5 years) have been utilized for the intended purpose and that in case of new constructions the applicant has taken preliminary steps such as collection of building stones and roofing slates etc. at the building site as a proof of the genuinessess of his demand.

22) The timber grants should be confirmed during the specific months/periods as per para (10) above. No piecemeal applications are to be entertained except in cases of natural calamities.

23) All trees marked in T.D must be given carved/engraved serial numbers (khudan marks) which should run continuously for each individual forest for a given calendar year.

24) While detecting and taking note of the illicit felling in the damage register as per Performa reproduced below and issuing damage reports, the mere hammer marking at the top surface of such stamps by the beat guards will not suffice. In addition to the tops- of all such stumps of illicitly felled trees will be given engraving (khudan marks) serial number by individual forests for a given calendar year:-

Name of Forest

Sr.No.	Species	Stump dia in cm	Damage Report No. and date.	Remarks
1.	2.	3.	4.	b.

25) It should be clearly understood that all trees felled from a particular forests, whether as TD grants or as illicit felling, are to appear in the respective T.D. and damage register.

2) In case of natural calamities like fire, floods etc. special grants for TD may be made expeditiously.

3) It has been observed that people belonging to lower strata of the society are generally denied T.D. and they are made to run after forest functionaries repeatedly. Their demand should be considered with special consideration.

4) Special care should be taken to see that the grants under T.D. do not exceed the prescribed yield in any Working Circle at any time. This is the personal responsibility of the DFO to ensure that grants are not made indiscriminately so as to upset the prescriptions of the working plan.

5) In tribal areas Range Officers are authorised to sanction upto three trees under exceptional circumstances. These grants will not include more than one 1st class and one 2nd class tree under any circumstances.

6) The timber granted in a revenue estate can be used within the same estate and no permission is required for the movement of such timber within the revenue estate. It will be necessary to record the timber extracted from the trees so granted on the back of the permit so that an account if the timber is maintained. The timber to be exported will be hammer marked before it is allowed to be moved out. Minimum period, keeping in view of the terrain of the area, should be allowed. The export/movement permit should not remain in force longer than absolutely essential.

7) CFs may make necessary amendments where ever considered feasible to suit the local conditions but under intimation to direction office.

1.13.4 Recently government has decided in case of Kullu and Chamba Districts as under:-

i) Min-khata holders of Kullu who have acquired ownership of land under land Tenancy Act or under any other provision of Land Reforms Act or any government scheme are provided land will enjoy the concessions of getting timber for their bonafide domestic use.

ii) Tribal min-khata holders of Himachal Pradesh settled in Kullu will get the concessions on timber for the bonafide domestic use at one place of their choice including Kullu District after getting their rights of getting T.D. in other districts extinguished. Intimation about the extinction of rights in other districts/areas will be communicated by the DFO of the area where such rights are exercised to other DFOs.

iii) Tribal's will be allowed to enjoy this right/concession once in seven years at one place starting from the latest grant in any area.

According to the executive instructions of CCF/HP vide memo. No. Ft.29-93/63(M) dated 8.9.1983. ROs can grant up to 5 trees preferably dry failed and snow damaged trees out of which not more than one trees is 1st class and one IInd class in case of damage by fire of flood etc.

1.13.5 Trees are sanctioned to non-right holders and other departments at the prevailing market rate during the year. These rates are revised every year by the government on the proposals of the Conservator of Forests/Chief Conservator of Forests. These rates fluctuate with the rates in the open market. The rates prevalent during 2012-13 for Conifers and Broad leaved species is reproduced below.-

Calculation Diameter class wise market rates (in Rs.) of Standing Trees of Various Species in HP

Sr.No. & name of Spp.	Class	Rate	Average volume factor	Rate of Standing Green Trees
1. Deodar	V	52386.4	0.06	3143.184
	IV	52386.4	0.14	7334.096
	III	52386.4	0.42	22002.288
	IIA	52386.4	1.27	66530.728
	IIB	52386.4	2.41	126251.224
	IA	52386.4	3.54	185447.856
	IB	52386.4	4.81	251978.584
	IC	52386.4	6.09	319033.176
	ID	52386.4	7.08	370895.712
2. Kail	V	41848.4	0.06	2510.904
	IV	41848.4	0.14	5858.776
	III	41848.4	0.42	17576.328
	IIA	41848.4	1.27	53147.468
	IIB	41848.4	2.41	100854.644
	IA	41848.4	3.54	148143.336
	IB	41848.4	4.81	201290.804
	IC	41848.4	6.09	254856.756
	ID	41848.4	7.08	296286.672
3. Fir/Spruce	V	24680.7	0.06	1480.842
	IV	24680.7	0.14	3455.298
	III	24680.7	0.85	20978.595
	IIA	24680.7	1.7	41957.19
	IIB	24680.7	3.11	76756.977
	IA	24680.7	5.1	125871.57
	IB	24680.7	7.08	174739.356
	IC	24680.7	8.49	209539.143
	ID	24680.7	9.34	230517.738
4. Chil	V	20493	0.06	1229.58
	IV	20493	0.14	2869.02
	III	20493	0.42	8607.06
	IIA	20493	1.27	26026.11
	IIB	20493	2.41	49388.13
	IA	20493	3.54	72545.22
	IB	20493	4.81	98571.33
	IC	20493	6.09	124802.37
	ID	20493	7.08	145090.44

5. Eucalyptus	V	11419.1	0.014	159.8674
	IV	11419.1	0.274	3128.8334
	III	11419.1	0.708	8084.7228
	IIA	11419.1	1.336	15255.9176
	IIB	11419.1	2.117	24174.2347
	IA	11419.1	3.232	36906.5312
	IB	11419.1	4.5	51385.95
	IC	11419.1	5.982	68309.0562
	ID	11419.1	7.678	87675.8498
6. Siris	V	5174.4	0.014	72.4416
	IV	5174.4	0.274	1417.7856
	III	5174.4	0.708	3663.4752
	IIA	5174.4	1.336	6912.9984
	IIB	5174.4	2.117	10954.2048
	IA	5174.4	3.232	16723.6608
	IB	5174.4	4.5	23284.8
	IC	5174.4	5.982	30953.2608
	ID	5174.4	7.678	39729.0432
7. Ban/Mohru/Kharsu	IV	23958	0.3	7187.4
	III	23958	1	23958
	IIA	23958	1.8	43124.4
	IIB	23958	3	71874
	IA	23958	4.6	110206.8
	IB	23958	6.4	153331.2
	IC	23958	8	191664
	ID	23958	9.6	229996.8
8. H.C. Nut	IV	4165.7	0.3	1249.71
	III	4165.7	0.8	3332.56
	IIA	4165.7	1.7	7081.69
	IIB	4165.7	2.7	11247.39
	IA	4165.7	3.9	16246.23
	IB	4165.7	5.6	23327.92
	IC	4165.7	7.1	29576.47
	ID	4165.7	9	37491.3
9. Walnut	IV	26211.9	0.2	5242.38
	III	26211.9	0.8	20969.52
	IIA	26211.9	1.5	39317.85
	IIB	26211.9	2.5	65529.75
	IA	26211.9	3.8	99605.22

	IB	26211.9	5.1	133680.69
	IC	26211.9	7.2	188725.68
	ID	26211.9	8.9	233285.31
10. Poplar	IV	10777.8	0.3	3233.34
	III	10777.8	0.7	7544.46
	IIA	10777.8	1.4	15088.92
	IIB	10777.8	2.8	30177.84
	IA	10777.8	4.9	52811.22
	IB	10777.8	6.8	73283.04
	IC	10777.8	9	97000.2
	ID	10777.8	11.2	120711.36
11. Mapple	IV	11550	0.2	2310
	III	11550	0.7	8085
	IIA	11550	1.3	15015
	IIB	11550	2.1	24255
	IA	11550	3.3	38115
	IB	11550	5	57750
	IC	11550	6.9	79695
	ID	11550	8.5	98175

1.13.6 Quantity of timber granted in TD to the right holders in Seraj forest division has been worked out by Kapoor in his IV working plan as follows: -

Period	Total volume of timber granted m^3)	Av./Year (m^3)
1934-35 to 1947-48 (14 years)	68,900	4, 921
1949-50 to 1963-64 (15 years)	82, 500	5, 5000
1961-62 to 1970-71 (10 years)	1, 05, 300	10, 530

The species wise detailed figures are not available because of burning of the office of Seraj forest division in 1985 in which the whole record was gutted. However, the figures of timber granted in TD to the right holders in Seraj forest division has been obtained from the Kullu Circle office from the Annual Administration report files from the year 1967-68 to 1986-87 (except 1976-77 & 1985-86) species wise and granted from different category of forests viz reserved, DPF and III class and is reproduced below: -

1967-68
Volume in (m^3)
Species

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
R.F.	138	1	1	-	-
DPF	1419	1147	35	181	13
III class	2743	5554	297	347	72
Total	41000	6702	333	528	85

G. Total = 48648

1968-69

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	362	55	-	-	-
DPF	2683	1633	55	163	9
III class	5233	4826	513	690	146
Total	8278	6514	568	853	155

G. Total = 16368

1969-70

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	-	-	-	-	-
DPF	499	406	26	103	2
III class	1882	1957	68	-	75
Total	2381	2363	94	103	77

G. Total = 5018

1970-71
Not available

1971-72

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	60	58	-	-	-
DPF	3199	1358	9	222	341
III Class	11266	9866	266	639	33
Total	14525	11282	235	861	374

G. Total = 27277

1972-73

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	-	-	-	-	-
DPF	196	266	-	3	104
III class	1750	1783	14	274	69
Total	1946	2049	14	277	173

G. Total = 4459

1974-75

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	-	-	-	-	-
DPF	756	672	1	140	4
III class	2035	2803	5	247	10
Total	2791	3475	6	387	14

G. Total = 6673

1975-76

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	324	-	-	-	-
DPF	4112	2319	34	869	26
III class	17752	16507	125	1744	133
Total	22188	18826	159	2613	159

G. Total = 43, 345

1976-77

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	31	7	-	-	-
DPF	1209	1019	9	374	1
III class	4634	6553	299	944	25
Total	5874	7579	308	1318	26

G. Total = 15, 105

1977-78

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	18	4	-	-	-
DPF	253	152	-	11	4
III class	815	559	1	51	-
Total	1086	715	1	62	4

G. Total = 1868

1978-79

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	129	54	-	-	1
DPF	2041	1788	1	223	3
III class	9206	5335	31	608	24
Total	11376	7177	32	831	28

G. Total = 19,444

1979-80

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	-	-	-	-	-
DPF	275	588	7	10	-
III class	1411	3565	105	217	7
Total	1686	4153	112	227	7

G. Total = 6185

1980-81

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	6	2	-	-	-
DPF	645	158	-	24	-
III class	1675	918	10	141	8
Total	2316	1078	10	165	8

G. Total = 3,577

1981-82

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	2	-	-	1	-
DPF	204	85	-	8	-
III class	1271	595	-	34	-
Total	1477	680	-	43	-

G. Total = 2,200

1982-83

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	-	-	-	-	-
DPF	80	78	-	1	-
III class	515	327	-	27	-
Total	595	405	-	28	-

G. Total = 1,028

1983-84

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	7	2	1	1	2
DPF	760	645	3	138	8
III class	2138	1605	27	411	1
Total	2898	2255	31	550	11

G. Total = 5,745

1984-85

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	84	10	-	-	-
DPF	836	337	1	102	-
III class	2577	2268	9	153	-
Total	3487	2615	10	255	-

G. Total = 6367

1985-86

Not available

1986-87

Category of Forests.	Deo.	Kail	Chil	Fir	Broad leave.
RF	103	47	-	-	-
DPF	187	46	1	41	-
III class	678	727	1	14	1
Total	968	820	2	55	1

G. Total = 1,846

DATA REGARDING SANCTION OF TREES TO RIGHT HOLDERS IN SERAJ FOREST DIVISION W.E.F. 1986 TO 2002 SPECIESWISE IN VOLUME (M3)

1987-88

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	102.61	17.96	-	-	-	120.57
DPF	940.68	263.47		7.1	-	1211.25
III classs	1551.3	129.11	-	28.48	-	1708.89
Total	2594.59	410.54	0	35.58	0	3040.71

1988-89

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	79.84	11.92	-	-	-	91.76
DPF	794.96	192.01	-	10.33	-	997.3
III classs	5260.31	3117.47	-	212.87	-	8590.65
Total	6135.11	3321.4	0	223.2	0	9679.71

1989-90

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	82.6	3.54	-	-	-	86.14
DPF	585.49	59.59	-	3.5	-	648.58
III classs	2964.99	1700.21	-	45.61	-	4710.81
Total	3633.08	1763.34	0	49.11	0	5445.53

1990-91

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	179.08	63.61	-	-	-	242.69
DPF	342.98	83.72	-	3.54	-	430.24
III classs	2831.6	1302.78	-	16.5	-	4150.88
Total	3353.66	1450.11	0	20.04	0	4823.81

1991-92

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	47.7	7.08	-	-	-	54.78
DPF	192.66	42.93	-	6.8	-	242.39
III classs	2078.13	1332.07	-	24.53	-	3434.73
Total	2318.49	1382.08	0	31.33	0	3731.9

1992-93

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	23.78	-	-	-	-	23.78
DPF	225.91	109.88	-	-	-	335.79
III classs	2192.89	1201.63	-	24.34	-	3418.86
Total	2442.58	1311.51	0	24.34	0	3778.43

1993-94

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	3.54	-	-	-	-	3.54
DPF	165.44	45.43	-	28.02	-	238.89
III classs	1404.69	471.14	-	14.34	-	1890.17
Total	1573.67	516.57	0	42.36	0	2132.6

1994-95

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	7.08	-	-	-	-	7.08
DPF	155.26	22.65	-	5.1	-	183.01
III classs	906.93	278.01	-	5.16	-	1190.1
Total	1069.27	300.66	0	10.26	0	1380.19

1995-96

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	-	-	-	-	-	0
DPF	282.62	9.49	-	2.41	-	294.52
III classs	1088.89	269.44	-	26.62	-	1384.95
Total	1371.51	278.93	0	29.03	0	1679.47

1996-97

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	-	-	-	-	-	0
DPF	481.67	18.97	-	-	-	500.64
III classs	1153.47	83.24	-	-	-	1236.71
Total	1635.14	102.21	0	0	0	1737.35

1997-98

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	-	-	-	-	-	0
DPF	211.83	10.62	-	-	-	222.45
III classs	1182.52	143.73	-	-	-	1326.25
Total	1394.35	154.35	0	0	0	1548.7

1998-99

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	-	-	-	-	-	0
DPF	310.41	8.35	-	-	-	318.76
III classs	1157.2	148.77	-	-	-	1305.97
Total	1467.61	157.12	0	0	0	1624.73

1999-2000

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	-	-	-	-	-	0
DPF	-	-	-	-	-	0
III classs	917.11	120.82	-	-	-	1037.93
Total	917.11	120.82	0	0	0	1037.93

2000-01

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	-	-	-	-	-	0
DPF	319.05	7.08	-	-	-	326.13
III classs	853.34	17.7	-	-	-	871.04
Total	1172.39	24.78	0	0	0	1197.17

2001-02

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	-	-	-	-	-	0
DPF	286.77	11.19	-	-	-	297.96
III classs	727.46	36.67	-	-	-	764.13
Total	1014.23	47.86	0	0	0	1062.09

2002-03

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	-	-	-	-	-	0
DPF	13.16	48.83	-	12.44	-	74.43
III classs	324.2	11.89	-	-	-	336.09
Total	337.36	60.72	0	12.44	0	410.52

2003-04

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	-	-	-	-	-	0
DPF	381.38	13.03	-	-	-	394.41
III classs	984.52	112.37	-	-	-	1096.89
Total	1365.9	125.4	0	0	0	1491.30

2004-05

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	-	-	-	-	-	0
DPF	162.99	7.08	-	-	-	170.07
III classs	1011.8	97.53	-	29.16	-	1138.49
Total	1174.79	104.61	0	29.16	0	1308.56

2005-06

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	-	-	-	-	-	0
DPF	339.38	29.6	7.08	-	-	376.06
III classs	1305.19	186.78	-	3.11	-	1495.08
Total	1644.57	216.38	7.08	3.11	0	1871.14

2006-07

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	-	-	-	-	-	0
DPF	49.1	-	-	-	-	49.1

III classs	697.25	94.85	-	-	-	792.1
Total	746.35	94.85	0	0	0	841.2

No T.D Sanctioned and Marked during 2007 to 2012

2012-13

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
R.F.	-	-	-	-	-	0
DPF	49.1	-	-	-	-	49.1
III classs	697.25	94.85	-	-	-	792.1
Total	746.35	94.85	0	0	0	841.2

Total TD Granted w.e.f 1986-87 to 2012-13

Category of Forest	Deo	Kail	Chil	Fir	Broad leaved	G. Total
RF	629.23	151.11	0	0	0	780.34
DPF	6428.74	1029.92	8.08	120.24	0	7586.98
III class	31271.79	11583.21	1	444.72	1	43301.72
Total	38329.76	12764.24	9.08	564.96	1	51669.04

Source: - Annual Administration Report of Seraj Forest Division.

1.13.7 From the above figures available from 1968-69 onwards no general "trend in grant of T.D. to right holders is discernible. However it will be seen that there has been a decline in the grant of T.D. which is a good sign. Prior to 1984-85 i.e. before the reorganisation of Serai Forest Division the T.D. grants used to be very high. The highest grant of 43,945 m3 was being during the year 1975-76 and the lowest of 1028 m3 during 1982-83.No T.D has been granted after 2006 till date in Seraj Forest Division.

1.14 Fruit Packing cases

Although the horticulture boom in Kullu valley can be seen between Kullu and Manali, there is not much impact of such development in the Seraj area. Next to T.D., this is another local demand of the local people. At present, during 2013-14, there are 39 saw mills spread over the area mainly located at and near Bandar, Sainj, Jibbi, Garagoshaini and Gosaini.

Prior to 1982-83 standing trees were used to be marked to the saw millers for conversion into the packing cases for further sale to orchardists. The quantity was small and the data is not available due to fire during 1985 in the Serai divisional office.

However, from 1982-83 onwards, trees were marked and handed over to the Forest Corporation for conversion into geltus and supply to the saw millers from their depots for further conversion into packing cases and supply to fruit growers. The quantity of timber marked and handed over to the Himachal Pradesh Forest Corporation is given below. –

Statement Showing the species wise and Forest wise Volume removed from the forests through salvage marking since 1986-87 to 2012-13 in Seraj Forest Division Banjar.

Year	Category of forests	Deo	Kail	Chil	Fir	B/L	Total
1986-87	DPF	10.757	52.681	0	100.810	0	164.248
1987-88	0	0	0	0	0	0	0
1988-89	DPF	0	610.319	0	3315.022	0	3925.34
	RF	159.234	139.404	0	61.428	0	360.066
	Total	159.234	749.723		3376.45		4285.406
1989-90	DPF	0	125.917	0	3038.272	216.553	3380.742
1990-91	DPF	3.382	2355.772	30.312	608.370	0	2997.836
	UPF	0	387.642	0	1580.195	0	1967.837
	Total	3.382	2743.414	30.312	2188.565	0	4965.667
1991-92	DPF	14.16	1240.99	0	1287.40	0	2542.55
	RF	23.78	1134.76	0	1869.50	0	3028.04
	Total	37.94	2375.75	0	3156.9	0	5570.59
1992-93	0	0	0	0	0	0	0
1993-94	DPF	2994.51	286.70	0	9602.82	3.50	12887.53
1994-95	0	0	0	0	0	0	0
1995-96	DPF	2.41	44.29	0	5813.60	0	5860.30
1996-97	DPF	0	5.95	0	94.76	0	100.71
	UPF	0	0	0	86.910	0	86.910
	Total	0	5.95	0	181.67	0	187.62
1997-98	DPF	0	8.99	0	5821.24	0	5830.23
	RF	277.95	470.75	0	3131.39	0	3880.09
	Total	277.95	479.74	0	8952.63	0	9710.32
1998-99	0	0	0	0	0	0	0
1999-2000	DPF	0	40.77	0	175.21	0	215.98
2000-01	0	0	0	0	0	0	0
2001-02	0	0	0	0	0	0	0
2002-03	DPF	1625.91	724.66	0	8183.53	0	10534.10
	RF	21.94	458.60	0	3404.04	0	3884.58

	Total	**1647.85**	**1183.26**	**0**	**11587.57**	**0**	**14418.68**
2003-04	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2004-05	**DPF**	**0**	**0**	**0**	**3845.03**	**0**	**3845.03**
2005-06	DPF	4.77	770.20	0	15728.31	0	16503.28
	RF	580.78	452.20	0	5134.09	0	6167.07
	Total	**585.55**	**1222.4**	**0**	**20862.4**	**0**	**22670.35**
2006-07	DPF	0	0	0	3211.57	273.00	3484.57
	UPF	2.940	0.840	14.54	0	0.08	18.400
	Total	**2.94**	**0.84**	**14.54**	**3211.57**	**273.08**	**3502.97**
2007-08	DPF	53.52	654.74	0	5748.55	0	6456.81
	UPF	64.620	74.67	10.742	0	91.63	241.662
	Total	**118.14**	**729.41**	**10.742**	**5748.55**	**91.63**	**6698.472**
2008-09	DPF	878.470	149.160	0	0	0	1027.63
	RF	0	69.76	0	2258.62	0	2328.38
	Total	**878.47**	**218.92**	**0**	**2258.62**	**0**	**3356.01**
2009-10	DPF	12.020	257.02	0	5732.45	467.82	6469.31
	UPF	9.28	78.24	0.60	84.47	3.66	176.25
	Total	**21.3**	**335.26**	**0.6**	**5816.92**	**471.48**	**6645.56**
2010-11	DPF	0	0	0	2603.11	2229.06	4832.17
	UPF	281.19	133.75	0	195.45	217.35	827.74
	Total	**281.19**	**133.75**	**0**	**2798.56**	**2446.41**	**5659.91**
2011-12	-Nil-						
2012-13	-Nil-						

Salvage Removal w.e.f. 1986-87 to 2012-13

Category	Deo	KAIL	CHIL	FIR	BL	TOTAL
DPF	5599.909	7202.242	30.312	71871.78	**2973.38**	**87677.62**
UPF	358.03	675.142	25.882	1947.025	312.72	3318.799
RF	1063.684	2725.474	0	15859.07	0	19648.23
					G. Total	110644.649

Salvage marking is entered in the CH files for particular forest for the corresponding years.

1.15 Firewood

The right- holders are entitled to collect- firewood free of charge from "the forests in which rights are recorded. Felling refuse is also given free of charge. According to the Annual Administration Report of Seraj Forest Division an annual consumption of 50000 m3 has been shown each year of fuel wood. The fuel wood comes from all categories of forests but major quantity is derived from the third class forests nearby the villages. The total population of Seraj Forest Division (Reorganised) is 41,937 human souls (1981 census).The families are generally combined. Taking 10 members in a family and average consumption of 40 kg. fuel wood per day of 24 hours on an average (the area falls in the temperate zone and wood is required round the year for heating the houses also), the total requirement of fuel wood comes to about 60,000 tones of timber for the whole year. This is a tremendous demand on the forest wealth.

1.16 Grazing

The grazing rights are recorded in a general way, the principle being, that a right holder may graze the number of cattle, sheep and goat necessary for his bonafide agricultural and domestic requirements. In practice large flocks are kept for pastoral purposes which are much more than the actual requirements. The villagers generally graze their sheep and goats on the waste land and IIIrd class forests near their villages for mannuring before the sowing operations.

Heavy grazing is inimical to regeneration of forests crops but in the high lying fir forests having thick layer of un-decomposed humus, light grazing is beneficial for the regeneration of fir forests. The incidence of grazing over the IIIrd class forests near the villages is highest and the IIIrd class forests have degraded. Area under cultivation has also increased at the cost of the hither to grazing land thus increasing the incidence of grazing because of increase in population.

In addition to local inhabitants who take their sheep and goats to alpine pastures, outside graziers also come for summer grazing. The ratio of grazing for summer graziers is fixed. They enter the Forest Division through affixed routes. The present cattle population of Seraj Forest Division is 62,355(1982) pertaining to reorganized division.

The following data collected from the Annual Administration Report of Sera;) Forest Division gives the number of cattle and other graziers and the fees realized from them in different years. The reorganization took place in 1984-85:-

The grazing rates prevalent at present are as follows

(a) For local inhabitants grazing in their own Kothi
Sheep Rs. 3/12 per hundred Goat Rs. 4/69

(b) For local inhabitants grazing outside their own kothi Rs. 3/12 per hundred extra in addition to (a) above both for sheep and goat

(c) Fir outside graziers Sheep 0.19 Paise per head, Goat 0.37 Paise per head.

1.16.1 Buffalo grazing

Buffaloes grazing is not permitted in the settlement. The Forest Officer at his description used to allow a certain number of buffaloes to graze on permits in flat places in undemarcated forests

where they could do little harm. During summer a limited number were allowed to graze in high level thatches of 2nd class protected forests.

Buffaloes grazing by outside Gujjars was introduced in 1940 in Kullu district under the orders of Punjab Govt. allowing 25 Buffaloes in Seraj Forest Division. Vide Punjab Govt. notification No. 912/Ft dated 29.3.1940. This number was further increased in 1942, 1950 and 1954 as the population increased, economic conditions improved and the tourist traffic multiplied. Each time there was increase of 5, thus raising the total number to 40 by 1954. The table given earlier shows the trend of the buffaloes grazing by the outside graziers at full rates. The list of gujjars with their cattle and the thatches/forests is attached as Appendix- XII

Grazing fee charged is Rs. 10/- per buffalo. Local people are also permitted under executive instructions to keep buffaloes for their own use. They graze in behals and other III class forests and a fee of Rs.l/- per buffalo is charged.

Under rule 8.1 of the Punjab Forest Manual (Forest Rules of Kullu) Deputy Commissioner allows outside graziers to bring their buffaloes into Kullu district. Permission so granted is not under any statutory powers. The grazier's put forth the plea that their buffaloes graze in the land of private owners. The facility is often misused at the instance of the local panchayats who derive some benefits from the gujjars in lieu of allowing them grazing. In effect such buffaloes graze in the government forests. However much of the buffaloes grazing was regularised by allowing them and adjusting in the 2nd class forests during 1972-73 thus increasing the legal buffalo grazing to manifold.

1.17 Lopping

Lopping of all broad leaved trees barring Walnut, Boxwood and Ash is permissible for fodder, manure, fuel and manufacture of charcoal. Kail lopping is permissible only in III class forests whereas lopping Silver Fir and Spr.uce is permissible in all the forests for the maintenance of the cattle. Shisham arid Alder are also lopped without restriction. Ruthless lopping of Kail, Fir and Broad Leaved tree by villagers and graziers is doing considerable damage to the forest crops.

1.18 Non Timber Forest Produce (NTFP): -

The Right Holders are permitted to remove roots, flowers, fruit, grass iris and other medicinal herbs free of charge from the forests where in right has been recorded. Such rights are recorded for each forest. The traders are also allowed to collect the NTFP by a resolution of the panchayats who are allowed to export the forest produce outside the state by paying a royalty to the panchayats. Panchayats collect the royalty on behalf of the public and the Forest Department, which is used for the developmental works of the Panchayats. The Punjab Government framed rules for the collection and removal of medicinal and aromatic plants from the protected forests ad notified these vide notification number 2005 Ft. III-54/1411 dated 21/3/1964.

Export permit fee per quintal vide HPFTs produce Transit (land rout) Rules 1993 is given below: -

Now the H.P. Government has empowered the Pradhans of Gram Panchayats vide notification No. FFR-B_G (9)-9/94-II dated 28/02/2003 to issue pass for transport of minor forest produce collected from the forests in the concerned panchayat.

Certain people have recorded rights to cut grass in certain portion of DPFs called ghasnis but they are not owner of the site and should the land become naturally covered with trees

sufficient to kill grass, the right would be extinguished.

1.18.1 The quantity of medicinal herbs and other forest produce exported outside the Forest Division during the past is given below.-

It- will be seen from "the -table of export, of medicinal herbs outside t,he forest, division, -that the sale and export, of the medicinal herbs has picked up after 1974-75 and the main items of export consist of banafsa, muskbala, tuth, gucchi (mushrooms) dhoop, chora and karoo.

1.19 Slate quarries

The right holders are permitted to remove stones, slates, free of charge from quarries recorded as such in the revenue record for construction and roofing of their houses. Non-right holders also obtain stones and slates against prescribed fee.

At present all the slate quarries are being auctioned by the Industries department to contractors on lease who are doing great damage to the forests by dumping enormous debris from the slate and stone quarries making the reproduction of forest species impossible.

1.20 Leaf mould

Right to remove leaf mould locally called as 'suhr' from all the forests except those under regeneration, exists. The practice of scrapping of leafmould with iron prong is inimical to the growth of trees and fertility of soil. The continuous removal of soil cover for agricultural purpose is harmful to the forests as it removes the nitrogen producing material from the soil.

1.21 Phat burning

The villagers have recorded rights of phat burning in III class forests. The 'phats' or grazing grounds and play grounds are burnt annually during winter for increasing the productivity of the grass. The burning of the same area year after year does not improve the quality of the grass, but on the other land, inferior grasses take hold of the ground ousting superior ones. The phats are required to be burnt in the presence of the Forest Guard and in the months of January and February. The provision is not adhered to and 'Phats'are not burnt in an organized way within the specific period and the Forest Guard is seldom informed. Due to such deliberate incendiarism the fires escape into the adjoining forest areas and adjoining plantations and closed areas and cause considerable damage to the young crop wiping out young regeneration completely. They, thus, prove to be harmful instead of being useful to check summer fires. The Divisional Forest Officer is entitled to make change in phat burning any particular year on account of special climatic conditions such as early or late rains but the power is not being used at all.

1.22 Nautors

Nautors granted in the past have caused great problems for the forest department as they have encouraged encroachments of government land. Nautors were sanctioned by the Deputy Commissioner through issue of a patta in the IIIrd class forests of a particulars Kothi of which a person is a resident many persons are in possession of land which they term as nautor even though regular patta has not been given to them. There are many others who have who have encroached upon prime government land through transfer of their original site. The situation is chaotic and it is felt that land settlement

would redeem the situation. No nautors are now given on forest lands after the enactment of the Forest Conservation Act. 1980.

1.23 Encroachments

Large number of encroachments took place since last many years. Nearly 300 cases of encroachments are in the court of Collector cum DFO Seraj and 159 cases are registered with police as per the directions of Hon'ble High Court of H.P.

It is noted here that the various categories of forests in Seraj Forest Division have not been recorded as such in the land record; instead they are recorded as wasteland.

1.24 The people

People are hardy and their main occupation is cultivation, Agriculture as well as Horticulture and rearing of sheep anhad goat for their lively hood. The holdings are marginal and small by and large. Very few people have large holdings. The fields are situated on hilly slopes in terraces and flat fields are rarely met with. The population is generally scattered over villages and in small hamlets. Only Banjar and Sainj are two small towns in the tract of meager population. Rest of the population lives in villages. There are four main motor able roads in the area. One from Larji to Jalori pass, other from Larji to Sainj in the Sainj valley and third from Jibbi to Gadagosini and the fourth from Banjar to Bathad. All these roads move along rivers and villages away from the river are not connected so far.

People live in houses generally made of wood in two storey's, the ground floor used by cattle while the upper storey is used by the family members. The houses are often not spacious enough for family and more than two members occupy one room.

In the areas where stone of brick quality is available, the walls are made of stone and timber and where slates are available within economical distances the house roofs are made of slate otherwise timber planks are used as roof cover. The people are religious and have a blind faith in the local dieties called 'devatas' or 'devis. Human and cattle population is attached as Appendix- XIII.

1.25 Important places of worship

The following account may be interesting about the religious places in the area:-

1. <u>Shri Shringa Rishi</u>

The main temple of this diety is in 2/14 Sakiran forest which is situated at an elevation of over 11000 ft (3385 meters) However another temple is situated at Chaini near Banjar. This is the ruling diety of Seraj area. Annual fair is held in the month of May at Banjar every year. People have got imense faith in him.

Shri Shringa Rishi is associated with the Pauranik story of blessing Raja Dasrath of Ayodya with sons.

2. <u>Shri Gada Durga</u>

The temple of Shri Gada Durga is situated in Tirthan valley at Bandal, about 10 kms. from Banjar on the roadside. People have great faith in the power of this goddess and annual fair is held at Gosaini during August.

3. Shri Shesh Nag Ji

The -temple is situated at, Kotla near Dhaman village. People have faith in him and an annual fair is held at, Largi in his name during May.

Another fair is held at- village Panihar in the name of Shri Kartha Nag during middle of January every year.

4. Shri Deota Pandir at Deori

There is a "temple at, village Deori near Sainj and annual fair is held during the month of May.

5. Laxmi Narain Temple of Raila

There is a temple at Raila and the local god is revered by j one and all. The annual fair is held at Sainj every year during May.

There is another temple of Laxmi Narain at Bhallan and I annual fair is held during the month of June.

The people are very fond of such fairs and even leave "the work to attend -there festivals. The forestry operations should be planned keeping in view the various religious festivals and fairs held all over the area.

People have deep faith in local gods and goddesses so much so that they will first go to their deity in case of any illness instead of going to the doctor.

Similarly all trees or patches of forest kept and preserved in the name of the Devi or Devta are never touched or damaged by anyone in the village. This belief of the people might be made use of in protecting the forests situated around the villages and elsewhere.

CHAPTER— II-A
FOREST FLORA

2.1 General

The area of Seraj Forest, Division falls in sub—tropical *zone*. with respect to its location from the equator. Because of its location in Himalayas and consequent great variation in altitude from 920 meters to 6127 meters combined with climatic conditions including snow fall, the tract embraces climatic zones of sub-tropical to alpine. Therefore various types of forests from sub-tropical to alpine occur in Seraj Forest Division at various places. The aspect, slope and the edaphic factors influence the type of vegetation giving rise to local variations in the general altitudinal zonations. The list of important trees srubs and climbers and herbs is given in volume – II appendix – X at page no. 23.

Generally the forests of various types occupy definite altitudinal zones but examples of local variations due to aspect, slope, moisture and soil are also seen frequently. All the important conifers i.e. Silver Fir, Spruce, Deodar, Kail and Chil occur in this Division. The more moist places along nalas and river banks are occupied by various broad leave species like Konsh, Khanor, Walnut, Acer, Bird Cherry etc. All the three Oaks like Ban, Mohru and Kharsu are also found in their altitudinal zones, Kharsu occupying the highest places, while Ban occupying the lower elevations. A host of other broad leaved species are also found in different altitudinal zones.

Normal on the ladder of altitude, Chir occupies the lower most elevation among the conifer, then comes Kail-Deodar and Deodar-forests, till Deodar-Spruce belt extends into Spruce-Fir zone. At the tree limit Juniper (dwarf) are met.

The detailed description and composition of crop of each forest compartment and sub-compartment has been prepared and is available with every compartment history file.

2.2 Foret Types

The main forest types form in Seraj Forest Division are given below, based on the classification of forest types by Champion and Seth

Group 9 Sub-Tropical Pine Forests

CI	Himalayan Sub-tropical pine forests
9 cl(b)	Upper or Himalayan Chir pine forest.
DS1	Himalayan Sub-tropical scrub.
DS2	Sub-tropical-Euphorbia scrub

Group-10 Sub-tropical dry ever green forests

10 cla	Olea Cuspidata scrub forests.

Group-12 Himalayan moist temperate forests

CI	Lower west Himalayan temperate forests.
CI(a)	Ban Oak qineana forests.
CI(b)	Mohru Oak(Q.dilatata)forests.
CI(c)	Moist deodar(Cedrus deodara)forests.

CI(d)	Western mixed coniferous forests.
CI(e)	Moist temperate deciduous forests.
CI(f)	Low level blue pine forests (P.wallichiana)
C2	Upper west himalayan temperate forests
C2(a)	Kharsu Oak forests.
C2(b)	West himalayan upper Oak fir forests.
DS1	Montane bamboo breakes.
DS2	Himalayan temperate parkland.
DS3	Himalayan temperate pastures.
IS1	Alder forests (Alnus).

Group-14 Sub-alpine forests

CI	West himalayan sub-alpine birch fir forest (Betulabies).
CI (a)	West himalayan sub-alpine high level fir forests.
1 (b)	West himalayan sub-alpine birch fir forests.
1S1	Hippophae/Myricaria brakes.
1S2	Dciduous sub-alpine scrub.
DS1	Sub-alpine pastures.

Group-15 Moist alpine scrub

CI	Birch-Rhododendron scrub forests
EI	Dwarg Rhododendron scrub.
C3	Alpine pastures.

9C1(b) Sub-tropical Upper or Himalayan chir pine forests

This type occurs on quartzite formations more or less as a pure crop of Chil in the top canopy with occasional broad leaved trees in the middle canopy and sparce undergrowth. The ground flora consists of some grasses which grow during the monsoons and for the rest of the period the ground looks dry and without any grass. This type is found at the lower elevations of the Forest Division and are found upto an elevation of 2,100 meters. Chir forests are found along Sainj and Tirthan rivers and occupy small area in extent. These Chir forests can be seen in (42 Balwagi)(1/27 Balwagi), 43 Sairopa (1/28 Sai Ropa), 47 Dharagahr (1/29 Dharaghr)in Tirthan Valley and 92 Khanidhar (1/44 Khanidhar,) 95 Chiliala (1/47 Chiliala), 93 Martian gahr (1/45 Marhan gahr) in Sainj valley.

The upper reaches of this type mix with the Deodar Kail forests. The main species occupying different canopies in this type are as follows: -

Top Canopy Pinus Roxburghii

Middle canopy

Quercus incana, Rhododendron arborium, Symplocos cratagodes, Pyrus Pashia, Myros rubra, Cratagus cranulata, Coriaria Nanalensis

Under growth

Indigofera dosua, Flemingia fruticosa, Rubus allinticuE, Viburaum foetens, Myrsine

airicana, Inula cappa, Berberis Iyeiuro Rubus laciocarouB, Viburnum cotnifolium Pieris ovalifolia, Wood fordia floributtdJu Albizzia iulibriEEin and Rhus Spp.

Ground floor

Tencrium quadrifarium, Pedicularis carnosa, Ananhalis araneosa, Eriegeron multicanles, Euphorbia prolifer Swertia spp, Plectran tus strictus, Galium spp. Artimesia vulgaris desmodiuin parvifolium,

Hetrodogan cont,or-tus, Arundinella int,rieat.a, Eulalia hirtifolia, Bot,hrio chloa, Capillipedium, Themada anathere, Agrost,is alba, Snorobolus elamgat-us, Climbers Rosa moschat-a.

2.2.1 'DS' Himalayan Sub-tropical scrub

This type consists of extensive grassy areas used as grazing ground and hay fields by the villagers. Such forests are found within the Chil zone. Due to frequent burning and grazing this type has been restricted to serai stage. Scattered Chil trees are found with scrub species like Dodoriaea viscosa, Rhus Parvif lora, Wood for dia floribunda, Berberis spp. Cotoneaster, Princepia, Indigofera and Adiantum spp. This type occupies the south and south western aspect in Seraj Forest Division right along the left bank of Beas upto Larji and from Larji to Ban jar and Larji to Sain, road. This type is there due to biotic interference like grazing and burning and once the biotic causes are removed the area may respond to natural/artificial regeneration.

2.2.2 DS2 Sub-tropical Euphorbia scrubs

This type consists of mainly single species viz Euphorbia royleane with occasional grasses and some broad leaved trees like Bauhinea and Ficus spp. etc and is associated with lime stone formations. This type is met with at places on the left bank of Beas up to Larji and from Larji to Sainj in the Sain;} valley and from Larji to Kotla along Larji-Banjar road.

2.2.3 10c I a -Sub-tropical dry ever green forests

Olea cuspidata scrub-forests.

This type is seen in the Sainj valley from Larji to Sainj. Olea cvspidata is the main species generally occurring on alluvial grounds associated with Punica granatum and Berberis species. This type is absent from dry slopes. Himachal Pradesh government has started a project near Talara in Sainj valley for top working of the Olea cuspidate tree locally called 'Rahu' with improved stocks obtained from European countries.

2.2.4 12 cl a

Lower west himalayan temperate forests Ban Oak (Q. Incana) forests.

This type of forest is spread over whole of the division and is found in small grounds mixed with Chil, Kail and Deodar forests.

It occupies the lowest, position on southern aspects and comparatively lower elevations on the northern slope and along nalas. In comparison with other moist temperate types, it occupies drier as well as warmer sites and may be viewed as their least mesophytic form. Geological formation has very little influence on the distribution of the Oak forest which builds up a good soil rich in humus. The ground is naturally well drained and Oak occupies all but really wet soils.

This type can be seen in 132 Manlgahr (1/42 Maul gahr-rupi series), 126 Sharan gahr (1/44 Sharan gahr-Rupi series),76, Bimu Kaln (1/35 Bimu Kalon)etc.

Top and middle storey consists of Ouercus incana, Rhododendron arboreum, Lyonia, Machilus edoratisima, Litsea umbrosa, Symplooos crataegoides, Pieris, Ovalifolia, Ilexdipvrena, Betula-alnoides, Rhus semialta, and Pyrus pashia etc.

The under growth consists of Berberis lycium, Daphne papyracea, Desmodium tiliaefolium, Rubus elipticus, R.niveus,

Indigofera gerardiana, Viburnum cotinifoliurn, Lonicera cuincue locularis , Strobilanthes dalhousianus, Myrsina africana, Deutsia stamnea . The ground flora consists of Pteridium aciniinum, Plectranthus strictus, Myriectis spp, Salvia glntinosa, thin grasses ami ferns vitis Himalayan, Rosa moschata, Hedera, Simiix Parviflora are the main climbers while Loranthus spp. is the main parasite of the trees.

2.2.5 12c Ib Lower west himalayan temperate forests mohru oak

(Q himalayana)

This type is found in patches in deodar zone from 2000 to 2500 mtrs and pure forests of Quereus dilatata do not exist in this Forest Division. There is greater admixture of secondary species mainly of deciduous trees in the top storey and a well marked ever green second storey of Rhododerdron Lauraceae, Euronynvus, Ilex etc. and Shruby undergrowth of Rubus, spiraea and Viburnum with some ever green such as Skimmia and Sarcococea.

This type is more mesophytic than Ban Oak which displaces it j on dry ridges.

Quereus dialatata is the most- appreciated of Oaks for leaf fodder and thus this tree is heavily lopped. This is found all over the Forest Division in Deodar zone which can be seen near Bahu, Jibbi, Shilli village, Gosaini, Bhallan etc. 132 Maul gahr (1/42 Maul-gahr-Rupi series), 126 Sharan gahr (1/44 Saharn gahr--Rupi series), 105 Dolun (1/52 Dolun--Seraj series)and 99 Tandi dhar (1/49 Tandi dhar Seraj series)

Quercus dialatata occurs mainly as under wood in the blue pine belt. Top canopy consists of Quercus dialatata, Q.incana, Abies pindrow, Aesculus indica, Celtis australis, Picea, Betula alnoides, Acecaesium etc. while the middle canopy consists of Eapymus Pendulus, Illex dinyrena, Rhamnus Purpurea, Rhododendron arboretum, Cedrella seriata, Lyonia availfolia, Fraxinus riucrantha, Machilus odoratisma, Litsea umbrosa etc. Undergrowth consists of Rosa mecrophylla, Rubus niveus, Viburnum spp, Berberis aristata, Strobilanthas wallichia Detzia cerymposa, Indigofera gerardiana, Daphne cannabina, Sardodocea, Desmodium etc.

Ground flora consists of Geranium wallichianum, Calium anarive, Fraogaria vesca, Thalictum and numerous ferns.

Main climbers are Hedera nepalensis and celamatis montane. Lot of mosses are found on the tree trunk and branches round the year.

2.2.6 12cl d Himalayan moist temperate forests-moist Deodar forests

This type is common to all the Ranges of this Division between 1500 meters to 2000 meters. On northern slopes and cooler aspects it descends down and ascends to even 3000 meters on sunny ridges. Winter snow fall seems necessary for the existence of these forests.

Deodar requires a well drained soil and occurs on all types of soils but it prefers

comparatively heavy soil formed by the disintegration of granite rocks. Fine quality Deodar stands are found on such soils all over the tract and can be seen at Shangarh. Deodar generally occurs pure but sometimes mixed with Kail at the lower extremes and Spruce on the higher reaches. Beautiful forests of Deodar can be seen in 34 Balaj dhar (1/20 Blaj dhar), 26 Salano(I/21 Salano) 20 Raghonal (1/10 Raghonal)14, Dungru thana (1/4 Dungru Thana), 16 Balo (1/6 Balo) and 40 Nagadhar (1/25 Nagadhar) in Jibbi catchment, 83 Rechi Kalon (1/40 Rechi Kalon), 84 Wahona (1/41 Walona)and 86 Dhaugi (R/S Dhaugi), 93 Marhon gahr (1/45 Marhon gahr), 94 Mahilidhar (1/46 Mahilidhar),101 Chaniara (1/50 Chaniara) and 100 Soaribir(1/51 Soaribir). In Rupi 128 Gohi (R/14 Gohi) and 127 Raila (R/15 Raila) are worth mention.

The top storey consists of Cedrus deodar and Pinus wal sichiana while the middle storey consists of Quereus incana or generally absent.

The under storey is generally absent. The undergrowth consists ol Rosa moschata, BerberiB lycium, Launicere angustifolia, Dentzia spp. , Desmodiumn and Viburnum. Carpinus, Ulmus Wallicl nana, Cedrela serata, Juglans regia, Aesculus indica etc. are found in moist, location such as along nallahs and depressions. Ground flow consists of Fragaria, Viola, Ainsliaea opera, Salvia glutinosa, Thymuls serphyllum etc.

The main climbers are Vitis semicardata, Hgdere nepaleunis, Jasminum officinale, Clematis montana, and Rosa moschate etc.

2.2.7 12cl d Himalayan moist temperate forest

Western mixed coniferous forests

This type is commonly referred as mixed Coniferous forest but it also includes pure Spruce, and Silver Fir and mixed forests of Silver Fir, Spruce, Deodar Spruce. These forests are the most attractive in the Himalaya with a varying mixture of coniferous trees often of very fine growth, Spruce, Silver Fir, Blue Pine and Deodar and a varying inter mixture of ever green and deciduous broad leaved trees and strips and patches of broad leaved forests. These forests lie at an elevation of 2300 to 3200 meters. Spruce predominates in the lower reaches and is associated with Deodar on spurs. Kail is confined to southern slopes ridges and shallow soils. In the higher reaches generally Silver Fir comes in pure crop and spruce occupying the ridges and warmer places. Broad leaved trees such as Aercilus indica, Juglans regia, Corylus coluna are found in depressions and nallahs. In many areas the young trees are marked by absence and the regeneration is a problem. These forests are generally found away from the habitations in this division. A thick layer of undecomposed humus is found in the forest where there is no grazing and inhibits the natural regeneration. Silver fir and spruce occur on all types of rock j formations and soils all over the Forest Division. The hill bamboos occur in these forests sometimes as thick etc. affecting the natural 1 regeneration adversely. Rich herbaceous vegetation is developed during j the monsoon, a variety of ferus being first to develop in the spring j after the snow melts, and shoots of Strobilnthus after predominating, / later this all dies and completely flattened by the winter snow . Snow I stays from December to April May in these forests every year.

There is good deal of moss and lichen on the trees but climbers are infrequent.

Beautiful forest of this type can be seen in 30 Jalora (2/10 Jalora), 28 Lafat (B/2 Lafat), 4, Bhindli (2/3 Bhindli), 6 Kashiadharl (2/5 Kashiadhar), 8 Kheunt and Bakhli Shil (2/6 Kheunt and Bakhlil shil) and 1 Sharag and Pleishil) (2/32 Sharag and Pleishil) in Oibbil catchment and 45 Sakiran Kanda (2/14 Sakiran kanda), 49 Topidhar (2/15« Topidhar) 54 Bung (2/18 Bung), 56 Basleo (2/19 Basloo) and 57 Deoril dhar (2/20 Deoridhar) in Tirthan valley and 91 Slikaria (2/39 Slikaria), 96 Sari Kanda (2/40 Sari Kanda), 106 Tispur (2/45 Tispur) and 108 Kamba(2/46 Kamba) in Sainj valley.

A large proportion of high level grazing stations are situated in this belt of forest Top canopy consists of Abies pindrnw picea smithiana Codrus deodera and Firms Wallichiana Middle canopy consists of Quercus semicarpifolia. Middle storey consists of mostly broad leaved trees, Acer spp., Birdchery, Taxus baccata is also met with at places.

The depressions and nailah coursce are occupied by broad leaved trees such as Juglans regia, Aesculus indica Corvlus colurna and Acer Spp. The undergrowth consists of Vibrnum, Cotoneaster bacillaris, Ilex diapyrena, Lonicera species, Deutsia corymbosa , Bebaris spp. Indigofera, Spirea, Arundinaria Sarcoca Spp. Strobilanthes, Impations and Disacus species, Sanecia polyeonum, Polygonatum, Podophylum, Valeriane wallichia Fragaria and Aneimone spp.,Ferrs and grasses from the ground flora.

Climbers generally found are Hedera spp. Vitis Himalayana and JasminuTtt officinala etc.

2.2.8 12cl e Moist temperate deciduous forests

This type is found all over the Forest Division in the Fir zone from 1800-2750 meters in moist hollows and depressions often as strips along the hill streams and also on many of the gentler slopes urisuited to conifers. Such broad leaved patches are found in 50 Bhunjat (2/16 Bhunjat), 53 Shirdunga (2/17 Shirdunga),56 Basleo (2/19 Basleo), 57 Deoridhar (2/20 Deoridhar), 1 Sharag and Pleishil (2/32 Sharag and Pleishil), 2 Kajlehar (2/1 Kajlahar), 28 Lafat (B/2 Lafat), 30 Jalora (2/10 Jalora) etc.

The top canopy consists of Aesculus indica, Acar Caesium, A. pictuha, Carpinus viminea, Ulmus wallichiana , Batula alenoides Juglans regia, Fraxinus nuerantha, Cuercus-Semicarbi folia, Celtis australis, Abies pindow, Prunus cornuta, Prunus padus etc.

The middle storey consist of Carylus colurna, Cornus capitata, Rhis Punjabenis, Taxus baccata, Lyonia ovalifolia, Rhododendron arboreuna, Eunymus spp. etc.

2.2.9 12 c1f Low level blue pine forests

This is a serai type of forest which is found all over the tract in Deodar zone. Pinus wallichiana is the main species. These forests are secondary to the destruction of preexisting forests of various types from natural or biotic causes. Pinus wallichiana blue pine or Kail is the universal coloriser of vacant sites, caused by wind, snow or land slides. The crop in these forests is naturally of even aged trees. This species is being replaced by Deodar in the lower portion and by Spruce in the upper portions. The flora is the same as found in Deodar forests.

2.2.10 12 c2 a Upper West Himalayan Temperate Forests

Kharsu Oak Forests.

This type of vegetation is found all over the Division from elevation of 2700 meters to 35.00 meters. Generally Quercus semicarpifolia occupies the ridges on the higher elevations.

On northern aspects and moist locations, Kharsu often comes down and is found in mixture with Silver Fir, Spruce and forms the under storey. In the upper reaches else where it is found mixed with Rhododendron and Betula spp. All age classes are reproduced and natural regeneration is adequate. The tree is lopped for fodder by graziers mostly and often by the villagers.

The top canopy consists of Quercus semicarpifolia, Picia smithiana, Abies Pindrow , Acer caesium, and Betula alenoides.Middle canopy consists of Rhododendron campanulatum Ibx dipyrana, Prunus padus , Betula utilis, Acer spp. Taxus baccata, Eunymus tingeris, Cotoneaster etc. Undergrowth consists of Cotoneaster bacillris , Viburnum cotxmifolium. Rosa macrophylla, Strobilavs wallichi, Salix elegans, Loncera angustifelia, Jasminum bumile, Rubus riveus, Smilix veginata, Beberis etc. The gound flora consists of geranium wallichiana, Frageris vesca, Rumex spp.Viola canascens, Anemone obtusiloba, Polygonum Speciosum, canecie, Waleriana wallichii, polygonlium verticvllatum etc. Clemati montana, Vitis himalayan, are main climbers.

This type of forests are met with in 103 Mander washi (2J/43 Mander wachi), 104 Sarakalon (2/44 Sarakalon) and 106 Tispur (2/45 tispur) in Sainj valley, in 54 Bung (2/18 Bung), 56 Basleo(2/19 Basleo), 57 Deoridhar (2/20 Deorodhar), 74 Karsot (2/32 Karsot) 75 Khaighar (2/33 Khaigahr) in Tirthan valley and in 1 Sharag and Pleishil (2/32 Sharag and Pleishil) 30 Jalora (2/10 Jalora) and 28 Lafat (R/2 Lafat) etc in Jibbi catchment.

2.2.11 C2 b West himalayan upper Oak Fir forests

This two storeyed high forest occurs above 2800 meters elevation all over the Division. Silver Fir occurs singly or in bands and groups over Oak and other evergreen deciduous trees . The Oak carry a conspicuous mantle of mosses.

Top conopy consists of Abies pindrow, Picea smithiana and middle conopy consists of Acer species, Taxus baccata, Cuercus semecarpifolia, Pyrus lanata, Betula alpoides, Quercus dialatata, Euonymus lacerus, Bhododendron camp anulatum etc.

Under growth consists of Rosa macrophylla, Vivrumum foetens, Rubus nivenus, Spirea spp.. Berberis spp. Strobilanthus wallichii Viola serfans, Cotoneaster acuminata, Lonicera angustifolia, Salix elegans, Tasminum humile, Asparagus filicinus. Sarcococa saligna, Wikstroemia canescens, Skimmia Lavraola etc.

Ground flora consists of Fragerialaureov vesca, Ainsliaea aptera, Valeriana wallichii, Gallium asperifolium, Podonhyllum haxandrum, Senecio spp, Polygonum speciosum, Jurinea macrocephala, Aconitum hetrophyllum, Picorhiza kurooa, Salvia moorcraftiana, Viola odorata, Podonhyllum emodi, Climbers are Vitis semicadata, Schisandra grandiflora, Hedera nepalensis and Clematis spp etc.

This type is found in 102 Jagnau (2/42 Jagnau), 106 Tispur (2/45 Tispur)108 Kamba (2/46 Kamba),109 Parali(2/33 Parali), 107 Humkhani (2/46 Humkhani)in Sainj valley, in 44 Sakiran (2/13 Sakiran) 56 Basleo (2/19 Basleo), 57 Deoridhar (2/20 Deoridhar),58 Bungdhar (2/21 Bungdhar) and 64 Bendhar (2/24 Bendhar) in Tirthan valley and in 30 Jalora (2/10 Deoridhar),32 Dala (2/12 Dala) and I Sharag and pleishil in Jibbi catchment..

2.2.12 12 DS 1

Montane bamboo brakes

(Arundinaria falcata and A spathiflora)

These two bamboos, occur as undergrowth in the mixed coniferous forests.

Arundinaria falcata confines to the lower zone and Arunidnaria spathiflora occurs in Spruce and Silver Fir zone. They generally occupy moist northern slopes and form thickets excluding all other shrubs. These hill bamboos are used by the villagers for basket making. Presence of bamboo brake inhibits regeneration. This type is found in 102 Jagnau (2/42 Jagnau), 103 Manderwachi (2/43

Manderwachi), 104 Sara-Kalon (2/44 Sara Kalon) and 108 Kamba (2/46 Kamba) of Sainj valley, in 50 Bhunjat (2/16 Bhunjat), 67 Khaninal), (2/26Khaninal), 70 Kulcu (2/28 Kulchi) and 46 Reunsi (P/3 Reunsi) in Tirthan valley and in 1 Sharag and Pleishil (2/32 Sharag) and Lafat (P/2 Lafat) etc.

2.2.13 12 DS2 Himalayan temperate park-land

This type of forest is mainly confined to the Fir zone. These are open park like land with scattered large, mis-shapen and often moribund trees of the species typical of the temperate deciduous forests or without coniferous trees also over a grassy turf full of flowers in springs. Generally certain Silver Fir, Bird cherry, Maple and Kharsu. Occasional clumps of Cotoneaster bacillaris, Viburnum continifolium and berberis spp are found. The ground is covered by Fragaria vesca, Anemone, Potentila, Viola, Delphinium, Primh, Polygoum trifolium and Raunalus spp. grass lands are heavily grazed by sheep goats buffaloos and bullocks.

This type is found in 96 Sarikanda (2/40 Sarikand) (Sarikanda and Bung thatches), 102 Jagnau (2/42 Jagnau Jagnau-Chhini and Duwara thatches), 106 Tispur (2/45 Tispur-Ukhal thatch and Raj thati), 104 Sarakalon (2/44 Sarakalon-sara thatch and Hari thatch) 46, Reunsi (P/3 Reunsi), 50 Bhunjat (2/16 Bhunjat) 54 Bung (2/18 Bung), 57 Deoridhar (2/20 Deoridhar) 56 Basleo (2/19 Basleo), 53 Shirdunga (2/17 Shirdungs), 75 Khaigahr (2/33 Khaiahr), 30 Jalora (2/ICr Jalora), 28 Lafat (P/2 Lafat), 31 Kanser (2/11 Kanser) and 1 Sharag and Pleishil (2/32 Sharag and Pleishil).

2.2.14 12 DS3 Himalayan temperate pastures

This type occurs in Kharsu oak zone and is characterised by the absence of tree growth. These are, grassy blanks devoid of any tree growth. These are found all over the Division in Deodar Fir zone. The ground flora is the same as under 12 DS2 above. The area is grazed by the grazier migratory as well as local in summer after melting of the snow.

The main grasses are Festuca spp., Agrostis spp. D^ctylis. glomerata, Brvmus spp. , Darthonia spp. lower down in Deodar forests these grasses are mixed with thameda, Haterpogon, Chrysopogon etc.

This "type occurs in "the forests shown under 12 DS2 above.

2.2.15 12 IS1 Himalayan moist, -temperate forests

Alder (Alnus) forests.

This type is found mainly along the banks of rivers and nallahs all over the division with or without undergrowth depending upon the site. In the lower course oi streams where fringe of Alder is the only remaining tree growth there is often an undergrowth of inedible or thorny shrubs ^whilst in the better wooded tracts progression starts early and other species like blue pine and other conifers are usually present. Mycorrhisa are known to occur on the roots. The range is extensive and this type occurs from 1000 meters to 3000 meters. The species grows on fresh alluvial soil and landslips. It is found in Sainj valley from Sainj to 108 Kamba forests (2/46 Kamba) along the sainj river in Ziwanal, Dashiar Nal, Sangarh Nala also in Sainj valley.

In Tirthan valley it is found along Tirthan nala from Banjar to Bathad.

The top storey consists of Alnusnitida, Poplus ciliata, Ulmus wallichiana, Celtis spp., Alnus nepalensis, Cedrella toona, Morus serrata and Ficus spp. The middle canopy consists of Crategus Granulate, Spiraea and the undergrowth consists of Gerardiana haterophylla, Romex nepalensis, Polygomum etc.

Vitis is the main climber.

2.2.16 12 IS2 Himalayan moist temperate forests

Riverain blue pine forests

This type of forests are found in the interiors of Sainj catchment along the Sainj river. Irregular often dense stands of blue pine are met with occasional Picea and /or Deodar and some times Populus and Alnus with little or no undergrowth at first but often becoming more open with inedible or thorny shrubs. This type is found above 2750 meters on new alluvial deposits along the rivers. This type is very conspicuous near Maraur village in Sainj valley. Top canopy consists of Pinus wallichiana, Picea smithiana, Cedrus deodara,: Populus citita and Alnusitida.

There is no middle storey and the undergrowth consists ofi Berbaris, Princepia etc.

Group 14 Sub-alpine forests.

2.2.17 14 C1 West himalayan sub-alpine high level fir forests.

14C1b West Himalayan sub-alpine Birch Fir forests

These "two types are found above 3000 meters elevation over the whole Forest Division. Fir, Birch and Rhododendrons may be found mixed in varying proportions, pure dense crop of Fir may occur but the most usual form is an open crop of Fir with Birch between and a dense undergrowth of Rhododendron with a varying amount of small shrubs in and under the latter. The overwood is absent in hollows leaving more or less pure Rhoddoendron. Spruce and occasional Quercus samicarpifolia may be found in this type in the moist zone.

The floristic composition in both the types is as under

2.2.18 14 C1 a

Top conopy consists of Abies spectablis, and Pica sithiana while middle canopy consists of Rhodoendron campanulatum, Taxus baccata, Prunus padue and the undergrowth consists of strobilanthus, Smilex vaginate, Viburnum foetons, Deotzia corymbosa, Berbaris spp, and Juniperous in wallichiana. The ground flora consists of Anemone obtusiloba, Lastrea barbata, Geranium emodii, Trillium and Viola patrinia.

2.2.19 14 C1b

Top canopy consists of Abies spectablis while middle canopy consists of Betula utilis, Quercus semecarpifolia, Rhododendron campanulatum, Sorbus foliolosa. Undergrowth consists of Cotoneaster acuminata, Rosa Sercea, Lonicera species, Rubus niveus and Smilex veginata.

2.2.20 14 IS1 Dry temperate forests Bippophae Mricaris scrub

This type is found in Sainj Valley near shakti village and between Shakti and Maraur. This type is found on gravel along the Sainj river at an elevation of 2500 meters and consists of more or less pure thicket of Hippophae salicifolia 3-6 meters high with some admixture of Salix spp., myricaria spp and occasional Populus clliata.

2.2.21 14 IS2 Deciduous Sub-alpine scrub

This type is found in Sainj and tirthan valleys near the tree limit which extends to the alpine zone. This type consists of outlying patches of sub-alpine forest and shrub chiefly in the form of colonies of Betula and Rhododendron. Extensive patches of dwarf Rhododendron and dwarf Junipers are also met with. The climate is too cold for the growth of tree and precipitation is usually mostly in the form of snow which lasts more than 6 months and therefore the growing season is very short.

Top and middle storey consists of Batula utilis and Rhododendron. The undergrowth consists of Syringalmodii/Salix spp. Lonicera spp., Berberis spp and Rosa spp. Ground flora consists of Accnitum spp. etc.

2.2.22 15 Cl Birch Rhododendron scrub forests

This "type is found all over the division in the alpine 2,orie. This type forms a low evergreen forest, entirely of Rohododendron but, with Borne birch and other deciduous trees on northern and moist aspects.

The growth is so dense as to be difficult, "to penetrate particularly in an uphill direction as owing to snow pressure, the stems are all covered up from more or less horizontal or down ward bent base. Trunks are short and rarely over 60 cm in girth. Mosses and ferns cover the ground.

The top conopy consists of Betula utilis, Rhododendron Campanulatum, Sarbus foliolosa and Quercus semicarpifolia. The middle can'opyconsists of Viburnum nervosum, Rhododendron, Lepidotum and Cotoeaster spp., while the undergrowth consists of Berbers spp. Lonicera parviflora, Gantheria arichophylla and Polygonum vacinifolium.

Ground flora consists of Primula denticvlata, P. stuarti Macrotomis Benthami etc.

2.2.23 15 El Dwarf Rhododandron scrub

The crop in such forest comprises stunted Rhododandron, Antbropogan and Rhododendron companulatum and occurs on elevations from 3200 meters to 3800 meters. Other broad leaved species are practically nonexistent. Ground flora is the same as under type 15 Cl,

2.2.24 15 C3 Alpine pastures

This type stretches above the tree growth limit to the line of perpetual snow. Here is found a wide range of medicinal herbs which are valuable to commerce like Mecopopris, Potentila Caltha, Aconite, Sanecios, Primulas, Borage, Myosotis, Gentians kuroo etc.

The extensive alpine lands are used for sheep and goat grazing by the migratory as well as local people. A Variety of wild life is also found at these elevations including muskdeer. In June, July wild strawaberies (Fragaria vesca) of execellent flavour are plentiful in the alpine pastures. Gentiana kuroo, Aconite (Aconitun heterophy Hum) , PodophvJJLum and Vietets art! tsxtinsively exported as medicine and dhup for incense.

The meadows are composed mostly of mesophytie, herbs conspicuous herbs are Primila, Anemone, Pvrethrium Fritillavia Iris, Gentiana, with many Ranunculaceae Garyonhvillaceae and Composite plants.

2.3 Injuries to which the crop is liable

Considerable damage is caused to the forests by various agencies in different ways. These are as follows'.-

(1) Human Population

(2) Animals and birds
(3) Insects
(4) Fungus
(5) Climate
(6) Weed growth
(7) Isolation

2.3.1 Human population

The principal ways by which the human being inflicts injury to the forest crop is through (i) fires (ii) lopping (iii) felling (iv) debarking.

Incalculable damage has been done to the forests by fire in the past. The fire burns the trees to death end those which survive are charred. The grasses and other undergrowth is also burnt affecting the wild life in the area. Fires in III class forests destroy the valuable plantations that are being raised under social forestry project and other central as well as state government schemes. Forest fires occur every year in varying extent. The great fire during 1921-22 caused extensive damage to forests, even those situated in the interior consisting of fir and spruce could not escape and extensive damage was done to forests.

Forest fires may be accidental or deliberate. Careless stubble burning in the fields, throwing away ofburning match sticks, careless handling of torches (wooden), are some of the main causes of accidental fires. The fire left unattended by shikaris in the forest is also one of the serious causes of accidental fires. Forest fires caused by natural causes such as lightening or rolling of stones are rare. The villager very often set the forest on fire deliberately. Though all the right holders are supposed to extinguish forest fires but often they do not help in extinguishing the fire. There is a specific provision in forest settlement of Kullu that those right holders who do not participate in extinguishing the fire, their rights shall be suspended by the Forest Officer for a period to be decided by him.

The fire generally occurs during the dry months of April to June and October to December. The extent of destructions caused by the fire varies with the condition and composition of the crop, aspect, undergrowth, presence of felling refuse and season of occurance. The damage is less in the properly thinned and heavily grazed stands. Kail is extremely sensitive to fire while Chil can withstand mild fires. Deodar stands are less prone to fire damage, but much damage is caused to unthinned crop. Similarly silver fir and spruce forests being away from the habitations and at comparatively high elevations are less prone to fire damage but once the fire sets in the damage to fir and spruce are extensive.

The local people need to be properly educated regarding damage done by fires to the forests through extension methods. Till now the efforts made by the departmental functionaries in educating the public has been dismal. Modern fire fighting equipments arid machinery required for quick mobility has to be provided to the staff in case of a forest, fire. The present- method of tackling the forest, fires is age old and often it takes several hours before the staff reaches the spot and by that time the fire extends to extensive areas.

2.3.2 The damage done by fire in Seraj Forest Division from 1967 68 to 2010-11 is attached as Appendix-XIV . The data from 1984-85 onwards relate to reorganised Division.

The 1st class, the Reserved and III class forests are more prone to forest fires being situated near the villages.

2.3.3 Lopping

Trees are lopped by the villagers for fodder, fuel, manure, and animal beddings. Though there are instructions regarding lopping in the rules, yet generally the trees are lopped upto the tip which results in their death ultimately. Kail is a most affected species through this practice because the fungus causing the rot in kail enters through cut surfaces in the trees.

Oaks are lopped for fodder in addition to mapple, Celtis, Robinia, Spruce and Kail lopped for different purposes.

2.3.4 Felling

Sizeable damage is done to the forests by illicit felling particularly near the habitations. Deodar and kail forests are the worst sufferers in this regard. Broad leaved trees are cut for agricultural implements while spruce and fir are felled for fruit packing cases. Delay in detection of illicit felling and lack of eye witness resulting into failure of cases in the courts are the main causes of illicit felling.

2.3.5 Torch wood extraction

The villagers cause extensive damage to chil and kail trees by cutting deeply the resinoves wood from the base portion of the stem. The forests situated in the proximity of village and along roadside are the worst suffers. The damage trees are weakened at the base and fall due to wind action. This resinous wood is used by the villagers for igniting fires in their houses and as torch for moving from one room to another or one house to another.

2.3.6 Debarking

Ban, spruce and chil are debarked for roofing material of sheds and charcoal by black smith respectively. Walnut roots are debarked for making dandasa. If complete girdling of the plant is not done it is not injurious. Generally dandasa extracted from the roots of walnut trees falling in the forest areas are sold in the market clandestinely.

2.3.7 Animals and Birds

Grazing is both harmful and useful depending on its intensity. In lower level, where pressure of population is more and grazing is continuous and concentrated, damage is very extensive. Natural regeneration does not come up easily and seedlings and saplings are often browsed by sheep and goat in addition to trammeling of young growth and compacting of the soil. The goats do more damage to the soil through their breezes and accelerate soil erosion.

Light grazing helps to keep down inflammable grass and herbage thus reducing fire hazards and help natural regeneration to establish,. In fir forests heavy grazing inhibits regeneration of spruce and silver fir but light grazing is beneficial as the humus layer is disturbed and the soil is exposed and the dense growth is kept down.

Migratory herds of sheep and goat and pours cause considerable damage to young seedlings and saplings by browsing in forests along their routes.

2.3.8 Wild animals

Wild animals also damage forest, crops but, such damage is not very extensive. Wild bear debarks deodar kail and ir poles which dry and die if debarking is to the extent, of girdling stage. Bears damage the branches of oaks and other broad leaved trees while eating fruit when wood is scarce. Rodants do considerable damage by burrowing holes and eating away the seeds sown in nurseries. Porcupines and monkeys dig out the seedlings in nurseries and plantations and eat roots. The monkey damage in young plantations is so extensive in third class forests that large plantation areas are destroyed by the monkeys within a couple of days making the plantation activity a total failure. Apart from adverse climatic factors in barren waste lands of the division, monkey menace is greatest single factor responsible for the failure of plantations over large tracts in Sainj and Tirthan valleys and area between Larji and Banjar as also the are lying along left bank of Beas river.

It has been observed that chil plantations raised during winter months are more prone to monkey damage than those raised during rains. The monkey and porcupine damage is noticed from November to March.

2.3.9 Birds

The birds nip the young seedlings and eat fruit. Wood peckers bore holes on standing trees and eat seed. On the other hand the birds do a lot good work by eating harmful insects and grubs specially in nurseries. They also help in dispersal of seed and help in natural regeneration of many a broad leaved species.

2.3.10 Insects

Damage by insects is sporadic and does not assume the form of an epidemic. *Electropis deodari* is the deodar defoliator *Euzophera cedrella* attacks deodar cores and destroys seeds. Scolytus major (bark beetle) causes damage to deodar poles and saplings. The cockchafer *Malolanthea* and the wireworm Flater devour the roots of young deodar in nurseries and plantations. *Agrotis ypsilon* does considerable damage in the nurseries by cutting the seedlings at the ground level. *Polyphagus* spp attack kail cones and sometimes chil and spruce cores also.

Platypus biferis, the shot hole borer of chil attach felled and sickly standing chil trees

and rid-dles them with holes. Ins longifolia and *Cryptorynchus Brandisii* also attack sickly trees in the forests. *Chlorophorus stroilicola* destroys chil cones and seeds.

Inslongifokia bores kail poles and makes irregular galleries which may result in snapping of these poles in case of severe attack.

Polygranhus spp attacks kail cones and destroys the seed. *Brachvxystus subsignatus* is the common pest in deodar, Spruce and fir turning the needles and terminal shoots into yellow or orange colour and withers and drop.

2.3.11 Fungus of Trametes ninli

This is the most- serious fungus in the tract and has done considerable damage to kail. Infection takes place by fungal spores setting on exposed wood from where it spreads to heart wood and makes it spongy and useless . In case of severe attack, the loss of timber is enormous. Besides lopping, browsing also assists in the spread of this disease. No kail forest is absolutely free from this fungus.

Fomes annosus

It attacks deodar poles through the roots in badly drained are-as and results in their death. It spreads centrifugally through the soil. The damage due to this fungus is riot appreciable. As the fungus is soil borne, digging of trenches around infected group of poles and uprooting and burning the infected material will be helpful in controlling this fungus.

Peridermium cedrii

This fungus attacks the leading shoot first and forms the witches broom and consequently the tree dies. .

Peridermium comanulatum* and *P. brevis

These fungii attack the needdls of chil and kail respectively and kill them. The damage done by these fungii is not severe.

Peridermium picea

This fungus attacks the branches and young leaves in spruce. The spruce forests suffer from this fungus. Characteristic orange tassets, generally seen in spring, are formed in the current years shoots. The growth of the deseased shoots are shurted and they are densely covered with curved needless, *s'*

***Fusarium* spp**

This fungus attacks the roots of young deodar seedlings which consequently damping off. The poor drainage and aeration are the main causes of this disease.

2.3.12 Climate, storm and hail

Wind storms are rare in the tract and are usually of no consequence. However winds after heavy snow cause considerable damage. Hails damage the plants in nurseries particularly the conifers.

2.3.13 Rain and Snow

Heavy rains do considerable damage to forests, especially localised cloud bursts. Land slips are caused due to cloud bursts which uproot the trees and bury them. Snow damage occurs chiefly at- higher elevations but heavy snowfall at, lower elevation causes considerable damage. Unthinned and even aged crops are more susceptible "to snow damage and many trees are uprooted, broken and bent. Due to heavy load of snow, young poles of deodar and kail are bent near the base and such defect sometimes lasts till maturity resulting in wastage of valuable bole. In plantations and regeneration areas, the seedlings are, sometimes smothered by dead weeds which are pressed on them from uphill side due to the weight of snow.

Snow slider and avalanches are common in upper parts and they wipeout treee growth and cause erosion to river occurs during May to June and October-November. In case of severe drought large number of plant banks and cause lot of soil erosion. Wet march snow does more damage than winter snow.

2.3.14 Frost

Frost uplifts seedlings of spruce and fir in the nurseries and plantations and causes death. The beds in nurseries need covering during nights till winter snow. Leaves and polythene sheet cover can be useful in checking frost uplifting. Sand mixed with earth also helps against frost.

2.3.15 Lightening

The damage due to lightening is localised and insignificant. Trees, when struck with lightening, generally get split and broken but at times they get killed also. The damage to the trees is often solitary.

Drought

Drought generally in the plantations die of drought. The wasteland plantations on southern and south-western slopes are most affected by drought. Droughts also increase fire hazard.

Plants

Heavy weeds do not allow the natural regeneration to come up. Strobilanthus, Balsam, Diesacus, Polygonvm Iris and Arundinaria species form thick growth and inhibit fir natural regeneration. At places spirea corbifolia and Sarcococca species, also form thickets. Similarly bushes like Rose, Rubus, Viburnum, Indigofera and Desmodium species often form and impenetrable mass especially in fire ^blanks and hinder natural regeneration. Climbers like Vitis semicbrdata, Hedera helix, Ivy and Rosa moschata do lot of damage to young poles and saplings by supressing them and by entertaining. Loranthes, and Viscum Parasites are found on ban oak and other broad leaved species.

2.3.16 Isolation shock

This peculiar type of damage affects spruce when the trees are suddenly exposed to light and sun after fellings and as a result of such sudden exposure many trees die.

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CHAPTER- II-B

FOREST FAUNA

2.4 Forest Fauna

Due to diverse flora, climate & altitude -the area possesses unique variety of Himalayan wildlife species. In the recent past a partial status survey of the wild life was conducted which confirms the above facts some of these species are endangered and are included in the Red Data Book (IUCW 1978). The main wildlife species found in the area are Musk deer, Barking deer, Serow, Himalayan Thatch Himalayan Ibex, Blue sheep, Black bear. Brown bear, Snow leopard, common leopard amongst animals. Whereas the main pheasant species are western Tragopan MonaL, Cheer, Kalij, Koklas and snow cock.

2.4.1 Status of wildlife

Out of the above said wild animals the snow leopard, western tragopan and cheer pheasants, though they exist in the area, yet they are facing a high degree of extinction and require special atention.

The status of the other species appears firmly secure. The animals and birds found in area are listed in Volume – II appendix – X at page no. 24.

2.4.2

The status and general distribution of the main wildlife species are given below:-

1. Yellow Throated Martan

Due to its nocturnal habits much studies of this species have not been made. However, the animal is seen near Rolla in Tirthan and near Lapah in the sainj valley. Further, it is presumed that they are much rarer than the marten, the Fox or the Himalayan weasel (Report ofthe Himachal Wildlife project 1981).

2. Musk deer

This species is reported tobe existing in sub-alpine Rhododendron zone in Jiwa nal, Sainj, and Tirthan va-lleys at about 3000 m. elevation and is solitary & secretive in its habits.

3. Barking deer

This species is found in the altitude range of 1600-2900 m all over the area, especially near Rolla and Bandal in the Tirthan valley. It is also nocturnal in its habits.

4. Serow

This goat- antilope is found on craggy, but- only moderately steep in Birch-Rhedodendron forests, sub-alpine scrub and adjacent small patches of meadows. Adult serows are totally solitary, excepting mothers and young ones. droppings of this animal is found in the R/6 Rolla and in the forest between Shakti and Maror villages.

5. Himalayan thar

This species is found below Dela thatch I, Sainj Valley) and below Idada thatch in Tirthan valley. Also it is reported to exist in the Jiwa Nal, Shagwara Nal and other rockey and steep areas of Sainj and Tirthan valleys upto 4400 m.

6. Himalayan Ibex

The favourite grounds of Ibex lie in the higher elevations above the tree line. In the spring they are found below the snow line, attracted by the new grass sprouting in patches on the steep slopes. Above their grazing grounds, Ibex have the shelter and security of precipitous cliffs and ridges in the upper reaches of Jiwa, Sainj and Tirthan valleys.

7. Blue Sheep

In structure and habits the Blue sheep or bharal holds a place intermediate beween sheep and goat. They are found at levels between the tree and the snow line, that is upto 4880 m in summer and rarely below 3660 m in winter. In summer they live in flocks which can be upto 200 in number.

Big flocks of blue sheep are reported to exist in Tirthan (Origin of Tirthan), higher reaches of Sainj river & around the Pin Parbati pass in the Parbati valley. The Pin Parbati pass forms corridor for the local migration of the species and a link ofthe Pin valley National Park with the Great Himalayan National Park.

8. Himalayan black bear

All the three valleys namely Jiwa, Sainj and Tirthan hold a good population ofthe black bear. These animals come close to habitations during crop season, and cause damage to the agricultural crops.

9. Himalayan Brown Bear

The Himalayan brown bear exists in all the three valleys of the National Park on the alpine meadows. They can be easily sighted in the Shagwara Nala, Dela thatch (Sainj valley), Basu nala, Nada thatch, and Chalocha in the Tirthan valley.

10. Snow leopard

The snow leopard is certainly found in the adjacent, areas of Hational Park that, is in Kinnaur and spiti areas. Its natural prey species like himalayan Ibex and blue sheep exist in this area. As per local evidence, the species -does exist ±n the upper snow bound areas of the National Park.

11. Common Leopard

It is found in Kalikanda Humkhani forests in Sainj valley and in Jiwa Nal. Also it does exist in Rolla and Basu forests in the Tirthan valley.

2.4.3 Pheasant Species

1. Western Tragopan

This pheasant species is threatened and small population exist in the north facing sides (left bank) in the Sainj valley, Nada thatch and Basu nala in the Tirthan valley.

2. Monal

The National Park supports a good population of the Monal which are very uniformly distributed in all the three valleys. The upper quarters of the main ridges having kharsu (Quereus semicarpifolia) form a good breeding ground for this pheasant. Kaili-kanda forest in Sainj valley, particularly the Kullu area (North-east of Maror) possess a good populaton of Monal. The upper Tirthan valley, which includes Nada thatch, and Hara thatch, appears to be the most suitable habitat where the population of this species concentrated.

3. Cheer Pheasant

This species occupies a wide range in the area and found on the steep grass clad hill sides with rocky crags. In the Park area it occurs on the south facing grass lands of Jiwa, Sainj and Tirthan valleys.

4. Koklas Pheasant

This species occurs upto 300 m and often observed with Monal pheasant in the Kalikanda forest in Sainj valley. It is common in the Lapah, Shagwara, Sakti and Maror areas in the same valley. In the Tirthan valley, it was observed in Holla, Nada & Hara thatches and in Basu nala.

5. Kalij Pheasant

It is found in Bandal, and Rolla areas in the Tirthan valley, and Sainj and Lapah areas in the Sainj valley.

Apart from this about 150 bird species have been recorded in the Park area.

Amphibions, reptiles and birds of prey are fairly common in the Park area. Amphibions, trout fishes occur in various rivers and streams. Reptiles and inumerable insects also exist in the Park area. Viper is more common.

2.5 Wild life and its management

Prior to 1897-98 no scientific management of the forests Seraj Forest Division was done. The population of human being was small and the population of wild life in plenty, there was no problem for the wild life protection. The interior areas of the Division comprising mainly spruce and fir forests were hardly exploited for commerce and therefore no fellings as such were carried out in the past. So also the man did not feel going in the interior areas frequently except occasional shikam or for grazing the sheep and goat in the thatches or alpine pastures.

It was only after 1897-98 that the first working plan for the management of the forests of this Division started. Most of the farflung forests were allotted to Protection Working Circle or Selection Working Circle. The market value of the trees of broad leaved species and the fir and spruce

being low, these forests were never exploited to the prescribed extent thus protecting the wild life otherwise. Throughout all the 4 Working Plans that have elapsed only a few forests allotted to fir working circle of Aggarwals plan were exploited exposing the security of the wild life to danger. As the time went on the population increased and the tree species considered uneconomical also found market in the plains and more forests in the interior started to be worked out for markets in the plains. The heavy demand for fruit packing cases also opened the flood gate of exploitation of fir and spruce in the hitherto considered inaccessible areas putting on enormous pressure in the safety of wild life.

It was during 1976 that an area of 83.96 sq. kms. was notified as Tirthan sanctuary vide notification no. 6-16/73-SF dated 17.6.1976 by the Himachal Pradesh Government. This marks the beginning of the wild life management in the area. Now the Govt. has Notified GHNP as National Park vide its Notification No. 6-16/73-SF-IV Dated 30/07/1990 by taking the area of Tirthan Wild Life sanctuary and included some more areas in it.

2.5.1

The following forests of Seraj Forest Division are included in the core and buffer zones of the National Park.

2.5.2

The core area forests are to be kept totally undisturbed without any felling while the buffer zone forests can be managed otherwise and the felling operations are also permitted. It is however noted that the government of Himachal Pradesh has already put a total ban on felling in the forests falling under Tirthan Sanctuary vide letter No. (F) 12-13-179 dated 13.5.83.

The total outlay over the National Park is Rs. 710.25 lakhs over a period of 10 years consisting of a non-recurring expenditure (mainly buildings) of RE. 380 lakhs and recurring expenditure of RE. 330.30 lacs on salary and maintenance of building and roads.

2.5.3 Management Practices

The main thrust shall be on preserving and propagating in natural conditions the wildlife in the Park area, without external interference. Thus in substance, the practices to be followed will aim at restoration of the ecosystem to its pristine form.

2.5.4 Regulation of forestry

The primary objective is to conserve and improve the habitat in the park area. This is essential to create conditions which shall be congenial for preservation and propagation of wild life. Total rights of the people shall be eliminated from this area as already pointed out and no commercial, felling permitted. This shall improve the area significantly.

All the developmental works shall be executed under the control of the Park Director. For this, annual plans shall be prepared. These plans shall aim at improved forestry operations required for amelioration of habitat.

2.5.5 Entry into and use of National Park

The entry in the core area shall be restricted to the minimum. Wildlife enthusiasts and scientists shall be allowed to the core area to a limited extent and as far as possible; their movements will be restricted to the tourist zones only.

The trekker shall be allowed to use path from Lapah to Rolla via Naza tratch. They shall

never be allowed to go without company of the wildlife staff.

The local inhabitants use the path along Tirthan to go to the place of "Devta" at Sakti at the source of Tirthan. This they do once in five years and this entry shall be permitted. it shall however, be ensured that some staff also accompanies them as a precaution. However, during such journey the local people generally do not do any mischief.

2.6 Wild Life Management

The main emphasis shall be on the protection and conservation of wild animals and birds. Antipoaching measures will be treated as an important function of the staff posted in the park.

However, the following steps shall be -taken -to have congenial circumstances for conservation and multiplication of wildlife in the Park area.

2.6.1 Habitat improvement

In order to improve the quality of fodder species, nurseries will be created for raising palatable grasses and broad leaved species which are of interest to wild life. The nursery stock will be planted in the field to provide food and fodder for the wild animals. About 100 ha. area will be taken up for planting during the period of the plan. Failures shall be beaten up annually.

2.6.2 Fire Protection

For protection against fire 10 fire watchers are required for five months on daily wage basis during the fire season. About 100 kilometer along fire line will be laid along the southern and western boundaries and this will be maintained.

2.6.3 Grazing Control

Grazing inside the core area will be completely stopped. However, in buffer zone area grazing and grass cutting by the right holders will be allowed. Stall feeding of cattle will be encouraged.

The domestic and migratory animals grazing in the buffer zone shall be compulsorily immunized by the veterinary doctor annually, so that diseases are not transmitted to wild animals who also frequently visit the area of this zone. The best places for treating the migratory animals are the various check posts.

2.6.4 Soil erosion

Soil conservation works will be carried out in nallas and heavily degraded pastures. Land slips will be stabilized. Engineering works such as check dams, retaining walls, brush-wood dams etc. will also be carried out wherever necessary.

2.6.5 Augmenting food resources for wildlife

In addition to planting the area with grasses and fodder species as already mentioned, sowings of wheat, maize and other cereals may be done at some suitable places. Along with this to overcome pinch period some hay shall be stacked at convenient places in alpine area. Also salt licks shall be provided near water sources.

2.6.6 Water facilities for wildlife

Though there are a number of perennial nallas inside the Park area yet there is a shortage of water in higher reaches. Thus 20 water ponds are proposed to be constructed within this plan.

2.6.7 Boundary integrity

Boundary of the National Park will be demarcated particularly on the southern and western sides by erecting boundary pillars. These pillars shall be maintained annually. A boundary register all necessary details. A sum of Rs. 2, 00,000 will be required for this purpose.

2.6.8 Amenities available for tourists

The tourist shall be allowed use of rest houses and inspection huts on usual rates as per rules. Facilities in shape of tented accommodation shall also be provided at the camping sites. Some buildings evacuated at Shakti and Maror shall be maintained as inspection huts on the same style in which these are existing at present.

A total of 25 watch towers and hideouts shall be constructed in the area.

2.6.9 Trekking tours

To create love for nature, and life youth particularly students shall be encouraged to undertake treks in the tourist zones under supervision of Park authorities.

2.6.10 Museum

A museum showing trophies of various wildlife animals and birds found in the Park shall be available at the nature interpretation centre. Arrangement for showing slides and wildlife films shall also be made at this centre.

2.6.11 Compensation to villagers

Wild animals and birds shall spill over to the buffer zone or even outside that. As such protection measures are necessary in such areas also. As a step in that direction, adequate compensation shall be paid to the villagers for such damage to their life and property including crops.

2.6.12 Employment opportunity to local inhabitants

It is natural that there is sentimental attachment -for homes where people have lived from generation to generation. No monetary remuneration can be adequate as compensation. However- consistent with their qualifications, the dislocated persons and those whose rights have been extinguished will be given preference for employment in government posts to be created for the Park. They will also be preferred for getting works executed in this area. Further, the local people will also act as duly authorised tourist guides. For this purpose some training can be imparted to them by the wild life wing, after which they should be issued licenses, or authorisation letters. They need be helped to set up tourist villages outside the Park area.

2.7 Prohibited Species

Some animals and birds are becoming extinctand therefore the government of India had legislated the Wild Life Protection Act, 1972 for the preservation of wild life and the establishment of National Park and sanctures have been provided there under. Animals and birds have been categorised separately as prohibited as big and small game. The virmins have also been categorised separately.

Schedule I (Prohibited Spp.)

The list of prohibited spp. for hunting runs long. Some of the important spp. are given as follows.

Mammal

Ibex, Himalayan thar, Leopard, Panther, Musk deer, Serow snow Leopard, Tiger

Birds

Monal, cheer pheasant, Mountain quail, Peacock-Pheasant, Peafowl, Tragopan pheasant etc.

This schedule also contains a number of spp. of amphibians and reptiles.

Schedule II

This schedule contains among others, Comon langur, Himalayan crestless porcupine, Rhesus monkey, Himalayan brown bear, Himalayan black bear, Otters and a host of beetles.

Schedule III

This schedule contains the barking deer, Chital, Ghoral, Hogdeer and wild pig etc.

Schedule IV

This schedule contains among other animals Common fox, Eares, Jungle cat, Jackal, Indian porcupine, Martens and a host of birds.

Schedule V

This schedule contains common crow fruit, bats, mice and rats which can be hunted without any license.

2.8 Injuries to which wild animals are susceptible

Hunting

Poaching by outsiders, though not very common is not yet unknown. Illegal hunting is also resorted to by local people to some extent while collecting medicinal herbs.

Fire

During the dry months of October and November when parties of local people scatter in the forests for collection of herbs, many cases of fire take place. Also the migratory graziers are responsible for incendiary fires. some times fire also spreads from the fields to the forests. As a result of damage by fire, habitats of wild animals are destroyed. Also young ones and eggs are burnt. Many animals also perish in the conflagrations which occur occasionally.

Grazing

Domestic animals affect wildlife by competing with them for food. Grazing by domestic cattle goes so far that a change in habitat occurs. The domestic animals are at times responsible for introduction of exotic diseases into the wild populations.

Glacial damage

The area particularly steep southern aspects are sources of big avalanches forming glaciers down below. The result of these natural calamities is destruction of habitat and on many occasions animals get trapped and burried in glaciers and slips. Very heavy snowfall results in scarcity of water availability for animals. Heavy snow pushes animals to lower altitudes near habitations where they are vulnerable for poaching.

2.9 Wild Life Rules

The Himachal Pradesh Government has notified the wild life (Protection) Himachal Rules 1975 vide notification no. 6-9/73-73 Sf dated 24.2.75 which came into effect from the date of notification in the Rajpatra. The salient points contained in the rules are given below:

2.9.1 Wild Life Advisory Board

The State Government has constituted a board consisting of prominent persons related to the wild life protection, the term of each member of the board being 3 years.

2.10 Registration of persons holding fire arms

The names of all persons holding fire arms within 10 kms of a sanctuary or National Park should be registered with full particulars of the person and the arms.

2.11 Compounding of Offences

All the Chief Wild Life Wardens and Wild Life Wardens and all the DFOs in the rank of DCF are authorised to compound the offence and rates of compensation are revised and fixed every year by the competent authority.

2.12 Grant of relief for damages

In case of loss of human life and cattle at the hands of the wild animals some relief has been granted by the government after the production of post mortem report in case of loss of human life and verification by Pradhan etc. and Ranger or Deputy Ranger in case of loss of animal life. The orders have been issued vide government of H.P. Notification No. Fts (F) 6-7/82-II dated 27.08.2001. The rates of relief are as under:

	(Amount in Rs.)
1) In case of death of human being	10,0000
2) In case of permanent disability of human being.	10,0000
3) In case of injury to human being	33,000
4) Loss of buffalo, Cow, Ox and mule in cowshed.	2,500
5) -do- in Jungle	1,500
6) Loss cow in cowshed (local breed)	625
7) -do- in Jungle	375
8) Loss of Ox (Local breed) in Shed	1,250
9) -do- in Jungle	625
10) Loss of young one of buffalo cow etc	250
11) -do- in Jungle	250
12) Loss of young one of buffalo, cow etc (local breed) in shed as well as in jungle.	188
13) Loss of sheep and goat in shed	375
14) -do- in Jungle	400
15) Loss of Yak, horse and camel in shed	2,500
16) Loss of Yak, Horse and camel in Jungle	1,500
17) Loss of churu in shed	1,250
18) Loss of Churu in Jungle	625
19) Loss of donkey in shed	675
20) Loss of donkey in Jungle	500
21) Loss of Pashmina goat, in shed	625
22) Loss of Palshmina Goat in Jungle	375
23) Loss of young one of yak, horse, camel, churu, donkey and Pashmina goat, in shed	250
24) Loss of young one of yak, horse, camel, churu, donkey and Pashmina goat in Jungle	125
25) Pigs in Shed	312.50/-
26) Pigs in Jungle.	188/-

2.13 Rewards

Any person giving bonafide information as shall lead to the conviction-shall be entitled to a reward by the chief Wild Life Warden extending to full amount of fine indicted by the court or up to half of the compensation. The rewards can be paid in cash or prize certificate or increments of pay and is admissible to the government servants also.

2.14 Fish fauna

The rivers of Beas, Tirthan and Sainj offer an ideal environment for the production of fish fauna. The famous Trout fish known for its liking for cool temperate and clear water is found in these rivers. Local fish known as Saleh and commonly known in english as gulguli is the only important fish in the tract. Its scientific name is Schizothorax plagios tomous.

Trout is an exotic spp. which was introduced in these rivers in the year 1909 due to the combined efforts of M/S A.C. Howell, G.C.L Howell, Cold stream and great angler Gen. Osborn. Its scientific name is Salmo truttafarie and S. gairdneri gairdneri (Brown and trout spp. respectively)

The water of these rivers has been declared as trout water vide section 3(i) B Himachal Pradesh Fisheries, Act, 1976 and only spot fishing is allowed i.e. rod and line method only.

Rod and line method can be used with lures such as

i) Artificial fly
ii) Artificial spinning bait including spoon
iii) Artificial baits as lures licensee can catch 6 trouts of min. 35 cm size/day.

Close season is from 1st November to end of February of subsequent year. Fishing licences can be obtained from

i) District Fisheries Officer Kullu at Katrain.
ii) Tourist Officer Manali and Kullu.
iii) Sub Inspector Fisheries at Kullu.
iv) Sub Inspector Fisheries at Larji.
v) Fisheries Officer Nagani (near Banjar)
vi) Field Assistant, Jari.
vii) Asstt. Director of Fisheries Mandi.

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CHAPTER—III

UTILIZATIOIN OF FOREST PRODUCE

3.1 Agricultural Customs and wants of the Population

The population of the tract by and large is agricultural and is dependent on forests for its existence. The day to day needs for fuel, fodder, grass, grazing and timber are met with from these forests. The agricultural fields are situated on the hill slopes. The fields are small often interaced and lot of soil erosion takes place from such -cultivated fields. These fields are ploughed with the help of a pair of bullocks and the plough locally called as 'hal' is made of timber. The main agricultural crops are wheat, barley maize, and paddy in flat and irrigated fields, potatoes and peas. The fields situated on higher reaches yield only one crop. The human population of the tract is 41,937 (1981 census) and cattle population 'including sheep and goat is 62,435 (1982 census).

There are hardly any industries worth the name in the tract except 26 odd number of saw miller for producing the fruit packing a cases and sawing of timber of local people for building work. Handloom weaving is the main pastime of the people preparing woolen shawls and other cloths for their own use. People rear large flocks of sheep and goat for wool and meat. There are recorded rights of grazing in various forests.

A large quantity of timber for building purposes is always in demand by the public. Due to good market for medicinal herbs extracted from the tract, increased production of potato and the support price offered by the government, cultivation of peas for the markets in the plains as off season vegetables and fetching good price, good price obtained from the sale of gucchis mainly for export to middle east countries combined with fruit crop like plums and apple boom, the financial position of the people has changed a lot as compared to the past. This has resulted into improved standard of living and a consequent great demand for construction of the houses. The various developmental works under 5 year plans and the centrally sponsored schemes like RLEGP, NREP etc. have brought good opportunity to improve the status of the people. A number of people have got regular employment in various departments increasing the income of the family. Now people are not so much interested in rearing of sheep and goat which is a laborious job now are running after white collared jobs.

Thus the main requirements of the tract are, timber for building purposes and fruit packing cases grazing areas for sheep and goat, fuel and fodder and timber for agricultural implements. For all these requirements they depend upon the forest areas.

3.2 Markets and marketable products

Prior to World War II there was all round depression in the timber market. During the world war II steep rise in prices was witnessed which continued even after the end of world War II. The demand for timber has been increasing since then. After the independence of the country and the execution of 5 year plans and consequent development in the financial position of the people, the demand for timber increased. The fir, spruce and broad leaved timber which was found in the remote areas and had no market before the second world was is now in great demand due to urbanisation of rural areas.

The medicinal herbs like, karoo, patis, thup etc. are now in great demand and its main markets are Delhi and Amritsar. Guchhi is selling upto Rs. 15000 to 20000 kg. in the local markets, and is mainly for export to middle east countries. Dioseores and Berberis roots are yet other items which are sold from this tract to the industries in the plains.

The tract has been opened up with roads and more and more roads are being

constructed. Timber is now extracted and sold by the Forest Corporation, a govt. of H.P. undertaking and sold in the markets/depots situated at the fringe of the State by open auction. The main depots where timber is sold are Pathankot depot, Sunder Nagar depot and Mantaruwala depot.

The main consuming centers of timber are the markets in the plains, including the Railways. Within the State the timber is used for fruit packing cases and hydroelectric projects, HPSEB and PWD.

3.3 Lines of Transport

Timber used to be transported through river Beas upto Dehra Gopipur in the past and then rafted upto Kandrori near Pathankot. But now with the opening of more roads and availability of the road transport, river floating is done in the small rivers upto the nearest road head only from where the timber is transported to the markets/depots by trucks . The timber is converted in the forests into sawn scants, round bailies and fuel and pulp wood and taken down to the road head by ropeways from where these are transported to the depots for sale through the trucks. The whole timber trade is now nationalised and no private company is allowed to. deal in timber unless registered with the forest department. One of the reasons of switching over to the road transport was the high river losses and the long time required before the timber reached to the depots. With the increase in the sale rates transit, the road transport has been found quick and cheaper and is expected to stay over a long period.

3.4 Methods of exploitation and their cost

Under the Forest settlement of Kullu, the right holders are permitted to collect medicinal herbs, roots, flowers etc. from thegovernment forests in which they have recorded rights and are permitted to sell them in the market. The details on medicinal herbs has already been discussed under chapter I (Part I).

The rates offered by the business men to the public are very low and the rates of royalty to be charged is also low and needs revision immediately.

The HP Government framed rules for the collection and removal of medicinal and aromatic plants from the protected forests. The rules were notified vide notification No. FFE-B-G (9)- 9/ 94- II DATED 28.2.2003. The royalty for important medicinal herbs was fixed as under:

Fee (in Rs. Per Quintal)

1. Anselia aptra Sath jalori 50/-
2. Picrorhiza kurrooa Karoo 540/-
3. Jurinea macrocephala Dhoop 500/-
4. Angelica glauca Chora 125/-
5. Viola odorata Banafsha 2250/-
6. Valeriana wallichi Mushk bala 600/-

7. Thalictrum spp Mamri 335/

8. Thymus sephyllum Banajwain 100/-

9. Morchella esculanta Guchchi 10,000/-

10. Potentilla nepalensis Dori 40/

11. Pistachia integerima Kakarsinghi 1,000/-

12. Polygonatum verticiliatum Salm Mishri 1,000/-

13. Salvia moorcroftlana Thuth 180/-

14. Bunium persicum Kala zira 2000/-

15. Selinum vaginatum Butkesh 400/-

16. Tinospora cordifolia Gloe 100/-

17. *Pyrus pashia* Orchis latifolia Salam panja 6000/-

18. *Valeriana hardwickii* Nihani 600/-

19. *Acorus calamus* Buch 130/-

20. Pinus wallichiana Kail cones 150/-

21. *Adiantum lunulatum* Dusgtuli 80/-

22. Lichens Chalora 225/-

23. *Abies webbiana* Tajpatra 85/-

24. *Hedychium acuminatum* Kapper Kuchri 70/-

25. *Heracleum* spp Patishan roots 25/-

26. *Gerardiana heterophylla* Bichu Buti 150/-

27. Cedar rosette Deodar Rossette 150/-

28. Birch pine Kush cones 150/-

29. *Cedrella* Spp Bari phool 50/-

30. Kainth 30/-

31. *Colebrookea oppositifolia* Bindi phool 50/-

32. Rhododendron spp Brass phool 150/-

33. Coleus aromaticus Pathan Bail 30/-

34. Lichens and Mosses Green Mous Ghass 250/-

35. *Hypericum patulum* Khaarera/Basanti 250/-

36. *Curcuma* spp Ban Haldi 50/-

37. *Juniper recurva* Bether patta 100/-

38. Dry pine needles Chillaru 5/

During the year 2013-14 Govt. has included more spp. for the extraction and forest Department has proposed royality rates and sent to the Govt. of H.P. for issuing notification which is still awailed and list of the spp. and there proposed rates are as under: -

Proposed rates of Permit fee of Forest Produce.

Sr. No.	Botanical Name	Local/Trade Name	Plant part	Permit pass fee Rs./ Qtl.
1.	*Abiso spectiablis/A. pindrow*	*Talis Patra*	*Needles /leaves*	*125/-*
2.	*Acacia catetchu*	*Khair*	a) *Heartwood/chips* b) *Khair billet (with bark)*	*250/-* *175/-*
3	*Aconitum dienorrhizum*	*Vatsnabh/Mohra*	*Tubers*	*7500/-*
4.	*Aconitum heterophyllum*	*Atis/Paatis/ Karvi Patis*	*Tubers*	*5000/-*
5.	*Aconitum Violaceum*	*Mitha Telia/Mitha Patis*	*Tubers*	*1000/-*
6	*Acorus Calamus*	*Bach/Bare/ Ghor bach*	*Rhizomes*	*150/-*
7.	*Adhatoda zeylanica / A. vasica*	*Basuti/ Bansa*	*Leaves*	*125/-*
8.	*Adiantum lunulatum*	*Dungtuli/Hanseri*	*Fronds/whole plant*	*125/-*
9.	*Aegle marmelos*	*Bilgiri*	*Fruits*	*500/-*
10.	*Aesculus indicia*	*Khanor*	*Fruits/seeds*	*150/-*
11.	*Ainsliae aptera*	*Sathjalori*	*Roots*	*150/-*
12.	*Ajuga beacteosa.*	*Neelkanthi*	*Leaves*	*125/-*
13.	*Alnus nitida*	*Kosh cones*	*Dry cones*	*150/-*
14.	*Angelica glauca*	*Chora*	*Roots*	*150/-*
15.	*Arctium lappa*	*Jangli Kuth*	*Roots*	*125/-*
16.	*Arnebia euchroma /A. benthami*	*Ratanjot*	*Roots*	*200/-*
17.	*Artemisia bervifolia*	*Seski*	*Flowering shoots*	*125/-*
18.	*Asparagus adscendens*	*Shatavari/Sanspai/Safed Musali*	*Root tubers*	*200/-*
19.	*Atropa acuminate*	*Belladonna/ Jharka*	*Leaves*	*125/-*

20.	Berberis spp.	Kashmal/ Daruhaldi	Roots/stemps	200/-
21.	Bergenia ciliate/B. stracheyi	Pasahnbhed/ Patharchat	Roots	150/-
22.	Betula utilis	Bhij Pattar/Birch pine	Bark Dry cone	500/- 200/-
23.	Bunium persicum	Kala Zera	Fruits	2000/-
24.	Carum carvi	Shingu Zira	Fruits	1000/-
25.	Cedrus deodara	Deodar Rosette	Dry cone part	150/-
26	Cinnamomum tamala	Tejpatra	Leaves	500/-
27.	Colebrookia opposuifolia	Bindi Phool	Leaves/roots	125/-
28.	Coleus aromaticus	Pathan Bail	Leaves/ seeds	30/-
29	Curcuma angustifolia	Ban Haldi	Rhizomes	150/-
30.	Dactylorhiza hatageria	Salam Panja/ Hath Panja	Roots tubers	6000/-
31	Dioscorea deltoidea	Singli Mingli/ Kins	Roots	900/-
32.	Emblica officinalis	Amla	Fruits	150/-
33.	Ephedra gererdiana	Somlata	Twigs	200/-
34.	Fritillaria roylei	Ban Lehsun/ Mushtanda	Bulb	10,000/-
35.	Geranium nepalense	Laljari/ Raktjari	Roots	125/-
36.	Girardiana diversifolia	Bichhu Buti	Roots	150/-
37.	Hedychium acuminatum	Kapur Kachri/ Kachur/ Van Haldi	Roots	100/-
38.	Heracleum spp	H. Patishan / Patrala	Roots	100/-
39.	Hyocymus niger	Khurasani Ajwain	Seeds/ leaves	150/-
40.	Hypericum patulum /H. perforatum	Khaarera /Basant	Whole plant	250/-
41.	Hyssopus officinalis	Juffa	Flowering Twigs	500/-
42.	Irisgermanica	Safed Bach	Rhizomes	125/-
43.	Juglans regia.	Akhrot/ khod	Bark	1000/-
44.	Juniperus conununis	Hauber	Berries	250/-
45.	Juniperus recurva /J. macropoda	Bether Patta	Leaves	150/-
46.	Jurinea macrocephala/ J. Deotomoea	Dhoop/ Guggal dhoop	Roots	500/-
47.	Lichens	Chalora/ Chharila/ Jhula/ Mehandi/ Stone flower.	Thallus	500/-
48.	Menthe longifolia	Jangli Pudina	Leaves	500/-
49.	Morechella esculenta	Guchhi/ Cheun	Fruiting Body	10,000/-
50.	Mosses	Green Moss Ghas	Thallus	250/-

51.	Murrasya koenigii	Mitthi Nim	Leaves	150
52.	Myrica esculenta	Kaphal	Bark	200/-
53.	Narostachys grandiflora	Jatamansi	Roots	1000/-
54.	Origanum vulgare	Ban Tulasi	Leaves	10
55.	Oroxylum indicum	Shyonak, Tatpalanga	Bark, Pod	125/-
56.	Paris polyphylla	Dadhia bach/Satva	Rhizomes	200/-
57.	Picrorhiza kurroa	Karoo/ Kutki	Rhizomes	1000/-
58.	Pinus gerardiana	Chilgoza/ Nooza	Seeds	1000/-
59.	Pinus roxburghii	Chil Cones	Dry Cones	1000/-
			Dry needles	5/-
			Dry Cones	1000/-
60.	Pinus wallichiana	Kail Cones	Dry Cones	1000/-
61.	Pistacia integerrima	Kakarsingi	Leaf Galls	250/-
62.	Podophyllum hexandrum = P. emodi	Bankakri	Fruits	450/-
			Roots	1000/-
63.	Podophyllum spp	Salam Mishri/Moda/ Mahameda	Rhizomes	125/-
64.	Potentilla napalenisis	Dori Ghas	Roots	125/-
65.	Prunus cerasoides	Paija/ Padam/ Padamkasht	Wood	500/-
66.	Punica granatum	Daru/ Anar	Fruits / seeds	125/-
67.	Pyrus pashia	Kainth / Shegal	Fruits	500/-
68.	Rauvolfia serpentine	Sarpagandha	Roots	200/-
69.	Rheum spp. (R. austral = R. emodi/ R. speciforme)	Revandchini	Roots	125/-
70.	Rhododendron anthopogon	Talis patra	Leaves	150/-
71.	Rhododendron arboretum	Brash/Burah	Flowers	150
72.	Rhododendron campanulatum	Kashmiri Patta	Leaves	200/-
73.	Salvia moorcroftiana	Thuth	Roots	150/-
74.	Sapindus mukorossi	Ritha/ Dodde	Fruits	300/-
75.	Saussurea costus/ S/ lappa	Kuth	Roots	400/-
76.	Selimum spp. (S. vaginatum/ S. tenuifolium)	Bhutkosi	Roots	700/-
77.	Swertia spp.	Chirata	Whole plant	125/-
78.	Taraxacum officienale	Dhudhi/ Dandelion	Roots	600/-
79.	Taxus wallichiana = T. baccata	Birmi// Thuna/ Rakhal	Needles	300/-
80.	Terminalia bellirica	Behera	Fruits	

81.	Terminalia chebula	Harar	Fruits	500/-
82.	Thalictrum foliosum	Mamiri	Roots	350/-
83.	Thymusserpyllum	Banajwain	Aerial Parts (Herb)	125/-
84.	Tinospora cordifolia	Giloe / Guduchi	Stems	125/-
85.	Toona ciliate/ Cedrelatoona	Bari phool	Dried fruits	125/-
86.	Trillidium govanianum	Nag Chhatri	Roots/ Rhizomes	8000/-
87.	Valeriana spp.	Mushakbala/ Tagar/ Nihanu	Roots/ Rhizomes	600/-
88.	Viola spp.	Banafsha	Flowers/aerial parts	2,250/-
89.	Withania somunifera	Ashvagandha	Roots	200/-
90.	Woodfordia fruticosa	Dhatki/ Dhai	Flowers	150/-
91.	Zanthoxyhun armatium	Tirmir	Fruits/seeds	250/-
All other medicinal plants not listed above				100/-

- Six species listed are prohibited by GOI vide Notification No. 481 dated 17.3.2009 under Biological Diversity Act, 2002 = Sr. No. 3,4,5,30,53 & 79
- Other species in danger as per enclosed Information from the website. = Sr. No. 6,29 & 68

A number of other costly and commercial articles were left for which no royalty was fixed the important among them is the 'guchhi' or the mushroom.

3.4.1 Local Panchayats are authorised to realise royalty on behalf of the public and the Forest Department and use the proceeds for the development of the facilities for the public in their respective Panchayats. However there is no control or interference of the Forest Department in spending such funds for the developmental work. There is also no control on the frequency of extraction of medicinal herbs from the same area.

3.4.2 During 1960-61, Dioscorea deltoides, locally known as 'singlimingli' came into prominence for extraction of important drugs and a number of companies, important being Wyeth Laboratories Bombay and CIBA private limited Bombay, entered the market for the extraction and purchase of this root. Indiscrimate extraction started and the species faced extinction. Therefore a scheme for extraction of Dioscorea was framed in 1964 and a Range was kept as a unit to be worked for two years and then given rest. However this scheme was changed and a new scheme was notified vide notification no. 38.8.89 vol. II, III (N) dated 17.11.1971.

This scheme has again undergone change after the reorganisation of the Forest, Divisions and Ranges and new scheme has been issued by CCF/HP vide his letter no. Ft. 38-8/59 (M) dated 8 4.1987.

The period of extraction has been kept from 1st April to 30th June and from 15th September to 15th December, but this is rarely adhered to by the public and the traders.

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CHAPTER-IV

ACTIVITIES OF FOREST DEVELOPMENT CORPORATION LTD.

4.1 GENERAL:

H.P. State Forest Corporation Limited an undertaking of the HP Government 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 and subsidiary products (viz., phenyl, varnish, black Japan). The Corporation has been mainly created with the following objectives :
timber extraction and resin tapping

(i) To carry out the extraction of timber and resin on scientific lines by adopting suitable modern techniques.

(ii) To eliminate the Contractor's agency in respect of works of

(iii) To obviate the chances of illicit felling of trees, illicit tapping of resin and other malpractices.

(iv) 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 a long experience of timber harvesting and extraction operations, marketing and is in a position to provide expertise for the purpose. Since the entire resin tapping work is being done by the Corporation, it has developed Modern techniques for resin tapping and expertise in this respect is available for training as well as execution of works

4.2. HARVESTING / EXPLOITATION OF TIMBER:

Due to nationalization of forest exploitation and ban on green felling imposed by HP Government, only dry and fallen trees referred to as salvage are handed over to Divisional Manager, HPSFDC Ltd. Kullu for harvesting/ exploitation who has jurisdiction over this division. Deodar, Kail, Fir, Spruce and Chil are the species for timber, which is regularly exported from this division. The main timber market is at Pathankot. The timber is sold by open auction at H.P. State Forest Development Corporation depots at Bhadroya and Nurpur and subsequently exported out of the state. Generally speaking, chil timber of this area is not of good quality and is, herefore, not popular in the trade.

4.3.Methods of exploitation:

Methods of exploitation are conventional. Axe or axe and saw do felling. Logging and conversion is done in situ. The trees are cut into logs of various sizes with the help of saws. The logs are further squared with the help of axe and then sawn into scantlings by using frame saw. These days non-standard sizes of timber are also being converted; lops and tops of chil are converted into pulpwood and charcoal / fuel wood on the schedule rates of H.P.S.F.C. Ltd. Directorate (North).

These rates vary considerably from forest to forest and are further likely to increase on account of rise in prices of essential commodities and labour rates.

4.4 RESIN:

Resin tapping was started for the first time in the forests of Seraj Forest Division (old) during 1960-61. In that year 1, 50,000 blazes were sold at an average rate of Rs. 1.42 per blaze. In 1970-71 the number of blazes sold was 1, 14,446 but the average rate obtained was Rs. 3.09 blaze. The extraction work was sold to private' contractors. In 1971-72 departmental extraction of resin was started in Sainj and Inner Seraj Ranges and 30,666 blazes were tapped.

During 1977-78 the resin extraction work was handed over to the Forest Corporation and 1,25,550 blazes were handed over to the Forest Corporation. Under the departmental resin tapping experiments were carried out by the application of a paste of Kaolin arid sulphuric acid on the blaze for increasing yield. The experiment however, failed to give any conclusive evidence of better economics therefore the experiments were abandoned later on. The Forest Corporation supplies the different store material and gets the resin tapping work done through the contractors by inviting tenders or allotting the work on schedule of rates fixed by the Forest Corporation. The extraction of resin is collected in the forest depots in empty tin containers of 15 kg, capacity which are sent to the Resin and Turpentine factorises situated at Bilaspur and Nahan, both owned by the Forest Corporation.

After carrying out enumeration by the department, the forests are handed over to the Forest Corporation for tapping. With the coming into force of H.P. After meeting the requirements of its factories, the rest of resin is distributed among private owned factories.

The tapping in the govt. forests is now being done by the **"Rill Method"**, which has been described in detail in the relevant chapter. However, in the private forests still conventional method of **"Cup and Lip"**, of resin tapping is in vogue. Local labour that are well versed with the tapping technique are generally employed.

The labourers are paid their wages for extraction of resin in a graded manner, thus, introducing a system of better work. The rates being paid by H.P. State Forest Corporation 2008-09 to the labourers are as under in Table 1.3.15.

Table 1.3.15. Resin Extraction Rates

Sr. No.	Resin yield per section.	Wage Rate (Rs. / qtl.).
1	2	3
1	Up to 20.00 Qtls.	384.55
2	20.1 to 25.00 Qtls.	433.70
3	25.1 to 30.00 Qtls.	515.50
4	30.1 to 35.00 Qtls.	556.50
5	35.1 to 40.00 Qtls.	605.65
6	40.1 to 45.00 Qtls.	678.40
7	Above 45.00 Qtls.	711.95

*Source: Schedule rates of H.P.S.F.C. Ltd. Directorate (North) for 2008-09.

4.5 Past and current prices

During the period from 1900-1901 to 1904-05 the forests were exploited departmentally, and on an average 5842 m^3 timber was launched annually from (Kullu-Seraj Division) giving an average surplus revenue of Rs. 12/36/ m^3 . In the next 5 year period, M/S Sultan Singh and Co. purchased deodar, launched 27,388 m^3. and paid a royalty @ Rs. 9/18 per m3. In the period 1910-11 to 191-4-15, trees were sold standing. to purchasers ~and average amount of timber launched yearly was 10,856 m3 and the average surplus revenue was Rs. 5.65 per m^3.

During the period 1920-21 to 1930-31, the timber launched yearly was 13,491 m3 and surplus revenue was Rs. 10/95 per m^3. Subsequent to 1930-31 sale of standing trees had been going on side by side with departmental works. During 1934-35 to 1948-49, average amount of timber launched annually was 9,949 m^3 in Sera.1 (old) Forest Division. For the period from 1934-35 to 1940-41 net revenue comes to Rs, 13.06/ m^3 for Seraj Forest Division.

Prices for standing trees, during the period upto 1945-46 obtained for deodar, kail and fir were Rs. 6.37 to 14.87, 4.25 to 5.66 and 1.06 to 1.77 per m^3 for Seraj Forest Division. In 1946-47 and 1947-48 these rates were Rs. 26.55, 11.68 and 8.32/ m^3 for deodar kail and fir respectively.

During the period from 1949-50 to 1960-61 timber extracted annually comes to 11,086 m3 and annual revenue comes to Rs. 8, 59,957 which is equivalent to Rs. 84.19/ m^3. For standing trees removed by purchasers during this period, the annual figures are 8,969 m^3 which gives Rs. 11.82/ m^3 standing.

From 1961-62 exploitation work was carried out by Timber extraction Division. During the 3 year period from 1961-62 to 1963-64, 22,894 m3 timber was extracted annually. Annual sales at the depots during these 3 years amounted to 28,426 m3 which includes 33,709 m3 timber of the year 1960-61 at the depot and fetched Rs, 38, 14,400. This gives a rate of Rs. 134.14/m3 for the timber sold and Rs. 166.62/m3 for the timber extracted during the period. During the period 1961-62 to 1970-71 timber extraction division felled 4, 24,049 m3 and timber launched was 1, 83,298 m3 forming 43% of the volume felled.

481,271 m3 standing volume was converted by Timber Extraction Division from 1964-65 to 1978-79 and the converted volume was 1, 85,837.94 m3 giving average conversion percentage of 38.61%. The conversion percentage for individual species works out at 50% for deodar, 45% for kail and 35% for fir by conventional methods. Mechanised logging has been used in fir forests only and conversion percentage of 80% in the form of logs obtained. The conversion in the form of scantlings ranges from 60 to 70%, the average being 65%.

Sale Rate of various Forest Produce from Retail Sale Depots 2012-13				
Sale rate of 'A' class timber				
Timber	**Deodar**	**Kail**	**Rai/Fir**	**Chil**
300x25x13 up	Rs. 56,630/cum	Rs. 54,420/cum	Rs. 28,415/cum	Rs. 13,960/cum
240x20x10 up	Rs. 51,820/cum	Rs. 48,360/cum	Rs. 27,085/cum	Rs. 13,340/cum
Sawn				
183x21x10, 244x16x10, 366x16x10	Rs. 26,120/cum	Rs. 24,985/cum	Rs. 12,135/cum	Rs. 5,000/cum
Axe Hewn				
305-366x13x13-16x16 up	Rs. 34,980/cum	Rs. 28,780/cum	Rs. 16,895/cum	Rs. 7,300/cum
183-24x13x13-16x16 up	Rs. 27,985/cum	Rs. 22,235/cum	Rs. 13,056/cum	Rs. 6,400/cum
Dim Dimas (All sizes)	Rs. 30,490/cum	Rs. 25,005/cum	Rs. 11,520/cum	Rs. 7,200/cum
Hakries				
85cm & above	Rs. 16,325/cum	Rs. 17,005/cum	Rs. 13,825/cum	Rs. 3,000/cum
Below 85 cm	Rs. 13,990/cum	Rs. 11,770/cum	Rs. 10,750/cum	Rs. 2,700/cum
Logs				
275cm & above	Rs. 28,620/cum	Rs. 15,450/cum	Rs. 13,040/cum	Rs. 11,700/cum
Below 275 cm length	Rs. 21,200/cum	Rs. 11,020/cum	Rs. 10,040/cum	Rs. 10,950/cum
Side Slabs (All sizes)	Rs. 24,955/cum	Rs. 20,930/cum	Rs. 11,825/cum	Rs. 4,600/cum
Round Ballies (running meters)				
31-40 girth	Rs. 300/Rmt	Rs. 205/Rmt	Rs. 155/Rmt	Rs. 80/Rmt
41-50	Rs. 490/Rmt	Rs. 325/Rmt	Rs. 260/Rmt	Rs. 140/Rmt
51-60	Rs. 715/Rmt	Rs. 495/Rmt	Rs. 345/Rmt	Rs. 190/Rmt
Joinery Articles	Rs. 35,000 /cum	Rs. 30,000 /cum	Rs. 21,875 /cum	

	Kharsu/Mapple	**Fir/Spruce**
Floor Tiles/Paneling	Rs. 15,625 /cum	Rs. 18,125 /cum

Sale rate of Fuel Wood and Charcoal				
	Retail Sale Depot		**Road Side Depot**	
Fuelwood	**BL**	**Conif**	**BL**	**Conif**
General	Rs. 410 /Qtl	Rs. 340 /Qtl		
Govt. and Commercial Org.	Rs. 710 /Qtl	Rs. 610 /Qtl	Rs. 570 /Qtl	Rs. 480 /Qtl

Rs. 50/Qtls less for Cremation throughout HP		
Charcoal	**Mixed**	**Chil**
General	Rs. 1,110 /Qtl	Rs. 850 /Qtl
Govt. and Commercial Org.	Rs. 1,480 /Qtl	Rs. 910 /Qtl
Treatment Charges	**Rs. 75.65 /cft**	

Seasoning Charges	upto 14 days	15 to 30 days	31 to 45 days	46 days onwards
	Rs. 20.65 /cft	Rs. 30.25 /cft	Rs. 41.25 /cft	Rs. 61.90 /cft

Varieties Prices (in cubic meters)

- **Deodar** — Rs. 30,000/- (approximately) in sawn sizes (Smoodha grade)
  Rs. 22,000/- (approximately) in log forms.
- **Kail** — Rs. 24,000/- (approximately) in sawn sizes (Smoodha grade)
  Rs. 16,000/- (approximately) in log forms
- **Partal (Rai Fir)** — Rs. 10,000/- (approximately) in sawn sizes (Smoodha grade)
  Rs. 6,000/- (approximately) in log forms.
- **Chil** — Rs. 7,000/- (approximately) in sawn sizes (Smoodha grade)
  Rs. 5,000/- (approximately) in log forms.
- **Board leave**

Species	Available only in log forms Rate in Rupees per cubic meter	
	Grade-I	**Grade-II**
Sal	17000 m3	11000 m3
Sain	8000 m3	6500 m3
Shisham	6000 m3	4000 m3
Kokat	3000 m3	2000 m3

Note: Rates are tentative and tend to vary with the fluctuation in market.

Sizes of Timber available

Sr. No.	Kind of Timber/General Name	Dimensions (cms)	Vol. in M3
1.	Beams	366x31x16	0.182
2.	Gattus	305x31x16	0.151
		275x31x16	0.136
		244x31x16	0.121
		183x31x16	0.091
		122x31x16	0.061
3.	Sleeper	427x26x13	0.144
		366x26x13	0.124
4.	Sleeper	305x26x13	0.103
		275x26x13	0.093
5.	Sleeper	244x26x13	0.082
		183x26x13	0.062

6.	Sleeper	183x21x13	0.050
7.	Scantlings	427x21x13	0.117
		366x21x13	0.100
		305x21x13	0.083
		275x21x13	0.075
		244x21x13	0.067
8.	Sleepers	366x16x10	0.059
		305x16x10	0.049
9.	Karries	427x18x18	0.138
		366x18x18	0.119
		305x18x18	0.099
		275x18x18	0.088
		244x18x18	0.079
		427x16x16	0.109
		366x16x16	0.094
		305x16x16	0.078
		275x16x16	0.070
		244x16x16	0.062
		427x13x13	0.072
		366x13x13	0.062
		305x13x13	0.052
		275x13x13	0.046
		244x13x13	0.041
10.	Side Slabs	427x26x8	0.059
		366x26x8	0.051
		305x26x8	0.042
		275x26x8	0.038
		244x26x8	0.034
11	Round Ballies	366x50-59	0.069
		305x50-59	0.058
		244x50-59	0.046
		183x50-59	0.035
		152x50-59	0.029
		366x40-49	0.046
		305 -do-	0.039
		244 –do-	0.031
		183 –do-	0.023
		152 –do-	0.019

		366x30-39	0.028
		305 -do-	0.023
		244 –do-	0.019
		183 –do-	0.014
12	Hakries	L.183cm&mid.girth 85cm & above	0.093
		L.152 cm & above	0.077
		L.122 -do-	0.062
		L.92 -do-	0.047
		183x23x23	0.097
		152x25x25	0.095
		122x31x31	0.117
		92x36x36	0.119

4.6 Charcoal

With the nationalisation of the timber extraction work, now the extraction arid sale of charcoal is undertaken by the Forest Corporation. Generally the charcoal conversion work is given on contract basis either by inviting tender or on schedule of rates fixed by the Forest Corporation. The rates for extraction of charcoal per quintal fixed by the corporation.

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CHAPTER-V
FIVE YEAR PLANS

5.1. GENERAL:

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

5.2. Ist FIVE YEAR PLAN (1951-56,IInd FIVE YEAR PLAN (1956-61)and IIIrd FIVE YEAR PLAN (1961-66:-

No data is available for this period in Seraj Forest Division.

5.3. IVth FIVE YEAR PLAN (1969-74):-

During this period, the forests of this tract were managed under Sh.D.P.Kapoor revised working plan (1964-65 to 1978-79) as above. The combined figures of revenue and expenditure during IVth Five Plan of Seraj Forest Division are tabulated as under in Table: 1.5.4.

Table: 1.5.4. Revenue and Expenditure during IVth Five Year Plan

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
1969-70	256512/-	1049339/-	(-) 792827/-
1970-71	N.A	N.A	N.A
1971-72	457654/-	1639653/-	(-) 1181999/-
1972-73	353505/-	1561346/-	(-)1207841/-
1973-74	914274/-	1910116/-	(-)995842/-

Annual Administration report of Seraj Forest Division.

5.4. Vth FIVE YEAR PLAN (1974-79):-

During this period, the forests of this tract were managed under under Sh.D.P.Kapoor revised revised working plan (1964-65 to 1978-79) as above. The figures of revenue and expenditure during Vth Five Plan of Seraj Forest Division are tabulated as under in Table: 1.5.5.

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
1974-75	924467/-	575501/-	(+)348966/-
1975-76	903908/-	1940149/-	(-)1036241/-
1976-77	458601/-	1593766/-	(-)1135165/-
1977-78	1897547/-	1577418/-	(+)320129/-
1978-79	3527591/-	2504449/-	(+)1023142/-

Table: 1.5.5. Revenue and Expenditure during Vth Five Year Plan

Source: Annual Administration report of Seraj Forest Division.

5.5. VIth FIVE YEAR PLAN (1980-85): -

As above upto 1981 the forests of this tract were maneged under Sh.D.P.Kapoor's Working Plan and from 1986-87 to 2001-2002 these forests has been managed under Jaiswl revised working plan.Due to ban on green felling only salvage removals has been done and no silvicultral felling carried out during this period. During this working plan with the launching of social forestry programme, the focus shifted towards raising of fuel, fodder, small timber and grasses to meet the growing domestic needs of rural communities. The figures of revenue and expenditure during VIth Five Plan of Seraj Forest Division are tabulated as under in Table: 1.5.6. Revenue and Expenditure during VIth Five Year Plan

Table: 1.5.6 Revenue and Expenditure during VIth Five Year Plan.

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
1980-81	2407190/-	3529796/-	(-)1122606/-
1981-82	771320/-	3422372/-	(-)2651052/-
1982-83	715312/-	4504952/-	(-) 3789640/-
1983-84	958965/-	5779942/-	(-) 4820977/-
1984-85	567253/-	3563522/-	(-) 2996269/-

Source: Annual Administration report of Seraj Forest Division.

5.6. VIIth FIVE YEAR PLAN (1985-90): -

During this period, the forests of this tract were managed under under Jaiswal's revised working plan (1980-81 to 1995-96) as above. The social forestry works were in full swing, main emphasis being on raising fuel, fodder, small timber and grasses to meet the increasing domestic needs of rural communities. The figures of revenue and expenditure during VIIth Five Plan of Seraj Forest Division are tabulated as underin Table: 1.5.7.

Table: 1.5.7. Revenue and Expenditure during VIIth Five Year Plan

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
1985-86	473000/-	4734093/-	(-)4261093/-
1986-87	N.A	N.A	N.A
1987-88	107492/-	8470416/-	(-)8362924/-
1988-89	219627/-	10215182/-	(-) 9995555/-
1989-90	135573/-	8626253/-	(-) 8490680/-

Source: Annual Administration report of Seraj Forest Division.

5.7. VIII FIVE YEAR PLAN (1992-97): -

During this period, the forests of this tract were managed under Jaiswal's revised working plan (1980-81 to 1995-96) as above the JFM approach also started in the division and the forestry activities were implemented under departmental schemes. Due to ban on green felling, the objective was afforesting denuded/degraded forests. The constitution of forest development committees and their participation in planning and implementation was sought.

The figures of revenue and expenditure during VIIIth Five Plan of Seraj Forest Division are tabulated as under in Table: 1.5.8.

Table: 1.5.8. Revenue and Expenditure during VIIIth Five Year Plan

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
1992-93	340280/-	3069420/-	(-) 2729140/-
1993-94	930542/-	10706379/-	(-) 9775837/-
1994-95	594944/-	11169914/-	(-) 10574970/-
1995-96	253526/-	12567577/-	(-) 12314051/-
1996-97	260992/-	15032383/-	(-) 14771391/-

Source: Annual Administration report of Seraj Forest Division.

5.8. IXth FIVE YEAR PLAN (1997-2002):-

The JFM activities continued in this perod and due to ban on green felling, the objective was mainly on afforesting denuded/degraded forests. 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 figures of revenue and expenditure during IXth Five Plan of Seraj Forest Division are tabulated as under in Table: 1.5.9.

Table: 1.5.9. Revenue and Expenditure during IXth Five Year Plan

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
1997-98	326718/-	16113662/-	(-) 15786944/-
1998-99	1019333/-	22356855/-	(-) 21337522/-
1999-00	6,85,630/-	21623415/-	(-) 20937785/-
2000-01	550154/-	18608802/-	(-) 18058648/-
2001-02	406947/-	14464548/-	(-) 14059601/-

Source: Annual Administration report of Seraj Forest Division.

5.9. Xth FIVE YEAR PLAN (2002-2007): -

Both the JFM programmes & SVY created mass awareness about forestry but the focus was again on raising plantations besides soil works and entry point activities. The CAT Plan of Larji Power Project and other Compensatory Afforestation was also implemented with emphasis on soil, water conservation. Due to ban on green felling only salvage removals has been carried out with focus on planting open and denuded forests. The figures of revenue and expenditure during Xth Five Plan of Seraj Forest Division are tabulated as under in Table: 1.5.10

Table: 1.5.10. Revenue and Expenditure during Xth Five Year Plan

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
2002-03	508782/-	12231718/-	(-) 11722936/-
2003-04	393916/-	14694816/-	(-) 14300900/-
2004-05	9756516/-	15038139/-	(-) 5281623/-
2005-06	88671998/-	23177316/-	(+) 65494682/-
2006-07	2471834/-	33188837/-	(-) 30717003/-

Source: Annual Administration report of Seraj Forest Division.

5.10. XIth FIVE YEAR PLAN (2007-2012): -

Both the JFM programmes & SVY created mass awareness about forestry but the focus again is on raising plantations/increasing forest cover besides soil works. The CAT Plan of Larji and Parvati Power Projects and other Compensatory Afforestation are being implemented with emphasis on soil, water conservation. Due to ban on green felling only salvage removals has been carried out with focus on planting open and denuded forests. The figures of revenue and expenditure during XIth Five Year Plan upto 2009-10 of Seraj Forest Division are tabulated as under in Table: 1.5.11.

Table: 1.5.11. Revenue and Expenditure during XIth Five Year Plan

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
2007-08	4855175/-	21889325/-	(-) 17034150/-
2008-09	1087906/-	25567967/-	(-) 24480061/-
2009-10	1414790/-	33196793/-	(-) 31782003/-
2010-11	13529884/-	49833820/-	(-) 36303936/-
2011-12	1791470/-	7492774/-	(-) 5701304/-

Source: Annual Administration report of Seraj Forest Division.

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CH AP T E R- VI
STAFF AND LABOUR SUFPLY

6.1 Staff

The following statement shows the strength of Seraj Forest Division as on 1.4.1988.

	Designation	Number of sanction Posts	Existing	variation
	(i)Gazetted			
1.	Divisional Forest Officer	1	1	-
2.	ACF	1	-	1
	(ii) Non-Gazetted			
3.	Forest Rangers	6	3	(-)3
4.	Deputy Rangers	14	6	(-)8
5.	Forest Guards	35	36	(+)1
6.	Patwari	-	-	-
7.	Peons	3	10	(+)7
8.	Chaukidars	7	7	-
9.	Malis	5	4	(-)1
10.	Timber watchers	1	1	-
11.	Depot watchers	-	-	-
12.	Forest worker	18	18	-
	(iii) Ministerial Staff			
12.	Superintendent Grade IV	1	1	-
13.	Sr Assistants	3	3	-
14.	Jr Asstt &Clerks	5	2	(-)3
15.	JDM	1	-	(+)1
16.	Driver	1	1	-

6.1.1 Executive charges

List of Ranges, Blocks and Beats Seraj Forest Division

Division	Range	Block	Beats	Remarks
Seraj (Banjar)	1. Sainj	Largi	Bhallan Dalashni Larji Kanoun	
		Sainj	Deori Sainj Dhaugi Gohi	
	2.Tirthan	Panihar	Kotla Panihar Chanoun	

		Palach	Bandal Kalwari Palach Deotha	
	2. Banjar	Banjar	Tandi Shikari Chaini Banjar	
		Bahu	Garagushani Gushani Sarandi Bahu	Gara Gushaini Gashani Sarandhi
		Jhibi	Trilokpur Sojha Hirab Jibhi	Shoja

Existing check posts

Sl No	Name of Divn	Name of Range	Name of check posts
1.	Seraj	Sainj	Larji Larji

Existing Van Thanna

Sl No	Name of Divn	Name of Range	Name of Van thanna.
1.	Seraj	Banjar	Jibhi

Thus, at present there are 3 Ranges 7 blocks and 27 beats in the Division The present strength of the staff is in-adequate for carrying out administrative, office and executive works of all types.

6.2 Labour supply

Local labour is available for most of the forestry works and in sufficient numbers, except during the sowing and harvesting seasons, during apple crop and local fairs and yatras. Some imported Gorkha Labour is at times employed on works when the local labour is not available. For exploitation work by conventional methods, labour is generally obtained from Mandi liistrict. Local labour is also available for sowing work in the Division. Gorkha labour is generally used for hakori conversion and Garhwali labour is used for manual carriage. Ropeway labour is available from the Kullu valley. The Forest Corporation gives an contract of the timber extraction operation and the timber extraction contractors manage the labour. Resin tapping labour is imported from Mandi district.

6.2.1 Labour Rates

The labour rates have undergone considerable change during the past two decades in view of development, Inflation and non availability due to large, number of developmental programmes started by the government under various 5 year plans.

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 attached as Appendix- XV

6.2.2 Labour for timber extraction operations

The extraction of timber and resin from the forests is under the control of the Forest Corporation, several items of work of timber extraction like felling, conversion and manual carriage, roping etc. are got done through different petty contractors. The contractor arrange the labour required for various works. Some times the timber extraction works is allotted by inviting tenders or allotted on the schedule of rates approved by the Forest Corporation.

1. **Felling labour**

Skilled felling labour is available locally in Seraj Forest Division.

2. **Sawing labour**

Sawers are imported from Mandi area and are also available locally.

3. **Mannual carriage labour**

This work is generally done by Garhwali labour. Now Gorkha labour has also picked up this work.

4. **Rope way labour**

The work of roping down -timber from the forest to the launching depots is done by labour from lag valley (Kullu). This labour is considered the most, skilled labour for roping work in whole of Himachal Pradesh.

6.2.3 Resin tapping labour

Very small area is under Chil and resin tapping is in Seraj Forest Division. The work of extraction of resin is allotted to contractors by the Forest Corporation by inviting tenders. The contractor manages his own labour either locally or from Mandi and Kangra districts.

Due to the execution of various developmental schemes in the area there is a great difficulty in arranging the labour.

6.2.4 The labour for nurseries, plantations and the soil conservation works are arranged locally. There is a acute shortage of labour during the apple season which coincides with the summer planting period and during the time of local fairs, people are so crazy about attending the. Local fairs that they strike work during that period without any notice.

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CHAPTER —VII
PAST SYSTEMS OF MANAGEMENT

7.1 General

There used to be only are working plan for the forests of whole Kullu district in the past, till the Vth working plan by Kapoor. After that separate working plan has been prepared for Kullu Division (consisting Kullu and Parbati Forest Divisions), and this working plan is being prepared for Seraj division as it stands now.

Prior to 1886 the forests were worked in an unsystematic manner. There was no definite scheme for exploitation or carrying out works of reproduction etc. This was the period when the only species of value for export was deodar and therefore traders were only removing a certain number of selected deodar trees from the forests. The government of Punjab undertook the departmental fellings for the first time during 1864-65. In the absence of a proper working plan, all that was done to make from time, to time rough estimates about the deodar trees available for export. Regarding extent of fellings, no proper records were maintained.

From 1864-65 to 1896-97, 150884 deodar trees were marked and felled for export, probably all 1st class. Also a considerable number of wind fallen trees were also converted and exported. In addition 7511 deodar trees, probably all 1st class were felled on government land for local use since 1861 to 1897 bringing the total removals to 22,895 1st class deodar trees.

7.2 Past system of Management and their result

The first attempt to manage forests of the tract on scientific lines was made in 1894 when Mr. C.P. Fisher, Deputy Conservator of Forests,, undertook the preparation of the 1st plan between 1894-97. It was sanctioned by Punjab government vide their letter No. 367 dated 5.9.1898. As deodar was considered the only valuable species for export, the plan mainly dealt with this species. The other trees were treated as inferior and their felling was considered only with reference to demand of right holders. Attempt was made to calculate annual yield of these trees in every forest to meet the demand of right holders. These calculations naturally assumed that normal reproduction would follow the selection felling whereas infact such reproduction was frequently not obtained and consequently the calculations become entirely erroneous.

Yield of deodar was calculated separately for Range and Working Circle. The annual yield was fixed at 1800 1st class trees (50 cm and over in diameter) for export and 300 first class trees for local use. At the close of 1917-18, i.e. 21 years, 36,004 1st class trees of deodar were felled against the prescriptions of the plan as far as felling are concerned were carried out. However the prescription that certain parts of mixed forests should be converted into pure deodar while remaining portions of these forests should be maintained solely for production of inferior trees was not generally followed. On the contrary, considerable attention was paid to the improvement felling and thinning, which resulted in establishing fairly large area of complete even aged crop of young deodar and Kail but elsewhere on older crop where selection fellings were carried out with the idea of obtaining natural regeneration, the results were highly disappointing and far below the anticipation of the Working Plan Officer. Many of the forests were left in a deplorable condition.

7.2.2.

The reasons of failure were plain and simple. None of the essential operations such as clearing of the felled debris, closure against grazing and tending of young regeneration could be undertaken because for all intents and proposes, the whole area of the division was under regeneration at one and the same time and it was impossible to devote regular attention. Another reason which mitigated against the success of selection system was the fact that whole area of the Division was open to grazing of cattle, sheep, goats and to the collection of leaf mould. Highly cumbersome and laborious procedure was required to be followed for obtaining sanction of the government for closure and notifying the same in the official gazette. Every closure proposed was generally objected to by the people and thus necessitated enquiries by various authorities and a long period elapsed before the matter could be finalized. The result has been that a very few areas could be closed and the grazing destroyed most of the regeneration which might have been expected from the selection fellings.

7.3 The Second Working Plan by Mr. C.G. Trevor

The revision work was carried out during year 1915 to 1919 and the plan came into operation during 1919-20. Prior to 1919 Trevor remained as DFO Kullu (covering the Kullu district) for about nine years and his plan was the result of a careful prolonged study. He knew it well that regeneration under Fishers Plan had largely failed because most of the areas worked were being heavily grazed. Therefore, he embraced in his Working Plan, a closure scheme, approved by civil enquiry. In his plan he included all forests except the most precipitous, in the working circles to be managed under uniform system so that definite area of the forests could be closed and regenerated within the stipulated period. The areas selected for regeneration were so chosen that minimum possible hardship was caused to the people living in the vicinity of the forests and due regard was given to needs and rights of villagers. The Working Circles were formed as under:

Regular Working Circle

This will comprised forests of deodar, kail, chil and oak situated on easy ground and considered suitable to be worked under uniform system.

Fir Working Circle

This consisted of all the fir and spruce forests which were considered suitable for working under uniform system.

Selection Working Circle

This included forests of deodar pine and fir where the application of any regular method of treatment was impossible due to configuration of ground but could be worked for export.

Unregulated Working Circle

This included all other demarcated forests areas considered too remote to work for export.

7.3.1 Regular Working Circle

Rotation of 120 years was adopted with four periodic blocks. The period of PB – I was however

reduced from 30 years to 25 years on the consideration that a good deal of regeneration existed in this block and it was considered desirable to complete it as early as possible. Yield was calculate on the basis of total enumeration carried out down to 30 cm diameter in the blocks plus half of the increment divided by 25 years. This yield came to 55, 158.32 m^3 and of this approximately deodar was 13% Kail 20%, fir 64% and chil 3%. By the end of 1933-34 i.e. after the expiry of plan period there was heavy deficit under all the species i.e. deodar 39%, kail 61%, fir 77% and chil 31%.

Results of the plan so far as silvicultural aspect was concerned, were excellent. Beautiful plantations of deodar bear testimony to the system evolved by the author. The plan though ideal in manner of its being guided by the great principles of silviculture, leaving a great deal of discretion in the execution with the DFO, succeeded only partly. The prescribed yield was not obtained and could not be sustained.

In general it may be noted that by far greater preparation of regeneration obtained in this working circle was artificial. Natural regeneration came up subsequently. Kail filled up the intervening blanks. It was however, observed that restocking was somewhat backward in fire burnt areas of 1921-22 especially in the upper portion of the compartment where fir, though carried out on a limited scale, were successful. Natural regeneration also came up as a result of closure, removal of humus and weedings carried out in subsequent years.

7.3.2 Fir working Circle

Rotation of 150 years with five periodic blocks of 30 years each was adopted. Annual yield of 65, 286.70 m^3 was arrived at but little could be achieved for the lack of a proper market. Departmental fellings were carried out in relatively easy areas for production of B. C. sleepers on a very limited scale or for experimental regeneration fellings. The deficit ran as high as 97%. In certain forests of this circle near the villages which held an open crop at the commencement of the plan, received further fellings with little resultant regeneration. Little was done to regenerate these areas because they had been worked merely for the right holders. It was too much to expect regeneration to come up without effective closure even in places, where humus accumulation was light, due to heavy grazing. To regenerate fir areas absolute closure to grazing by sheep and goat is necessary even in the more distant forest where animals halt for a few days on their way to and back from higher grazing runs.

7.3.3 Selection Working Circle

A rotation of 120 years was adopted. Yield was calculated for deodar only according to Hufnagals formula and was fixed at 1, 28,922 m3 annually. Upto the end of 1933-34, there was a deficit of 38%. The yield as calculated was very much over assessed.

Hufnagals formula presumes existence of a normal distribution of all age gradations which is highly incorrect in case of Kullu valley. The younger age classes are very much deficient. Even the 2nd class trees from which 1st class tree are recruited were hopelessly deficient and constituted less than one sixth of the volume of 1 class trees. In spite of above revelation, the yield of deodar prescribed 30 years accounted for 82% of total volume of 1st class deodar.

The yield prescribed trees down to 30 cm dia wherein selection forests trees below 60 cm dia are removed only when dead or dying or in strict silvicultural thinning, this implied that in actual practice yield based on 2nd class to 3rd class trees was also obtained from 1st class trees which obviously lead to over felling.

In addition to this 1921-22 fires afflicted heavy damage to many portions of this working circle which necessitated their working.

All these factors resulted in a depletion of the growing stock of these forests. On the other hand regeneration did not come up adequately and advanced satisfactorily so as to allow removal of remaining over wood for many years to come.

7.4 Third Working Plan by W.H.G. Smaler

The revision of Trevor's plan was undertaken by Mr. W.H.G. Samler from 1931 to 1934 and the plan came into operation from 1.4.1934. This plan was really c continuation of Trevor's plan and the objects of management where stated to be the continuation of second plan. The same Working Circles as described below were constituted and remained practically unchanged except that a considerable area of the regular working circle containing pure or predominantly fir was transferred to Fir Working Circle and some of the very steep and precipitous areas were allotted to Selection Working Circle.

7.4.1 Regular Working Circle

Rotation was increased from 120 to 150 years with 5 periodic blocks of 30 years each. Increment was excluded from yield calculation. Preparatory felling were prescribed in PB-II and the yield from PB-II was combined with the yield to be obtained from PB-1 and P.B.V. There was no justification for this, when two were to be regenerated in two different periods. The PB-I was being regenerated and PB-II was to be treated in almost the same manner as rest of the intermediate blocks In fact PB-II should have been saved from all the inroads. The effect of such a prescription has been heavy removals and thereby reducing "the yields in "the next 30 years when these forests pass to PB-I.

The following figures will illustrate the extent of removals in PB-I, PB-II and PB-V.

Yield	PB's P.B-I			P.B.II			P.B.V	
	Deo.	Kail	Chil	Deo.	Kail	Chil	Deo.	Kail
Chil Seraj.	CFT. 102086 901	75227	1717	25874	30264	1834	92336	106981
Divn. -	312,415	557445	122,440	73,260	182,460	41,070	8,720	295
m3	(8846.6)	(15785.07)	(3467.11)	(2074.5)	(5166.7)	(7162.9)	(246.9)	(8.3)
Beas felling series	8.747.62	15,608,46	3,428.32	2,051.28	5,108.88	1149.96	244.16	8.2

(Note: m3 - 353147 CFT)

The yield from intermediate Block was divided into final and intermediate yield, former consisting of all trees 60 cm, and over in diameter and latter of 2nd class (40 cm to 60 cm) trees. For the reasons already explained, yield was actually over assessed in the plan and when much more than this is felled, it should be obvious that it must jeopardise future yields very considerably. Then came the World War II with enormous demand for timber. Every effort was made to produce

increased quantities of timber and was counted as an effort directed towards winning war. Working Plan programmes, estimates and systems were upset. All the work was done under practically independent triennial felling programme. At the end of Trevors plan, fellings were largely in deficit, but at the end of Samler plan in 1947-48, the fellings in case kail and chil were very considerably in excess. Forthunately fellings of deodar were in deficit. The relust of excess fellings has been the opening upof Intermediate Block and over working of easily accessible forests in comparison to other areas. Even the young pole woods in PB-I and PB-V were not spraed in later years of war.

7.4.2 Fir Working Circle

A rotation of 150 years was kept. No enumerations were carried out except for a few PB-I areas. It was presumed that forests of this circle would mostly remain in reserve. The other forests allotted to this circle were not even described or inspected. Yield was calculated on Trevors enumerations. In PB-I increment was excluded and yield was based on trees 60 cm and over in dia. To begin with, fellings were in deficit but war completely changed the picture.

Demand of timber was enormous. The deficit was not only wiped out but at the end of the war, the fellings excess stood at little over 6 years and at the end of 1947-48, it was approximately 9 years.

When it is remembered that regeneration has not advanced and the forests are under stocked with a deficiency of younger age classes, it should be obvious that even if the assessed yield was correct,, most of it has already been removed and consequently future yield has been seriously jeopardised. In this connection it may be brought out, that, fellings during the -war were not confined to PB-1, but were frequently carried out in other areas leaving the PB-1 intact, because other areas happened to be more convenient, for exploitation. The felling in these areas did not differ in the least in tensity from there Undertaken in PB- If areas.

There was great demand for mapple and walnut trees for rifle and gun half wroughts. In all 21 mapple and 13 walnut tree were extracted from Seraj Division owing to difficulties in extraction from 1942-42) to 1947-48. A large number however was extracted from Kullu Division

During the plan period fir forests remained neglected No sustained efforts were made to regenerate them except in some experimental plots where systematic cultural works were carried out by Research Division.

7.4.3 Selection Working Circle

No enumerations were carried out in this Circle also, except in forests which were prescribed for felling during the plan period. These forests were not enumerated even during Trevors plan. Rotation was raised from 120 to 150 years as it was admitted that growth in these forests was much slow, comparatively easier areas were exploited where cost of extraction was low leaving the difficult and remote areas untouched. However, good work was done in fire burnt areas prescribed for concentrated cultural works in 3rd plan. Natural regeneration had also comp up on broken ground where the pressure of grazing was not heavy and weed growth was not a problem. The yield in this working circle was over assessed.

7.4.4 Fellings in Undemarcated Protected Forests

Heavy fellings were done in 3rd class forests also to meet the demand of war, ignoring the demands of the right holders and the prescriptions of the plan. Sainj and Inner Sera.1 areas were particularly heavily felled.

7.5 The Fourth Plan by Shri K.L. Aggarwal

Revision work was under taken between 1947-48 and the plan came into operation from 1st April 1949. The following four working circles were constituted:

Regular Working Circle

This circle comprised the most valuable and important forests of deodar kail on comparatively easy ground with a small proportion of fir arid spruce in the upper reaches and a little chil in the lower parts in sainj and Tirthan valleys.

Fir Working Circle

The forests which predominantly contained silver fir and spruce and were considered suitable for working under shelter wood system were allotted to this circle.

Selection Working Circle

The irregular mixed forests of deodar, kail and fir on steep and broken ground were allotted to this Working circle. In these forests the system of concentrated regeneration felling was not possible except on limited patches occurring on easier ground.

Protection Working Circle

This included all the Reserved and Demarcated Protected forests which were remote and inaccessible and were not included in any of the Working Circle described above. They lie at the head of the valleys and streams on difficult ground and stretch far beyond the tree growth.

7.5.1 Regular Working Circle

The constitution of this Working Circle remained almost the same as in the Working plan under revision except for the transfer of the very steep and preciptitous areas to the Selection Working Circle and compact and reasonably large portions containing predominantly fir to the Fir Working Circle. The forests of the Working circle are mainly deodar and kail. Complete enumeration down to 20 cm dia in 10 cm dia classes were carried out. Stock maps on 4"=1 mile scale showing ' different species were prepared for all the compartments and areas I under different species calculated. The rotation was fixed at 150 years with an exploitable diameter of 60 cms d.b.h. O.B. The silvicultural shelter wood system which provided fellings according to j the nature of the ground and permitted certain amount of irregularity in the canopy so as to avoid sacrifice of immature pole wood. Retention of compact groups of poles as part of the future crop and selection fellings on steep ground were prescribed.

7.5.2 Division into Periodic Blocks

5 periods of 30 years each of which PBs-I, II and V were definitely allotted while the

remaining two PBs were grouped as PB. Inter. This period of 30 years was considered suitable silviculturally as well as legally.

Calculation of yield

Yield from PB-I

The yield estimates were based on field observations by evolving a constant indicating the percentage of volume of each species available, keeping allowance for, compact group of poles to be retained as advance growth or trees allowed to stand in blanks where regeneration has not established or on broken ground where entire over wood can not be removed for silvicultural reasons. The yield from P.B. I was calculated according to the following formula: -

$$Y = \frac{C1V1 + C2V2}{P}$$

Where Y = Annual yield
V1 = Volume of I class -trees standing in PB-I
V2-Volume of II class trees standing in PB-I
P= Period of the plan i.e. 30 years.

C1 and C2 are the constants. The volume of C2 was estimated at 0.3 for deodar and 0.5 for Kail, Chil and Fir.

7.5.3 Yield from PB-V

It was considered advisable to leave only such a proportion of over wood as can stand without suppressing the regeneration. It was estimated that 50% of the 1st class and IInd class tress otherwise available silviculturally should be removed in the interest of young crop during the first 15 years of the plan. Field inspections revealed that all the trees were not available. The value of C1 was estimated as 0.9 for kail and chil in case of 1st class trees and 0.8 for deodar. As regards II class trees the value of C2 was estimated as 0.3 for deodar and chil and 0.5 for kail, spruce and fir. The yield was calculated according to the formula.

$$Y = \frac{1/2(C1V1 + C2V2)}{P}$$

Where P is 15 years.

7.5.4 (C) Yield from PB-Inter

The yield from PB-Inter was divided into two categories.

7.5.5 Final yield from PB-Inter

The yield from over mature stock i.e. IB and over was designated as final yield and was calculated by volume. It was estimated that 40% of the over mature trees of deodar and chil, and 60% of kail and fir would be available for felling during the period of the plan.

7.5.6 (II) Intermediate yield from PB-Inter

There was no volume control of yield from thinning which were tobe carried out under strict silvicultural system. It was controlled by area.

7.5.7 The prescribed yield

The following annual yield was prescribed from PB-I, PB-V and PB-Inter from Seraj Forest Division (Beas felling series forming present Seraj Division)

	Yield (m3)			
Spp	PB-III	PB-V	PB Inter	Total
Deodar	616	532	168	1316
Kail	644	448	252	1344
Chil	28	56	28	112
Fir	1036	308	476	1820

No fellings were prescribed in PB-II except removal of dead, dry and uprooted trees.

7.5.8 Control of yield

All 1st and 2nd class trees iron: PB-Inter counted yield. No fellings for export were prescribed in PB-II. However, all 1st class trees removed from this P.B. for what so ever purose such as removal of dead, dry and uprooted trees on grants of right holders and counted towards yield. It was emphasised that such removals shall be exceptional and shall consist only of trees which cannot usefully stand for the period of plan.

In order to ensure that the yield of fir was riot taken out in terms of more valuable species, it was made necessary to show, yield by species and to adjust this yield between different species at the end of 3 or 5 years when it should not be in excess by more than 10% of the combined yield of deodar, kail and chil.

7.5.9 Results of management

In general the prescriptions of the Working Plan were carried out. No attention was paid towards other works prescribed under subsidiary silvicultural operation.

The position in each PB is given below

PB-I An area of 715.09 ha. was allotted to this periodic block. Out of this 573.85 ha. of forests prescribed for seeding felling during the first 15 years of the plan. The forests were to be felled after the approval of the 3 years felling programme by the Conservator. All the areas were prescribed for felling during the 15 years ending 31.3.1964.

Regeneration operations were carried out in all the forests after seeding felling. Out of

this 246 ha in Seraj Forest Division were totally regenerated by the time Kapoor took revision of the plan by 1964. In general the regeneration in PB-I area was progressing well with the result that some of the PB-I areas were transferred to PB-last by Kapoor.

PB-II

No fellings were prescribed for this PB, but occasional T.D was granted from these forests.

PB Inter

The forests under this PB were prescribed thinning during the period of the plan. These forests were however subjected to heavy T.D. grants and the forests depleted in thinnings were undertaken wherever found necessary.

PB-V

Young crops in this PB were tended properly and the over wood was removed as prescribed.

The following was the position of deviation as on 31.3.64.

Name of W.C.	PB		Annual Yield prescribed (Cft)	Deviation as on 31.3.1964 (m3.)	(Cft)	(m3)
R.W.C	P.B.I	Deodar	22,000	(622.98) (-)	123,720	(3,503.42)
		Kail	23,000	(651.30) (-)	29,520	(835.92)
		Chil	1,000	(28.31) (-)	12,455	(352.69)
		Fir	37,000	(1047.74) (-)	52,950	(1,499.40)
	P.B.V	Deodar	19,000	(538.03) (-)	58,440	(1,938.04)
		Kail	16,000	(453.07) (-)	24,325	(688.82)
		Chil	2,000	(56.63) (-)	15,540	(440.05)
		Fir	11,000	(311.49) (-)	71,240	(2,017.33)
	PB-Inter	Deodar	6,000	(169.90) (-)	35,980	(1,018.85)
		Kail	9,000	(254.85) (-)	120	(3.39)
		Chil	1,000	(28.31) (-)	11,175	(316.44)
		Fir	17,000	(81.39) (-)	201,170	(5,696.60)
	Total R.W.C	Deodar	47,000	(1330.91) (-)	156.180	(4,422.60)
		Kail	48,000	(1359.23) (-)	53,975	(1,528.43)
		Chil	4,000	(113.27) (-)	39,170	(1,109.19)
		Fir	65,000	(1840.62) (-)	325,360	(9,213.34)

In case of thinnings under PB Inter and controlled by area the following was the position:

Name of P.B.	Period	Total prescribed Area acre/ha.	Annual Area acre/ha.	Position as on 31.3.64 acres/ha
	1954-55 to 1964-65	5,759 (2,330.63)	576(233.10) (-)	1,672 (676.65)

The position of regeneration operations in PB-I areas under artificial regeneration was not very satisfactory.

7.5.10 Fir Working Circle

This working circle contained forests on comparatively easy slopes containing mainly fir and spruce trees. Enumerations were carried out down to 20 cm d.b.h. in all the forests of the Working circle. Rotation was fixed at 180 years and the exploitable diameter was kept at 28" (70 cm).

7.5.11 Silvicultural System

The forests allotted to this Working Circle were managed under Punjab Irregular Shelter-wood System. Healthy patches of advance growth of any extent and size was prescribed to be retained as part of future crop.

7.5.12 Choice of species

Fir and spruce was the choice of the species for this Working Circle although introduction of deodar and kail on south and south western slopes of the forests of this Working. Circle at suitable elevation was contemplated.

7.5.13 Division into Periodic Blocks

Six periodic blocks were recognised with 30 years period for each. P.B.I only was year marked in the field and rest all the PBs were grouped as PB others.

7.5.14 Calculation of Yield

During the first 15 years 4% of the volume of 1st class trees was expected as final yield from PB-I areas as no regular seeding felling was expected on account of the fact that forests were already opened in the past.

7.5.15 Yield from PB others

30% of the stock of trees IC-D was expected as final yield from this P.B.

7.5.16 Prescribed final yield (Cft/m3)

P.B. I	P.B.Others	Total
25,000 (707.93)	(207,000) (5,861.69)	2, 32,000 (6,569.63)

7.5.17 Control of yield

All the 1st class trees were counted towards yield. The deviation at the end of 15 years period was prescribed as 10%.

7.5.18 Result of management

The following was the position of deviation at the end of 1963-64 i.e. on 31.3.64:

Name of W.C.	P.B.	Annual Prescribed yield	(Cft)	(m3)	Deviation as on 31.3.64 (Cft)	m3)

F.W.C	P.B.I Fir	25,000 (707.93)	(+)	363580	(10,295.63)
	P.B. others	207,000 (5,861.69)	(+)	1159890	(32845.0)

All the forests were said to be similar in nature in so for as distribution of species and age classes was concerned. There was no forest which could be allotted to PB-IV (last) because no area could be regenerated after fellings under P.B.I in the past.

It will be clear from the position of the deviation that a huge excess felling was carried out the fellings prescribed from PB others were most disastrous because it allowed access to those forests for felling which ultimately opened large gaps in the forests inviting weeds and without any regeneration.

7.5.19 Selection Working Circle

The forests on steep slopes were allotted to this working circle. These forests contained deodar kail, spruce and fir situated in far flung in accessible areas usually at the head of the streams. All coniferous crop was enumerated down to 20 cm. d.b.h. in 10 cm diameter classes. The growing stock contained a large proportion of over mature crop.

7.5.20 Rotation and exploitable size

The exploitable diameter was fixed at 70 cm d.b.h with a rotation of 210 years.

7.5.21 Silvicultural system

The forests were managed under modified Punjab Selection System which permits the retention of small compact groups of even aged trees through out the roation.

No regularity in the forests was aimed at and the forests were prescribed to be worked under selection principles inducing regeneration naturally.

7.5.22 Calculation of yield

It was estimated that 50% of IB-D stock of deodar was available over first 15 years and 60% of Ist Class trees of Kail and chil was expected to be removed. In case of fir two third of IB-D class trees was expected to be available.

7.5.23 Prescribed yield

Spp	Yield (Cft)	(m3)
Deodar	2,000	(56.83)
Kail	55,000	(1,557.45)
Chil	-	-
Fir & Spruce	30,000	(849.52)
Total:	87,000	(2,463.60)

7.5.24 Control of yield

The volume of all I and II class trees was to be counted towards yield which should not exceed +- 10% at the end of 15 years period.

7.5.25 Results of Working

The following was the position of deviation at the end of 15 years period i.e. 31.3.64.

Name of the W.C		Annual yield prescribed (Cft)	(m3)	Deviation as on31.3.64 (Cft)	(m3)
Selection	Deodar	2,000	(56.63)	2,763	(782.40)
	Kail	53,000	(1,557.45) (-)	2,284	(646.76)
	Fir	30,000	(849.52) (-)	7,060	(2748.48)

All the forests of the working circle were worked as prescribed. This means that the yield was over assessed by the W.P.O. As regards reproduction it was observed that the regeneration works were taken up at a very nominal extent in these areas and the natural regeneration did not come up. The total effect was that the position of regeneration was not satisfactory.

7.5.26 Protection Working Circle

This Working Circle contained all other Reserves and DPFs not included in R.W.C and F.W.C or Selection W.C described earlier beiving situated in remote and precipitons areas or having vegetation of low economic value. These forests were, however, very important from soil and water conservation point of view.

III class forests or UFs were also included under this Working Circle. No fellings were prescribed in these forests except under meeting the demand of the right holders for T.D. No. enumerations were carried out in the forests. However, removal of Kharsu Oak under a proper scheme and demand was provided under para 84.1.

7.5.27 Result of Working

No major fellings were done in this working circle and only occasional T.D. grants were made.

7.6 Fifth Plan by Shri D.P. Kapoor

The previous plan by Sh. K.L. Aggarwal provided for an intermediate revision after 15 years period. Post independence period was a lot of developmental acivity and new orientations and uses of forests products was realised. The National forest Policy was framed during 1952.

A newsprint factory was conceived which would use the fir spruce timber of Kullu and other regions of the Pradesh. The demand for broadleaved species increased many fold for use in the defence factories and in the textile industry in the civilian sector.

Therefore Shri Y.P. Bajaj was posted as W.P.O to revise the Aggarwals Plan during 1961. He was replaced by shri S.S. Chahal in 1963. Shri D.P. Kapoor joined during 1966-67 and continued till completion of the plan during 1972.

Shri D.P. Kapoor prepared the draft, plan for the period 1964-65 to 1978-79 and submitted the proposals in 1972-73. The draft plan however, could not be approved. The forests, however, were worked under the prescriptions of Kapoor's plan but the yield was controlled under Aggarwal's plan. Thus Kapoor's plan, though not formally approved, was followed in the field.

The following Working circles were constituted

i) Regular Working Circle

ii) Fir Working Circle

iii) Protection Working circle,

iv) Broad Leaved (Over-lapping) Working Circle.

Selection working circle of Aggarwal's plan was later abolished and forests merged with F.W.c and Protection Working circles.

7.6.1 Regular Working Circle

Not much change was made by Kapoor in this working circle as compared to that of Aggarwal. The area fit for working under Punjab Irregular Shelterwood System were allotted to this working circle. The larger compartments were sub divided and fir bearing areas were transferred to F.W.C.

7.6.2 Analysis and Evaluation of Crop

No enumerations were undertaken. The species wise growing stock, however, was worked out from the serial photographs by Shri G.A. Jones, a Canadian during 1962-64. However it was found from the field observations that there was lot of error in the assessment of the growing stock by this method.

7.6.3 Silviculture System

The forests were managed under Punjab Irregular shelter wood system which provides retention or compact group of poles upto 30 cm d.b.h. with a minimum area of 0.2 ha. as advance growth. The system also permitted selection marking over steep and broken land.

7.6.4 Choice of Species

Deodar and kail being the valuable trees, deodar was preferred over kail in case of silvicultural treatment.

7.6.5 Rotation and exploitable diameter

The rotation was fixed as 150 years with an exploitable diameter of 60 cm. d.b.h.

7.6.6 Division into Periodic Blocks

Five Pb's were recognised, PB-I being the most mature while PB-V the youngest crop. PB-III and IV were merged to be called P.B. Inter.

7.6.7 Yield calculation

Yield from PB-I

It was estimated that about 40% of the total stock of 30 cm d.b.h. and above will be available for felling during next 30 years. In addition 20% volume of trees below 30 cm. d.b.h. was also to be available by way of thinning etc.

7.6.8 Yield from PB-II

No fellings were prescribed. However an Yield equivalent to 10% of the total growing stock in this PB was contemplated by way of salvage fellings.

7.6.9 Intermediate yield from PB-Inter

It was estimated that 10% of the volume of growing stock in this PB would be available from the thinning etc.

7.6.10 Total prescribed annual yield (m3)

The total annual yield P.B.wise is given in the following table :-

Name of W.C	Annua (m3)	PB-I	PB-II	PB.Inter	PBV	Total Yield
R.W.C	Deodar	1,300	300	500	1,000	3,100
	Kail	1,100	200	300	300	1,900
	Spruce/Fir	1,900	200	300	400	2,800
	Chil	600	10	10	200	820
	Total:	4,900	710	1,110	1,900	8,620

7.6.11 Control of yield

All the classes of trees felled for any purpose were to count towards the yield. The deviation after 15 years should not be more than 10% of all conifers combined.

7.6.12 Results of management

The fellings were carried out according to the prescriptions of the plan.

P.B-I

Of the several forests continuing under PB-I since the Aggarwal's plan, 1/47 Ranagarh, 1/50 Chaniara Cl, 1/46 Mahilidhar Cl, 2/7 Relikaterate Cl, 1/21 Salano Cl and 1/26 Ranikot Cl could not be regenerated properly. The progress of the regeneration was however, satisfactory. Other compartments taken up under PB-I in addition, were also not regenerated fully.

7.6.13 PB-II

No fellings were from this PB.

7.6.14 PB-Inter

All the forests could not be taken up for thinning due to poor stocking of the crop and grant of T.D. to right holders from this PB and some other reasons like convenience of working alongwith PB-I forests etc.

7.6.15 PB-V

The areas as prescribed were worked. There was excess removal at the close of 1978-79.

7.6.16

The position of deviation at the end of 1978-79 for Seraj Forest Division (old), stood as given below for all the species:

Spp.	Deviation as on 31.3.79 (Cft)	(m3)
Deodar	+ 8,04,539	(22,782.43)
Kail	+ 2,33,201	(6,603.64)
Chil	- 93,429	(2,645.68)
Fir	- 22,68,275	(64,231.60)

It will be seen that while there was excess removal in case of deodar and kail, there was deficit removal in caxe of fir and spruce to a large extent. This shows that the yield for different species was not assessed properly.

7.6.17 Fir Working Circle

In addition to the forests under Fir Working Circle of Aggarwal's plan, some forests from Protection Working Circle, R.W.C and Selection Working Circle, of the previous plan and bearing fir and spruce suitable for working under Punjab Irregular shelterwood system were included in this working circle. Fir and spruce were the principal species in addition to broad leaved species like walnut, khanor, mapple, bird cherry etc. found along depressions and water courses.

7.6.18 Analysis and evaluation of crop

No enumerations were undertaken. The species wise growing stock figures worked out from the aerial photographs by Jones were used for calculation of the growing stock and yield.

These felling series were constituted as follows:

i) News print felling series consisting of forests of Inner Seraj Range.

ii) Departmental felling seris consisting the forests of Sainj Range.

iii) Packing cases felling series consisting the forests of Sainj and Inner Seraj Ranges.

7.6.19 Silvicultural system

The forests were to be worked under clear felling system with a provision to retain advance growth occuring singly or in groups and upto 40 cm in diameter. The regeneration ws to be obtained by artificial methods.

7.6.20 Choice of species

Main stay was on fir and spruce along with important broadleaved species like mapple, walnut, bird cherry etc.

7.6.21 Division into Periodic Blocks

Three fix periodic blocks were created having 1/3 area under each period.

7.6.22 Rotation and Regeneration period

A rotation of 90 years was adopted consisting of 3 periods of 30 years each.

7.6.23 Yield calculations

It was estimated that 90% of the volume of growing stock above 40 cm d.b.h. in PB-I will be available for fellings. Another 10% was estimated to be available from growing stock; below 40 cm dbh. No major fellings were recommended from PB-II and PB-III. Only sanitary fellings from PB-II and thinning cum improvement fellings in PB-III were suggested. It was estimated that 10% and 20% of the volume of growing stock in PB-II and PB-III respectively would be available for felling.

The following table gives the annual yield (m3) PB wise.

Felling Series	Yield (m3)			
	PBI	PB-II	PB-III	Total
News Pring	29,700	3,600	6,000	39,300
Departmental	22,800	2,300	4,800	29,900

No separate yield was prescribed for packing cases Felling Series and the supply for

packing cases was intended to be obtained from the timber removed from News Print and Departmental Felling Series and fir forests of Regular Working Circle.

7.6.24 Control of yield

All trees removed from PB-I, II and III for whatever purpose were prescribed to be counted towards yield. Deviation at the end of the 15 year period was prescribed to check with in 10% of the prescribed yield.

7.6.25 Results of management

All forest prescribed for felling were not felled. The pace of artificial regeneration and natural regeneration was unsatisfactory mainly because of weeds and grazing combined with paucity of budget. At the end of the plan period i.e. 1978-79 there was a huge surpluse removal from this working circle. Vast areas were clear felled and regeneration operations did not keep pace with the fellings.

The rotation of 90 years with 3 periodic blocks increased the annual cut over two fold area. The clear felling added another dimension in excess removal of the yield. No regular PB-I markings were envisaged and thus the annual yield prescribed was very small. This was the root cause of exhibition of a huge excess removal at the end of the plan period. The position of yield from this Working Circle was as under from 1963-64 to 1977-78.

Spp.	Annual prescribed yield (cft) (m3)	Yield removed (cft) (m3)	Deviation (cft) (m3)
Fir	2, 32,000 (6,569.63)	32, 48,300 (91,983.35)	25, 92,700 (73,418.47)

7.6.26 Protection Working Circle

This working circle contained the rest of the Reserve and D.P.F's not allotted to Regular Working Circle or the Fir Working Circle and contained forests of deodar, kail, fir and spruce and broad leaved species like mapple, walnut, khanor, etc. In addition U.F.s or III class forests near the village etc. were also allotted to this Working Circle.

7.6.27 Analysis and valuation of crop

No enumerations were carried out and no stock maps were prepared as this was not considered necessary. However, the forests varied from open in the III class forests near the habitations to a close density one in interior inaccessible forests. Fir spruce forests formed a major constituent of this Working Circle. Most of the area of these forests was rocky and alpine pasture devoid of any tree growth.

7.6.28 Method of treatment

Keeping the protective value of the forests in view, no fellings were prescribed except removal of trees by way of grant of T.D. The III class forests near the habitations were the worst sufferers in this case being heavily tapped for T.D. for meeting the requirement of the local people. The details of T.D. grants from III class forests have been given under chapter-I of part-I of this plan.

The closures followed by sowing and planting were taken up in 111 class forests on extensive scale but the results were not encourging. Some soil conservation measures were also adopted on badly eroded III class areas but the results were not very encouraging except in a few cases either.

7.6.29 Broad leaved over-lapping Working Circle

This Working Circle overlapped over the broad leaved forests occurring in regular, Fir and Protection Working Circle. Enumeration of important broad leaved trees was carried out down to 20 c.m. d.b.h. in 10 c.m. diameter classes. In compact blocks of broad leaved patches clear felling system with a provision to retain compact groups of advance growth upto 40 c.m. d.b.h. was prescribed. Rotation was fixed at 100 years. Yield was estimated at 50% of the growing stock III class forests were excluded from felling and yield calculation. These priority areas were categorised as along the motorable road, where roads needed improvement or extension and where no roads existed. Priority I and II areas were recommended for exploitation in the beginning.

Annual yield (m3) was prescribed only for a few species for whole of (old) Seraj and (old) Seraj and (old) Kullu division as under:

Mapple	B.Cherry	Kharsu	Walnut	Horse Chest nut.	Ban oak	Mohru
1,620	100	4,356	815	2,120	420	148

The accumulated annual yield was allowed to be removed periodically.

7.6.30 Result of Working

No schedule for felling was prescribed. The broad leaved trees were extracted from some forests. The replenishment of broad leaved trees by way of planting the trees was neglected badly and nothing tangible was achieved. Most of the broad leaved trees were extracted from fir forests and fir was tried in the patches hitherto fore occupied by the broad leaved which resulted in a failure.

Roads

No new road was constructed during the period of the plan. There were no suggestions for constriction of new road and paths in the Division as it already existed.

Buildings

Except a couple of small buildings, no new building or rest house was constructed during the plan period. The new building for the Divisional head quarter was constructed during the period.

7.7 Period from 1979-80 to 1985-86

There was no working plan for Seraj Forest, Division from "the period 1979-80 to 1985-86 and the works were executed on the basis of felling programmes approved by the C.C.F. from time to time. During the period no major fellings were carried out except some thinnings and

felling of fir forests for supply of packing cases etc. and marking for T.D. It is worth while to mention that the whole working of forests was nationalised with the formation of H.P. Forest Corporation and commercial fellings have been banned since long, salvage fellings were however under taken.

During this period the control of yield has been excercised on the basis of yield controls of Aggarwals plan.

It will be seen from the following figures that there has been a deficit felling in almost all the species and the Working Circles. The total yield obtained and the deviation as on 31.3.86 in case of all the working circles and P.B.s of Aggarwals plan is given, in the following table. It is relevant to mention here that the deviation as on 1.4.79 has been considered as zero for these calculations.

Fir	I & VI	Fir	636. 75	2,690.99	(-)	1,766. 21
		Deodar	-	37.06	(+)	37.06

Name of W.C	P.B.	Species	Annual prescribed yield m3	Total yield removed 1979-80 to 1985-86 m3		Deviation as on 31.3.86 (m3)
Regular	I	Deodar	560. 34	329.48	(-)	3,592.90
		Kail	585.81	140.14	(-)	3,960.53
		Chil	25.47	1.14	(-)	176.88
		Fir	942.39	101.94	(-)	6,494.79
		Total : -	2,114.01	572.20	(-)	14,225. 10
	Other	Deodar	152.82	2,833.24	(+)	1,763.50
		Kail	229.23	1,244.42	(-)	360.19
		Chil	25.47	51.35	(-)	126 .94
		Fir	432.99	519.98	(-)	2,510.95
		Total: -	840.51	4,648.99	(-)	1,234.58
	V	Deodar	483.93	1,519.00	(-)	1,868.51
		Kail	407.52	695.06	(-)	2,157.58
		Chil	50.94	60.71	(-)	295.87
		Fir	280.17	95.26	(-)	1,865.93
		Total : -	1,222.56	2,370.03	(-)	6,187.89
	G.Total:	Deodar	1,197.09	4,681.72	(-)	3,697.91
		Kail	1,222.56	2,079.62	(-)	6,478.30
		Chil	101.88	113.47	(-)	599.69
		Fir	1,655.55	717. 18	(-)	10,871.67
		Total:	4, 177.08	7 ,591.99	(-)	21,647.57

		Kail	-	71.69	(+)	71.69
	Total : -		636.75	3,079.74	(-)	1,657.51
	P. B. Others	Fir	5,272.29	10,029.28	(-)	26,876.75
		Deodar	-	67.85	(+)	67.85
		Kail	-	631 .45	(+)	631.45
	Tota		5,272.29	10,728.58	(-)	26, 177.45
	G. Total:	Fir	5,909.04	12,720.27	(-)	28,643.01
		Deodar	-	104.91	(+)	104. 91
		Kail	-	703.14	(+)	703.14
	Total :		5,909.04	13,528.32	(-)	27,834.96
Selection		Deodar	50.94	518.04	(+	161.46
		Kail	1,400.85	679.83	(-)	9,126.12
		Chil	-	4.81	(+)	4.81
		Fir	764. 10	107.41	(-)	5,241.29
	Total :		2,215.89	1,310.09	(-)	14,201.14
Protection		Deodar	-	241.21	(+)	241.21
		Kail	-	233.82	(+)	233.82
		Fir	-	247.94	(-)	247.94
	Total :		-	692.97	(+)	692.97

7.7.1

The main reason for deficit removals has been attributed to lack of a working for the Division, conservation of forests as a policy of the government by banning fellings for commercial use except ~he salvage workings and T.D. and application of 10% cut on the annual prescribed yield by the government as contained in CCF's communication no. cIII (a) 114/3791-4028 dated 24.3.83.

7.7.2

The progress of the regeneration operations in PB-I areas of Regular Working Circle was satisfactory and number of PB-I areas of Aggarwals plan have passed into PB-IV now, but the pace of regeneration in PB-I areas of fir working circle remained poor. Some of the *forest* of PB-I continuing from Aggarwals plan such as 91 Shikarla 3,7 deonkaniali 1b, 46 Feunsi 2b, 4, Bhindli 3a, 8 kheunt and Bakhlishil 3 have established regeneration and have now passed to PB-IV in the revised plan. In other areas, the regeneration is at various stages. The pace of regeneration has not been satisfactory because of taking up large areas at a time under PB-I planting and huge weed growth combined with biotic interference.

In other PBs no regular silvicultural fellings were done.

7.7.3 Roads and buildings

Some new buildings and jeepable as well bridle paths were constructed during the period although there was no prescription for construction of buildings in the expired plan.

7.8 Past Yield

The past yield removed since 1964-65 is given in Appendix. IX-B.

7.9 Past, Revenue and Expenditure

The past revenue and expenditure from 67-68 to 1985-86 is given in Appendix IX-A.

7.10 Sixth Plan by R. P. Jaiswal 86-87 to 2001-02

In this working plan the following four working circles are as under:

7.10.1 Deodar & Kail Working Circle

The distribution of this working circle in their ranges is as under: -

Name of the Range	Area under Deodar & Kail W.C.
1. Banjar	1537.41
2. Tirthan	1146.52
3. Sainj	1897.15
Total:	4581.08

And 789.17 ha was gone out of this working circle from previous working plan.

The crop is generally un-even-aged except for those forests which have successfully been regenerated over the past under the various working plans. The crops are fairly stocked except on steep ground and near the villages where un-silvicultural markings have created large gaps due to marking for the right holders. The deodar forest in the tract conform to quality I/II of the F.R.I.

As already indicated above, the chil occupies the lower most areas in the tract and are confined to Sainj and Tirthan Ranges only. The crop is generally open and is tapped for resin. The broad leaved trees occupy the depressions and along rivers and stream courses.

7.10.2 Fir Working Circle

The area of this working circle falling in three territorial Ranges is as follows: -

<---------- Area under F.W.C (ha) ---------->

Name of the Range	P.B. I	P. B. II	P. B. III	P. B IV	Total
1. Banjar	991.81	329.36	520.15	1068.40	2909.72
2. Tirthan	801.62	1232.23	879.81	734.13	3647.79
3. Sainj	1115.55	1035.44	1164.82	767.20	4083.01
Total:	2908.98	2597.03	2564.78	2569.73	10640.52

7.10.3 Protection Working Circle

This Working Circle Consist of those Reserved and Demarcated Protected Forests which have not been allotted to Deodar and Kail Working Circle, Fir Working Circle or the Aesthetic Working Circle and some of the Un-demarcated Protected Forests bearing forest cover or situated away from habitations. These forests are generally found on rugged terrain (except the Un-demarcated Protected Forests from the catchments of the river valley projects of Bhakra Dam and lie at the head of the valley and stretch far beyond the limit of the whole growth.

The slope in these forests varies from steep to precipitous and are generally situated in far flung inaccessible areas away from the habitation. The UFs included in this Working Circle, however, lie on moderate slopes and in some forests the terrain is rocky and precipitous devoid of any tree growth.

7.10.3.1 Area Statement The total area of this working circle is 72108.04 ha. Constituting 66711.48 ha of Reserved and DPFs and 5396.56 ha of UFs. The range wise distribution is given in the following table: -

Name of Range	Area of forests			
	R.Fs.	DPFs.	UFs.	TOTAL
Banjar	59.90	2183.36	569.82	2813.08
Tirthan	1219.77	11783.77	2187.25	15190.70
Sainj	3296.97	48167.71	2639.49	54104.17
Total :	4576.64	62134.84	5396.56	72108.04

7.10.4 Improvement Working Circle

The small area less than 10 ha. have not been included in the list of Un-demarcated Protected Forests because of difficulty of their identification in the field view of nautors and private cultivations. The river banks or the behals also are improvement areas in this Working Circle.The alpine pasture extend to the top of the ridges below permanent snowline, the pasture or summer grazing grounds for sheep and goat of local people and the migratory grazers. Such areas are extensive and are found away from the habitations.

7.10.4.1 Area Statement

Range wise distribution of areas of UFs that lie below 3000 meter elevation is given in the following table. The area shown is only approximate as the UFs have never been measured or surveyed. The areas have been calculated from the 4" = 1 mile survey sheets of the area.

Table

Name of Range	Area of UF (ha)
Banjar	2118.68
Tirthan	7304.02
Sainj	6917.48
Total	16340.18

Most of plantation are proposed in this working circle.

7.10.5 Aesthetic Working Circle

This is a new working circle. This working circle consists of forests situated around the tourist spot at Sojha. Sojha is a beautiful place situated above 2900 meters from the mean sea level surrounded by fir spruce forests of Lafat and Jalora. All the forests near and around Sojha having visual impact on the scenic beauty of the place have been included in this working circle.

7.10.5.1 Area Statement

The area this working circle fall in banjar range and the area of this working circle is 1087.39 ha.

7.10.6 Period from 2001-02 to 2012-13. The period between the year 2001-02 to 2012-13 shall be consider gone over as per the prescription of expired Working Plan. All the removals, plantations etc. have been taken into account for the purpose of yield regulation and control forms. The details of all the removals during this period have been mentioned in the present Plan. All the removals are salvage marking carried out as per the present instruction.

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CHAPTER — VIII

STATISTICS OF GROWTH AND YIELD

8.1 General

The following records are available for statistics of growth and yield:-

(1) Cedrus deodara (Deodar) multiple yield tables for deodar (Dedrus deodara) by H.G. Champion and I.D. Mahendru, Indian Forest, Records volume XV Fart VIII. Silviculture series, 1933.

(2) Pinus wallichiana (Pinus excelsa-Blue pine) by H.G. Records volume XIII part X. silviculture series, 1929.

(3) Growth and yield statistics of common Indian Timber species (Himalayan Region) compiled by Director of Forest Education, F.R.I., 1967.

8.2 Age-diameter relation:

During the course of revision of 2nd Working Plan of Kullu forests Trevon had collected thousands of figures for ascertaining the growth and out turn of deodar on ring countings carried out, over more than 1200 trees and figures for different species are given below in Table: 1.8.1

Age (years)

Table: 8.1 Age – Diameter Relationship

Dia at 4/1/2 feet,		Deodar	Kail	Chil	S.Fir	Spruce
14"	(35 cm)	65	50	60	84	65
18"	(45 cm)	80	63	85	104	80
22"	(55 cm)	100	82	109	130	100
26"	(65 cm)	120	104	143	150	115
30"	(75 cm)	155	132	NA	180	135
34"	(65 cm)					

When this data by Trevor was collected, the standardization of crops in quality classes was not there. Now the quality classes have been recognised and it is found that forests of Seraj Forest Division are of F.R.I. quality I/II. The yield tables for various grades of thinning is available now and the diameter age relationship for E grade thinning can be compared with the figures derived by Trevor. Since the density of the crop in the tract is towards the open side hence E grade thinning has been assumed for the sake of comparison of the growth.

8.2.1

F.R.I. yield table for I/II quality deodar crops with E grade thinning gives the following age diameter relationship:

Dia b.h.	Trevor's age	FRI age
14" (35 cm)	65	64
18" (45 cm)	80	90
22" (55 cm)	100	124
26" (65 cm)	120	160
30" (75 cm)	155	212

The comparison thews the Trevors rate of growth of deodar has been faster than the PBI figures which should not, be unexpected as only healthy and fast growing trees must have been selected for the sake of data collection. Majority of the sample plots laid out for the preparation of the yield tables were located in Seraj Forest, Division and therefore the FRI figures for age diameter relationship hold good for Seraj Forest, Division. No fresh data has "therefore been collected in this regard during the course of this revision.

8.3 Volume tables

It has been pointed out that deodar forest in Seraj Forest. Division correspond to FRI quality I/II and now the yield and volume tables for different quality classes are available, these figures can be made use of straight way because most of the FRI sample plots for determination of yield tables/volume tables were located in Seraj Forest.

The commercial volume table for deodar gives the following figures at page 9 of the FRI publication on growth and yield statistics of common India species (of Himalayan Region), 1967

Table: 8.2 Commercial volume table for Deodar

Diameter Class	Volume in Cft (cms) Quality	I & II	Quality I/II	Volume in m^3
10-20	-	-	-	.06
20-30	-	-	-	.14
30-40	14	14	14.00	0.39
40-50	51	41	46.00	1.30
50-60	98	71	84.50	2.39
60-70	145	106	125.50	2.55
70-80	192	144	168.00	4.75
80-90	239	188	213.00	6.02
90-100	-	-	-	-

Table: 8.3 Commercial volume table for Kail

Diameter Class	Volume in Cft (cms) Quality	I & II	Quality I/II	Volume in m^3
V 10-20	-	-	-	.06
IV 20-30	6.5	6.5	6.5	0.18
III 30-40	20	20	20	0.56
IIA 40-50	41	41	41	1.16
IIB 50-60	71	71	71	2.00
IA 60-70	109	108	108.5	3.07
IB 70-80	164	159	161.5	4.57
IC 80-90	237	223	230	6.50
ID 90-100	326.5	294.0	310.25	7.78

Table: 8.4 Commercial volume table of chil

Diameter Class	Volume in Cft (cms) Quality	I & II	Quality I/II	Volume in m^3
V 10-20	-	-	-	.06
IV 20-30	-	-	-	.14
III 30-40	11	11	10.5	0.29
IIA 40-50	39	32.5	35.5	1.00
IIB 50-60	79.5	67	73.25	2.07
IA 60-70	143	-	143	4.04

8.3.1 Volume Table for Broad-Leaved Species:

Kapoor prepared the volume tables of important broad leaved species after actual conversion of trees in the field during the course of revision of the working plan by him. The volume tables have been compiled down to 20 cm d.b.h. including the branches and the same has been relied upon and shall be in use which are tabulated are given below in Table 1.8.5:-

Table: 8.5 Volume table for some Broad – Leaved Species

Sr. No	Name of Spp.	IV	III	IIA	IIB	IA	IB	IC	ID	& Over
1	Quercus Semicarpifolia (Kharshu)	0.3	1	1.8	3	4.6	4.6	8	9.6	12.2
2	Aesculus Indica (Khanor)	0.3	0.8	1.7	2.7	3.9	5.6	7.1	9	12
3	Juglaus regia (Akhrot)	0.2	0.8	1.5	2.5	3.8	5.1	7.2	8.9	11.3
4	Acer Spp. (Mapple)	0.2	0.7	1.3	2.1	3.3	5	6.9	8.5	11.2
5	Prunus padus (Jammu)	0.1	0.7	1.4	2.2	3.2	4.3	5.6	6.9	9.6
6	Betula alnoides (Bhoj Patra)	0.3	0.9	1.6	2.3	3.3	4.4	5.4	6.6	8
7	Carpinus Spp.	0.3	0.9	1.5	2.4	4	6	7.8	9.7	12.6
8	Populus ciliata (Phalas)	0.3	0.7	1.4	2.8	4.9	6.8	9	11.2	14.5
9	Cedrula serrata (Daral)	0.5	1	1.8	2.8	4.4	6	8	9	13.3
10	Rhus Spp. (Rikhal)	0.3	0.7	1.3	2	2.9	4	5.1	7	10.1
11	Celtis australis (Khirak)	0.3	0.7	1.3	2.2	3.3	4.6	6.3	8	11.1
12	Alnus nitida (Kosh)	0.3	0.8	1.5	2.2	3.2	4.3	5.7	7.8	1
13	Salix Spp. (Willow)	0.4	0.8	1.5	2.4	3.1	3.9	-	-	-
14	Robinia psedocasia	0.3	0.6	1	1.4	1.7	2	-	-	
15	Buxus sempervirens	0.1	0.2	-	-			-	-	-

8.3.2 Volume Table for Conifer Species

In view of the fact that the site quality in the Seraj Forest Division has not undergone any change during the short period, the volume factors of R. P. Jaiswal Working Plan in case of broad leaved species has been followed in this working plan also. Similarly the Volume factor of R. P. Jaiswal Plan for conifers shall be adopted as follows in Table 1.8.6: -

Table: 8.6 Volume table for some Broad – Leaved Species in m^3

Diameter in cms	Deo, Kail & Chil	Fir/Spruce
10-20	0.06	0.06
20-30	0.14	0.14
30-40	0.42	0.85
40-50	1.27	1.70
50-60	2.41	3.11
60-70	3.54	5.10
70-80	4.81	7.08
80-90	6.09	8.49
90-100	7.08	9.34

8.4 Recruitment Period

The Recruitment period for different species and age classes has been adopted for this plan from R.P. Jaswal plan and is reproduced below in Table 1.8.7: -

Table 8.7 Dia Classes/recruitment period (years)

Deodar						
IV-III	III-IIA	IIA-IIB	IIB-IA	IA-IB	IB-IC	IC-ID
17	18	19	19	20	24	24
Kail						
IV-III	III-IIA	IIA-IIB	IIB-IA	IA-IB	IB-IC	IC-ID
13	14	16	19	19	22	22
Fir/Spruce						
IV-III	III-IIA	IIA-IIB	IIB-IA	IA-IB	IB-IC	IC-ID
32	30	28	25	25	25	25
Chil						
IV-III	III-IIA	IIA-IIB	IIB-IA	IA-IB	IB-IC	IC-ID
12	14	17	18	19	22	22

8.5 Volume Increment Percentage:

The volume increment percentage of Deodar, Kail, Spruce, Fir and Chil species, as adopted in Raghubir Singh Banyal's Working Plan for Palampur Forest Division shall be adopted, which are tabulated in Table 1.8.8

Table no. 8.8 Volume Increment Percent

Diameter class (cm.)	Volume Increment Percentage.				
	Deodar	Kail	Spruce	Fir	Chil
1	2	3	4	5	6
10-20	4.27	4.72	3.64	2.75	6.51
20-30	3.52	3.81	3.08	2.34	3.87
30-40	2.82	2.92	2.56	2.08	3.22
40-50	2.27	2.47	1.97	1.69	1.80
50-60	1.82	1.80	1.54	1.30	1.23
60-70	1.56	1.67	1.21	1.13	0.56
70-80	1.27	1.24	0.95	0.91	-
80-90	1.14	1.20	0.83	0.73	-
90 & above.	0.86	0.88	0.65	0.49	-

8.6. Density

The crops are uneven aged and therefore the density can not be compare with the yield table figures. However, ocular estimation of density has been done during the course of enumerations and has been recorded in the compartment history files.

8.7 Enumerations

Total enumerations down to 10 cm d.b.h. of all forests under deodar and Kail working circle and Fir Working Circle has been done. All the conifers and the important broad leaved species have been included in the enumerations. The enumeration results have been compiled and the results are given in the Compartment History files for each Compartment/sub compartment separately.

8.8 Stock mapping

All the DPFs and Reserve Forests and all the undemarcated protected forests have been stock mapped on 1:15000 scales. The stock maps are filed with the compartment history files, the area under different species has also been compiled for each Working Circle based on the stock maps and has been given in the form of appendix also.

8.9 Conversion factors:

The conversion factors for fire wood and charcoal have been adopted from the Working Plan of Mandi Nachan by R.V. Singh and is as follows:-

Diameter class Of B.L Tree (Ban Oak)	Yield in quintals	
	Timber	Charcoal
10-20 cm	1.90	0.32
20-30 cm	3.00	0.50
30-40 cm	8.2	1.2
40-50 cm	12.3	2.05
50-60 cm	18.6	3.10
60-70 cm	22.4	3.77
70 & over	30.0	5.00

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CHAPTER – IX
ESTIMATES OF THE CAPITAL VALUE OF THE FORESTS

9.1. Capital Value of the Land under Forests:

The estimated capital value of the forest lands based on the value of Land of different category for taking NPV rates supplied by Hon'ble Supreme Court of India. The Table 1.9.1 below gives this detail based on the category of forest land.

Table: 9.1. Capital value of Forest Land

Sr. No.	Type of Forest land	Area (ha.)	Average cost of land (Rs/ha.)	Total cost of the land (Rs.)
1	Reserved Forest	1,015.74	991000	1006598340'00
2	Delimited Protected Forests.	11,972.30	845000	10116593500.00
3	Un-delimited Protected Forests.	14,056.76	657000	9235291320.00
4	Total	27,044.80		20358483160.00

9.2. Capital Value of the Growing Stock:

The estimated value of the growing stock present in the forests of Banjar Forest Division is given as under in Table 9.2. The estimation has been done on the basis of rates fixed by the Pricing Committee for the year 2010-11.

Table: 9.2. Capital Value of Growing Stock

Sr. No.	Species	Growing Stock (m^3)	Royaly (Rs./m^3)	Total Value (Rs.)
1	Deodar	865033.46	5903.00	**5106292514**
2	Kail	344187.39	3098.00	**1066292534**
3	Fir/Spruce	238657	790.00	**188539030**
4	Chil	39,471.65	572.00	**22577783.8**
5	Broad leave	1,906,004.36	326.00	**621357421.4**
	Total Value			**7005059283**

9.3. Capital Value of Minor or Non-wood Forest Produce:

The estimated annual income from minor or non-wood forest produce in this division is given in Table 1.9.3.

Table: 9.3. Annual Value of Minor/Non-wood Forest Produce

Sr. No.	Minor/Non-wood Forest Produce	Amount (Rs.)
1	Resin	219830/-
2	Other NTFP.	40,000/-
	Total.	**2,59,830/-**

The Total capital value of the forests of this division, including value of forest land, growing stock, Minor/Non-wood Forest Produce excluding existing buildings, roads, B/paths, inspection paths work out to the tune of 27363802273.00 or say **Rs. 2736.38 crores.**

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PART II FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED

CHAPTER — I

BASIS OF PROPOSALS

1.1 BASIS OF PROPOSALS: The national Forest Policy Resolution dated 7th December, 1938 lays down the basic objectives governing the National Forest Policy as follows:-

1. Maintenance of environmental stability through preservation and, where necessary, restoration of the ecological balance that has been adversely disturbed by serious depletion of that forests of the country.

2. Conserving the natural heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna, which represent the remarkable biological diversity and genetic resources of the country.

3. Checking soil erosion and denudation in the catchment areas of rivers, lakes, reservoirs in the interest of soil and water conservation, for mitigating floods and droughts and for the retardation of siltation of reservoirs.

4. Checking the extension of sand dunes in the desert areas of Rajasthan and along the coastal tracts.

5. Increasing substantially the forests/tree cover in the country through massive afforestation and social forestry programmes, especially on all denuded, degraded and unproductive lands.

6. Meeting the requirements of fuel wood, fodder, minor forest produce and small timber of the rural and tribal populations.

7. Increasing the productivity of forests to meet essential national needs.

8. Encouraging efficient utilisation of forest produce and maximising substitution of wood.

9. Creating a massive people's movement with the involvement of women, for achieving these objectives and to minimize pressure on existing forests.

10. The principal aim of Forest Policy must be to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium which are vital for sustenance of all life forms, human, animal and plant. The derivation of direct economic benefit must be subordinated to this principal aim.

1.1.1 The National Forest Policy 1988 further lays down the essentials of forest management as follows: -

1. Existing forests and forest lands should be fully protected and their productivity improved. Forest and vegetal cover should be increased rapidly on hill slopes, in catchment areas of rivers, lakes and reservoirs and ocean shores and on semi-arid, and desert tracts.

2. Diversion of good and productive agricultural lands to forestry should be discouraged in view of the need for increased food production.

3. For the conservation of total biological diversity, the network of national parks, sanctuaries, biosphere reserves and other protected areas should be strengthened and extended adequately.

4. Provision of sufficient fodder, fuel and pasture, specially in area adjoining forests, is necessary in order to prevent depletion of forests beyond the sustainable limit. Since fuel wood continues to be the predominant source of energy in rural areas, the programme of afforestation should be intensified with special emphasis on augmenting fuel wood production to meet the requirement of the rural people.

5. Minor forest produce provides sustenance to tribal population and to other communities residing in and around the forests. Such produce should be protected, improved and their production enhanced with due regard to generation of employment and income.

According to the National Forest Policy two third area in the hills should be under the forest cover.

1.2 The Himachal Pradesh Forest Policy approved and circulated by Secretary Forests No. Fts. (B) 17-5/80 dated 3.9.1989 envisages that 50% area of the Pradesh should be brought under forests by the year 2000 AD.

It provides for a gradual reduction in fellings aimed at the total stoppage after some period of time. It provides planting of productive waste lands with suitable species capable of providing fodder, fuel, fruit and small timber and creating a green belt around the populated areas to improve the environment and ecology.

It suggests greater restriction on felling on either side of the road and the spots of tourist importance.

Grazing in the alpine pastures is to be restricted to Gujjars and restriction on population of goats aiming in its complete elimination. In addition cattle tax to be levied and free grazing to be stopped completely.

Keeping the National Forest Policy and State Policy in view, the following general objects of management are laid out.

1.3 General Objects of Management

The general objects of management will be as under:-

(i) To preserve and improve the forest cover and thereby to prevent denudation and erosion, so as to preserve natural eco-system and nature including wild life, and to ensure an equitable flow of water in the streams and rivers.

(ii) To attain as far as possible a Normal Forest with Normal Growing Stock and Normal Age Classes.

(iii) To meet the legitimate domestic and agricultural requirements of the local people for

timber, fire wood, grazing and other forest produce.

(iv) To improve the grazing pasture in the alpine region and un-demarcated protected forests near the villages with a view to rehabilitate these and improve both the quality and quantity of grasses and fodder species and restock such areas with suitable species.

(v) To increase the area under more valuable species in all localities suited to their growth and for requirements of people with emphasis on fast growing species.

(vi) Consistent with the above, to obtain progressive yield and to exploit all species of economic value for export.

1.4 Constitution of Working Circles

In conformity with the general objects of management laid down above, the following Working Circles shall be constituted:-

1. Deodar and Kail Working Circle.
2. Fir Working Circle.
3. Protection Working Circle.
4. Plantation Working Circle.
5. Joint Forest Managment (Overlapping) Working Circle.
6. Wild Life Managment (Overlapping) Working Circle.
7. Non Timber Forest Produce (Overlapping) Working Circle.

1.4.1 Deodar and Kail Working Circle

This working circle comprises the most valuable and important forests of deodar and kail on comparatively easy ground having a small admixture of spruce and fir in the upper reaches and small quantity of chil in the lower. The forests are not even aged and generally contain all the age classes more or less intimately mixed up except in the areas regenerated during the past working plans. The process of conversion of the uneven crop to even aged crop with preponderance of valuable species will continue under Punjab Shelter Wood System which provides for the retention of even aged patches to a certain extent along with the mother trees at the time of marking in PB-1 areas: thus creating an element of irregularity in the canopy. More stress shall be laid on regenerating the felled areas within the shortest possible time by supplementing the natural regeneration with artificial means so to regenerate the areas allotted to PB-I fully within the regeneration period of 30 years. No discrimination will be made between deodar and kail and no effort shall be made to compel deodar to come up in the areas unsuitable for deodar by repeating sowing and planting.

1.4.2 Fir Working Circle

The predominantly fir and spruce bearing areas with a little admixture of deodar and kail at the lower elevations and broad leaved species along nallahs and depressions have been allotted to this Working Circle. The forests are situated on slopes which can be worked under Shelter Wood

System. The system of concentrated regeneration adopted in the PB-I during the previous plan in some forests has not worked well and the regeneration operation has been hampered due to heavy opening of the canopy resulting into heavy weed growth. The artificial regeneration operations have not showed any quick result as expected. Therefore the forests of fir and spruce will not be worked under Punjab Shelter Wood System. Efforts will be made to allot almost equal areas under each periodic block.

Greater emphasis will be made to regenerate the PB-I areas by artificial means as quickly as possible within the regeneration period of 30 years. The conversion of un-even aged crop to even aged crop will continue. The depressions and sheltered places most suited for broad leaved species shall be planted up with valuable broad leaved species like Acer, Walnut, Bird cherry etc.

1.4.3 Protection Working Circle

This Working Circle includes all the Reserved and Demarcated forests which lie away in the interiors or which have slopes varying from steep to precipitous and can not be managed under Shelter Wood System and thus not included under the Deodar and Kail Working Circle or the Fir Working circle. This working circle also includes high level alpine pastures and undemarcated protected forests near the villages which have degraded and need rehabilitation and improvement with a view to improve the quantity of timber, grasses and fodder species suited best to the site. Artificial regeneration technique will be adopted to rehabilitate such areas with the active cooperation of the local people.

Some of the Undemarcated Protected forests having good crop of deodar, Kail and fir etc. have also been included in this Working Circle.

The vegetative cover is required to be preserved and improved in order to prevent soil erosion and denudation of slopes and to keep the perennial supply of water in the streams, Fauna of the area is also to be protected from extinction and nursed properly in these forests.

1.5 Working Circles, Their Areas and Distribution

The details of all forests, Reserved, Demarcated as well as Undemarcated, allotted to various Working Circles along with their areas have been given in Appendix – I. The total area in hectares, Working Circle wise, and their distribution Range wise is tabulated below :-

Range and Working circle wise area of Seraj Forest Division (ha.)

Range		Deo & Kail. W.C	Fir W.C.	Protection W.C	Total
Banjar	RF & DPF	1537.41	2976.01	3146.07	7591.18
	U.F.	-	-	2954.57	2954.57
Tirthan	RF & DPF	570.36	750.36	1028.82	2349.73
	U.F.	-	-	4683.45	4683.45
Sainj	RF & DPF	1285.31	1007.66	753.92	3047.13
	U.F.	-	-	6418.74	6418.74
Total	**RF & DPF**	**3393.08**	**4734.03**	**4928.81**	**12988.04**
	U.F.	**-**	**-**	**14056.76**	**14056.76**
Grand Total :		**3393.08**	**4666.15**	**18985.57**	**27044.80**

1.6 Reasons for Constitution of Working Circles

The coniferous forests are silviculturally suited for regeneration under a system of concentrated regeneration fellings and the overriding factor for allotting those of the workable areas as lie on comparatively easy ground to the Deodar and Kail Working Circle and Fir Working Circle for regeneration under the system is the necessity for closure against grazing. Even otherwise too it is the configuration of the ground in these hills that determines the silvicultural treatment rather than the species and such of the forests as on largely on moderate slopes are conveniently suited for treatment under a system of concentrated regeneration felling.

The experience during the past working plan has been that the Punjab Shelter wood System along with supplementing the natural regeneration by artificial means combined with closure of the area under regeneration has been most, successful . The experiment of managing the over mature fir forests under clear felling system has proved a failure because of immense wood growth that comes up after the opening up of the forests under clear felling system. The isolated poles retained during the course of such operation died later on due to isolation and wind damage.

Separate working Circles for deodar – kail forest and fire – spruce forests have been created. The regeneration of fir areas has lagged behind in the past and could not keep pace with the fellings.

Therefore the fellings are to be linked with the pace of regeneration. Because of remoteness and distance from the villages, non-availability or poor availability thick humus and heavy weed growth combined with the poor or dismal allotment of budget, for taking such fir forests has resulted in poor regeneration of forests in the Fir Working Circle in the past.

The forests which are inaccessible or precipitous and away from the habitation and containing rich wild life and some Undemarcated Protected Forests containing valuable species near the villages have been allotted to Protection Working circle. Also the alpine grazing grounds which are so important from the point of view of the general population have been constituted in Protection Working Circle.

Improvement working circle has been created so as to focus the attention over the degraded Undemarcated Protected Forests in and around habitations to improve the availability of small timber, fuel and fodder to the population. Naturally such areas included in this Working Circle are proposed to be brought under plantations in a big way.

1.7 Blocks and Compartments

The forests and compartments, where ever possible, have been divided into sub-compartments of about 40 hectares. This division has been made with the help of existing natural features likes ridges, streams, paths etc. The forests allotted under Regular Working Circle of the expired plan were already subdivided into small workable units of 40 hectares or less. However, the forests under Fir Working Circle were generally more than 40 hectares and such of the forests where the sub-division was possible have been divided into smaller units capable of being bounded by existing natural features. No effort has been made to create sub-compartments without natural features and in such cases the area of the sub-compartments has remained more than 40 hectares. Further divisions of forest compartments into sub-compartments of the areas allotted to Protection Working Circle have not been attempted. A detail of forests and compartments subdivided into smaller units is given in the relevant paras of each Working Circle.

1.8 Felling Series

There will be only one felling series conforming to the territorial jurisdiction of Seraj Forest Division.

1.9 Period of the Plan and Necessity of Intermediate Revision

The period of the plan will be 15 years from 2013-14 to 2027-2028. The mid-term review shall be conducted during 2018-19. In view of the growing concern for the preservation of ecology, wild life and the effect of forests on general climate, the government is not very keen on the commercial exploitation of the forests. Therefore no intermediate revision of the plan is anticipated unless the forests suffer from serious outbreak of fire or epidemic disease or outbreak of a war and such other unforeseen and compelling events which require harvesting of the forests more than the anticipated yield from them.

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CHAPTER II

DEODAR AND KAIL WORKING CIRCLE

2.1 General Constitution

The forests allotted to this Working Circle in the previous plan by Jaiswal remains almost unaltered except few areas whichb has been transferred to the Great Himalayan National Park. As a result of these changes the area of this Working Circle falling in 3 Territorial Ranges is as follows: -

Table: 2.1

Name of the Range	Area under Deodar & Kail W.C.
1. Banjar	1537.41
2. Tirthan	570.36
3. Sainj	1285.31
Total:	3393.08

2.2 General Character of Vegetation

The forests included in this Working Circle are situated near the habitations and contain Deodar and Kail crop often mixed in varying proportions. Pure crop of Kail is rarely found. The forests of this Working Circle fall under type 12/C 1C and 9/C IB of the Forests Types by H.G. Champion and Seth (Revised Survey of Forests Types of India - 1964). These forests have already been described in detail under chapter II of part-I of this plan.

The forests are uneven and of moderate density consisting of deodar and kail in most of their distribution. While chil occupies the lower most elevation in the area, silver fir and spruce are found in the upper reaches of deodar forests. Valuable broad leaved species are found along sheltered locations. In the deodar-kail mixed forests, kail occupies the lower elevation and exposed surfaces like ridges in the higher reaches of such forests.

The crop is generally un-even-aged except for those forests which have successfully been regenerated over the past under the various working plans. The crops are fairly stocked except on steep ground and near the villages where un-silvicultural markings have created large gaps due to marking for the right holders. The deodar forests in the tract conform to quality I/II of the F.R.I.

2.3 Blocks and Compartments

The boundaries of the forest blocks of the old plan have been retained. The compartment and sub-compartments also remains the same as in the previous Working Plan. All the compartment and sub compartments are distinguishable on the ground.

2.4 Special Objects of Management.

Without prejudice to the general objects of management of forests, the special objects of this Working Circle will be:-

1. Gradual conversion of the irregular stock to normal stock and thus build up the growing stock.

2. To regenerate P.B.I areas as speedily as possible by resorting to artificial regeneration where ever necessary.

3. To avoid as far as possible, sacrifice of immature stock by retaining compact but even aged well grown groups of poles, to a certain extent, as part of the new crop.

4. To protect and preserve the forests in consonance and inconformity with the policy of State Government so as to maintain the ecosystem.

2.5 Analysis and Evaluation of Crop

Except for the converted crop during the period of previous Working Plans, the crop is irregular having all the age classes in the same area. The converted crop, however, is generally well stocked having more or less represented almost equally generally in mixtures and some times as pure crops of deodar and kail separately. Spruce and fir are found in the higher portions of the compartments bearing deodar and kail. Kail is found as an almost pure crop in only a few forest compartments, but generally in a mixture with kail and deodar in the lower extremities of the compartments of the working circle. The broad leaved trees are confined to depressions and along nallahs.

The stock maps have been prepared on 1:15000 scales and filed in respective Compartment History files. Except for the converted crops, other forest compartments have an average density of 0.5.The quality of the crop varies from place to place, but overall quality conforms to I/II of the F.R.I quality classes.

2.5.1 The stocking in this working circle has been improved and it is above the Normal Growing Stock has evident from the following Table:

Table: 2.2

Normal Growing Stock (m3/ha for deodar for 120 years		Present. Growing Stock m3/ha of Deodar and Kail working circle (Rotation period of 120 years)		
C	grade	thinning	394.90	
D	"	"	370.26	
F	"	"	303.50	500.36

(Based on the data of 100 acres, page 24,25 of growth and yield statistics of Indian Timber F.R.I. Publication, 1967).

Note: 1. The figures for normal fir are growing stock for kail spruce and not available.

2. Present growing stock consists of all the conifers.

2.5.2 The higher size trees are deficient as will be seen from the following table which gives the number of trees and volume per hectare for the conifers and the total taken together, class wise. Out of 165.56 trees/ha., 54.99 trees/ha account for V class and 31.18 and 24.73 trees/ha are represented by IV and III class trees making a total of 110.90 trees/ha i.e. 66.98% of the total trees per hectare in this

Working Circle. Fir spruce and chil are represented in small proportion while deodar and kail constitute the bulk of the Working Circle. The broad leaved trees are also found in some of the compartments, generally along nallahs and depressions. The economically important species form a small proportion to the total.

2.6 Enumerations:

Total enumerations down to 10 cm d.b.h. in 10 cm diameter classes has been carried out in PB I and IV whereas in PB II and III only 20 % enumeration done to assess the growing stock. The result of the enumeration has been given in Appendix IVA. The PB wise abstract for Deodar and Kail which are the main species in this Working Circle is given below in Table:

Detailed enumerations results are appended in volume – II appendix – IV A in Volume – II at page no. 1 to 91

Table no. 2.3 : P.B Wise Abstract of Deodar Enumerations

Deodar	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
PB I	31232	13732	10676	12414	11924	8675	4944	3019	2477	306	**99399**
	1873.92	1922.48	4163.64	16138.2	28498.36	30796.25	23484	18174.38	14911.54	1842.12	**141804.9**
PB II	23975	17390	19625	21000	15170	11600	5410	2325	1515	375	**118385**
	1438.5	2434.6	7653.75	27300	36256.3	41180	25697.5	13996.5	9120.3	2257.5	**167334.95**
PB III	77895	63550	55105	40285	23550	12160	57115	2865	1480	190	**334195**
	4673.7	8897	21490.95	52370.5	56284.5	43168	271296.3	17247.3	8909.6	1143.8	**485481.6**
PB IV	51320	14072	6654	3776	2103	1149	549	454	337	31	**80445**
	3079.2	1970.08	2595.06	4908.8	5026.17	4078.95	2607.75	2733.08	2028.74	186.62	**29214.5**
TOTAL no.	184422	108744	92060	77475	52747	33584	68018	8663	5809	902	632424
TOTAL Vol.	11065.32	15224.16	35903.4	100717.5	126065.3	119223.2	323085.6	52151.26	34970.18	5430.04	823835.95

Table no. 2.4: P.B Wise Abstract of Kail Enumerations

Kail											
PB I	26026	12372	7507	6187	5128	3661	2273	1336	888	34	**65412**
	1561.56	2226.96	4203.92	7176.92	10256	11239.27	10387.61	8684	6890.88	263.84	**62890.96**
PB II	40075	23720	13930	10215	6925	3185	1820	875	500	140	**101385**
	2404.5	4269.6	7800.8	11849.4	13850	9777.95	8317.4	5687.5	3880	1086.4	**68923.55**
PB III	60320	39645	23635	1550	10555	6005	3405	1635	720	120	**147590**
	3619.2	7136.1	13235.6	1798	21110	18435.35	15560.85	10627.5	5587.2	931.2	**98041**
PB IV	21828	8675	4989	2991	1860	1101	648	321	210	36	**42659**
	1309.68	1561.5	2793.84	3469.56	3720	3380.07	2961.36	2086.5	1629.6	279.36	**23191.5**
TOTAL No.	148249	84412	50061	20943	24468	13952	8146	4167	2318	330	357046
TOTAL Vol.	8894.94	15194.16	28034.16	24293.88	48936	42832.64	37227.22	27085.5	17987.68	2560.8	253047.01

Table – 2.5 Enumeration Results Deodar, Kail Working Circle Conifers

	Diameter classes (cm) No. of "trees and volume P. B. wise										
	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER	TOTAL	
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
DEODAR	P.B.I (Area 786.32 ha.)										
No.	31232	13732	10676	12414	11924	8675	4944	3019	2477	306	99399
Vol.	1873.92	1922.48	4163.64	16138.2	28498.36	30796.25	23484	18174.38	14911.54	1842.12	141804.9
KAIL											
No.	26026	12372	7507	6187	5128	3661	2273	1336	888	34	65412
Vol.	1561.56	2226.96	4203.92	7176.92	10256	11239.27	10387.61	8684	6890.88	263.84	62890.96
SPRUCE											
No.	11127	4104	2067	1581	1394	1079	830	563	644	53	23442
Vol.	667.62	574.56	1756.95	2687.7	4335.34	5502.9	5876.4	4779.87	6014.96	495.02	32691.32
FIR											
No.	425	293	151	131	141	82	101	90	57	30	1501
Vol.	25.5	41.02	128.35	222.7	438.51	418.2	715.08	764.1	532.38	280.2	3566.04
CHIL											
No.	466	289	233	243	204	165	78	31	8	0	1717
Vol.	27.96	40.46	97.86	308.61	491.64	584.1	375.18	188.79	56.64	0	2171.24
TOTAL											
No.	69276	30790	20634	20556	18791	13662	8226	5039	4074	423	191471
Vol.	4156.56	4805.48	10350.72	26534.13	44019.85	48540.72	40838.27	32591.14	28406.4	2881.18	243124.5

Table – 2.6

(Broad Leaved) P.B.I. Area 786.32 ha

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
Konsh	823	227	149	76	53	37	21	8	7	0	1401
Kharsu	786	646	459	263	181	180	174	151	132	6	2978
Willow	-	-	-	-	-	-	-	-	-	-	0
Khanor	768	620	508	458	489	360	287	244	224	47	4005
Mapple	2041	907	460	345	202	96	85	78	36	0	4250
Walnut	373	235	221	130	88	73	55	27	35	2	1239
Kharak	545	215	119	50	37	23	16	0	2	0	1007
Poplar	1593	936	416	118	44	13	13	3	2	0	3138
Ban	2633	1457	724	440	246	86	39	33	20	1	5679
Daral	9562	5243	3056	1880	1340	868	690	544	458	56	23697
Jamu	2119	1309	745	300	44	16	10	5	12	0	4560
Mohru	196	117	69	60	19	23	4	1	7	2	498
Betula	748	667	528	416	66	14	9	3	2	0	2453
Total	22187	12579	7454	4536	2809	1789	1403	1097	937	114	54905
Misc.	11175	4289	1278	494	252	126	75	36	38	1	17764
Grand Total	**33362**	16868	8732	5030	3061	1915	1478	1133	975	115	31
Grand Total Vol. in cum.	934.136	13865.70	14695.20	14497.20	13677.40	8809.00	11569.00	10819.00	11796.20	1403.00	102066.04
No of trees/ha.	**42.43**	**21.45**	**11.10**	**6.40**	**3.89**	**2.44**	**1.88**	**1.44**	**1.24**	**0.15**	**92.42**

Table – 2.7 Conifers

Diameter classes (cm) P. B. II 20% Area Enumeration

(Area 222.58 ha.)

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER		Total
	V	IV	I II	IIA	II B	IA	I B	IC	ID	IE	
DEODAR											
No.	4795	3478	3925	4200	3034	2320	1082	465	303	75	23677
Vol.	287.7	486.92	1530.75	5460	7251.26	8236	5139.5	2799.3	1824.06	451.5	33467
KAIL											
No.	8015	4744	2786	2043	1385	637	364	175	100	28	20277
Vol.	480.9	853.92	1560.16	2369.88	2770	1955.59	1663.48	1137.5	776	217.28	13784.7
SPRUCE											
No.	4146	2392	885	649	436	364	283	212	186	77	9630
Vol.	248.76	334.88	752.25	1103.3	1355.96	1856.4	2003.64	1799.88	1737.24	719.18	11911.5
FIR											
No.	83	69	41	11	4	9	22	0	6	2	247
Vol.	4.98	9.66	34.85	18.7	12.44	45.9	155.76	0	56.04	18.68	357.01
CHIL											
No.	307	271	415	340	280	124	61	18	10	1	1827
Vol.	18.42	37.94	174.3	431.8	674.8	438.96	293.41	109.62	70.8	7.08	2257.13
TOTAL											
No.	17346	10954	8052	7243	5139	3454	1812	870	605	183	55658
Vol.	1040.76	1723.32	4052.31	9383.68	12064.5	12532.9	9255.79	5846.3	4464.14	1413.72	61777.3

Table – 2.8

(Broad Leaved) P.B.II. 20% Area Enumeration (Area 222.58 ha)

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER	TOTAL	Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
Konsh	93	33	24	24	8	4	4	3	1	0	194
Kharsu	1126	881	305	80	58	38	26	21	8	6	2549
Willow	3	-	-	-	-	-	-	-	-	-	3
Khanor	452	298	197	132	131	150	172	133	130	55	1850
Mapple	413	195	110	40	14	11	3	3	0	0	789
Walnut	176	155	93	86	45	41	29	18	23	8	674
Kharak	242	152	54	41	18	7	8	2	1	0	525
Poplar	151	61	57	31	17	11	3	0	0	0	331
Ban	4297	3119	1909	1077	713	517	406	268	239	51	12596
Daral	198	138	62	40	15	17	13	2	1	0	486
Jamu	856	502	290	159	91	65	19	3	1	0	1986
Mohru	212	95	67	18	7	4	5	2	2	0	412
Betula	2	2	1	0	0	0	0	0	0	0	5
Total	8221	5631	3169	1728	1117	865	688	455	406	120	22400
Area	222.58	222.58	222.58	222.58	222.58	222.58	222.58	222.58	222.58	222.58	222.58
Misc.	3321	958	479	288	142	32	9	2	0	0	5231
Grand Total	**11542**	**6589**	**3648**	**2016**	**1259**	**897**	**697**	**457**	**406**	**120**	**27631**
No of trees/ha.	**51.86**	**29.60**	**16.39**	**9.06**	**5.66**	**4.03**	**3.13**	**2.05**	**1.82**	**0.54**	**124.14**
Vol. in cum	**323.17**	**1976.70**	**6566.40**	**6048.00**	**6043.20**	**4126.20**	**3206.20**	**3656.00**	**3897.60**	**1464.00**	**37307.47**

Table – 2.9

P.B. III 20% Area Enumeration (Area 217.10 ha.) Conifers Diameter classes

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER		
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
DEODAR											
No.	15579	12710	11021	8057	4710	2432	1143	573	296	38	56559
Vol.	934.74	1779.4	4298.19	10474.1	11256.9	8633.6	5429.25	3449.46	1781.92	228.76	48266.3
KAIL											
No.	12064	7929	4727	3118	2111	1201	681	327	144	24	32326
Vol.	723.84	1427.22	2647.12	3616.88	4222	3687.07	3112.17	2125.5	1117.44	186.24	22865.5
SPRUCE											
No.	4010	1961	1004	580	382	190	98	71	47	14	8357
Vol.	240.6	274.54	853.4	986	1188.02	969	693.84	602.79	438.98	130.76	6377.93
CHIL											
No.	713	785	1034	679	501	316	175	58	8	0	4269
Vol.	42.78	109.9	434.28	862.33	1207.41	1118.64	841.75	353.22	56.64	0	5026.95
Total											
No.	32366	23385	17786	12434	7704	4139	2097	1029	495	76	101511
Vol.	1941.96	3591.06	8232.99	15939.31	17874.33	14408.31	10077.01	6530.97	3394.98	545.76	82536.7

Table – 2.10

(Broad Leaved) P.B.III. 20% Area Enumeration (Area 217.10 ha)

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER		Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
Konsh	334	81	24	19	5	4	1	0	0	0	468
Kharsu	360	124	28	31	11	0	0	0	0	0	554
Willow	3	-	-	-	-	-	-	-	-	-	3
Khanor	434	329	239	268	157	98	73	51	36	5	1690
Mapple	242	118	66	42	18	7	5	0	0	0	498
Walnut	97	111	88	50	29	17	8	6	1	2	409
Kharak	83	34	13	3	2	0	0	0	0	0	135
Poplar	84	129	68	22	13	3	0	3	0	0	322
Ban	3362	2279	1942	1647	1294	1098	905	702	451	0	13680
Daral	615	322	164	87	13	1	0	0	0	0	1202
Jamu	3294	1980	699	274	84	17	14	12	0	0	6374
Mohru	2210	1437	164	192	95	180	123	0	0	0	4401
Betula	12	7	5	3	1	0	0	0	0	0	28
Total	11130	6951	3500	2638	1722	1425	1129	774	488	7	29764
Misc.	8280	5406	2401	869	333	110	16	10	0	0	17425
Grand Total	19410	12357	5901	3507	2055	1535	1145	784	488	7	47189
No of trees/ha.	89.41	56.92	27.18	16.15	9.47	7.07	5.27	3.61	2.25	0.03	217.36
Total vol. in cum	543.48	12703	11967.23	10618.2	8277.54	7717.98	6902.06	5509.95	3917.66	63.19	68221.29

Table – 2.11

P.B. IV Area 408.34 ha. Conifers Diameter classes

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER		
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
DEODAR											
No.	51320	14072	6654	3776	2103	1149	549	454	337	31	80445
Vol.	3079.2	1970.08	2595.06	4908.8	5026.17	4078.95	2607.75	2733.08	2028.74	186.62	29214.5
KAIL											
No.	21828	8675	4989	2991	1860	1101	648	321	210	36	42659
Vol.	1309.68	1561.5	2793.84	3469.56	3720	3380.07	2961.36	2086.5	1629.6	279.36	23191.5
SPRUCE											
No.	8797	3455	1861	964	766	591	445	245	267	25	17416
Vol.	527.82	483.7	1581.85	1638.8	2382.26	3014.1	3150.6	2080.05	2493.78	233.5	17586.5
CHIL											
No.	205	213	165	146	91	39	29	12	1	0	901
Vol.	12.3	29.82	69.3	185.42	219.31	138.06	139.49	73.08	7.08	0	873.86
Total No.	82150	26415	13669	7877	4820	2880	1671	1032	815	92	141421
Total Vol.	4929	4045.1	7040.05	10202.58	11347.74	10611.18	8859.2	6972.71	6159.2	699.48	70866.20

Table – 2.12

(Broad Leaved) P.B.IV. Area 408.34 ha

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER		Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
Konsh	26	12	15	13	11	2	0	0	0	0	79
Kharsu	11	5	4	2	1	0	0	0	0	0	23
Khanor	339	204	239	235	204	187	109	112	67	6	1702
Mapple	595	326	158	50	33	15	9	4	6	0	1196
Walnut	216	177	104	37	23	18	10	12	3	0	600
Kharak	73	39	16	6	2	0	0	0	0	0	136
Poplar	1270	207	61	17	6	2	1	1	0	0	1565
Ban	1229	891	504	246	141	87	58	40	48	90	3334
Daral	948	385	155	73	35	28	9	2	6	0	1641
Jamu	606	415	254	135	20	4	0	0	0	0	1434
Mohru	57	22	7	2	0	0	0	0	0	0	88
Betula	204	183	103	56	21	9	4	1	2	0	583
Total	5574	2866	1620	872	497	352	200	172	132	96	12381
Misc.	8280	5406	2401	869	333	110	16	10	0	0	17425
Grand Total	13854	8272	4021	1741	830	462	216	182	132	96	29806
No of trees/ha.	33.92761	20.25763	9.847186	4.263604	2.03262	1.13141	0.528971	0.445707	0.32326	0.235098	72.9931
Total vol in cum.	387.912	8503.616	8154.588	5271.748	3343.24	2322.936	1302.048	1279.096	1059.696	866.688	32491.57

Table – 2.13 Conifers											
Diameter classes (cm) P. B. II 20% Area Enumeration, 100% = 20% area into 5											
Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER		Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
(Area 1112.92 ha.)											
DEODAR											
No.	23975	17390	19625	21000	15170	11600	5410	2325	1515	375	118385
Vol.	1438.5	2434.6	7653.75	27300	36256.3	41180	25697.5	13996.5	9120.3	2257.5	167334.95
KAIL											
No.	40075	23720	13930	10215	6925	3185	1820	875	500	140	101385
Vol.	2404.5	4269.6	7800.8	11849.4	13850	9777.95	8317.4	5687.5	3880	1086.4	68923.55
SPRUCE											
No.	20730	11960	4425	3245	2180	1820	1415	1060	930	385	48150
Vol.	1243.8	1674.4	3761.25	5516.5	6779.8	9282	10018.2	8999.4	8686.2	3595.9	59557.45
FIR											
No.	415	345	205	55	20	45	110	0	30	10	1235
Vol.	24.9	48.3	174.25	93.5	62.2	229.5	778.8	0	280.2	93.4	1785.05
CHIL											
No.	1535	1355	2075	1700	1400	620	305	90	50	5	9135
Vol.	92.1	189.7	871.5	2159	3374	2194.8	1467.05	548.1	354	35.4	11285.7
TOTAL											
No.	86730	54770	40260	36215	25695	17270	9060	4350	3025	915	278290
Vol.	5203.80	8616.60	20261.55	46918.40	60322.30	62664.25	46278.95	29231.50	22320.70	7068.60	308886.65

Table – 2.14

(Broad Leaved) P.B.II. 20% Area Enumeration (Area 222.58 ha) 100% area = 20% area into 5 = 1112.92 ha

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER	TOTAL	Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
Konsh	465	165	120	120	40	20	20	15	5	0	970
Kharsu	5630	4405	1525	400	290	190	130	105	40	30	12745
Willow	15	-	-	-	-	-	-	-	-	-	15
Khanor	2260	1490	985	660	655	750	860	665	650	275	9250
Mapple	2065	975	550	200	70	55	15	15	0	0	3945
Walnut	880	775	465	430	225	205	145	90	115	40	3370
Kharak	1210	760	270	205	90	35	40	10	5	0	2625
Poplar	755	305	285	155	85	55	15	0	0	0	1655
Ban	21485	15595	9545	5385	3565	2585	2030	1340	1195	255	62980
Daral	990	690	310	200	75	85	65	10	5	0	2430
Jamu	4280	2510	1450	795	455	325	95	15	5	0	9930
Mohru	1060	475	335	90	35	20	25	10	10	0	2060
Betula	10	10	5	0	0	0	0	0	0	0	25
Total	41105	28155	15845	8640	5585	4325	3440	2275	2030	600	112000
Area	1112.92	1112.92	1112.92	1112.92	1112.92	1112.92	1112.92	1112.92	1112.92	1112.92	1112.92
No. of	36.93	25.30	14.24	7.76	5.02	3.89	3.09	2.04	1.82	2.70	102.80
trees /ha.											
Misc.	16605	4790	2395	1440	710	160	45	10	0	0	26155
Grand Total	**57710**	**32945**	**18240**	**10080**	**6295**	**4485**	**3485**	**2285**	**2030**	**600**	**138155**
No of trees/ha.	**51.85**	**29.60**	**16.39**	**9.06**	**5.66**	**4.03**	**3.13**	**2.05**	**1.82**	**0.54**	**124.14**
Total Vol. in m3	**1615.88**	**33867.46**	**36990.72**	**30522.24**	**25356.26**	**22550.58**	**21007.58**	**16058.98**	**16296.84**	**5416.8**	**209683.34**

Table – 2.15

P.B. III 20% Area Enumeration (Area 217.10 ha.) Conifers Diameter classes 100% area =20%area into 5 = 1085.50 ha

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER		Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
DEODAR											
No.	77895	63550	55105	40285	23550	12160	57115	2865	1480	190	334195
Vol.	4673.7	8897	21490.95	52370.5	56284.5	43168	271296.3	17247.3	8909.6	1143.8	485481.6
KAIL											
No.	60320	39645	23635	1550	10555	6005	3405	1635	720	120	147590
Vol.	3619.2	7136.1	13235.6	1798	21110	18435.35	15560.85	10627.5	5587.2	931.2	98041
SPRUCE											
No.	20050	9805	5020	2900	1910	950	490	355	235	70	41785
Vol.	1203	1372.7	4267	4930	5940.1	4845	3469.2	3013.95	2194.9	653.8	31889.65
CHIL											
No.	3565	3925	5170	3395	2505	1580	875	290	40	0	21345
Vol.	213.9	549.5	2171.4	4311.65	6037.05	5593.2	4208.75	1766.1	283.2	0	25134.75
Total											
No.	**161830**	**116925**	**88930**	**48130**	**38520**	**20695**	**61885**	**5145**	**2475**	**380**	**544915**
Vol.	**9709.8**	**17955.3**	**41164.95**	**63410.15**	**89371.65**	**72041.55**	**294535.1**	**32654.85**	**16974.9**	**2728.8**	**640547**

Table – 2.16

(Broad Leaved) P.B.III. 20% Area Enumeration (Area 217.10 ha), 100% Area =20% into 5 = 1085.50 ha.

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER		Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
Konsh	1670	405	120	95	25	20	5	0	0	0	2340
Kharsu	360	124	28	31	11	0	0	0	0	0	554
Willow	15	-	-	-	-	-	-	-	-	-	15
Khanor	2170	1645	1195	1340	785	490	365	255	180	25	8450
Mapple	1210	590	330	210	90	35	25	0	0	0	2490
Walnut	485	555	440	250	145	85	40	30	5	10	2045
Kharak	415	170	65	15	10	0	0	0	0	0	675
Poplar	420	645	340	110	65	15	0	15	0	0	1610
Ban	16810	11395	9710	8235	6470	5490	4525	3510	2255	0	68400
Daral	3075	1610	820	435	65	5	0	0	0	0	6010
Jamu	16470	9900	3495	1370	420	85	70	60	0	0	31870
Mohru	11050	7185	820	960	475	900	615	0	0	0	22005
Betula	60	35	25	15	5	0	0	0	0	0	140
Total	54210	34259	17388	13066	8566	7125	5645	3870	2440	35	146604
No. of trees/ha	49.94	31.56	16.02	12.04	7.89	6.56	5.20	3.57	2.25	0.03	135.06
Misc.	41400	27030	12005	4345	1665	550	80	50	0	0	87125
Grand Total	**95610**	**61289**	**29393**	**17411**	**10231**	**7675**	**5725**	**3920**	**2440**	**35**	**233729**
No of trees/ha.	**88.08**	**56.46**	**27.08**	**16.04**	**9.43**	**7.07**	**5.27**	**3.61**	**2.25**	**0.03**	**215.32**
Total Vol.in m3	**2677.08**	**63005.09**	**59609**	**52720.51**	**41210.47**	**38589.9**	**34510.3**	**27549.76**	**19588.32**	**315.98**	**339776.41**

Table No. 2.17 Deodar W.C Spp wise Growing Stock

	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
Deodar No.	184422	108744	92060	77475	52747	33584	68018	8663	5809	902	632424
Vol.	11065.32	15224.16	35903.4	100717.5	126065.3	119223.2	323085.6	52151.26	34970.18	5430.04	823836
Kail No.	148249	84412	50061	20943	24468	13952	8146	4167	2318	330	357046
Vol.	8894.94	15194.16	28034.16	24293.88	48936	42832.64	37227.22	27085.5	17987.68	2560.8	253047
Spruce	60704	29324	13373	8690	6250	4440	3180	2223	2076	533	130793
Vol.	3642.24	4105.36	11367.05	14773	19437.5	22644	22514.4	18873.27	19389.84	4978.22	141724.9
FIR	840	638	356	186	161	127	211	90	87	40	2736
Vol.	50.4	89.32	302.6	316.2	500.71	647.7	1493.88	764.1	812.58	373.6	5351.09
Chil	5771	5782	7643	5484	4200	2404	1287	423	99	5	33098
Vol.	346.26	809.48	3210.06	6964.68	10122	8510.16	6190.47	2576.07	700.92	35.4	39465.5
Conifer No.	399986	228900	163493	112778	87826	54507	80842	15566	10389	1810	1156097
Vol.	23999.16	35422.48	78817.27	147065.3	205061.5	193857.7	390511.6	101450.2	73861.2	13378.06	1263424
B/L	200536	119374	60386	34262	20417	14537	10904	7520	5577	846	474359
Vol.	5615.01	119241.9	119449.5	103011.7	83587.37	72272.42	68388.93	55706.84	48741.06	8002.47	684017.2
G.Total	600522	348274	223879	147040	108243	69044	91746	23086	15966	2656	1630456
Total Vol	29614.17	154664.4	198266.8	250077	288648.9	266130.1	458900.5	157157	122602.3	21380.53	1947442

2.7 Quality Classes

The average quality of crop in this Working Circle conforms to FRI quality I/II. According to the multiple yield table of deodar the top height, for the different quality classes at 120 years age for deodar, kail and chil has been given as under

Site Quality	Top height in Ft.	Top height in meters
I	120-140	36.57 - 42.67
I/II	120	36.57
II	100-120	30.48 - 36.57
II/III	100	30.48
III	80-100	24.38 - 30.48
III/IV	80	24.38
IV	60-80	

2.8 Density

The density of the crop in each compartment has been assessed ocularly and has been recorded in the compartment history files. The density of the crop in this Working Circle varies from 0.4 to 0.6 and almost 1.0 in the beautifully regenerated PB-IV areas.

Current Annual Increnment: The Current Annual Increment for Deodar and Kail which are the main species in this Working Circle is calculated on the basis of increment percent given as in Table: 8.8 at page no. 133 in Chapter VIII of Part –I is given as under in Table:

Table no. 2.18 : CAI of Deodar

	DIAMETER CLASSES										
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
No.of Trees	184422	108744	92060	77475	52747	33584	68018	8663	5809	902	632424
Vol. in Cum.	11065	15224	35903	100718	126065	119223	323086	52151	34970	5430	823836
Increment %	4.26	3.52	2.62	2.27	1.82	1.56	1.27	1.14	0.86	0.86	
CAI	471.38	535.89	940.67	2286.29	2294.39	1859.88	4103.19	594.52	300.74	46.698	13433.65

Table no. 2.19 : CAI of Kail

	DIAMETER CLASSES										
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
No.of Trees	87929	44767	26426	19393	13913	7947	4741	2532	1598	210	209456
Vol. in Cum.	5275.7	8058.1	14799	22495.9	27826	24397.3	21666.4	16458	12400	1629.6	155006
Increment %	4.72	3.81	2.92	2.47	1.8	1.67	1.24	1.2	0.88	0.88	
CAI	249.01	307.01	432.13	555.649	500.868	407.435	268.663	197.5	109.12	14.34	3041.729

2.9 Silvicultural System

The forests allotted to this Working Circle will be managed under Punjab Shelter Wood System which is well understood by all foresters. This is a modification Uniform System or Shelter Wood System. This system permit a retention of compact group of young poles over a certain minimum area and also permits selection markings on steep slopes thus bringing in an element of irregularity in the final crop. Therefore this system is also called as Irregular Shelter Wood System.

2.10 Choice of Species

The species eminently suited to the locality will be favoured and shall get preference over all other species. In deodar kail forests deodar and kail occur in pure patches or in mixtures of varying proportions, chil generally occurs pure on lower elevations and some times mixed with kail in some forests. Still there are some forests which carry pure kail crop. Generally the areas generated over the past working plans contain a pure crop of kail. Pure kail patches can also be seen on the ridges and dry locations in the deodar forests.

Economically deodar and kail, both, are important, and of almost equal value. But kail is more susceptible to fire damage and is often damaged by fire. It is also lopped heavily and is there lore attacked by Tremetes pinii a fungus, which renders the timber of kail trees unsuitable for use. Therefore, all reasonable attempts must be made in future as in the past to increase the proportion of deodar. The proportion of deodar can be increased by manipulating and favouring deodar at the time of cleanings, thinnings and improvement fellings etc. The proportion can also be increased by retention of deodar mother trees and by artificial planting with deodar. However deodar should never be tried on hot southern slopes and exposed ridges in its zone which is best suited to kail. Similarly moist locations and along the nallahs or in the areas occupied by spruce/fir deodar should never be attempted for introduction. In the most and shady location and along the river and nallah course valuable broad leaved species are to be introduced after extraction of the broad leaved species which will be worked at the time of marking along with conifers. A detailed suitability and treatment map of the area should be prepared before taking up sowing and planting.

2.11 Regeneration Period

It has been observed that a period of 30 years is quite sufficient and therefore a regeneration period of 30 years has been adopted for this Working Circle. According to the provisions of Forest Settlement also an area can be closed for regeneration for a maximum period of 30 years and therefore a regeneration period of 30 years satisfies this requirement also.

2.12 Exploitable Diameter and Rotation

Keeping in view the demand of the market for large sized timber for industrial, structural and defense purposes, exploitable diameter has been fixed at 60 cm. d. b. over bark. According to the multiple yields table diameter of 56.50 cm is achieved in 140 years, with "D" grade thinning and 59.75 cm with "E" grade thinning in case of deodar. Kail is faster grown and so is the case with chil. The density of the forests under this working circle being less than normal the trees put-on faster growth and are expected to achieve an exploitable diameter of 60 cm in 120 years and therefore the rotation has been kept at 120 years. The exploitable diameter for B.L. species will be 40 cms d.b.h.

2.13 **Felling Cycle:** A felling cycle of 15 years in case of thinning of the crop will be adopted.

Sequence of fellings areas in Deo & Kail Working Circle P.B.I

Table no. 2.20

Year.	Range.	Name of Forest.	Comptt./Sub-Comptt.	Area (ha.)
1	2	3	4	5
2014-15	Banjar	Pokhar Dhar	CIII	12.55
2016-17	Tirthan	Dibri	CI	80.94
2018-19	Banjar	Segali	Whole	4.05
2018-19	Banjar	Karohadhar	CII	12.14
2018-19	Banjar	Karohadhar	CIII	5.26
2018-19	Tirthan	Joun Kaloun	Whole	7.28
2019-20	Sainj	Serikanda	1b	64.75
2021-22	Banjar	Balo	CI	8.09
2021-22	Banjar	Naga Dhar	4b	26.31
2022-23	Tirthan	Galoun Kaloun	CI	16.19
2022-23	Tirthan	Galoun Kaloun	CII	20.64
2022-23	Banjar	Deodwar	CII	7.28
2023-24	Banjar	Raghunal	CII	21.45
2024-25	Sainj	Run	CIV	16.59
2024-25	Banjar	Talata	CII	23.07
2024-25	Banjar	Bagthachi	CI	6.07
2024-25	Banjar	Bagthachi	CIII	8.09
2024-25	Sainj	Raila	Whole	28.73
2024-25	Tirthan	Richi Kaloun	Whole	14.16
2025-26	Tirthan	Jhutlikalwala	IIIa	33.25
2025-26	Tirthan	Jhutlikalwala	IIIb	25.02
2025-26	Tirthan	Kanalbag	Whole	6.88
2025-26	Sainj	Marhanghar	CI	14.57
2025-26	Sainj	Marhanghar	CII	17.81
2025-26	Banjar	Rani-Kot	CII	33.18
2026-27	Banjar	Blaj Dhar	3b	21.04
2026-27	Banjar	Balaj dhar	4b	21.45
2026-27	Tirthan	Wohana	Whole	12.95
2026-27	Banjar	Jibhi	Whole	4.86
2026-27	Banjar	Salanu	CI	15.36
2026-27	Banjar	Salanu	CIV	19.43
2026-27	Banjar	Dalicha	CII	4.86
2027-28	Banjar	Relikatrate	CI	25.5
2027-28		Dungru Thana	C2	11.74

Sequence of fellings areas in Deo & Kail Working Circle P.B.IV

Table no. 2.21

Deo. And Kail W.C. Banjar Range P.B. IV				
1	Deodwar 1/8	C1	4.45	Deo. & Kail
2	Bagthachi	C2	21.04	Deo. & Kail
		C4	12.14	Deo. & Kail
3	Talata 1/12	C3	9.71	Deo. & Kail
4	Serishil 1/16	C2	28.33	Deo. & Kail
5	Bakhliara 1/19	C3	23.88	Deo. & Kail
6	Balajdhar 1/20	2b	27.52	Deo. & Kail
7	Pokhardhar 1/22	C2	16.19	Deo. & Kail
8	Nagadhar 1/25	4a	38.45	Deo. & Kail
Sainj Range Deo. & Kail W.C.				
1	Loal 2/36	2a	31.16	Deo. & Kail
2	Shikarla 2/39	C2	58.66	Deo. & Kail
Tirthan Range Deo. And Kail W.C. P.B. IV				
1	Jutlikalwa	2a	45.0	Deo. & Kail
		2b	28.66	Deo. & Kail
2	Dharagad 1/29	1a	22.16	Deo. & Kail
		1b	28.43	Deo. & Kail

2.14 Division in to Periodic Blocks

There will be 4 Periodic Blocks and all the 4 P.B's. will be fixed one with a period of 30 years each. The forests under this Working Circle have been allotted to P.B.I, P.B.II, P.B.III and P.B. IV.

2.15 Allotment to Periodic Blocks

The areas in which regeneration is intended to be obtained by felling the mature crop will be allotted to P.B.I while the fully regenerated forests will be allotted to P.B.IV. Rest of the irregular forests will be allotted to P.B.II and P.B.III. The area of the forests allotted to various P.Bs. Rangewise, specieswise and P.B. wise Growing Stock in this Working Circle is also given in the following tables'--

Table no. 2.22 - 6 Statement showing Range-wise area under different P. Bs

Area in ha.					
Name of Range	P.B.I	P.B.II	P.B.III	P.B.IV	Total
Banjar	305. 56	230.68	804.92	196.28	1537.41
Tirthaii	295.01	35.61	115.50	124.24	570.36
Sainj	185.75	846.63	165.11	87.82	1285.81
Total :	786.32	1112.92	1085.50	408.34	3393.08
Normal area	848.27	848.27	848.27	848.27	3393.08

2.15.1 Periodic Block I

Theoretically the entire growing stock except that of mother trees above 60 cm. in diameter should be available for fellings during the plan period. But some trees will not be available for felling on various considerations, and will restrict the scope of availability of trees of various diameter classes.

2.15.2 Periodic Block II

Relatively mature crop after making the allotment to P.B.I has been put under this P.B. In fact all the forests have irregular crop having all age classes mixed together. Deodar and Kail are the major constituents of the forests with some admixture of spruce, fir and Chil in small proportions. The number of trees/ha, is very low and so is the volume per hectare.

The forests are of low density because of excessive fellings in the past and markings of trees in T.D.

2.15.3 Periodic Block III

The areas are those areas which have been properly regenerated in the past and now allotted to this P.B. on the basis of the average diameter of the crop and also areas contain those forests which have not been converted so far but have irregular crop i.e. all the age classes mixed together. The difference in the stocking of the forests both in terms of number of trees and volume per hectare is self speaking and can be compared to the low stocking of this P.B.

2.16 Calculation of Yield

The yield from this Working Circle will consists of yield from P.B.I and P.B. IV areas and has been calculated for Deodar and Kail only as theses are main species in this Working Circle. The dry, fallen, dead and damaged trees from PB II and III areas will be utilized for meeting the right-holders demand and removal under salvage marking. The volume of theses removal shall be counted against the prescribed yield in this Working Circle. The yield has been calculated separately for Deodar and Kail in PB I and IV and prescribed accordingly.

2.16.1 Yield from P.B.I

The major yield from this Periodic Block will be realized through seeding fellings. The field observations have revealed that the mature trees/seed bearers standing in such forests is definitely more than the optimum. The yield for Deodar and Kail has been calculated separately.

2.16.1.1 Yield for Deodar: - The abstract of growing stock of Deodar present in this PB is tabulated asunder in Table:

Table no. 2.23 : Abstract of Deodar growing stock in PB I

Dia Class.	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
No. of trees	31232	13732	10676	12414	11924	8675	4944	3019	2477	306	99399
Vol. in M^3	1873.92	1922.48	4163.64	16138.2	28498.36	30796.25	23484	18174.38	14911.54	1842.12	141804.9

The average annual yield for Deodar is calculated below using Hufgnal's formula as under:-

$$Y = C_1V_1 + C_2V_2/P$$

Where Y = Average annual yield in m^3

C_1 = Constant representing the fraction of volume of trees of class II A and above that will be available for felling i.e. 0.7

V_1 = Volume of trees 40 cm dbh and above (II and above)

C2 = Constant representing the fraction of volume of trees of classes III and IV that will be available for felling i.e. 0.2

V_2 = Volume of trees of 20-40 cm dbh (class III and IV)

P = Period of the plan, in the present case it is 15 years.

Accordingly the average yield works out is as below:

Y = 70% of 133844.85 + 20% of 6086.12/15

= 93691.04 + 1217.22/15

= 94908.26/15 = 6327.24 m^3

Or say 6000 m^3

Hence annual yield for Deodar from PB I areas of this working Circle is 6000 m^3.

2.16.1.2 Yield for Kail: - The abstract of growing stock of Kail present in this PB is tabulated asunder in Table:

Table no. 2.24 : Abstract of Kail growing stock in PB I

Dia Class.	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
No. of trees	26026	12372	7507	6187	5128	3661	2273	1336	888	34	65412
Vol. in M^3	1561.56	2226.96	4203.92	7176.92	10256	11239.27	10387.61	8684	6890.88	263.84	62890.96

The average annual yield for Kail is calculated below using Hufgnal's formula as under:-

$$Y = C_1V_1 + C_2V_2/P$$

Where Y = Average annual yield in m^3

C_1 = Constant representing the fraction of volume of trees of class II A and above that will be available for felling i.e. 0.7

V_1 = Volume of trees 40 cm dbh and above (II and above)

C2 = Constant representing the fraction of volume of trees of classes III and IV that will be available for felling i.e. 0.2

V_2 = Volume of trees of 20-40 cm dbh (class III and IV)

P = Period of the plan, in the present case it is 15 years.

Accordingly the average yield works out is as below:

Y = 70% of 54898.52 + 20% of 6430.88/15

= (38428.96 + 1286.17)/15

= 39715.13/15 = 2647.67 m^3

Or say 2500 m^3

Hence annual yield for Kail from PB I areas of this working Circle is 2500 m^3.

2.16.2 Yield from PB II:

No yield is being prescribed in this Periodic Block as no fellings are to be carried out except salvage removals.

2.16.3 Yield from P.B. III:

Areas included in this Periodic Block are the even aged converted pole crop generally of pure deodar, irregular and un-even aged crop which is un converted, and of crops requiring different treatments. The converted crop requiring light thinning only to remove congestion while the second type of crop requiring conservation of the growing stock as far as possible and removal of only over-mature trees which are not expected to survive upto the period when this will be allotted to P.B.I for regeneration felling. The crop in later type generally is open and does not require any thinning. However, removal of over matured trees also has to be on silvicultural lines.

Since the properly converted and well stocked forests have been allotted to this group, the yield will be obtained in the form of silvicultural thinnings and therefore no hard and fast yield can be prescribed. The yield arrived at for removal for this P.B. shall be used as a guide only.

The uniformly converted and well stocked crop will require light thinning to prepare for the optimum growth conditions and remove the congestion in the crop on silvicultural principles. Therefore it is estimated that 20% of the growing stock can safely be assumed to be available for felling during such thinnings over a period of the 30 year period. 1C and above trees be removed cautiously without creating gaps wherever silviculturally required to be removed.

2.16.4 Yield from P.B. IV:

2.16.4.1 Yield for Deodar: - The abstract of growing stock of Deodar present in this PB is tabulated asunder in Table

Table no. 2.25 : Abstract of Deodar growing stock in PB IV

Dia Class.	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
PB No.	51320	14072	6654	3776	2103	1149	549	454	337	31	80445
Vol in m^3	3079.2	1970.08	2595.06	4908.8	5026.17	4078.95	2607.75	2733.08	2028.74	186.62	29214.5

The average annual yield for Deodar is calculated below using Hufgnal's formula as

under:-

$$Y = C_1V_1 + C_2V_2/P$$

Where Y = Average annual yield in m^3

C_1 = Constant representing the fraction of volume of trees of class II A and above that will be available for felling i.e. 0.7

V_1 = Volume of trees 40 cm dbh and above (II and above)

C2 = Constant representing the fraction of volume of trees of classes III and IV that will be available for felling i.e. 0.2

V_2 = Volume of trees of 20-40 cm dbh (class III and IV)

P = Period of the plan, in the present case it is 15 years.

Accordingly the average yield works out is as below:

Y = 70% of 21570.1 + 20% of 4565.14/15

= 15099.08 + 913.03/15

= 16012.11/15 = 1067.47 m^3

Or say 1000 m^3

Hence annual yield for Deodar from PB IV areas of this working Circle is 1000 m^3.

2.16.4.2 Yield for Kail: - The abstract of growing stock of Kail present in this PB is tabulated asunder in Table:

Table no. 2.26 : P.B Wise Abstract of Kail Enumerations

Dia Class.	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
No. of trees	21828	8675	4989	2991	1860	1101	648	321	210	36	42659
Vol. in m^3	1309.68	1561.5	2793.84	3469.56	3720	3380.07	2961.36	2086.5	1629.6	279.36	23191.5

The average annual yield for Kail is calculated below using Hufgnal's formula as under:-

$$Y = C_1V_1 + C_2V_2/P$$

Where Y = Average annual yield in m^3

C_1 = Constant representing the fraction of volume of trees of class II A and above that will be available for felling i.e. 0.7

V_1 = Volume of trees 40 cm dbh and above (II and above)

C2 = Constant representing the fraction of volume of trees of classes III and IV that will be available for felling i.e. 0.2

V_2 = Volume of trees of 20-40 cm dbh (class III and IV)

P = Period of the plan, in the present case it is 15 years.

Accordingly the average yield works out is as below:

Y = 70% of17526.45 + 20% of 4355.34.88/15

= 12268.52 + 871.07/15

= 13139.59/15 = 875.97 m^3

Or say 800 m^3

Hence annual yield for Kail from PB I areas of this working Circle is 800 m^3.

2.16.5 Total Annual Yield by Vonmantal's Formula

Annual yield = 2 G.S/R

Where R = Rotation = 120 years, Annual yield on the basis for this formula comes as follows: -

Table – 2.27

Species	Total G.S In m3	Annual yield (m3) by Y - 2 G.S/R
Deodar	171019.40	2850
Kail	86082.46	1434
Spruce	68567.20	1142
Fir	3923.05	65
Chil	10329.18	172
	Total Yield	5663

2.16.6 A comparison between the annual yields calculated by different formulae will show that the prescribed total annual yield from the Working circle is within safe limits.

Table – 2.28

Yield in m3 by different, methods

Species	Prescribed yield	Yield by Vonmantal' s formula
Deodar	7000	2850
Kail	3300	1434
Spruce	1730	1142
Fir	120	65
Chil	120	172
Total :	12270	5663

The vast variation in case of chil is on account of the fact that most of the chil bearing areas fall under P.B.II of this working circle from where no yield has been prescribed for removal.

To total annual yield removed from the working circle works out to be 1.11% of the total growing stock of the Working Circle.

2.16.7 Calculation of yield for Broad Leaved Species

Due to abnormal growth in the living standards of the people of the tract, the requirement of broad leaved species has increased many folds for manufacture of furniture. Important broad leaved species like walnut, kharsu, mapple and khirki are used in the textile industries for manufacturing of various articles. In the absence of non-supply of better furniture making wood, comparatively inferior species of broad leaved trees like khanor, daral, bird cherry etc are now in great demand.

Not much effort has been made in the past to scientifically calculate the permissible yield, exploit and regenerate the broad-leaved species. Here in this plan an effort is being directed towards calculating permissible yield of broad leaved trees, their extraction and consequent regeneration with valuable broad leaved species.

The broad leaved trees will be marked and exploited along with the conifers in one go so that valuable species of conifers and broad leaved suited to the locations is introduced by artificial ration for supplementing the natural regeneration. No effort will be made to convert the broad leaved bearing areas into coniferous crop by artificial regeneration.

Marking in the broad-.leaved patches will be made in accordance with, the general rules for marking under Punjab Irregular Shelter Wood System as laid down for Deodar and Kail.

Broadleaved trees are found in the forests of the Working Circle in small proportions. No broad leaved tree are found over an area of 945.84 Via. In the remaining forests also there are some forests only from where the broad leaved trees of commercial importance can be extracted because of being in sizable proportions.

2.16.8 Yield from P.B.I.

From the list of species and their growing stock it will be seen that, konsh, kharsu, willow, kharak, poplar, daral and mohru are in small numbers. Higher diameter classes of betula are also almost absent of the remaining species, kharsu is found on the ridges and can not be exploited for the reasons of soil erosion. Felling of ban trees is banned by the government from the forests.

Therefore only khanor, walnut, mapple and jamu (bird-cherry) are the remaining species which can be extracted.

The marking will be undertaken on the same principles as that adopted for conifers. On gentle slopes, concentrated marking will be done and on steep slopes and along nallahs selection marking will be done.

It is estimated that 25% of the growing stock of 40 cm. and above of the important species will be available for removal over a period of 15 years.

Annual Yield of Khanor

$$= \frac{458 \times 1.7 + 489 \times 2.7 + 360 \times 3.9 + 287 \times 5.6 + 244 \times 7.9 + 271 \times 9}{60} = \frac{9476.7}{60} = 157.94\ m^3$$

or say 150 m3

Annual Yield of Mapple

$$= \frac{345 \times 1.7 + 202 \times 2.7 + 96 \times 3.9 + 85 \times 5.6 + 78 \times 7.9 + 36 \times 9}{60} = \frac{2922.5}{60} = 48.70\ m^3$$

or say 50 m3

Annual Yield of Walnut

$$= \frac{130 \times 1.7 + 88 \times 2.7 + 73 \times 3.9 + 55 \times 5.6 + 27 \times 7.9 + 37 \times 9}{60} = \frac{1597.60}{60} = 26.62\ m^3$$

or say 25 m^3

Annual Yield of Jamu

$$= \frac{300 \times 1.7 + 44 \times 2.7 + 16 \times 3.9 + 10 \times 5.6 + 5 \times 7.9 + 12 \times 9}{60} = \frac{894.7}{60} = 14.91\ m^3$$

or say 15 m^3

2.16.9 Yield from P.B. II

Since B.L. species are to be worked along with the conifers and no removals are prescribed from P.B.II, hence no yield from P.B.II is prescribed.

2.16.10 Yield from P.B.III

Since thinning have been prescribe in Group-A areas of this P.B. B.L. trees will also be given the treatment, at the time of marking where necessary provided no permanent, gap is created in the canopy. No thinning has been prescribed in Group-B type areas. No yield is prescribed.

2.16.11 Yield from P.B-IV

In this P.B. also the over mature B.L. trees have no place i.e. IIB and above trees have to be removed as these will be unfit till the time this area is allotted to P.B.I for exploitation. It is expected that 35% of the stock of over mature trees will be available for felling during period of the plan.

From the table of growing stock it will be seen that the IIB and above trees of important species is as follows:-

Table no. 2.29

Species	<- -------- No. of trees in diameter classes ------- -> IIB	IA	IB	IC	ID
Khanor	204	187	109	112	73
Mapple	33	15	9	4	6
Walnut	23	18	10	12	3
Jamu	20	4	0	0	0

Annual Yield of Khanor

$$= \frac{70}{(2 \times 100)} \times \frac{1}{15} \times 204 \times 2.7 + 187 \times 3.9 + 109 \times 5.6 + 112 \times 7.9 + 73 \times 9 = 77.99\ m^3$$

or say 80 m^3

Annual Yield of Mapple

$$= \frac{70}{(2 \times 100)} \times \frac{1}{15} \times 33 \times 2.7 + 15 \times 3.9 + 9 \times 5.6 + 4 \times 7.9 + 6 \times 9 = 6.54\ m^3$$

or say 5 m^3

Annual Yield of Walnut

$$= \frac{70}{(2 \times 100)} \times \frac{1}{15} \times 23 \times 2.7 + 18 \times 3.9 + 10 \times 5.6 + 12 \times 7.9 + 3 \times 9 = 7.01\ m^3$$

or say 7 m^3 Annual

Yield of Jumu

$$= \frac{70}{(2 \times 100)} \times \frac{1}{15} \times 20 \times 2.7 + 4 \times 3.9 + 0 \times 5.6 + 0 \times 7.9 + 0 \times 9 = 1.62\ m^3$$

or say 2 m^3

Table no. 2.30 Yield of Broad Leaved Species (m^3)

Species	P.B.I	P.B.I1I	P.B.IV	Total
Khanor	150	-	80	230
Mapple	50	-	5	55
Walnut	25	-	7	32
Jamu	15	-	2	17
Total:	240	-	94	334

Table no. 2.31 Annual yield from Deodar and Kail Working Circle of conifers and Broad Leaved Species (m3)

Species	P.B.I	P.B.III	P.B.IV	Total
Deodar	4960	320	700	5980
Kail	2660	150	600	3410
Spruce	1100	40	590	1730
Fir	120	-	-	120
Chil	70	30	20	120
Khanor	150	-	80	230
Maple	50	-	5	55
Walnut	25	-	7	32
Jamu	15	-	2	17

2.17 Control of Yield

All removal of conifers and broad leaved trees down to 10 cm. diameter over bark, for what ever reason, shall count towards yield. Deviation controls at yearly intervals are not practicable, therefore the deviations should be checked within +110% after a lapse of first 5 years and again at intervals of 5 years. The total *variation in* yield should not be allowed beyond +-10% after the close of the working plan period of 15 years.

Although yield calculations are only a guide to the executive agency but the limit should not be crossed lest we remove more than the increment put on by the crop in the Working Circle. The marking in the P.B. I forest will be taken up according to the situation and condition and silvicultural requirement of the crop, so as to obtain a uniform regeneration over the whole fewest and the prescribed annual yield should be taken as an indicator only and not as a hinderance for giving proper silvicultural treatment to the whole compartment taken up for P.B.I marking. Should there be excess removal of yield from any P.B. I forest than prescribed, no further area aid be taken up for P.B. I felling in the subsequent years till the deviation comes within reasonable limits as prescribed. There may be instances where the yield from P.B.I compartment might be obtained more than calculated yield but this is obvious because the yield calculations have been made after application of a number of safety factors against any excess removals. In such cases the yield from P.B.II can be correspondingly reduced, again, not at the cost of silvicultural requirement of the crop. As has already been demonstrated, the crop is far from the NORMAL and therefore it is rather advisable to remove less yield so as to bring the G.S as near to the Normal Growing Stock as possible period.

2.17.1 However, the removals from P.B.I will be subject to the following more conditions laid down:

1. Removals from P.B.I areas will depend upon the progress of regeneration in the already felled areas. If the progress of regeneration is hindered by some causes further removals from P.B.I will be stopped. The progress of regeneration will be perceptible after a lapse of 5 years from the year of felling under P.B. I and therefore a review of the progress of regeneration should be undertaken at an interval of 5 years.

   Particular interest will be taken and all possible measures will be taken to ensure that the regeneration is established as early as possible.

2. Advance planning for nursery stock for regenerating the felled P.B.I areas be made and the area be undertaken for regeneration fellings only after the proper sized seedlings are available with the Forest Division. It should be kept in mind that fir takes 3.b years, spruce 2.b year and deodar 1.5 years and B.L. species 1-2 years to grow to the plantable size.

Normally felling in P.B.I areas and their restocking by restoring to artificial regeneration should continue uninterrupted unless a ban on felling specific to P.B.I areas has been proclaimed by the State, otherwise the conversion of crop to the Normal Forests will suffer a set back and all the removals from either P.Bs shall be unscientific. The forests which have been converted to uniform crop bear testimony that the growing stock in such crops has improved many fold.

Regeneration survey in group-A and group-B areas of P.B.I will be undertaken every year and result communicated to C.F. W.P. CF (T) and the C.C.F every year.

2.17.2 The proscribed annual yield has been given species wise and the yield control is also intended to be exercised specie wise. But the species wise yield shall vary depending upon which of the compartments have been taken for P.B.I fellings. Therefore it will be difficult, at times, to control the species wise yield within the prescribed limit. Therefore control over the combined yield of all species shall be checked within the prescribed limits of deviation after the prescribed intervals. The removals from the forest compartments will take place according to the silvicultural requirement of the crop.

Each P.B.I marking shall be taken up by the Divisional Forest Officers of the Division himself, as far as possible, or by his A.C.F. Each P. B.I marking should be inspected by the concerned Conservators of Forests of the territorial circle.

In case of broadleaved species the yield will be checked within +-10% of the prescribed yield after the close of the working plan period as it is not possible to control the yield annually. Broad leaved yield will depend upon P.B.I area has been worked having broad leave or no broad leaved tree.

2.18 Method of Executing Fellings in P.B.I

Before undertaking the markings, the marking officer will acquaint himself with the technique of regeneration contained in CCF's technical order number 2 of Punjab Forest Manual Vol. III and the marking rules given hereunder. The removals must be aimed at obtaining maximum natural regeneration for which the forests under this wording circle are quite suited provided proper protection against grazing and fire is provided to the crop. The marking officer will open the canopy in such a way so as to induce natural regeneration of deodar on locality suited to it. No attempt should be made to introduce, even artificially, deodar where fir and spruce are happily coming up. In such areas, marking will be done keeping the silvicultural requirement of these species. Similarly marking in B.L. patches will be done according to the requirement of these species.

2.18.1 The following general principles are laid down for the guidance of the marking officers:-

(1) The compartments taken up for marking under seeding felling shall be gone-over the whole compartment and will not be restricted to annual yield prescriptions under P.B.I.

(3) If, after review of yield control as prescribed, it is found that more yield than prescribed under P.B.I has been removed in the past, further marking should be stopped. In no case the excess removal over the permissible yield limit should be allowed. Should any compartment remains for P.B. I felling after the prescribed yield for the plan period has been obtained such of the remaining P.B. I area should not be marked during the period of the plan and should be left for the next plan.

(3) The pace of removal of yield from P.B.I will be linked with the progress of regeneration under group - A arid group - B areas. Should the regeneration not progress satisfactorily felling of P.B.I areas be stopped till such time a decision is taken by C.F. Working Plan on the basis of the regeneration survey reports submitted to him by the field agency.

(4) Well grown tall and healthy seed bearers of deodar and kail of IIB and IA classes will be left as seed bearers uniformly allotted to the area at 16 to 18 meter distance in case of deodar and 18-20 meter distance in case of Vail.

The seed bearers of fir and spruce in their zone will be left at comparatively smaller distances and 45-50 seed bearers/ha, will be retained. The location of the seed bearers will be so selected as to help in disposal of seed to maximum distance. Kail being comparatively high light demander will be left on the ridges.

Similarly broad-leaved species important from the industrial point of view will be left at a distance of 20-22 meters to act as seed bearers. The seed bearers be selected from IInd class trees. First class trees should not normally be retained as seed bearers.

(5) The P.B.I markings will encompass the seedling and secondary fellings as one operation and therefore utmost care should be taken to open the canopy properly.

(6) Compact groups of healthy, even aged poles up to 40 cm. in diameter and not less than 0.1 ha. in extent will be retained as an Advance growth. Unevenaged heterogenous crop having all age gradations, though in compact areas, shall not be retained as an advance growth. The tendency of keeping un-even-aged groups as advance growth must be avoided. The compact patch of such a diameter should be selected for retention which will merge in the future crop in due course of time.

Once a group is retained as part of the future crop, its details should be marked on the map of the compartment and a proper mention be made in the marking note to be appended with the compartment history files, so that such patches are not opened up under P.B.I marking subsequently. Thinning in such group be carried out at the time of P.B.I markings.

(7) Individual poles will be marked for removal.

(8) Markings shall be done keeping in view the silvicultural requirement of each species.

(9) In mixed crops deodar shall be preferred over kail.

(10) On steep and broken ground selection markings shall be carried out, at other places markings conforming to Shelter Wood principle be made.

(11) No markings over 30 meters on either side of the National/State High Ways (except for dead, dying and diseased trees) shall be made.

(12) No marking up to 150 meters on either side of rivers/streams (except for dead, dying and diseased trees) shall be done.

(13) All the trees standing over regeneration shall be lopped completely before felling and Guy ropes will be used for control of the direction of fall of the trees.

(14) Valuable broad leaved species like mapple, walnut, bird cherry, khirki etc. will be preferred over other less useful broad leaved trees.

(15) In case of broadleaved trees the exploitable diameter will be 40 cm. d.b.h. All trees above this diameter except seed bearers will be marked for removal. Markings on steep slopes and along nallahs will conform to the selection principles. Trees below this diameter will not be marked for removal. Thinning will be done in the younger crop strictly in accordance with the silvicultural requirements of the species.

The areas occupied by broadleaved species will be planted up with commercially important species after the P.B.I fellings. No attempt shall be made to introduce conifers in the areas where broad leaved trees were occurring.

(16) No rolling of logs will be allowed in the area having regeneration.

(17) A marking note will be prepared by the marking officer, by not below the rank of Assistant Conservator of Forests, and pasted in the compartment history file along with marking map showing advance growth retained etc.

(18) Marking in P.B.I will be inspected by the Territorial Conservator wherever possible, this should be inspected by C.F. Working Plan and the higher authorities also.

2. 18.2 Felling in P.B. II

No felling in this P.B. have been prescribed mainly to safeguard the final yield under P.B. I. The forests in this P.B. have a low stock and density. Only dead and uprooted tree however can be removed for T.D. or handed over to the Forest Corporation for marking. No green standing tree should be marked from this P.B. even for T.D. purposes.

2.18.3 Fellings in P.B. III

P.B III areas are the well stocked, even aged converted crop of pure deodar, kail or an admixture of both or more species. This crop should be silviculturally tended in a proper way so as to achieve the concept, of Normal Forests. Only light 'C' grade thinning is prescribed. In addition, the IB and above diameter trees are out of place in this Periodic Block and therefore, these trees should also be removed on silvicultural principles without creating any permanent gap in the canopy. The salient points to be kept in view by the marking officer are: -

(1) All removals shall aim at improving the condition and composition of the crop.

(2) No tree will be marked to induce regeneration.

(3) Dead, dying, diseased and fallen trees shall be marked for removal.

(4) Malformed, moribund, and fallen trees shall be marked.

(5) Trees of IB and above diameter class will be marked for removal without creating any gap in the canopy.

(6) Valuable species are to be preferred over the inferior ones for retention.

Thinning will be carried out in accordance with the thinning principles contained in njab Forest Leaflet No. 1 and IA with additional numerical check of the yield table figures. Only single nning over half the area of the P.B. is prescribed.

18.4 Method of Executing Fellings in P.B.IV.

The marking in this P.B. will combine the removal of mature trees i.e. seed bearers tanding over the established crop with 'C' grade thinning in the rest of the pole crop.

The salient points guiding principle for marking officer are:-

(1) No attempt should be made to obtain or induce regeneration. The markings should aim at freeing the established regeneration from suppression. Thus I and II class trees standing over the established regeneration will be marked for removal.

(2) All solitary trees of II and III class standing amongst the young crop and which are likely to develop into wolf trees shall be marked for removal.

(3) 'C' grade thinning in the established group of poles and the advance growth will be carried out. No attempt should be made to open the patches of advance growth for regenerations

(4) All marked trees likely to damage the young crop should be lopped completely before felling. Guy ropes should be used to fix the direction of fall of the tree.

(5) In the broadleaved patches, thinning should be undertaken in the young crop. All IIB and above trees should be removed without creating permanent, gap in the canopy.

2.19 Subsidiary Cultural Operations in P.B.I

The subsidiary cultural operation, though an important tool of management, has been neglected all along in the past mainly due to paucity of funds. The operations are prescribed in the Working Plans but are rarely followed in letter and spirit thus hindering the regeneration operations. The operations, though seem very trivial, are very important from the silvicultural point of view and therefore must be carried out. Salient points are:-

(1) Disposal of felling refuse in accordance with the instructions laid, down in Punjab Forest Leaflet No. 6. These lay down the instructions for collecting debris at suitable places and then dispose it through burning or disposal into some big depression.

(2) Removal of trees of inferior species interfering with the young regeneration and not marked originally or not removed even after marking due to considerations of market etc.

(3) Removal of unfelled marked trees.

(4) Cleaning in the existing patches of regeneration and timber cuttings.

(5) Shrub cutting where ever necessary for providing clean bed for the natural regeneration.

(6) Closure to grazing of the area by erecting barbed wire fence.

The planting operation in the area will be taken up immediately after the area is vacated by the Forest Corporation. For this purpose nursery stock is to be arranged in advance.

2.20 Artificial Regeneration in P.B.I Areas

The whole tract falling under this Working Circle is suitable for natural regeneration of all the conifers except fir and spruce if strict closure to grazing is provided to the forest. But in view of socioeconomic conditions prevailing in the area, it is generally very difficult to effect complete closure. Moreover, if the area is left unregenerated immediately after felling under P.B.I, then there is danger of the area being invaded by the weeds and bushes. In view of these considerations stocking of the area by artificial means is prescribed. This will, on one hand reduce the period of the closures and on the other restock the area expeditiously.

The techniques of artificial regeneration of conifers has already been perfected and is contained in Punjab Leaflet No. 3 and 4 and are well understood and practiced by the field staff. The technique therefore is not being discussed in detail.

Temporary nurseries for deodar, fir and spruce and chil are established in advance. Nursery raised seedlings are generally not planted in case of kail instead patch sowing is to be resorted because kail seeds almost every year. Suitable area favourable for deodar can be taken up for line or patch sowings also but the refractory areas are planted up with nursery raised seedlings of minimum 25 cm. height and 1.5 years old. Sowing of deodar is done before the snowfall in patches or lines while planting is always done during summers.

No attempt should be made to introduce deodar in the area occupied by fir and spruce except in the tension belt of deodar spruce. Similarly no conifer should be tried in the area occupied by the broadleaved species. Artificial regeneration is a good tool to change the composition of the crop with better and commercially valuable species.

It is futile to attempt to fill 'thatches' and 'phats' and rocky southern slopes with shallow soils with deodar or any other species not suited to the site conditions.

2.21 Tending in Young Regeneration

Young regeneration has to be nursed and tended so as to produce high quality timber. Generally this work is neglected for want of sufficient budget. The spacing between the plants and selection of proper plants of desirable species starts at this stage in addition to freeing the crop from unnecessary competition. Therefore this operation should be given proper attention by the field staff. The cost of tending operation Is more than rapid by the production of high quality stems and stands.

2.22 Weeding

All regeneration areas should be properly weeded in infancy so as to eliminate the weeds for food resources available to the plant and also save the plants from being smothered by weeds. Normally two weedings, one in June-July and another in August-September are considered sufficient for young plantations. Number and frequency of weedings depends upon the incidence of bushes and weeds as also on the condition of the regeneration. If more than two weedings are necessitated, these should be carried out without any hesitation for betterment of the crop. In actual practice the natural regeneration areas are rarely weeded.

The plantation areas are also not weeded for want, of funds. This is a major cause of the failure of regeneration areas. The weeds grow very fast and cover the whole area within no time during the rainy season. The plants are suppressed and smothered. The sunlight so precious for the growth of the plants during rains, which is the growing period available for the plants, is obstructed and in many cases the plants die of insufficient light.

This aspect should be seen by the higher authorities that proper budget is provided for the weedings and it should be monitored in the office as well as in the field that weedings are carried out actually in the field. This will go a long way to save further huge expenditure on replanting the whole area year after year. More' emphasis should be given on inspection of planting and weeding operations in the field by the higher authorities.

2.23 Cleaning

Cleaning operations are carried out in the regeneration areas when the regeneration is past sapling stage and should be carried out till the area is fit for thinning. Best and vigorously growing stems of the species considered important from the management point of view should be retained.

All forked, crooked and damaged stems should be removed in cleanings so as to provide growing space to better species and stems. In deodar plantations kail has been found coming up naturally in plenty. Kail is 2-3 times faster grown than deodar in the initial stages and suppresses deodar. Therefore all kail plants competing with healthy deodar must be cut when it is young.

The cleaning operation is described in detail in technical order No 1 of Punjab Forest Manual Vol. III and must be studied thoroughly. Normally the spacing between deodar plants is kept equal to the diameter of plant in inches expressed as feet as a thumb rule.

2.24 Closure

Effective closure of the regeneration areas is most essential for the success of the plantation/regeneration. Experience has shown during the past working plans that the regeneration/plantation areas have failed due to ineffective closures. Therefore it is imperative that each felled area is closed for grazing immediately after disposal of felling refuse. The closure has to be effectively kept intact till the regeneration establishes. In view of the settlement provisions, the maximum period for which an area can be kept continuously closed is 30 years.

This period is quite sufficient for stocking the area. The closure notification of the regeneration areas is notified by the government through notifications.

It has been said that there is a huge time lag between the actual closure and the issue of gazette notifications. Any mischief done by any body in between this period normally does not constitute an offence when challenged in a court of law. The issue of closure notifications takes unduly large time as it is scrutinised and passes through the departmental channels up to the government who ultimately notifies it, after a lapse of time.

The power of notifying the closure of plantation areas should he vested in the Divisional Forest Officers for speedy implementation after ascertaining that sufficient area was left open for the fulfillment of grazing rights of the right holders. A proper and effective closure will definitely help in establishing the regeneration in the shortest possible time.

2.25 Grazing

The local inhabitants have grazing rights in the forest areas and they will be allowed to enjoy these rights except in the closed areas.

2.26 Grass Cuttings

There is no restriction on grass cutting in the areas other than regeneration areas. In the regeneration areas grass cutting should only be allowed after the plants have passed the one meter height stage. Generally, this aspect is not given proper consideration in actual practice.

2.27 Right Holders Requirement

The demand of timber by the rightholders will be metwith from the forests in which their rights are recorded. Normally the timber in such cases be made available from undemarcated forest first and only in rare cases the timber be granted from DPF or RF. The observations however show that T.D. timber is marked In the field at the convenience of the recipient. All silvicultural principles are thrown to wind while marking the T.D. timber.

It should therefore be ensured that the T.D. is sanctioned from a forest where this is allowed. No T.D. should be marked in any forest which has been marked for silvicultural or other fellings. No T.D. be marked in P.B.I areas after the area has been felled and closed for regeneration. No T.D. markings are allowed in P.B.II areas. Markings for T.D. in P.B.IV and P.B.III shall be done strictly according to the prescriptions of the plan. All removals under T.D. marking shall be counted towards yield from this Working Circle.

2.28 Fire Protection

Forest fires are common in the tract therefore strict watch is required to be kept over the forest fires. The fire lines are to be kept properly maintained and fire watchers be engaged for detection and reporting of the fire.

It is really a sorry state of affairs that so-far-the Forest Department could not provide the systems for communications in such emergencies as fire. The mobility of the staff and people is also restricted due to hilly terrain ad lack of conveyance. By the time people reach the fire it has already spread to vast areas. It is right time that some thing is done for fire protection at the earliest.

The fire lines around the plantations are not burnt every year endangering the whole plantation in case of severe fire.

Suitable budget for fire protection be provided and the progress watched by the higher authorities. The present practice of engaging fire watchers during the fire season and putting them on a job other than fire watching has to be discouraged.

People not rendering help in case of forest fires should be severely dealt and exemplenary punishment given for this lapse by suspending their rights for 10 or 15 years by the Divisional Forest Officers after proper inquiry in the matter.

2.29 Regeneration Survey

Regeneration survey in the felled P.B.I areas should be carried out right after the area is planted-up or closed for regeneration till the regeneration establishes. This exercise should be done by the Range Officers every year during April-May after melting of the snow when the weed and bush growth is at its minimum on 1 : 3960 scale (16" = 1 mile scale) and submitted to the higher authorities through the DFO. If the regeneration does not progress properly or keep pace with the prescribed fellings, further P.B.I fellings be stopped and the orders of the working plan circle obtained.

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CHAPTER – III
FIR WORKING CIRCLE

3.1 General Constitution

This working circle includes almost all the forests of the previous plan by Jaiswal allotted under Fir Working Circle and contain predominantly spruce and fir bearing forests occurring on moderate slopes and considered suitable for working under Punjab, Irregular Shelter Wood system or concentrated regeneration.

3.1.1 The area of this Working Circle falling in three Territorial Ranges is as follows:-

Table 3.1

Name of the Range	<---------- Area under F.W.C (ha) ---------->				
	P.B.I	P. B. II	P. B. III	P. B IV	Total
1. Banjar	991.81	329.36	586.44	1068.40	2976.01
2. Tirthan	137.58	359.14	84.17	169.47	750.36
3. Sainj	-	341.15	275.97	390.54	1007.66
Total:	1129.39	1029.65	946.58	1628.41	4734.03

3.2 General Character of Vegetation

The forests in this Working Circle mainly fall into Champion and Seth type 12 C1d (Western Himalayan moist temperate mixed coniferous forests, and 12 CII b (Western Himalayan upper oak-fir forests) with some patches of 12 Cle on raoist locations and along nallahs. The main species are silver fir and spruce occurring pure or with an admixture of silver fir, spruce, kail and deodar in varying proportions according to the change in locality and climatic and edaphic factors. kail and deodar are found at the lower extremes of this working circle forming a small admixture while fir occupies the highest locations. The cooler places, nallahs and depressions are occupied by broad leaved species while kharsu generally occupies the ridges only. In cooler localities silver fir descends upto 2500 meters where as spruce penetrates higher along warm spurs. Kail and spruce generally occupy the exposed locations. Important broad leaves found in these forests are mapple, bird cherry, khanor, akhrot etc. The details of the forest types and their composition has been described in chapter - II of part - I.

In general the forests are under stocked and heterogeneous-in nature having all the age classes in the same area. The efforts made under the expired plans have not been able to regenerate the felled areas because of so many factors. Almost the whole crop under this Working Circle, thus, is irregular. But against the normal belief that fir forests are over mature, they are actually not so and I class trees form only about 12.11% of total tress in case of spruce and 14.91% in case of fir trees, of these also 10 and over trees form only 4.89% of total spruce trees and 4.90% of total fir trees. The young regeneration is very much deficient over the area including the P.B.I areas felled for regeneration in the past. The average crop diameter of the forests varies between 20 cm. d.b.h. to about 60 cm. d.b.h. and thus by no means these crops can be considered as over mature.

Fir forests are characteristics of having weeds like Iris spp., Strobilanthe spp. and Senecio etc. in addition to bushes like hill bamboos, and thick humus deposition which contributes to the poor regeneration status in the fir forests. Wherever some canopy has been opened which is conducive to

the natural regeneration, some regeneration has come up on the ground. Clear felling of the forests in the past with a view to naturally regenerating them has failed miserably and weeds have taken place in the openings hindering the natural as well as the artificial regeneration efforts.

3.3 Blocks and Compartments

The forest compartments of the old plan have been retained. Conspicuous rings have been put up on the boundaries of subunits. The serial number of Reserved and Demarcated Protected Forests and the nomenclature for the compartments and sub compartments are the same as in the previous plan to conform to the instructions contained in the working plan code.

3.4 Special Objects of Management

Without prejudice to general objects the special objects of management of Fir Working circle will be

1 To harvest the mature and over mature stock of fir and spruce and replace it artificially by planting and to harvest the broadleaved trees along with the conifers.

The forests are rather open and carry much less growing stock per hectare than the site is capable of supporting. Therefore artificial regeneration operations will be carried out to make full use of the site and potential.

Not-with-standing what has been stated above, the forests will be managed in such a manner so as to maintain adequate vegetative cover for soil and water conservation as these forests form the catchment of Pandoh Dam situated at a short distance.

To provide for supply of timber to meet the growing demand for packing cases.

3.5 Analysis and Evaluation of Crop

The crop consists mainly of fir and spruce with some admixture of kail and deodar in some compartments occurring in the lower extremities of the Working Circle. Among above species the majority is that of fir followed by spruce, kail and deodar, Valuable broad leaved trees which occupy the moist locations like depressions and along nallahs are also found in this Working Circle.

The coniferous crop is form middle-aged to mature and is heterogeneous in nature having all the age classes in the same area. The efforts of converting the fir high forests into even aged regular crop under Fir Working Circle in the past has not been encouraging because of a number of factors including paucity of budget for tackling large areas under regeneration. Stock maps have been prepared for each forest, and posted in the compartment, history files. The area occupied by different species and their mixtures have been worked out from the stock maps and contained in Appendix III.

The species wise number of trees per hectare (for conifers only) and the average crop diameter for each compartment/sub-cornpartment has been worked out and is given in Appendix VB. The density of the crop on an average is 0.6 and is far from satisfactory in case of fir and spruce crop which are t-hade bearers.

The stocking and the growing stock in the working circle is poor. The average number of trees per hectare comes to 151.83 and the volume as 257.56 m3. No figures for Normal Growing Stock for fir forests are available for comparison with the existing total growing stock, but it is felt that the forests are under stocked and far from having a Normal Growing Stock.

The lower class trees are particularly deficient that shows the poor status of regeneration. The mature and over mature trees consisting of 1A and above trees account for 17.22% of the total number of trees while II class account for 14.95% and V to III class account for 67.82%. Volume wise it

will be seen that 72.08% of the total volume of trees is locked in IA and above class trees, 19.86% in II class trees and 8.08% in V to III class trees.
It will however be seen that only 4.40% of ID and over trees occur in the Working Circle and 23.88% volume is locked in. The crop in this Working Circle is from middle to mature and in rare cases the crop is over mature.

Broadleaved trees are also found in the moist locations, generally along nallahs and depressions. The economically important species like walnut, mapple, bird-cherry, khanor and daral are found in comparatively low proportions. All the forests do not carry broad leaved species.

As compared to the growing present at the time of Jaiswal's plan, the stock has improved three fold in respect of volume and even more in case of number of trees (IV to ID & over classes considered) in respect of conifers. No data regarding the broad-leaved species is available in respect of Jaiswal's plan, hence the corresponding figures cannot be put to scrutiny.

3.6 Enumerations

Total enumeration of conifers and broad leaved species down to 10 cm d.b.h. was carried out in all the Periodic Blocks of this Working Circle. The result of the enumeration has been given in Appendix – IVB and the abstract is reproduced below in the following table: -

Detailed enumerations results are appended in volume – II appendix – IV A in Volume – II at page no. 1 to 91

Table – 3.2 Enumeration Results Fir Working Circle Conifers											
Diameter classes (cm) No. of trees and volume											
Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER	TOTAL	
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
DEODAR											
No.	7790	3528	1798	1482	1070	830	679	492	571	119	18359
Vol.	467.4	493.92	701.22	1926.6	2557.3	2946.5	3225.25	2961.84	3437.42	716.38	19433.83
KAIL											
No.	49743	16709	7399	4990	3881	3277	2016	1252	867	143	90277
Vol.	2984.58	3007.62	4143.44	5788.4	7762	10060.39	9213.12	8138	6727.92	1109.68	58935.15
SPRUCE											
No.	116521	41352	27850	17020	15305	13319	10126	8385	11425	1443	262746
Vol.	6991.26	5789.28	23672.5	28934	47598.55	67926.9	71692.08	71188.65	106709.5	13477.62	443980.3
FIR											
No.	112050	61574	41214	36237	27523	22417	16510	12859	15692	1334	347410
Vol.	6723	8620.36	35031.9	61602.9	85596.53	114326.7	116890.8	109172.9	146563.28	12459.56	696987.9
Total											
No.	286104	123163	78261	59729	47779	39843	29331	22988	28555	3039	718792
Vol.	17166.24	17911.18	63549.06	98251.9	143514.4	195260.5	201021.3	191461.4	263438.12	27763.24	1219337

Table - 3.3

Broad leaved species

DIAMETER CLASS

SPECIES	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
MAPPLE											
No.	26379	8699	4478	3101	1735	982	537	298	278	0	46487
Vol.	-	1739.8	3134.6	434.14	3643.5	3240.6	2685	2056.2	2363	0	19296.84
BAN											
No.	1059	446	219	136	97	49	37	29	4	1	2077
Vol.	-	133.8	219	244.8	291	225.4	233.1	232	38.4	9.6	1627.1
KHARSHU											
No.	60628	34434	21775	14049	9428	6189	3641	2638	3219	174	156175
Vol.	-	10330.2	21775	25288.2	28284	28469.4	22938.3	21104	30902.4	1670.4	190761.9
JAMU											
No.	88290	39876	16740	6687	2502	1259	571	373	433	34	156765
Vol.	-	3987.6	11718	9361.8	5504.4	4154.7	2455.3	2349.9	2987.7	234.6	42754
WALNUT											
No.	3289	2185	1478	1311	977	746	448	336	270	170	11210
Vol.	-	437	1182.4	1966.5	2442.5	2834.8	3091.2	2419.2	2403	1513	18289.6
POPLAR		0.3	0.7	1.4	2.8	4.9	6.8	9	11.2		
No.	569	326	149	84	36	25	4	6	3	0	1202
Vol.	-	97.8	104.3	117.6	100.8	122.5	27.2	54	33.6	0	657.8
KHANOR											
No.	3716	2565	1312	1349	1022	842	688	572	837	295	13198
Vol.	-	769.5	1049.6	2293.3	2759.4	3283.8	3852.8	4061.2	7533	2655	28257.6
KHARAK											
No.	1001	601	311	230	150	44	21	23	1	0	2382
Vol.	-	180.3	217.7	299	330	145.2	96.6	144.9	8	0	1421.7
DAIAL											

No.	309	237	92	51	39	28	32	26	0	0	814
Vol.	-	118.5	92	91.8	109.2	308	192	208	0	0	1119.5
KOSH											
No.	445	103	42	45	92	66	46	23	9	0	871
Vol.	-	30.9	33.6	67.5	230	217.8	211.6	149.5	72	0	1012.9
MOHRU											
No.	7359	2318	944	703	339	260	129	78	130	73	12333
Vol.	-	695.4	944	1265.4	1017	1196	812.7	624	1248	700.8	8503.3
WILLOW											
No.	838	197	46	25	8	0	0	0	0	0	1114
Vol.	-	78.8	36.8	37.5	19.2	0	0	0	0	0	172.3
RIKHAL (Rhus Species)											
No.	41174	19492	8467	3521	1875	1152	634	372	390	28	77105
Vol.	-	5847.6	5926.9	4929.4	3750	3340.8	2726.2	1897.2	2574	184.8	31176.9
TOTAL											
No.	193882	91987	47586	27771	16425	10490	6154	4402	5184	747	404628
Vol.	0	24447.2	46433.9	46396.94	48481	47539	39322	35300.1	50163.1	6968.2	345051.4
MISC. No.	83525	37808	17454	10326	5529	3433	2001	1234	1252	71	162633
	-	11342.4	13963.2	17554.2	14928.3	13388.7	11205.6	8761.4	11268	639	103050.8

Table – 3.4

PB I Area 786.32 ha. Diameter classes (Growing Stock) (m3)

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER	TOTAL	
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
DEODAR											
No.	1102	417	227	140	118	96	101	71	121	32	2425
Vol.	66.12	58.38	88.53	182	282.02	340.8	479.75	427.42	728.42	192.64	2846.08
KAIL											0
No.	4937	1733	837	652	593	464	288	170	101	20	9795
Vol.	296.22	311.94	468.72	756.32	1186	1424.48	1316.16	1105	783.76	155.2	7803.8
SPRUCE											0
No.	20887	10388	6400	5326	4994	4304	3676	3038	4337	761	64111
Vol.	1253.22	1454.32	5440	9054.2	15531.34	21950.4	26026.08	25792.62	40507.58	7107.74	154117.5
FIR											0
No.	21966	11674	8609	7393	6455	5351	4181	3391	4283	643	73946
Vol.	1317.96	1634.36	7317.65	12568.1	20075.05	27290.1	29601.48	28789.59	40003.22	6005.62	174603.1
Total											0
No.	48892	24212	16073	13511	12160	10215	8246	6670	8842	1456	150277
Vol.	2933.52	3459	13314.9	22560.62	37074.41	51005.78	57423.47	56114.63	82022.98	13461.2	339370.5

Table no. 3.5

(Broad Leaved) P.B.I. Area 786.32 ha

Diameter Class (Growing Stock (m3)

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER		
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
Kharsu	14894	10518	6658	4645	3163	2232	1021	1061	1450	164	45806
Khanor	2230	1650	655	574	501	310	218	216	164	120	6638
Mapple	3133	1093	443	450	324	187	132	61	61	0	5884
Walnut	1150	842	571	457	386	288	220	188	127	107	4336
Kharak	128	83	30	12	10	7	2	0	0	0	272
Poplar	143	72	41	18	11	4	0	0	0	0	289
Ban	2	0	0	0	0	0	0	0	0	0	2
Daral	948	385	155	73	35	28	9	2	6	0	1641
Jamu	29015	13274	6684	2877	1377	844	359	274	254	29	54987
Mohru	1854	819	493	355	233	149	92	44	59	73	4171
Betula	420	367	164	34	19	8	3	0	0	0	1015
Total	53917	29103	15894	9495	6059	4057	2056	1846	2121	493	125041
Area	786.32	786.32	786.32	786.32	786.32	786.32	786.32	786.32	786.32	786.32	786.32
No. of	68.57	37.01	20.21	12.08	7.71	5.16	2.61	2.35	2.70	0.63	159.02
trees /ha.											
Misc.	50323	24164	12400	6842	4377	2884	1586	1126	1463	102	105267
Grand Total	**104240**	**53267**	**28294**	**16337**	**10436**	**6941**	**3642**	**2972**	**3584**	**595**	**230308**
No of trees/ha.	132.57	67.74	35.98	20.78	13.27	8.83	4.63	3.78	4.56	0.76	292.89

Table – 3.6

F.W.C. P.B. II 20% Area Enumeration (Area 222.58 ha.) Diameter classes

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER	TOTAL	
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
DEODAR											
No.	631	351	292	260	187	135	151	90	61	39	2197
Vol.	37.86	49.14	113.88	338	446.93	479.25	717.25	541.8	367.22	234.78	3326.11
KAIL											
No.	3601	1745	1299	871	739	637	469	374	262	90	10087
Vol.	216.06	314.1	727.44	1010.36	1478	1955.59	2143.33	2431	2033.12	698.4	13007.4
SPRUCE											
No.	5251	3598	2421	1740	1646	1547	1249	1195	1348	438	20433
Vol.	315.06	503.72	2057.85	2958	5119.06	7889.7	8842.92	10145.55	12590.32	4090.92	54513.1
Fir											
No.	11577	8198	5545	4354	3175	3221	2714	2368	2479	448	44079
Vol.	694.62	1147.72	4713.25	7401.8	9874.25	16427.1	19215.12	20104.32	23153.86	4184.32	106916.4
CHIL											
No.	4	1	2	0	0	0	0	0	0	0	7
Vol.	0.24	0.14	0.84	0	0	0	0	0	0	0	1.22
Total											
No.	9487	5695	4014	2871	2572	2319	1869	1659	1671	567	32724
Vol.	569.22	867.1	2900.01	4306.36	7043.99	10324.54	11703.5	13118.35	14990.66	5024.1	177764.23

Table 3.7

(Broad Leaved) P.B.II 20% Area Enumeration (Area 222.58 ha)

Diameter Class (Growing Stock (m3)

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER	TOTAL	
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
Kharsu	9437	6879	4783	2638	1922	1455	1295	804	905	9	30127
Khanor	163	165	161	97	134	141	124	99	85	73	1242
Mapple	3430	1719	1056	692	324	281	125	91	54	0	7772
Walnut	347	263	189	151	165	140	57	59	52	43	1466
Kharak	138	107	81	58	76	26	13	20	0	0	519
Poplar	55	36	19	13	11	4	0	0	0	0	138
Ban	429	261	134	90	59	29	28	21	2	1	1054
Daral	107	122	43	20	15	5	2	0	0	0	314
Jamu	6492	3827	2268	1042	514	184	112	70	141	5	14655
Mohru	27	21	11	0	0	0	0	0	0	0	59
Rikhal	4051	2425	1513	828	546	413	280	158	163	2	10379
Betula	5	2	0	2	0	0	0	0	0	0	9
Willow	70	30	17	8	4	0	0	0	0	0	129
Total	**24676**	**15825**	**10258**	**5629**	**3766**	**2678**	**2036**	**1322**	**1402**	**133**	67725
Area	222.58	222.58	222.58	222.58	222.58	222.58	222.58	222.58	222.58	222.58	222.58
No. of	110.86	71.10	46.09	25.29	16.92	12.03	9.15	5.94	6.30	0.60	304.27
trees /ha.											
Misc.	9575	5214	3317	2090	1077	787	482	215	85	1	22843
Grand Total	**34251**	**21039**	**13575**	**7719**	**4843**	**3465**	**2518**	**1537**	**1487**	**134**	90568
No of trees/ha.	**153.88**	**94.52**	**60.99**	**34.68**	**21.76**	**15.57**	**11.31**	6.91	6.68	0.60	406.90

Table – 3.8

F.W.C. P.B. III 20% Area Enumeration (Area 217.10 ha.) Diameter classes

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER	TOTAL	
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
DEODAR											
No.	651	357	246	201	105	82	80	60	47	17	1846
Vol.	39.06	49.98	95.94	261.3	250.95	291.1	380	361.2	282.94	102.34	2114.81
KAIL											
No.	2169	1128	881	572	382	288	260	183	186	24	6073
Vol.	130.14	203.04	493.36	663.52	764	884.16	1188.2	1189.5	1443.36	186.24	7145.52
SPRUCE											
No.	4883	3088	2186	15869	1402	1448	1057	891	909	224	31957
Vol.	292.98	432.32	1858.1	26977.3	4360.22	7384.8	7483.56	7564.59	8490.06	2092.16	66936.09
Fir											
No.	7319	5336	3826	3496	2389	2432	1907	1579	1558	221	30063
Vol.	439.14	747.04	3252.1	5943.2	7429.79	12403.2	13501.56	13405.71	14551.72	2064.14	73737.6
Total											
No.	15022	9909	7139	20138	4278	4250	3304	2713	2700	486	69939
Vol.	901.32	1432.38	5699.5	33845.32	12804.96	20963.26	22553.32	22521	24768.08	4444.88	149934

Table 3.9

(Broad Leaved) P.B.III 20% Area Enumeration (Area 217.10 ha)

Diameter Class (Growing Stock (m3)

	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER		
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
Walnut	279	201	200	109	99	70	68	43	31	19	**1119**
Kharsu	7002	4144	2693	1393	838	504	253	152	71	1	**17051**
Jammu	8719	4313	2185	887	214	85	46	0	3	0	**16452**
Khanor	128	124	90	77	66	81	107	55	66	79	***873***
Mapple	3350	1034	600	340	185	96	55	22	33	*0*	***5715***
Kharak	88	24	10	6	6	1	1	0	*0*	*0*	***136***
Willow	50	22	12	5	3	0	0	0	*0*	*0*	***92***
Poplar	33	12	17	3	4	8	0	0	*0*	*0*	***77***
Mohru	599	171	95	55	17	4	5	1	*0*	*0*	***947***
Daral	24	31	17	12	15	14	28	26	*0*	*0*	***167***
Konsh	6	4	8	7	6	0	0	0	*0*	*0*	***31***
Ban	10	8	6	6	9	0	0	0	*0*	*0*	***39***
Total	**20278**	**10080**	**5927**	**2894**	**1453**	**863**	**563**	**299**	***204***	***99***	***42660***
Area	217.1	217.1	217.1	217.1	217.1	217.1	217.1	217.1	217.1	217.1	***217.1***
No. of trees /ha	93.40	46.43	27.30	13.33	6.69	3.98	2.59	1.38	*0.94*	*0.46*	***196.50***
Misc.	9575	5214	3317	2090	1077	787	482	215	*85*	*1*	***22843***
Grand Total	**29853**	**15294**	**9244**	**4984**	**2530**	**1650**	**1045**	**514**	***289***	***100***	***65503***
No of trees/ha.	**137.51**	**70.45**	**42.58**	**22.96**	**11.65**	**7.60**	**4.81**	**2.37**	**1.33**	**0.46**	**301.72**

Table – 3.10

F.W.C. P.B. IV Area 408.34 ha. Diameter classes

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER		
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
DEODAR											
No.	5406	2403	1033	881	660	517	347	271	342	31	**11891**
Vol.	324.36	336.42	402.87	1145.3	1577.4	1835.35	1648.25	1631.42	2058.84	186.62	**11146.83**
KAIL											
No.	39036	12103	4382	2895	2167	1888	999	525	318	9	**64322**
Vol.	2342.16	2178.54	2453.92	3358.2	4334	5796.16	4565.43	3412.5	2467.68	69.84	**30978.43**
SPRUCE											
No.	85500	24278	16843	8368	7263	6020	4144	3261	4831	20	**160528**
Vol.	5130	3398.92	14316.55	14225.6	22587.93	30702	29339.52	27685.89	45121.54	186.8	**192694.8**
Fir											
No.	73458	37860	24254	21916	16291	11996	8025	5783	7625	22	**207230**
Vol.	4407.48	5300.4	20615.9	37257.2	50665.01	61179.6	56817	49097.67	71217.5	205.48	**356763.2**
Total											
No.	**203400**	**76644**	**46512**	**34060**	**26381**	**20421**	**13515**	**9840**	**13116**	**82**	**443971**
Vol.	**12204**	**11214.28**	**37789.24**	**55986.3**	**79164.34**	**99513.11**	**92370.2**	**81827.48**	**120865.56**	**648.74**	**591583.3**

Table 3.11

(Broad Leaved) P.B.IV Area 408.34 ha

Diameter Class (Growing Stock (m3)

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER		
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
Mapple	16466	4853	2379	1619	902	418	225	124	130	0	**27116**
Jammu	44064	18462	5603	1881	397	146	54	29	65	0	**70701**
Kharsu	28576	12202	7118	5171	3362	1953	1043	616	785	0	**60826**
Walnut	1513	879	518	594	327	248	103	46	60	1	**4289**
Khanor	1195	626	406	601	321	310	239	202	522	23	**4445**
Poplar	338	206	72	50	10	9	4	6	3	0	**698**
Wollow	573	117	12	10	1	0	0	0	0	0	**713**
Kharak	647	387	190	154	58	10	5	3	1	0	**1455**
Mohru	4863	1279	323	284	84	103	31	32	70	0	**7069**
Konsh	439	99	34	38	86	66	46	23	9	0	**840**
Daral	178	84	32	19	9	9	2	0	0	0	**333**
Ban	618	177	79	40	29	20	9	8	2	0	**982**
Rikhal	21056	8736	3238	1243	433	229	96	74	113	1	**35219**
Betula	560	291	244	120	41	18	11	1	4	0	**1290**
Total	**98852**	**39194**	**16687**	**10421**	**5557**	**3272**	**1752**	**1081**	**1645**	**24**	**178485**
Area	408.34	408.34	408.34	408.34	408.34	408.34	408.34	408.34	408.34	408.34	**408.34**
No. of trees/ha.	242.08	95.98	40.87	25.52	13.61	8.01	4.29	2.65	4.03	0.06	**437.10**
Misc.	48314	18356	5919	3822	1761	1025	482	422	524	0	**80625**
Grand Total	**147166**	**57550**	**22606**	**14243**	**7318**	**4297**	**2234**	**1503**	**2169**	**24**	**259110**
No of trees/ha.	**360.40**	**140.94**	**55.36**	**34.88**	**17.92**	**10.52**	**5.47**	**3.68**	**5.31**	**0.06**	**634.54**

Table – 3.12

F.W.C. P.B. II 20% Area Enumeration (Area 222.58 ha.) Diameter classes, 100% area = 20% area into 5 = 1112.92ha

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER	TOTAL	
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
DEODAR											
No.	3155	1755	1460	1300	935	675	755	450	305	195	10985
Vol.	189.3	245.7	569.4	1690	2234.65	2396.25	3586.25	2709	1836.1	1173.9	16630.55
KAIL											
No.	18005	8725	6495	4355	3695	3185	2345	1870	1310	450	50435
Vol.	1080.3	1570.5	3637.2	5051.8	7390	9777.95	10716.65	12155	10165.6	3492	65037
SPRUCE											
No.	26255	17990	12105	8700	8230	7735	6245	5975	6740	2190	102165
Vol.	1575.3	2518.6	10289.25	14790	25595.3	39448.5	44214.6	50727.75	62951.6	20454.6	272565.5
Fir											
No.	57885	40990	27725	21770	15875	16105	13570	11840	12395	2240	220395
Vol.	3473.1	5738.6	23566.25	37009	49371.25	82135.5	96075.6	100521.6	115769.3	20921.6	534581.8
CHIL											
No.	20	5	10	0	0	0	0	0	0	0	35
Vol.	1.20	0.70	4.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.10
Total											
No.	47435	28475	20070	14355	12860	11595	9345	8295	8355	2835	163592
Vol.	2846.1	4335.5	14500.05	21531.8	35219.95	51622.7	58517.5	65591.75	74953.3	25120.5	354239.15

Table 3.13

(Broad Leaved) P.B.II 20% Area Enumeration (Area 222.58 ha), 100% = 20% into 5 = 1112.92 ha

	Diameter Class (Growing Stock (m3)										
Species	*10-20*	*20-30*	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER	TOTAL	
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	**Total**
Kharsu	47185	34395	23915	13190	9610	7275	6475	4020	4525	45	**150635**
Khanor	815	825	805	485	670	705	620	495	425	365	**6210**
Mapple	17150	8595	5280	3460	1620	1405	625	455	270	0	**38860**
Walnut	1735	1315	945	755	825	700	285	295	260	215	**7330**
Kharak	690	535	405	290	380	130	65	100	0	0	**2595**
Poplar	275	180	95	65	55	20	0	0	0	0	**690**
Ban	2145	1305	670	450	295	145	140	105	10	5	**5270**
Daral	535	610	215	100	75	25	10	0	0	0	**1570**
Jamu	32460	19135	11340	5210	2570	920	560	350	705	25	**73275**
Mohru	135	105	55	0	0	0	0	0	0	0	**295**
Rikhal	20255	12125	7565	4140	2730	2065	1400	790	815	10	**51895**
Betula	25	10	0	10	0	0	0	0	0	0	**45**
Willow	350	150	85	40	20	0	0	0	0	0	**129**
Total	**123380**	**79125**	**51290**	**28145**	**18830**	**13390**	**10180**	**6610**	**7010**	**665**	**338625**
Area	1112.92	1112.92	1112.92	1112.92	1112.92	1112.92	1112.92	1112.92	1112.92	1112.92	**1112.92**
No. of trees/ha.	110.86	71.10	46.09	25.29	16.92	12.03	9.15	5.94	6.30	0.60	**304.27**
Misc.	47875	26070	16585	10450	5385	3953	2410	1075	425	5	**114233**
Grand Total	**171255**	**105195**	**67875**	**38595**	**24215**	**17343**	**12590**	**7685**	**7435**	**670**	**452858**
No of trees/ha.	**153.88**	**94.52**	**60.99**	**34.68**	**21.76**	**15.58**	**11.31**	**6.91**	**6.68**	**0.60**	**406.91**

Table -3.14

F.W.C. P.B. III 20% Area Enumeration (Area 217.10 ha.) Diameter classes, 100% area = 20% area into 5 = 1085.50 ha

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER	TOTAL	
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
DEODAR											
No.	3255	1785	1230	1005	525	410	400	300	235	85	**9230**
Vol.	195.3	249.9	479.7	1306.5	1254.75	1455.5	1900	1806	1414.7	511.7	**10574.05**
KAIL											
No.	10845	5640	4405	2860	1910	1440	1300	915	930	120	**30365**
Vol.	650.7	1015.2	2466.8	3317.6	3820	4420.8	5941	5947.5	7216.8	931.2	**35727.6**
SPRUCE											
No.	24415	15440	10930	79345	7010	7240	5285	4455	4545	1120	**159785**
Vol.	1464.9	2161.6	9290.5	134886.5	21801.1	36924	37417.8	37822.95	42450.3	10460.8	**334680.45**
Fir											
No.	36595	26680	19130	17480	11945	12160	9535	7895	7790	1105	**150315**
Vol.	2195.7	3735.2	16260.5	29716	37148.95	62016	67507.8	67028.55	72758.6	10320.7	**368688**
Total											
No.	**75110**	**49545**	**35695**	**100690**	**21390**	**21250**	**16520**	**13565**	**13500**	**2430**	**349695**
Vol.	**4506.6**	**7161.9**	**28497.5**	**169226.6**	**64024.8**	**104816.3**	**112766.6**	**112605**	**123840.4**	**22224.4**	***749670.1***

Table 3.15

(Broad Leaved) P.B.III 20% Area Enumeration (Area 217.10 ha), 100% Area = 20% area into 5 =1085.50 ha

	Diameter Class (Growing Stock (m3)										
	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & OVER		
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
Walnut	1395	1005	1000	545	495	350	340	215	155	95	5595
Kharsu	35010	20720	13465	6965	4190	2520	1265	760	355	5	85255
Jammu	43595	21565	10925	4435	1070	425	230	0	15	0	82260
Khanor	640	620	450	385	330	405	535	275	330	395	4365
Mapple	16750	5170	3000	1700	925	480	275	110	165	0	28575
Kharak	440	120	50	30	30	5	5	0	0	0	680
Willow	250	110	60	25	15	0	0	0	0	0	460
Poplar	165	60	85	15	20	40	0	0	0	0	385
Mohru	2995	855	475	275	85	20	25	5	0	0	4735
Daral	120	155	85	60	75	70	140	130	0	0	835
Konsh	30	20	40	35	30	0	0	0	0	0	155
Ban	50	40	30	30	45	0	0	0	0	0	195
Total	**101390**	**50400**	**29635**	**14470**	**7265**	**4315**	**2815**	**1495**	**1020**	**495**	**213300**
Area	1085.5	1085.5	1085.5	1085.5	1085.5	1085.5	1085.5	1085.5	1085.5	1085.5	1085.5
No. of trees/ha.	93.40	46.43	27.30	13.33	6.69	3.98	2.59	1.38	0.94	0.46	196.50
Misc.	47875	26070	16585	10450	5385	3935	2410	1075	425	5	114215
Grand Total	**149265**	**76470**	**46220**	**24920**	**12650**	**8250**	**5225**	**2570**	**1445**	**500**	**327515**
No of trees/ha.	**137.51**	**70.45**	**42.58**	**22.96**	**11.65**	**7.60**	**4.81**	**2.37**	**1.33**	**0.46**	**301.72**

Table no. 3.16 Fir W.C Spp wise Growing Stock

	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
Deodar No.	12918	6360	3950	3326	2238	1698	1603	1092	1003	343	34531
Vol.	775.08	890.4	1540.5	4323.8	5348.82	6027.9	7614.25	6573.84	6038.06	2064.86	41197.51
Kail No.	57973	21231	11084	7707	5605	4467	3342	2060	1654	344	115467
Vol.	3478.38	3751.38	5958.84	9122.12	11574.65	14037.69	15408.84	13174	12304.34	2330.14	91140.38
Spruce	86982	56843	38865	32511	25994	24609	19856	17208	19102	4141	326111
Vol.	5219.52	7958.02	32469.45	54866.7	79530.34	124870.4	139648.5	145354.9	177632.5	38394.74	805945.1
FIR	189904	117204	79718	68559	50566	45612	35311	28909	32093	4010	651886
Vol.	11394.24	16408.56	67760.3	116550.3	157260.3	232621.2	250001.9	245437.4	299748.6	37453.4	1434636
Chil	20	5	10	0	0	0	0	0	0	0	35
Vol.	1.2	0.7	4.2	0	0	0	0	0	0	0	6.1
Conifer No.	347797	201643	133627	112103	84403	76386	60112	49269	53852	8838	1128030
Vol.	20868.42	29009.06	107733.3	184862.9	253714.1	377557.2	412673.5	410540.2	495723.5	80243.14	2372925
B/L	571926	292482	16995	94095	54619	36831	23691	14730	14633	1789	1121791
Vol.	14870.08	8189.5	164995	169370.5	163857	169421.3	189528	141408	178521.9	21825.8	1221987
G.Total	548333	321017	194013	146365	104820	90923	71016	56789	59429	9684	1602389
Total Vol	26483.43	148251	227182.8	287874.6	337301.5	449829.6	481062.4	466247	544464.6	88245.61	3056943

Table 3.17 :-CAI of Spruce

	DIAMETER CLASSES										
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
No.of Trees	86982	56843	38865	32511	25994	24609	19856	17208	19102	4141	325821
Vol. in CUM	5219.52	7958.02	32469.45	54866.7	79530.34	124870.4	139648.5	145354.9	177632.5	38394.74	805945.1
Increment %	3.64	3.08	2.56	1.97	1.54	1.21	0.95	0.83	0.65	0.65	
C.A.I	189.99	245.11	831.22	1080.87	1224.77	1510.93	1326.66	1206.95	1154.61	249.57	9020.68

Table 3.18 : CAI of Fir

	DIAMETER CLASSES										
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
No.of Trees	189904	117204	79718	68559	50566	45612	35311	28909	32093	4010	651886
Vol. in CUM	11394.24	16408.56	67760.3	116550.3	157260.3	232621.2	250001.9	245437.4	299748.6	37453.4	1434636
Increment %	2.75	2.34	2.08	1.69	1.3	1.13	0.91	0.73	0.49	0.49	
C.A.I	313.34	383.96	1409.41	1969.70	2044.88	2628.62	2275.02	1791.69	1468.77	183.52	14468.91

Table no. 3.19 Abstract of Enumeration for Spruce: -

	DIAMETER CLASSES										
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
PB I	20887	10388	6400	5326	4994	4304	3676	3038	4337	761	**64111**
	1253.22	1454.32	5440	9054.2	15531.34	21950.4	26026.08	25792.62	40507.58	7107.74	**154117.5**
PB II	26255	17990	12105	8700	8230	7735	6245	5975	6740	2190	**102165**
	1575.3	2518.6	10289.25	14790	25595.3	39448.5	44214.6	50727.75	62951.6	20454.6	**272565.5**
PB III	3255	1785	1230	1005	525	410	400	300	235	85	**9230**
	195.3	249.9	479.7	1306.5	1254.75	1455.5	1900	1806	1414.7	511.7	**10574.05**
PB IV	36595	26680	19130	17480	11945	12160	9535	7895	7790	1105	**150315**
	2195.7	3735.2	16260.5	29716	37148.95	62016	67507.8	67028.55	72758.6	10320.7	**368688**
TOTAL No.	86992	56843	38865	32511	25694	24609	19856	17208	19102	4141	325821
TOTAL Vol.	5219.52	7958.02	32469.45	54866.7	79530.34	124870.4	139648.5	145354.92	177632.5	38394.74	805945.1

Table no. 3.20 For Fir:-

PB I	21966	11674	8609	7393	6455	5351	4181	3391	4283	643	**73946**
	1317.96	1634.36	7317.65	12568.1	20075.05	27290.1	29601.48	28789.59	40003.22	6005.62	**174603.1**
PB II	57885	40990	27725	21770	15875	16105	13570	11840	12395	2240	**220395**
	3473.1	5738.6	23566.25	37009	49371.25	82135.5	96075.6	100521.6	115769.3	20921.6	**534581.8**
PB III	36595	26680	19130	17480	11945	12160	9535	7895	7790	1105	**150315**
	2195.7	3735.2	16260.5	29716	37148.95	62016	67507.8	67028.55	72758.6	10320.7	**368688**
PB IV	73458	37860	24254	21916	16291	11996	8025	5783	7625	22	**207230**
	4407.48	5300.4	20615.9	37257.2	50665.01	61179.6	56817	49097.67	71217.5	205.48	**356763.2**
TOTAL No.	189904	117204	79718	68559	50566	45612	35311	28909	32093	4010	*651886*
TOTAL Vol.	11394.24	16408.56	67760.3	116550.3	157260.3	232621.2	250001.9	245437.41	*299748.6*	*37453.4*	*1434636*

Silvicultural System

3.7 The forests allotted to this Working Circle will be managed under Punjab Irregular Shelter Wood System with artificial regeneration. This is a modification to Uniform System or Shelter wood System which allows concentrated regeneration markings on gentle ground and selection type removal from the steep slopes and other difficult terrain bringing in an element of Irregular canopy in the finally converted crop and allows retention of compact patches of pole crop of advance growth occurring over a minimum fixed area to be retained as a part of future crop.

Choice of Species

3.8 In this Working Circle fir and spruce are the coniferous species suited to the locality over a major area except the tension-belt formed by deodar-kail and spruce in the lower extremes of the Working Circle. Valuable broad leaved trees like walnut, mapple, khanor, birdcherry etc. are found in the depressions and along water courses. No attempt should be made to induce regeneration naturally or artificially of deodar in the area occupied primarily by the spruce and fir. Similarly the broad-leaved patches should only be replaced with more valuable broadleaved species and no attempt should be made to introduce conifers in the locality primarily occupied by the broadleaved trees. Only in the tension-belt at lower elevations of this Working Circle deodar be introduced after studying the factors favourable for the growth of deodar.

Regeneration Period

3.9 A period of 30 years is quite sufficient for regenerating fir and spruce and these species attain a height of 4-5 meters within 30 years period well beyond the damage by cattle etc. This period is suitable legally also, being the maximum period upto which a forest can be closed under the provisions of the Settlement. Therefore the regeneration period is fixed at 30 years.

Exploitable Diameter and Rotation

3.10 The exploitable diameter is fixed as 60 cm. keeping the market demand for the converted scants in view for conifers and 40 cm. for B.L. species. The rotation for this Working Circle is only of academic interest as the irregular crop is yet to be converted into regular crop. NO significant achievement has been made in this direction during the past working plan periods. Our main concern at the moment is the period of time in which these irregular crops can be converted to regular ones. Thus for this Working Circle the conversion period has been fixed at 120 years. The regeneration is very difficult to action in case of fir and spruce because of various factors and only a very dedicated effort can convert the whole crop in 120 years period.

Felling Cycle

3.11 A felling cycle of 15 years in case of thinning operations will be adopted.

Sequence of fellings in P.B.I areas in Fir Working Circle

Table no. 3.21

Year.	Range.	Name of Forest.	Comptt./Sub-Comptt.	Area (ha.)
1	2	3	4	5
2014-15	Banjar	Shalut	CI	47.34
2014-15	Banjar	Shalut	CII	56.65
2015-16	Banjar	Sakiran Kanda	CIIa	86.50
2015-16	Banjar	Sakiran Kanda	CIIb	37.68
2015-16	Banjar	Sakiran Kanda	2c	91.11
2019-20	Banjar	Chauhar	CI	22.26
2019-20	Banjar	Khajlahara	CI	38.04
2021-22	Banjar	Jalora	4a(i), 4b(i)	153.28
2021-22	Banjar	Jalora	4b(iii)	61.94
2021-22	Banjar	Jalora	4b(v)	45.26

2022-23	Banjar	Sakiran	CIIa(i)	28.81
2022-23	Banjar	Sakiran	CIIa(ii)	37.49
2022-23	Banjar	Sakiran	CIIa(iv)	57.14
2023-24	Tirthan	Reunsi	3a	51.77
2023-24	Tirthan	Reunsi	3b	27.30
2023-24	Tirthan	Reunsi	3c	58.51
2023-24	Banjar	Talata	4a	18.18
2024-25	Banjar	Kasiha dhar	1a	33.87
2024-25	Banjar	Kasiha dhar	1b	33.06
2024-25	Banjar	Talata	4b	21.04
2026-27	Banjar	Sharag & Palishil	4d(i)	29.74
2026-27	Banjar	Sharag & Palishil	4d(ii)	44.39
2026-27	Banjar	Sharag & Palishil	4d(iii)	18.95
2027-28	Tirthan	Jhutali Kalwala	3a	33.26
2027-28	Tirthan	Dharagahr	CII	77.70

Sequence of fellings in P.B.IV areas in Fir Working Circle

Table no. 3.22

Banjar Range F.W.C. P.B. IV

Sr. No.	Name of Forest	Comp.	Area	Working Circle
1	Dheon Kamli R/1	1b	19.42	F.W.C.
2	Lafat R/2	1a	59.9	F.W.C.
3	Sharag and Pleishil 2/32	3a	33.81	F.W.C.
		3b	34.92	F.W.C.
		3c	24.44	F.W.C.
		4a (ii)	29.67	F.W.C.
		4b (iii)	28.87	F.W.C.
		4b (i)	37.48	F.W.C.
		4b (ii)	22.34	F.W.C.
		4c (iii)	25.05	F.W.C.
4	Kajlahr 2/1	C2	52.61	F.W.C.
5	Bajeha 2/2	C1	29.54	F.W.C.
		C2	38.82	F.W.C.
6	Bhindli 2/3	C1	27.52	F.W.C.
		C2	34.04	F.W.C.
		3a	25.9	F.W.C.
		3b	50.58	F.W.C.
7	7Kheunt and Bakhlishil	C1	16.19	F.W.C.
		C2	14.16	F.W.C.
		C3	25.09	F.W.C.
8	Chuar III	C2	42.49	F.W.C.
		C3	29.54	F.W.C.

9	Relikatrate 2/7	C2	20.23	F.W.C.
10	Bataigarh 2/8	C3	12.95	F.W.C.
		C3	42.08	F.W.C.
11	Rialu 1/3	C4	37.63	F.W.C.
		C1	22.66	F.W.C.
12	Barch 1/13	C2	30.35	F.W.C.
13	Latura 1/15	Whole	44.51	F.W.C.
14	Jalora 2/10	C3	19.02	F.W.C.
		4a (iii)	43.52	F.W.C.
15	Sakiran 2/13	4a (vi)	73.95	F.W.C.
		C1	47.75	F.W.C.
16	Sakiran Kanda 2/14	2a (iii)	31.96	F.W.C.
		1a	35.75	F.W.C.
	Sainj Range F.W.C. P.B. IV			
1	Thachgarh 2/38	C3	143.66	F.W.C.
2	Sarikanda 2/40	2c	49.94.	F.W.C.
		2d	60.3	F.W.C.
		2e	42.73	F.W.C.
		2f	36.02	F.W.C.
3	Shikarla 2/39	3a	57.89	F.W.C.
	Tirthan Range F.W.C. P.B. IV			
1	Renusi R/3	1a	31.87	F.W.C.
		1b	20.29	F.W.C.
		C2	42.49	F.W.C.

3.12 Division into Periodic Blocks

There will be four fixed Periodic Blocks with a period of 30 years each. The forests in this working circle have been allotted to P.B.I, II, III and IV.

3.13 Allotment, to Periodic Blocks

The areas in which regeneration is intended to be obtained by removal of the mature crop will be allotted to P.B.I.

Areas already opened up under regeneration fellings during the previous plans whether under Clear Felling System or Shelter Wood System and still unregenerated will also be allotted to P.B.I. P.B.I areas will be further divided into groups-A, group-B and group-C according as these were felled under Clear Felling or in yield is expected now and Shelter Wood System in the past and area unmarked for regeneration fellings during the current plan respectively.

The number of trees per hectare specieswise (for conifers) along with the average diameter of the crop have been worked out for each forest and details given in Appendix - VB.

The allotment to P.B.I group - C, P.B.II, P.B. III and P.B. IV have been made on the basis of relative maturity of the crop as seen from their crop diameters. The most mature crop has been allotted to group - C P.B.I, and thereafter maturity since no crop worth the name has been converted to Uniform System, all the forests are more or less alike and heterogenous in nature.

3.13.1 The Range wise and P.B. wise allotment of area in this Working Circle is given in the following

table

Table 3.23

Statement showing Range wise and P.B. wise area under Fir Working Circle

Name of the Range	<---------- Area under F.W.C (ha) ----------			----------->
	P.B.I	P. B. II	P. B. III	P. B IV	Total
1. Banjar	991.81	329.36	586.44	1068.40	2976.01
2. Tirthan	137.58	359.14	84.17	169.47	750.36
3. Sainj	-	341.15	275.97	390.54	1007.66
Total:	1129.39	1029.65	946.58	1628.41	4734.03

3.13.2 The P.B. wise and specieswise growing stock in this Working Circle is given in the following table:-

3.13.3 Periodic Block - I

The fir forests were worked under Shelter Wood System on gentle slopes. During the later period some areas were felled under concentrated regeneration system reaching to almost clear felling as an experiment. Therefore these areas have been grouped separately in this plan for the sake of their identification. Some fresh areas bearing mature crop have also been included in this P.B. as a result there are three categories of areas in this P.B, group - A consists of areas felled in the past under concentrated regeneration fallings or from where no yield is expected group - B areas consist of those felled under Shelter Wood System and corrective markings required and finally group - C areas consist of mature crop to be harvested under this plan. The forests opened up during the previous plans have not been completely regenerated hence the necessity of their retention under P.B.I is warranted. The list of P.B.I forests is given in the following table:-

Table – 3.24

Banjar Range

Name of Forests/ Compartment.		Area (ha)
2 - Kajlahr	1	38.04
5 - Shalut	2	56.65
9 - Chuar	1	22.26
6 - Kashiadhar	1a	33.71
6 - Kashiadhar	1b	33.06
22- Talate	4b	21.04
44- Sakiran	2a(ii)	37 .49
30- Jalora	4a(ii)	57.08
30- Jalora	4a(iv)	45.26
Total:		**991.81**

Name of Forests/ Compartment		Area(ha)
1 - Sharag & Pleishil	4d(i)	38.04
1 - Sharag & Pleishil	4d(ii)	44.39
1 - Sharag & Pleishil	4d(iii)	18,95
22- Talate	4a	16.18
30- Jalora	4a(i)	95.48
44- Sakiran	2a(i)	28.81
44- Sakiran	2a(iv)	57.14
30- Jalora	4a(iii)	16.94

Tirthan Range

46- Reunsi	3a	51.77
- do -	3b	27.30
- do -	3c	58.51
Total :		**137.58**

Sainj Range

- Nil -

3.13.4 The distribution of number of trees and volume per hectare in P.B.I. areas is given in the following table. It will be seen that fir and spruce are the major constituents in this P.B. fir being a major constituent while kail and deodar from small proportion. The total number of trees comes to 133.12 /ha. (Conifers) and the volume 209.76 m3/ha. All the trees are very widely scattered and very small in number in case of nature trees. The blanks have been now occupied by B.L. species.

Table – 3.25
Areas 1129.39 ha.
Diameter Classes

Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
DEODAR											
No.	0.98	0.37	0.20	0.12	0.10	0.09	0.09	0.06	0.11	0.03	2.15
Vol.	0.06	0.05	0.08	0.16	0.25	0.30	0.42	0.38	0.65	0.17	2.52
KAIL											
No.	4.37	1.54	0.74	0.58	0.53	0.41	0.26	0.15	0.09	0.02	8.68
Vol.	0.26	0.21	0.29	0.75	1.26	1.46	1.21	0.91	0.54	0.11	7.00
SPRUCE											
No.	18.50	9.20	5.67	4.72	4.42	3.81	3.26	2.69	3.84	0.67	56.79
Vol.	1.11	1.29	2.21	6.13	10.57	13.53	15.47	16.20	23.13	4.06	93.70
S. FIR											
No.	19.46	10.34	7.63	6.55	5.72	4.74	3.70	3.00	3.79	0.57	65.50
Vol.	1.17	1.45	2.97	8.51	13.67	16.83	17.59	18.08	22.84	3.43	106.54
TOTAL											
No.	43.31	21.45	14.24	11.97	10.77	9.05	7.30	5.91	7.83	1.29	133.12
Vol.	2.60	3.00	5.55	15.56	25.74	32.12	34.70	35.57	47.15	7.76	209.76
Broad leaved trees											
No.	92.34	47.18	25.06	14.47	9.24	6.15	3.23	2.63	3.17	0.53	204.01

3.13.5 Period Block – II

Relatively less mature crops than those allotted under P.B.I. have been allotted to this P.B. The major species are spruce and fir with abundant broad leaved species mostly commercially useless. The proportion of the deodar and kail trees is very low there is practically no difference of class wise trees as compared to P.B.I areas. The crop is irregular and heterogeneous having all the age classes in the same area.

In this area the position of trees/ha. in various diameter classes is almost the same as in P.B.I areas. Out of 74.58 trees/ha., the remaining portion of the total Broad leaved trees account for 87.95 trees/ha. which is almost same as the figure of confers. The broad leaved trees occupy the depressions and water courses in patches and their density as compared to the confers in much more. The position becomes clear from the following table showing per hectare number and volume of trees: -

Table – 3.26
P.B.II. Areas 1029.65 ha. (Conifers)
Diameter Classes

Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
DEODAR											
No.	0.61	0.34	0.28	0.25	0.18	0.13	0.15	0.09	0.06	0.04	2.13
Vol.	0.04	0.05	0.11	0.33	0.43	0.47	0.70	0.53	0.36	0.23	3.23
KAIL											
No.	3.50	1.69	1.26	0.85	0.72	0.62	0.46	0.36	0.25	0.09	9.80
Vol.	0.21	0.24	0.49	1.10	1.72	2.20	2.16	2.19	1.53	0.53	12.36
SPRUCE											
No.	5.10	3.49	2.35	1.69	1.60	1.50	1.21	1.16	1.31	0.43	19.84
Vol.	0.31	0.49	0.92	2.20	3.82	5.33	5.76	6.99	7.88	2.56	36.25
S. FIR											
No.	11.24	7.96	5.38	4.23	3.08	3.13	2.64	2.30	2.41	0.44	42.81
Vol.	0.67	1.11	2.10	5.50	7.37	11.10	12.52	13.84	14.49	2.62	71.33
TOTAL											
No.	20.45	13.49	9.28	7.02	5.58	5.38	4.45	3.91	4.03	0.99	74.58
Vol.	1.23	1.89	3.62	9.12	13.34	19.10	21.14	23.54	24.26	5.93	123.17
Broad leaved trees											
No.	33.26	20.43	13.18	7.50	4.70	3.36	2.45	1.49	1.44	0.13	87.95

3.13.6 Periodic Block – III

This P.B. consists relatively less mature crop as compared to those allotted to P.B. II of deodar and kail in the lower zone of the Working Circle. The crop is irregular consisting of all the age classes in the same areas.

The stocking of P.B. III areas is still poor as compared to P.B.I and P.B. II type areas. The number of trees in 1st class/ha. comes to 19.23 of 2nd class 34.91 and V to III comes to 45.85. The proportion of commercially important species is almost same. The position becomes clear from the following table showing per hectare number and volume of trees.

Table – 3.27
F.W.C. Areas 946.58 ha. (Conifers)
Diameter Classes

Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
DEODAR											
No.	0.74	0.41	0.28	0.23	0.12	0.09	0.09	0.07	0.05	0.02	2.10
Vol.	0.04	0.06	0.11	0.30	0.29	0.33	0.43	0.41	0.32	0.12	2.40
KAIL											
No.	2.46	1.28	1.00	0.65	0.43	0.33	0.30	0.21	0.21	0.03	6.90
Vol.	0.15	0.18	0.39	0.84	1.04	1.16	1.40	1.25	1.27	0.16	7.85
SPRUCE											
No.	5.55	3.51	2.48	18.03	1.59	1.64	1.20	1.01	1.03	0.25	36.30
Vol.	0.33	0.49	0.97	23.44	3.81	5.84	5.70	6.09	6.22	1.53	54.42
S. FIR											

No.	8.31	6.06	4.35	3.97	2.71	2.76	2.17	1.79	1.77	0.25	34.15
Vol.	0.50	0.85	1.70	5.16	6.49	9.81	10.29	10.80	10.65	1.51	57.75
TOTAL											
No.	17.07	11.26	8.11	22.88	4.86	4.83	3.75	3.08	3.07	0.55	79.45
Vol.	1.02	1.58	3.16	29.74	11.61	17.14	17.83	18.55	18.46	3.32	122.43
Broad leaved trees											
No.	33.91	17.37	10.50	5.66	2.87	1.87	1.19	0.58	0.33	0.11	74.41

3.13.7 Periodic Block – IV

This P.B. consists of relatively least mature crop of all the composition of the crop remains the same as under other P.Bs so far species and relative number of trees in different dia classes is concerned.

The position of forests allotted to P.B. IV of this working circle reflects that there are less number of mature trees and the number of younger trees upto IIB Class is more than its counter parts in other P.Bs. These forests have also got fairly good amount of broad leaved trees present but comparatively less than the forests in other areas. The useless species are more as compared to the commercially important species. The position is clear from the following table reflecting per hectare number and volume of trees: -

Table – 3.28

F.W.C. P.B. IV Areas 1628.41 ha. (Conifers)

Diameter Classes

Species	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	TOTAL
DEODAR											
No.	4.07	1.81	0.78	0.66	0.50	0.39	0.26	0.20	0.26	0.02	8.95
Vol.	0.24	0.25	0.30	0.86	1.19	1.38	1.24	1.23	1.55	0.14	8.39
KAIL											
No.	29.37	9.11	3.30	2.18	1.63	1.42	0.75	0.39	0.24	0.01	48.39
Vol.	1.76	1.27	1.29	2.83	3.90	5.04	3.57	2.38	1.44	0.04	23.52
SPRUCE											
No.	64.32	18.26	12.67	6.30	5.46	4.53	3.12	2.45	3.63	0.02	120.77
Vol.	3.86	2.56	4.94	8.18	13.06	16.08	14.81	14.77	21.88	0.09	100.23
S. FIR											
No.	55.26	28.48	18.25	16.49	12.26	9.02	6.04	4.35	5.74	0.02	155.90
Vol.	3.32	3.99	7.12	21.43	29.29	32.04	28.68	26.19	34.53	0.10	186.68
TOTAL											
No.	153.02	57.66	34.99	25.62	19.85	15.36	10.17	7.40	9.87	0.06	334.01
Vol.	9.18	8.07	13.65	33.31	47.43	54.54	48.30	44.56	59.40	0.37	318.82
Broad leaved trees											
No.	110.72	43.30	17.01	10.72	5.51	3.23	1.68	1.13	1.63	0.02	194.93

3.14 Calculation of Yield

The composition of crop in this Working Circle remains almost the same in all the Periodic Blocks. The regeneration attempts in the past have not been encouraging because of the huge weed

growth, thick humus and other adverse factors combined with meager allotment of budget for the regeneration areas. Natural regeneration is also not responding because of weed growth and poor seed years, combined with short growing season. Fir has good seed year after a long interval. Moreover very little is done to free the regeneration from the smothering action of weeds primarily because of want of adequate budget. Under the circumstances only a negligible area has been converted so far. Therefore yield will be removed only from the areas allotted to P.B. I. No yield is contemplated from other P.Bs. Frosts under other P.Bs cannot be allowed felling as gaps will be opened in the canopy due to faulty marking and damage to other trees during felling and the weeds will invade such blanks. Moreover unless regeneration progresses properly any felling done will amount to eating away the growing stock itself.

3.14.1 Yield from P.B.I

No felling is contemplated from this group as most of the over wood has already been removed under concentrated felling and Shelter Wood felling in the past.

The forests under this group have been felled under Shelter wood System in the past. But the observations show that marking has not been done properly and there is scope of corrective marking wherever felt necessary and where regeneration operations have not been started. However no separate yield is being attempted from this P.B. All the removals from this group shall count towards the yield from P.B.I. The areas from where removals will take place and therefore the yield has been prescribed from this group only. Theoretically speaking all the trees should be removed barring suitable seed bearers of IIB and IA class about 40-45 trees/ha. spread over the whole area. But it will be seen that some trees have to be left on steep slopes and broken grounds. Broadleaved trees will also contribute towards seed bearers and in retention of trees along contribute towards seed bearers and in retention of trees along nallahs etc. No individual pole 45 cm. and below has to be retained except when occurring in compact group of poles. Such group of poles are however, not present in this group.

IC and over class trees are not to be retained as seed bearers even if the distance between the seed bearers increases than the prescribed one. It will be necessary to retain even IIA class trees as seed bearers wherever it becomes absolutely necessary. Even the broad leaved trees of importance will be retained as seed bearers wherever feasible.

3.14.2 Yield for Spruce: - The abstract of growing stock of Spruce present in this PB is tabulated asunder in Table:

Table no. 3.29 : P.B Wise Abstract of Spruce Enumerations

Dia Class	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
No. of trees	20887	10388	6400	5326	4994	4304	3676	3038	4337	761	64111
Vol. in m^3	1253.22	1454.32	5440	9054.2	15531.34	21950.4	26026.08	25792.62	40507.58	7107.74	154117.5

The average annual yield for Spruce is calculated below using Hufgnal's formula as under:-

$$Y = C_1V_1 + C_2V_2/P$$

Where Y = Average annual yield in m^3

C_1 = Constant representing the fraction of volume of trees of class II A and above that will be available for felling i.e. 0.6

V_1 = Volume of trees 40 cm dbh and above (II and above)

C2 = Constant representing the fraction of volume of trees of classes III and IV that will be available for felling i.e. 0.1

V_2 = Volume of trees of 20-40 cm dbh (class III and IV)

P = Period of the plan, in the present case it is 15 years.

Accordingly the average yield works out is as below:

Y = (60% of145970.00 + 10% of 6894.32)/15

= (87581.98 + 689.43)/15

= 88271.41/15 = 5884.78 m^3

Or say 5800 m^3

Hence annual yield for Spruce from PB I areas of this working Circle is 5800 m^3.

3.14.3 Yield for Fir: - The abstract of growing stock of Fir present in this PB is tabulated asunder in Table:

Table no. 3.30 : P.B Wise Abstract of Fir Enumerations

Girth Class.	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
No. of trees	21966	11674	8609	7393	6455	5351	4181	3391	4283	643	73946
Vol. in m^3	1317.96	1634.36	7317.65	12568.1	20075.05	27290.1	29601.48	28789.59	40003.22	6005.62	174603.1

The average annual yield for Fir is calculated below using Hufgnal's formula as under:-

$Y = C_1V_1 + C_2V_2/P$

Where Y = Average annual yield in m^3

C_1 = Constant representing the fraction of volume of trees of class II A and above that will be available for felling i.e. 0.6

V_1 = Volume of trees 40 cm dbh and above (II and above)

C2 = Constant representing the fraction of volume of trees of classes III and IV that will be available for felling i.e. 0.1

V_2 = Volume of trees of 20-40 cm dbh (class III and IV)

P = Period of the plan, in the present case it is 15 years.

Accordingly the average yield works out is as below:

Y = (60% of164333.20 + 10% of 8952.01)/15

= (98599.90 + 895.20)/15

= 99495.10 = 6633.00 m^3

Or say 6600 m^3

Hence annual yield for Fir from PB I areas of this working Circle is 6600 m^3.

3.14.5 Yield from P.B. II

No yield is contemplated from this P.B. during the plan period however salvage: marking for dry and fallen trees can be undertaken. Yield thus removed shall be count towards the yield of the Working Circles.

3.14.6 Yield from P.B.III

Since the stocking of the trees in this P.B. is poor and young regeneration/pole trees are absent altogether requiring any kind of thinning no felling is prescribed. Removal of over mature trees, which have no place in this P.B. can also not be ventured because of creation of gaps inviting heavy weed growth. Therefore no removals are prescribed from this P.B.

3.14.7 Yield from P.B.IV

The crop under this P.B. is of heterogeneous nature having all the age gradations and is irregular. No converted/fully regenerated crop has passed on to this P.B. so far. Therefore no removals are prescribed from this P.B., as the crop is already open. Although trees of 1A and above class in this P.B., have no place but the stocking is so poor that, removal of such trees will create permanent gaps and will invite huge weed growth..

3.14.7.1 Yield for Spruce: - The abstract of growing stock of Spruce present in this PB is tabulated asunder in Table:

Table 3.31 : P.B Wise Abstract of Spruce Enumerations

Dia Class.	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
No. of trees	36595	26680	19130	17480	11945	12160	9535	7895	7790	1105	150315
Vol. in m^3	2195.7	3735.2	16260.5	29716	37148.95	62016	67507.8	67028.55	72758.6	10320.7	368581

The average annual yield for Spruce is calculated below using Hufgnal's formula as under:-

$$Y = C_1V_1 + C_2V_2/P$$

Where Y = Average annual yield in m^3

C_1 = Constant representing the fraction of volume of trees of class II A and above that will be available for felling i.e. 0.6

V_1 = Volume of trees 40 cm dbh and above (II and above)

C2 = Constant representing the fraction of volume of trees of classes III and IV that will be available for felling i.e. 0.1

V_2 = Volume of trees of 20-40 cm dbh (class III and IV)

P = Period of the plan, in the present case it is 15 years.

Accordingly the average yield works out is as below:

Y = (60% of346496.06 + 10% of 1995.70)/15

= (207898.00 + 1999.57)/15

= 209897.57/15 = 13993.17 m^3

Or say 13900 m^3

Hence annual yield for Spruce from PB IV areas of this working Circle is 13900 m^3.

3.14.7.2 Yield for Fir: - The abstract of growing stock of Fir present in this PB is tabulated asunder in Table:

Table 3.32 : P.B Wise Abstract of Fir Enumerations

Dia Class.	V	IV	III	IIA	IIB	IA	IB	IC	ID	II	Total
No. of trees	73458	37860	24254	21916	16291	11996	8025	5783	7625	22	207230
Vol. in m^3	4407.48	5300.4	20615.9	37257.2	50665.01	61179.6	56817	49097.67	71217.5	205.48	356763.2

The average annual yield for Fir is calculated below using Hufgnal's formula as under:-

$Y = C_1V_1 + C_2V_2/P$

Where Y = Average annual yield in m^3

C_1 = Constant representing the fraction of volume of trees of class II A and above that will be available for felling i.e. 0.6

V_1 = Volume of trees 40 cm dbh and above (II and above)

C2 = Constant representing the fraction of volume of trees of classes III and IV that will be available for felling i.e. 0.1

V_2 = Volume of trees of 20-40 cm dbh (class III and IV)

P = Period of the plan, in the present case it is 15 years.

Accordingly the average yield works out is as below:

Y = (60% of326439.50 + 10% of 25916.30)/15

= (195863.70 + 2591.63)/15

= 198455.33 = 13230.35 m^3

Or say 13200 m^3

Hence annual yield for Fir from PB I areas of this working Circle is 13200 m^3.

13.14.8 Total Annual Yield by Vonmantal's Formula

Annual yield = 2 G.S/R

Where R = Rotation = 120 years, Annual yield on the basis for this formula comes as follows: -

Table – 3.33

Species	Total G.S In m3	Annual yield (m3) by Y - 2 G.S/R
Spruce	522805.5	8713.25
Fir	531366.3	8856.10
	Total Yield	17569.35

3.14.9 It will be seen that the annual yield that has been allowed to be removed from F.W.C. is 13966 m^3 (all conifers) against the annual yield of 13985.14 m^3 by increment present formula and 20922.2 m^3 by Vonmental's formula and is well within safe limits keeping in view the condition of the crop. This forms 0.74 % of the total Growing Stock in the Working Circle against annual average increment percent of 1.11 for all species combined for this working circle. Since the total growing stock in this P.B. is low below the Normal Growing Stock the balance of the increment left in the forests will enrich the capital in the long run.

3.15 Control of Yield

All removals of conifers and broadleaved trees, for whatever reason, down to 10 cm. d.b.h. will count towards yield. Since the proportion of deodar and kail etc. in this working circle is small their yield will be counted as the yield of fir (representing fir & spruce), in this Working Circle. Yearly control of yield removal is neither practicable not desirable. However the yield will be controlled at the end of each 5 years period within 10%. The total variation at the end of 15 years should also be kept, within the limit prescribed above. In case of broad leaved species the yield will depend upon the particular forest worked having less or more broad leaved trees. Therefore the deviation will be checked at the time of expiry of the plan and should check within 10%.

However each compartment/sub-compartment will be marked according to the silvicultural requirements of the species and in accordance with the instructions laid down executing felling in this Working Circle.

The fellings under P.B.I are further linked with the progress of regeneration in the old and new P.B.I areas. Should the regeneration not progress satisfactorily, further fellings will be stopped.

Any forest/compartment will be taken up for felling only when sufficient nursery stock has already been had in hand by planning 3 to 4 years in advance. 136.06 Conversion of P.B.I. areas and taking up regeneration operations should continue normally unless, a ban on felling specifically in P.B.I is clamped by thx Stele authority. Our experience with the Deodar and Kail Working Circle shows that converted crops fully regenerated having several times more growing stock than the one we are having at the present.

The markings will be carried out by at least a A.C.F. of the DFO or DFO himself and must be inspected by the Conservator of Forests concerned.

Regeneration survey will be carried out every year in the old and new P.B.I areas and submitted to C.F. Working Plans Circle, who will be watching the progress of the regeneration before approving the felling programme.

3.16 Method of Executing Felling In P.B.I

It has already been laid out that P.B.I marking conforming to the regeneration felling shall be restricted to group - C of P.B.I. Some corrective markings in group - B type areas has also been proposed. Before undertaking the marking, the marking officer shall go through Punjab Forest Leaflet No. 2 and the guidelines given here under:-

1. The compartment/sub-compartment taken up for P.B.I marking shall be covered completely irrespective of annual prescribed yield in respect of conifers and broad leaved species keeping in view their silvicultural requirements.

2. Should the marking result in excess removals than prescribed, further fellings be postponed.

3. Should the regeneration not progress, further marking will be stopped.

4. Well grown healthy seed bearers of species suitable to the locality including the broad leaves will be retained evenly spread all over the area. The mother trees in case of conifers should be of that classes IIB to IA while in case of B. L. Species it would be IIA & IIB.

In exceptional cases trees of IIA may also be retained. Where broad leaved tree has been retained, it is not necessary to retain a conifer also as a seed bearer. There should be 40-45 trees/ha. as seed bearers in case of conifers and at a spacing of 20-22 meter in case of B.L. species.

5. The marking will conform to seeding felling only, the secondary and final fellings may be combined after the regeneration has established. Therefore proper care should be taken in carrying out the markings.

6. IC and II and over class trees will not be retained as seed bearers even if the spacing; between the seed bearers exceeds the prescribed limit.

7. Compact group of even aged poles are not, present, in this group. However if any such group is found not below 0.1 ha., are and average diameter not exceeding 40 cm. will be retained as part of the future crop, A mention regarding this has to be made by the marking officer in the marking note and marking map.

8. Individual poles will not be retained.

9. On steep and broken ground the marking will be done on Selection principles and on flat and moderately sloping areas on Shelter Wood principles.

10. No marking over 30 meters on either side of the National/State Highways (except for dead, dying and diseased trees) shall be made.

11. No marking up to 150 meters on either side of rivers/streams (except for dead, dying and deceased trees) shall be made.

12. All the trees standing over regeneration shall be lopped before felling and guy-ropes shall be used to control the direction of fall of the trees.

13. Valuable broadleaved trees like walnut, birdcherry, mapple, khanor etc will be preferred over other less useful broadleaved trees.

14. In case of conifers the exploitable diameter will be 60 cm. and that of broadleaved species 40 cm. d.b.h.

15. No rolling of logs will be allowed in the areas having regeneration.

16. A marking note will be prepared by the marking officer along with a map showing the location of advance growth, regeneration and the type of marking i.e. on Selection principles or Shelter Wood principle, and pasted in the compartment history files.

17. All P.B.I markings shall be inspected by territorial C.F. and wherever feasible by the C.F. Working Plan Circle and higher authorities.

3.17 Felling in P.B.II and P.B.III

No felling in P.B. II and III is prescribed during the period of the plan. However salvage marking for dead and fallen/damaged trees can be undertaken.

3.18 Subsidiary Cultural Operations in P.B.I

After the fellings and extraction from the P.B.I areas is over, the slash and the debris should be properly disposed. The technique of slash disposal is laid down in Technical Order No. 6 of Punjab Forest Manual Vol. III and it still holds good. Now-a-days the felling refuse is also extracted by the Forest Corporation and sold as fuel wood and pulp wood and there is no difficulty in disposing the slash. However where slash is required to be disposed, it should be collected and disposed off in nallahs. Very rarely the burning of the refuse should be allowed as the existing fir, spruce trees are very susceptible to fire damage.

The humus is generally raked up during the course of extraction. But before taking up the regeneration operations by artificial planting, the thick humus layer should be raked to expose the soil.

3.19 Artificial Regeneration

Natural regeneration in fir areas has failed in the past due to various factors including remoteness, small working and growing period, thick humus and heavy weed growth. Therefore reliance has to be placed on artificial regeneration. The technique of raising nurseries and artificial reproduction has been given in detail in CCF Punjab Technical Order No. 3 & 4 contained in Punjab Forest Manual Volume – III. The same is also contained in an article on plantation Technology of silver fir in Himachal Pradesh by Sh. R.C. Kaushick and R.V. Singh. The instructions issued by CCF HP letter No. 401/PA (M) dated 8-3-1973 is also useful and should be consulted.

Fir and spruce have got totally different silvicultural requirements. In the fir forests spruce occupies the lower strata and the spurs while fir occupies the cooler places and higher position/elevation than spruce. Therefore before venturing for plantation a suitability map of the site should be prepared showing the locations best suited to a particular species including that of broad leaved trees and the plantation should be raised accordingly. This important necessity is usually never

not in practice in the files. The nursery plants suitable for the locality are generally not available so when the plantation period comes all the available species are planted all over the locality irrespective of their silvicultural requirement. Areas originally having broad leaved species- should be plant-fed up with broad leaves only.

The seed of fir and spruce ripens during September and October the seed should be collected from healthy seed and well developed crown and bole tree and sown in the nurseries before the snow fall. Only two pricking have been found useful for optimum development of shoot and growth of fibrous roots. Healthy plants of 3 years in case of spruce and at least 4.5 years in case of fir not below 25-30 cm in height should be planted out in the field in 30 cm. x 30 cm. x 30 cm. pits at a spacing of 2.5 m x 2.5m during monsoon.

Broadleaved plants like walnut, khanor, birdcherry and maple etc are grown easily in the nurseries. Since spruce seeds every year and fir after 4-5 years it is better to put reliance on the planting of spruce. Though in nature the fir trees are more than 3 times of that of spruce in the Fir Working Circle.

The nursery and plantation technique is well understood by the staff in the field.

3.19.1 The failure of slow growth of plantations in the field in fir areas can be attributed to following factors, not necessarily put in their order of importance; -

(i) The fir areas are located away from the habitation and thus supervision part is lacking due to non – touring in fir areas.

(ii) Proper nursery stock it not planned in advance of taking of felling operations.

(iii) Operations like weeding and protection from grazing are not given due care after planting by the field staff.

3.19.2 The weeds invade the plantation are and have such a fast growth that it surpasses and smothers the fir plants within no time. To free the plants from weeds not one or two but even many more weeding are required. If the effort is directed in such a way that the weeds are not allowed to grow over the plants only then the weedings will be of some use.

Once the weeds cover the plants from the top the sunshine is not available to the plant and the plant is not able to pickup growth. It has been observed that weeding are not carried out to the desired extent by the field staff.

3.19.3 The main reason for the failure of even artificial fir plantations i.e. the paucity of budget allotted to the field staff under the regeneration head. The whole budget is not only inadequate for tackling problem areas but it is a drop in the ocean considering the huge areas of fir felled during the previous years. The non-touring/supervision by superior officers of the fir nurseries is another very important factor.

3.19.4 The artificial regeneration of fir can be made successful by making temporary labour and staff huts in the plantation area itself and keeping adequate labour force for weeding purposes after the plantation is carried out from July to September. From October towards with the onset of winter the weeds automatically come down but the precious growing period for the plants is lost if they are suppressed by weeds.

Now fir and spruce are fetching good price in the market and the allocations for fir plantations should be increased substantially before any success should be expected. Over the past about 100 years of forest management the fir forest have been the worst sufferers as removals have continued taking place while the regeneration has not kept pace. Now the period of experimentation on regeneration of fir should be over and all felled areas should be regenerated.

3.20 Weeding

All regeneration areas should be properly weeded from the beginning of the planting if the weeds are allowed to grow with the hope to weed them out at a later stage, it will not succeed because the weeds grow so fast that it is impossible to cover all the areas under weeding at a time. Late weeding after the weeds have overpowered and smothered the plants, will be of no use.

In actual practice the lack of supervision is so grave and the budget allotment for the regeneration is so meager that the weeding are not carried out or if at all these are carried out these become ineffective because of wrong timing for weeding. The growing period in the fir areas is limited and the main growth takes place during the summer months only. Therefore it should be ensured that proper weeding is carried out in the fir plantations a proper time by taking intensive touring in the interiors by the higher officers.

3.21 Miscellaneous Regulation

Closures all the regeneration areas should be fenced with a 4-5 trend barded wire immediately after the area is handed over by Forest Corporation for planting. Timely action should be taken to notify these closures. The present practice of notifying the closures at the government level should be dispensed with and the DFOs be delegated powers for the closure of the regeneration areas. Maximum damage is done to fir areas by buffalo grazing.

3.22 Right Holders Requirements

Right holders requirements will be met with from the forests where recorded rights exist. All the markings in these forests will be carried out strictly in accordance with the marking and felling rules laid down for each P.B. Generally fir timber is not demanded for T.D. by the villagers.

3.23 Demands for Timber for Packing Cases

Packing cases for the Apple and other fruit are required for sending the produce in the market in the plains. Huge quantity of timber is required for this and removed from the forests by the Forest Corporation. No markings are to be done in the forests other that-prescribed under this Working Circle and it should be ensured that the yield does not exceed the prescribed yield. If there is surplus timber after meeting the demand for fruit packing only then it should be diverted for commercial sale in the markets. However now no forests are marked for meeting the demand of packing cases.

3.24 Fire Protection

Fir forests are subjected to incendiary fires during the month of Nov. by the shikaries otherwise the fires in fir areas art not very common. Proper watch be kept to put-out any fire observed immediately.

3.25 Regeneration Survey

Regeneration survey in the regeneration areas shall be carried out every year after melting of the snow or during October after the weeds die out, and submitted to the C.F. working Plan through the Territorial Conservator for having a watch over the progress of regeneration and for deciding the quantum of fellings which has been linked with the progress of regeneration.

3.26 Proposal for Launching of a Project for Regeneration of Fir Forest.

Past experience shows that the fir areas have not been regenerated thus keeping a huge backlog. With the normal budget and the normal staff it is very difficult to get these far-flung areas regenerated within a short span of time. Because of the failure of the fir plantations the money spent on

them has gone waste. The fir areas form the catchment of Bhakra Dam and are the origin of many important rivers.

Therefore it becomes more important to restock these felled forests without further loss of time. The main impediments in the regeneration areas have been explained else where in this chapter. However these are again summarised as follows:-

1. The Fir forests are situated away from the habitations.
2. The supervision and touring by the executive staff is very tardy for these areas.
3. There are lot of fast growing annual weeds, thick humus and a short- growing period.
4. The budget allotment norms per hectare and total budget for the Division for regeneration of these areas are very meager.
5. Local labour is not available because of fir forests being generally away from the habitations and thus for better results labour as well as special staff has to be stationed at the planting site by providing suitable temporary hut ments for them.

There are quite some sizable areas of fir forests which have been felled for regeneration/packing cases but have not been regenerated so far in the neighboring Forest Divisions of Kullu, Parbati, Nachan and Mandi. It will be worthwhile if some project for regenerating these areas is launched with a band of dedicated officials and labour force with adequate budget allotment aimed at the result i.e. regeneration of areas.

It is therefore proposed that a project suitably funded by Govt. of India or other agency be launched within shortest possible time to regenerate the fir areas.

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CHAPTER-IV
THE PLANTATION (OVERLAPPING) WORKING CIRCLE

4.1 GENERAL CONSTITUTION: This working circle comprises such areas which are devoid of tree growth/vegetation, carry open crop or have young plantations or crop which still need protection. 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.

4.1.1 GENERAL CHARACTER OF THE VEGETATION: The forests of this working circle are located in different altitudinal zones, therefore, the vegetation varies. The following type of forests is included in this working circle:-

Group 9 Sub-Tropical pine forests.

'DS' Himalayan Sub-Tropical scrub.

DS2 Sub-Tropical Euphorbia scrubs.

10c 1 a Sub-Tropical dry ever green forests

12cla Lower Himalayan temperate forests Ban Oak (Ineana) forests.

12c1b Lower west Himalayan temperate forests mohru oak.

12c1d Himalayan moist temperate forest-moist Deodar forests.

12c1d Himalayan moist temperate forest.

12c1e Moist temperate deciduous forests

12cf Low level blue pine forests.

12c2a Upper West Himalayan temperate Forests.

12c2b West Himalayan upper Oak Fir forests.

12DS1 Montane bamboo brakes.

12DS2 Himalayan temperate park-land.

12DS3 Himalayan temperate pastures.

12IS1 Himalayan moist, temperate forests Alder (Alnus) forests.

12IS2 Himalayan moist temperate forests riverain blue pine forests.

14c1 West Himalayan sub-alpine high level fir forests.

14c1b West Himalayan sub-alpine Brich Fir forests.

These forests have been described in detail in Chapter II, Part-I.

4.2 BLOCKS AND COMPARTMENTS:

The forests have been divided into compartments and sub-compartments wherever felt necessary to separate the area suitable for plantation. The maps depicting the stock have been prepared on 1:15000 scale and placed in individual Compartment History files.

4.3 SPECIAL OBJECTS OF MANAGEMENT: The special objects of management are:-

1. To manage degraded, poorly or sparsely stocked, blank forests on scientific basis so as to increase the area under forest cover, thereby, reducing the pressure on other forests.

2. To develop and augment forest resources of area in order to meet the demand of the locals for firewood, fodder and timber & NTFPs.

3. To check denudation and soil erosion and to conserve moisture.

4.4 Plantation Series: There will be only one plantation series, the division being the unit of control.

4.5 ANALYSIS AND VALUATION OF CROP: The stock maps of all areas have been prepared on 1:15000 scale and placed in respective compartment history files. In order to cover the entire plantable area of the Division during the plan period, about 200-400 ha area annually is to be taken up for planting which is going well if the actual planting trend from 1987-88 to 2010-11 is visualized barring few years where the quantum has been high. The emphasis however, should be on proper selection of species, combination of species, reduction of mortality, post planting scenario and in this the JFM committees, PRIs and communities can play a very important role. The provision of PFM Rules can be made best use of by educating and sensitizing the communities. Actual planting from 1987-88 to 2010-11 is given in Table 3.2.

Table 4.1 Year Wise area Planted in Seraj Forest Division (1987-88 to 2010-2011)

S.No.	Year of Plantation	Total area planted in ha.
1	1987-88	726
2	1988-89	832
3	1989-90	415
4	1990-91	597.50
5	1991-92	661
6	1992-93	333.50
7	1993-94	398.50
8	1994-95	688
9	1995-96	445.30
10	1996-97	276.80
11	1997-98	715.52
12	1998-99	628
13	1999-2000	652.98
14	2000-01	466.50

15	2001-02	276.50
16	2002-03	181.20
17	2003-04	212.50
18	2004-05	232.20
19	2005-06	464
20	2006-07	813
21	2007-08	312
22	2008-09	337.53
23	2009-10	448
24	2010-11	215
25	2011-12	260
26	2012-13	430

4.6 STRATEGY

Table 3.2 above, shows that more than 12500ha area has been planted in last 25 years in an average of 500ha per year in Seraj Division. However, when we look at their survival percentage, it is miserably low (7% to 11% for the plantation raised during last 25 years) Thus, it is time to seriously relook at our plantation strategy.

4.6.1 THE CONCEPT OF USER GROUPS: This has been demonstrated elsewhere in HP and is working well. Essentially a User Group comprises 10-15 local women or a SHG who are organized to protect the plantations and keep it free of grazing. This User Group is allowed to cut grass from the plantation area (which they divide amongst themselves) for self use. The User Group is further incentivized by making them take care of the plantation and funds earmarked for Maintenance are transferred to them. The practice of organizing User Groups needs to become necessary for any area taken up for plantation by the department. The User Group will be allowed to take grass from the area as long as feasible and thereafter be allowed to take firewood and fodder once the trees are bigger. An active User Group would be invaluable in keeping exotic weeds away and in preventing fires.

4.6.2 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, vermicomposting etc can be 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 component for raising quality stock. Thus care must be taken not to compromise with quality of soil mixture (ideally 1:1:1 of soils and : vermicompost)

There are 21 nurseries in Seraj (as on 30th Nov 2011) having a stock of 1385377 plants. Thus average number of plants per nursery is 65970, which can further be increased (and the average plant cost reduced) with development of infrastructure in more nurseries.

4.6.3 TALL PLANTING One of the main reasons for failure 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 4.2 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 4.3 Raising of Oaks in Nurseries

Month	Activities for Raising 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 in table 3.5.

Table 4.4 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

4.6.4 Choice of Species The choice of species depends on various factors such as climatic, edaphic, topographic and biotic but the surviving indigenous species give a clear indication of the most suitable species. Indigenous, fast growing, hardy species should be preferred which can survive under adverse conditions. Very sincere efforts should be made to bring the blank areas at lower elevation under forest cover. Efforts should be made to first afforest/ reforest areas near habitation with species of immediate use (mainly fuel, fodder) and then focus should be on blank areas away from habitation.

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: 4.5 Suggested list of species to be planted

Altitude	Species suggested for plantation
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

4.7 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 2 and a 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.

4.7.1 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.

4.7.2 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.

4.7.3 NO SITE CLEARANCE IS TO BE DONE: 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.

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CHAPTER— V
PROTECTION WORKING CIRCLE

5.1 General Constitution of the Working Circle

This Working Circle consists of those Reserved and Demarcated Protected Forests which have not been allotted to Deodar and Kail Working Circle, Fir Working Circle and the area of Aesthetic Working Circle merge in Improvement Working Circle, and some of the Undemarcated Protected Forests bearing forest cover or situated away from habitations. These forests are generally found on rugged terrain except the Undemarcated Protected Forests form the catchments of the river valley projects of Bhakra Dam and lie at the head of the valley and stretch far beyond the limit of the tree growth. The forests under this Working Circle traverse the whole altitudinal zonation and terrain of the tract.

The slope in these forests varies from steep to precipitous and are generally situated in far flung inaccessible areas away from the habitation. The UFs included in this Working Circle, however, lie on moderate slopes and in some forests the terrain is rocky and precipitous devoid of any tree growth.

5.1.2 The details of RFs, DPFs and UFs. Included in Protection Working Circle are given in Appendix-III.

5.2 General Character of Vegetation

Because of varied types of areas and climatic zones included in this Working Circle and their distribution through the tract almost all types of vegetation and forest types right from chil to fir and alpine flora is found in this Working Circle. The detailed description of each type has already been given under chapter - II Part 1 of this plan.

5.3 Special Objects of Management

The special objects of management are: -

1. Protection of steep hill slopes from denudation and erosion by preserving the forest cover by taking affecting soil conservation measures wherever necessary.
2. Consistent with the above to provide for the grazing requirements of the local and outside grazers.
3. To protect and preserve valuable forest wealth from indiscriminate fellings and lopping specially near the village.
4. To preserve the wild life wealth in the Great Himalayan National Park in the tract.
5. Consistent with the above to satisfy the genuine demands of right holders.

5.4 Block and Compartments

The existing compartments and sub-compartments remain unchanged. However in some forests some sub-compartments have been carved out being situated on smaller slopes and has been allotted for working under Shelter Wood Principles. Because of proposed constitution of the Great Himalayan National Park, a number of forests/compartments have been included in the core zone of the Park which were allotted to Regular and Fir Working Circles earlier.

5.5 Area Statement

The total area of the Working Circle is 18985.57 ha. Constituting 4928.81 ha of Reserved and DPFs and 14056.76 ha. of UFs. The range wise distribution is given in the following table: -

Table – 5.1
Area of forests

Name of Range	R.Fs.	DPFs.	UFs.	TOTAL
Banjar	482.80	2663.27	2954.57	6100.64
Tirthan	-	895.19	4683.45	5578.64
Sainj	96.31	657.61	6418.74	7172.66
Total :	579.11	4216.07	14056.76	18851.94

5.6 Analysis and Valuation of Crop

The crop consists of various types of forests varying from sub-tropical to alpine pastures. The major species is fir-spruce followed by Kail, deodar and chil. Chil is found on the lowermost extreme of the Working Circle while fir occupies like, maple, walnut, betula, birdcherry, and khan or art found along with lesser economic valued trees. The forest are generally situated on steep and precipitous slopes except those previously allotted to Fir Working Circle and Deodar and Kail W.C. which lie on easy gradients and have now come under the national park. The broad leaved trees occupy the moist and shady localities because of their being situated in inaccessible areas the forests have not been exploited in the past and are quite dense except for the forests earlier worked under Shelter Wood System.

Stock maps prepared by earlier Working Plan Officer have been adopted and no fresh stock maps have been prepared.

No enumeration have been carried out in the forest allotted to this Working Circle.

5.7 Silvicultural System

Since no felling are to be made and the forest are to be protected from felling as such no silvicultural system is prescribed.

5.8 Method of Treatment

Generally no felling, except for occasional T.D. requirement, will be made from these forests. However the blanks will be regenerated with suitable species best suited to the locality wherever necessary and feasible by artificial methods, if necessary.

The forests allotted under the Great Himalayan National Park (core zone) will be under the control of Wild Life wing and will be treated according to the scheme drawn out by them which will include the planting of culture able blanks in Reserves, DPFs and UFs and restocking all the areas felled under Fir Working Circle and Deodar and Kail Working Circle previously.

Grazing will be dealt with according to the record of rights but in the core zone of the National Park it will be regulated by the Wild Life Wing.

5.9 Fire Protection

Fire protection measures will be taken including the maintenance of the fire lines and engagement of fire watchers. Any case of fire will be dealt with least possible delay.

5.10 Plantation Programme

No fixed plantation programme can be laid down due to local conditions. The executive staff will keep contact with the local panchayats and obtain closure consents in advance and the plantation programme planned accordingly.

5.10.1 Plantation Methodology

5.10.1.1

As far as possible the seedlings required for planting in the waste lands should be raised by the people. For this purpose private nurseries should be created and registered with the department and contract entered into forth supply of suitable size plants giving the time schedule and the price of the plant in advance. Only about 25% plants should be raised by the department in its nurseries to act as a buffer stock. The plantation areas be decided in advance and the nurseries should be raised within convenient distance.

5.10.1.2 Closures

As far as possible cooperation of the people will be obtained so that the important of fencing could be avoided by directly involving the public in the plantation programme. Where inevitable a three strand barbed wire fence will be created and maintained properly. Soon after the closure, steps should be taken to notify, the closure as early as possible.

5.10.1.3 Preparation of Site

Before taking up of any plantation work a suitability map of the area indicating the species best suited for a particular place, shall be prepared. The pits be dug in advance before the planting season at a spacing decided by the department.

5.10.1.4 Planting Operation

Major part of the planting work will be done during winter rains. The seedlings should be carefully lifted from the nurseries and side roots and the tap root pruned properly in case of broad leaved species before planting. Plants should be tied in bundles of convenient sizes for carriage to the planting site, only that many plants should be uprooted from the nursery which suffice for a day's work.

While planting care should be taken that the roots are in their natural pose, the planting should be done when it is raining or the sky is cloudy. Alter putting the plant in the pit the soil should be gently lowered in the pit so as not do damage the roots and compacted properly with feet after filling the pits.

5.10.1.5 Weedings

The plants will be weeded to keep them free. If the intensity of weeds in more than two weedings may be required. Proper and adequate budget should be provided for this work.

5.10.1.6 Grass Cutting

Grass cutting from the plantation areas should be allowed free of cost to the villagers but not for sale.

5.10.1.7 Plantation Journals

Plantation journals on prescribed proforma will be maintained for each plantation and shall be posted upto date after submission of each years account. Inspecting officers will invariably record their observations in the journals.

5.10.1.8 Maintenance of Plantations

The plantations raised in the area in the past have suffered due to shortage of funds. Therefore adequate funds must be provided if the plantation are to succeed. The maintenance cost can be minimised by the active cooperation of the people which can be obtained by forming Mahila mandals and forest lovers societies in the villages, by encouraging the stall feeding of the cattle and keeping improved varieties of cows and bullocks. The grass of the plantation areas can also be allowed to be cut

by the village people in the presence of forest staff. Incentives like distribution of fuel efficient 'Chullahas' and fuel saving devices like pressure cookers and solar cookers etc. should go only to the person who contributes to the improvement of the plantations and not to the village Pradhans and other influential people of the area.

5.11 Alpine Pastures

Alpine pastures extending beyond the tree limit up to the permanent snow line are included in the area of the Reserves and DPFs where they occur in such locations. There are very few UFs which extend to and include the alpine pastures. The total area of the alpine pastures Range wise is given in the following table. Most of this area falls in the forests allotted to Protection Working Circle. Forests under F.W.C have fewer patches while forests under Deodar and Kail Working Circle have almost none.

With the proposal of establishment of the Great Himalayan National Park in Seraj Division now most of the alpine pastures will fall in the core zone of the Par where grazing of the sheep goat and cattle can not be allowed.

However, the details regarding the extinguishment of grazing and other rights are being worked out by a settlement officer.

5.11.1 Cattle Population

The cattle population of Seraj Forest Division as it stood on 1.4.84 is as follows:

Tableno. 5.2

Name of Animal	Number
Cows and bullocks	31828
Goat/sheep	36076
Others	160
Total: -	**68064**

Note: - Data taken from Annual Administration Report of Seraj Division.

In addition to above the following number of cattle head are brought from outside: -

Table 5.3 (as on 1.4.84)

Name of Animal	Number
Buffaloo	227
Bullocks	26
Goat/Sheep	310
Others	15
Total:	578

5.11.2 Grazing Requirement of Cattle

The grazing requirement of animals has been determined in the grazing policy of Himachal Pradesh. Keeping in view the weight and feeding habits of the various animals and taking sheep as unit, the following values in terms of units has been assigned to different animals.

Table 5.4

Name of animal	No. of units assigned
Sheep	1
Goat	1. 5
Buffalo	6
Kine, Horse	4
Mule	5
Donkey and others	3

On the basis of above figures, the total cattle units in the division are: -

Name of animal	No. of animal	Cattle units	Total units
1. Cows and bullocks	31828	3	95484
2. Goat and Sheep	36076	1.5	54114
3. Others	160	3	480
Total:-	68064		150078
Nomadic Grazers		6	1,362
1. Buffalo	227	3	78
2. Bullocks	26	1.5	465
3. Goat/Sheep	310	3	45
4. Others	15		
Total: -	578		1,950

Thus total cattle units that graze in the forests and alpine pastures comes to 152028

The bare minimum area that is required per cattle unit has been considered as 0.5 ha. Accordingly the total area required for 152028 units comes to 76014 ha.

The total area of the Reserves DPFs and UFs in the Forest Division is as under:

Category of forests	Total area ha.
1. Reserves	1015.74
2. DPFs	11972.30
3. UFs	14056.76
Total:	**27044.80**

All the above area is not, available for grazing because (I) no grazing is allowed in Reserves grazing and (II) about 1/3 of the total DPFs and the UFs is under regeneration and thus closed to grazing and (III) about 25% of the area of DPFs and UFs is rocky and precipitous making them unfit for grazing. Thus hardly 17753 ha. is available for grazing against total area requirement of 76014 ha. Therefore the grazing of incidence in this Forest Division comes to 0.038 and is very high as compared to the optimum.

The average grazing incidence for whole of Himachal is 0.25 ha. From the above discussion it is revealed that while the carrying capacity of the grazing lands has to be improved, the number of useless cattle has to be reduced also by encouraging the stall feeding of quality animals for milk etc. The quality marino sheep.

5.11.3 Methods of Treatment

Before attempting any treatment to the problem of grazing we have to see and consider from the points of view of forest conservancy as well as keeping of cattle by the local population. No doubt the Himalayan forests are among the greatest of National assets as we owe to the much of the richness of the country. The denudation and erosion of these forests is bound to inflict an immeasurable loss and permanent impairment of soil fertility not only in the hill area but also in the plains.

On the other hand the rearing of live stock continues indispensably to be chief source of livelihood, next only to the agriculture and is in pockets and it is more important then even agriculture. When the word 'livelihood' is used in this context, it means the direct fulfillment of domestic needs as

well as the earning of cash income with which to satisfy the needs that can not be met with domestic production. When we think of the interest of our forests and consequently the national interest, we can not afford to over look the essential life requirement of the poor local inhabitants of the area who have nothing else to fall back upon. Moreover national interests are involved in animal husbandry also. If we think in the importance of both aspects we realise that:-

i) Forests and live stock both are essential,
ii) There is a clash of interests between the two and
iii) The wisdom and the skill lies in the framing of the policy and in the implementation there is so adjusting and dovetailing the requirements produce the optimum net result of good to the community and to the state.

Grazing vis a vis the preservation of the forests is a very complex problem bristling with numerous difficulties. In spite of best efforts in the past no satisfactory solution has so far been found out and it still continues to be a baffling question.

Grazing is one of the principal recongnised rights of the rural population which stand embodied in various Settlement Reports and the basic document of land administration. With the increase of population, both human and cattle, more and more areas were brought under plough and the expansion of the commercia1 utilisation of forest produce more and more trees came to be felled and the land also squeezed through Nautors etc. Due to steep slope and limited holdings, the people can not live on agriculture alone, in spite of the fact that almost all the culturable land has been brought under plough. This has lead to keeping large herds of cattle and flocks of sheep and goat. Grazing grounds have in general deteriorated in quality and hunger for more and more land for cultivation and pasture continues. Such areas have not only to be saved from further deterioration but also have to be recuperated by clothing them again with vegetation.

The following suggestions are made in this respect.

5.11.4 Pasture improvement works

The pasture lands should be improved by closure arid application of manure and carrying out plantations of fodder trees bushes and improved grasses and weeding out the unpalatable grasses. Leguminous crops like clovers, lupines and Alfa alfa should be introduced in the pastures to build up soil fertility and increase the nutritive value of the fodder. No closure sequence is being given and is left entirely to the extending agency according to requirements and funds.

Under this programme stall feeding should be enforced arid grazing should be replaced by grass cutting through a -wide putlicity amongst cattle breeders. The cattle breeders should ELEO be supplied fertilisers on subsidised rates for growing fodder in their own land. The farmers should be dissuaded from keeping non working animals only for the purpose of manure.

5.11.5 Fodder Research Seed and Incentives

Animal husbandry department is presently engaged in procurement and distribution of fodder seeds. They should start a fodder forum this purpose. Local people should also be given incentives in terms of fertilisers for raising their own fodder. Dr. Yaswant Singh Parmar University of Horticulture and Forestry Solan should be provided funds for carrying out study on carrying capacity of the grazing areas and measures to be taken to improve them.

5.11.5.1 Improvement of Breeds

The local people should be educated to keep improved breed cattle only and reduce the number of useless cattle.

5.11.5.2 Survey of the Animal

The DFO should fix the migratory routes for the grazing animals and determine the actual number of animals with the migratory graziers. Proper census should also be undertaken in case of

local graziers.

5.11.5.3 Enhancement in Fees

The grazing fees are very low. in the Pradesh as a whole. There is a need of an upward revision in the grazing fees to discourse keeping of useless animals. The matter is already under consideration of the government.

5.12 Medicinal herbs

The local people have recorded rights for collection, extraction and sale of roots, flowers, fruits and medicinal herbs from the forest areas under the provisionas of Settlement. The traders are also allowed to collect and export the medicinal herbs on a resolution of the Panchayat and payment of royalty. The export of the medicinal herbs is being controlled under a rule notified by Punjab Government in 1964. Adter that nothing has been done to amend the rules or royalty rates even after 24 years when the market rate of the medicinal herbs has increased many fold. The details of medicinal herbs exported out from this division and the royalty rates etc. are given under chapter – I and chapter – III of part – I of this plan and these are not being repeated here.

Detailed study about of the correct period of collecting roots and the period of rest etc. are not available for the medicinal herbs available in the alpine pastures and else where. At present these medicinal herbs are subjected to extraction of roots etc. (like dhoop) every year without adopting any scientific way for extraction of roots of the medicinal herbs. The result is that these herbs are being extracted indiscriminately and as out the medicinal herbs are likely to be extinct within near future.

5.12.1 Following suggestions are made

i) Mean while it is suggested that the Central drug Research Institute Lucknow or Ayurvedic Research Center Joginder Nagar should be approached for giving the scientific method and rest period for extraction may then be revised. The technique of development and propagation should also be suggested by these studies.

ii) However, the Divisional executive staff should have strict watch and supervision so that the closed areas get actual rest and not only on paper. Anybody found collecting the medicinal herbs during the closure period should be dealt with severly. For this purpose a provision for sever penalty be included in the relevant rule/rules.

iii) It is further proposed that the revision of rates of medicinal herbs be done immediately after studying the rates of various items in the market.

iv) The royalty is being collected by the panchayats on behalf of the public and the Forest Department but the panchayats do not furnish any information to DFOs regarding its utilization for the developmental works and the panchayats should spend this royalty money on the development of medicinal herbs through the Divisional Forest Officer. For other scheme of village development, DFO should be included on the committee of persons who administer this fund. For this purpose the list of the members of the committee should be notified by the government.

v) Possibility be explored for setting up industry of based on medicinal herbs locally available in Seraj, Parwati, Kullu, Mandi, Nachan Kotgarh and Rampur Divisions. It presents the main market for the medicinal herbs Amritsar and Delhi.

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CHAPTER – VI
THE JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE

6.1 JOINT FOREST MANAGEMENT IN HIMACHAL PRADESH In 1985, social forestry was given impetus by the National Social Forestry (Umbrella) Project. The project achieved its objective of planting more than 100,000 hectares of plantation, but physical targets took precedence over participatory objectives and social equity issues could not be addressed.

In the 1980 the World Bank – supported Social Forestry Project (1984-92) and the Indo- German Integrated Dhauladhar Project (1982-92) were taken up in H.P. Both were more participatory than previous FD Project. In the 1990 both donors switched their focus to the Shivalik hills with the Indo – German Changer Project that went on till 2005-06, as did the WBIWDP Kandi Project.

The framework for JFM in H.P. is provided by the Govt. of H.P. order of 12 May, 1993, which followed the June, 1990 Government of India (JFM) Circular enabling the spread of JFM. The H.P. order was compiled following study of JFM resolutions issued by other states. The JFM order coincided with the development of a donor – led (DFID) Project for Mandi & Kullu districts, in which JFM was a key element. This Himachal Pradesh Forestry Project (HPFP) may be seen to have facilitated the introduction of JFM statewide. Donor support to Mandi & Kullu districts continued until March, 2001. But as one HPFD officer put it: *"there were no rules and this plagued everything"*.

Table 6.1 Growth of JFM in Kullu & Mandi

Year	No. of VFDCs in Kullu	Area (ha.)	No. of VFDCs in Mandi	Area (ha.)	Total No.	Total area
1995-96	4	1,870	-	-	4	**1,870**
1996-97	4	2,685	8	3,110	16	**5,795**
1997-98	12	8,930	13	5,537	25	**14,467**
1998-99	21	12,426	35	7,134	53	**19,560**
1999-00	14	7,000	42	21,174	59	**28,174**
Total =	**55**	**32,911**	**98**	**36,955**	**153**	**70,166**

In addition in Mandi there are 35 Forest Management Plans (FMPs) covering about 10,500 ha. And in Kullu there are 21 FMPs covering about 10,000 ha. While efforts were made to integrate these FMPs into Working Plans and a nascent GIS facility started at FTI, Sundernagar, and talk of using remote sensing for WP writing on the Karnataka model, the whole thing fell through after 2001with the end of the second phase of the DFID project. At the end of the second phase of the H.P. Forestry Project in 2001, it was agreed that all the 153 VFDCs formed in Kullu & Mandi would be taken over by the SVY and converted into societies.

Until 1998, JFM in H.P. was confined to donor – supported pilot activities (DFID, GTZ, World Bank). Then,

as in earlier years (see above with illegal timber) the arrival of a new PCCF in 1998 meant the search for a new programme to make a positive public relations impact. Participation was the buzzword from Delhi and a small group of three or four FD staff were tasked with developing plans for the new scheme. The Chief Minister was persuaded to launch Sanjhi Van Yojna (SVY). 'Entry point activities' – such as making pots, water taps, mending temples, small infrastructure developments; all designed to attract people to the project – were given a budget so that DFOs could be seen to be dispensing something worthwhile.

To support the state JFM order, Participatory Forest Management (PFM) Rules were developed for H.P. and notified on 23 August, 2001. These Rules make provision for increasing the institutional autonomy of Village Forest Development Committee (VFDCs) by registering them as Village Forest Development Societies (VFDSs) under the societies Registration Act. Importantly, the PFM Rules. Rules encourage VFDS formation Panchayat ward wise thereby attempting to link these bodies directly with the Panchayat structure with each elected panch being on the executive committee of the VFDS, ex officio. However, the role of the VFDSs continues to be viewed narrowly, focusing mainly on helping the HPFD to police , forests and on wage – based micro – plan activities.

This resulted in 'New SVY' rules and guidelines being announced by the GoHP in August, 2001. They contain provisions for VFDSs to become, in legal terms ' the forest officer' (not notified as on July, 2011) for levying fines etc, and for 100 percent share in intermediate usufructs while on final harvest 75 percent would go to the VFDS and 25 percent to the Panchayat. The GoHP agreed to completely forgo any share from JFM areas. Under 'New SVY'. Entry point activities are abandoned but "income – generating activities" introduced; forest guards will not be the member secretary of the Executive Committee; but local organizers – usually led by a literate woman linked to a local community – based organization, help mobilies towards a properly representative VFDS based on a Panchayat ward. Several meetings are held before a micro plan is initiated - this shows VFDS maturity. The FD sends a cheque to a local bank account. The VFDS agrees with the FD to furnish a 'utilization certificate' which can be monitored and checked.

Since January, 2001 the Government of India agreed to bring "better" forests under JFM but how many have actually been included under micro plans is not known. Even under FDAs,

JFM continues to be restricted to degraded forests.

At the policy level the PFM Rules and SVY Rules and Guidelines of August, 2001 are seen as a major step forward, laying the basis for uniformity in approach to community based forest management. It also makes JFM poverty focused and is targeted to the resource dependent.

In 2003, MoEF started the Forest Development Agencies (FDAs) at district level – with DFOs getting

direct access to central funding – for forest and plantation work for employment generation objectives. This is an 100 percent central sector scheme, created to reduce the multiplicity of schemes with similar objectives (it merges four existing central schemes), ensure uniformity in funding pattern and implementation mechanism, avoid delays in availability of funds to the field level and institutionalize peoples' participation in project formulation and implementation. FDAs will be constituted at the territorial / wildlife forest division level, and JFM committees will be the implementing agencies at grassroots level. FDAs are to work through forest guard / deputy rangers and thus appear to conflict with SVY rules which allow for the member secretary to be elected by the JFMC / VFDS.

The growth of FDAs and therefore of JFMCs since 2003 appears to be fluctuating as figures culled out from various departmental reports indicate. In March, 2003, 678 JFMCs were reported covering a forest area of about 1640 km 2 distributed in RFs, DPFs & UPFs. In March, 2005, 1690JFMCs are reported covering a forest area of over 4200 km2. As of December, 2008, 1381 JFMCs stand listed. However , as per field reports only 986 of these are said to be active. Area covered is not mentioned. In March, 2010, a total of 1109 JFMCs have been reported covering again an area of about 4200 km2 . in July, 2010, the total number of JFMCs has been pegged at 1270 but how much forest area they cover is not indicated.

6.2. THE LESSONS LEARNT: The last three decades of dabbling with JFM / PFM under various EAPs and the homegrown SVY and now the Centrally administered FDA do hold some valuable lessons and insights for the future of participatory natural resource management in the state.

1. PFM should focus in and around pockets of poverty i.e. remote, forests areas (better forests) and where livelihood dependence on forests is high. This would entail several genuine joint management activities (other than plantation) like collective protection against illicit felling, fires, poaching and so forth. Issues of Rights, equity and benefit sharing are better addressed and conflicts resolved
2. In participatory approaches, the process is more important than achieving targets. Choosing and regularly training the right persons for the job is therefore critical.
3. Sharing of removals, including resin, intermediate and salvage felling with VFDSs are necessary to establish long term stake of local communities in PFM.
4. Continual policy and Rules adjustment and calibration to promote better market returns for wood and non - wood based enterprises. Example the recent decontrol of bamboo trade and transit. Next: efficient markets for value added products.
5. Local Leadership – this is a critical role. Successful examples of CFM show that local leadership roles have been crucial in making the change. It could be an enlightened, accepted local person, an elected representative, a dedicated NGO / CBO or even a committed forest officer. This is also

important for sustainability of groups.

Why consolidated forest committees?

- Allow economies of scale to be applied, reducing the number of micro – plans to be established by one – quarter,
- More economical to produce field maps at a scale smaller than 1:20,000 and indentifying all present land uses.
- Development issues common to all villages could be addressed in a more efficient, coordinated and economic manner, including road upgrading, health and education, service delivery of agriculture and forestry extension, and minor irrigation.
- Facilitate dealing with common forestry problems.
- Promote development of marketing cooperatives of federations, based on economies of scale for product sales, and improve market positions.
- Facilitate training for the communities by covering a larger, yet similar group.
- Support landscape – level forest planning that address conservation and economic goals.
- Allow scope for zoning community forests into areas conductive for timber and pole production, NTFPs grazing and biodiversity conservation (with limited access)

Source: Unlocking Opportunities for Forest Dependent People,

World Bank 2006

6.3 CONCEPT OF PARTICIPATORY FOREST MANAGEMENT: The concept of joint or Participatory Forest Management is an intervention to evolve organized and collective thinking on the issues if forest management keeping in view the fact that the forest resources are limited and the claim over these are varied, no single solution can satisfy the needs of all. The philosophy aims at involving all the stakeholders in resource generation activities through motivation, active involvement in the process of management and sparing of benefits through adequate institutional arrangements.

Joint management of forest lands is sharing of responsibilities, control, decision making authority and products over forest lands between Govt. and local user groups. The primary purpose of PFM is to create conditions at the local level which enable improvements in forest conditions and productivity. It is a movement towards a more democratic management of natural resources founded on the Principal

of equity, transparency and social justice.

It is widely acknowledged that the Govt. and development agencies alone can not solve the growing problem of degradation of forests and natural resources depletion. The traditional approach to management worked satisfactorily in the past when the population was less but depleting natural resources have led to the concept and practice of participatory management. In Seraj Forest Division 50 JFMCs are registered and out of these 21 are playing active role in managing the forest resources.List of the registered JFMCs is as under:

Table no. 6.2

LIST OF JFMC 's EXIST IN SERAJ FOREST DIVISION AT BANJAR.

S.No.	Name of Range	Name of JFMC.	Status
1	Banjar	Hirab	Active
2		Rashalla	
3		Bhallagran	
4		Mihar	
5		Thogi	
6		Pujali	Active
7		Khawal	
8		Mohani	Active
9		Percha	Active
10		Teel	
11		Bachhut	
12		Gashini	Active
13		Alwah	
14		Pattan	Active
15		Bini	
16		Latipri	
17		Bhumar	
18		Rohlo.	Active
19	Sainj	Raila	
20		Gohi	Active
21		Deori	Active
22		Sainj	
23		Bhallan	Active
24		Shalwar.	Active
25		Sari	Active
26		Dalasni	
27		Bakshal	
28		Kashadi.	
29		Talara	Active
30		Seri	
31		Dhaaugi	Active

32		Dushahar	
33		Phagla	
34		Matla	
35		Rau Nal	
36		Shukari	
37	Tirthan	Thatibir	Active
38		Panihar	Active
39		Baragran	
40		Sidhwan	
41		Deotha	Active
42		Thanicher.	
43		Galoon.	
44		Bandal.	Active
45		Thawari	Active
46		Dhaman	
47		Targali.	Active
48		Chanon.	
49		Mathiana.	
50		Chakurtha.	Active

6.4 SPECIAL OBJECT OF MANAGEMEMNT: The basic objects of joint or Participatory Forest Management are:-

i) To evolve consensus on the basic issues for the conservation of forest resources including soil and water.

ii) To provide an effective treatment for wastelands, degraded forests and forest lands situated near villages through protection, afforestation, pasture development, soil conservation by active participation of local people.

iii) To maintain the environment stability through Preservation of natural resources through involvement of local people in management.

iv) To augment fuel wood, fodder and small timber production for use by local people.

The Govt. of H.P. has notified Himachal Pradesh Participatory Forest Management Regulations, 2001 and the Sanjhi Van Yojna Scheme, 2001 which have strengthened the JFM approach to a great extent.

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CHAPTER- VII
WILD LIFE MANAGEMENT (OVERLAPPING) WORKING CIRCLE

7.1 GENERAL CONSTITUTION

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. There is GHNP adjoining to this Forest Division which is administered by the Divisional Forest Officer GHNP at Shamshi.

7.2. IMPORTANCE OF WILDLIFE

The Seraj Forest Division extends from very low altitude of 1050 Meters at Larji to high snow bound areas of altitude about 1500 meters and touching the boundaries of trans Himalayas. Therefore it has species assemblage of flora and fauna representative of front ranges of Western Himalayas to trans- Himalayas. The monsoon-affected forests and alpine meadows of the Himalayan inner ranges support a unique biota comprised of many distinct altitude-sensitive ecosystems and are home to many plants and animals. The Western Himalayas are considered an endemic bird area (EBA) by Birdlife International, supporting many restricted-range species, as well as a Conservation International Biodiversity Hotspot. This region as a whole has come under enormous pressure from human activities, both from the ongoing practice of traditional livelihoods, such as seasonal grazing, hunting and the collection of medicinal plants, as well as more recent developments such as the farming of temperate cash crops, commercial forestry, tourism and hydro-electric power development.

7.3 Great Himalayan national park:

Great Himalayan National Park is diadem of Himalayas. This park is bestowed with nature's blessing in true sense. This is the area where nature is in its purest form. The cacophony and chirping of rare pheasants and birds in conifer forest adds additional feathers to its beauty .The arduous treks inside the park give maximum opportunities to the hill trekkers to test their endurance .This park is located in Kullu district of himachal Pradesh.Intially constituted in 1984 GHNP was formally declared a National Park in 1999 covering an area of 754.4 sq kms.In year 1994, two major changes were made in land use around the park. A buffer zone of 5 km from the park's Western boundary, covering 265.6 sq km and including 2300 households in 160 villages, was delineated as Ecozone .Most of the population(About 15000 to 16000 people) in ecozone are poor and dependent on Natural resources for their livelihood. The second change was the creation of Sainj Wild Life sanctuary (90 Sq Km)around three villages of Sugad, Shakti and Marror .On the southern edge of GHNP ,another Protected area was declared as Tirthan wild life sanctuary. This covers 61 sq kilometer of area without any habitation.More In the year 2010, rationalization process of sanctuaries and National park boundaries, intension proclamation by state government had included sainj wildlife sanctuary and Tirthan wild life sanctuary into Great Himalayan national park .The whole 754.4 square kilometer area of GHNP is deprived of road facility. This vast chunk of land is inviolate. The existing Park including buffer zone (popularly known as Ecozone) lies between the latitudinal range of 31^0 38'28" and $31^0$54'58"N, and longitudinal range of 77^0 20'11" and $77^0$45'00". The altitude variation in the park is from 1800 meter to 6000 meter above mean sea level. The park has its headquarter at Shamshi.It is a true representative of flora and fauna of western Himalayan landscape. There are many precious floral and faunal elements in this area which need respect, protection and conservation on each front. The climate of GHNP is typical of the front ranges of

western Himalaya. It receives moderate (1100-1500mm) precipitation over most of the year and abundant during monsoon season in June-August. Snowfall in winter occurs throughout the National Park. Snow persists above 3,000 m from November to March with profound effect on distribution of fauna and flora.

The Four Valleys of the Park:

- ***Tirthan Valley***

  The motorable, all-weather road from Aut to Gushaini is about 52 kms. Gushaini is the roadhead for trekking in this valley.

- ***Sainj Valley***

  Starting from Aut, the 46 kms road in Sainj valley ends at Neuli where the trekking trail starts. About 5 kms short of Neuli, is the village Ropa. Here, a gravel road climbs up to Shangarh, which is famous for its large meadow surrounded by the cedar trees. Only four-wheel-drive vehicles can use this gravel road, which is very narrow and not generally advised for travel by car.

- ***Jiwa Nal Valley***

  On the Sainj valley road, about 35 kms. from Aut, is the Siund village where the Jiwa river meets Sainj. Siund is the starting point for treks in Jiwanal Valley.

- ***Parvati Valley***

  Beyond Aut follow NH 21 up to Bhuntar then take the link road to Manikaran and up to Barshaini. The trek starts from Barshaini or the more popular village of Pulga (with an old Forest Rest House). This is the starting point of very popular treks up to Mantalai and further up to cross the Pin-Parvati Pass (5319 m altitude).

The park management is concentrating on three basic aspects of management.

1) Conservation through efficient protection regime.
2) Documentation and monitoring the natural wealth.
3) Involving local villagers through eco development activities.

1) Conservation through efficient protection regime

It need proper planning and execution at ground level to protect this nature trove of western Himalayas in GHNP. For this implementable protection plan is in place. In this plan main emphasis is on establishment of temporary and permanent Nakas at vulnerable points, regular patrolling, combing operation, supply of ration to patrolling parties, procurement and installation of camera traps to check the movements of animals as well as poachers. Use of home guards for patrolling and manning the nakas.

2) Documentation and monitoring the natural wealth.

To manage anything we need to measure. Thus, the management effort is to establish inventory of numbers, distribution and trend in change of different floral and faunal element of GHNP .In this regards help of research institute and researchers are being sought .A detail research and monitoring protocol of GHNP had been developed. This shall be implemented as per budget availability. This step help in answering the basic question that, What is so important in the park which is being protected ?and what is its status at present?.

3) Involving local villagers through eco development activities.

This vision work with the Hypothesis that. give income generation option for the poor villagers

outside the park so that they have enough for to meet their need and thereby they do not enter inside the park. The well developed and time tested mechanism is in place .Park management is in constant efforts to implement the same in each village around the park periphery. At present around 60 self help women saving and credit groups are in place. The make traditional articles produce traditional crops and sell in the market. Park management help them to organize, conduct skill development trainings and appoint Group organizers to keep these groups charged and motivated. Beside marketing channels, for the products produced by these groups, is being provided by the park management.

The Great Himalayan National Park (GHNP) was the first major area of unique species assemblage in the Western Himalayas to be protected by the Indian/State Government as part of its commitment to ecosystem conservation. The monsoon-affected forests and alpine meadows of the Himalayan front ranges support a unique biota comprised of many distinct altitude sensitive ecosystems and are home to many regionally-endemic plants and animals. The Western Himalayas are considered an endemic bird area (EBA) by Birdlife International, supporting many restricted-range species, as well as a Conservation International Hotspot. GHNP is large enough, with the adjacent sanctuaries (Rupi Bhaba and Kanawar) and National Parks (Pin Valley National Park and Khirganga National Park) to maintain viable populations of all plant and animal species characteristics of these zones .

The Great Himalayan national park is at the threshold of elite list of World heritage Site.The park has been selected into tentative list of world heritage sites.The evaluation process has been completed and the report for final induction ,into world heritage site list, stand submitted to UNESCO.

List of floral and faunal elements of GHNP is annexed

7.3.1 DISTRIBUTION OF WILDLIFE

The distribution of wild life has been described in detail in Chapter IIB of Part-I of the plan.

7.4 SPECIAL OBJECTS OF MANAGEMENT

The primary goal of management of wildlife in Seraj Forest Division is to conserve wild life and its habitat, to mitigate human wildlife conflicts and to reduce poaching.

In order to achieve this goal, it is imperative to adopt multi pronged strategy and integrate the functions, i.e.

A. Working with the local communities to reduce their dependencies on the forests to minimize human-wildlife conflict.
B. Interventions for habitat management.
C. Interventions to manage monitor and protect wildlife.
D. Take steps to reduce poaching by enhanced interface with local populace.

7.5 MANAGEMENT STRATEGY

The strategic approach of wildlife protection/conservation in the Seraj Forest Division aims at recognizing the fact that the wildlife conservation is possible only through active support of the local community. There is a need to gain a more informed understanding of the different stakeholder groups and the major influences that shape them.

Accordingly, management prescriptions for the objectives mentioned above are given as following:

7.5.1 Working with the local communities to reduce their dependencies on the forests to minimize human-wildlife conflict

i) Help resolve man-animal conflict with emphasis on social and environmental justice for the poor people living in the Seraj Forest Division.

ii) The officials of Seraj Forest Division should provide for resolving the man-animal conflict with emphasis on social and environmental backdrop of the poor people living close to the forests and development of a competence based training programme for the Seraj Forest Division staff and the local community.

iii) Attitudinal change and increased sensitivity on part of field staff on the issues of wild life damages and more responsive and quicker actions.

7.5.1.1 Crop Depredation:

Historically, the villagers have been hunting the large bodied animals for meat and trophy (crest of a monal, meat and horns of Ghoral, Thar, blue sheep and ibex) in whole of the forests of Seraj Forest Division. This was also a strategy to check the wild animals populations from killing the livestock or damaging the crops.

About fifteen years back, the state govt. imposed ban on the hunting of wild animals (1986). Ever since, the number of wild animals have shown increasing trend in the area. Most of the villagers try to save their crops by putting up snares, traps, etc. This being an illegal activity, the resource-deficient villagers need to resort to labour intensive measures of crop protection. Such actions mostly result in disproportionate cost of raising crops by the poor and marginal villagers.

The villagers raise wheat, maize, barley, potato, rajmash, peas, and garlic. The time of growing these crops mostly depends on the altitude of the area. The wheat in higher altitude is harvested in May/June while at lower altitude it is harvested in April. This area is also very rich in Horticulture crops with apple have lion's share beside peach, plums, apricot, Kiwi and pear. The wild animals such as Ghoral, monkey, and paraqueets do the maximum damage to these crops. Porcupine is known to dig out the potato, while black bear raids the maize crop. The paraqueets feed mostly on fruits, while monkey and rats go for any crop. There are legal provisions to annihilate the small-bodied animals such as rats and many insects; the big-bodied animals are protected under the various Schedules of the Wildlife Protection Act. In this scenario the poor farmer living on the edge of the forest is faced with the problems of the crop depredation as well as the legal action in the event of his killing a wild animal.

The villagers often use retaliatory measures of harming/killing the wild animals of which there is hardly any record or report. The depredation enhances dramatically when there is an increase in the number of livestock as well as the area under cultivation close to the forests; when there is a decline in the availability of the natural food; when there is an increase in the number of large wild herbivores. In all these circumstances, the crop depredation or killings of livestock gets escalated exponentially.

Monkey which were earlier unknown in these areas are now started creating menace and their population is increasing very fast as religious belief protects them.

7.5.1.2 LIVESTOCK DEPREDATION

Due to increasing population pressures and consequent degradation of forest habitat, the wild animals such as Himalayan Black Bear and leopards have become "refugees" in their own habitats. At the same time the rhesus macaque and langurs are able to adapt themselves to the human presence. It is a well-known fact that the wild animals avoid areas with disturbances. This means that when their habitat gets further restricted as a result, they venture into the human habitations. The wild animals

also intrude into agriculture fields as the crops raised are more palatable, and they are located in easy locations. In addition to this the poor and marginal farmers in the villages keep livestock such as sheep and goats, which usually survive on grazing on the forest and pasture land. For wild carnivores, such domestic livestock are very easy prey.

7.5.1.3 TIMING OF PREDATION BY THE WILDLIFE

The timing of the predations by the wild animals is very crucial to understand human-animal conflict. The leopard killings are mostly in July to September; the Himalayan Black Bear made killings in almost same months. The wild carnivores remain active in the months of June to October when the livestock is in the forests/pastures of the forests.

7.5.1.4 COMPENSATION

Human-wildlife conflicts have assumed different dimensions in terms of human casualties, livestock killings and agricultural and horticultural crop raiding at the interface of wildlife habitats and human use dominated landscape. Such a situation affects the diverse sections of the village society, differently. Those who live closer to the forest areas and away from the road-head are mostly poor and bear most of the burnt of the human-wildlife conflict.

The Himachal Pradesh Forest Department has a provision of providing compensation to the person whose sheep, goats or cattle have been killed by the wild animals. A close look at the Department's rules reveals their inadequacy with reference to the damage done by the wild animals in the field. The rules provide for postmortem report, and verification by the high authority in the villages such as Pradhan/up-Pradhan of Gram Panchayat/ and a forest official, not less that the rank of a Forest Ranger. For a poor person, it is difficult to approach these high authorities, as a result many cases went unreported. Moreover, most of the damage done relates to the crops and horticulture trees for which there is no provision of compensation.

Man-animal interface filter down to the base of the pyramid where the people are most directly affected by the depletion of physical resources, least able to fend off the ill-effects of man-animal conflict, and ill-equipped to take remedial action. Providing relief or compensation for damage to the crops and animals of the poor populations living close to the forests should become the priority for the Forest Officers.

Some of the suggested measures for the reduction in the conflict between man and animals:

PROACTIVE

- Constant interaction with the local people and to attend to problems faced by them on account of Man animal conflict.
- Educating and information sharing with local people regarding behavior, eating/ preying habits, timing and circumstances of attacking etc. of wild animals found in the area.
- The villagers are advised to use deterrents such as making sounds at night, beating drums, lighting a fire, or putting up a scarecrow in their fields.
- The Forest Officials need to take some proactive measures such as proper identification of the rogue animals, their tracking, and if needed "culling" or elimination.
- Feasibility of setting up of cages/radio collaring of the problem animals may be explored. The Forest Officials and the local villagers need to put up a combined defense against such animals.
- Training for capturing, tranquilizing and shooting of animals need to be imparted to 4-6 field officers in each division so that they can constitute a rescue team when ever required.
- There is a need of regular census of ungulates and carnivores in the forests. The prey-predator relationship needs to be studied and worked out for the mountain animals along with the carrying capacity of their habitats.

- The issue of crop insurance has a lot of promise to resolve the man-animal conflict for which forest department should take a lead by paying for small insurance premium.
- REACTIVE
  - However, once the damage is done, the provisions of compensation should be an easy and straightforward process so that the poor villagers are able to receive the compensation easily and without delay. Now under new rules, providing compensation in a time bound manner has been made "right to service". It will definitely going to help poor and marginal farmers.
  - The compensation rates which are terribly low need realistic enhancement.
  - In case of any animal becoming rogue, immediate remedial steps are required to be taken by forest department to capture or cull the same. The removal of problem animals may be considered after their properly identification.

In fact, the main solutions lie in awareness about the large-bodied animals, their ecology and behaviour; at the same time recognition of the fact that these are the poor villagers showing tolerance to the existence to the crop damaging bear or livestock lifting Leopard. This enhances the limits of human existence with the large carnivores. The future of man-animal conflict resolution lies as much in the involvement of the local communities in the wildlife habitat management, as in the measure that are taken to leave the wild habitats to the wild herbivores.

7.5.2 DEALING WITH LEOPARDS:

The Divisional Forest Officer 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 inhabited area and ensuing political pressure, media attention does not qualify for its capture/elimination.

b) When first human killing is reported, the concerned Wildlife Warden must study the reasons on these lines: Whether it was a chance encounter? Whether outright aggressiveness? Was it a female leopard merely protective of her cubs? Was the leopard injured and unable to hunt? Whether the victim entered the forest to cut grass or collect firewood or otherwise and got killed when mistaken by leopard for its prey? How many times the leopard had mauled a man or killed a livestock in the past?

c) The Wildlife Warden should remember the underlying principle before declaring a leopard man-eater unless they actually consume the body of human killed. Jim Corbett, a renowned naturalist who had been dealing with man-eaters *pointed out that every human-killer is not a man-eater in the making.*

d) Shooting of leopards through identified shooters shall be considered only as a last resort once it is confirmed to be a man-eater after due observations and studies. Distinction between purposeful and accidental attack be made carefully. Purposeful attacks should always be dealt with immediately and the animal should be removed from the wild as soon as possible. In case of accidental attacks, the situation should be monitored.

e) No leopard captured as man-eater shall be released back into the wild and also should not be placed on display in a zoo. However, it can be kept in off-display facility in a zoo or rescue centre.

7.5.3 INTERVENTIONS TO MANAGE, MONITOR AND PROTECT THE NATURAL HABITATS AND RESOURCES.

1. Maintain and protect the natural vegetation communities (remove exotics and Invasive Alien Species), populations of large ungulates and pheasants.

One of the important indicators of the success of management practices for wildlife protection is the abundance of animals (pheasants, large mammals). The inventories of mammals, birds, reptiles, amphibians, annelids, and insects (mostly butterflies and moths) may be prepared with the help of experts in HPFD or reputed institutions. Similarly the angiosperms, Gymnosperms, ferns, bryophytes, mosses and lichens need to be documented.

- Services of institutions such as Wildlife Institute of India or NGOs of repute may be hired to train frontline staff including the Forest Guards, Forest Workers and wildlife watchers to measures abundance of species: absent, rare, occasional, common and abundant (first level).
- Conduct proper field trainings for the Forest Guards, Forest Workers and wildlife watchers for the next/second level of information collection on evidence of the animal's presence, such as tracks, droppings, calls, nests, feeding signs, etc.
- The advanced or third level of information collection is by determining the trends or indices of population growth and the actual population numbers/ density.

Control of Poaching and Illegal Trade in Wild animal and plant species is needed with the help of enforcement measures. Intelligence gathering needs to be undertaken by the forest officials in this regard.

Provide facilities and opportunities in natural areas for purposes of formal and informal education, research and the study

The training need analysis should clearly bring out all that is required (elements of competence) to help the target group to perform competently in the given area of the job/role. For agreed elements of competence it will be required that necessary performance criteria are generated which necessarily means that unless distinct performance criteria are developed for agreed elements of competences, there would always be an ambiguity with respect to what training be imparted to trainees. Once the performance criteria have been laid out, the mode of assessment becomes important. The assessment is about generating and collecting evidences that tell whether or not the trainee is able to perform as per the laid out standards.

. Protect (with the consent of the local community) the cultural, historic sites such as Sacred Groves for research purposes as elements of the cultural heritage of the region.

The Western Himalayas are home for some of the globe's most intact and colourful indigenous and traditional cultures. The people are manifesting their traditional lifestyle in form of Sacred Groves (*Devban* or forests of Gods). These areas show how local villagers combine their beliefs and religion with natural resource management. The sacred groves have been instrumental in biodiversity conservation. They have a religious connotation and mostly located away from each other. Each Sacred Grove has its own devta (deity) mostly related to Hindu pantheon. A very distinct characteristic of these devtas are that they are treated as a corporal entity by the villagers. The Devtas own property in form of a forest which is locally known as Devban. Most of the Devbans are treated as sacred. Enumeration of such sacred groves must be given top priority. Communities must be encouraged to maintain these forests in perpetuity. Forest department should encourage proper protection and management of such sacred groves and try to enhance buffer forested area around these groves.

7.6 HUMAN RESOURCE DEVELOPMENT AND PERSONNEL PLANNING: -

The challenging wildlife conservation requires committed wildlife managers who possess scientific competence and social awareness aided by communication.

7.7 SCIENTIFIC STUDY, RESEARCH AND DATA COLLECTION

In order to avoid or reduce man-animal conflicts, the scientific study, data collection and possible local or expert aided solutions are required.

The wildlife damage related problems must be addressed on priority. The focus issues are :

7.7.1 MONKEY – HUMAN INTERACTION

Population surveys are of immense value in resolving man-animal conflict. For developing a conservation plan for a species such as monkey or leopard we need to answer several basic questions. Consider for example the rhesus monkey, the common red-faced monkey of India. How many rhesus monkeys are in Kullu Forest Division? Where do they mostly live? What do they eat? What is happening to the habitat of these monkeys? How do rhesus monkeys interact with the human beings?

7.7.1.1 MONKEY SURVEYS

- Initially we need to identify different segments in the Core Area (places of monkey concentration in the Karsog Forest Division) where the survey will be conducted. In these segments, various vantage points will be identified to closely observe the monkeys without interference. If a particular segment is quite big this may be further sub-segmented under a person/forest guard/observer to observe the monkeys from a vantage observation point, in the morning between 7 and 8 AM when monkeys come out to forage. This should be ensured that monkey in line-of-sight of the observer are counted and there is no repetition of count of the same monkeys by the other observers.
- Location and identification of these observation points should be noted/plotted on a map of the area with number of monkey recorded. Data Sheets will be prepared on the Performa given below. Information regarding age and sex of the monkeys, and food provisioning and garbage disposal at surveyed sites need to be kept.
- The survey/population estimation is to be conducted in such a manner that all the monkeys in every observer's domain are counted in a period of half an hour to one hour depending on size of the segment. The period of counting should be such that the level of error of number is avoided due to migration of the animals from one observation point to another.
- The monkey survey is to be conducted by involving various NGOs, professionals and other similar institutions involved with monkeys. Perhaps involvement of Eco-clubs, schools/colleges in the vicinity of identified locations will be also a most desirable component
- The whole exercise is to be repeated during winter (January, March), summer (May, July) and autumn (September, November) at an interval of two months to know the standard variation and error if any.
- Once the results are obtained, the methodology may be improved and then approved to be replicated in different areas of the state to arrive at a figure of population of monkeys.
- A basic website/blog will be created to have an online access to the information to a wide user/stakeholder groups
- The lessons from this exercise will be integrated with the standard wild life surveys/population estimations of the Wildlife Wing of HPFD.

In the year 2011, monkey survey simultaneously in all parts of the state was done on a single day which rule out any possibility of double count. The survey figures for Seraj Forest Division are as under:-

Name of Division	No. of troops	Adult	Infant	Total
Seraj	130	4386	1391	5777

And similarly sarvey figures of monkies and Langur estimations for the year June 2013 as under: -

Sr. No.	Name of Range	No. of troups	No. Monkeys/Langur				Nature of damage by the troupe
			M	F	Y	T	
1.	Banjar	11	285	255	236	776	Local crops
2.	Tirthan	31	358	785	470	1613	Local crops
3.	Sainj	56	280	644	555	1479	Local Crops
Grand Total						**3868**	

7.7.2 PHEASANTS

The Seraj Forest Division has Monal (*Lophophorus impejanus,* Kaleej (*Lophura leucomelana),* Koklas (*Pucrasia macroplopha) and Western Tragopan(Tragopan me;anocephalus). The* Red Junglefowl *Gallus (gallus murghi)* can also be seen in the lower areas. These spectacular birds are known through their fragmented surveys done so far in different regions. The non-availability of information from other areas is perhaps for lack of attention by the forest officials. A species like Western Tragopan occurs in inaccessible areas which would make its survey rather difficult. Obtaining access to these areas make the job of their survey difficult. Similarly Cheer Pheasant are quite common in their grassland habitat, though a serious and systematic effort to collect baseline information about them is lacking.

7.7.2.1 PHEASANT CENSUS

The following method is advised for Kullu staff observe/record their pheasants observations, systematically.

7.7.2.2 CALL COUNT

This method can be used for most of the pheasants which call during morning hours in their breeding season. The counts can be made from a strategic point in the habitat of the particular pheasant. The number obtained can be doubled for obtaining the estimate of breeding population (e.g., one male; one female). The following factors will influence observations

1. **SEASON OF THE YEAR**

The count of calling males assumes that all the existing males in the area will call every morning. In the western Himalayas, the calling behavior of three species of pheasants during various months of the year is as following:

Koklas : January to June; September to December

Western Tragopan : April to June

2. TIME OF DAY

Most Koklas observations are made during a short period of early morning. The males usually call at dawn for 15 - 20 minutes. The Western Tragopan starts its song in early morning and continues intermittently throughout the day during breeding period.

3. POSITION OF CENSUS POINT

Surveys will be more successful if a strategic point is selected in the habitat of pheasant. This site should be identified on the day before the survey/census. The census point should allow the observer to hear the birds over as wide an area as possible. A point on a ridge usually allows the observer to listen to the pheasant calls on both the sides. It is possible to hear all the calling birds within a radius of 400 meters from the ridge, however, this can be reduced by the intervening ridges.

4. POSITION OF OBSERVERS

When there are multiple observers taking part in census operation of pheasants, they must be positioned at an interval of about 500m to 600m. All the observers must have visited their observation points on the previous evening of the census day. They should be in position well before dawn so that all the calling pheasants are counted.

5. RECORDING OF OBSERVATIONS

The observer should have good knowledge of identification of the calls of pheasants which s/he is likely to encounter in the field. The observers should practice counting the involved numbers of calling birds. An approximate range of each call and the direction of the call, must be anticipated. A compass can be used by the observer.

It is best to have similar formats for all the observers. These formats will have following details:

- Date of observation
- Time of start and end of observations
- Altitude of the observation point
- Major vegetation types within the sample area.
- Weather conditions on the day of observation including wind speed, precipitation, cloud cover, temperature etc.
- Marking of observation points on a large scale map of the area (marking of a conspicuous point such as a rock or a tree which can be located for subsequent census in the same area.)

7.8 FIELD CRAFT - HOW TO OBSERVE AND UNDERSTAND THE JUNGLE

(Adopted from an account by Dr. AJT Johnsingh of WII)

When guards/officers/others venture into the forest they should be equipped with certain indispensable articles: a small sharp knife, a compass, a lighter or a match-box (covered in a water-proof polythene bag), leech-proof socks (if it is a leech country), a small rope, rain-coat (if it is in the rainy season or in an area of high rainfall), a good pair of field shoes and field dress (olive green or khaki), which will merge with the background.

Animals such as Himalayan Black Bear, Brown Bear and Leopard can move much faster than humans. At the first close encounter they may snort, roar or scream. These sounds when heard in the setting of the jungle can frighten us terribly and only experienced lucky persons who have survived these encounters will be able to tell us how week and wobbly their knees became after the first nerve-wracking encounter. We should not think that we can easily outrun and escape these animals which, as said earlier, are much faster than we are. Also the terrain on which we will have to run- with slope, many holes, sharp wooden stumps, tangle of creepers, dense tall grass, logs, and rocks- is not an ideal place to outrun these beasts which run with four legs while we have only two teetering legs.

Therefore, go with caution in a forest where there are dangerous animals. Please follow the dictum " I should see these animals before they see me and should hear them before they hear me". Do not talk unnecessarily. Human voice can be heard, even from a long distance, by the jungle animals, in the "silence" of the forest. If there is a need to communicate, better whisper and signal. The objective of our visit to the forest is to see as many animals as possible and observe them. This can be accomplished only when we move as quietly as possible. We spend a fraction of our life looking for and observing animals in the forests. During this brief period, we should be as quiet as possible and observant of the events that happen around us. **Silence is an essential part of jungle-craft.**

In the jungle, smokers should become non-smokers. This is necessary for several reasons: by not smoking (i) the animals will not be alerted by the smell of the smoke, (ii) we avoid setting fire to the jungle, (iii) we show the utmost reverence to the jungle which we have resolutely determined to conserve. When we walk along a forest trail, particularly when the wind carries our smell down the train, we should proceed with utmost caution. This is because animals like bear (particularly those which have had encounters with people earlier and therefore are not shy of people) can smell your approach and then either slink away or wait for your arrival. When the wind carries your smell down the path, walk slowly and silently, stop for a few seconds every 50-100 m, listen for sounds and then proceed. Most animals like bear make some sound and indicate their presence. All these can be heard if you walk silently.

FOREST RULES

- Never approach dangerous animals like black bear (particularly with the cubs) very close when they are in a flat terrain. With caution it is possible to approach them in a hilly or rocky terrain where the chances of escaping these animals are much greater.
- If there is a fresh blood trail on the path one should proceed carefully. A wounded animal (e.g. a bear wounded by a poacher) may be ahead of us and should turn aggressive if approached very close. The same is applicable to other potentially dangerous animals like the leopard.
- A leopard carrying its fresh kill may cause the fresh blood trail. Approaching a leopard on its fresh kill could be dangerous.
- While on a blood trail if there are alarm calls of monkeys, and birds ahead of us it could be an indication of the predator going ahead. Go with caution.
- If you are returning to your camp alone on foot late in the evening and if you see a dangerous animal (e.g. a bear with cubs), stop immediately. Stay at a safe distance. Hide behind a tree or rock, observe the animal and then by talking, by tapping on the tree with a stone or wood, or even by allowing the wind to carry your smell let the animal know that a human being is somewhere in the vicinity. The presence of the unseen human being makes most animals nervous and they make a slow but steady retreat away from your direction. Who will enter in to a patch of tall dense grass where you hear the hissing of a cobra but don't see the snake? We will move away from the area. The great naturalist Dr. George B. Schaller has successfully used the above technique of remaining unseen and scaring away the Himalayan black bears in Dachigam National Park, Kashmir, India.

- Do not stumble through the forest without carefully looking at the path.
- Climbing a steep hill slope by clinging on to trees, climbers and rocks. Particularly in a tropical habitat, needs to be done with great caution. Before placing the palms, which like the feet are not protected, to hold on to something, watch carefully. There could be a scorpion, a nettle plant or a wasp nest nearby.
- People often fail to differentiate between chasing and charging by a bear. Charging may stop with a forward aggressive rush for 20-50 m but chasing can go much beyond that even for a few hundred meters which could be very dangerous. When chased by an animal throw a conspicuous object (e.g. a white hand-kerchief) on a bush and run down a slope or run zigzagging among the bushes. Put up as much distance as possible between you and animal. While chased, do not crouch inside a bush hopping to hide.
- When chased by an animal, never try to climb a tree. A jungle- living tribal can do that but not a guard if he is recruited from a town or a Manager who is not used to tree-climbing. The fear would drain all the energy needed to climb.
- Sometimes you will be forced to walk through the forest at night. If you are in a group, stay together. As you walk along make some noise (talk, sing, or tap on a tree or rock at regular intervals). Don't surprise animals by walking in to them. Tap the ground periodically, as you walk along, either with your foot or a stick. The vibrations will keep the snakes away and most animals will also move away when they are warned from a distance.

6. This Chapter has been vetted by Chief Wildlife Himachal Pradesh vide letter No.WL/Working Plan/ 7682 Dated; 21.2.2013.

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CHAPTER – VIII WILD LIFE AND ITS MANAGEMENT

CHAPTER – IX
NON TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE

9.1 GENERAL CONSTITUTION

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, Cedar oil, grass. The resin extraction has been dealt under Chil working circle. The main emphasis/focus would be on medicinal plants.

9.2 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.

9.3 BLOCKS AND COMPARTMENTS

The entire tract of the division will be covered by taking beat as a unit.

9.4 AREA STATEMENT

The working circle is overlapping, no area statement is required.

9.5 ANALYSIS AND VALUATION OF THE CROP

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 etc. A list of commonly used or economically extracted medicinal herbs, plants occurring naturally are given in Table 5.2.

9.6 STOCK MAPS

As the medicinal plants are mostly herbs and shrubs found on annual or perennial basis, stock mapping is not possible.

9.7 METHOD OF TREATMENT

9.7.1 ROTATIONAL EXTRACTION

Unscientific and unsystematic extraction of medicinal plants is likely to reduce the yield and quality of the plants and may even lead to disappearance of the species. A four year extraction cycle of the medicinal plants is already in force.

This cycle will continue and is extended to the plan period as under:-

Table 9.1 Cycle of Extraction of Medicinal Plants

Range	Blocks	Years when Extraction will be allowed
Banjar	Banjar, Jibhi, Bahoo	2015, 2018,2021, 2024, 2027, 2030
Sainj	Sainj & Larji	2014,2017, 2020, 2023, 2026,2029
Tirthan	Plach & Panihar	2013, 2016, 2019, 2022, 2025, 2028

Table 9.2 Medicinal Plants of Seraj Forest Division

S.N	Botanical Name	Common Name	Habit	Occurrence Zone	Parts Used
1	*Aconitum heterophyllum*	*Mithi Patish*	*Herb*	*Sub alpine*	*Root*
2	*Acorus calamus*	*Barian*	*Herb*	*900 to 2000m*	*Rhizome*
3	*Angelica glauca*	*Chora*	*Heb*	*Above 2200m*	*Whole plant*
4	*Artimisia nilagirica*	*Siski*	*Herb*	*1500-2500m*	*-do-*
5	*Asparagus adscendens*	*Sufed Musli*	*Shrub*	*Upto 1800m*	*Root*
6	*Berberis spp.*	*Rasaunt*	*Shrub*	*1800-3200m*	*Root*
7	*Cannabis sativa*	*Bhang*	*Herb*	*Up to 1600m*	*Leaves*
8	*Cinnamonium tamala*	*Tej patta*	*Shrub/Tree*	*Up to 2200m*	*Leaves*
9	*Dioscorea detoidea*	*Shingli mingli*	*Climber*	*Upto 2200m*	*Tuber*
10	*Ephedra spp.*	*Bhutshur*		*Above 2200m*	*Roots*
11	*Heracleum candicans*	*Patlain*	*Herb*	*2000-2500m*	*Roots*
12	*Mallotus phillipinensis*	*Kemal*	*Tree*	*Up to 1000m*	*Roots*
13	*Morchella esculenta*	*Guchhi*	*Fungus*	*1500-2500m*	*Fruiting body*
14	*Myrica nagi*	*Kaphal*	*Tree*	*1000-2100 m*	*Fruit*
15	*Dactylorhiza hatagirea*	*Salam Panja*	*Herb*	*Above 3000m*	*Roots*

16	Picrorhiza kurroa	Karoa	Herb	Above 3000m	Roots
17	Pistacia integerrima	Kakarsinghi	Tree	Up to 1500m	Fruit
18	Podophyllum emodi	Bankakri	Herb	Above 2200m	Rhizome
19	Polygonatum vaticilatum	Salam Mishri	Herb	2300-3000m	Leaves
20	Potentilla fulges	Bajardanti	Herb	1500-3000m	Roots
21	Rhododendron arboretum	Chco	Tree	1200-2400m	Leaves
22	Rhododendron compaulatum	Saranger	Tree	Sub alpine	Flower
23	bergenia ligulata	Pathar Tor	Shrub	1800m & above	Whole plant
24	Swertia chrata	Chiryata	Herb	Sub alpine	Flower
25	Taxus wallichiana	Rakhal	Tree	2400-3000m	Leaves
26	Thumus surphyllum	Banajwain	Herb	1200-1800m	Seeds, leaves
27	Tinospora cardifolia	Gall	Heb	1500-2200m	Leaves
28	Viola serpens	Banafsha	Herb	1000-3000m	Flower
29	Valeriana wallichii	Mushbala	Herb	2100-3000m	Root stock
30	Valeriana hardwickii	Nihani	Herb	1200-3600m	-do-

9.7.2 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:-

- Systematic rotational collection should be followed strictly as given in Table 5.1
- Heavy grazing and destruction of medicinal herbs should be checked as these species do not produce sufficient seeds/vegetative form of regeneration.
- The raising of nurseries/herbal gardens, 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.

9.8 PROPAGATION TECHNIQUES

The technique of propagation and harvesting of some important plants is described in Table 5.3

9.9 OTHER NON TIMBER FOREST PRODUCING PLANTS/PRODUCTS

In terms of local extraction of NTFPs, the most removed species (by quantity) is Berberis (several species).As per record shown in the Working Plan, between1990-91 and 2006-07, a total of over 2604 MT of Berberis was exported out of Seraj Forest Division.. The other high value export from the division has been of *"gucchhi"* (*Morchella esculenta* + Pleurotis spp.), *"dhingri"* mushrooms; c. 15 mt between 1990-91 and 2002-03. Export of Taxus leaves; *Taxus wallichiana*, are recorded between 1990-91 and 1993-94 (86 MT). There are other low value NTFPs being collected and exported out.

9.9.1 *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 5 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 review these export permit rates for gucchhi and bring about a more transparent system in its trade.

Table 9.3 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 15m deep at 30cm×30cm spacing during Feb.-March. If direct sowing is decided, then the soil is worked up to a depth of 15	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.

	cm. Sowing is done in patches which may be spaced at 30cms×30cm		
Asparagus racemosus	The species is propagated by direct sowing in patches at 30cms×30cm during Feb.-March	Roots are dug out in the month of Oct.-Nov.	Roots are used as astringent, tonic and in diarrhoea, cough
Angelica glauca	The species is easily propagated by sowing in patches at spacing of 3'×3'. Sowing is carried out in Feb.-March.	Collection/harvesting is done in Sep.-Oct.	Roots, fruits used for flavouring. Used in medicines for digestion, heart burn, flatulence.
Dioscorea deltoidea	It is propagated by planting rhizomes in 15cm deep pit at the spacing of 60cms×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.
Nardostachys grandiflora	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 75cms×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	The species is propagated by direct sowing or planting	Rhizomes are dug out after 3-5 years when fully	Dried rhizomes are employed for hair

wallichii	rhizomes in 15 cm deep pits at espacement of 30cm×30cm during Feb.-March. About 25-40 Qtls.of root stock is sufficient for one hectare.	developed.	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.

9.9.2 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?

9.9.3 URGENT ACTION ON *TAXUS WALLICHIANA*

1. There is an urgent need to locate pockets / distribution of this tree in the forests of Seraj, 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.

9.9.4 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, khair, chil etc. which are normally grown in forest plantations are not reckoned as medicinal trees. In Seraj 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 Seraj would be Taxus wallichiana, of course!

9.10 **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.

9.11 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.

9.12 MISCELLANEOUS REGULATIONS

9.12.1 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.

9.12.2 The following table shows the details of various NTFPs exported outside Seraj Forest Division from 1988-89 to 2006-07:-

Table9.4 Extraction of NTFPs from Seraj Forest Division Banjar

Year	Guchhi	Berberis roots	Kail, Chil, Deodar cones	Lichens	Acrus roots	Taxus Leaves	Talis Patta	Muskbala	Green moss	Shingli Mingli	Kakar singhi	Mari gold	Other
Unit	Qtls.	Qtls.	Qtls.	Qtls.	Qtls.	Qtls.	Qtls.	Qtls.	Qtls.	Qtls.	Qtls.	Qtls.	Qtls.
1988-89	11			16	15			75		260			417
1989-90	9.50			50	19			61		120	2		312
1990-91	0.4			201	3			28					485
1991-92	9.2			591	2			39			1		70
1992-93	1.00			496	53	4532		120.50		20			226
1993-94	1.00			244	10			119		50			357
1994-95				118	4	0.25							407
1995-96				120.00				11					374.5
1996-97				170.30	2			34.50					521
1997-98				407	40			15					797.3
1998-99	15.99			487	31	672							672
1999-2000	1.30			715	42	190		6					386.25
2000-01	0.65			0	12								329
2001-02	0.15			387	28								654
2002-03	18		20	142									474
2003-04		500											50
2004-05													
2005-06													
2006-07													
Total =	68.19	500	20	4144.3	261	166.97				0.20			72.91
						5561.22		509		450.2	3		6604.96

After 2006-07 no record for extraction of NTPF is available as the extraction is carried out through Panchayats.

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CHAPTER — X
MISCELLANIEOUS REGULATIONS

10.1 Petty Fellings

Petty fellings are defined as the fellings that are not prescribed under any of the Working Circles and can be sanctioned by the DFO under the provisions of the settlement and in accordance with the government orders. These may be as follows:

(i) Trees required for meeting the demand of the right holders as per provisions of the Settlement.
(ii) Trees on market rate non-right holders.
(iii) Trees to meet the free grants for construction of houses destroyed by fire and floods and other natural calamities.

It is suggested that the sanction of trees under (i) and (iii) be made by the DFO himself and nobody else as it is liable to be misused.

All such fellings shall be shown in the compartment history files and control forms and shall count towards prescribed yield.

Observation and experience shows that T.D is not being granted on merits and after due verification of the genuine demands of the persons concerned as laid down in Pr. CCF/HP instructions from time to time. These instructions have been given in detail in chapter I Part-I and should be followed strictly. Proper verification of genuine demand sanction of T.D to wrong person happens while the genuine person suffers for want of timber. The present instructions are sufficient to check the misuse of T.D. if followed properly.

There should be proper checking during the movement of timber within the kothi also.

10.2 Deviations

Any large scale felling, not covered by the prescripts one of the working plan will constitute a deviation. Sanction for all deviations from the prescriptions of the working plan shall be obtained 1 from the competent authority well in time. Such felling may comprise damage by fire, snow or wind, for road alignments Power Projects and trees along the electric lines.

10.3 Demarcation and Survey

The Reserves and DPFs have been surveyed and shown on 4" =1 mile scale maps along with the position and location of the boundary pillars. But the boundary record is not available with the DFO Seraj. This register should be rebuilt as soon as possible.

There are extensive Undemarcated Protected forests in the area. The Reserves, DPFs and the UPFs or III class forests are not shown on Revenue records and only private holdings have been surveyed at the time of Revenue Settlement. It becomes therefore difficult to detect the encroachments in the field.

These UFs and DFFs and Reserves should be surveyed and demarcated a fresh and shown on revenue map also as soon as possible. Fixing of boundary pillars of UFs without any demarcation and settlement will only in a futile expensive exercise.

10.4 Forest Boundaries

The State of boundaries of the forests particularly near the habitations and along private holdings are not satisfactory as already indicated under Part-I of this plan. The boundary register showing the location and forward and backward bearings are not available with DFO sera j due to

accidental fire in his office during 1985. This is a very important tool of forest management and should be reconstructed by taking personal interest by the DFO himself. In case where the original main boundary pillars are at larger distances, intermediate boundary pillars should be constructed, their distances and bearings recorded in the boundary register. The existing boundary pillars with dry rubble masonry should be replaced with pillars of cement mortor or R.C.C of appropriate sizes. The line between sub compartments should also be marked with small pillars.

The boundary pillars of the included chak a list of which it given as Appendix-XI are not to be found in position at all. Therefore steps should be taken to demarcate the included 'chaks' properly and the boundary pillars of R.C.C fixed around them. Because of the removal of the boundary pillars people have encroached upon large areas of forest and are continuing with impunity.

A three years programme for checking of the boundary pillars after a proper survey by qualified staff, particularly of the forest along private cultivations, should be taken up indicated below and all the boundary pillars should be fixed at proper locations. The local Block Officer or the Range Officer should not be entrusted this job as explained above. If the boundary pillars are fixed at a wrong place by an unqualified person this will do more harm to the forests than good.

The budget required for this purpose should be assessed by the DFO and demanded from the government.

There should be a sign board showing the number and name of each compartment and sub compartment displayed at prominent locations like paths, roads and junctions of sub-compartments etc. This is necessary in view of the division of some compartments into smaller sub-compartments and due to the new nomenclature of the forests. The boundary lines of compartments and sub-compartments have been marked by making prominent rings around the pole of the trees at about 10 meters distance. The name and number of sub-compartments has also been written with white paint at prominent places.

10.5 Roads

The road network in the Division is very poor. There are only a motor road connecting Banjar with Gadausaini, Jalori, Bathad and Sainj. Another small stretch of road from Kartah to Ropa (2KM), Banjar Khabal Bahu road, Panihar road Sidhwan to Godigad road, Thawari Kotla roads and Sainj Deori, Bathad Bagipul Deori to Sanad, Salwar Dhaugi road have been constructed in the past and many other are in the pipe line for want of FCA clearance.

It is proposed that the forests may be connected by Jeep able roads by constructing new roads and out of thease sr.no.8 to 26 are constructed partly during 2012-13 and names are as follows:-

1. Sainj	Panihar
2. Ropa	Lapah
3. Ropa	Maror via Bahu
4. Sainj	Bhallan

5. Gadagusaini Maryad Patan
6. Ghusaini Karungcha
7. Daroni Nal Daroni Dhar.
8. Bahu Balo
9. Division Office FRH Banjar.
10. Logging road Jalora.
11. Shadao Muthas.
12. Widening of Fagwa B/path.
13. Kotla Hurla.
14. Manam Deori Manyasi Nursery.
15. Hurcha Bhalan.
16. Dabadona Dugha Khadouna.
17. Sajahra Kulha and Jokpuni.
18. Chori Nal Raila Gharali.
19. Shnauli Manyashi Nursery.
20. Kansar Shikarla Nursery.
21. Kharon Bhumiyan.
22. Dharakhadi Doghar.
23. Kandhi Swachar.
24. Badi Kaliedhar Bagthachi Forest.
25. Janakhala Thawari.
26. Sanauli Manyasi.

10.6 Bridle Paths

A net work of bridle paths and inspection paths exists in the Division the details are given in Appendix-VII B. These paths have suffered from neglect, since two to three decades and are in a miserable condition at present. No new constructions are proposed. It is proposed that all the existing bridle paths and inspection paths should be well maintained by allotment of sufficient budget. Touring by the senior officers in the interiors will go a long way in keeping these paths fit by the field staff.

10.7 FCA Cases

Many developmental works are taken up and being taken up by different departments and large area has been diverted under FCA cases in this Division. Detail of area diverted for different projects and roads is attached as Appendix-XVI

10.8 Buildings

After the reorganization of the territorial units and creation of new Ranges, Blocks and Beats there is shortage of accommodation for the field staff. The list of existing buildings is given in Appendix-VII A. The condition of existing inspection huts was miserable as these have not been maintained over a long period and excep Bhallan rest house rest of these are maintained during 2012-13. The old huts at Bhallan have and in a miserable condition. Except at Sainj, Sojha and Bandal there are no rest houses with proper facilities in the division. The construction of rest houses at the following places is proposed. It is also proposed that inspection huts and via old huts at other places be maintained properly: - Larjil, Deori, Bahu, and Gadagushaini. The deployment of cots, beds furniture and kitchen equipment and lighting arrangement under the charge of a part time or full time Chowkidar and water supply is a must before some touring officer is expected to stay there. At preset all the interior inspection huts lack the above mentioned basic facilities. List of bulding is attached in Volume II as appendix –VIIA.

10.9 Water Supply

The buildings should be provided with water supply and sanitary fittings. These basic requirements are lacking in most of the buildings and inspection huts.

10.10 Meteorological Data

At present the Division is lacking in snow and rainfall data because of poor maintenance of the existing rain gauges. The rain gauges installed at rainy Bhangahr, bhallan, Panihar, Sojha, Jibi and Bandal are not in working order.

It is, proposed that all the rain gauges be kept in working order and one more raingauge be installed at Gadagusaini. Snow gauges be installed at Jibhi and Sojha, It is further proposed that Range headquarters be provided with a rain guage, snow gauge where necessary, maximum-minimum thermometer and hygrometers. Some incentive should also be provided to the local literate Chowkidar for upkeep of the record.

10.11 Maps

Proper maps are not available in the Division. All maps on 4"=1 mile scale or equivalent should be procured by the DFO for his office as well as all the Range Officers Maps on 1:50,000 scale are available with survey of India. Complete set of maps be obtained from the concerned quarters;

Management map showing all the Reserves, DPFs, and UFs has been prepared on 1"=3 mile scale map. The stock maps on 4"=1 mile scale have also been prepared a fresh for Deodar and Kail Working Circle and posted in the compartment history files. The forests allotted to Protection Working Circle have not been stock mapped afresh.

10.12 Photographs of Forests

Effort has been made to photograph the forests and keep a copy of it in the C.H. files wherever possible. It is not possible to photograph complete forest in one photograph, therefore sub-compartments have been photographed. This visual record will go a long way in appreciating the change in the forest canopy. It is proposed that DFO territorial should photograph the remaining forests and keep a copy in the compartment history files.

10.13 Included Chaks

There are a number of included cultivations as given in Annexure-XI inside the DPFs. Effort should be made to acquire these chaks by purchase or exchange. Immediately the 'chak' pillars should be installed properly as these are missing in almost all cases.

10.14 Nautors and Encroachments

Nautors have been granted in UFs and even in DPFs. In most of the cases the department has not been consulted or informed about such grant. DFO should try to contact the Deputy Commissioner and get a list of the Nautors sanctioned in each phati. The encroachments should be ejected after due process of law. Immediate action should be taken to evict the encroachments from DPFs and Reserves also.

10.15 Research and Sample Plot

There are some plots having seed trees called (+) trees all over the Division set up by the Forest Research Division. It is suggested that yield tables of various species be compiled by the Research Division for which it IE, not available by laying out sample plots.

There will be no felling in sample and research plots.

10.16 Monumental Trees

Monumental trees of various species shall be found out, preserved and proper record there of kept by the DFO.

10.17 Temple Groves

Some of the temple groves have magnificent trees of deodar. These should be prescribed and no felling should be allowed. Record of all temple groves be kept by the ROs and DFOs.

10.18 Lopping

Lopping rules are included in the notification of DPFs and UFs etc. But these are not being fllowed by the people and not enforced by the staff at present. Kail is the worst sufferer due to lopping. Kail trees have been infected with deadly fungal disease rendering the tree hollow and unfit, for use spruce and fir trees also suffer badly. The broad leaved trees are lopped by the local people and the shepherds and gujjars inflict injury to the tree by not following the proper lopping rules. There is a need to educate people and bring out the ill effects of lopping. The lopping rules be enforced properly by the staff.

10.19 Fire Protection

The area being hilly is not easily approachable, suffers badly once the fire breaks out. Therefore it is necessary that proper precautions like, keeping the fire lines clean and control burnt, control burning of a narrow line of about 10 meters around the new plantations and engaging of fire watchers be taken in time. The goodwill and cooperation of the public is necessary for protecting the forests. At the same time the miscreants and the defaulters in fire fighting should be dealt with suitably under law. All the bridle and inspection paths should be kept clean during the fire season. No proper equipment for firefighting are available with the Division. It is suggested that proper equipments for firefighting be arranged and kept- handy with all the field staff. A short range walkie talkie set with the staff will be additional advantages in flashing the news about fire to all the staff. The phat burning should be allowed only in presence of a forest staff and should not be left unattended.

CHAPTER – XI
CONTROL AND RECORDS

11.1 Control Forms

The system of control and records will be followed as adopted by the stale.

The procedure laid down in Technical Order No.11 Regarding preparation and revision of Working Plan issued by the Chief Conservator of Forest H.P. will be followed. Separate control forms for different operations have been prescribed as follows: -

(i) Fellings Form 2(a) and 2(b) will be used for controlling the fellings, form 2a will be used in case the control is by volume and form, 2(b) for area control.

(ii) Form 4 will be used for Roads and buildings etc., while form 'C' will be used to control and for watch of the progress of reproduction.

(iii) Regeneration Survey Report
Regeneration survey report of all PB-I areas will be submitted on 16"=1 mile scale map. Separate instructions exist for preparation of such report.

It has been observed that the officials responsible for preparation of control forms are not equipped with detailed instructions for preparation of the control forms. In fact, if prepared properly, these forms show the arrears of felling, advance felling position of deviation, previous deviation and felling during the year at a glance. Also the agency by which felled and whether these removals fall within the prescription suggestions or neither of the working plan.

An abstract of Technical order No. 11 regarding filling of control forms is worth while to reproduce here.

(i) Separate control forms will be prepared for each Working Circle, main fellings, thinnings etc,
(ii) Control form 2a will be prepared by Working Circle using separate sheet for each.
(iii) All entries in form 2a will be made under three main heading.
(a) Prescriptions of the plan
(b) Suggestions of the plan
(c) Neither Prescribed nor suggested in the working, plan

Against the tree removed the agency of removal should be quoted as under:

Government, Agency	a
Purchasers	b
Free grantees	c
Right holders	d

The forests which have been fully worked will only be entered in the forms after the working is over.

11.1.2

The removal of yield under, volume control will be entered in form 2 (a) as follows:

Control Columns 1-6

The first entry will be in red ink, will show the deviation (+ or -) if any, brought forward from deviation column of the previous year. Column 1 will show the year from which carried forward, column 2-4 the periodic block and forest and column 6 the volume of trees. Under the same columns 1-6, and below the red entry will be the entry for prescriptions for the year in black ink. The entry under column 8 will show the volume to be removed during the year.

11.1.3 Annual yield

In the result columns, column 7 will show the year of working, 8.9.10 will show the forest and compartment with their area which have been worked and column 11 will show the species wise, number and volume of trees removed and the entries will be totaled below. for this purpose column 11 will be enlarged to show various species etc. column 12 will show the deviation between the totals of columns 6 and 11 i.e. annual yield and the yield removed as (+) or (-) deviation. The remarks column will give the authority for deviation if the same is outside the limit prescribed in the working plan.

(iv) In case of thinning if the marked trees are reserved for right holders the area should be entered in the control forms even if the trees have actually not been removed and explanation given in the remark column. The marked trees be shown as removals under relevant columns.

(v) Similarly, if a compartment has been gone over in thinnings, it should be shown as worked even if no trees have been removed on account of the area being already open. A remark to this effect should be made under the remarks column.

(vi) In case of an advance felling, it will be shown as entry in the deviation column 12, if the prescription has fully been carried out. However, if the felling remains incomplete, it will be shown *as* minus entry in deviation column. In the following year it will be shown as usual in red ink in columns 1-6 and 6.9,10 as s (+) entry in deviation column. In subsequent years it will continue to be shown in red ink in columns 1-6 and as (+) entry under colun 12 till its actual year of prescription with remarks under last column. In the year of prescribed fellinfg this entry will automatically disappear.

(vii) The paragraph of the working plan be quoted in case of prescriptions or suggestions under column for the year of working.

(viii) For calculating the volume of trees same volume factor will be used as used for calculation of yield.

(ix) All fellings including petty fellings of controlled species and classes will be entered in the form 2(a).

(x) Prior approval for all fellings neither prescribed nor suggested in the plan will be obtained by the DFO from Principal Chief Conservator of Forests through his Conservator and quote the authority under remark column.

(xi) All other deviations from the prescriptions of the Working Plan i.e. deficit fellings, alteration of the year of felling, writing off or abandonment of arrear fellings etc. will be sanctioned by territorial conservators after obtaining previous concurrence of the Conservator Working Plans and quote his authority in the remarks column while submitting the control forms to Principal Chief Conservator of Forests.

(xii) Sanction to deficit felling be renewed every year and quoted in the control forms until the end of the period when there is periodic control of yield.

(xiii) Control forms 4

This form is to be prepared under standard heading of

(i) Prescript-ions of the plan (quoting para)

(ii) Suggestions of the plan (quoting para)

(iii) Neither prescribed nor suggested.

The entries will be made by budget sub headwise distinctly for new works and repairs, in case of road paths, buildings, maintenance of compounds and departmental firing etc.

(xiv) Control form 'C' will be prepared on the saint heading as contained in the C.H. files for watching the progress of regeneration along with Regeneration survey Report.

(xv) The controls forms will be submitted in duplicate to the Conservator Working Plans for scrutiny and approval and for counter signatures of the Pr. Chief Conservator of Forests.

(xvi) The control forms duty completed and signed by the DFO will be submitted to the Territorial Cultivator by 15th May every year together with (i) a deviation statement (ii) a certificate to the effect that all compartment history files are fully posted to date and the annual control forms for the year agree with the entries in the compartment history files and (iii) a note on progress of operations prescribed in the working plan.

(xvii) After the scrutiny and after removal of all objections raised by Territorial C.F. the control forms will be submitted to Pr. CCF for approval through C.F. Working Plans. An approved copy of the control form will be retained by DFO as permanent record.

11.1.4 Deviation Statement

A consolidated statement of deviation be prepared and submitted to the Pr. CCF along with the control forms and explanations for the deviations.

11.2 Plantation Journals and C.H, Files

It is pity to see the C.H. files and plantation journals not properly filled in and brought upto date. These two records are most important document as they bring out the various operations undertaken in any forests and also show the amount of money spent. The result of the operations carried out and their efficiency in getting the desired result can only be watched if these are properly and correctly filled in upto date. It is suggested that the C.H. files be filled in every year and be signed by the person giving a certificate that all the entries of the operations/removals during the year have .been filled correctly. In case these are found wrong some punitive action should be initiated against the defaulter. The Range Officer should be squarely held responsible for completion of the C.H. files and plantation journals.

All the inspection notes of superior officers be promptly filed in the C.H. files and plantation journals.

11.3 Nursery Journals

At, present the nursery journals are not prepared on proper lines and forms. The nursery record is a basic record and should be maintained on proper forms and registers showing various operations like sowing, watering, weeding, manuring, spraying of insecticides etc. and the number of plants in the nursery should be recorded at least every month giving their average age and height species wise. Half yearly nursery returns sent to the DFO should tally with the entries in the nursery Journals. Similarly

detailed account of distribution of plants to various plantation areas and public should also find mention in proper form. The details of the forms for nursery journal is found in Punjab Forest Manual Vol.III as adopted by the State.

11.4 Boundary Register

At present the boundary register of the forests in Seraj Division is not available. The same should be reconstructed from old records. The copy of the boundary records should be available with the Range Officer and the Divisional Office.

11.5 Register of books and maps

Register of books and maps will be maintained in the Range office and Divisional office. All roads, buildings, paths etc. constructed during the year should be shown in maps every year.

11.6 Register of Reserved and Demarcated Forests

The register of reserved and Demarcated Forests will be properly maintained and all changes in area or boundaries recorded every year giving reference of government orders and notifications.

11.7 Register of Roads and Buildings

The register of roads and buildings will be maintained both in the Range and Divisional office and kept upto date. All roads and buildings contracted during the year shall be entered along with the cost of construction every year.

11.8 Fire Records

A complete record of fires will be maintained at Range and Divisional level maps showing the forest area affected by the fire along with all relevant details will also be placed in the C.H. files. The Divisional office should have a fire map brought upto date and hung on the wall.

11.9 Beat maps and Beat Manuals

Every territorial Beat Guard should have Beat Maps and Beat Manuals with him which provides complete information about the field. The Beat Manuals should be got printed in sufficient numbers and supplied to each official. The map should be on 16"=1 mile scale or at least 4"=1 mile scale showing the location of boundary pillars about the forests, boundary record and the fellings and other operations undertaken.

The Best maps and manuals should be checked by the DFO and superior officers while on tour.

Similarly the Block Officer must have all the information about his Block regarding forests and works and kept upto date.

It is really very shameful when a Beat Guard does not know the location of the boundary pillars. In such cases what kind of protection of forests can be expected of such and official.

It is proposed that untrained staff should never be posted in a territorial Beat, Block or Range. In case where it is unavoidable a short duration orientation course on forest, its boundary, and the Silviculture must be provided to the officials before posting.

There will be maintained a Range map showing all P.B.I areas and areas taken up for regeneration.

11.10 Divisional Note Book

A divisional note book will be maintained in the Divisional office which should contain the following information: -

i) Auction results

ii) Out turn of various coupes.

iii) Results of experiments carried out.

iv) Results of species tried in different plantations and result achieved.

v) Record of experiment lots and seed trees:

vi) Annual consumption of timber for T.D. and packing cases,

vii) Any other information as ordered by C.F.

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CHAPTER – XII
SUMMARY OF PRESCRIPTION

The following is the summary of Prescription: -

Heading	*Prescription*	*Paragraph*	*Page*
	DEODAR/KAIL WORKING CIRCLE		
Silviculture system	"Punjab Irregular Shelterwood System" in which natural regeneration will be supplemented with artificial regeneration.	2.9	144
Regeneration period	30 years	2.11	144
Rotation (Exploitable diameter conversion period)	Exploitable diameter is 60 cm d.b.h. and rotation has been fixed as 120 years	2.12	144
Division into periodic blocks	Four periodic blocks have been formed	2.14	146
Calculation of yield	Yield has been calculated by volume for PBI and PBIV	2.16	147
Prescribed annual yield	The prescribed annual yield in m^3 is as under	2.16.10	149

Species — Final yield in m^3 Inter yield in m^3

	PBI	PBIV	PBIII	Total
Deodar	6000	1000	-	7000
Kail	2500	800	-	3300
Spruce/Fir	1220	590	-	1810
Chil	70	30		100
Total	**9790**	**2420**	-	**12210**

Yield		G.S.	P.B's					Area
Prescribed Yield	Yield by Vonmental's formula		P.B.I	PBII	PBIII	PBIV	Total	In ha.
12210	5663	257092.86	9790	-		2420	12210	3393.08

Control of yield	Control of yield for a period of 5 years and plan period to be +- 10%	2.17	155
Method of Executing fellings in PBI	General Principles laid down	2.18	156
Treatment of area PBII	No communication fellings prescribed	2.18.2	158
Method of executing fellings in PBIII	General principles laid down with thinning prescribed	2.18.3	158
Method of executing fellings in PBIV	General principles laid down	2.18.5	159
Subsidiary siliviculture operation in PBI	Works as per general principles	2.19	159-160
Artificial regeneration in PBI	Carried out to supplement natural regeneration	2.20	160
Right holders requirement	Requirement to be met with as per Settlement	2.27	162
Fire protection	Area to be protected from fire	2.28	162-163
Regeneration Survey	Regeneration survey of felled PBI area to be	2.29	163

	carried out every year on 1:3960 scale for assessment of the progress of regeneration						
	FIR WORKING CIRCLE						
Silviculture system	"Punjab Shelterwood System" in which natural regeneration will be supplemented with artificial regeneration.					3.7	185
Regeneration period	30 years					3.9	185
Rotation (Exploitable diameter conversion period)	Exploitable diameter is 60 cm d.b.h. and rotation has been fixed as 120 years					3.10	185
Division into periodic blocks	Four periodic blocks have been formed					3.12	187
Calculation of yield	Yield has been calculated by volume for PBI					3.14	191-192
Prescribed annual yield	The prescribed annual yield in m^3 is as under					3.14.3	193
Species	Final yield in m^3 Inter yield in m^3						
	PBI	PBIV	PBIII	Total			
Spruce	5800	13900	-	19700			
Fir	6600	13200	-	19800			
Total	**12400**	**27100**	-	**39500**			
Yield	G.S.	P.B's				Area	
Prescribed Yield / Yield by Vonmental's formula		P.B.I	PBII	PBIII	PBIV	Total	In ha.
39500 / 17569.35	1054171.8	12400	-	-	27100	39500	4734.03
Control of yield	Control of yield for a period of 5 years and plan period to be +- 10%					3.15	196
Method of Executing fellings in PBI	General Principles laid down					3.16	197
Treatment of area PBII	No communication fellings prescribed					3.17	198
Method of executing fellings in PBIII	General principles laid down with thinning prescribed					3.17	198
Method of executing fellings in PBIV	General principles laid down					3.17	198
Sequence of fellings	Fellings programme has been laid					3.11	185
Subsidiary siliviculture operation in PBI	Works as per general principles					3.18	198
Artificial regeneration in PBI	Carried out to supplement natural regeneration					3.19	198
Miscellaneous regulations	Effective closure of all PBI areas prescribed					3.21	200
Right holders requirement	Requirement to be met with as per Settlement and new T.D. policy of H.P.					3.22	200
Fire protection	Area to be protected from fire					3.24	200
Regeneration Survey	Regeneration survey of felled PBI area to be carried out every year on 1:3960 scale for assessment of the progress of regeneration					3.25	200
	PPROTECTION WORKING CIRCLE						

Method of treatment	Defined	5.8	209
Grazing	Defined	5.11.2	211-212
	MISCELLANEOUS REGULATION		
Petty felling	Petty felling has been defined	10.1	241
Deviation	Deviation defined and regulation made regarding the same.	10.2	241
Demarcation & Survey	Checking of boundaries of the demarcated forest with the help of their maps and preparation of boundaries registers has been prescribed survey and demarcation of un-demarcated forest has been suggested.	10.3	241
Forest Boundary	A quinquential programme for checking of forest boundaries has been prescribed.	10.4	241-242
Road /Bridle Path/contour path and inspection path	Maintenance suggested	10.5.1 and 10.5.2	242-243
Building	Suggested added	10.5.3	243
Nautors & Encroachments	Total restrictions to be there Speedy ejectment required	10.5.5	264
Meteorological data	Rain/Snow gauges suggestions	10.5.9	244
Miscellaneous i.e. Research and sample plots, Looping, monumental trees, Temples groves, Fire Protection	Listing up of genetically superior trees suggested preservation and listing required No fellings to be allowed from here, Fire lines, fire watchers employment etc.	10.5.10 to 10.5.14	245
	CONTROLS & RECORDS		
Control forms	Maintenance of control forms for fellings subsidiary operation and regeneration works suggested.	11.1.1	246
Deviation statement	Summary of Deviation be to submitted along with the control form.	11.1.4	248
Compartment history file	Proper maintenance and up-dating prescribed.	11.2	248
Plantation journal and other forms i.e. Register of Book & maps. Register of reserve and demarcated forests. Register roads and buildings, fire records, divisional note book, forest guard beat manual	To be maintained	11.2 to 11.10	248-250

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FOREST DEPARTMENT HIMACHAL PRADESH
WILD LIFE WING

No. WL/ Working Plan/ 7682

Dated, Shimla-1, the/ 21/2/13

From: PCCF (Wildlife) HP. To: DFO Seraj

Subject: Draft revised Working Plan of Seraj Forest Division.

Memo:

Reference your office memorandum No. 7550 dated 22.01.2013 on the subject cited above.

2. The draft of chapter-VII of working plan of Seraj Forest Division has been vetted/ approved.

21/2-

Principal Chief Conservator of Forests,
(Wildlife)- Cum-CWLW HP Shimla-1.

25/2/13

भारत सरकार
पर्यावरण एवं वन मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FOREST

सत्यमेव जयते
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NORTHERN REGIONAL OFFICE
BAYS NO. 24-25, SECTOR 31-A
DAKSHIN MARG, CHANDIGARH-160030

F. No.13-7(16)/97-ROC

Dated: Wednesday, January 22, 2014

To

The Principal Secretary (Forests),
Government of Himachal Pradesh,
Department of Forests,
Civil Secretariat, Shimla,
Himachal Pradesh.

Sub.: Approval to the Working Plan of Seraj Forest Division, Himachal Pradesh for a period of 15 years w.e.f. 1st April, 2013 to 31st March, 2028 *-regarding*

Ref: Letter No. WP/Mandi/2054 dated 17th December, 2013 of Addl. PCCF (Working Plan & Settlement), Mandi, HP

Sir,

The Working Plan for the forests of **Seraj 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 orders in this respect shall be strictly enforced;
c) Yield obtained from dead, dry & salvaged timber will form part of prescribed yield and in case prescribed yield has been achieved from dead & dry and fallen timber, 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 complied with;
e) Intensive protection measures against fire, biotic interference and encroachment in forests shall be taken up;
f) All 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 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 validity of this Working Plan.

3. *The following suggestions/observations may be incorporated in the final print of the Working Plan Document:*

(i) At p. 35, information on timber ditribution granted should be updated upto March 2013;
(ii) At p.38, salvage removals be updated upto 2012-13;
(iii) At page 54, sub-heading "II-A, "Forest Flora" and at page 67, sub-heading II-B, "Forest Faunn" be added;
(iv) In part-II, Chapter-1, page 139, the name of Working Circle should be written as "Non-Timber Forest Produce (overlapping) Working Circle";

(v) At page 142, the period of Mid-term Review (2018-19) be mentioned;

(vi) Reference of the letter of CWLW vetting the chapter on forest fauna and Wildlife Management (overlapping) Working Circle be given in the Wildlife Management Working Circle;

(vii) At page 250, there is no need of separate chapter on Wildlife and its Management when there is a Working Circle (overlapping) on this issue/subject;

(viii) The maps of various ranges in colour should also be incorporated;

(ix) There is need to improve the contents of executive summery. Information may be given in narration form *(in four to five pages)* which should also include gist of prescriptions/activities to be undertaken during the Working Plan period;

(x) The long tables should be given as annexures (for e.g list of gujjars on pages 39-47, human and cattle population on pages 50-52, fire damage on pages 55-56, labour rates 100-105, PCA cases on pp-261-264, etc.);

(xi) On pages 83-85, the proposed rates of permit fee for forest produce for the year 2013-14 have been given. It is expected that by now, the Government would have notified the new rates. If so, the same may be given as notified and as a annexure;

(xii) Under chapter-**Five Year Plans**, the details of schemes (state/central sector) being implemented in the Division may be given;

(xiii) The botanical names, wherever appearing in the document, should always be given in italics or underlined as per the standard nomenclature norms;

(xiv) There is much need for making improvements in English language of the document;

(xv) In the text wherever a reference is be made to an appendix, its page number (s) should also be mentioned as it is not possible to locate some of the appendices being too long;

(xvi) Further in the appendices, below each appendix, page number of the text where it has been referred to, should also be mentioned so that time is not wasted in locating the same in the text. As some of the annexures are too long, top right hand side of each of the page of the annexure may show the annexure number;

(xvii) The pages in the volume II have not been serially numbered. The same should be done;

(xviii) Copy of this approval letter should be incorporated in the document;

(xix) Copy of the final document should be forwarded to his office for record; and

(xx) Soft copy of the working plan may be copied in a Compact Disc and kept inside the back cover of each copy of the final document and may also be uploaded on the website of the Department.

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, Seraj Forest Division, Kullu, HP.
5. Guard file.

B S Vasu IFS

Working Plan Officer Seraj

C F Working Plan & Settlement

(K D SHARMA) IFS
CF Working Plan Mandi

(Dr. Tejinder Singh) IFS
APCCF Working Plan & Settlement Mandi

(R.K. GUPTA) IFS
Pr CCF H P Shimla (HOFF)

D.F. Kullu
(G.S. NEGI) IFS

Deputy Commissioner (RAKESH KANWAR) IAS
Kullu (Rakesh Kanwar) IAS