GOVT. OF HIMACHAL PRADESH

FOREST DEPARTMENT

REVISED WORKING PLAN
FOR THE FORESTS OF
KOTGARH FOREST DIVISION
(2012-2013 TO 2026-2027)

VOLUME-I

(Part-I and Part-II)

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CONTENTS

INTRODUCTION

1. This working plan revises R.K.Kapoor of Kotgarh and Rampur Forest division respectively
2. It covers the area of working plans under revision as under :-

   Shri R.K.Kapoor = 53826.10 ha.

3. The revised plan deals with R.Fs , D.P.Fs and U.P.Fs
4. Geographical Area = 27090 ha.
5. Range wise breakup of the forest area is as under :-

RANGE WISE AREA

Sr. No.	Name of Range	Reserved Forests (in Ha.)	Demarcated Protected Forests (in Ha.)	Un-demarcated Protected Forests (in Ha.)	Total (in Ha.)
1.	Kotgarh	570.62	3917.59	1480.37	5968.58
2.	Kumarsain	-	4356.84	2753.86	7110.70
	G. Total	**570.62**	**8274.43**	**4234.23**	**13079.28**

6. The following new Working Circles have been added for the first time :-
   (i) Non Timber Forest Produce (over lapping) Working Circle
   (ii) Joint Forest Management(overlapping) Working Circle
   (iii) Soil & Water conservation (overlapping) Working Circle
   (iv) Wildlife Management (overlapping) Working Circle
7. The revenue record of R.Fs, D.P.Fs and U.P.Fs was reconciled and detail has been given in Chapter-I of part - I of the plan.
8. The PWPR was written by Rajesh J Ekka (I.F.S) C.F.Rampur.
9. PWPR has been approved by A.P.C.C, F.Central Chandigarh vide letter No. 13-7(1)/97-Rec/1678 dated 28-02-2012.
10. The effort has been made to prepare a Working Plan based upon latest technique of inventory analysis and application of computer for analysis of data.
11. The work of division of this working plan was undertaken in December, 2011 and was completed in a period of about four Months. It is expected that prescription of this working plan shall help in continuation of the process of forests conservancy.

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GLOSSARY OF BOTANICAL TERMS

(A) TREES		

Local Name	English Name	Botanical Name
Tosh	Silver fir	*Abies Pindrow*
Khair	Cutch tree	*Acacia Catechu*
Parang	Himalayan maple	*Acer Oblongum*
Rikhandlu	Painted maple	*Acer Pictum*
Rikhandlu	Tail leaf Maple	*Acer Caudatum*
Khanoor	Horse chestnut	*Aesculus Indica*
Siris	Lebbek-tree, fry-tree, flea-tree	*Albizzia Lebbek*
Kachnar	Budhist bauhinia, Mountain Ebony, Orchid tree	*Bauhinia variegata*
Semal	Cotton wood tree	*Bombax Ceiba*
Dhak	Flame of forest	*Butea Monosperma*
Amaltas	Indian laburnum	*Cassia Fistula*
Toon	Indian Mahogany	*Toona Ciliata*
Deodar	Cedar	*Cedrus Deodara*
Khirak	European nettle tree	*Celtis Australis*
Saru	Himalayan cypress	*Cupressus Torulosa*
Banshahri	Turkish Hazel	*Corylus Colurna*
Japani Saru	Japanese cedar	*Cryptomeria Japonica*
Tali	Shisham	*Dalbergia Sissoo*
Bans	Bamboo	*Dendrocalamus Strictus*
Pippal	Sacred fig	*Ficus Religiosa*
Biul		*Grewia Oppositifolia*
Kanderu	Himalayan Holly	*IIex Dipyrena*
Pula		*Kydia Calycina*
Akhrot	Walnut	*Juglans Regia*
Jhingan	Indian ash tree	*Lannea Coromandelica*
Chirindi		*Litsea Umbrosa*
Kamela	Monkey puzzle tree	*Mallotus Philippinensis*
Aam	Mango	*Mangifera Indica*
Toot	Mulberry	*Morus Alba*
Drek	Persian lilac	*Melia Azedirachta*
Kahu	Indian olive	*Olea Cuspidata*
Sandan		*Ougeinia Oojeinensis*
Rai	Spruce	*Picea Smithiana*
Kail	Kail	*Pinus Wallichiana*
Chil	Chir-pine	*Pinus Roxburghii*
Pahari papal	Hill poplar	*Populus Ciliata*
Chulli	Wild apricot	*Prunus Armenniaca*
Jaman	Sour cherry	*Prunus Cerasus*
Jaman	Himalayan Bird cherry	*Prunus Cornuta*
Aaroo	Wild apricot	*Prunus Persica*
Kainth	Wild Himalayan Pear	*Pyrus Pashia*
Mohru	Moru Oak	*Quercus dilatata*
Bani	Ring- cupped Oak, Japanese	*Quercus Glauca*

	Blue Oak or Glaucous-leaf Oak	
Ban	Bluejack Oak	*Quercus Leucotrichophora*
Kharsu	Brown Oak	*Quercus Semicarpifolia*
Baras	Rhododendron	*Rhododendron Arborium*
Tung	smoke tree	*Rhus Cotinus*
Pahari Kikar	Black locust	*Robinia Pseudoacacia*
Majnu	Babylon Willow	*Salix Babylonica*
Biuns	Violet Willow	*Salix Daphnoides*
Bhashal	Elegant willow, Dwarf willow	*Salix Elegans*
Ritha	Soap-nut tree	*Sapindus Mukorossi*
Thuna	Yew	*Taxux Baccata*
Marn	Kashmir Elm	*Ulnus Wallichiana*
	(B) SHRUBS	
Basuti	Malabar nut	*Adhatoda Vasica*
Ram ban	Century Plant	*Agave Americana*
Charmar		*Artemisia Vulgaris*
Bans		*Bambusa Arundinarea*
Kasmal		*Berberis Aristata*
Kasmal		*Berberis Lycium*
Karonada		*Carrisa Spinarum*
Gangara		*Coriaria Nepalensis*
Chhunchhunu		*Crotoleria Albida*
Reuns		*Cotoneaster Bascillaris*
Chamrol		*Cotoneaster Microphylla*
Kathla		*Cyathula Tomentosa*
Kaula		*Daphne Papyracea*
Murt		*Desmodium Tiliaefolium*
Philru		*Deutzia Corymbosa*
Shuru		*Euphorbia Royleana*
Kathi		*Indigofera Gerardiana*
Kathi		*Indigofera Trifolliata*
Chameli		*Jasminum Officinale*
Guggal		*Juniperus Communis*
Tiknoi		*Lonicera Orientalis*
Pand		*Loranthus Vestitus*
Chhichhri		*Plectranthus Coetsa*
Jangli palak		*Polygonum Chinesis*
Bhekhal		*Prinsepia Utilis*
Gulab		*Rosa Macrophylla*
Gulab		*Rosa Sericea*
Karanoi		*Roylea Calycina*
	(C) HERBS	
Hinsar		*Rubus Ellipticus*
Tiliari		*Saracococca Saligana*
Kongtri		*Spiraea Lindleyana*

Machin		*Strobilanthus Wallichii*
Loe		
Bana	Five-leaved chaste tree	*Vitex Nagundo*
Dhau		*Woodfordia Fruticosa*
Beri		*Zizyphus Oxphylla*
(D) CLIBMERS		
Agla		*Acacia Pennata*
Taur		*Bauhinia Vahali*
Garol		*Clematis Monotana*
Saragbali		*Cusauta Reflexa*
Kural		*Dioscorea Deltoides*
Mithiari		*Hedera Helix*
Balgulab		*Rosa Monschata*
Ushwa		*Smilax Niveus*
Panibel		*Vitis Parvifolia*
(E) GRASSES		
		Bothriocloa Pertusa
		Brachiaria Villosa
		Brorus Spp.
Dhalu		*Chrysopogon Mantanus*
Dub		*Cynodon Dactylon*
		Dicanthium Annulatum
		Festucapratensa
Lamb		*Heteropogon Contortusa*
		Phalcaris Tuberosa

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LIST OF COMMON ANIMALS AND BIRDS

Local Name	English Name	Scientific Name
MAMMALS		

	Spotted Deer	*Asix Medius*
	Barbos telio bat	*Barbastella Barasetellus*
	Jackal	*Canis Aureus*
	Wolf	*Canis Pallips*
	Hog deer	*Cervuo Oryzeus*
Kakar	Barking deer	*Cervus Aureus*
	Himalayan warmot	*Farmota Roback*
Jangli billi	Common jungle cat	*Felis Chaus*
Bagh	Leopard	*Felis Pardus*
	Large tiger cat	*Felis Viverrina*
Neola	Common Mangoose	*Hepestes Edwardsil*
	Haena	*Hyeona Straite*
Sehi	Indian Porcupine	*Hystrix Indica*
Khargosh	Common Indian Hare	*Lepus Indicus*
Bander	Monkey	*Macac Malatta*
	Hill mouse	*Mos Homourus*
Kastura	Musk deer	*Moschus Moschiferus*
Goral	Forest Goat	*Nemorhaedus Bubalina*
	Himalayan Goat	*Nemorhaedus Goral*
	Indian mole rat	*Nesekia Indica*
Koryal	Brown flying squirrel	*Peeromys Petaurista*
Guni	Common languor	*Presbytis Entellus*
Jarao	Sambar	*Rusa Aristotelis*
	Common striped squirrel	*Sciurus Palmarum*
Bhalu	Himalayan black bear	*Selenaretos Tibetanus*
	Wild Pig	*Sus Indicus*
Lomari	Indian Fox	*Vulpes Bengalensis*
BIRDS		
	Tree Pipit	*Aathus Tribialis Haringtoni*
		Accipter Risus
	Common Myena	*Acriditheres Tristic*
Chakor	Chakor partidge	*Alectoris Graeca*
	Pintaill	*Anas Acuta*
	Common Teal	*Anas Creca*
	Barheaded Goose	*Anner Indicus*
	Golden eagle	*Aquila Chrysactus*
Peora	Hill partidge	*Arborophila Torqueola*
Tuti	Beautiful Rose finch	*Caropdanlus Erythrinus*
Cheer	Cheer Pheasant	*Catreous Wallichii*
	Brown dipper	*Cinclus Pallaiitenuirostris*
	Pied Crestedcuckoo	*Clamator Jacobinous*
Safed malya	Snow Pigeon	*Columba Leuconta*
Kabutar	Blue Rock Pigeon	*Columba Livia*
	Hill Pigeon	*Columba Rupestris Turkestanica*
	Estern Soock Pigeon	*Columba Lversmanni*
Kawa	Jangli Crow	*Corvous Macrophynchos*
	House Crow	*Corvous Splendens*

	Himalayan tree creeper	*Crethia Himalayana*
	Cuckoo	*Cuculus Cqnorus Aureus*
	Scooted Porktail	*Encurus Maculatus*
Kalatiter	Black partidge	*Francolinus*
Jungli murghi	Red Jungle fowl	*Gallus Ferrugienes*
	Collared Pygmy owl	*Glaucichium Prodied*
Gidh	Himalayan Griffon	*Gyps Himalayensies*
	Black Bulbul	*Hypsiyetes Mandagascriensis*
Gunguria	Snow partidge	*Lerwa Lerwa*
Monal	Impeyan Pheasent	*Lohhophorus Imprejanus*
Kala murga	White crested	*Lopure Leucomelana*
	Great hill barbet	*Megalaima Virens*
	Masked Wagtail	*Metecilla Abla Persouted*
	Black kitw	*Milvus Migrans*
	Grap Wagtail	*Motacilla Caspica*
	Sooty fly catches	*Muscicapa Ceylonesis*
	Purple sun bird	*Nactrainin Asiatica*
	Egyptiarur Scavener volture	*Neophhron Perconopters*
	Spoted scop own	*Otus spiloconopters*
	Brown crested tit	*Parus. D. Chorus Kanfrae*
	Green backed tit	*Parus Monticolus*
	Black Spooted tit	*Parus Xanthogenys*
Gauriyya	House sparrow	*Passer Domesticus Indicus*
	Pea- fowl	*Pavo Cristatus*
	Yellow throathed sparrow	*Petronia Xasshocollis*
	Dull green warbles	*Phylloscopus Trochiloides*
	Peoki	*Picus squamatus*
	Blossom headed parakeet	*Psitt Acula Cyanocephala*
	Slaty Headed	*Psittacula Himlayanas*
Kokla	Koklas pheasant	*Pucrasia Madrolopha*
	Kestrel	*Salco Tinnunclus*
	Crested serpent eagle	*Spilornis Cheela*
Chitter fakhta	Spooted dove	*Streptopeliachi Neusia*
	Quail	*Sussumier*
Harial	Weete tailed green pigeon	*Treron Sphennra*
	Little bus fard	*Trunix Sylvatica*
	Kaleej	
	Parakeet	
	Csallu bellied green wood	
REPTILES		
Chhipkali	Rock Lizard	*Agamo Tuberculata*
Sapp	Himalayan pit viper	*Ancistrodous Himalayanus*
Krait	Common Indian Krait	*Bungarus Caerules*
Chhipkali	Common House Geeko	*Hemidactylus Brooki*
Nag	Indian Cobra	*Naja Naja*
Dhaman	Rat snake	*Pyyas Mocosus*

	Blood sucker	*Techydrmous species*
Chhipkali	Common Indian Monitor	*Varanus Minitor*

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PART - I

Summary of facts on which proposals are based

CHAPTER I

THE TRACK DEALT WITH

1.1 NAME AND SITUATION

This working plan deals with the Reserved Forest, the Demarcated and Un-demarcated Protected Forests of Kotgarh Forest Division, Distt. Shimla, H.P. The forests which have been covered are in Kumarsain & Kotgarh Ranges of Kotgarh Forest Division. The total Geographical area of the tract is 27090 hac. The whole tract drains into river Sutlej except Shilaroo Block of Kotgarh Range which drains into river Giri. The tract lies between latitude 31^0 -8'-40" to 31^0 -42-'50" North and longitude 72^0-18'-50" to 77^0-58' East.The head quarter of the division is at Kotgarh.

1.2 CONFIGURATION OF THE GROUND

The tract is hilly with altitude varying from 730 mtrs at Pandoa, to 3215 mtrs at Hattu Peak. All types of variations in slopes and aspects are met with in the tract. However the aspects mostly vary from north-east to north-west in Sutlej catchment and south-west to north-west in Giri catchment. The slopes vary from moderate to steep and precipitous etc.

1.3 GEOLOGY AND ROCK

The tract lies in inner western Himalayas and consists of metamorphic rocks mostly micaceous schists and chloritic schists with gneiss, granite, phyllites, slates, shale and quartzite. The rocks of Bhaira, Swera & Kingal basins are mostly micaceous schists and gneiss without crops of slate rock or quartzose shale. Some limestone and conglomerate are met with in Sangri area on western boundary, Upper shale limestones from the summit of Nagtikkar hill. The off-shoots from the main Hasbeshan-Narkanda ridge run south to north and are generally of gneiss and schists.

1.4 SOILS

Soil types found in the areas are:-

i) **Forest Soil :-** Forest Soil is mainly of two types namely Acidic Soil with low base status and Neutral Soil with high based status. Forest Soils are by and large rich in humus**.**

ii) **Alluvium Soil: -** At very few places in this tract, this type of Soil is found mostly along the river.Soil is rich in humus in Deodar and Fir Forest which hampers the natural regeneration.

1.5 CLIMATE

The climate is temperate but due to variation in altitude, the tropical climate is found in sub-mountainous areas at the base of the Satluj valley to alpine in the upper reaches. Semi-arctic conditions prevail in some portions. March to April and October to November are cool and bright. This tract is endowed with four distinct seasons: Spring, summer, Rains and winter. The spring season lasts from February to April in the lower valleys along the river where as on the higher altitudes it is in the month of April to June. The rains come during the summer in the last week of June and extend up to September. Snow fall starts from November and last till the end of March/April on higher altitudes.

1.6 TEMPERATURE

Due to greate variation in altitude the temperature also varies considerably. Minimum temperature goes down below 0°C degree during winter and maximum temperatrure exceeds 40°C in lower areas during summer.

Temperature data of Kotgarh is as under:-

Table 1.1

Temperature data of Kotgarh Station

		Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Average	max	8.7	10.1	10.1	14.0	22.4	20.5	16.1	17.3	14.6	17.5	14.3	10.4
	min	2.2	2.8	3.9	7.6	13.3	16.6	11.8	11.0	9.9	10.6	8.6	5.3

(Source: www.meoweather.com)

1.7 RAINFALL

The rainfall data of Kotgarh Forest Division for the year 1993 to 2011 is as under:

Table 1.2

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	103	57	139	11	31	NA	396.2	465	-	-	6	-	**1208.2**
1994	43.0	119	NA	82.2	110	110	282	220	49.1	6.6	-	28.7	**1050.6**
1995	41.3	126.6	62	-	9	34.6	327.6	206.9	161	5.6	NA	NA	**974.6**
1996	81.5	49.4	124	42	63	131	81.6	179	112.4	33	NA	-	**896.9**
1997	35	29.2	66	122.7	116.4	112.1	76.4	356.3	48.3	51.4	86.1	70.4	**1170.3**

1998	16.4	106	136	97	50	119	106	197	187	149	12	NA	**1175.4**
1999	51	55	-	NA	136	128	313	106	101	-	-	NA	**890**
2000	57	76	61	13	102	148	303	63	3	-	3	-	**829**
2001	5	14.5	76	38	66	192	177	48	7	-	4	11	**638.5**
2002	38	99	90	87	14	73	14	217	157	8	-	-	**797**
2003	32	72	111	61	13	88	229	220	67	-	8	38	**939**
2004	98	5	-	30	41	30	109	145	22	112	-	2	**594**
2005	50.5	141	2	-	40	160	368	49	119	-	-	-	**929.5**
2006	102	-	78	35	94	80	170	201	55	17	5	30	**867**
2007	0	129	196	0	52	57	160	259	89	2	Nil	30	**974**
2008	91	51	-	25	68	259	141	244	201	7	3	11	**1101**
2009	23	15	36	39	88	33	110	202	343	0	23	0	**912**
2010	12	8	15	15	41	181	340	249	166	39	NA	NA	**1066**
2011	3	36	108	3	6	252	204	330	207	36	0	15	**1200**

(Source: Deptt. of Meteorology,Shimla)

Table 1.3

RAINFALL STATISTICS

S.N	Month	Average Rainfall (mm)		Average number days
		Daily	Monthly	
1	January	0.1	3	3
2	February	1.2	36	3
3	March	3.6	108	4
4	April	0.1	3	3
5	May	0.2	6	5
6	June	8.4	252	5
7	July	6.8	204	12
8	August	11	330	11
9	September	6.9	207	6
10	October	1.2	36	1
11	November	0	0	1
12	December	0.5	15	2

(Source: Deptt. of Meteorology, Shimla)

1.8 WATER SUPPLY

The whole tract is covered with spellings khuds. However, the quantity of water in each varies with the intensity of rainfall in their catchments. It is maximum in the month of July to September and minimum in May-June.The main perennial khuds are Sawara, Kingal, Pandoa (Bag), Kirti Khad and Bhaira Khad draining into Sutlej and Chagaonti Khad into Giri.

1.9 DISTRIBUTION AND AREA

The forests are not found in a compact belt, but are generally scattered. 86 UPFs have been converted / notified into DPFs during the period of working plan under revision. As per detail given in **Appendix-XVIII**. Out of 86 newly notified DPFs, 62 forests have been enterned in the revenue record and the remaining 24 forests are being enterned.Accordingly the revised range wise total forests are covered under this plan as classified into various legal categories is as under:-

Table 1.4

Sr. No.	Name of Range	Reserved Forests (in Ha.)	Demarcated Protected Forests (in Ha.)	Un-demarcated Protected Forests (in Ha.)	Total (in Ha.)
1.	Kotgarh	570.62	3917.59	1480.37	5968.58
2.	Kumarsain	-	4356.84	2753.86	7110.70
	G. Total	**570.62**	**8274.43**	**4234.23**	**13079.28**

1.10 STATE OF BOUNDARIES

The forests of Kotgarh Forest Division comprises of the forest from erstwhile Kumarsain, Kotgarh, Khaneti & Sangri. Although Reserved and Demarcated Protected Forests have been delimited on the ground with the help of main as well as intermediate boundary pillars constructed out of loose stone masonry and distances have been maintained / indicated between one Boundary / pillar and the other pillars and no magnetic bearings (Forward and Backward) were recorded for any pillar making it an very easy affairs for illegal encroachments. The position is still worse in respect of un-demarcated protected forests where the boundaries are simply indicated by the cultivation of particular village. Bushahr Forests were demarcated during the year 1884-87. This demarcation was revised by Mr. H.M. Glover, during 1916-21 at the time of revision of forest Settlement of Sutlej Valley, Forests of Bushahr State. Nagkelo reserved forest (the only reserved forest in Kotgarh Forest Division) of Kotgarh illaqa was demarcated during the year 1879-84 and is bounded by 181 boundary pillars. The included chak's were bounded by pillars much latter but are missing now and there is no record of such chak's on the maps. No forest settlement of Sangri State was ever done nor any record of rights prepared.

DPFs stand properly demarcated and mapped.The UPFse only roughly demarcated and mapped.The condition of B.Ps is not very satisfactory and these require proper and regular maintenance. Annual programme for checking and repair of B.Ps was proposed in the W.P

under revision.All the B.Ps could not be checked as per annual programme due to paucity of funds. However B.Ps checked / maintained during the period of expired W.P have been as under:-

Table 1.5

Repair of Boundary Pillars

Year	Kotgarh Range		Kumarsen Range		Total
	No. of B.Ps repaired		No. of B.Ps repaired		
	Small	Big	Small	Big	
1993-94	-	383	-	152	535
1994-95	-	62	-	100	172
1995-96	14	48	-	19	81
1996-97	-	73	-	81	154
1997-98	47	76	-	36	159
1998-99	40	35	65	134	274
1999-2000	-	245	49	202	496
2000-01	-	160	7	227	394
2001-02	-	-	46	26	72
2002-03	-	415	-	125	540
2003-04	60	146	-	62	258
2004-05	80	358	-	141	438
2005-06	78	459	-	136	673
2006-07	54	-	-	136	190
2007-08	6	398	-	148	552
2008-09	72	69	-	148	289
2009-10	--	46	-	131	177
2010-11	--	---	-	--	--
2011-12	17	88	17	88	210

1.11 LEGAL POSITION

As no forest settlement has been carried out of Kumarsain, Sangri & Khaneti, there is no change in the legal position, rights and concession in the forests. As such the legal position, rights and concessions as in last working plan are briefly described below: -

Prior to the integration of princely States in Himachal Pradesh on April 15, 1948, rulers of erstwhile Bushahr, Kumarsain, Khaneti, Sangri and Delath States were the owners of all types of land including demarcated as well as un-demarcated protected forests. After formation of Himachal Pradesh, the ownership of all demarcated as well as un-demarcated areas including pastures and ghasnies not assessed to land revenue vested in the Himachal Pradesh Government subject to the rights of users.

Kotgarh area was annexed by the then British Government as early as 1815 (at the conclusion of Gorkha war), when all land not assessed to land revenue became the property of the Government. Dehat Forests of Kotgarh area was managed by Revenue department and their control was transferred to Forest Department of Himachal Pradesh in 1960. Nagkelo Reserve Forest was demarcated some time between 1879-84 and declared as Reserved Forest vide Punjab Government Notification No. 175 dated April 15, 1885.as per **Appendix-XV.**

After the re-organization of forest department, Indian Forest Act, 1927 was made applicable in the newly formed State of Himachal Pradesh vide Govt. of India, Ministry of States, Notification No. 146-J dated December 6, 1950. Thereafter the provisions of Chapter-IV of Indian Forest Act, 1927 have been made applicable to all forest lands and wastelands in Himachal Pradesh, which are the property of Government or over which the Government have proprietary rights or to the whole or any part of the produce of the which the government is entitled as recorded in the forest settlements or land revenue settlements or land revenue records of the integrated States.

Rules under section 32 of Indian Forest Act, 1927 for the forests of erstwhile Bushahr State were notified vide Himachal Pradesh Govt. notification No. 43-241-A/49-2 dated February 25, 1952 according to which demarcated protected forests of erstwhile Bushahr State included in the Forest Settlement Report of H.M. Glover, were declared as first class protected forests. Management of the forests of erstwhile Kumarsain, Khaneti, and Sangri States was governed by Shimla Hills States forest conservancy rules sanctioned by the Governor in Council in letter of the Secretary to the Government of India No. 1789 dated May 21, 1885. New rules under Section 32 of Indian Forest Act, 1927 were, however,

framed and notified vide Himachal Pradesh Government Notification No. Ft.-43-241-A/49-3 dated February 25, 1952.

And whereas in T.N. Godavarman Thirumalpad V/s Union of India, the Supreme Court of India held that the Forest (Conservation) Act, 1980 must apply to all forests irrespective of the nature of ownership of classification thereof and it was further held that the word "Forest" must be understood accordingly to its dictionary meaning. This description covers all statutory recognized forests, whether designated as reserved, protected or otherwise for the purpose of Section 2 (i) of the Forest (Conservation) Act, 1980. Although neither formal notification to this effect has ever been issued by the H.P. Government nor the revenue entry has been made in revenue record under the H.P. Land Revenue Act, 1954.

1.12 RIGHTS AND CONCESSIONS

There is record improvement in the economy of area from cash crops such as apple.But the burden on the forest area is increasing day by day. The rights and concessions of different areas with regard to timber, fuelwood, grazing, lopping and slate quaarying are summarized as under:-

(i) TIMBER:-

Kotgarh: - For construction and repairs of houses at nominal rate fixed in 1885 except Nagkelo. This concession has also been granted to the residents of surrounding villagers but at reduced rates due to non availability of trees.

Kumarsain: - Free for cremation purposes and at nominal rates for domestic purposes.

Khaneti: - For construction and repair of houses and cattle shed at nominal rates.

Shangri: - At concession rates fixed by erstwhile state ruler.

(ii) FUELWOOD: - Through out, right to remove dry, fallen wood except deodar trees. Cutting of green shrubs and bushes also permitted.

(iii) GRAZING:-

Kotgarh: - In Nagkelo reserve the number of cattle is fixed, sheep and goats not permitted.

Kumarsain: - No recorded rights but in the absence of a regular settlement, ample grazing goes on.

Khaneti: - As in Bushahr. In addition buffalos, cattle, sheep, goats and ponies of nomadic Gujjars also permitted in Jamunda D.P.F. on payment.

(iv) LOPPING: -

Kotgarh: - No ban on lopping except Nagkelo reserve.

Kumarsain: - Lopping of all conifers prohibited and for oak it is allowed if the trees are over 45 cms. in girth upto half the height. On the other hand, there is ruthless lopping of conifers.

Khaneti: - Lopping of all broad leaved species is allowed. Lopping of Kail 90 cms. in girth is also allowed during the month of July and that too up to one fourth of total height of the tree.

(v) SLATE QUARRYING: - No such right is admitted in reserved forests but elsewhere it is admitted both for personal use and commercial sale as per forest settlement reports. But whereas in T.N. Godavarman Thirumalpad V/s Union of India, the Supreme Court of India held that no quarrying is to be allowed in forests without prior permission of the Government of India under Forest (Conservation) Act, 1980 for commercial sale purpose.

1.12.1 Grant of timber: - Timber Distribution (T.D.) is a unique policy in the colonial history of forest management. It is a policy that provides every landowner with the right to harvest timber for the construction and repair of their houses. This policy while providing for a basic need of the local population is also the single largest reason for timber harvest in the western Himalayan region. It results in the harvest of 15598.48 cubic meters of prime timber till recently before Hon'ble High Court while disposing a PIL directed the State Govt. to rationalize the

process as rates for T.D. were fixed at 20% of the market rates at the time of the initial forest settlements, for all species that had a market value at that time. Thus practically while the market rates had increased over 15,000 to even 88,000 times (in case of Fir), state used to charge the original rates till 2005. Since the timber was available at such dead cheap rates, most of it was also mis-used and was sold further at commercial rates.The annual quantity of timber given to right holders on right holder rates and free grant during the period 1993-94 to 2011-12 is as under:-

Table 1.6

Year	Deodar		Kail		Rai/Fir		Chil		B.L.	
	No.	Vol.	No.	Vol.	No.	Vol.	No.	Vol.	No	Vol
1993-94	362	1685.436	671	2723.213	50	228.870	36	81.865	-	-
1994-95	279	1052.928	469	1860.414	34	159.945	12	31.126	-	-
1995-96	99	355.708	455	1807.503	22	91.851	13	21.525	-	-
1996-97	533	1734.318	371	1549.714	69	225.73	38	56.164	-	-
1997-98	260	862.826	474	1655.256	16	59.883	30	56.184	-	-
1998-99	380	1340.081	1136	3917.81	51	179.285	6	20.423	-	-
1999-2000	332	1292.135	390	1290.681	23	110.032	12	24.669	-	-
2000-01	169	467.834	216	704.721	35	173.473	4	7.928	-	-
2001-02	128	440.128	198	722.422	11	59.653	20	28.154	-	-
2002-03	84	348.635	253	904.293	14	71.701	62	91.604	1	1.201
2003-04	222	884.129	318	1173.534	64	271.653	36	52.931	1	1.201
2004-05	279	1095.117	545	2475.161	130	592.583	52	78.32	-	-
2005-06	122	480.534	232	783.161	102	450.352	75	85.542	1	1.336
2006-07	27	111.528	105	470.865	25	106.613	2	2.956	-	-
2007-08	-	-	-	-	-	-	-	-	-	-
2008-09	-	-	-	-	-	-	-	-	-	-
2009-10	-	-	-	-	-	-	-	-	-	-
2010-11	-	-	-	-	-	-	-	-	-	-
2011-12	-	-	-	-	-	-	-	-	-	-

The state has recently notified H.P. Forest (Timber Distribution to Right Holders) Rules, 2010 for the rationalization of grant of timber which is enclosed as **Appendix-XVI.** The merits of TD rules 2010 as under:-

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

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

1. These Rules of TD have been integrated and unified for whole of the state.

2. Timber will be available in converted form and near to the place of residence of the people helping them in saving precious time and money during this schedule.

3. The rules are forest centered as well as right holder centered based on the guiding principles of HP Forest Settlement Rules, 1965 as indicated in point 3 which will help in conservation of forests and so also catering to the demand of TD to the present and future generations.

4. The periodicity and quantity has been made based on optional requirement so that forest remains and TD continues to be given in perpetuity.

5. Priority has been given to poor and needy (BPL) followed by other people who need wood in TD.

6. A detailed procedure for grant is enshrined in the Rules itself which is time scheduled for the year.

7. People have been empowered as the application for needy will start from the Gram Sabha.

8. The right holder now has to simply give application duly authenticated by the Gram Sabha of the Panchyat to the FG which will pass through the various Chanels of the Forest Deptt. and the applicants would get their converted TD at the earmarked depots between September to December.

1.13 NAUTOR LAND

As in the plan under revision no nautor lands are now given on forest land, after the enactment of the Forest (Conservation) Act, 1980.

1.14 THE FOREST (CONSERVATION) ACT, 1980

In the year 1980 a new Act was promulgated which has made it mandatory to seek permission of the Central Government for diverting any forest land for non forestry purpose. During 1997-1998 to 2010-2011 total 19.57.31 hac. UPFs forests have been diverted under the provisions of the Forest (Conservation) Act, 1980 and the details of the cases is as per **Appendix- XIV.** The general abstract is as under:-

Table-1.7

Type of	Number	Area Diverted in ha.	Total area

cases	of cases	R.Fs	D.P.Fs	U.P.Fs	Diverted (ha.)
Const. of road	15	0	0	18.46.81	18.46.81
Const. of Building	4	0	0	1.10.50	1.10.50
Total	**19**	**0**	**0**	**19.57.31**	**19.57.31**

1.15 ENCROACHMENTS

Encroachment is not a major problem in RF/DPF except in UPF's and others Government lands in the tract. Vide Government of Himachal Pradesh Notification No. 1-21/71 LSG dated 8th June, 1994 as per **Appendix-VII**, the DFO's in Himachal Pradesh have given the powers of collector under H.P. Public Premises Land (Eviction & Rent Recovery) Act, 1971 to deal with the cases of encroachment on forest land only. After the Act came into effect, in Kotgarh Forest Division a total of 147 cases of encroachment were detected / transferred from the revenue Courts have been decided under the Act and 385 cases received from the Tehsildar Kumarsain / Theog through R.O. Kumarsain / Kotgarh have returned back to the respective ranges since the applicants were wanted to regularized their encroachment land under the H.P. Regularization of encroachment on Government land & disposal of Government Land Rules, 2002. They have been directed that no forest land can be regularized without prior permission of Government of India under Forest (Conservation) Act, 1980 and further directed that now the matter is not come to an end, however the case for encroachment on forest land should be prepared after taking demarcation from Revenue authority and proceeding should be initiated under the H.P Public Premises Land (Eviction & Rent Recovery) Act, 1971.

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CHAPTER II

FLORA AND FAUNA

CHAPTER II A
Forest Flora

2A.1 TREES

The tract has rich history of flora both in variety and extent. The so-called all round development over the past has adversely affected the flora of the tract.The forests of the tract comprise of *Pinus roxburghii (Chil) Pinus wallichiana,(kail) Cedrus deodara(Deodar) ,Abies pindrow(Silver fir), and Picea smithiana(Spruce) as coniferous and Quercus incana (Ban) , Quercus dilatata (Mohru), Quercus semecarpifolia (Kharsu).* Besides a number of other trees are found in the tract, list of which is given in glossary.

The hills are usually devoid of these species below 800m of elevation except along the banks of the streams where scattered Shisham trees are found. Pure chil forests are found of western slopes, where as Chil mixed with ban is found on cooler aspects on elevations ranging from 800m to 2000m. However, on the left bank of river Satluj in 15/20 area the slips are mainly covered with grass land and Chil forests start comparatively from a higher elevation of about 1100m. Between 1500m to 2100m elevation there are some pure Ban oak forests of Northern slopes. Middle elevations are occupied mainly by deodar and kail while at high elevations from 2400m to 3000m spruce and silver firs are the predominant coniferous species. Higher up kharsu oak is found upto 3600m scattered as well as in extensive patches. Some birch mixed with kharsu oak is also found in the upper limits. Over 3600m elevation, trees are gradually replaced by scrubby growth of evergreens like Rhododendron (brass) species, ultimately merging into grass lands and finally to permanent snow line.

2A.2 GENERAL DESCRIPTION OF THE GROWING STOCK

The Forests of this tract have been classified as per "The Forest types of India" by Champion and Seth as follows:-

Dry Tropical Forests

Group 5 Tropical Dry Deciduous Forest.

Sub Group 5B Northern tropical dry deciduous forests.
5B/C2 Northern mixed deciduous forests.
5/IS2 Khair-Sissu forest.

Group 9 Sub-Tropical Pine Forests.

Group 12

Sub Group 12/C 1 Lower West Himalyan temperate forests.
12/C Ia Ban Oak Forests.
12/C 1b Mohru Oak forests.
12/C 1c Moist Deodar Forests.
12/C 1d Western mixed coniferous forests.
12/C 1e Moist temperate deciduous forests.
12/C 1f Low level blue pine forests.
12/C 1 /DS 1 Oak scrub.
12/C 2 Upper Broad leaved and coniferous forests.
12/C 2 a Kharsu Oak forests.
12/C b West Himalyan Upper Oak/fir forests.
12/DS 2 Himalyan temperate parkland.

Group **14 Sub Alpine Forests**.

Sub Group 14/C 1 West Himalyan sub alpine birth/fir forests.
14/C 1b Birch/fir forests.

Group **15 Moist Alpine Scrub**.
15/C Birch/Rhododendron scrub forests.

2A.2.1 Sub Group 5B/C 2 Northern mixed deciduous forest:-

This type of forest is found above Rampur upto about 40 Km upstream of the river Sutlej and its tributaries, scattered in patches or in strips, below Chil pine (1200m) on the banks of the streams as well as river Sutlej. The forests are largely of the scrub type but the quality improves slightly in depressions and in shades and gorges formed by the river. On the southern aspect it goes utp 500m. On the alluvial soil, Sissoo occurs good patches.

The important trees species are Lannea coromandelica (Jhingan), Mallotus philippinensis (Roghi), Cedrela toona (Toon), Bauhinia variegata (Kachnar), Albizzia lebbek (Siris), Bombax ceiba etc.

The indergrowth consists of Desmodium tiliaefolium, Rhus copinus, Mallotus philippinensis**,** Plectranthus rugosus, and Colebrookia oppositifolia. *Woodfordia floribunda*, Rubus ellipticus, and herbs line Cannabis sativa, Gerardiana heterophylla, and *Euphorbia royleana* occurs

in cliffs on the hotter aspects but limited in distribution. These foress are now covered with poor auality grasses and bushes with scattered trees. The important species are Dalbergia sissoo (Shisham), Cedrela toona (toon), Sapindus Mukorossi (ritha) and Bombax ceiba (semal) etc.

2A.2.2 Sub group 5/IS2 Khair-Sissu Forest:-

This Type of forests is restricted along the river Sutlej, Forests are found on gravely and sandy loam soil. Accacia catechu is conspicuous by its absence through out the tract and the crop comprises of, open to very open Dalbergia sissoo (shisham), with fairly dense shrubby undergrowth of *Adhatoda vasica* (Basuti), *Zizyphus numularia* (Ber), Meriandra strobilifera (Pothi), *Mallotus philippinensis* and Sissoo (shisham) is mainly in pole stage and forms the upper storey. *Arundo donax* (Nadu) is very common, while *Saccharum spontaneum* (Kash) occurs only on the exposed sandy soils.

2A.2.3 Sub-group 9/c 1 Himalyan Sub-tropical pine forests:-

This type occurs between 1000m to 2000m elevation, overlapping the tropical dry mixed deciduous forest and lower elevations and giving way to temperate forest above. The principal specie is Pinus roxburghii (Chil) which occurs remarkably in pure and gregarious form and constitutes stable sub climax due to biotic factors. The crop is generally irregular and mature trees are few and widely scattered. Where pure quartzite formation occurs, as noticeable near Pashada, Brawni and Bhandhal in Sarahan Range, the crop improves in quality and stocking.

Admixture of other species occurs along the upper limits as well as along the lower streams and damp ravines. The common associates are Quercus incana (Ban Oak) , *Rhododendron arboreum* (Brass), *Lyonia ovalifolia*(Anyar) and occasionally trees of Cornus species and *Albizzia procera*. The associates may occur either in light admixture or occasionally form an under storey in pine forests. Pinus wallichiana (Kail) makes its appearance in the upper most reaches and is some times found extending into Chil as may be noticed in Brawni forests C.55 (new). A peculiar association is rarely noticeable in Gaura forests, sarahan Range, where owing to the heavy rain fall on cool Nothern aspect, Spruce comes fairly low upto 1800m and may be found growing alongwith Chil, pine and Kail. This phenomenon however, is not wide spread. The flora constituting the undergrowth varies in tye and density according to the aspects and the overhead shade.

Under open stands of Chil**,** *Pistacia integerrim*a is common as a low squat tree amongst a fairly dense bushy growth of *Woodfordia floribunda***,** *Rhus cotinus*, *Desmodium sambuense* and *Rubus ellipticus* and occasional plants of Lillium thomsonianum in heavy grass clumps. Higher up and under a more regular canopy bush growth is lesser in extrent and here Desmodium species, Berberis

species, *Myrsine africana, Indigofera pulchella,* and *Caryopteris wallichiana* are found with *Plectranthus, Lespedeza* and other species of composite family as the common herbs such as *Fragaria vesca* etc.

2A.2.4. Group 12 Himalayan Moist temperate forests:-

This type extends the wet zone tract between the Chil pine forests below and the alpine formation higher up in the Division. The altuide range of this type is generally between 1500m to 3300m, these limits varying distinctly according to the aspect, configuration of the ground and the drainage. The chief characteristic of this type is the extensive development of the coniferous forests with relatively little admixture with board leaved species. The number of dominant species is small, the species being dependent mainly on altitude and aspect for their distribution.

The conifer generally form well stocked forests of good height of growth varying from 30 to 45m with a varying amount of underwood formed mostly of evergreen oaks. The conifer tends to avoid hot southern exposures, giving place to oak forests. Oaks i.e. Ban, Mohrou and Kharsu form somewhat pure forests in their optiumn growth zone, and are usually of low height 9m to 19m with widely spread crowns and poor holes. The quanity as well as stocking improves in sheltered localities and on good soils.

In these forests decidous shrubby undergrowth is alwaus present. Evergreen shrubs such as Sarcococca saligna, Skimmia laureola are usually met with Strobilanthes species occur gregariously over considerable areas. Climbers of temperate zone such as Rosa moschata, Clematis Montana and Hedera helix are frequent. Arundinaria falcata sometimes forms extensive brakes.

2A.2.5 Sub-group 12/C 1 a Ban Oak forests (Quercus incana) :-

The Ban oak is the common low level oak of the moist zone and is the major specie over considerable area which varies from 1500 to 2100m. It thus, overlaps the altitudinal zones of all the lower coniferous and is the common companion of the blue pine, deodar, spruce. Pure Ban Oak forests occur in sheltered belts in Nogli Valley and Machhanda Valley. Ahr and narenti block. The forests are of selection type and irregular in age. The chief associtates are Rhododendron arboreum**,** *Lyonia ovalifolia with some Machilus odoratissima, Litsea umbrosa. Cedrela serrate, Carpinus viminea* etc, in damp ravines. There is generally good deal of shruby undergrowth chiefly of Berberis lycium, Indigofera gerardiana, Sarcococca salgana, Daphne papyracea, Desmodium tiliaefolium, Myrsine africana, Prinsepia utilis, spiraea canescens, Lonicera quinquelocularis, Viburnum species, Rubus species etc.

2A.2.6 Sub- group 12/C 1 b Mohru oak forests (Quercus dilate):-

These forests occur in small patches above the ban forests between 2100 to 2500m and are definitely of more mesophytic type than the ban oak which displaces it on dry ridges and hot Southren aspects. There is great admixture of secondary species in the top storey consisting manily of deciduous trees such as Cedrela serrata, Acer pictum, Rhus semialata, Aesculus indica, *Prunus cornata, Pyrus pashia and Juglans regia* etc.

This formation merges with Kharsu oak in the upper reaches. The crop is irregular with a preponderance of over mature trees and deficient of regeneration. Examples of this type are met within compartments 63(a) to 63(h) namely Marau, Dhua Rua, Jlabhi Dhar, Kahai Dhar, Deori Dhar, Runpu, bangi Saran, dhara DPFs in the manglad catchment and all along the valley of Suga, Ganwi and Kut of Sarahan Range.

2A.2.7 Sub-group 12DSI/ Ic Moist Deodar forests (Cedrus deodara):-

The deodar forests occur between the altitudinal ranges of 1800m to 2400m but may go a little lower down in depressions of nallas and coller aspects and higher up on the southern aspects and sunny ridges with better draiage. Deodar is poorly represented in the heavy rainfall zone of the Manglad catchment and the areas adjoining Sarahan where it generally clings to rocky ridges. Here, a few small patches occur on well drained rocky ground e.g. in C. 59 (Gopalpur) and C.61 (Dofda). The under growth consists of Viburnum foetens and *Indigofera pulchella***,** Rosa species**,** *Daphne* **species,** Jasminum species.

2A.2.8 Sub- group 12 DSI/Id Westren mixed coniferous forests:-

This type is commonly referred to as mixed conifer but it also includes pure Spruce and silver fir types and mixed Deodar, Kail and Spruce forests. The forests occur above the pur Deodar forests mixed with low level blue pine deodar forests at altitudes of about 2400m to 3000m or more. High level blue pine is found both in and above it and the fir –oak mixture above it. These forests are commercially important. In the moist mixture of coniferous trees often of very fine growth, such as spruce, deodar, blue pine and silver fir with varying amount of evergreen and decedous broadleaved undergrowth and, strips and patches of broadleaved trees like Aesulus indica, corylus colurna, Juglans regia, Prunus cornuta etc. the conifers are of good quality.

2A.2.9 12 DSI/Ie Moist temperate deciduous forests:-

The coldest aspects and all reentrants and ravine bottoms of the spruce belt between 2100m to 3000m are entirely cccupied by a rich mixture of broad leave species to the exclusion of coniferous except scattered spruce and a very occasional deodar.

The oaks are only occasional member of this type, which is commonly known in Bushahr as Thach(grazing land) owing to the richess of the shruby growth and the quantity of loppings , which mixed broad leaved species provide. The common trees are Acer pictum, Acer Caesium, Pyrus pashia, *Lyonia ovalifolia*, Rhododendron arboreum, Rhus cotinus, *Rhus punjabensis, Celtis australis, Corylus colurna, Aesculus indica***,** Alder, Walnut, Birdcherry**,** populus ciliate and less commonly the Box wood, Ash and Yew. The shruby growth is a mixture of Skimmia laureola, *Cotoneaster bacillaris, Deutizia corymbosa***,** *Viburnum foetens, Lonicera quinquelocularis, Litsea species***,** etc. Herbs growth is poorly developed except in a few rather specialized types of canopy e.g. a dense growth of *Chaerophyllum reflexum* under a pure stand of *Pyrus pashia, Galium species, Rubia species, Salvia* species, Voila species, Adiantum fern, Horsechestnut and under the very dense growth of the Corylus and Pyrus stands a herb growth of Viola species and Ainliana species instead of shrubs**.**

2A.2.10 Sub- group 12 DSI/If low level blue pine forests (*Pinus wallichiana*):-

The blue pine is second only to deodar in its importance as a commericial timber, and it it accompanies the deodar throughtout the whole field of the latter's distribution. The blue pine has two altitudinal zones which are well defined although the species is quite common on intermediate grounds between these two habitats. The low level form, depending on a moderately good monsoon rainfall and northern aspect is well developed in Shimla hills and lower Bushahr. The high level type is dependent on a heavy and long lying winter snow fall and is confined to upper forests limits in the inner hills.

This species is a wonderful coloniser and has estilbished itself over large areas during the last 100 years. Of all the large trees species of the moist zone, the blue pine is undoubtful nearest to deodar in its ecological requirements and in its love for a warm well drained soil. Hence, deodar is following blue pine and establishing itself in ever increasing numbers in this belt assisted, of course, by judicious thinnings and cleaning under the working plan prescriptions.

2A.2.11 Sub- group 12/DSI oak scrub:-

This serial type occurs near habitations between 1500m to 220m elevation and covers mostly UPF's where heavy lopping and browsing as well as unregulated fellings for fuel and agricultural implements have reduced oaks to low, stuned, unsound and bushy trees often of coppice origin. Mostly ban and mohru areas are in this state but some kharsu areas along Narenti, Narkanda and Baghi ridge have also been reduced to scrub state due to heavy lopping by villagers and gujjars. Rhododendron arborium and *Lyonia ovalifolia* are common associates, while undergrowth consists

of thorny and unplantable bushes of *Berberis lycium, Prinsepia utilis, Rosa macrophylla***,** Rosa moschata, *Rubus niveus, Spiraea lindleyana, Sarcococca saligna, Wikstroemia canescens, Salvia* ***glutinosa*** etc, Regeneration of oaks is almost absent due to heavy pressure of grazing, browsing, lopping and unrestricted fellings for fuel etc. these are getting gradually denuded.

2A.2.12 Sub – group 12/C 2 Upper west Himalayan temperate forests:-

(i) 12/c 2 a Kharsu oak forests (*Quercus semecarpifolia*):-This type generally occurs between 2400m to 3400m elevation and is met with along Narenti Narkanda dhar, Hattu Ridge, and form fairly extensive belts from Baghi to Moral Kanda and along Daranghatti Hansbeshan Ridge, Swalar etc. These Kharsu Oak forests are slowly gaining importance on account of their demand for various commericial uses. Kharsu seeds well and regernerates easily as compared to other oaks. It finds good expression on the Sourthern aspects at the top of the Ridges in belt pure forests. In their upper reaches, the dense oak forests end abruptly at the edge of alpine pasture. On other exposures in Sarahan Range, this oak descends down the nallas and depressions and occurs as scattered trees or in large pure groups amongst the open silver fir stands, other trees of second storey being *Beltula utilis, B. alnoides and Taxus baccata*. This mixture advance towards the higher regions into the alpine pastures rather than the pure Kharsu does.

The herbaceous cover is usually coarse and consists of the following species:- Anaphalis species, Fragaria vesca, Primula denticulata, *Gaultheria trichophylla,* Saxifraga ligulata etc. the common climbers are Schizandra grandiflora and Vitis semi-cordata.

(ii) 12 /C West Himalayan upeer oak /Fir forest:-This type occurs between 2500m to 3300m elevation especially on the Northern aspects and sheltered sites. The forests are covered with snow for servaval months in the winters. Abies pindrow and A. spectabilis the low and the high level silver fir to gather forest belt throughout the wet zone with much the same distribution as the spruce.

Kharsu oak, forms a belt of pure on the southern aspects in the main and side Valleys of Sutlej in the wet zone between 2500m to 3400m to the complete exclusion of the silver fir, the dense oak forest stopping abruptly at the edge of the alpine grass lands. On the exposures in pandrabis of Sarahan Range this oak occurs as a scattred trees or in large pure groups amongst the open silver fir stands, other trees of second storey being species of *Betula alnoides, Betula utilis, Euonymus tingens, and Taxus baccata*. The mixture goes up the hill much higher into the alpine pasture than the pure Kharsu does. In this type silver fir, regenerates itself freely whenever the Oak and other broad leaved trees from a ligh understorey in the fir forests. Excellent examples of this may be

observed in fir forests along the upper ridges in the Ganwi Suga, Kut and Manglad Valleys of this area.

2A.2.13 Sub –group 12/C I/DS 2 Himalayan temperate Secondary scrub, Thach Parkland:-

This seral type occurs mostly between 2400m to 3600m elevation for more in the Nohru Kharsu and Fir forests and is the result of heavy grazing, lopping and fires which have thinned out the forests to a varying degree, destroyed all under growth except for patches of inedible species and reduced the shruby ground cover to a grassy turf. The thach consists of an open park like land with scattred usually mature mis- shaped and after moribund trees standing over a grassy turf full of flowers in springs. The common tree at such places is Birdcherry, Acer and Kharsu. These thaches are heavily grazed year after year by enormous flock of sheep and goats. Due to thick humus deposits and luxuriant weed growth, the regeneration of fir and other broadleved is not coming up at all and the ground is being replaced by grassy turf. Examples of this may be seen in all over the wet zone less rarely in dry and arid tracts e.g. in Guara, Manglad forests of Sarahan Range, Narenti, Khudlu, Jammunda, DPF's of Kumarsain Range and Forest numbers 18-C4 (Punan)20-C 1 to C-4(Kungal Mundar)21, (Bahali) 22 (Bai) and 23 (Andela) of Nogli Range are typicial examples of this type.

2A.2.14 Group 14 Sub –alpine Forest

(i) Sub –group 14/C 1 West Himalayan sub-alpine birch/fir forests(Betula/Abies):-

This type occurs above 3000m elevation and extends upto 3400m. It comprises of mostly Undermarcated protected Forests and upper fringes of forests No. 30(c-8) Sharan Jarashi, 35 Kuki Darkali and 36 Dibridansa of Nogli Range and Hattu DPF's. The Principal species in this type are Kharsu oak mixed with scattrred fir and Maple and occasional Betula utilis along upper limits. Amongst under growth, *Viburnum foetens, Rosa sericia, Cotoneaster acuminate* are commonly found. Medicinal herbs like *Aconitum heterophyllum* (Patis), Gentiana kurroo (Karu) etc. occur in this type. Large flocks of local sheep and goats graze in these areas during summer months.

2A.2.15 Group 15 Moist alpine scrub:-

This type occurs from 3300m to the limit of tree growth at 3900m. It consists of evergreen scrubby growth, usually upto 1m high forming a dense cover over big patches broken by grass. Outlying patches of alpine forests, colonies of the larger *Rhodondron campanulatum* some times, occur in this zone. The Shrub species are Salix elegans, Lonicera parviflora, and Polygonum vacciniflium. Herbs are Aconitum heterophyllum (Dhoop) and Gentiana Kurroo (Karu).

2A.2.16 15/C 1 Birch/ Rhododendron Scrub forests:-

This forms the upper limit of alpine forest and occurs as patches of varied size in these sheltered sites and usually on northern and western aspects. The Rhododendrons with its various species occur as a dense mat in which Betula utilis, Salix elegans, etc occur in varying proportions. The whole mass of vegetation is well adapted to stand heavy snow. The common shrubs are *Salix elegans, Cotoneaster microphylla, Lonicera orientalis* & herbs are *Potentilla species. Primula denticulata, Aconitum heterophyllum* etc.

2A.3 STATUS OF NATURAL REGENERATION

Due to ban imposed on green felling, no green fellings were carried out during the period of the working plan under revision. Therefore no regeneration survey was conducted as proposed in the working plan under revision.

2A.4 INJURIES TO WHICH THE CROP IS LIABLE

The injuries are as under:-

i) **Climatic injuries: -** It is caused by the extent of snow,by wind action, hail storms mainly, by lightening, frost and drought.

(a) Snow:- Due to heavy snow fall, breaking and uprooting of trees are quite common.

(b) Wind action and Hail storms: - Considerable wind damage in the form of uprooting and breaking of trees occur during October, November and March. Hail storms are common during April.

(c) Lightning: - Damage due to lightning is insignificant. Only few trees are damaged annually by lightning.

(d) Frost: - Young seedling suffers in case of winter frost.

(e) Drought: - There is a drought period of two to three months before and after rains which causes morality to a large number of seedlings in the afforested areas. Fire damage is maximum during periods of prolonged drought.

ii) Biotic injuries: - This factor is largely responsible for injuries to trees and forest crops. The various biotic factors are as follows :-

(a) **Fires:-**The greatest damage to forests is due to fires. Fires are caused accidentally as well as through incendarism. Accidental fires due to lightening or carelessness and are not very common. Most of the fires are due to local incendiarism with the

belief that the burning of forest areas improves the fodder resources by getting fresh grass and tender herbage.

(b) **Wild Animals: -** Wild animals also damage forest crop, but such damage is not so menacing. Wild bear debarks Deodar, Kail and Spruce poles.Percupines and Monkeys dig out young seedlings in the nurseries as well as in the plantations areas and eat roots. Flying squirrels consume unripe cones of Deodar, Kail and Chil and as such sizeable quantity of seed is destroyed.

(c) **Birds: -** The birds and Lizards nip the young seedlings and eat fruit. Wood packers bore holes in the stems of standing trees.

(d) **Damage by Insects: -** Insect damage is spordic and does not assume the form of an epidemic. Deodar defoliator, Ectropia Deodara does great damage to Deodar, Euzophera Cedrella attacks deodar comes and destroys the seed. Malolontta (Cock Chafer) and Elater (wise worm) kill young deodar seedlings in the nurseries and plantations devouring the roots. The insect Chermes abietispiseoe causes galls on Spruce. There is another insect namely Photophagus Chalcit which causes galls on Deodar needles and Spruce.

(e) **Fungi :-** The following are fungi attack on the plants :-

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

(ii) *Fomes annosus*: It attacks deodar poles through the roots in badly drained soil and results in their death. The damage due to this fungus is not appreciable and only sporadic casualties have been noticed in this division. As the fungus is soil borne, digging of trench around infected groups of poles, uprooting and burning the infected material will be helpful in controlling this fungus.

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

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

(f) **Climbers: -** There are mainly three climbers namely Vitis Semecodate, Rosa Moschata and Hedra Helix which are most common and are commonly found in Deodar and Kail Forests. These climbers if not removed have been seen to be damaging young plants by suppression.

(g) **Invasive Species: -** Invasive species pose a very serious problem in all altitudes however their distribution in high hills is less. In the lower zone *Lantana camara* and *Ageratum* spp. are actively encroaching upon the open scrub forests and have caused serious threat to forest growth. The areas having new infestation (about10%) need to be focused in order to make sure that this does not spread further. Parthenium has been reported from Sainj,Khaker,Luhri,Banolidhar,Naula,Kriti and Thar. However, the main concentration is only agricultural fields. As these weeds normally confine to wastelands having grazing pressure they have not actually intruded deep into forests so far. However, they need to be managed now to check their spread and become a problematic weed.

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CHAPTER II B
Forest Fauna

2B.1 FAUNA

(a) Mammals:-

A variety of fauna is found in the tract due to variation in altitudes, topography, climate and vegetation. The important fauna is Leopard or Panther (Panthera *pardus),* Himalayan Black Bear (*Selenarctos thibetanus*), Brown Bear (*Ursus arctus),* Jungle Cat (*Felis chaus*) , Leopard Cat (*Felis bengalensis)*. Himalayan Pine Marten (*Martes flavigula*) ,Jackal (*Canis aurs)* Red Fox (*Vulpes vulpes*) ,Goral (*Nemorhaedus goral),*Musk Deer (*Moschus moschiferus*), Kakar (*Muntiacus muntijak),* Indian Wild Bear (*Susscorfa cristatus),* Monkey (*Macaca mulata*) ,Langurs (*Presbytis entellus)* ,The Giant Indian Flying Squirrel (*Pataurista petacirista*),Indian Hare (*Lepus nigricollis).* The brief descriptions of common Mammals are as under:-

(i) **Leopard or Bagh (Panthera Pardus):-** Belongs to cat family and is commonly met in the forests near habitations. It often infests villages off sheep, goats, dogs and even poultry, but never attacks human beings without provocations.

(ii) **Flying Squirrel (Pataurista petacirista):-** Flying squirrel (Petaurista petacrirista Philipensis) is another animal found commonly in this tract upto 10,000 feet elevation. It does considerable damage to coniferous trees seeds. Its fur is valued much for hand gloves etc.

(iii) **Kala Bhalu (Ursus arctus):-** (Ursus arctus) the black bear commonly inhabits oak forests from 6,000 to 10,000 feet elevation. It often comes down to the village-fields during harvest seasons and causes considerable damage to the standing crops. It is a savage animal, and sometimes attacks human beings even without provocation. It is prized for its skin, fat and gall-bladder.

(iv) **Kakar** (**Muntiacus muntijak**):- (Cervulus muntjak) It is fairly disturbed between 3,000 to 7000 feet elevation.It is small red deer found in scrub forests and especially fond of amla trees and karaunda like plants.

(v) **Goral** (**Nemorhaedus goral) :-** (Cemes goral) This is another Himalayan wild goat distributed all over the area from an elevation of 3,000 to 8,000 feet, and is one of the commonest and most fearless of the Himalayan animals. It hunts rocky

grassy hills and is generally found in groups of 4 to 8. It is available fairly in abundance in step to precipitous grounds amongst chil forest round about Taklech.

Amongest other common wild animals, Jackals, Langoors and Monkeys are found practically all over the division upto 9000 feet elevation.Recently Monkey cencus has been carried out in this division which is as under:-

Table-2B.1

Monkey Census--2012

S.N	**Range**	**Papulation of Monkeys**		**Total**
		Adult	**Infant**	
1	Kotgarh	300	57	357
2	Kumarsain	954	307	1261
	Total	**1254**	**364**	**1618**

Emphasis on recruitment i.e young ones is to be given during the one hour count every six months. The detailed guidelines issued for monkey incidence estimation -2012 is as per **Appendix-XIX**.

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

(i) **Monal (Lophophorous impejanus):-** Monal is the finest amongst the game birds, which is fairly common in remote fir and kharsu oak forests above 9,000 feet elevation,especially near Hatu, Maral Kanda, Kuki Darkali, Debari Dansa, Gatghore and Kashapat. Its shooting is probihited throughout Himachal Pradesh.

(ii) **Cheer Pheasant(Catreus wallichii**):- (Catrens wallichii) is tailed pheasant which keeps in small coveys of five or six on precipitous hill sides or ravines covered with tall grass, scrub and oak forests. It is found only in Nogli valley from 4000 to 8,000 feet elevation, but is rather rare.

(iii) **Chikor (*Alectoris gracea*)**:- (Alectoris gracea) is another game bird common throughout the Division upto 9,000 feet. It is generally found in grassy and bushy areas near rocky places.

(c) **Reptiles:-** Himalayan pit viper(*Ancistrodous Himalayanus*),Common Indian Krait(*Bungarus Caerules*),Indian Cobra(*Naja Naja*),Rat Snake(*Pyyas Mocosus*),Common Indian Monitor(*Varanus Monitor*),Rock Lizard(*Agamo Tuberculata*),Blood Sucker(*Techydrmous Spp.)*

2B.2 INJURIES TO WHICH THE FAUNA IS LIABLE

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

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

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

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

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

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

2B.3 PROTECTION AND MANAGEMENT OF FAUNA

Following are the measures for protection of fauna

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

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

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

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

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

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

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

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

As per guidelines in the National working plan code, 2004, this chapter has been vetted by P.C.C.F (Wildlife) cum Chief Wildlife Warden (H.P) vide letter No. WL/Working plan-7411 dated 24-03-2012.

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CHAPTER III

UTILIZATION OF THE PRODUCE

3.1 AGRICULTURAL CUSTOM AND WANTS OF THE POPULATION

The human population of area falling under Kotgarh forest division as per 2011 census is 52048 and as per the 2007 census the cattle population is 20364. There are 455 villages in this division.The Horticulture and Agriculture is the main occupation of the people. The total Geographical area of the tract is 27090 hac. Human population density per Sq Km is 191 and that of cattle population density is 75.People depend on forests for timber & other forest produce. The land holdings are small and un-economic. The area is not self sufficient in agricultural commodities, however horticulture has picked up very well exccept few areas of Kangal and Shilaroo Blocks of the division. The human population of the tract is generally dependent on forest for meeting requirement of timber, agricultural implements, fuel wood and grasses etc. With the increase of population the requirement of timber has increased whereas the carrying capacity of the forests to meet the requirements has decreased considerably. People depend on the forests for timber and other forest produce.The landholdings are small. The yield is low. The area is not self sufficient in agriculture commodities and large quantities of food grain are brought from the plains. However horticulture has picked up very well and apple is the main crop. The income from agriculture and rearing of goats and sheep requires to be supplemented by income from forest and MNERGA works.Except in areas where development works provide employment. The people mainly depend on forest work to supplement their requirements of agriculture implements, fuel, grazing, grass, fodder leaves for manure, building stone and various medicinal herbs etc. Supplementary income of people has significantly improved through a variety of development works undertaken by different Govt.agencies / Projects over the past. As a result of improvement in economy of the tract living standard of general masses have improved. Majority of the people live in properly designed pucca houses. Education is spreading. Mechanization of agriculture is also coming in though at a slow pace. The land use under different categories is as under:-

Table-3.1
Land use under different categories

S.N	Categories	Area in ha.
1	Forest land	13079.28
2	Cultivated land including agriculture	7557.42

3.2. MARKETS AND MARKETABLE PRODUCE

The primary marketable products of this division are timber, resin, fuel wood etc. The commercial exploitation of the forests has been transferred to the Himachal Pradesh Forest Corporation Ltd. since 1982, when the H.P. Forest Produce (Regulation of Trade) Act, 1982 came into force and since then all commercial exploitation is being executed through the HPSFC. The timber extracted by HPSFC is being exported to Himkasth Sale depot Baddi and resin supplied to Resin & Turpentine factories at Nahan and Bilaspur.

Medicinal herbs and fruits from the forests are collected by the locals for their own domestic use and are not sold as their yield is not much.There are 124 registred Saw Mills in this Division.

3.3 DEMAND AND SUPPLY OF FOREST PRODUCE

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

Table 3.2

TIMBER YIELD

Year	Volume marked in m3	Volume Felled in m3	Volume converted in m3	Converted %
1993-1994	0	0	0	0
1994-1995	8870.329	8870.329	3902.94	44%
1995-1996	12186.893	12186.893	5240.36	43%
1996-1997	19986.965	19986.965	8794.26	44%
1997-1998	5769.008	5769.008	2480.67	43%

1998-1999	5183.683	5183.683	2177.14	42%
1999-2000	0	0	0	0
2000-2001	2283.101	2283.101	958.9	42%
2001-2002	0	0	0	0
2002-2003	13876.415	13876.415	5966.85	43%
2003-2004	0	0	0	0
2004-2005	0	0	0	0
2005-2006	7901.184	7901.184	3476.52	44%
2006-2007	2216.15	2216.15	908.62	41%
2007-2008	5586.8	4754.054	1996.7	42%
2008-2009	14.727	14.727	5.89	40%
2009-2010	3285.252	3285.252	1379.8	42%
2010-2011	8404.602	8404.602	3782.07	45 %
2011-2012	556.797	556.797	--	---
Total	**96121.91**	**95289.16**	**41070.72**	

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

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

3.3.4 Other Minor requirements:- People have rights for collection and sale of medicinal herbs. The important medicinal herbs collected by the local people are Dhoop, Karoo, Kuth Guchhi and Banaksha etc.The detail of NTFP found in the division and its use is given in the NTFP (overlapping) working circle seperatly.

3.4 LINES OF EXPORT

There has been revolutionary development of network or roads (metalled and unmetalled) which have significantly in boosting up of export of forest produce from the tract. From forest upto road side, the Forest produce is generally transported manually.There after the forest produce is transported by roads.Length of main roads are as under:-

Table 3.3

S.N	Name of Road	Distance in Kms.
1	Kotgarh--Narkanda	15.00
2	Kotgarh—Kumarsain	34.00
3	Narkanda-Shimla	67.00
4	Kumarsain—Narkanda	22.00
5	Hattu—Narkanda	8.00
6	Kingal—Matiana via Kothighat	72.00
7	Kotgarh-Baddi	195.00
8	Kotgarh-Nahan	215.00
9	Kotgarh-Bilaspur	160.00

3.5 METHOD OF EXPLOITATION AND THEIR COSTS

3.5.1 Timber: - The Forest Working Division has been constituted for the purpose of extraction of timber, resin, fire wood etc. Method of exploitation is conventional and no mechanization has taken place except transportation of forest produce by trucks of H.P. State Forest Development Corporation or otherwise private trucks engaged on the basis of auction/ tender. Felling is done by axe or axe and saw. The trees are cut into logs of different lengths with the help of saws. These logs are further squared with the help of axe and then swan into scantlings by using frame saw.In the past decade no green forests have been felled. However, the dead, dry, fallen trees have been removed as salvage in compliance of the Supreme Court's order in T.N. Godavarman case in CWP No. 202/95 dated 12.12.1996.

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

Table 3.4

Exploitation of costs of Timber and Pulpwood

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

(Source:-HPSFDC)

3.5.2 Resin: - Resin blazes are sold annually to H.P.S.F.D.C. at royalty rates fixed by the H.P. Govt. for every year. Earlier the extraction was done by cup and lip method which proves to be disastrous many forests. Now there is complete shift to the Rill method for extraction of resin which gives good yield. Setting of crop commences in February/March every year.Extraction is required to be done as per instructions contained in Punjab Forest leaflet No. 13.The details of resin extracted for last 15 years and the cost of extraction of resin for the year 2010-2011 are tabulated below:-

Table 3.5

RESIN YIELD

Year	No. of Resin Blazes Tapped	Total Resin Yield (Qts)	Qty./000 blazes
1993	30331	931.2	31
1994	28651	904.53	32
1995	26170	1291.9	49
1996	14899	641.29	43
1997	26068	895.12	34
1998	26068	1210.21	46
1999	27733	1319.6	48
2000	7200	259.12	36
2001	7200	273.27	38
2002	14289	618.17	43
2003	14289	558.95	39
2004	14289	559.03	42
2005	14289	503.84	35
2006	14289	561.13	39

2007	14289	519.47	36
2008	14289	483.63	34
2009	14289	458.42	32
2010	7025	224.80	32
2011	7025	224.80	32

Table 3.6

Resin Extraction Cost Statement

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

(Source:-HPSFDC)

3.6 PAST AND CURRENT PRICES

The Average royality rates of timber obtained from the Forest Corporation during the year 1993-94 to 2011-2012 are tabulated as under:-

Table 3.7

Royality rates / Average rates per cum (Rs.)

Year	Deodar	Kail	Fir/Spruce	Chil
1993-1994	0	0	0	0
1994-1995	4611.00	2838.00	983.00	0
1995-1996	4934.00	3037.00	1012.00	0
1996-1997	5427.00	3341.00	1113.00	1738.00
1997-1998	5970.00	3675.00	1224.00	1899.00
1998-1999	8358.00	4961.00	1591.00	1519.00
1999-2000	8530.00	5760.00	1600.00	1519.00
2000-2001	8700.00	5930.00	1480.00	2200.00
2001-2002	3890.00	2640.00	770.00	480.00

2002-2003	3950.00	2430.00	770.00	400.00
2003-2004	3940.00	2190.00	740.00	380.00
2004-2005	3620.00	2380.00	720.00	450.00
2005-2006	4576.00	2833.00	800.00	568.00
2006-2007	4146.00	2817.00	835.00	484.00
2007-2008	4315.00	2388.00	677.00	431.00
2008-2009	4315.00	2388.00	677.00	431.00
2009-2010	5664.00	2944.00	836.00	626.00
2010-2011	5903.00	3098.00	790.00	572.00
2011-2012	-	-	-	-

(Source:-HPSFDC)

Table 3.8

The average royality rates for Resin

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

(Source:-HPSFDC)

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

Table 3.9

Market Rates of green standing trees in cum

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

(Source:-Office record of DFO Kotgarh)

There has been a marked rise in the prices of Resin, timber, fuelwood and charcoal during recent years. The prices are increasing every year due to the products being in short supply**.**

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CHAPTER IV

ACTIVITIES OF H.P. FOREST DEVELOPMENT CORPORATIONS IN HARVESTING AND MARKETING OF FOREST PRODUCE:-

4.1 HARVESTING

4.1.1 Timber Lots: - After nationalization of forests in 1983, standing trees are being handed over to HP State Forest Development Corporation at rates decided by the Himachal Pradesh Government from time to time. Only dry and fallen trees referred to as salvage are handed over to Divisional Manager, HPSFDC Ltd. Shimla who has jurisdiction over this division.Timber lots are handed over before 15th December each year. The H.P. State Forest Development Corporation carries out extraction through conventional methods and there is no sign of any mechanization being introduced in the future. Felling is done by axe or saw. The trees are cut in to logs different sizes with the help of saws. These logs are further squared with help of axe and then sawn into scantlings by using pharnies. The details of extraction of Timber for the last fifteen years has been given in para 3.3.1 of Part-I

4.1.2. Resin lots: - Resin blazes are sold annually to H.P.S.F.D .Corporation at royalty rates fixed Himachal Pradesh Government for every year. Earlier the extraction was done by cup and lip method which proved to be disastrous for many forests. Now there is complete shift to rill method of extraction which gives equally good yield as well as obviates the likely damage by fire and wind. Since 1996, the detail of resin extraction has been given in para 3.5.2 of Part-I.

4.2 MARKETING OF FOREST PRODUCE

There is little local market for the forest produce; the demand of local people being met mostly through exercise of rights.Timber extracted from this division is marketed through sale depot Baddi. The annual sale turn for the year 2010-2011 was 3, 11, 71,000 as per data given by D.M.Baddi, and the Kotgarh division contributes to only 10 to 15 %. The resin is processed and further sold through R&T Nahan and Bilaspur factories.

4.3 RESULT OF SOCIO ECONOMIC SURVEY

The socio- economic conditions of the people of this tract is intimately bound with the forests. Due to net work of communications and developmental activities in the fields of Agriculture, Horticulture, Education and Health etc. there is a marked improvement in the living conditions of the

inhabitants. It is intresting to note that per Capita income of Kotgarh is the highest in India due to Apple orchards.

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CHAPTER V

FIVE YEAR PLANS

5.1 GENERAL

The forests of the division have been managed for getting sustainable yield. The silvicultural fellings were aimed at making the forest uniform and the regeneration achieved through natural means. Till the early seventies, the emphasis was on planting commercially important species such as deodar, kail, chil, fir, spruce etc. Growing demand of forest produce in the state especially that of timber resulted in focus on large scale plantations of commercially important species. Although the plantation programme started from I Five Year Plan but it gained momentum from III Plan onwards. The Plan wise management of forests is depicted as under

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

5.2 I FIVE YEAR PLAN (1951-56):- After the merger of states in 1949, the forests were densely stocked and exploited commercially thereafter. Deodar and Chil working circles were constituted and worked. Fuel and fodder working circle to meet local demand and protection working circle to fulfill conservation objectives were created. There is nothing on record to show the silvicultural system which was adopted. The year-wise revenue and expenditure of the erstwhile Sarahan Forest division is tabulated as under:

Table 5.1
Expenditure and Revenue of Kotgarh Forest Division during First Five Year Plan

Year	Revenue(`)	Expenditure(`)	Surplus(`)
1951-52	218058	48307	169751
1952-53	161418	41536	119882
1953-54	378350	43932	334418
1954-55	438554	74720	363834
1955-56	770500	74711	695789

(Source: WP by I.D. Sharma)

5.3 II FIVE YEAR PLAN (1956-61):- During this period, the Deodar forests were exploited for revenue with emphasis on regeneration by mainly natural means. The artificial regeneration in the form of patch sowing and planting has been carried out in Chil and Deodar forests. The slow pace of regeneration was primarily due to fire, uncontrolled grazing and poor protection. In

1960-61, 1537452 cft. Conifers were removed in erstwhile Sarahan Forest division, earning surplus revenue of 259713.

5.4 III FIVE YEAR PLAN (1961-66):- The commercial working of all conifer species was continued with thrust on natural regeneration. Table 5.2 gives the yield (in cum) of deodar, kail, fir, spruce and chil during the plan period.

Table 5.2
Yield (in m^3) of Conifers during III Five Year Plan

Year	Deodar	Kail	Chil	Fir/Spruce	Total
1961-62	1640	5200	1200	3700	11740
1962-63	1620	5310	1210	3804	11944
1963-64	1590	5290	1190	3640	11710
1964-65	1680	5410	1195	3720	12005
1965-66	1630	5395	1253	3750	12028
Total	**8160**	**26605**	**6048**	**18614**	**59427**

(**Source: Kotgarh WP by C.L.Sudhera)**

5.5 IV FIVE YEAR PLAN (1969-74):- The year-wise revenue and expenditure of the Kotgarh Forest division is tabulated as under:

Table 5.3
Expenditure and Revenue of Kotgarh Forest Division during Fourth Five Year Plan

Year	Revenue (Rs`)	Expenditure (Rs`)	Surplus (Rs`)
1969-70	2108609	844502	1264107
1970-71	2254094	1003325	1250769
1971-72	3268663	1287198	1981465
1972-73	4180000	1304379	2875621
1973-74	4529780	1303378	3226401

(Source: Kotgarh WP by C.L.Sudhera)

5.6 V FIVE YEAR PLAN (1974-78):- The emphasis had already shifted to raise plantations on blank degraded forests. The year wise plantation programme adopted was as given in Table 5.4 below.

Table 5.4
Plantations Raised from 1974-78 in Kotgarh Division

Year	Area planted in Kotgarh range(ha)	Area planted in Kumarsain range(ha)	Total Area Planted
1974	125	130	255

1975	156	130	286
1976	124	136	260
1977	150	140	290
1978	175	200	375
Total	**730**	**736**	**1466**

(Source: Suket WP by C.L Sudhera)

5.7 VI FIVE YEAR PLAN (1980-85):- With the launching of social forestry programme, the focus shifted towards raising of fuel, fodder, small timber and grasses to meet the domestic needs of rural communities. Year wise plantations raised in Kotgarh division are given in Table 5.5 below:

Table 5.5

Plantations Raised from 1980-1985 in Kotgarh Division

Year	**Area planted (ha)**
1980-81	342
1981-82	355
1982-83	410
1983-84	428
1984-85	421
Total	**1956**

(Source: Office record DFO Kotgarh)

5.8 VII FIVE YEAR PLAN (1985-90):- The social forestry works were in full swing, main emphasis being on raising fuel, fodder, small timber and grasses to meet the domestic needs of rural communities.

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

5.10 IX FIVE YEAR PLAN (1995-2000):- The activities of ODA/DFID continued in the pilot phase and in the C & D phase. The works of afforestration, soil conservation, entry point activity started by the VFDCs and microplan process learnt and executed. Sanjhi Van Yojna started on the principles of JFPM. Here again the focus remained on

restocking/regeneration of degraded forests.The year wise plantations raised in Kotgarh division are tabulated below.

Table 5.6

Plantations Raised from 1995-2000 in Kotgarh Division

Year	**Area planted (ha)**
1995-96	345
1996-97	558
1997-98	858
1998-99	980
1999-2000	489
Total	**3230**

(Source: Office record DFO Kotgarh)

5.11 X FIVE YEAR PLAN (2000-2005) :-Both the JFM programmes DFID & SVY created mass awareness about forestry but the focus was again on raising plantations besides soil works and entry point activities. The contribution in works to the tune of 5 to 15 % was desired but could not be persued properly. The year wise plantations raised in Kotgarh division are tabulated below.

Table 5.7

Plantations Raised from 2001-05 in Kotgarh Division

Year	**ha**	Year	ha
2001-02	172	2004-05	155
2002-03	87	2005-06	289
2003-04	160	**Total**	**863**

(Source: Office record DFO Kotgarh)

5.12 XI FIVE YEAR PLAN (2005-2010) :- The year wise plantations raised in Kotgarh division are tabulated below.

Table 5.8

Plantations Raised from 2005-2010 in Kotgarh Division

Year	Area planted (ha)
2005-06	289
2006-07	319
2007-08	188
2008-09	175
2009-10	161
Total	**1132**

(Source: Office record DFO Kotgarh)

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CHAPTER VI

STAFF AND LABOUR SUPPLY

6.1 STAFF

The following statement shows the present sanctioned strength of various categories of staff:-

Sr. No.	Category of post	Sationed Strength	Existing Strength	Variation if any
	GAZETTED			
1.	D.F.O.	1	1	-
2.	A.C.F.	1	-	
3.	Forest Rangers	4	2	(-2)
	Executive			
4.	Dy. Rangers	9	9	-
5.	Forest Guards	26	27	(+1)
	Ministerial			
6.	Supdt. G-II	1	1	-
7.	Sr. Assistants	2	1	(-1)
8.	Jr. Asstt./Clerks	5	1	(-4)
9.	Drivers	1	1	-
10.	Patwari/Kanungo	-	1	
11.	Peons	2	3	(+1)
12.	Malies	4	3	(-1)
13.	Chowkidars	7	6	(+1)
14.	Forest Workers	26	21	(-5)
15.	Dak runner	-	-	-
16.	Electrician	-	-	-
17.	Sweeper	1	1	-
Total		**90**	**78**	

There has been no increase in staff strength as warranted by increase of work load and change of public attitude with time. List of D.F.Os who holds the charge of D.F.O. Kotgarh is given in **Appendix-X**.

6.2 EXECUTIVE CHARGES

There are 2 Ranges, 6 Blocks, 21 Beats in the division at present and their detail alongwith headquarters is given in **Appendix-VIII**.

6.3 LABOUR SUPPLY

Generally adequate local labour is available in the tract for various forestry operations like raising of nurseries, plantation, cultural operation, enumerations, marking, repair of

boundary pillars, construction and repairs of buildings, roads and paths etc. Slight scarcity is felt during monsoon planting season i.e in July and August which coincides with the apple harvesting season.For resin extraction and timber exploitation, H.P.S.F.D.C are relying mostly on imported labour from Mandi,Kangra,Nepal and U.P.areas.

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

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

(Source:- As per Forester's companion)

6.4 LABOUR RATES

Conservator of Forests, Rampur Circle fixes the labour rate keeping in view the rates of daily waged unskilled labour fixed by the Govt which presently is Rs. 120/- per day. The past and present rates of daily waged unskilled labour are as below:-

S.N	Category of daily labour	Rates per Day (Rs)	
		Past	Present
1	Un- skilled	60	120
2	Quarry man (Khangir)	60	120
3	Driller(for Air Pump)	60	120
4	Sprayman	60	120
5	Carpenter Ist Class	109	218
6	Carpenter 2nd Class	81	162
7	Mason Ist Class	109	218
8	Mason IInd Class/Stone Chisler	81	162
9	Painter Ist Class/ Distemperer	81	162

10	Painter IInd Class/white washer	66	132
11	Blacksmith	76.50	153
12	Plumber Ist Class	76.50	153
13	Plumber IInd Class	64	128
14	Bar binder	66	132
15	Sawmiller	76	152
16	Assistant Sawmiller	60	120
17	Cleaner	60	120
18	Electrician Ist Class(I.T.I)	96	192
19	Electricial IInd Class	76	152
20	Surveyor	96	192
21	Driver	81	162
22	Feller(Girani)	60	120
23	Logger	60	120
24	Sawyer (Charani)	60	120
25	Dresser (Pachhani)	60	120
26	Chowkidar(Office, Depot,Nursery etc)	60	120
27	Khalasi,Zoo Animal Attendant/Fire Watcher/Grinder forch flooring/Mate/Calliperman/Mali,Sweeper/ Enumerator/Enclosure sweeper	60	120

(Source:- As per schedule of rates for Rampur Circle)

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CHAPTER VII

PAST SYSTEM OF MANAGEMENT

7.1 GENERAL HISTORY OF FORESTS

A brief account of the past history of the management of the forests of this division has been given in para 5.1 and 5.2 of previous working plan which is just sufficient and will be adopted with minor changes wherever required.Little is known about the history of the forests covered by the W.P before the advent of the British Rules.For describing the past management, the area has been divided into various constituents as under:-

i) Kumarsain Forests.

ii) Kotgarh illaqa Forests.

iii) Khaneti State Forests.

iv) Sangri State Forests.

7.2 KUMARSAIN FORESTS

Prior to 1880-87, there was no forest staff and the protection of the forests was completely neglected. The people generally met with their requirements to any extent from wherever they liked. During 1874-76, some contractors were allowed to remove Kharsu trees on petty payments without much restrictions.In 1896, a manager was appointed to conduct the state affairs and system of exploitation did undergo some improvements laid by E.M. Coventry in 1899.

7.2.1 Coventry's Working plan:-There being little demand for Fir and Spruce, the first working plan covered only Oak forest. The forests were divided into 11 compartments. Two working circles namely Talghore working circle comprising mostly of Kharsu areas and Narenti working circle were constituted thereof from narenty working cicle under selection cum improvement fellings with felling cycles of 40 years (300). Ban and mohru prescribed for fellings annually. The exploitable girth was fixed at 162 cms for Kharsu and 210 cms. For Ban and Mohru. Thinnings were also prescribed for Talghore working circle. As no records were available for the period 1899 to 1918 it was not possible to say as to how far the prescriptions of the plan were carried out.

7.2.2 Maye's working scheme (1907-1917):-Under this scheme the number of class I trees of various coniferous species to be felled annually under selection felling was fixed. Owing to the

lack of records it is not possible to ascertain the intensity or order of felling made during the scheme period.

7.2.3 Gibson's felling scheme (1919-1931):-Gibson compiled two felling schemes in 1919, one for silver fir and spruce for thirty yerars and for Kail and Deodar for a period of twenty five years. Assessing the number of class I and II fir and spruce through partial enumerations, an annual yield to two thousand trees of 180 cms. Girth and over was prescribed. The fellings were to be governed by silvicultural requirements of the crop. Natural regenerations was to be supplemented by sowing. The schemes did not work well.

7.2.4 Mehar Chand's Working Plan (1932-33 to 1961-62):-This plan covered demarcated forests 6336.63 ha. There were four working circle which are briefly described as under:-

7.2.4.1 (i) The Regular Working circle (1646.32 ha):- Kail, Deodar and Chil forests with some proportion of fir and spruce in upper reaches of kail areas were included in this working circle. Growing stock was enumerated down to 30 cms. Diameter. An exploitable diameter of 60 cms was expected to be attained in 120 years. The rotation was therefore fixed of 60 cms was expected to be attained in 120 years. The rotation was therefore fixed at 120 years, 432.94 ha was allotted to PB-I., 291.60 ha to PB-II and remaining to PBs.- III and IV.

7.2.4.2 Annual yield:-Annual yield was to be controlled separately for PB-I, PB-III and PB-IV. All trees above 45 cm. diameter in P.B.I. and 50 cms.diameter in PB-III and IV were to count towards yield. The results of felling were as under:-

Table-7.1 **Volume(m3)**

Species	**Felled**		**1949-50 to 1960-61 Excess or deficit**			**Total**
	PB-I & IV	**PB-III**	**Total**	**PB-I & IV**	**PB-III**	
Deo.	1666.56	605.24	2271.80	(+)770.56	(-)839.55	(-)68.99
Kail	1200.64	4062.91	5263.55	(-)2058.56	(+)720.91	(-)1355.65
Chil	77.28	43.68	120.96	(-)5325.92	(-)57.12	(-)383.04
Fir	458.08	2863.28	3321.36	(-)3103.52	(-)3991.12	(-)7094.64

The table shows excess felling of deodar in PB-I although the total yield from the circle for it is within the permissible limit of 5% diviation. The deficit in case of the other species is due to non availability of overwood for fellings in view of poor progress of regeneration in PB-I. areas.
Besides the above 23.52m3 of Deodar, 556.64m3 of Kail and 601.44 m3 of fir was removed from PB-II areas for meeting with the right holders demands during 1949-50 to 1960-61.

7.2.4.3 (ii) The Oak and Fir working circle (1369.71 ha.):-The main object of management was to maintain and increase the proportion of oaks for sustained production of charcoal. The silvicultural system adopted was selection system. Enumeration of conifers and oaks was carried out down to 30 cms. diameter in 15 cm. diameter classes. An exploitable diametere of 60 cms and a rotation of 200 years was adopted because spruce and fir were expected to be of 75 cms. and over in diameter during this period. Felling cycle was fixed at 15 years. Yield was prescribed by number of trees i.e. 210 Oak trees, 175 spruce and 125 silver fir, every year.

7.2.4.4 Yield positon:-During the year of 1949-50 to 1960-61 against prescribed yield of 2520 oaks and 3600 fir and spruce trees only 293 oak and 1600 fir trees were removed. In addition 264 kail, 12 Deodar and 1 chil trees were also removed during the period. The deficit fellings in Oaks were due to lack of demand for charcoal in Shimla market because coke was readily available. The spruce and fir trees also could not be worked due to lack of demand.

7.2.4.5 (iii) The Fir working circle (2784.37 ha):-Based on enumerations over 45% of the area, and exploitable size of 75 cms. 790 trees of spruce and 410 trees of fir were to be removed annually on a fifteen years felling cycly. Deficit fellings were permitted and against 14400 trees of spruce and fir only 8325 trees were felled from 1949-50 to 1960-61. however, 276 kail and 46 deodar trees were also felled during this period.

7.2.4.6 (iv) The Protection working circle (536.22 ha):-High line kharsu, areas prescribed. The number of buffaloes grazing along Hatu ridge was restricted to 30.

7.3 KOTGARH ILLAQA FOREST

No control was being exercised over these forests before Colonel wace's revenue and forest settlement of 1985-86. The people were at a liberty to cut and remove any thing from anywhere. It was only after the settlement that some sorts of restrictions were imposed by appointing a

forest Guard under the control of the Tehsildar of the illaqa. Burning of forests was prohibited. Villagers were allowed to remove firewood and timber for building purposes. However, they were required to get the trees marked before removal.

7.3.1 Mointire's plan (1886-1990):-Although the plan was completed by Miontire in 1890m, its prescription was applied from the very beginning, which mainly consisted of thinnings and removal of mature trees under selection improvement fellings.

7.3.2 Coventry's working plan (1901-1921):-Coventry's prescriptions were almost the same as in the previous working plan.Between (1921-1926) there was no working plan and fellings were limited to the removal of those damaged in 1921 fires.

7.3.3 Glover's working plan (1927-28 to 1946-47):-Glover prescribed thinning, restocking of burnt areas and meeting the demand of right holders. These prescriptions were carried out in letter and spirit except in Fir areas where no thinnings were carried out due to the material being unsaleable. This resulted in congested crop. The fellings for meeting with the right holders demands resulted in over fellings in the forests near the villages.

7.3.4 Mohan Singh's Working Plan (1947-48 to 1967-68):-This plan also covered only the Reserved Forests with the object of creating normal forests with normal distribution of age classes and to meet with demands of fruit packing cases etc. there were two working circle as under:-

7.3.4.1 (i) The Regular working circle (456.84 ha):-Nagkelo reserved forests except compartment 7 (b) (new 59 b) was included in this working circle. Enumeration of Deodar, Kail, Fir, Chil, Oaks, Jaman, Akhrot, Khanor, and other miscellaneous species were carried out down to 20 cm. diameter. Seventy percent coniferous crop consisted of class III and IV trees. Large sized trees were very few. Rotation was fixed from 100-150 years. Fixation of regeneration period, allotment to P.Bs. and calculation of yield by volume was considered unnecessary as only C grade thinnings were prescribed. These forests were reserved for meeting the requirements of right holders who could take only Kail trees. For packing cases only 100 trees of spruce and fir or diseased Kail trees were given out of the trees marked in thinnings at rates fixed by the Conservator.

7.3.4.2 Following is the result of the fellings carried out from 1948-49 to 1960-61 on account of the trees marked for right holders.

Table-7.2

Species	**Number of trees**	**(m3)**
Deodar	1561	1290.80
Kail	3290	2958.68
Fir	535	1238.21
Chil	2120	1202.40

Due to selection marking for right holders, groups of poles remained neglected.

7.3.4.3 (ii) Selection working circle (114.21 ha):-In compartment 7 (b) (new 59 b) enumerations were carried out down to 20 cms. diameter. Exploitable diameter was fiexed at 70 cms. and rotation at 100-150 years with a felling cycle of 10 years. Only selection felling and thinnings were prescribed.

7.3.4.4 Yield:- Yield was restricted to 0.75 % of the existing growing stock of coniferous and broad leaved species with a permissible deviation of 10 %. Trees upto 20 cms. diameter were counted towards yield. Deodar planting in sheltered places and sowings of Kail and chil on spurs was prescribed over an area of 16.20 ha.

7.3.4.5 Not a single prescription of the working plan was carried out.

7.4 KHANETI STATE FORESTS

Felling of every mature and over mature tree was allowed before 1885 and I and II classes tree after 1885 for the sake of revenue.

7.4.1 Pring's working scheme (1935-36 to 1944-45):-This plan prescribed thinnings in congested crop and restocking of blanks. 72.0 ha of area was prescribed to be thinned every year. As there was no demand in the market for the thinned material till 1942-43, the prescriptions for the last 9 years were carried out only in the last 3 years towards the end of the working plan

period. Out of 36.45 ha prescribed for sowing and planting 29.16 ha were sown and planted successfully.

7.4.2 Puran Singh working scheme (1935-36 to 1944-45):-Prescription of the unapproved working scheme remained in force till the revision of the plan by I.D. Sharma. Puran Singh prescribed the following working circles:-

7.4.2.1 (i) The Improvement working circle (57.10 ha):-It consisted of Deodar and Kail forests of Sadoch illaqa. No enumerations were carried out. Only C grad thinnings and improvement fellings in favour of Deodar and Kail were prescribed. Yield was prescribed by area on 10 years cycle. A total number of 485 deodar 490 kail and 2 fir trees were felled upto the year 1960-61 for meeting the right holder's demands. Sowing and planting prescribed in 202 ha were carried out.

7.4.2.2 (ii) The Protection working circle (699.03 ha):-This circle comprised of the area containing spruce, fir, glades of broad leaved species and some kail trees. Neither any enumerations were not carried out nor were any fellings prescribed. It was kept reserved for meeting the future demand if any. In that case it was to be worked under selection –cum-improvement fellings, that too, only in Nun and Sidhpur D.P.F's.

The number of trees all classes felled upto 1960-61 is as under:-

Table-7.3

Deodar	**Kail**	**Fir**	**Total**
31	188	1088	1307

7.4.2.3 Planting programme for restocking of 62.77 ha was not followed at all.

7.5 SANGRI STATE FORESTS

No authentic attempts were made in 1933 by the then ruler to frame some rules for the management of the forests by regulating the grant of timber and other forests produce, grazing, grant of nautors etc. after the state in Himachal Pradesh when these forests formed part of

Kumarsain range, these forests were brought under the sustematic management in I.D.Sharma's working plan (1961-62 to 1975-76).

7.6 I.D. SHARMA's WORKING PLAN (1961-62 to 1975-76)

This plan dealt with reserved, Demarcated and un-demarcated forests of all the areas discussed earlier, with the main object of improving the existing stock, to rehabilitate degraded un-demarcated, protected forests and to bring the same to the condition as near as possible to normal forests. It was also aimed at replacing the diseased Kail trees with deodar, meeting the requirements of local people, including packing cases. As such the following working circles were constituted in this plan.

7.6.1 (i) The Regular working circle (9791.28 ha):-This circle comprised of Deodar and Kail forests, pure or mixed spruce and oak forests which were suitable for working under the system of concentrated regeneration felligns. The extent of various types of forests covered by this circle was 462.91 ha of reserved forests, 4992.23 of demarcated and 4336.38 ha of un-demarcated forests.

7.6.2 Silviculture system:-Mixed forests were to be worked under the modified Punjab Selection system. In irregular crops and steep slopes, selection markings were to be carried out. Pure fir forests were to be worked under true selection system with thinnings and improvements fellings in middle aged groups. In both the cases efforts were to be made to give preference to Deodar over kail and kail over spruce and fir. Rotation was fixed at 150 years, exploitable diameter at 60 cms diameter for all the conifer species. Filling cycle was fixed at 15 years.

7.6.3 Result of working:-The prescribed felling programme in respect of export felling series as well as local felling series was not properly. The position of the annual yield species –wise at the end of the working plan period (1975-76) is as under:-

Table-7.4

Species	Precribed Yield	Yield obtained	Variation
Deodar	21000	24613	+ 3613
Kail	67200	80128	+ 12928
Chil	3394	5399	+ 2005
Fir/Spruce	69720	56766	- 12954

From the above result it is quite clear that there had been an over felling in the circle in respect of Deodar (17.20 %), Kail (19.24 %) and chil (59.07 %) whereas under felling in respect of fir (18.58 %).

7.6.4 (ii) Chil working circle (3064.23 ha):-All pure chil forests mentioned in Regular working circle or selection working circle or previous plan were allotted to this working circle. In addition some U.P.F's were also included in this circle. The total area of various type of forests allotted was 107.73 ha of reserved forests, 966.73 ha D.P.F's and 1989.76 ha of U.P.F's.

7.6.5 Silviculture system:-These forests were worked under punjap shelterwood system. Rotation was fixed 120 years with four periodic blocks. Regeneration period was fixed at 30 years and exploitable diameter 60 cm.

7.6.6 Yield Position:-The prescribed yield consisted of final yield from PB-I, PB-III and PB-IV and intermediate yield from PB-II. and PB-III. The increment was not taken into consideration. No yield was prescribed for deodar, kail and spruce.

7.6.7 Result of working:-The yield position of this working circle is given below:-

Table-7.5

Species	**Precribed Yield**	**Yield obtained**	**Variation**
Chil	20580	12700.74	-7879.26

7.6.8 (iii) The Rampur fuel working circle (944.46 ha)-It comprised of such Ban oak forests as were within economic reach of Rampur town. It consisted of 77.76 ha of Theda C.2 (new 153) D.P.F and rest of 862.65 ha of U.P.F. it constituted one felling series. It was estimated that out of 944.46 ha of area only 729 ha would contain Ban oak and other broad leaved species.No enumerations were carried out. The system adopted was selection and improvement fellings. Exploitable diameter was fixed at 50 cm. diameter in case of Ban and 60 cm. in case of deodar, kail, chil, and spruce.

7.6.9 Yield position:-The yield was to be regulated by area. Annual felling coupe prescribed was of 48.60 ha of net oak area. This was expected to produce 6583.93 qtl. of fuelwood, out of which 3557.74 qtl. was to be converted into 731.54 qtl. of charcoal.

7.6.10 Result of working:-As per the record available from compartment history files not a single prescription of the working plan was followed.

7.7 C.L SUDHERA's WORKING PLAN (1978-79 to 1992-93)

This working plan covered the RFs, DPFs and UPFs of all the areas falling within erstwhile (as on 31.03.83) Kotgarh Forest Division.The following working circles were constituted in this plan.

7.7.1 (i) The Chil working circle : - (Area -9116.36 ha):-This working circle comprised of pure chil forests / all those forests containing 60 % or more chil as major component of the crop.

7.7.2 Enumeration :-The growing stock and number of trees was assessed with the help of relascope by post stratified random sampling.

7.7.3 Silvicultural system:-The forest allotted to this working circle, were proposed to be managed under the punjb shelterwood system with the provision of retention of compact group of well grown poles as a part of future crop.

7.7.4 Control of Yield:-All the trees upto 10 cum dbh and above removed from PB-I and part of working circle of any kind of operation were to be counted towards yield.

7.7.5 Result of working:-

Table-7.6

Species	Precribed Yield	Yield obtained	Variation
Deodar	1254	501.326	-752.674
Kail	2079	2101.217	+ 22.217
Chil	43725	6529.38	-37195.6
Fir/Spruce	1045	2287.971	+ 1242.971
B/L	8184	29.533	-8154.467

From the above result it is clear that no excess felling has been done.

7.7.6 (ii) Deodar and Kail working circle:- (Area-543.31 ha):-This working circle comprised of all the Deodar and Kail forests having pure crop of Kail and Dodar or with 60% or more of it as its component in a compartment.

7.7.7 Enumeration:-The growing stock was assessed with the help of relascope. The total no. of samples taken in this working circle were 458.

7.7.8 Silvicultural system:-The forests were to be managed under Punjab shelterwood system. The young crop upto 40 cm dia and 0.2 ha. in extent of area was to be retained as future crop. Artificial regeneration of the forest was prescribed to be carried out in all forests immediately after main fellings.

7.7.9 Calculation of Yield:-The total prescribed annual yield for different species in this working circle worked out as under:-

Table-7.7

Chil	Kail	Deodar	Fir /S	Total (in cum)
451	9372	7189	3833	20845

7.7.10 (iii) Miscellaneous:-The demand for right holders was to be met from areas prescribed for felling. However DFO could deviate and do some markings in UPF's.

7.7.11 Result of working:-Overall position of final yield (in cum) obtained from PB's for the year is as under:-

Table-7.8

Species	Precribed Yield	Yield obtained	Variation
Deodar	79079	19427.41	-59651.6
Kail	103092	54802.19	-48289.8
Chil	4961	615.48	-4345.52
Fir/Spruce	42163	24514.83	-17648.2
B/L	9986	212.479	-9773.521

From the above statement it is clear that no excess felling has been done.

7.7.12 (iv) Fir and Spruce working circle :- (Area = 17476-52 ha) :- All the forests of fir and spruce occurring either as pure crop or in a mixture containing fir and spruce with 60 % or more were included in this working circle.

7.7.13 Enumeration: - Enumeration was carried out with the help of relascope.

7.7.14 Silvicultural System:-The modified Punjab shelter wood system was prescribed. Young crop upto 20 cm dia and 0.1 ha in extent was to be retained as future crop.

7.7.15 Result of working:

Table-7.9

Species	**Precribed Yield**	**Yield obtained**	**Variation**
Deodar	21032	6210.08	-14821.92
Kail	33550	17251.51	-16298.49
Chil	759	135.24	-623.76
Fir/Spruce	266343	410263	+143920
B/L	96415	1501.71	-94913.29

From the above statement it is clear hat in Fir / Spruce excess felling has been done as prescribed by the working plan. In this division this is the only working circle where prescriptions of working plan were followed to some extent and concentrated regeneration fellings were carried out.The total area marked in this working circle is approximately 2000 ha. Whereas artificial regeneration was carried out in 200 ha. The status if regeneration is overall good.

7.7.16 (v) Broad Leaved (Overlapping) Working circle (Area -1333.65ha):-This working circle overlapped all other working circles some broad leaved species are found all over forests.The growing stock is estimated 2041923 cum. Annual prescribed yield is 14308 cum. Modified Punjab Shelter Wood system was prescribed in Ban Oak forests coppice with standards system was to be applied. The yield of all species was to be controlled by

area. The trees removed annually were to be counted towards prescribed yield. The deviation is as under:-

Table-7.10

Precribed yield (cum)	**Yield obtained (cum)**	**Deviation (cum)**
22803	1339.05	-21463.95

7.7.17 (vi) Protection working circle (Area -12800.81 ha):-All forests which are inaccessible have been included in this working circle.

7.7.18 Silvicultural System:-These forests were to be protected against felling, fire, grazing. However, salvage marking were allowed every 5th year.The trees removed as under:-

Table-7.11

Deodar (cum)	**Fir/Spruce (cum)**	**Total (cum)**
4.126	9.568	13.694

7.8 R.K. KAPOOR WORKING PLAN's (1993-94 to 2007-08)

Under Kapoor's Plan, the forests were divided into six working circle as under: -

i) The Chil working circle.
ii) The Deodar working circle.
iii) The Fir Spruce working circle.
iv) Oak working circle.
v) Plantation working circle.
vi) The Protection cum rehabilitation working circle.

7.8.1 (i) The Chil Working Circle: - This includes all reserved, demarcated and un-demarcated protected forests containing chil as pure crop. These forests shall be worked under

Indian Irregular shelter wood System. Regeneration will be obtained naturally, supplemented with artificial regeneration.

7.8.1.2 General Constitution, Character and Valuation of Crop:-Nearly all pure Chil forests of this Division were allotted to this Working Circle. The total area of this working circle including Rampur Forest Division was 7192.97 hac. The forests on the whole are under stocked, vastly variable in density and normal distribution of age class is lacking except PB-IV and PB-III areas. Young to middle aged trees predominate and mature trees are rather scattered in them.The whole area of this working circle was stock mapped on 4"=1 mile scale. General site quality is II & III. The density varies from 0.2 to 0.6. Total enumeration of Chil and some important B.L. species was carried out in 10cm dia classes down to 20cm d.b.h for whole working circle and exploitable diameter at 60 cm.

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

7.8.1.4 Calculation and Control of Yield:-Yield in this circle was also calculated on the basis of von Mantel's increment method, and by Hufnagel's formula. As prescribed in para 2.13.1 & 2.13.2, the annual prescribed yield for PB-I is 1200 cum and 100 in PB-IV. The removals from PB-II, PB-III will count towards PB-I.

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

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

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

7.8.1.8 Cultural Operations:-Subsidiary Silvicultural Operation were suggested in PB-I areas were carried out by removing the refuse and effective closure of the areas and regeneration by artificial planting/regeneration including, cleaning of the areas as a safeguard against fire hazards. Control burning was followed and fire lines maintained as per availability of funds as per recommendations.

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

7.8.1.10 Results of Implementation of the Plan:-

i) The yield position as it stood on 31-3-2007 is deficit in PB-I and PB-IV due to general moratorium on green felling and removal of TD. Thus the deficit position is due to the ban on green felling of trees.

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

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

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

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

The total volume removed from this working circle during the plan period including Rampur Forest Division was (-) 13465.274 m^3 and position of deviation as on 31.03.2007 is as under: -

Table-7.12

Species	PB-I	PB-IV	Total	Annual Deviation %age
Deodar	245.423	85.553	330.976	PB-I (-) 98.57 %
Kail	(-) 657.433	111.863	(-)545.570	PB-IV (-) 100.00%

Fir/Spruce	299.090	320.614	619.704	
Chil	(-) 13119.473	(-)750.911	(-)13870.384	
B.L.	0	0	0	
Total	**(-)13232.393**	**(-) 232.881**	**(-) 13465.274**	

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

7.8.2.1 General Constitution, Character and Valuation of Crop:-Nearly all pure crops of deodar and kail ore having 60% more of these species were allotted to this working including Rampur Forest Division was 15817.93 hac. The crop varies from young to over mature trees. Regeneration in these forests especially of kail is very good except in the areas where the incidence of grazing is very high. The whole area of this working circle was stock mapped on 4" = 1 mile scale. Average site quality for deodar & kail is II. The density varies from 0.4 to 0.5. Total enumeration of deodar, kail & important B.L. Species were carried out in 10 cm dia classes down to 20 cm d.b.h. for whole working circle.

7.8.2.2 Method of Treatmemt: - The forests of this working circle were managed under Indian irregular shelter wood system. The working was to be done on selection principal along steep & precipitous slopes and broken ground. Rotation period was 120 years, based an age at which trees will attain d.b.h. of 60 cms. Four periodic blocks were constituted with specific allotment. The re-generation period of 30 years was therefore adopted.

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

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

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

important and to regeneration, and as Subsidiary Silvicultural Operation must be carried out soon after the felling have been completed.

7.8.2.6 Results of Implementation of the Plan: -

i) The yield position as it stood on 31.03.2007 is excessive in PB-I and deficit in PB-IV due to the removal from PB-II and PB-III counted towards the yield from PB-I on account of salvage marking and removal of TD to meet the demands of the local people. However, the over all removal from the PB's is deficit during the plan period because of non-marking of green trees due to the imposition of ban on green felling.

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

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

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

The total volume removed from this working circle during the plan period including Rampur Forest Division was (-) 76091.040 m^3 & the position of deviation as on 31.03.2007 are as under: -

Table-7.13

Species	PB-I	PB-IV	Total	Annual Deviation %age
Deodar	15576.259	(-)12185.950	3390.309	PB-I (+) 148.16%
Kail	(-)19993.001	(-)51682.861	(-)71675.862	PB-IV (-) 70.62%
Fir/Spruce	25585.213	(-)31510.164	(-)5924.951	
Chil	(-)104.233	(-)1776.303	(-)1880.536	
Total	**21064.238**	**(-)97155.278**	**(-)76091.040**	
B.L.	1118.535	979.584	2098.119	

7.8.3 (iii) Fir Spruce Working Circle:-The forests which predominately support Fir & Spruce have been allotted to this working circle. Due to heavy felling in the past for apple packing cases, most of the forest allotted to this working circle gives a look of PB-I area. Felling done in the past in the majority of the areas has not been followed by regeneration.

7.8.3.1 General Constitution, Character and Valuation of Crop: - All the Fir, Spruce forests having pure crop or having 60% more of these species were allotted to this working circle. The total area of this working circle including Rampur Forest Division was 16030.20 hac. The forests are very much under stocked and there is preponderance of mature to over mature trees. Natural regeneration in these forests is very poor and artificial regeneration is also inadequate. The whole area of this working circle was stock mapped on $4'' = 1$ mile. The average crown density is 0.3 to 0.4 & the crop is irregular. The UPF's areas have not specific boundaries.

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

7.8.3.3 Calculation and Control of Yield: - Yield in this working circle was calculated on the basis of Hufnagel's formula. As prescribed in the para 4.13. & 4.14, the yield of the working circle will be controlled by PBs but all the species taken together. Removals from PB-II & PB-III will count towards PB-I. The annual prescribed yield for Deodar, Kail, Chil & Fir-Spruce for PB-I is 4280 cum and 425 cum in PB-IV.

7.8.3.4 Regeneration Fellings: - Annual sequence of felling has laid down in this working circle. No regeneration felling has been under taken due to ban on green felling in compliance of the Supreme Court's order. However, salvage marking of dead, drying, dry and uprooted trees and T.D. has been carried out as per the norms fixed by the expert committee in compliance of the Supreme Court's order in CWP NO. 202/95 dated 12.12.1996 and as per settlement report. Thus seeding felling prescribed in PB-I areas was remained un-felled owing to change in Policy of the Government.

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

7.8.3.6 Results of Implementation of the Plan: -

i) The yield position as it stood on 31.03.2007 is deficit in PB-I is excess and deficit in PB-IV due to the removals from PB-II and PB-III counted towards the yield from PBs together. The reason for the excess deviation is account of the removal of dead, dying, dry and uprooted trees in salvage marking. The deficit in PB-IV is due to the ban on green felling incompliance of the Supreme Court's order.

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

iii) The various prescription & suggestion made in the working circle were not followed in practice owing to change in Policy of the Government and large areas could not be regenerated due to lack of fund. This is for the reason that felling as prescribed, were not done with the result opening in the canopy not carried out, with the result all the area were not properly regenerated.The total volume removed from this working circle during the plan period including Rampur Forest Division was 39667.197 m^3 & the position of deviation as on 31.03.2007 is as under: -

Table-7.14

Species	PB-I	PB-IV	Total	Annual Deviation %age
Deodar	1185.206	(-) 97.427	1087.779	PB-I (+) 289.84%
Kail	10333.500	1050.682	11384.182	PB-IV (-) 64.62%
Fir/Spruce	36081.202	(-) 31387.971	4693.231	
Chil	22193.867	308.138	22502.005	
Total	**69793.775**	**(-) 30126.578**	**39667.197**	
B.L.	1258.241	432.548	1690.789	

7.8.4 ((iv) Oak Working Circle:-The forests containing oak species either in pure patches or glades either in the above regular working circle have been included in this working circle. Since there was ban on the green felling of oak trees, no felling were done during this plan period.

7.8.4.1 General Constitution, & Character: - It included predominantly Ban oak forests mostly in pure patches. Pure Ban oak forests occur in sheltered belts in Ahar and in Narenty forest of Kangal Block of Kumarsain Range. The area allotted to this working circle including Rampur Forest Division was 1356.05 hac. The forests are of selection type and irregular in age. Its chief associates are Rhododendron arboretum, Pyres ovalifolia with some Machilus

odoratissima, Litsaea umbrosa, Cedrala serrata, Sarpinus viminea etc. in damp ravines. There is generally good deal of shruby undergrowth chiefly of Barberis, Indigofera, Gerardiana, Sarcococca saliana, Daphne, Desmodium, Prinsepaa utilis, Viburnum species & Rubus species etc. No separate compartment and sub compartments have been formed in this working circle.

7.8.4.2 Analysis & and Valuation of Crop : - Rendom enumeration has been done with the help of Rela scope. No commercial fellings were prescribed. It was felt that coppice shoots had come up well only in those forests that were away from habitation and where biotic pressure was low eg. Narenty and Ahar forests. No commercial felling were carried out and only dead, dry, uprooted & fallen trees were removed in salvage marking & utilized for meeting the requirements of the right holders. ***No yield or its control was prescribed***.

7.8.4.3 Results of implementation of the plan: - The only activity prescribed was planting as per the oak planting programme, but not much appears to have been achieved under it as most of the forests still are under stocked. The weeding, cleaning & other cultural operations were not carried for want of funds. The control over lopping of Ban-Oak trees as envisaged was also not enforced, resulting in depletion of growing stock and degradation especially in near habitation but status forest is good where biotic pressure are low. ***Though no yield was prescribed,*** the total volume removed from this working circle during the plan period including Rampur Forest Division was 349.415 m^3 and position of deviation as on 31.03.2007 is as under: -

Table-7.15

Species	Balance deviation as on 31.03.2006	Felling during the year	Total deviation as on 31.03.2007	Remarks
Deodar	22.844	1.824	24.688	No yield by volume has been prescribed. The removal has been shown as prescribed in para 5.10 of the plan
Kail	233.202	17.245	250.447	
Fir/Spruce	43.015	0	43.015	
Chil	1.778	0	1.778	
B.L.	25.131	4.376	29.507	
Total	**325.970**	**23.445**	**349.415**	

7.8.5. (V) Plantation working circle: -

(i) Departmental afforestation:-The working circle included areas which are blank and poorly stocked but are suitable for raising plantation of valuable and economically important

species. The plantation raised in the UPF's in the past has not fully established were included in this circle. The detail of plantation carried out under departmental plantation is as below:-

Table-7.16

Year	Area in hac.	Year	Area in hac./
1996-97	558	2005-06	289
1997-98	858	2006-07	319
1998-99	980	2007-08	188
1999-00	489	2008-09	175
2000-01	312	2009-10	161
2001-02	172	2010-11	174
2002-03	87	2011-12	61.35
2003-04	160		
2004-05	155		

(ii) **Plantation under Compensatory afforestatio**n:-Total 25 hac. plantation has been carried out under CA from 1997-98 to 2011-12, the detail of which is given below:-

Table-7.17

Year of plantation	Name of Area planted	Area in hac.	Amount spent	Name of project for which area diverted.
1997-98	UPF Thanu	2	47000	Chamola Kangal Road.
1997-98	UPF Tipper	3.2	75000	Oddi Ghareothi Road.
1998-99	UPF Dhalli	2.5	60000	Link Road to Village Kupri.
1999-00	UPF Sainj	2	470000	Bhutti Lauga Road.
2000-01	UPF Palvi	1.5	35000	Kot-Kandyali Road
2007-08	UPF Shagelta	4.5	105700	Ekantbari-Dawala Road
2007-08	UPF Manan C-130	3	60000	Nog to Kirti Road.
2008-09	UPF Deha	4	83200	Baragaon Matiana Road.
2009-10	-	-	-	-
2010-11	-	-	-	-
2011-12	-	-	-	-

(i

ii) Plantation under Midhill Project:-Total 84 ha. plantation has been carried out from 2006-07 to 2011-12 by planting various broad leaved species,the detail of which is given as below:-

Table-7.18

Year	Are in ha.	No. of plants	Location of plantation.
2006-07	35	38500	Nahal,chcodli,Serdhar,Bhanoli,Maholi,Serdhar
2007-08	70	77000	B/Gaon,Sirkot,Paresh,Dhinguli,Trambli,Khekhar,Kachinghati I&II,B/Gain I & II,Khekhar I & II.
2008-09	45	47700	Maholi,Lambidhar I & II.
2009-10	85	82500	Maholi I & II,Sanaogi I & II,Tinidhar-I & II,Kanda I,II & III,Lambidhar I & II.
2010-11	55.7	61410	Bargal,Kanda and Hathia
2011-12	20	22000	Bani Nal

7.8.5.1 General character of the vegetation: - It included the young plantation and other blank areas and all areas which are under stocked. No separate compartments or sub compartments have been formed in this working circle. Random enumeration has been done with the help of Rela-scope. No commercial felling was prescribed.

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

7.8.5.3 Results of implementation of the plan: -

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

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

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

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

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

Though no yield was prescribed, the total volume removed from this working circle during the plan period including Rampur Forest Division was 434.686 m^3 & the position of deviation as on 31.03.2007 is as under: -

Table-7.19

Species	Balance deviation as on 31.03.2006	Felling during the year	Total deviation as on 31.03.2007	Remarks
Deodar	24.778	0	24.778	Neither any yield nor any control prescribed for this working circle.
Kail	69.724	0	69.724	
Fir/Spruce	22.228	0	22.228	
Chil	267.374	0	267.374	
B.L.	50.582	0	50.582	
Total	**434.686**	**0**	**434.686**	

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

7.8.6.1 General character of the vegetation: - It included all forests which are not included in other working circles. Besides all forests, which are not fit for working under any silvicultural system have also been included in this working circle. No separate compartments or sub compartments have been formed in this working circle. No enumerations have been carried out in these areas. No commercial felling was prescribed. The total area allotted to this working circle is 11650.15 hac. including Rampur Forest Division. The break up of the forest areas of Kotgarh Forest Division allotted to this working circle is as under: -

Table-7.20

Name of Range	R.F.	D.P.F.	U.P.F.'S	Total in hac.
Kotgarh	-	307.41	-	307.41
Kumarsain	-	132.84	214.63	347.47
Total	**-**	**440.25**	**214.63**	**654.88**

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

7.8.6.3 Results of the implementation of plan: -

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

Though no yield was prescribed, the total volume removed from this working circle during the plan period including Rampur Forest Division was 25933.371 m^3 & the position of deviation as on 31.03.2007 is as under: -

Table-7.21

Species	Balance deviation as on 31.03.2006	Felling during the year	Total deviation as on 31.03.2007	Remarks
Deodar	1503.681	0	1503.681	Neither any yield nor any control prescribed for this working circle.
Kail	861.587	0	861.587	
Fir/Spruce	4862.821	0	4862.821	
Chil	17.223	0	17.223	
B.L.	14457.434	4230.625	18688.059	
Total	**21702.746**	**4230.625**	**25933.371**	

7.8.6.4 Miscellaneous Regulations:-

(i) Boundaries:-No separate compartments or sub-compartments have been formed in this working circle.However the detail of boundary pillars repaired during the last working plan period has been given in para 1.9 of Chapter-I in Part-I.

(ii) Fire Protection:-The existing fire lines were maintained and cleared according to availability of Budget. The record of fire cases prior to 1999 is not available in this office as the

same burnt in fire incident in divisional office during 2/99 whereas the following fire incidents /cases have occurred after 1999-2000:-

Table-7.22

Year	No of cases	Area affected/burnt (ha.)	Approximate loss to plantation/forest etc.
1999-2000	43	973.63	817000/-
2000-01	4	29	16900/-
2001-02	2	24 .	69420/-
2002-03	10	67.	730925/-
2003-04	4	76.	1331240
2004-05	27	36.	480000/-
2005-06	1	12.	No loss.
2006-07	29	261.97.	10,80,540/-
2007-08	13	163.10.	174000/-
2008-09	11	53.5.	54000/-
2009-10	34	337.5.	10,68,500/-
2010-11	27	154.5.	99310/-

Outbreak of any forest pest/disease infestation has not been noticed/reported during the last Working Plan period. No research work has also been carried out in this behalf.

(iii) Resin Tapping:-Resin tapping in this Division is being done by HPSFC Ltd. by adopting Rill method. The record of resin blazes handed over to HPSFC from Govt. forest prior to 1999 is not available as the same gutted in fire incident during 2/99 whereas the detail of resin blazes handed over from 1993 is given in para 4.1.2 of Part-I.

(iv) Salvage Lots:-The following salvage lots have been handed over to HPSFC for exploitation during the last working plan period is given in para4.1.1 of Part-I.

7.8.6.5 Joint Forest Management:-FDA Project was started in this division during the year 2003-04 to 2006-07 for carrying out various plantations, EPA and Soil moisture conservation activities. Under FDA 36 Nos JFMCs in Kotgarh and Kumarsain Ranges were constituted and registered in the office of Chairperson of FDA i.e. CF Rampur and works executed as per approved microplans and as per MOU. The list of JFMCs formed and microplans of each JFMCs is as under:-

Table-7.23

1.Naula	10. Khalawan/Dabi	19.Thathal	28. Kacheri
2.Barghaon	11. Bhareri/Ghasni	20.Ropa	29.Kalmu
3. Kanda	12.Phirnoo	21.Dakolu	30.Malendi
4. Kirti	13.Jadoon	22.Majhrog	31.Koti
5. Kepu	14.Dakoon	23.Moghra	32.Teshan
6.Sainj/Paranoo	15.Dhar	24.Kanda(K/sain)	33.Chalan/Dhinguli
7.Lohala	16.Shillaru	25.Shiwan	34.Dhaguli
8.Guna	17.Sharmla	26.Chamola	35.Jhamoli
9.Pamlai/Bankoti	18.Kiara	27.Gharewati	36.Kachhi.

The component wise detail of afforestation works carried out under FDA Kotgarh is given as under:-

Table-7.24

Sr. No.	**Component.**	**Target fixed(ha)**	**Target achieved (ha.)**
1.	Assisted Natural Regeneration	475	475
2.	Artificial Regeneration	615	615
3.	Pasture Development	225	225
4.	Mixed Plantation	245	245
5.	Herbs Medical Value	175	175
	Total	**1735 hac.**	**1735 hac.**

The microplan period of these JFMCs have elapsed and proposal of new JFMCs are yet to be prepared .New micro plans shall be prepared for the JFMC where the people participation is satisfactory.

7.8.6.6 Maps:- No map of Division are available in Kotgarh Division.However the following survey sheets are available:-

Table-7.25

Sr. No.	**Survey sheet No.**	**Scale/Nos.**
1.	Plain Sheet No.53E/7/SW	1:15000=1
2.	Plain Sheet No.53E/8/NW	1:15000=1
3.	Plain Sheet No.53E/11	1:50000=6
4.	Plain Sheet No.53E/12	1:50000=5
5.	Plain Sheet No.53E/7	1:50000=5
6.	Plain Sheet No.53E/8	1:50000=10
7.	Plain Mounted Sheet No.53E/11/SW	1:15000=1No.
8.	Plain Mounted Sheet No.53E/12/NW	1:15000=1No.
9.	Plain Sheet No.53E/7/SE	1:15000=38Nos.

10.	Plain Sheet No.53E/7/SE	1:15000=20Nos
11.	Plain Sheet No.53E/7/SE	1:25000=1No.
	Total sheets	**89**

7.8.6.7 Compartment History Files:- The detail of compartment history files maintained in Kotgarh Forest Division is given as under:-

Table-7.26

Division/Range	**C.H.files maintained**			**Total**
	RF	**DPF**	**UPF**	
Division	-	-	-	Burnt in fire incident during 2/99
Kotgarh	9	16	76	101
Kumarsain	-	42	78	120

Compartment history files maintained in Ranges have been maintained uptodate.

7.8.6.8 Control Forms: - The control forms have been prepared annually and deviation statement has been mentioned in working circle-wise in concerned chapters.

7.8.6.9 Plantation and Nursery Journals:- The plantation/nursery journals have been maintained at Range level and have been updated.where the people participation is satisfactory.

7.8.6.10 Studies on changes in land use patterns:-No special research/studies on changes in land use patterns,urbanization,industrialization,pollution/drying up of natural springs/wetlands has been done in the past whereas local people have their own land holdings which has been utilized mostly for horticulture purposes. The use of LPG by local people has increased and people use firewood during winters.

7.9 PAST REVENUE AND EXPENDITURE

The statement of the summary of Revenue & Expenditure under various scheme incurred in Kotgarh Forest Division during R.K. Kapoor's Plan are given as under: -

Table-7.27

Year	Revenue 0406 Forests	2406 Forest Non-Plan	2406 Forest Plan	4216 Capital outlay	2402 Soil Conservation N/Plan	2402 Plan	Surplus/ Deficit
1993-94 to 1999-2000	Record no available due to fire						
2000-01	2,72,759	59,86,300	62,21,100	-	59,200	3,65,500	-
2001-01	3,49,947	41,69,200	58,43,700	-	2,64,000	9,50,700	-
2002-02	2,30,254	37,74,700	45,86,700	-	2,00,000	9,17,200	-
2003-04	3,13,528	77,81,500	15,03,200	1,00,000	11,26,000	4,26,100	-
2004-05	2,27,542	80,88,300	18,13,800	5,50,000	10,16,600	1,10,000	-
2005-06	20,04,684	69,67,800	81,59,700	6,50,000	10,72,600	2,15,500	-
2006-07	2,12,679	83,11,500	84,31,600	8,33,300	13,92,100	1,95,000	-
2007-08	668093	8064600	6391900	-	1844700	185000	-
2008-09	170333	14279900	3239300	-	1967100	745000	-
2009-10	219977	14527407	3520000	-	1963400	979800	-
2010-11	264502	5288933	3905300	200000	745583	25000	-

7.10 PAST YIELD

The average out- turn % for last four years is as follow **(**Figures taken from H.P.S.F.D.C)

Table-7.28

PAST OUT- TURN

S.N	Type of Lot	Out – turn %
1	Timber	45 %
2	Resin	34 Qts per 1000 blazes

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CHAPTER VIII

STATISTICS OF GROWTH AND YIELD

For compilation of growth and yield statistics of various species, the following documents have been relied upon.

(i) Growth and yield statistics of common Indian Timber species(Himalayan Region) Volume-I
(ii) Indian Forest Utilisation, Volume I & Volume II FRI Publication.
(iii) Punjab Forest Manaual, Volume III
(iv) PIS, North Zone, Shimla forest resources of H.P for Kotgarh, Kullu and Seraj division, 1979.

8.1 SELECTION OF VOLUME TABLE

The volume tables of the working plan under revision has been adopted in this working plan also.These volume tables are mainly based upon Project Report of P.I.S, North Zone, Shimla,1979.were considered fit to be used for the species of this division.The volume table for all the coniferous and broad leaved species are given as under:-

Table-8.1

Volume Table/Factor—Kotgarh Forest Division

Spp.	Diameter Class									
	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & Above
	Volume in cum									
Fir	0.136	0.429	1.040	1.969	3.217	4.784	6.669	8.872	11.394	14.234
Spruce	0.136	0.429	1.040	1.969	3.217	4.784	6.669	8.872	11.394	14.234
Kail	0.152	0.423	0.964	1.775	2.855	4.205	5.824	7.713	9.872	12.301
Deodar	0.178	0.486	1.039	1.824	2.855	4.126	5.638	7.390	9.384	11.618
Chil	0.089	0.328	0.775	1.478	2.470	3.789	5.466	7.531	10.013	12.938
Kharsu	0.134	0.300	1.000	1.800	3.000	4.600	6.300	8.000	9.600	12.200
Mohru	0.134	0.300	1.000	1.800	3.000	4.600	6.300	8.000	9.600	12.200
Bird Cherry	0.079	0.100	0.700	1.400	2.200	3.200	4.300	5.600	6.900	9.600
Walnut	0,079	0.200	0.800	1.500	2.500	3.800	5.100	7.200	8.900	11.300
Maple	0.117	0,200	0.700	1.300	2.100	3.300	5.000	6.500	8.500	11.200
Taxus	0.104	0.234	0.467	0.821	1.310	1.945	2.734	3.685	4.803	6.094
Ban	0.134	0.313	0.657	1.201	1.974	2.996	4.285	5.857	7.723	9.894
Boxwood	0.094	0.294	0.708	1.336	2.177	3.232	4.500	5.982	7.678	9.587

Carpinus	0.094	0.294	0.708	1.336	2.177	3.232	4.500	5.982	7.678	9.587
Other B/L	0.094	0.294	0.708	1.336	2.177	3.232	4.500	5.982	7.678	9.587

Note: - The volume table/factors refer to under bark volume including cull upto a top diameter limit of 5 cm. over bark from the base of the tree for conifers. In case of B/L species (Taxus, Ban, Boxwood, Carpinus and rest of B/L it is also inclusive of branch wood volume upto a limit of 5 cm. over bark diameter.

8.2 QUALITY CLASS ASSESSMENT

Quality class for Deodar, Kail,Chil,Fir and Spruce has been determined by measuring heights of two dominant trees of dominant species in each forest and then compairing them with those given for standard quality class in the yield table for those species. The quality class assessed has been recorded in the compartment history files.

8.3 GROWTH RATES

Diameter, Age, Height relationship from P.I.S. report on Forest resources of Chenab Vally Vol 1975-1976 as adopted in previous working plan is reproduced below:-

Table-8.2

Diameter/Age/Height Relationship

Dia (cms)	Fir		Blue Pine		Deodar		Chil	
	Age Years	Height (m)	Age Years	Height (m)	Age Years	Height (m)	Age Years	Height (m)
10	--	--	--	--	--	--	--	--
20	--	--	52	16	67	17	--	--
30	95	25	66	24	79	25	62	22
40	125	28	78	29	89	30	71	27
50	153	33	89	33	100	33	79	29
60	179	38	100	35	111	35	84	30
70	201	42	111	38	122	37	89	31
80	220	45	124	40	134	38	--	--
90	238	43	136	41	144	39	--	--
100	254	49	--	--	--	--	--	--

The annual volume increment % obtained by Forest Survey of India, Shimla for different species of this division are as under:-

Table-8.3

Speices	Increment %
Deodar	1.74
Kail	1.58
Chil	2.16
Fir	1.06
Spruce	1.20

8.4 DENSITY

The density of crop in each compartment has been estimated ocularly and recorded in the respective compartment history files. It varies widely from 0.1 to 0.9 but average density is 0.3

8.5 ESTIMATION OF GROWING STOCK

The growing stock in each of the working circles is given below:-

Table-8.4

The Chil Working Circle

Species	No. of stems	Volume in m3	% stems	% Volume
Deodar	20052	14707.21	3.64	5.78
Kail	45963	36792.48	8.34	14.46
Chil	380472	126701.99	69.00	49.80
Spruce	4007	7284.26	0.73	2.86
Fir	923	1572.31	0.001	0.60
Ban	65490	51419.00	11.88	20.21
Moh/Kar	1435	740.28	0.002	0.29
B.L	33020	15280.99	5.99	6.00
Total	**551363**	**254377.33**	**99.58**	**100.00**

Table-8.5

The Deodar/Kail Working Circle

Species	No. of stems	Volume in m3	% stems	% Volume
Deodar	388120	227446.63	28.71	21.36
Kail	463891	419422.02	34.31	39.39
Chil	213773	58444.30	15.81	5.48
Spruce	98040	190537.93	7.25	17.89
Fir	13911	11067.00	1.02	1.03
Ban	277	37.12	0.0.	0.0

Moh/Kar	173673	157742.79	12.84	14.8
B.L	119	0.00	0.0	0.0
Total	**1351804**	**1064697.78**	**99.94**	**99.95**

Table-8.6

The Fir/Spruce Working Circle

Species	No. of stems	Volume in m3	% stems	% Volume
Deodar	76158	72319.84	6.63	4.14
Kail	143781	160339.02	12.52	9.19
Chil	0	0	0	0
Spruce	322777	442841.34	28.10	25.37
Fir	531036	976411.31	46.24	55.94
Ban	21754	27922.02	1.90	1.60
Moh/Kar	33871	45014.84	2.95	2.58
B.L	19027	20628.28	1.66	1.18
Total	**1148405**	**1745476.66**	**100.00**	**100.00**

Table-8.7

The Oak Working Circle

Species	No. of stems	Volume in m3	% stems	% Volume
Deodar	110	88.27	0.20	0.19
Kail	2094	1863.48	3.92	4.12
Chil	4791	5954.73	8.96	13.19
Spruce	592	399.42	1.10	0.88
Fir	0	0.00	0	0
Ban	18415	23533.88	34.45	52.15
Moh/Kar	0	0.00	0	0
B.L	27447	13281.95	51.35	29.43
Total	**53448**	**45121.73**	**99.98**	**99.96**

8.6 OUT-TURN

The conversion % of different species as per Punjab Forest Manual is as under:-

Species	Percentage
Deodar	49
Kail	48
Chil	45
Fir/Spruce	30

The conversion factor of solid volume, stacked volume and weight of fuelwood and miscellaneous B/L species are as under:-

Ratio of solid volume/stacked volume =1:2
Air-dry weight/cum solid volume = 7.20 qtls.
Air-dry weight/cum stacked volume = 3.60 qtls

8.7 STOCK MAPS

Stock Maps on 1:15000 scale has been prepared for each compartment.

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CHAPTER IX

ESTIMATE OF THE CAPITAL VALUE OF THE FOREST

9.1 CAPITAL VALUE OF LAND UNDER FOREST

An estimate of the capital value of the forests based on the existing (2011-2012) values of land is as under. The capital value is however subject to variation.

Table-9.1

Gradation of Land	Total Forest area in ha.	App. Cost of land per ha. in Rs.	Total cost in Crores
R.F	570.62	25000	1.43
D.P.F	8274.43	25000	20.69
U.P.F	4234.23	25000	10.59
Total	**13079.28**	25000	**32.71**

9.2 CAPITAL VALUE OF THE GROWING STOCK

The capital value of the growing stock has been worked out on the basis of out-turn percentage given in para 8.6 in Chapter-VIII and market rates given by HPSFDC for the year 2010-2011

Table-9.2

S.N	Type of Timber	App. Estimated value Crores
1	Deodar	748
2	Kail	1163
3	Chil	196
4	Spruce	449
5	Fir	664
6	B/L	45
	Total	**3265**

9.3 VALUE OF MINOR FOREST PRODUCE

The main minor forest produce are resin, Medicinal herbs, Guchhi and grass and their values are as under:-

Table-9.3

S.N	Type of Produce	App. Estimated value in Crores
1	Resin	0.48
2	Medicinal herbs,Grasses	0.10
	Total	**0.58**

9.4 TOTAL CAPITAL VALUE OF FORESTS

Thus the total value of the Forest works out to be Rs 280.29. The detail is as under:-

Table-9.4

S.N	Capital Value of	App. Estimated value in Crores
1	Land	32.71
2	Growing Stock	3265.00
3	MFP	0.58
	Total	**3298.29**

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PART-II

FUTURE MANAGEMENT

DISCUSSED AND PRESCRIBED

CHAPTER I

BASIS OF PROPOSALS

1.1 GENERAL OBJECTS OF MANAGEMENT

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

i) To conserve & improve the quality and density of the existing forests for the protection, preservation, improvement, prevention of erosion and maintenance of an equitable flow of water in the streams and rivers.

ii) To develop the sustainable management of forests, watershed, wild life & biodiversity and to rehabilitate the degraded forests & habitat through plantation of native species, habitat improvement, assisting of natural regeneration and taking up soil & water conservation measures.

iii) To protect and conserve the forest biodiversity including total protection of endangered species of flora and fauna consistent with environmental considerations, to increase the proportion of more valuable species while conserving biodiversity etc.

iv) To bring the growing stock to a condition nearer the normal forest, as far as possible.

v) To meet the bonafide requirements of the local population for timber, fuel, agricultural implements, grazing & other forest produce for enhanced livelihood of the local people.

vi) To aware and educate local people through participatory forest management about importance of biological diversity & their role to human ecology and environment and also seek their co-operation and participation in its management.

vii) To develop recreational forestry to encourage nature based Eco-tourism and to regulate and control growing tourist influx in forests under the Indian Forest Act, 1927, The Environment Protection Act, 1986 read with

provision of Forest (Conservation) Act, 1980 in consonance with Eco-tourism principles to cater the need of tourist/visitors to the area.

1.2 STATE FOREST POLICY

Himachal Pradesh Government have also formulated a Forest Policy for the Pradesh vide letter No.Fts.(8)17-5/10 dated 3rd September,1980. Important feartures of this policy are as under:-

i) To have 50% of the geographical area of the state under Forest by 2000 A.D and to raise this percentage to 60% ultimately.

ii) To do fellings strictly in accordance with the prescriptions of sanctioned working plan and to count all removals from the forests towards the prescribed yield.

iii) To do fellings subject to coming up of regeneration.

iv) To undertake Forest and Revenue Settlements simultaneously and to regulates an Act of Legislation.

v) To meet the requirement of local right holders judiciously keeping in view the conditions of forests.

vi) Managements of watersheds to be given due importance.

vii) To undertake afforestation in the vest blank stretches in the productive waste land under Social Forestry Programme with appropriate involvement and co-operation of the people especially youth and school children.

viii) To plant fast growing fuel and fodder species near habitations to meet the requirements of the local people.

ix) To redue cattle population rationally, fixing norms of grazing under comprehensive legislation.

x) To promote tourism alongwith improvement of forest vegetation.

xi) To ban shooting of Big and Small game in the Pradesh for the development of wildlife and to establish sanctuaries all over the state.

xii) Not to grant the lease for the extraction of minerals the prior consent of Forest Department.

xiii) To create research facilities in the forest department to solve problems of applied nature.

1.3 CONSTITUTION OF WORKING CIRCLES & METHOD OF TREATMENT

To achieve the above objective of management, the following working circles will be constituted: -

i) The Chil Working Circle

ii) The Deodar Kail Working Circle.

iii) The Fir Spruce Working Circle.

iv) The Oak Working Circle

v) The Plantation(overlapping) Working Circle

vi) The Forest Protection (overlapping) Working Circle

vii) JFM (overlapping) Working Circle

viii) Wild Life Management (overlapping)Working Circle

ix) NTFP (overlapping) Working Circle

The areas suggested to be constituted in these Working Circles are given below:-

Table-1.1

S.No	Name of Working Circle	Area in ha.			Total
		R.Fs	D.P.Fs	U.P.Fs	
1	Chil	107.73	981.92	1502.14	2519.79
2	Deodar/Kail	462.89	2159.04	1750.39	4372.32
3	Fir/Spruce	---	4404.66	6.07	4410.73
4	Oak	---	64.80	87.88	152.68
5	Protection	---	355.16	214.65	569.81
6	Plantation	---	308.85	673.10	981.95
	Total	**570.62**	**8274.43**	**4234.23**	**13079.28**

1.3.1 The Chil working circle: - This includes all R.Fs, D.P.Fs and U.P.Fs containing chil as pure crop.These forests shall be worked under Indian Irregular shelterwood System. .Regeneration will be obtained naturally, supplemented with artificial regeneration.

1.3.2 The Deodar Kail working circle:-All the forests having more than 60% deodar and kail on easy slopes have been allotted to this working circle. The forests are not even aged. The forests will be managed under Indian Irregular shelterwood System. The emphasis will be laid on natural regeneration supplemented with artificial regeneration.

1.3.3 The Fir Spruce working circle:-The forests which predominately support Fir and Spruce have been allotted to this working circle. Due to heavy fellings in the past for apple packing cases, most of the forest allotted to this working circle gives a look of PB-I area. Fellings done in the past in the majority of the areas have not been followed by regeneration.Emphasis will be laid to regenerate PB-I areas by artificial means in a time bound manner.

1.3.4 The Oak working circle:-The forests containing Oak species either in pure patches or glades either in the above regular working circles have been included in this working circle. Since there is ban on green fellings of Oak trees, felling will be carried out only after obtaining the approval of competent authority. Silvicultural system will be coppice with standard.

1.3.5 The Plantation (overlapping) working circle:- This working circle includes areas which are blank and poorly stocked but are suitable for raising plantation of valueable and economically important species.The plantation raised in U.P.Fs in the past which are not fully established are also included in this circle.

1.3.6 The Forest Protection (overlapping) working circle:-This working circle contains all the forests which are not included in other working circles described above. These forests are on steep and precipitous slopes where concentracted fellings are not advisable due to environmental hazards and regeneration problems. The blanks and other degraded areas are to be rehabilitated by planting species suitable to the area.

1.3.7 The JFM (overlapping)working circle:-The degraded U.P.Fs near to the habitations, D.P.Fs close to habitations which are facing fast natural resource depletion are prime candidates to be taken up for JFM.

1.3.8 The Wild Life Management (overlapping) working circle:-This Working Circle is constituted for emphasizing the necessity of conservation of wildlife and collection of information for better management of wild life. The whole tract has a variety of wild animals and birds since the forests are distributed from low elevation to the high snow bound areas. Therefore, this working circle overlaps all other working circles.

1.3.9 The NTFP (overlapping) working circle:-This would be an overlapping working circle covering all the working circle and is constituted to ensure systematic development

and exploitation of non timber forest produce species that occur in the division. The main non timber forest produce found/extracted in the division are Resin, Medicinal plants, grass.

Note: _ The area of different working circles differs from the expired working plan due to creation of new DPFs from earlier existing listed UPFs.

1.4 BLOCKS AND COMPARTMENTS

In the period of the expired working plan, eighty six (86) U.P.Fs have been converted/notified into D.P.Fs .Out of 86 newly notified D.P.Fs, 62 forests have been entered in revenue record and remaining 24 forests are being entered.The following old listed U.P.Fs stands fully converted into new D.P.Fs as under:-

Table-1.2

Range	**Old U.P.F**	**Old Comptt.**	**Area**	**New D.P.F**	**New Comptt.**	**Area**
Kumarsain	Bijave	224	52.65	Bijave	CN-1	34-64
	GhareniDhar	230	60.75	GhareniDhar	CN-2	21-83
	Kanda	230	60.75	Kanda	CN-3	36-91
	Kufar Jubbar	231	56.07	Kufar Jubbar	CN-4	23-86
	Bhutt	232	125.55	Bhutt	CN-5	10-39
	Banaharkand	233	72.09	Bhaunan	CN-6	25.00
	SarDhar	234	96.79	SarDhar	CN-7	5-47
	Tharu	234	96.79	Tharu	CN-8	29-86
	Bargoh	235	40.50	Bargoh	CN-9	33-45
	Dibbar	235	40.50	Dibbar	CN-10	20-72
	BishanDhar	236	89.10	BishanDhar	CN-11	53.69
	Bargal	237	141.75	Bargal	CN-12	165.11
	Karadu	237	141.75	Karadu	CN-13	13.53
	Teshanban	239	72.20	Teshanban	CN-14	22.81
	Ghadalu	241	24.03	Ghadalu	CN-15	14.17
	Panu Dhank	242	20.25	Panu Dhank	CN-16	22.80

	Devlidhar	242	20.25	Devlidhar	CN-17	12.87
	Thalinal	242	20.25	Thalinal	CN-18	9.96
	Shrikot	244	61.15	Shrikot	CN-19	38.62
	Tarushah	244	61.15	Tarushah	CN-20	29.34
	Manu	245	22.27	Manu	CN-21	19.85
	Oddi Dhank	246	30.37	Oddi Dhank	CN-22	44.12
	Lathi	269	4.05	Lathi	CN-23	10.09
	Khekhar	272	10.12	Khekhar	CN-24	8.75
	Shanand	275	12.15	Shanand	CN-25	6.04
	Paneog	276	8.10	Paneog	CN-26	8.99
	Bharara	277	12.15	Bharara	CN-27	6.85
	Banalag	278	20.25	Banalag	CN-28	9.60
Kotgarh	Shakli	119	24.30	Shakli	CN-29	11.57
	Tikkar	120	63.18	Tikkar	CN-30	34.15
	Bharari	125	6.07	Bharari	CN-31	5.05
	Manan	130	12.15	Manan	CN-32	19.19
	Sainj	135	72.90	Sainj	CN-33	40.05
	Dalan	136	28.35	Dalan	CN-34	18.2
	Kepu	138	121.50	Kepu	CN-35	132.51
	Rewali	139	121.50	Rewali	CN-36	91.15
	Nagraon	146	16.20	Nagraon	CN-37	14.94
	Bhera	147	12.15	Bhera	CN-38	4.39
	Naula	148	81.00	Naula	CN-39	81.76
	Baragaon	150	20.25	Baragaon	CN-40	8.01
	Kharola	152	10.12	Kharola	CN-41	7.72
	Jhanga	153	17.82	Jhanga	CN-42	7.27
	Dakon	187	97.20	Dakon	CN-43	108.15
	Jadoon	188	25.11	Jadoon	CN-44	21.42
	Dhomari	189	48.60	Dhomari	CN-45	16.57
	Dharuri	190	30.37	Dharuri	CN-46	26.99
	Daroo	191	19.44	Daroo	CN-47	19.44

	Shilikandli	192	72.90	Shilikandli	CN-48	49.57
	Nagrot	193	89.10	Nagrot	CN-49	58.65
	Singhadhar	194	12.96	Singhadhar	CN-50	15.16
	Firnu	196	48.60	Firnu	CN-51	46.88
	Sheglta	197	68.40	Sheglta	CN-52	66.89
	Tapra	198	176.17	Tapra	CN-53	147.37
Kumarsain	Churath	279	32.40	Churath	CN-54	28.79
	Kehari	280	28.35	Kehari	CN-55	30.66
	Khaltudhar	281	36.85	Khaltudhar	CN-56	40.98
	Lohala	283	14.48	Lohala	CN-57	20.34
	Dalahar	284	24.30	Dalahar	CN-58	37.63
Kotgarh	Bhalari	142	32.44	Bhalari	CN-59	6.30
	Bahali	142	32.44	Bahali	CN-60	33.37
	Shathala	145	50.62	Shathala	CN-61	38.83
Kumarsain	Barogdhar	234	96.79	Barogdhar	CN-62	53.83

1.5 PERIOD OF WORKING PLAN

The period of the revised Working Plan will be 15 years from 1.4.2012 to 31.3.2027. The period from 2008-09 to 2011-12 is to be treated as Plan holiday because no green fellings took place during this period. The increment put on is to be taken towards building up of growing stock. The fellings during the period are to be reflected in control forms with respect to this Working Plan and the excess removals are to be carried forward and deflcits ignored. No necessity of intermediate revision is anticipated until or unless there is a natural calamity on large scale.

****

CHAPTER II

THE CHIL WORKING CIRCLE

2.1 GENERAL CONSTITUTION OF WORKING CIRCLE

All the pure chil forests or the forests containing chil as 60% or more in composotion have been including in this working circle.

2.2 GENERAL CHARACTER OF VEGETATION

The overall condition of the vegetation is that the forests are poorly stocked and mostly blanks with heavy biotic interference like grazing, fire, breaking up land for agricultural use especially in U.P.Fs. Defective resin tapping of trees for extraction of resin and uprooting of trees by wind and snow have caused a vast destruction of the crop.

2.3 FELLING SERIES AND CUTTING SECTIONS

There will be one felling series

2.4 AREA STATEMENT

Total area of this working circle is 2591.79 ha.which works out to be 19.81 % of the total area of the division**.**

Table-2.1

Range	**R.F**	**D.P.F**	**U.P.F**	**Total in ha.**
Kotgarh	107.73	313.42	233.77	654.92
Kumarsain	--	668.50	1268.37	1936.87
Total	**107.73**	**981.92**	**1502.14**	**2591.79**

2.5 BLOCKS AND COMPARTMENTS

No change has been made in exisiting compartments or sub-compartments. Some compartments which are having very poor stocking have been transferred to newly created plantatiohn working circle.

2.6 SPECIAL OBJECTIVES OF MANAGEMENT

The special objects of the Management will be as under:-

i) To check retrogression in chil forests by fires to maintain the tempo of regeneration and improve the environment thereby.

ii) To improve stocking of low density chil forests.

iii) To convert irregular forest into a regular one to the extent possible under the prevailing conditions.

iv) To restock the poorly stocked and blank areas through artificial regeneration.

v) To obtained maximum possible yield of resin and Timber on sustained basis

2.7 ANALYSIS AND VALUATION OF THE CROP

2.7.1 Stock Map:-All the forests including in this working circle has been stock mapped on 1:15000 scale.

2.7.2 Density:- The crown density of the compartments have been estimated ocularly and has been recorded in respective compartments history files.

2.7.3 Age Classes: - The crop is very irregular**.** The overall age condition is as under:-

Table-2.2

	Young, 10-29 cms.	**Middle aged, 30-59 cms**	**Mature & over Mature 60 &above cms.**
Stems	340506	33639	6327
Volume	48879.87	43781.83	34042.40

2.7.4 Enumerations:- The growing stock has been assessed by random sampling.

Table-2.3

Volume of Chil Working Circle

Specie	**10-20**	**20-30**	**30-40**	**40-50**	**50-60**	**60-70**	**70-80**	**80-90**	**90-100**	**100 & above**	**Volume In cum**
PB-I											
Deodar	12.99	140.45	77.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	231.37
Kail	939.21	4711.37	4909.65	2547.13	208.42	306.97	576.58	0.00	0.00	0.00	14199.32
Chil	728.30	2664.61	1535.59	1522.78	4894.06	6756.92	2166.18	1044.55	0.00	0.00	21312.99
Spruce	29.51	62.63	0.00	143.74	0.00	0.00	0.00	0.00	0.00	0.00	235.89
Fir	0	0	0	0	0	0	0	0	0	0	0.00
Ban	230.614	179.349	0	260.617	0	0	0	0	0	0.00	670.58
Moh/ Khar	9.78	21.90	0.00	0.00	219.00	0.00	0.00	0.00	0.00	0.00	250.68
B.L	33.84	84.67	101.95	97.53	311.31	0.00	0.00	0.00	0.00	0.00	629.30
Total	**1984.24**	**7864.98**	**6625.12**	**4571.80**	**5632.79**	**7063.89**	**2742.76**	**1044.55**	**0.00**	**0.00**	**37530.13**
PB-II											
Deodar	0	0	0	0	0	0	0	0	0	0	0.00
Kail	0	0	0	0	0	0	0	0	0	0	0.00

Chil	17631.52	14578.94	1101.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33314.74
Spruce	0	0	0	0	0	0	0	0	0	0	0.00
Fir	0	0	0	0	0	0	0	0	0	0	0.00
Ban	0	0	0	0	0	0	0	0	0	0	0.00
Moh/ Khar	0	0	0	0	0	0	0	0	0	0	0.00
B.L	0	0	0	0	0	0	0	0	0	0	0.00
Total	**17631.52**	**14578.94**	**1101.28**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**33314.74**
PB-III											
Deodar	1234.25	2883.44	4275.49	3379.87	1555.98	375.47	321.37	332.55	84.46	23.24	14469.02
Kail	1335.62	2052.82	2903.57	3974.23	3571.61	2964.53	2778.05	2190.49	612.06	110.71	22498.52
Chil	1523.59	4250.22	9575.90	11138.21	11369.41	9089.81	5963.41	3938.71	1251.63	155.26	58252.70
Spruce	214.88	131.70	342.16	559.20	987.62	1851.41	1513.86	1011.41	239.27	199.28	7048.36
Fir	24.75	92.66	153.92	381.99	183.37	435.34	73.36	195.18	0.00	28.47	1572.31
Ban	4446.12	2849.87	4249.48	7057.08	6506.30	5719.36	4919.18	5792.57	2741.67	6460.78	50748.42
Moh/ Khar	86.83	92.10	216.00	61.20	33.00	0.00	0.00	0.00	0.00	0.00	489.60
B.L	1531.17	2366.11	2703.85	3142.27	1632.75	1321.89	715.50	819.53	222.66	201.33	14651.69
Total	**10397.21**	**14718.92**	**24420.37**	**29694.05**	**25840.04**	**21757.81**	**16284.73**	**14280.44**	**5151.75**	**7179.07**	**169730.61**
PB-IV											
Deodar	4.81	0.97	1.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.82
Kail	7.30	40.61	46.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	94.65
Chil	3504.64	3997.99	1794.90	257.17	592.80	670.65	202.24	52.72	0.00	0.00	13823.77
Spruce	0	0	0	0	0	0	0	0	0	0	0.00
Fir	0	0	0	0	0	0	0	0	0	0	0.00
Ban	0	0	0	0	0	0	0	0	0	0	0.00
Moh/ Khar	0	0	0	0	0	0	0	0	0	0	0.00
B.L	0	0	0	0	0	0	0	0	0	0	0.00
Total	**3516.75**	**4039.57**	**1842.21**	**257.17**	**592.8**	**670.65**	**202.24**	**52.72**	**0**	**0**	**13925.24**

Table-2.4

Yield Calculation Table
Growing Stock in PB-I & PB-IV

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Volume In cum
Deodar	17.80	141.43	78.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	238.19
Kail	946.50	4751.98	4955.92	2547.13	208.42	306.97	576.58	0.00	0.00	0.00	14293.97
Chil	4233.02	6662.34	3330.95	1779.51	5485.87	7430.23	2372.24	1097.27	0.00	0.00	35136.76
Spruce	29.51	62.63	0.00	143.74	0.00	0.00	0.00	0.00	0.00	0.00	235.89
Fir	0	0	0	0	0	0	0	0	0	0	0.00
Ban	230.61	179.35	0.00	260.62	0.00	0.00	0.00	0.00	0.00	0.00	670.58
Moh/ Khar	9.78	21.90	0.00	0.00	219.00	0.00	0.00	0.00	0.00	0.00	250.68
B.L	33.84	84.67	101.95	97.53	311.31	0.00	0.00	0.00	0.00	0.00	629.30
Total	**5501.06**	**11904.30**	**8467.78**	**4828.53**	**6224.60**	**7737.20**	**2948.82**	**1097.27**	**0.00**	**0.00**	**51455.47**

Table-2.5

General Abstract

Growing Stock all PBs

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Volume In cum
Deodar	1252.05	3024.86	4354.45	3379.87	1555.98	375.47	321.37	332.55	84.46	23.24	14707.21
Kail	2282.13	6805.22	7860.46	6521.35	3780.02	3271.49	3354.62	2190.49	612.06	110.71	36792.48
Chil	23388.04	25491.83	14007.35	12919.20	16855.28	16516.25	8335.65	5038.24	1251.63	155.26	126704.09
Spruce	244.39	194.34	342.16	702.93	987.62	1851.41	1513.86	1011.41	239.27	199.28	7284.26
Fir	24.75	92.66	153.92	381.99	183.37	435.34	73.36	195.18	0.00	28.47	1572.31
Ban	4676.73	3029.21	4249.48	7317.69	6506.30	5719.36	4919.18	5792.57	2741.67	6460.78	51419.00
Moh/ Khar	96.61	114.00	216.00	61.20	252.00	0.00	0.00	0.00	0.00	0.00	740.28
B.L	1565.01	2450.78	2805.80	3239.80	1944.06	1321.89	715.50	819.53	222.66	201.33	15280.99
Total	**33529.71**	**41202.90**	**33989.62**	**34524.03**	**32064.63**	**29491.21**	**19233.54**	**15379.97**	**5151.75**	**7179.07**	**254377.32**

2.7.5 Total growing stock per ha. Works out as under:-

Table-2.6

P.B	Area in ha.	Vol. of conifers In cums	Vol. of B.L In cums	Vol./ha of conifers In cums	Vol./ha of B.L In cums	Total vol/ha In cums
I	730.16	35979.56	1550.56	49.28	2.12	51.40
II	785.27	33311.74	---	42.42	----	42.42
III	929.94	103839.02	65771.31	111.67	70.72	182.38
IV	146.42	13925.14	---	95.10	---	95.10
Total	**2591.79**	**187055.46**	**67321.87**	**72.17**	**26.02**	**98.14**

2.8 SILIVICULTURAL SYSTEM

The forest allotted to this working circle will be managed under the Indian Irregular shelter Wood System. The marking will be done on slection principal along steep slopes, nallas and broken ground. Efforts will be made to regenerate the area naturally with effective closure. Artifical planting will only resorted where natural regeneration fails to come up in a reasonable time.

2.9 ROTATION AND CONVERSION PERIOD

The roration of 120 years has been adopted. The general quality class of the tract is II/III FRI.

2.10 EXPLOITABLE DIAMETERS

Exploitable diametere fixed is 60 cm.d.b.h due to better out turn in the form of sleeper size which fatches better price in the market.

2.11 REGENERATION PERIOD

Regeneration period is fixed as 30 years. Efforts will be made to regenerate the area naturally supplemented with artificial planting**.**

2.12 FELLING CYCLE

Corresponding to the plan period the felling cycle will be of 15 years.

2.13 DIVISION INTO PERIODS AND ALLOTMENT TO PBs

With 120 years as rotation and 30 years for regeneration there will be 4 periodic Blocks. As the crop in generally of younger age classes with very few middle aged-mature trees. So PBs can not be divided on text book pattern. Yet every attempt is made to allot areas to befitting PBs depending on dia classes available. The allotment is discussed as under:-

PB-I:-

Forests with generally blanks & having majority of mature trees are alloted to this PB. No fellings were generally done in the plan under revision in PB-1. Some closures for artificial regeneration were, however done in PB-1 areas. All such areas have been put in PB-1. No change is made in PB-1 area of the plan under revision. The area generally support young chli crop either scattered or in groups.

PB-II:-

Area with pre-dominance of middle aged treees have been alloted to PB-II as in an under revision.

PB-III:-

Forests comprising chil pole crops with fair proportion of middle aged and mature trees have been allotted to PB-III as in plan under revision. No change has been made therein.

PB-IV:-

All the compartment having young poles with scattered mother trees have been allotted to PB-IV as in the plan under revision. No change has been made therein.

The allotment of the areas to different Ranges is as under:-

Table-2.7

Range	PB-I	PB-II	PB-III	PB-IV	Total in ha.
Kotgarh	218.98	167.38	221.89	46.67	654.92
Kumarsen	511.18	617.89	708.05	99.75	1936.87
Total	**730.16**	**785.27**	**929.94**	**146.42**	**2591.79**

2.14 CALCULATION OF YIELD

2.14.1 Yield from PB-I area:-It is observed during field insepction that only 10% of V, IV and III classes and 20% of II and 30% of I class trees would be available tor felling. These figures are arrived at after analysis number of stems per ha. also.

Thus the yield of PB1 is caclulated as under:-

$$Y = \frac{C1V1+C2V2+C3V3}{P}$$

C1= Constant representing the fraction of volume of V, IV and III class trees available for felling during the regeneration period. CI has been taken as 0.1

C2= Constant representing the fraction of volume of IIA&IIB class trees available for felling during period. C2 has been taken as 0.2.

C3= Constant representing the fraction of volume of IA above class trees available for felling during period. C3 has been taken as 0.3

VI= Volume of trees of V, IV & III class trees of chil/ conifer.

V2= Volume of trees of II class trees of chil/ conifer.

V3= Volume of trees of I class trees of chil/ conifer.

P= Regeneration period which is 30 years

(CHIL) $Y = \frac{0.1 \times 4928.5 + 0.2 \times 6416.84 + 0.3 \times 9967.65}{30}$ = **159 cum or say 160 cum**

(KAIL) $Y = \frac{0.1 \times 10560.23 + 0.2 \times 2755.55 + 0.3 \times 363.92}{30}$ = **57 cum or say 60 cum**

2.13.2 Yeild from PB-IV Area:-

The crop density in lower classes is low therefore removal has been prescribed for high classed. Only 30 % of the volume available in II A and above class of all PB-IV area be removed and rest retained for fire insurance reasons.

The yield of PB-IV thus comes as under:-

$$Y = \frac{\text{Total volume of IIA and above trees of chil/ conifers in PB-IV}}{30}$$

$$\frac{1775.98 \times 0.3}{30} = \textbf{18 cum or say 20 cum}$$

2.14.3 Yield from PB-II & III Area:-Since the forests are poorly stocked there is hardly any acope of thinning. Hence no green fellings are prescribed. The removals will, However, count towards the yield of PB-I.

2.14.4 Prescribed annual yield:- Total Annual prescribeded yield in cum will therefore be 160 cum of Chil and 60 cum of kail totaling to 220 in PB-I and 20 cum of Chil in PB-IV. The yield will be PB wise.

2.14.5 Control of Yeild:-All removales of whetever nature down upto Vth class count for the yield of this working circle. The removls from the PB-II, PB-III will count towards PB-I. The yield should not exced by 25% of the annual prescribed yield (220 and 20 cum) in a year and will further be checked by every fifth year when the cummulative deviation should be within +/- 10%.

2.14.6:- Yeild in relaion to CAI:-The annual volume increment percentage (CAI) is already given in para 8.3 of part- I.Based on these the yeild is compared to the increment as under:-

Table-2.8

Species	**Total Standing Volume (cum)**	**Increment % age**	**Annual Increment**	**Annual Yield**	**Prescribed Yield % age**

Chil	123958.72	2.16	2677	180	7
Kail	36788.56	1.58	581	60	10
Total	**160747.28**		**3258**	**240**	**7**

2.15 TABLE OF FELLING

The felling programme for PB-I & PB-IV areas is as under:-

Table-2.9

Year	Range	Name of Forest	Comptt. No.	Area in ha.	Allotmen	Nature of felling
2012-13	--	--	--	--	--	Only salvage marking in The division
2013-14	--	--	--	--	--	Only salvage marking in The division
2015-16	--	--	--	--	--	Only salvage marking in The division
2016-17	--	--	--	--	--	Only salvage marking in The division
2017-18	Kumarsain	UPF Deha	207(part)	130.81	PB-I	Seeding Felling
2018-19	Kumarsain	UPF Deha	207(part)	130.81	PB-I	Seeding Felling
2019-20	Kotgarh	DPF Khaltudhar	CN-56	40.38	PB-I	Seeding Felling
2021-22	Kumarsain	UPF Tipper	264	58.72	PB-I	Secondary Felling
2022-23	Kotgarh	DPF Churt	CN-54	28.79	PB-I	Seeding Felling in patches
2023-24	Kumarsain	DPF Gadhalu	CN-15 (part)	14.17	PB-I	Secondary Felling
2024-25	Kumarsain	DPF Gadhalu	CN-15 (part)	14.17	PB-I	Seeding Felling
2025-26	Kumarsain	UPF Kholti	220	54.67	PB-I	Seeding Felling
2026-27	Kumarsain	UPF Shillaropa	223	49.41	PB-I	Seeding Felling

2.16 METHOD OF EXECUTING THE FELLING

2.16.1 In PB-I Areas:-

i) The number of seed bearers retained will be 20-25 per ha.

ii) Marking should be heavier in area with favourable soil conditions and lighter in areas with heavy soils, dense undergrowth, bed fire records and no hot aspects.

iii) Seed bearers retained should be in 40-60 cms. d.b.h. range free from twist with well formed bole well formed crown, free from disease, free from all kind of malformations, free from rot, sound at tapping height. If

required number of seed bearers in the d.b.h. range of 40-60 cms is not available, preference should be given to tree of 30-40 cms. d.b.h. instead of trees over 60 cms d.b.h.

iv) Number of seed bearers should be more on ridges than on lower slopes.

v) Number of seed bearers should be more when available trees have under developed feathery crowns instead of well developed crowns.

vi) Seed bearers should be as evenly distributed as possible. However, quality of seed bearers should not be compromised for the sake of spacing.

vii) Compact groups of well grown poles with average 30 cms d.b.h. and not less than 0.1 ha. in area should be retained as advance growth to form part of future crop. Such patches of advance growth should be thinned to ***C*** Grade of thinning along with marking in the area.

viii) Scattered saplings expected to merge with future crop can be retained but scattered holes not likely to merge with future crop should be marked for felling.

ix) Only selection-cum-improvement marking will be carried out in 10 m wide belt on either side of main roads for road protection.

x) In case of serious fires, heavy wind damage in PB-I areas under exploitations, marking should be revised.

xi) All IV class and over trees of broad leaved species will be marked for felling to extend chil unless some are required to be retained and protection purpose.

xii) On steep and broken ground, marking should confirm to selection principles.

xiii) Secondary felling be made when the young regeneration has attained a height of 1-2 m and has been properly tended.

xiv) Final fellings will be made when young regeneration has attained a height of 2m and has been adequately spaced and control burnt twice.

xv) Marking should be carried out by an officer not below rank of F.R. and at least 50% of the marking should be checked by a Gazetted officer.

2.16.2 In PB-II & PB-III Areas: - No fellings have been prescribed in these PBs in order to save guard future yield. The yield removed from these PBs shall be count for yields towards the yield of the working circles.

2.16.3 In PB-IV Areas:-

i) All overwood shall be marked for fellings unless required on silvicultural ground.

ii) Mother trees will be removed in two installments depending upon the condition of young regeneration. Young crop will be cleaned and thinned. Thinning will be plan period. Mother trees likely to damage young crop be lopped before felling them.

iii) All malformed dead, deceased and dry trees shall be removed to improve the crop.

2.17 SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING

Following subsidiary silvicultural operations are prescribed:-

i) **Site clearance**: - In areas allotted to PB-I, seeding felling will be carried out as per felling sequence. After seeding felling every year, disposal of refuge is essential to obtain hospitable seed bed. Some of the refuge reduce site clearing cost and to meet right holders demand for fuel and earn their goodwill. In areas where regeneration already exists and secondary fellings are being carried out, no attempts at burning the felling debris should be made. In situations debris should simply be collected and dumped into nullas.

Following points should be kept in view during the course of above operations.

- The operation shall be carried out in winter only.
- Branched of trees and climbers should be cut, left over logs rolled away from seed bearers and slash stacked in open away from mother trees but close to the thickets of bushes
- Slash heaps should be burnt from top downwards.

All above operations must be carried out in the presence of Range Officer to avoid accidental fires. Instructions contained in Punjab Forest Leaflet No.6 should be kept in view.

ii) **Sowing and Planting:-** After site clearance, sowing and planting be done as under:-

- After seeding felling and site clearance in PB-I pits of 30 cms x 30 cm x 30 cm size shall be prepared at a spacing of 2.5 m x 2.5 m during pre-monsoon showers.
- After site clearance and preparation of pits during pre-monsoon showers, planting will be done using minimum 25 cms. Tall chil plants raised in polythene bags as per standard nursery technique.

Areas planted should be securely fenced with barbed wire.These closed areas shall be jealously protected and maintained for 15 years to ensure regeneration of PB-I areas.

iii) **Weeding and Bush Cutting**: This is most important because of high incidence of grasses and bushes. There should be two weedings-ones during March and second during September in the first year and one weeding in Sept. every year for 3 years. Bushes will be cut twice once in March and once in Sept. every year till plants have out grown normal bush canopy and thereafter one during spring every year till the plantation is grown to a minimum height of 3m and is control burnt. Cut material should be disposed by using it to reinforced barbed wire fence or by burning it safely outside the plantation area to reduce fire hazards.

iv) **Cleaning and Climber cutting:-** Cleaning should start at the age of 3 years and cut material should be carried out side the grass under regeneration and burnt or thrown into nullahs vigorous and healthy seeding should be spaced upto 2.5 m apart. No pruning is to be done. Climber cutting is necessary.

v) **Mechanical Thinning:-** In PB-IV areas when the crop is in the young pole stage (3m-5m height & 10-20 cm dia), it will be subjected to stock thinnings.

The technique has been given Punjab Forest Leaflet No.1 and 1A. If cleaning mentioned in the preceding paragraph are carried out, if the necessity of mechanical thinning may be obviated.

vi) Control burning:- All chill areas shall be control burnt once in every two years except the regeneration area where regeneration is less than 1.5, meter height. Recently pine needles have found use for industrial purposes.There is huge demand for pine needles in Ambuja cement factory, Katha factory Gagret and in Hoshiapur. Keeping in view this industrial use, it is recommended that scheduled control burning will be done. The rates of pine needles are Rs. 2/kg.

2.18 ARTIFICIAL REGENERATION

For artificial regeneration, following points should be kept in mind:-

i) Chil seedlings should be raised in Polythene bags. They should be 9 months old at the timing of planting.The plants should be at least 20 cms in height and possesgood vigour.Such plants should be planted out in the field with the onset of the monsoons in pits and size 30 cm x 30 cm x 30cm at a spacing of 3 x 3 m.

ii) Collection of seeds and raising of seedlings in the nurseries should be scientifically and carefully done as success depends on the plants planted in the field.

iii) Seed should be socked in cold water at least 24 hours at least before sowing.

iv) The adoption of the proper technique and the time bound programme for planting is must.

v) Before planting/Sowing, area should be closed to grazing by fencing.

Planting programme has been given in Plantation (overlapping) Working Circle.

2.19 OTHER REGULATIONS

2.19.1 Fire Protection:- Chil forests are vulnerable to risk of fire. Most of the damage from fires occurs during pre-monsoon summer months of April to June when lot of inflammable material is present on the forest floor. For past record of fires, refer to para 7.8.6.4

Fires can be accidental caused by sparks from falling stones lightening charcoal burning, fires by travelers, Shikaries, Honey hunters, labourers and throwing away of burning cigarette buts. Such fires can be controlled if detected in the starting stage. Other fires can be deliberate due to business rivalry between people engaged in forest working, political reasons un-controlled

burning of Ghasnis to induce nascent growth of grass, kindling of fires to drive away wild animals or to cover evidence of forest crimes. In such cases of incendiarism, results are really destructive over extensive areas and it is very difficult to control such conflagrations.

General instructions on forest fire protection, prevention, detection and fighting are amply explained in Punjab Forest Leaflet No.8 and CCF.HP standing Order No.5 dated 03-05-80 which must be followed religiously and treated as an integral part of the prescriptions of this working plan. Following fire protection measures are prescribed:-

a) Direct Measures*:*

i) **Maintenance of existing fire lines**: - All existing fire lines be maintained by control burning and bush cutting during winters as per the programme given in **Appendix-XIII**.

ii) **Cleaning of roads and paths**: - All roads and paths criss- crossing forests should be kept swept clean so that there is no inflammable material. Labour be engaged under MNREGA scheme.

iii) **Timely completion of forest extraction operations**:- Extraction operations in all govt. and private forest must be completed before March.

iv) **Control burning along roads and paths:-** A belt of 1.5 width on up hill side and 3m width on the down hill side of every road should be control burnt annually during winter.

v) **Application of IFA 1927:-** Provision of IFA-1927 concerning right holders in case of fires should be applied tactfully and in a reformative spirit. Habitual and mis chievious offenders should, however, be dealt with sternly after proper enquiry through Deptt. or police.

vi) **Timely salvage operations**:- Salvage removals must be carried out regularly to exclude fire hazards.

vii) **Disposal of felling refuge:-** Immediately on close of felling operations , felling refuge should be collected and control burnt at safe points inside or outside the operations area so that fire hazards are reduced.

viii) **Display of educative slogans and warnings:-** Sign boards carrying educative slogans and warnings should be displayed at conspicuous points all over for information of the general masses.

ix) **Maintenance of fire record:-** All fires should be properly documented. A detailed fire report in prescribed proforma along with location map in respect of every fire should be submitted by R.Os to DFO within a week. A fire cases register should be maintained by R.Os.

b) Indirect Measures:- With the object of preventing fires by winning the goodwill of right holders and general public living in the vicinity of forests, should meet their reasonable demands for fuel, grazing, grass cutting and by intelligent enforcement of closures etc.

2.19.2 Resin Tapping: - Following broad guidelines should be followed:-.

i) Method of tapping in force should be continued.

ii) Punjab Forest leaflet No.13 should be strictly adhered to.

iii) No resin tapping should be carried out in PB-I areas under regeneration.

2.19.3 Control Burning:- The programme of biennial control burning is given as under:-

Table-2.10

Programme of Control Burning

Range	Name of Forest	Comptt. No.	Area in ha.	Year of burning
Kotgarh	Smathla	U-141	18.22	2012-2013
	Bhalali	U-142	32.40	
	Nagroan	D-CN-37	16.20	
Kumarsen	Teshan Dhar	U-238	81.00	
	Teshan Ban	D-CN-14	22.81	
	Panu Dhank	D-CN-17	12.87	
	Shirkot	D-CN-19	38.62	
	Manu	D-CN-21	19.85	
	Oddi Dhank	D-CN-22	44.12	
	Ushu	U-247	24.30	
	Kotla	U-249	18.22	
	Parbona	U-250	16.20	
	Kalnu	U-252	22.27	

	Malendi	U-255	10.93	
Kotgarh	Bhera	D-CN-38	12.15	2013-2014
	Naula	D-CN-39	81.76	
	Churt	D-CN-54	28.79	
	Khaltudhar	D-CN-56	40.98	
Kumarsen	Kahudhar	U-256	54.67	
	Chhiri	U-261	24.30	
	Narti	U-265	14.17	
	Khekhar	D-CN-24	8.75	
	Banolidhar	U-274	40.50	
	Shanand	D-CN-25	6.04	
	Thanu	U-287	40.50	
Kotgarh	Dalan	D-CN-34	28.35	2014-2015
	Rewali	D-CN-36	121.50	
	Kalimatti	U-140	32.40	
Kumarsen	Ahr	D-32	81.81	
	Jaroja	U-213	20.25	
	Hathia	U-217	60.75	
	Jajehli	U-225	30.75	
	Dhimthaia	U-228	36.35	
	Banardhar	U-232	125.55	
	Banarkaud	D-CN-6	25.00	
	Bargoh	D-CN-10	20.72	
	Bargal	D-CN-13	13.53	
Kotgarh	Smathla	U-141	18.22	2015-2016
	Bhalali	U-142	32.40	
	Nagroan	D-CN-37	16.20	
Kumarsen	Teshan Dhar	U-238	81.00	
	Teshan Ban	D-CN-14	22.81	
	Panu Dhank	D-CN-17	12.87	
	Shirkot	D-CN-19	38.62	
	Manu	D-CN-21	19.85	
	Oddi Dhank	D-CN-22	44.12	
	Ushu	U-247	24.30	
	Kotla	U-249	18.22	
	Parbona	U-250	16.20	
	Kalnu	U-252	22.27	
	Malendi	U-255	10.93	
Kotgarh	Bhera	D-CN-38	12.15	2016-2017
	Naula	D-CN-39	81.76	
	Churt	D-CN-54	28.79	
	Khaltudhar	D-CN-56	40.98	
Kumarsen	Kahudhar	U-256	54.67	
	Chhiri	U-261	24.30	
	Narti	U-265	14.17	
	Khekhar	D-CN-24	8.75	
	Banolidhar	U-274	40.50	

	Shanand	D-CN-25	6.04	
	Thanu	U-287	40.50	
Kotgarh	Dalan	D-CN-34	28.35	2017-2018
	Rewali	D-CN-36	121.50	
	Kalimatti	U-140	32.40	
Kumarsen	Ahr	D-32	81.81	
	Jaroja	U-213	20.25	
	Hathia	U-217	60.75	
	Jajehli	U-225	30.75	
	Dhimthaia	U-228	36.35	
	Banardhar	U-232	125.55	
	Banarkaud	D-CN-6	25.00	
	Bargoh	D-CN-10	20.72	
	Bargal	D-CN-13	13.53	
Kotgarh	Smathla	U-141	18.22	2018-2019
	Bhalali	U-142	32.40	
	Nagroan	D-CN-37	16.20	
Kumarsen	Teshan Dhar	U-238	81.00	
	Teshan Ban	D-CN-14	22.81	
	Panu Dhank	D-CN-17	12.87	
	Shirkot	D-CN-19	38.62	
	Manu	D-CN-21	19.85	
	Oddi Dhank	D-CN-22	44.12	
	Ushu	U-247	24.30	
	Kotla	U-249	18.22	
	Parbona	U-250	16.20	
	Kalnu	U-252	22.27	
	Malendi	U-255	10.93	
Kotgarh	Bhera	D-CN-38	12.15	2019-2020
	Naula	D-CN-39	81.76	
	Churt	D-CN-54	28.79	
	Khaltudhar	D-CN-56	40.98	
Kumarsen	Kahudhar	U-256	54.67	
	Chhiri	U-261	24.30	
	Narti	U-265	14.17	
	Khekhar	D-CN-24	8.75	
	Banolidhar	U-274	40.50	
	Shanand	D-CN-25	6.04	
	Thanu	U-287	40.50	
Kotgarh	Dalan	D-CN-34	28.35	2020-2021
	Rewali	D-CN-36	121.50	
	Kalimatti	U-140	32.40	
Kumarsen	Ahr	D-32	81.81	
	Jaroja	U-213	20.25	
	Hathia	U-217	60.75	
	Jajehli	U-225	30.75	
	Dhimthaia	U-228	36.35	

	Banardhar	U-232	125.55	
	Banarkaud	D-CN-6	25.00	
	Bargoh	D-CN-10	20.72	
	Bargal	D-CN-13	13.53	
Kotgarh	Smathla	U-141	18.22	2021-2022
	Bhalali	U-142	32.40	
	Nagroan	D-CN-37	16.20	
Kumarsen	Teshan Dhar	U-238	81.00	
	Teshan Ban	D-CN-14	22.81	
	Panu Dhank	D-CN-17	12.87	
	Shirkot	D-CN-19	38.62	
	Manu	D-CN-21	19.85	
	Oddi Dhank	D-CN-22	44.12	
	Ushu	U-247	24.30	
	Kotla	U-249	18.22	
	Parbona	U-250	16.20	
	Kalnu	U-252	22.27	
	Malendi	U-255	10.93	
Kotgarh	Bhera	D-CN-38	12.15	2022-2023
	Naula	D-CN-39	81.76	
	Churt	D-CN-54	28.79	
	Khaltudhar	D-CN-56	40.98	
Kumarsen	Kahudhar	U-256	54.67	
	Chhiri	U-261	24.30	
	Narti	U-265	14.17	
	Khekhar	D-CN-24	8.75	
	Banolidhar	U-274	40.50	
	Shanand	D-CN-25	6.04	
	Thanu	U-287	40.50	
Kotgarh	Dalan	D-CN-34	28.35	2023-2024
	Rewali	D-CN-36	121.50	
	Kalimatti	U-140	32.40	
Kumarsen	Ahr	D-32	81.81	
	Jaroja	U-213	20.25	
	Hathia	U-217	60.75	
	Jajehli	U-225	30.75	
	Dhimthaia	U-228	36.35	
	Banardhar	U-232	125.55	
	Banarkaud	D-CN-6	25.00	
	Bargoh	D-CN-10	20.72	
	Bargal	D-CN-13	13.53	
Kotgarh	Smathla	U-141	18.22	2024-2025
	Bhalali	U-142	32.40	
	Nagroan	D-CN-37	16.20	
Kumarsen	Teshan Dhar	U-238	81.00	
	Teshan Ban	D-CN-14	22.81	
	Panu Dhank	D-CN-17	12.87	

	Shirkot	D-CN-19	38.62	
	Manu	D-CN-21	19.85	
	Oddi Dhank	D-CN-22	44.12	
	Ushu	U-247	24.30	
	Kotla	U-249	18.22	
	Parbona	U-250	16.20	
	Kalnu	U-252	22.27	
	Malendi	U-255	10.93	
Kotgarh	Bhera	D-CN-38	12.15	2025-2026
	Naula	D-CN-39	81.76	
	Churt	D-CN-54	28.79	
	Khaltudhar	D-CN-56	40.98	
Kumarsen	Kahudhar	U-256	54.67	
	Chhiri	U-261	24.30	
	Narti	U-265	14.17	
	Khekhar	D-CN-24	8.75	
	Banolidhar	U-274	40.50	
	Shanand	D-CN-25	6.04	
	Thanu	U-287	40.50	
Kotgarh	Dalan	D-CN-34	28.35	2026-2027
	Rewali	D-CN-36	121.50	
	Kalimatti	U-140	32.40	
Kumarsen	Ahr	D-32	81.81	
	Jaroja	U-213	20.25	
	Hathia	U-217	60.75	
	Jajehli	U-225	30.75	
	Dhimthaia	U-228	36.35	
	Banardhar	U-232	125.55	
	Banarkaud	D-CN-6	25.00	
	Bargoh	D-CN-10	20.72	
	Bargal	D-CN-13	13.53	

2.19.4 Planting: - Planting of Chil be done in felled PB-I areas after waiting for three years for natural regeneration.

2.19.5 **Weeding:-**It is an essential and most important activity that young regeneration should be properly weeded by freeing it from thick grasses and over head shade of bushes.

2.19.6 Cleanings:-It should be attended to as early as possible in order to produce healthy stems and minimize fire hazards.

2.19.7 Closures:-All PB-I areas shall be closed immediately after felling work is over.The duration will be about 30 years or till such lesser period when plants attain a height of more than 3 meters**.**

2.19.8 Grazing and grass cutting:-Grass cutting will be prohibited in all PB-I areas after the commencement of regeneration operations till the young crop is beyond damage i.e 75 cms and above.Grass cutting shall be allowed under strict supervision in order to avoid damage to young seedlings.Grazing shall be strictly prohibited in regeneration areas during the closer period.

2.19.9 Regeneration Survey: - Regeneration Survey shall be carried outonce in every fifth year in all the PB-I areas as per para 32 of the National Working plan code, 2004.Reasons for failure should be detailed and corrective measures taken. If the regeneration does not keep pace with fellings, then fellings should not be carried out till the problem is resolved.

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CHAPTER III

THE DEODAR- KAIL WORKING CIRCLE

3.1 GENERAL CONSTITUTION OF WORKING CIRCLE

This working circle including all the Deodar and kail forests having pure crop of Deodar and kail or having 60% or more of these species moderate / steep to moderate slope in composition in a compartment of all the reserved , Demarcated and un- demarcated protected forests.

3.2 GENERAL CHARACTER OF VEGETATION

The forests have been decribed in detail in chapter- 2 part-I. The crop varies from young to over mature trees, Regeneration in these forests especially of kail is very good, except in the areas where the incidence of grazing is vey high.In some areas fire has created blanks. Slective and indiscriminate fellings by right holders has also caused extensive damage to these forests. Infections of blue pine trees near habitations with tremetes pine fungus isvery common.

3.3 FELLING SERIES AND CUTTING SECTIONS

There will be one felling series.

3.4 AREA STATEMENT

Total area of this working circle is 4372.32 ha. This works out to be 33.40 % of the total area of the division.

Table-3.1

Range	**R.F**	**D.P.F**	**U.P.F**	**Total in ha.**
Kotgarh	462.89	1374.30	1094.73	2931.92
Kumarsain	---	784.74	655.66	1440.40
Total	**462.89**	**2159.04**	**1750.39**	**4372.32**

3.5 BLOCKS AND COMPARTMENTS

No new compartments have been created. Compartments have been subdivided into 40 ha. Units as far as possible but in the case of some forests where the forest is rocky and precipitous and workable area is less then 40 ha. No other subdivision has been done.

3.6 SPECIAL OBJECTIVES OF MANAGEMENT

1. To convert uneven aged forest to normal forest.
2. To obtain maximum suatainable yield of timber.
3. To restock PB-I areas as soon as possible by artificial regeneration.

3.7 ANALYSIS AND VALUATION OF THE CROP

i) **Stock Maps:-** The stock maps on 1:15000 scale have been given in respective compartment history files.

ii) **Compartment Description:**- The crop has been described and posted in the relevant compartment history files.

iii) **Site Quality:**-This has been described for each compartment and posted in the relevant compartment history files.The average quality for Deodar and Kail is II.

iv) **Density:-** The density as based on ocular estimates has been recorded in compartment history files. The average crown density is 0.4 to 0.5.

v) **Age Classes:**- The crop is irregular. All age classes are represented.

vi) Enumerations:- The growing stock has been assessed by random sampling.

The enumeration results PB wise is as under:-

Table-3.2

Volume of Deodar/Kail Working Circle

Speci	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Volume In cum
PB-I											
Deodar	873.09	1313.172	777.172	76.608	0	0	0	0	0	0.00	3039.68
Kail	2603.30	5574.29	17191.98	24129.35	19582.45	6816.31	2178.18	3208.61	0.00	0.00	81284.45
Chil	0	0	0	0	0	0	0	0	0	0	0.00
Spruce	0	0	0	0	0	0	0	0	0	0	0.00
Fir	893.25	1833.12	938.08	618.27	1135.60	2248.48	2354.16	1046.90	0.00	0.00	11067
Ban	0	0	0	0	0	0	0	0	0	0	0.00
Moh/ Khar	0	0	0	0	0	0	0	0	0	0	0.00
B.L	0	0	0	0	0	0	0	0	0	0	0.00
Total	**4369.64**	**8720.582**	**18907.232**	**24824.22**	**20718.05**	**9064.79**	**4532.34**	**4255.51**	**0**	**0**	**95391.13**
PB-II											
Deodar	16119.68	25307.48	31817.30	14094.05	5507.30	2281.68	389.02	1012.43	2580.60	3194.95	102304.48
Kail	19574.10	32472.44	61514.77	52882.58	31393.58	29367.72	9656.19	12209.68	9516.61	5929.08	264516.75
Chil	12995.51	12102.87	11597.10	8256.11	4940.00	3656.39	1497.68	519.64	1381.79	892.72	57839.81
Spruce	0	0	0	0	0	0	0	0	0	0	0.00
Fir	0	0	0	0	0	0	0	0	0	0	0.00
Ban	0	0	0	0	0	0	0	0	0	0	0.00
Moh/ Khar	0	0	0	0	0	0	0	0	0	0	0.00
B.L	0	0	0	0	0	0	0	0	0	0	0.00
Total	**48689.29**	**69882.79**	**104929.17**	**75232.74**	**41840.88**	**35305.79**	**11542.89**	**13741.75**	**13479**	**10016.75**	**424661.04**
PB-III											
Deodar	1178.71	5075.78	933.02	295.48	0	0	0	0	0	1870.50	9353.50

Kail	1920.06	11054.68	12892.54	8722.35	8502.19	5651.52	4816.45	5275.69	5242.03	2841.53	66919.11
Chil	0	0	0	0	0	0	0	0	0	0	0.00
Spruce	3133.16	14622.89	17681.04	13729.8	11629.46	14878.24	7362.57	13707.24	16851.73	78785.19	190381.42
Fir	6.43	47.36	170.22	254.75	191.84	68.72	81.83	114.09	93.05	71.96	0.00
Ban	0	0	0	0	0	0	0	0	0	0	0.00
Moh/ Khar	7234.93	17846.10	35203.00	24597.00	11568.00	9568.00	7900.20	8240.00	4924.80	31634.60	157742.79
B.L	0.16	1.90	7.58	35.42	27.74	97.97	23.77	84.05	0.00	108.08	0.00
Total	**13473.45**	**48648.71**	**66887.4**	**47634.8**	**31919.23**	**30264.45**	**20184.82**	**27421.07**	**27111.61**	**115311.9**	**424396.82**

PB-IV											
Deodar	621.93	62805.29	42510.69	6017.38	793.69	0.00	0.00	0.00	0.00	0.00	112748.98
Kail	316.16	986.44	214.97	4561.75	622.39	0.00	0.00	0.00	0.00	0.00	6701.71
Chil	604.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	604.49
Spruce	37.67	118.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	156.51
Fir	0	0	0	0	0	0	0	0	0	0	0.00
Ban	37.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.12
Moh/ Khar	0	0	0	0	0	0	0	0	0	0	0.00
B.L	0	0	0	0	0	0	0	0	0	0	0.00
Total	**1617.37**	**63910.56**	**42725.66**	**10579.13**	**1416.08**	**0**	**0**	**0**	**0**	**0**	**120248.80**

Table-3.3

Yield Calculation Table

Growing Stock in PB-I & PB-IV

Species	**10-20**	**20-30**	**30-40**	**40-50**	**50-60**	**60-70**	**70-80**	**80-90**	**90-100**	**100 & above**	**Volume In cum**
Deodar	1495.02	64118.47	43287.86	6093.98	793.69	0.00	0.00	0.00	0.00	0.00	115789.02
Kail	2919.46	6560.73	17406.95	28691.10	20204.84	6816.31	2178.18	3208.61	0.00	0.00	87986.17
Chil	604.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	604.49
Spruce	37.672	118.833	0	0	0	0	0	0	0	0.00	156.51
Fir	893.25	1833.12	938.08	618.27	1135.60	2248.48	2354.16	1046.90	0.00	0.00	11067.85
Ban	37.118	0	0	0	0	0	0	0	0	0.00	37.12
Moh/ Khar	0	0	0	0	0	0	0	0	0	0	0
B.L	0	0	0	0	0	0	0	0	0	0	0
Total	**5987.01**	**72631.153**	**61632.89**	**35403.35**	**22134.13**	**9064.79**	**4532.34**	**4255.51**	**0**	**0**	**215641.16**

Table-3.4

General Abstract

Growing Stock all PBs

Species	**10-20**	**20-30**	**30-40**	**40-50**	**50-60**	**60-70**	**70-80**	**80-90**	**90-100**	**100 & above**	**Volume In cum**
Deodar	18793.49	94501.79	76038.47	20482.74	6300.99	2281.68	389.02	1012.43	2580.60	5065.45	227446.63

Kail	24413.63	50087.85	91814.25	90296.03	60100.61	41835.55	16650.82	20693.98	14758.64	8770.61	419422.02
Chil	13600.00	12102.87	11597.10	8256.11	4940.00	3656.39	1497.68	519.64	1381.79	892.72	58444.30
Spruce	3170.84	14741.727	17681.04	13729.837	11629.455	14878.24	7362.576	13707.24	16851.73	78785.19	190537.93
Fir	899.64	1880.31	1107.60	872.27	1325.40	2320.24	2434.19	1153.36	91.15	71.17	11067.00
Ban	37.118	0	0	0	0	0	0	0	0	0.00	37.12
Moh/ Khar	7234.93	17846.10	35203.00	24597.00	11568.00	9568.00	7900.20	8240.00	4924.80	31634.60	157742.79
B.L	0.16	1.90	7.58	35.42	27.74	97.98	23.77	84.07	0.00	108.09	0.00
Total	**68149.81**	**191162.5**	**233449**	**158269.4**	**95892.2**	**74638.08**	**36258.26**	**45410.72**	**40588.71**	**125327.8**	**1064697.78**

3.8 SILIVICULTURAL SYSTEM

The forest of this working circle will be manged under Indian Irregulr Shelter Wood system which is described in Para 30 of Punjab forest leaflet No. 2.This system allows felling according to the nature of the ground and also permits certain amount if irregularity so as to avoid sacrifice of immature pole crop that are unavoidably included in PB-I protection of steep and precipitious slopes is done by carrying out markings on selection principles.

3.9 ROTATION AND CONVERSION PERIOD

Rotation period is fixed at 120 years, based on age at which trees will attain d.b.h. of 60 cms. The conversion was going on since 1928 in haphazard manner in some of the forests. Only a few forests have been converted so far. Moreover, there are some which give a look of converted once. Taking these factors into considerations, the conversion period is fixed 60 years.

3.10 EXPLOITABLE DIAMETERS

It has been fixed at 60 cm d.b.h

3.11 REGENERATION PERIOD

Regeneration period is fixed as 30 years. Efforts will be made to regenerate the area naturally supplemented with artificial planting**.**

3.12 FELLING CYCLE

Corresponding to the plan period the felling cycle will be of 15 years.

3.13 DIVISION INTO PERIODS AND ALLOTMENT TO PBs

With 120 years as rotation and 30 years for regeneration there will be 4 periodic Blocks.. The allotment is discussed as under:-

PB-I:-

Forests containing mature crop fit for seeding felling in PB-I areas which have not yet been fully established and need immediate restocking have been allotted to this periodic block.

PB-II:-

Area with pre-dominance of middle aged to mature crop have been alloted to this periodic block.

PB-III:-

Forests which have irregular crop and predominantly young to middle aged classes have been alloted to this periodic block.

PB-IV:-

All the forests where the regeneration is fully established and the forests carrying mostly young crop in sapling to pole stage with a few scattered maturing and mature trees have been alloted to this periodic block.

The allotment of the areas to different Ranges is as under:-

Table-3.5

Range	**PB-I**	**PB-II**	**PB-III**	**PB-IV**	**Total in ha.**
Kotgarh	1011.05	475.86	737.01	708.00	2931.92
Kumarsen	32.80	515.06	434.14	458.40	1440.04
Total	**1043.85**	**990.92**	**1171.15**	**1166.40**	**4372.32**

3.14 CALCULATION OF YIELD

3.14.1 Yield from PB-I areas:- The yield is calculated as under:-

Table-3.6

Species	No. of Trees in PB-I	Proportion of trees	No. of Seed bearer to be retained /ha.	No. of Seed bearer to be retained /ha on proportionate basis	Total Tree to Be retained over 1043.85 ha	Existing No. of Trees class I , &II	No. of Trees Available For removal I ,&II	Proportion Ate no. of Class I, II & III class available
Deodar	8397	9	30	3	3131	42	0	0
Kail	71003	77	25	19	19833	22864	3031	0.1
Chil	0	0	20	0	0	0	0	0
Spruce	0	0	25	0	0	0	0	0
Fir	13350	14	50	7	7306	1608	0	0

The above proportion is based on purely theoretical consideration. This combined with field observations gives following well suiting proportions.

Deodar = 0.1

Kail = 0.1

Spruce = 0.1

Fir = 0.1

Chil = 0.1

This was in respect of II A and above classes. Field inspections indicate that 60 % of V, IV and III classes trees will also be available for felling.

The yield is now calculated by Hufnagels formula as under:-

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

C1= Constant representing the fraction of volume of V, IV and III calss trees available for felling during the regeneration period. CI has been taken as 0.6 for all species.

C2= Constant representing the fraction of volume of IIA & above class trees available for felling during period. C2 has been taken as 0.1, for Deodar, Kail,Chil Spruce and Fir respectively.

VI= Volume of trees of V, IV & III class trees of conifers

V2= Volume of trees of II class and above trees of conifers

P= Period of the plan is 30 year i.e regeneration period.

$$\text{(DEODAR)} \quad Y = \frac{2963.434 \times 0.6 + 76.608 \times 0.1}{30} = \textbf{60 cum}$$

$$\text{(KAIL)} \quad Y = \frac{25369.57 \times 0.6 + 55914.88 \times 0.1}{30} = \textbf{694 cum}$$

$$\text{(FIR)} \quad Y = \frac{3664.45 \times 0.6 + 7403.40 \times 0.1}{30} = \textbf{98 cum}$$

Table-3.7

Species	**Annual Yield**
Deodar	60
Kail	694 or say 700
Fir	98 or say 100

3.14.2 Yield from PB-IV areas:-

The yield in PB-1V is caclulated by Hufnagels as under:-

$$\textbf{Y} = \frac{\textbf{C1V1+C2V2+C3V3}}{\textbf{P}}$$

C1= Constant representing the fraction of volume of V, IV and III calss trees available for felling during the regeneration period. CI has been taken as 0.1

C2= Constant representing the fraction of volume of IIA& IIB class trees available for felling during period. C2 has been taken as 0.4.

C3= Constant representing the fraction of volume of IA above class trees available for felling during period. C3 has been taken as 0.8

VI= Volume of trees of V, IV & III class trees of chil/ conifer.

V2= Volume of trees of II class trees of chil/ conifer.

V3= Volume of trees of I class trees of chil/ conifer.

P= Period of the plan is 30 year i.e regeneration period.

(DEODAR) $Y = \frac{0.1 \times 105937.91 + 0.4 \times 6811.06 + 0.8 \times 0}{30} =$ **443.94 cum**

(KAIL) $Y = \frac{0.1 \times 1517.57 + 0.4 \times 5184.14 + 0.8 \times 0}{30} =$ **74.18 cum**

The annual yield of Deodar and Kail is as under for PB-IV.

Table-3.8

Species	**Annual Yield**
Deodar	443.94 or say 450
Kail	74.18 or say 75

3.14.3 Yield from PB-II & PB-III areas: - For conservative reasons no yield is prescribed from PB-II &PB-III areas. The removals therefrom will however be counted towards PB-I

The yield of the working circle is thus as under which will be controlled by PBs, but for all the species taken together.

Table-3.9

Species	**PB-I,PB-II & PB-III**	**PB-IV**	**Total**
Deodar	60	450	510
Kail	700	75	775
Chil	---	--	----
Spruce	---	--	-----
Fir	100	--	100
Total	**860**	**525**	**1385**

3.14.4 Yield in relation to CAI:- The annual volume increment % (CAI) are already given in para 8.3 of Part-I. Based on these the yield is compared to the increment as under:-

Table-3.10

Species	**Total Standing Volume (cum)**	**Increment % age**	**Annual Increment**	**Annual Yield**	**Prescribed Yield % age**

Deodar	227447	1.74	3958	510	13
Kail	419422	1.58	6627	775	12
Chil	58444	2.16	1262	---	---
Spruce	190537	1.20	2286	-----	----
Fir	11067	1.06	117	100	78
Total			**10702**	**1385**	**13**

3.15 CONTROL OF YIELD

The yield will be controlled by volume. All dia. Classes conifers felled for whatsoever purpose will count towards the yield.The combined yield of Deodar, Kail, Fir, Spruce and Chil in year should not be exceed 20 % and in a slab of 5 years should not exceed 10 %. The volume of trees in salvage removals or for any purpose will count the yield of the working circle. The yield will be PB wise.

3.16 TABLE OF FELLING

Following sequence of fellings in PB-I and PB-IV will be followed:-

Table-3.11

Year	Range	Name of forest	Comptt No.	Area(ha.)	Allot ment	Nature of Fellings
2012-13	--	--	--	--	--	Only salvage marking the division
2013-14	--	--	--	--	--	Only salvage marking the division
2015-16	Kumarsen	DPF Hawan	44	74.11	PB-IV	Final felling
2017-18	Kumarsen	DPF Ahr	31	74.92	PB-IV	Final felling
2019-20	Kotgarh	DPF Hatu	11a(Part)	99.63	PB-I	Seeding felling
2021-22	Kotgarh	UPF Dakori	187(Part)	97.20	PB-I	Seeding felling
2023-24	Kotgarh	DPF Tangri	92 (Part)	26.32	PB-I	Seeding felling
2024-25	Kotgarh	DPF Hatu	11a(Part)	99.63	PB-I	Seeding felling
2025-26	Kotgarh	UPF Dakori	187(Part)	97.20	PB-I	Seeding felling
2026-27	Kotgarh	DPF Tangri	92 (Part)	26.32	PB-I	Seeding felling

3.17 METHOD OF EXECUTING THE FELLING

3.17.1 PB-I areas: - There will be only one felling i.e. seeding felling in PBI fellings (removal of overwood) will be done in PBIV.

Marking Rules:-

1. Marking will be done under Indian irregular Shelterwood System.
2. A) In seedling fellings in case of pure crop of deodar 30-40 trees shall be retained per as seed bearers. In case of pure Kail this number be 25 to 30 trees (56 to 65 m3 volume) per ha. In cases, these trees will invariably be 50 to 70 cm. diameter classes and uniformly spaced all over the area.

   b) In case of mixtures of deodar and kail 30 to 45 trees both and kail of class of 50 to 70 cm per ha shall be retained spaced all over the area.

   c) In case of the seedling felling if the trees of diameter classes of deodar and kail are not available for retention the trees of the high diameter to retained uniformly spaced all over the area.

   This number will vary depending upon the steepness of altitude and aspect.

   3. The seed bearers should be evently spaced and will be of quanity trees with clean boles, with healthy growth and possessing well developed crowns.

   4. Compact group of healthy and vigorously growing poles up to 30 cm d.b.h. with density not less than 75 at least 0.1 ha. In extent shall be retained as of future crop. Thinninig will be done in such.

   5. On step and broken slopes and along nallas marking conform to selection principals.

   6. All trees standing over established regeneration should be lopped before felling.

   7. Broad-leaved species should also be marked on selection on selection principal alongwith principal spp.

   8. A note on advance growth retained areas where marking done and status of regeneration will be by marking officer alongwith map and marking and filled in the concerned C.H. file.

3.17.2 PB-II & PB-III areas: - No fellings of any kind and magnitude will be done in P.B. II and III areas. However, salvage marking of dead and dry trees will be done to clear these forests from fire.

3.17.3 PB-IV areas: - All overwood shall be removed in areas where the regeneration has been fully established. D grade thinning will be carried out in young crop.

3.18 SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING

The role of subsidiary operation to helping seedling to established themselves can not be over-emphasize and successful natural regeneration greatly depends upon that.It is, therefore, prescribed that the following subsidiary silvicultural operations will be carried out as soon as possible after the felling:-

1. **Removal of unfit trees of inferior species:-**All deodar, kail, spruce and fir marked in the main marking or in thinning and left unfelled by the purchasers of the coupe, should be felled, provided the slash resulting from such fellings can be disposed of. In places, where heavy shade from other species is preventing or interfering with the devolpment of deodar and Kail regeneration, it must be lessened by felling or looping, as the circumastances indicate. No attempt should however be made to reduce mixture of Brode-leaved species, which should be retained to provide side shade and removed only where it is essential to give overhead light to the deodar and kail regeneration.
2. **Slash disposal:-**Slash disposal should follow the main felling as closely as possible, and aim should be to complete it by November of the year of felling. So as to be in a position to be take full advantage of any seed that may fall. As in the case of chil, slash disposal is not await the corporation completion of the whole compartment, but should commence as soon as practicable in any part of the area where felling and convertion has been completed and if burning can not be done while the corporation is still working the coupe, it is always possible to collect into heaps so that burning may commence as early as possible afterwards. During burning, all heaps should as far as possible be reduced to ashes as a really severe burn produces conditions very favourable for the regeneration of seed and the establishment of seedling by reducing raw humus and weed growth. The heaps should be as large as possible without causing harm to adjacent regeneration or seed bearers during burning, because the bigger the heap the more severe is the burn. As the fellings will be in and around groups and patches of advance growth, the destruction of the debris will be a difficult matter, as the burning may endanger regeneration, while its removal to places where it can be safely burnt will be expensive, but in all such patches the collection of debries into small haeaps and burning in safe places must be done regardless of cost. In damp and cold places it may even be necessary to burn slash two or three times.
3. **Removal of thick Humus layer:-**A thick layer of partially decomposed humus has been found to be one of the main causes of failure of natural regeneration. This is more so in case of those spruce and fir areas which have been brought under concentrated regeneration.

Wherever humus layer is found to be thick, it should be disturbed sufficiently to expose the mineral soil. This is a very important and to regeneration, and as this must be carried out soon after the felling have been completed, and in any case before November of the year of fellings so as to give full benefit to any seed that may fall on them. Wherever possible slash burning must be followed by hoeing up of the humus layer mixing it up with the ash and exposing the mineral soil.

4. **Shrub Cutting:-**Wherever shrubs and weeds are found to be a menace and interfering with regeneration, shrub-cutting will be carried out in the year of subsidiary operations and repeated as and when necessary.
5. **Cleaning and unsaleable thinning:-**Cleaning and unsaleable thinning shall be carried out regulary in the crops. All cut material shall be removed from the area of burnt in order to avoid fire hazareds.
6. "D" Graded thinning shall be carried out in young pole crops retained as part of the new crop.

3.19 ARTIFICIAL REGENERATION

Areas of the felled PBI areas will be gone over for planting after about five years of felling to fill in the blanks. Planting programme has been given in Plantation (overlapping) Working Circle

3.20 OTHER REGULATIONS

3.20.1 Fire Protection:-The areas are prone to fire during May and June.Intensive patrolling coupled with regular cleaning of fire lines and inspection paths should suffice to keep the incidence of fires under control.

3.20.2 Cleanings:-It should be attended to as early as possible in order to produce healthy stems and minimize fire hazards.Best and vigorously growing stems should be retained. All forked, crooked, sickly and damaged stems should be removed in cleanings so as to provide growing space to better stems.

3.20.3 Closures:-All PB-I areas shall be closed immediately after felling work is over.The duration will be about 30 years or till such lesser period when plants attain a height of more than 3 meters.Closures shall be notified under IFA, 1927.

3.20.4 Grazing and grass cutting:-Grass cutting will be prohibited in all PB-I areas after the commencement of regeneration operations till the young crop is beyond damage i.e one meter and above.Grass cutting shall be allowed under strict supervision in order to avoid damage to young seedlings.Grazing shall be strictly prohibited in regeneration areas during the closer period.

3.20.5 Lopping:-Lopping is not allowed in areas prescribed for regeneration or area with young crop in PB-I and PB-IV.The efforts should be made to stop the lopping of Kail which is the main cause of spread of trametes pini fungus.

3.20.6 Regeneration Survey: - Regeneration assessment survey of PB-I areas should be carried out every third year as per para 32 of the National Working plan code, 2004.Reasons for failure should be detailed and corrective measures taken. If the regeneration does not keep pace with fellings, then fellings should not be carried out till the problem is resolved.

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CHAPTER IV

THE FIR /SPRUCE WORKING CIRCLE

4.1 GENERAL CONSTITUTION OF WORKING CIRCLE

All the Fir, Spruce forests having pure crop or 60% or more in composition in a compartment, and suitable for working under concentrated regeneration felling have been allotted to this working circle.

4.2 GENERAL CHARACTER OF VEGETATION

The detailed description of the forests is given in chapter-2 part I. the forests are very much under stocked and there is preponderance of nature to overmature trees. These forests have been exploited in the past for packing cases. Natural regeneration in these forests is very poor and artificial regeneration in inadequate. Heavy grazing and indiscriminate felling in the past have caused great dmage to these forests.

The forests are covered with snow for several months in the winter. Abies pindrow and A.spectabilis the low and the high level silver fir together from a high level forest belt throughout the wet zone with much of the same distribution as that od spruce. In this type, silver fir, regenerates itself freely whenrver the ok and other brod leaved trees from a light understory in the forests. Excellent examples of this may be observed in fir forests along the upper ridges in the Ganwi Suga, Kut and Manglad valleys of this Division.

4.3 FELLING SERIES AND CUTTING SECTIONS

There will be only one felling series.

4.4 AREA STATEMENT

Total area of this working circle is 4410.73 ha. Which works out to be 33.72 % of the total area of the division**.**

Table-4.1

Range	**R.F**	**D.P.F**	**U.P.F**	**Total in ha.**
Kotgarh	--	1770.19	6.07	1776.26
Kumarsain	--	2634.47	--	2634.47
Total	**---**	**4404.66**	**6.07**	**4410.73**

4.5 BLOCKS AND COMPARTMENTS

Except for a few forests which have been further subdivided into sub compartments no new compartments/ sub compartments have been created. In a few remote forests where in major

portion of forest is rocky, precipitous and unculturable the principle of creating sub compartments not more then 40 ha. has not been possible to strictly adhere to.

4.6 SPECIAL OBJECTIVES OF MANAGEMENT

1. To improve the forests cover for water and soil conservation.
2. To replace mature and over mature growing stock within the conversion period.
3. To obtain maximum progressive sustained yield.
4. To restock the areas deficient in regeneration either naturally or artificially.
5. To protect these forests from damages caused by various agencies.
6. To improve the biodiversity of the areas.

4.7 ANALYSIS AND VALUATION OF THE CROP

vii) **Stock Maps:-** The stock maps on 1:15000 scale have been given in respective compartment history files.

viii) **Compartment Description:-** The crop has been described and posted in the relevant compartment history files.

ix) **Site Quality:-**This has been described for each compartment and posted in the relevant compartment history files.

x) **Density:-** The density as based on ocular estimates has been recorded in compartment history files. The average crown density is 0.3 to 0.4.

xi) **Age Classes:-** The crop is irregular. All age classes are represented.

xii) **Enumerations:-** The growing stock has been assessed by random sampling. The following table gives the distribution of areas in different PBs by ranges as under:-

Table-4.2

Range	**PB-I**	**PB-II**	**PB-III**	**PB-IV**	**Total in ha.**
Kotgarh	428.91	510.60	85.45	751.30	1776.26
Kumarsen	383.93	451.97	936.75	861.82	2634.47
Total	**812.84**	**962.57**	**1022.2**	**1613.12**	**4410.73**

The enumeration results PB wise is as under:-

Table-4.3

Volume of Fir/Spruce Working Circle

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Volume In cum
PB-I											
Deodar	0.00	145.80	310.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	456.46
Kail	257.94	506.75	673.84	177.50	571.00	420.50	0.00	771.30	0.00	0.00	3375.49
Chil	0	0	0	0	0	0	0	0	0	0	0.00
Spruce	40.80	256.97	414.96	785.63	965.10	3822.42	666.90	887.20	0.00	0.00	7835.17
Fir	2335.26	6210.20	9656.40	7862.22	6102.65	6688.03	5328.53	8854.26	5685.61	29848.70	88565.95
Ban	13.40	156.19	65.70	120.10	0.00	0.00	0.00	0.00	0.00	0.00	355.11
Moh/ Khar	240.80	209.70	100.00	898.20	1197.00	460.00	0.00	0.00	0.00	2440.00	5541.99
B.L	46.91	469.52	0.00	933.86	217.70	0.00	0.00	0.00	0.00	958.70	2624.64
Total	**2935.11**	**7955.13**	**11221.56**	**10777.51**	**9053.45**	**11390.95**	**5995.43**	**10512.76**	**5685.61**	**33247.4**	**108755.09**
PB-II											
Deodar	0	0	0	0	0	0	0	0	0	0	0.00
Kail	347.32	579.93	3895.52	8924.70	11014.59	6690.16	2020.93	285.38	0.00	0.00	33755.07
Chil	0	0	0	0	0	0	0	0	0	0	0.00
Spruce	0	0	0	0	0	0	0	0	0	0	0.00
Fir	12584.35	34911.59	71590.48	137339.72	154161.86	77582.13	58407.10	2918.89	2916.86	782.87	553193.67
Ban	0	0	0	0	0	0	0	0	0	0	0.00
Moh/ Khar	9.78	252.30	1042.00	1382.40	879.00	0.00	0.00	0.00	0.00	0.00	3564.09
B.L	0.00	86.14	349.75	268.54	0.00	0.00	0.00	0.00	0.00	0.00	704.21
Total	**12941.45**	**35829.96**	**76877.75**	**147915.4**	**166055.5**	**84272.29**	**60428.03**	**3204.27**	**2916.86**	**782.87**	**591217.05**
PB-III											
Deodar	1318.27	762.53	19.74	0.00	0.00	0.00	107.12	0.00	0.00	0.00	2293.31
Kail	2984.52	3578.16	9095.34	8695.73	4753.58	2173.99	448.45	293.09	375.14	947.18	33340.11
Chil	0	0	0	0	0	0	0	0	0	0	0.00
Spruce	10655.33	15360.77	23286.64	17370.52	9171.67	9797.63	10590.37	11373.90	15484.45	39228.90	162318.01
Fir	182.24	968.68	4398.16	11418.23	14466.85	15471.46	12124.24	16466.43	16350.39	16340.63	108198.22
Ban	0	0	0	0	0	0	0	0	0	0	0.00
Moh/ Khar	174.33	424.80	976.00	414.00	231.00	878.60	604.80	152.00	547.20	463.60	4872.57
B.L	9.02	50.57	176.29	229.79	624.80	1050.40	603.00	1262.20	1028.85	2387.16	7418.01
Total	**15323.71**	**21145.51**	**37952.17**	**38128.27**	**29247.9**	**29372.08**	**24477.98**	**29547.62**	**33786.03**	**59367.47**	**318240.23**
PB-IV											
Deodar	2286.59	8015.11	19860.49	24797.28	9629.92	3515.35	1347.48	0.00	319.06	0.00	69769.79
Kail	3325.00	7004.88	15273.62	20804.78	13618.35	12753.77	8532.16	5784.75	2359.41	418.23	89868.35

Chil	0	0	0	0	0	0	0	0	0	0	0.00
Spruce	8016.79	13521.22	25939.68	38980.29	21705.10	31296.93	32264.62	38087.50	27949.48	34916.00	272688.15
Fir	630.22	3289.14	10028.72	28312.25	22798.88	35372.90	39087.01	36579.26	25625.11	24738.69	226453.46
Ban	424.65	1546.53	3491.96	3314.76	2556.33	4389.14	3650.82	3988.62	1845.80	2364.67	27566.91
Moh/ Khar	652.98	1870.50	5145.00	5520.60	3372.00	4701.20	3005.10	2728.00	1958.40	2074.00	31036.20
B.L	374.78	1141.90	1640.44	1866.39	1632.75	772.45	765.00	1429.70	261.05	0.00	9881.43
Total	**15711.01**	**36389.28**	**81379.91**	**123596.4**	**75313.33**	**92801.74**	**88652.19**	**88597.83**	**60318.31**	**64511.59**	**727264.29**

Table-4.4

Yield Calculation Table

Growing Stock in PB-I & PB-IV

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Volume In cum
Deodar	12846	16791	19414	13595	3373	852	239	0	34	0	72435.40.
Kail	23572	17758	16543	11821	4970	3132	1465	849	239	34	93243.84
Chil	0	0	0	0	0	0	0	0	0	0	0.00
Spruce	59247	32117	25341	20196	7046	7341	4938	4393	2453	2453	280523.33
Fir	21805	22142	18927	18372	8984	8792	6659	5121	2748	3834	315019.42
Ban	3269	5440	5415	2860	1295	1465	852	681	239	239	27922.02
Moh/ Khar	6670	6934	5245	3566	1524	1122	477	341	204	370	36578.18
B.L	4486	5482	2317	2096	849	239	170	239	34	100	12506.07
Total	**131894**	**106664**	**93203**	**72506**	**28042**	**22943**	**14800**	**11624**	**5951**	**7031**	**836019.38**

Table-4.5

General Abstract

Growing Stock all PBs

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Volume In cum
Deodar	20252	18360	19433	13595	3373	852	258	0	34	0	72319.84
Kail	45493	27588	30018	21748	10493	5240	1889	924	277	111	160339.02

Chil	0	0	0	0	0	0	0	0	0	0	0.00
Spruce	137594	67923	47732	29018	9897	9388	6527	5675	3812	5209	442841.34
Fir	115677	105780	91994	93922	61402	28243	17235	7307	4439	5037	976411.31
Ban	3269	5440	5415	2860	1295	1465	852	681	239	239	27922.02
Moh/ Khar	8044	9191	7263	4563	1893	1313	573	360	262	408	45014.84
B.L	4581	5946	3059	2469	1137	564	304	449	168	349	20628.28
Total	**334910**	**240228**	**204915**	**168176**	**89491**	**47067**	**27637**	**15397**	**9231**	**11353**	**1745476.66**

4.8 SILIVICULTURAL SYSTEM

The forest allotted to this working circle shell be managed under the Indian irregular Shelterwood system. Young crop upto 30cm diameter and upto 0.1 ha. in extent of area shall be retained as part of future crop. In addition all fir trees upto 30cm dbh will also be retained as part of future crop. Conservative felling shall be done on steep and precipitous slopes. Artificial regeneration shall be resorted to immediately after the fellings, nurseries will be raised in advance of fellings. The poplar should be inter-planted as a nurse crop.

4.9 ROTATION AND CONVERSION PERIOD

Rotation period is fixed at 120 years. Since the forests allotted to this working circle are in the course of conversion, the rotation period is of little significance.

4.10 EXPLOITABLE DIAMETERS

For Fir and Spruce it has been fixed at 40 cm d.b.h where as the rest of the coniferous it is 60 cm d.b.h

4.11 REGENERATION PERIOD

Regeneration period is fixed as 30 years. Efforts will be made to regenerate the area naturally supplemented with artificial planting

4.12 FELLING CYCLE

Corresponding to the plan period the felling cycle will be of 15 years.

4.13 DIVISION INTO PERIODS AND ALLOTMENT TO PBs

With the rotation of 120 years and regeneration period of 30 years, the whole working circle has been divided into 4 fixed periodic blocks

P.B-I :- Area allotted to this periodic block cotain preponderance of mature trees or with poor density. Besides PB-I areas of the working plan under revision which are not fully regenerated have also been retained in this PB.

P.B-II :- Areas with semi mature to mature crops has been allotted to this periodic block.

P.B-III :- The forests carrying majority of middle aged to mature trees have been allotted to this periodic block.

P.B-IV :- The forests carrying majority young crop in sapling to pole stages with a few scattered maturing and matured trees have been allotted to this periodic block.

4.13.1 General Abstract of areas and growing stock PB wise:- General Abstract of areas and growing stock PB wise is as under:-

Table-4.6

Particulars	**PB-I**	**PB-II**	**PB-III**	**PB-IV**	**Total**
Area allotted (ha.)	812.84	962.57	1022.20	1613.13	4410.73
Growing stock(cum)	108755.09	591217.05	318240.23	727264.29	1745476.66

4.14 CALCULATION OF YIELD

The yield is calculated as under:-

4.14.1 From PB-I areas:-

Table-4.7

Species	No. of Trees in PB-I	Proportion of trees	No. of Seed bearer to be retained /ha.	No. of Seed bearer to be retained /ha on proportionate basis	Total Tree to Be retained over 812.84 ha	Existing No. of Trees class I , II & III class	No. of Trees Available For removal I, II & III class	Proportion Ate no. of Class I , II & III class available
Deodar	599	1	30	0.3	244	299	55	0.1
Kail	4094	7	25	1.75	1423	1199	226	0.1
Chil	----	----	20	----	---	---	--	--
Spruce	2996	5	25	1.25	1016	2097	1307	0.6
Fir	52613	87	50	44	35765	25966	----	----

The above proportion is based on purely theoretical consideration. This combined with field observations gives following well suiting proportions.

Deodar = 0.1

Kail = 0.1

Spruce =0.6

This was in respect of III and above classes. Field inspections indicate that 40 % of V and IV classes trees will also be available for felling.

The yield is calculated by Hufnagels formula as under:-

$$Y = \frac{C1\ VI + C2\ V2}{P}$$

Where CI = Constant representing of fraction of volume of V and IV class trees available for felling during the period of regeneration.Thus 0.4 be taken for all species.

C2 = Constant representing of fraction of volume of class III and above class trees available for felling during the period of regeneration.Thus 0.1 for Deodar,0.1 for Kail and 0.6 for Spruce respectively.

V1 = Volume of trees below IIA class.

V2 = Volume of trees of IIA and above class

P = normally no concentrated fellings were done in the plan under revision. So is kept as 30 years i.e regeneration period

Annual yield of different species is summarized as under:-

(Kail) $Y = \frac{C1\ VI + C2\ V2}{30}$

$= \frac{764.69 \times 0.4 + 2610.80 \times 0.1}{30} =$ **20 cum**

(Spruce) $Y = \frac{C1\ VI + C2\ V2}{30}$

$= \frac{297.77 \times 0.4 + 7537.40 \times 0.6}{30} =$ **265 cum**

(Fir) $Y = \frac{C1\ VI + C2\ V2}{30}$

$= \frac{8545.46 \times 0.4 + 80020.49 \times 0.1}{30} =$ **380 cum**

Table-4.8

Species	**Annual Yield**
Kail	20
Spruce	265
Fir	380
Total	**665**

4.14.2 From PB-IV areas:-

In PB-IV removal of overwood will be carried out. The yield is again calculated be Hufnagels formula. There is no need at this stage to fell trees of other classes**.**The yield in PB-1V is as under:-

$$\mathbf{Y = \frac{C\ V}{P}}$$

C = Constant representing the fraction of volume of IA above class trees available for felling during period. C has been taken as 0.3

V = Volume of trees of I class trees of chil/ conifer.

P = Period of the plan is 30 year i.e regeneration period.

$$\text{(DEODAR)} \quad Y = \frac{0.3 \times 5180.43}{30} = \mathbf{52\ cum}$$

$$\text{(KAIL)} \quad Y = \frac{0.3 \times 29841.72}{30} = \mathbf{284\ cum}$$

$$\text{(SPRUCE)} \quad Y = \frac{0.3 \times 164525.07}{30} = \mathbf{1645\ cum}$$

$$\text{(FIR)} \quad Y = \frac{0.3 \times 161394.25}{30} = \mathbf{1614\ cum}$$

The annual yield of Deodar and Kail is as under for PB-IV.

Table-4.9

Species	**Annual Yield**
Deodar	52 cum or say 55 cum
Kail	284 cum or say 285 cum
Spruce	1645 cum
Fir	1614 cum or say 1615 cum

4.14.3 From PB-II & PB-III areas:- For conservative reasons no yield is prescribed from PB-II &PB-III areas. The removals therefrom will however be counted towards PB-I.

The yield of the working circle is thus as under which will be controlled by PBs, but for all the species taken together.

Table-4.10

Species	**PB-I,PB-II & PB-III**	**PB-IV**	**Total**
Deodar	---	55	55
Kail	20	285	305
Chil	---	---	---
Spruce	265	1645	1910

Fir	380	1615	1995
Total	**665**	**3600**	**4265**

4.14.4 Yield in relation to CAI:-

Table-4.11

Species	Total Standing Volume (cum)	Increment % age	Annual Increment	Annual Yield	Prescribed Yield % age
Deodar	72319.84	1.74	1258	55	4
Kail	160339.02	1.58	2533	305	12
Chil	0.00	2.16	----	---	---
Spruce	442841.34	1.2	5314	1910	36
Fir	976411.31	1.06	10350	1995	19
Total			**19455**	**4265**	**22**

4.15 CONTROL OF YIELD

All removals of all age classes and for all purposes shall count towards the yield. The deviation in a year should not exceed 25 % and a slab of 5 years will not exceed + 10 % of the prescribed yield. No commercial felling will be undertaken until there is a stand by nursery of required age of planting stock. If regeneration is not keeping pace with fellings, removal will be curtailed.

4.16 TABLE OF FELLING

Following sequence of fellings in PB-I and PB-IV is as under**:-**

Table-4.12

Year	Range	Name of forest	Comptt No.	Area (ha.)	Allot ment	Nature of Fellings
2012-13	--	--	--	--	--	Only salvage marking in the division
2013-14	--	--	--	--	--	Only salvage marking in

						the division
2014-15	Kotgarh	DPF Dewala	8a	55.08(Part)	PB-IV	Seeding felling.
2017-18	Kotgarh	DPF Dewala	7b	100.44(Part)	PB-I	Seeding felling
2019-20	Kumarsen	DPF Ahr	30	145.80(Part)	PB-I	Seeding felling
2021-22	Kotgarh	DPF Dewala	9	85.50(Part)	PB-I	Seeding felling
2022-23	Kotgarh	DPF Dewala	8a	55.08(Part)	PB-IV	Seeding felling.
2023-24	Kotgarh	DPF Dewala	7b	100.44(Part)	PB-I	Seeding felling
2024-25	Kumarsen	DPF Ahr	30	145.80(Part)	PB-I	Seeding felling
2025-26	Kotgarh	DPF Dewala	9	85.50(Part)	PB-I	Seeding felling
2026-27	Kumarsen	DPF Ahr	30	145.80(Part)	PB-I	Seeding felling

4.17 METHOD OF EXECUTING THE FELLING

The marking shall be carried out by the D, F, O or A.C.F and invariably checked by the C.F.The technique of carrying out regeneration marking is described in Punjab Forest leaflet No. 2.In addition the following broad guidelines are laid down for the marking officer:-

4.17.1 PB-I Areas:-

i) Mother trees should be uniformly distributed all over the area and tall well grown healthly trees with superior poles and well developed crown should be selected as mother trees.These should be preferably of class II A and II B.

ii) As far as practicable, mother trees selected should be of Fir and Spruce.When these are not available then economically important B/L species may be selected as mother trees.The number of mother trees per ha. should be 50-60 in case of Fir and 25-30 in case of Spruce.

iii) Vigorously growing samplings and poles upto 30 cm. d.b.h compact groups with area exceeding 0.1 ha. and density exceeding 0.5 shall be retained as advance growth.

iv) No marking shall be done on slopes exceeding 40 %.

v) On broken and precipitous ground the marking shall be of selection type.Only those trees shall be removed the removal of which will not result in creating a permanent gap in the canopy. Further trees/poles standing on steep slopes shall not be marked.All natural regeneration shall be retained and tended.

vi) Wherever B/L trees are found creating excess overhead shade to Fir and Spruce, these should be marked. However no attempt should be made to introduce Fir and Spruce in areas suitable for B.L species.

vii) Trees standing over established regeneration should be lopped before felling.

viii) Before undertaking any forest for seeding fellings it shall be ensured that nursery stock is readt to for planting and subsequent beating up immediately after the timber has been extracted from the forest. In case neither the nurseries have been raised nor the stock is available, no marking/felling shall be done.

4.17.2 PB-II & PB-III Areas:-

No felling will be done in PB-II & PB-III areas.However salvage markings of dead and uprooted trees will be done to clear these forests from fire hazards every fifth year. All removals will count towards the yield of the working circle.

4.17.3 PB-IV Areas:-

All overwood shall be removed in areas where the regeneration has been fully established.

4.18 SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING

These operations are indicated mainly for establishing regeneration and would be as follows:-

i) Removal of damaged and unfelled marked trees.

ii) Slash disposal by heaping into nallahs or by control burning

iii) Bush cutting and removal of humus are the important operations to be carried out in PB-I areas.

4.19 ARTIFICIAL REGENERATION

Sinnce the natural regeneration has failed in Fir/Spruce areas, reliance has to be placed on artificial regeneration. The techniques of raising nurseries have been given in H.P Forest Manual Vol.IV in

detail.In their natural zones, Spruce occupies lower belt and Fir in upper belt.Fir prefer cooler,moist and shady location in Spruce belt.Where as in Fir zone,Spruce occupies the raised groundand exposed Spruce leaving depression. Planting programme has been given in Plantation (overlapping) Working Circle

4.20 OTHER REGULATIONS

4.20.1 Fire Protection:-These areas are generally not fire prone. However the areas should be still be protected from fire.It is recommended that all inspection paths be kept free of inflammable material during May and June and from October to December.Fire watchers should be deployed during this period.These measures are enough for this working circle and no fire lines is required to be constructed.

4.20.2 Closure:- The felled areas should be closed to grazing for at least 30 years.The notification of closures shall be issued under IFA,1927.Action for the issue of closures notification should be initiated well before the areas to be felled.

4.20.3 Weeding:- Growth period of Fir is only five months starting from April to August. The plants should be kept free from weeds during this effective growing period.Timely weeding results in healthy plants growth.This operation should be continue till plants are beyond the weeds competition.Two- three weedings are normally required every year for a period of five years at least.

4.20.4 Regeneration Survey:- Regeneration Survey of felled PB-I areas shall be carried out as per para 32 of National Working Plan Code,2004 once every five years as the progress of regeneration is directly linked with fellings.

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CHAPTER V

THE OAK WORKING CIRCLE

5.1 GENERAL CONSTITUTION OF WORKING CIRCLE

This working circle includes predominantly Ban Oak forests mostly in pure patches.The total area of this working circle is 152.68 ha.

5.2 GENERAL CHARACTER OF VEGETATION

The Ban oak is the common low level oak of the moist zone and is the major species over considerable area which varies from 1300 to 2100 m. It thus, overlaps the altitudinal zones of all the lower conifer is the common companion of the blue pine, deodar, and spruce. Pure Ban Oak forests occur in sheltered belts in Narkanda and Baragoan Block**.**

The forests are of slection type and irregular in age. Its chief associates are Rhododendron arboreum, Pyres ovalifolia with some Machilus odoratissima, Litsaea umbrosa, Cedrela serreta, Carpinus viminea etc. in damp ravines.There is generally good deal of shurby undergrowth chiefly of berberis, Lycium, Indigofera, Gerardiana, Sarcococca saliana, Daphne pepyracea, Desmodium tiliaefolium, Myrsine africanam, Prinsepia utilis, Spiraea canescens, Lonicera quinquelocularis, Viburnum species, Rubus species etc.

5.3 FELLING SERIES AND CUTTING SECTION

There is only one felling series namely Kotgarh felling series.

5.4 AREA STATEMENT

Total area of this working circle is 152.68 ha. Which works out to be 1.17 % of the total area of the division**.**

Table-5.1

Range	**R.F**	**D.P.F**	**U.P.F**	**Total in ha.**
Kotgarh	--	64.80	---	64.80
Kumarsain	---	--	87.88	87.88
Total	**---**	**64.80**	**87.88**	**152.68**

5.5 BLOCKS AND COMPARTMENTS

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

5.6 SPECIAL OBJECTIVES OF MANAGEMENT

1. To project and preserve the hill sides.
2. To meet the local demand of people for fodder and fuel.
3. To improve the stocking of these forests by effective closure carrying out artificial sowing and planting.
4. To obtain maximum progressive sustained yield.

5.7 ANALYSIS AND VALUATION OF THE CROP

i) **Stock Maps**:- Stock mapping has been done for each compartment and description has been given in respective history files.

ii) **Age Class**:- Since the forests are of typically of selection type, all age class are well represented.

iii) **Enumerations**:- 5 % Sampling has been done and result is as under:-

Table-5.2

General Abstract

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Total Trees
Deodar	42	42	16	0	0	0	0	5	0	0	105
Kail	565	665	440	257	104	42	10	10	0	0	2093
Chil	1346	1456	995	330	199	167	47	68	57	125	4790
Spruce	698	657	428	149	83	74	21	56	47	99	2312
Fir	0	0	0	0	0	0	0	0	0	0	0
Ban	2576	4593	5320	2670	1068	771	267	409	172	592	18438
Moh/ Khar	0	0	0	0	0	0	0	0	0	0	0
B.L	8906	12634	3880	989	266	205	42	215	36	172	27345
Total	**14133**	**20047**	**11079**	**4395**	**1720**	**1259**	**387**	**763**	**312**	**988**	**55083**

Table-5.3

Volume of Oak Working Circle

Specie	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 & above	Volume In cum
Deoda	7.47	20.41	16.624	0	0	0	0	36.95	0	0.00	81.46
Kail	85.88	281.30	424.16	456.18	296.92	176.61	58.24	77.13	0.00	0.00	1856.41

Chil	119.79	477.56	771.12	487.74	491.53	632.76	256.90	512.10	570.74	1617.25	5937.52
Spruc	94.92	281.85	445.12	293.38	267.01	354.01	140.04	496.83	535.51	1409.17	4317.87
Fir	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Ban	345.18	1437.60	3495.24	3206.67	2108.23	2309.91	1144.09	2395.51	1328.35	5857.25	23628.06
Moh/ Khar	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
B.L	837.16	3714.39	2747.04	1321.30	579.08	662.56	189	1286.13	276.408	1648.96	13262.05
Total	**1489.73**	**6213.13**	**7899.31**	**5765.27**	**3742.78**	**4135.87**	**1788.29**	**4804.66**	**2711.02**	**10532.63**	**49082.68**

5.8 SILIVICULTURAL SYSTEM

Coppice with standards syatem will be applied. However, felling will be done only after approval of the competent authority as the government has imposed restrictions on felling of oak forests as per **Appendix-III.**

5.9 ROTATION AND CONVERSION PERIOD

Rotation of 45 years for coppice and 90 years for standards will be kept.

5.10 EXPLOITABLE DIAMETERS

The exploitable diameter for Ban-Oak coppice is 20 cm and for Ban-Oak standards is 35 cm.

5.11 FELLING CYCLE

Felling cycle is fixed at 15 years corresponding to period of plan.

5.12 CALCULATION OF YIELD

The yield is regulated by area. Since there is a ban on green felling, no yield has been prescribed. However the trees removed during the course of the plan shall be recorded in the control forms for the purpose of record.Salvage removal of 55 cum of Oak will be taken as equivalent to one ha. of yield.

5.13 TABLE OF FELLING

Following sequence of fellings will be followed:-

Table-5.4

Range	Name of Forest	Comptt.No.	Area in ha.	Area Precribed (ha.)	Year of felling
Kotgarh	DPF Hattu	13 b	64.80	15	2013-2014
Kumarsen	UPF Kuftu	209	58.72	15	2014-2015
Kumarsen	UPF Thatal lower	210	29.16	10	2015-2016
Kotgarh	DPF Hattu	13 b	64.80	15	2016-17
Kumarsen	UPF Kuftu	209	58.72	15	2017-18
Kumarsen	UPF Thatal lower	210	29.16	10	2018-19
Kotgarh	DPF Hattu	13 b	64.80	15	2019-20
Kumarsen	UPF Kuftu	209	58.72	15	2020-21
Kumarsen	UPF Thatal lower	210	29.16	9.16	2021-22
Kotgarh	DPF Hattu	13 b	64.80	15	2022-23
Kumarsen	UPF Kuftu	209	58.72	13.72	2023-24
Kotgarh	DPF Hattu	13 b	64.80	4.80	2024-25

5.14 METHOD OF EXECUTING THE FELLING

These will be carried out in the year following the main fellings and will consist of:-

i) Annual coupe prescribed for felling should be marked on the ground by clearing one meter wide strip around it in case the boundary does not happen to be a natural feature.

ii) About 15 to 20 trees of diameter 40-60 cm healthy vigorously growing Oak trees per ha. Shall be retained as standard depending upon the terrain.The standards should be as evenly distributed as possible over the entire area of the coupe. The standards retained will be marked with rings of white paint, measured, numbered and listed. A list of the same will be kept in the compartment history file.

iii) The remaining coupe excluding the standards will be felled. The height of the stump should not exceed 15 cm. Stool dressing is not necessary but the cut surface should not slope towards the centre of the stump and must be completed and material removed from the coupe by middle of next March.

iv) Cut material shall not be stocked over the stools.

5.15 SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING

Subsidiary cultural operations will be carried out in the year following the main fellings as under:-

i) Felling and conversion refuse shall be collected and dumped in nallas and depressions unsuitable for planting.

ii) Lopping of inferior B/L species interfering with the young saplings poles of valuable species will be done.

iii) Weeding and cleaning should be carried out to help regeneration of valuable species to come up and grow.

iv) Climber and bush cutting to be done where necessary.

5.16 ARTIFICIAL REGENERATION

The felled areas, the blanks and compartments allotted to this working circle will be artificially regenerated during the period of the plan. Planting programme has been given in Plantation (overlapping) Working Circle.

5.17 OTHER REGULATIONS

5.17.1 Weedings: - Weedings shall be carried out till the plants are free from damage.Two weedings during the growing season shall suffice.

5.17.2 Closure: - In areas where natural regeneration of desired species is deficient or absent and planting is required and has been done.Closure to grazing must be enforced by erecting barbed wire fence. However, such closure will be on small areas of the working circle and will not interfere with the rights of people.

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CHAPTER VI

THE PLANTATION (OVERLAPPING) WORKING CIRCLE

6.1 GENERAL CONSTITUTION OF WORKING CIRCLE

Human population has increased manifold and is further increasing day by day. Their requirements for fuel-wood, fodder, timber, NTFP and water has also increased manifold thereby putting pressure on traditional forests which in turn are degrading day by day. Now, time has come when each and every corner of earth (land) is put to use economically as per land capabilities. This working circle overlaps all working circles 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.

6.2 GENERAL CHARACTER OF VEGETATION

Since the forests assigned to this working circle are situated in different altitudinal zone, therefore, the vegetation varies.

6.3 PLANTATION SERIES

There will be only one plantation series, the division being the unit for the purpose of control.

6.4 AREA AND ALLOTMENT

The distribution of area in this working circle in different ranges is given below:-

Table-6.1

S.No	Name of Range	Area allotted in ha.
1	Kotgarh	318.36
2	Kumarsain	663.59
	Total	**981.95**

6.5 BLOCKS AND COMPARTMENTS

No change has been made in the boundaries of forest allotted in this working circle

6.6 SPECIAL OBJECTIVES OF MANAGEMENT

1. To manage the degraded, sparsely stocked and blank forests on scientific basis to increase the area under forest cover, thereby, reducing the pressure on traditional forests.
2. To augment the resources of timber, fodder and fire wood, to meet the increasing demand of local people in the vicinity of these forests.
3. To check denudation and soil erosion.
4. To raise compact plantation to make available raw material for wood based industries
5. To rehabilitate degraded areas by planting fodder trees and high yielding varieties of grasses.
6. To increase tree cover of valuable species so as to increase supply of fuel-wood and fodder to meet with demand of local community.
7. To increase employment opportunities (wage earning) to rural man folk
8. To make people aware about better management of forest resources and to inculcate habit of tree planting among the masses.
9. To train staff and labour regarding planting techniques and also that of nursery techniques.

6.7 ANALYSIS AND VALUATION OF THE CROP

i) **Stock Maps**: - Stock Maps of all the compartments of this working circle have been prepared on 1:15000 scale. These stock maps have been placed in the respective compartment history files

ii) **Enumeration**: - 5 % enumerations have been carried out in these areas.

iii) **Density**: - Density has been ocularly estimated and recorded in compartment history file.

6.8 SILIVICULTURAL SYSTEM

As the main objective is to raise plantations, no silvicultural system is prescribed. The plantations will be raised by artificial means. However, as and when plantations are established, areas as per crop composition will be allotted to respective working circles in next working plans

6.9 ROTATION

There is no need for prescribing rotation at this stage

6.10 CHOICE OF SPECIES

The success of plantation works depends on the choice of species. The correct choice of species would give productive and praise worthy results where as wrong choice of species always brings adverse publicity for the forester. In short, adequate care must be taken while selecting the species to be planted keeping in view the land capability, terrain and the demands of the local people. The species to be planted altitude-wise are suggested as under. However, Divisional Forest Officer is at liberty to change/add/raise new species suitable to a particular site.

Table-6.2

Suggested list of species to be planted

Altitude	Species suggested for plantation
Up to 1000 metres	Shisham, Bamboo, Khair, Ritha, Toon, Bihul, Siris, Khirk, Kachnar,Daru, Harar, Bahera
1000 to 1500 metres	Robinia,Bihul,Toon,Ritha,Kachnar, Willow, Leucaenia,Bamboo,Khair,Khirk, Kikker, Daru, Hill Poplar
1500 to 2500 metres	Deodar, Walnut, Hill Poplar, Willow, Robinia, Ban Oak, Horse Chestnut
2500 to 3000 metres	Silver Fir, Maple, Walnut, Moru Oak, Bird Cherry, Ash, Hill Poplar

6.11 CALCULATION OF YIELD

Since blank areas have been prescribed for afforestation and density of the growing stock is below 0.2, therefore no felling has been prescribed in this working circle and so there is no question of yield.

6.12 TABLE OF PLANTING

The table below gives the plantation programme in these areas:-

Table-6.2

Range	**Name of Forest**	**Comptt.N**	**Area of Comptt.(ha)**	**Area to be Planted(ha)**	**Year-wise planting**
Kotgarh	DPF Hattu	10a	55.1	5.00	2012-2013
	DPF Marni	52	157.14	5.00	
	DPF Kandali	14	35.6	5.00	
	DPF Dawala	6(a)	34	5.00	
Kumarsain	DPF Beshndar	11	53.69	5.00	
	UPF Paersh	229	60.75	10.00	
	DPF Ahar	31	74.92	10.00	
	UPF Bajwa	CN1	34.64	5.00	
			Total	**50.00**	
Kotgarh	UPF Jabbal	124	25.11	5.00	2013-2014
	RF- Nagkelo	58	57.91	5.00	
	UPF Shmathala	141	18.22	5.00	
	DPF Kepu	CN 35	132.51	15.00	
Kumarsain	DPF Jogsha	46	38.07	10.00	
	DPF Hawan	43	55.48	10.00	
	DPF Chhicher	37a	134.86	10.00	
			Total	**50.00**	
Kotgarh	DPF Kelonal	64	21.06	5.00	2014-2015
	DPF Jhanga	CN-42	7.22	5.00	
	DPF Naula	CN-39	81.76	15.00	
	UPF Kirti	134	72.9	5.00	
	DPF Nihari	49	202.5	5.00	
	DPF Hattu	11a	55.1	5.00	
	DPF Madawani	47	46.17	5.00	
	UPF Revi	200	9.72	5.00	
	DPF Dawala	6C	52.6	5.00	
	DPF Mohal	2	59.53	5.00	
Kumarsain	DPF Lathi	CN23	10.09	5.00	
	UPFBarubag	262	60.75	10.00	
	DPF Chhicher	38b	105.3	10.00	
	UPF Teshandar	238	81.00	10.00	
			Total	**95.00**	

Kotgarh	UPF Horu	127	32.4	5.00	2015-16
	UPF Saroga East	154	34.83	5.00	
	UPF Kunda	149	72.09	5.00	
	UPF Sirkot	CN19	38.62	5.00	
	DPF Hattu	12a	109.35	5.00	
	DPF Kehri	CN55	30.66	5.00	
	DPF Dawala	7b	100.44	5.00	
	DPF Mohal	3	36.5	5.00	
Kumarsain	UPF Banolidhar	274	40.5	10.00	
	UPF Ghareuti	270	45.76	10.00	
	UPF Urshu	247	24.30	5.00	
	DPF Bargoh	CN9	33.45	5.00	
	DPF Bhaunan	CN6	25.00	5.00	
	DPF Ahar	32	81.81	5.00	
			Total	**80.00**	
Kotgarh	UPF Loshta	131	8.91	5.00	2016-17
	DPF Bargaon	CN40	8.01	5.00	
	DPF Sainj	CN33	40.05	5.00	
	DPF Noon	67	20.3	5.00	
	DPF Panudhank	CN16	22.8	5.00	
	DPF Bargodhar	CN62	53.83	10.00	
	DPF Ahar	29	64.8	5.00	
	UPF Kholti	220	54.67	5.00	
			Total	**40.00**	
Kotgarh	DPF Deorgarh	65	18.2	5.00	2017-18
	DPF Bhali	CN60	33.37	5.00	
	DPF Hattu	13b	64.8	10.00	
	UPF Sunpur	202	11.3	5.00	
	DPF Dawala	9	85.05	5.00	
	UPF Sharmla	175	22.27	5.00	
Kumarsain	DPF Paneog	CN26	8.99	5.00	
	UPF Khakthar	254	58.32	5.00	
	UPF Luhri	271	101.25	10.00	
	DPF Baragaon Kandi	35	37.66	5.00	
			Total	**60.00**	
Kotgarh	UPF Kadanu	133	30.37	10.00	2018-19
	UPF Dadesh	143	48.6	5.00	
	DPF Rewali	CN36	91.15	5.00	
	DPF Dalan	CN34	18.2	5.00	
	DPF Tapra	CN53	147.37	5.00	
	DPF Kaltudhar	CN56	40.98	5.00	
Kumarsain	DPF chhicher	37a	134.86	10.00	
	UPF Parshan	248	46.57	10.00	

	UPF Chimthla	228	36.85	10.00	
			Total	**65.00**	
Kotgarh	RF Nagkelo	59a	54.67	10.00	2019-20
	UPF Batari	122	20.25	5.00	
	DPF Jumnda	51	101.25	5.00	
	DPF Madwani	47	46.17	5.00	
	DPF Mohal	4	38.5	5.00	
Kumarsain	UPF Dhali	258	63.99	5.00	
	UPF Darorunala	240	60.75	5.00	
	DPF Manu	CN21	19.85	5.00	
	UPF Chopernala	219	162	5.00	
			Total	**50.00**	
Kotgarh	UPF Horu	127	32.4	5.00	2020-2021
	RF Nagkelo	59c	107.73	5.00	
	DPF Dakon	CN43	108.15	5.00	
	DPF Lohala	CN57	20.34	5.00	
	DPF Kotbari	15	28.80	5.00	
	DPF Dawala	6a	34	5.00	
Kumarsain	UPF Luhri	271	101.25	5.00	
	DPF Chalah	36	30.78	10.00	
	UPF Duma	227	71.28	10.00	
			Total	**55.00**	
Kotgarh	DPF Manan	CN32	19.19	5.00	2021-22
	UPF Kalimati	140	32.4	5.00	
	DPF Singhadar	CN50	15.16	5.00	
	DPF Madawani	48	70.9	5.00	
	UPF Kunjla	286	16.05	5.00	
Kumarsain	UPF Teshandhar	238	81	5.00	
	DPF Chalah	36	30.78	10.00	
			Total	**40.00**	
Kotgarh	RF Nagkelo	56	79.38	5.00	2022-23
	DPF Kharola	CN41	7.72	3.00	
	DPF Nagraon	CN37	14.94	5.00	
	UPF Khanahar	285	40.5	5.00	
	DPF Talgore	16	164	5.00	
	Lambidar	174	111	5.00	
			Total	**28.00**	
Kotgarh	DPF Dalhar	CN58	37.63	3.00	2023-2024
	DPF Sidhpur	60	72.9	5.00	
	DPF Solku	1	58.32	5.00	
Kumarsain	UPF Kalmu	252	22.27	10.00	
	UPF Teshandar	238	81	5.00	
			Total	**50.00**	
Kotgarh	UPF Churti	278	32.40	5.00	2024-2025

	UPF Kandayali	199	111	5.00	
	UPF Bijli	185	22.27	5.00	
	UPF Rajana	176	46.60	5.00	
Kumarsain	DPF Bargal	CN12	165.11	3.00	
	DPF Ahar	30	145.8	3.00	
Kotgarh	DPF Hatu	11a	99.63	15.00	
	DPF Hattu	12b	26.73	5.00	
	DPF Churti	CN54	28.79	5.00	
			Total	**51.00**	
Kumarsain	UPF Gadhalu	241(part)	24.30	10.00	2025-2026
Kotgarh	UPF Dakori	187	97.20	20.00	
Kotgarh	DPF Dewala	9	85.50	20.00	
Kumarsain	UPF Kholti	220	54.67	15.00	
			Total	**65.00**	
Kumarsain	UPF Gadhalu	241(part)	24.30	10.00	2026-2027
Kotgarh	UPF Palvi	201	6.07	5.00	
	DPF Dawala	8a	55.08	5.00	
	DPF Mohal	5	12.5	5.00	
	UPF Thar	273	121.5	5.00	
	DPF Tangri	92	26.32	10.00	
			Total	**40.00**	

6.13 TREATMENT OF EXISTING PLANTATION

All existing young plantations must be strictly protected and tended properly. Maintenance operations such as fence repair, weeding, bush cutting, beating up of failures etc. should be carried out for a period of at least 5 years after the planting.

6.14 NURSERIES

It is axiomatic that the degree of survival of plantations is directly linked to the quality of nursery stock raised in nurseries. More so, when we are faced with increasing swings in seasonal fluctuations, both in terms of erratic rainfall and rising temperatures. These recent changes in weather patterns exacerbate our historical woes of compacted soil, damage by fire and cattle and general lack of interest (and therefore concern) of local communities in our plantations. Vastly improved nursery stock can in a major way address most of these impediments coming in the way of establishing successful plantations in and outside forests.

Few important qualities of any good nurseries would include:

a) It should be large in size (atleast 0.5ha) so that it is cost effective and also proper infrastructure including water suppy, germination chamber (poly-house), Mali-hut, soil mixing yard, vermicompost etc can de developed.

b) Adequately trained, dedicated staff should be available in each nursery. Mali and laboureres should be trained and guided from time to time about raising of quality stock.

c) Each nursery should specialize in 5-6 species suited to the area and have large stock of each species, which is graded from time to time so that only quality stock goes for planting.

d) Soil mixture is most vital componenet for raising quality stock. Thus care must be taken not to compromise with quality of soil mixture (ideally 1:1:1 of soil:sand:vermicompost)

There are 7 nurseries in Kotgarh (as on December 2012) having a stock of 473815 plants.Thus average numbr of plants per nursery is 67687 which can further be increased (and the average plant cost reduced) with development of infrastructure in more nurseries.The schedule rares of nursery works is as per A**ppendix-VI**

6.14.1 Tall Planting:- One of the main reasons for faiure of plantations is grazing / trampling by cattle.Also drought, fire hazards contribute to failure. Thus, to overcome pressure of grazing and drought, planting of tall plants (above grazing height) with well developed root system and good collar girth is desirable. Such plants will be able to cope with droughts owing to their well developed spread out root system, will be above grazing height and thus will survive grazing pressure and their good collar girth will help them withstand trampling. Such plants can be raised in nurseries for which month-wise operation activity has been given here.

Table-6.3

Raising of Deodar in Nurseries

Month	Activities for Raising Deodar
Nov-Dec	1. Sow seeds in trays filled with only Vermicompost. Keep the trays in polyhouse. (1 kg deodar seed contains 8000-10000 seeds approximately)
March (1st Year)	1. Prick in 6”x4”bags or in root trainers with potting mixture of 1:1:1 of sand :soil: vermicompost.
July (1st Year)	1. Transfer to 9”x5”bag alongwith ball of earth, add some more soil at bottom and sides
July (2nd Year)	1. Transfer to 15”x7”bag alongwith ball of earth, add some more soil at bottom and sides
July (3rd Year)	1. Plant 90% of the good quality plants 2. Retain10% best plants from among the quality plants for production

	of **'Tall Plants'** and shift them in bags of size 20"x12"
July (4th Year)	1. Shift these plants to cement bags or such other alternatives.
July(5th Year)	1. Plant out these plants in pits of size 60x60x60cm

Similarly month wise activity chart for raising Ban is given here:

Table-6.4

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 below:-

Table-6.5

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	1. Flood irrigation 2-3 times depending on rainfall and temperature

(Next Year)	2. Weeding twice- once before and once during monsoon (these plants will not be shown in nursery return)
Nov' (Next Year)	1. Uproot plants that are >2', transport to production nurseries 2. Make root-shoot cutting retaining 4" of root and 4" of shoot 3. Plant in polybags of size 15"x7" (Now they will be shown in the Nursery Return of May'13 under age group 1.5 years)
Nov-Dec' (2nd Year)	1. Plant 90% of the quality plants 2. Retain10% best plants from among the quality plants for production of 'Tall Plants' 3. Make root shoot cutting of these 10% retained plants by cutting the shoot at 2' height (retaining only one shoot) and shift alongwith the soil to bags of size 20"x12"
Dec'(3rd Year)	1. Plant out these plants in pits of size 45x45x45cm

6.15 NEW PLANTATIONS

The technique of "Forest Nursery work" and "Artificial Reproduction" in hills has been dealt with in the Technical Orders No. 3 & 4 contained in the Punjab Forest Manual, Vol-III. The general principles to be followed for planting are given below:-

6.15.1 Site Selection:- The areas to be planted have been identified and discussed and described above.The blanks to be planted have been shown in the stock-maps. However, while selecting the area for plantation the requirement of grazing and grass-cutting of the right-holders must be given due consideration.

6.15.2 Notification of Closures :- Every ara to be taken up for plantation should be notified for closure one year in advance.The period of closure may be 15-20 years.

6.15.3 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.

6.15.4 Plantation Journals :- It is essential that whenever a site is selected for plantation a proper hard bound nursery journal is prepared for that site. The nursery journal must have a

large sketch may be of the area showing boundaries and other details like nallas, rocky out crops, existing patches of trees etc. It is important that GPS coordinates of atleast 6 to 8 points around plantations are recorded and entered in the plantation journal along with the altitude of the area. Details of all works carried out must be entered in the plantation journals and signed by the concerned officials showing date of signature. All inspecting officers are to record their visits and comments/observations in the plantation journals. Once a plantation journal is complete i.e. in the fourth and fifth year of the plantation, it should be transferred to the division office and kept properly in record there.

6.15.5 Fencing :- Fencing needs to be done around plantation sites only where it is necessary. Fencing along their steep slopes cliffs, should be avoided where it serves no purpose. However, it is advisable to plant bio-engineering species suitable for the area along three strand barbed wire fencing especially in areas where grazing incidence is high. Fencing work should be taken up during the rainy season along with live fence support even for area which is to be planted in the ensuing winter. Where economical, and especially along roads, treated bamboo posts should be used for fencing. Where adequate live fence material is planted, only 2 strands of barbed wire may be sufficient. Tall plants of broad leaved species (6 -8 ft high) wherever available can also be planted along the fence.

6.15.6 Site Clearance: - In the past it has been a practice to cut and remove all bushes & shrubs from the plantation area. This practice is to be discontinued as shrubs & bushes help prevent soil erosion and add in moisture retention. However, if the area has exotic weeds/ aliens' species like lantana, Parthenium etc. then these are to be removed when the area is fenced.

6.15.7 Advance earth work: - Pits of the statdard size (30cm x 30 cm x30 cm for chil and 45cm x45cm x 45cm for brod leaves) should be dug about 3-4 months in advance and the soil be heaped on the loer side of the pit. This helps in weathering and improvement of the soil.

6.15.8 Weeding:-Bush cutting and weeding of lants shell be done in accordance ith the practice for each species, preferably in the rainy season. For chil and deodar to weedings in the month of July and August will be done.

6.16 LAND BANK

The following areas have been taken up for land bank:-

Table-6.6

S.N	Name of Range	Name of area	Comptt. No.	Areas in ha.
1	Kumarsain	UPF Banahardhar	232	20.00
2	Kotgarh	UPF Kanda	149	10.00
3	Kotgarh	DPF Nehari	50	10.00
4	Kotgarh	DPF Solku	1	10.00
			Total	**50.00**

6.17 OTHER REGULATIONS

1. Grazing:-

All plantations areas shall remain closed for grazing for 15 to 20 year's period depending upon the progress of the new crops. The closure should be effective and for the minimum possible time, so that least hardships is experienced by right holders. However, depending upon the progress of the young crop, particular area may be thrown open to kine grazing even before the period of closure expires. This will be so, especially in the case of Chil plantations when after 8-10 years of effective closure, the young crop will be nearly 2m in height and cattle grazing will also minimize damage by fire.

2. Grass Cuttings:-

No grass cutting shall be allowed except under strict supervision of the forest guard. Removal of grass reduces competition and also mortality due to overhead shade.

3. Lopping:-

Trees standing in the plantation areas shall remain prohibited for lopping during the closure period.

4. Fire Protection:-

All the old and new plantations area will be strictly fire protected. Young Chill plantation should receive special attention in this behalf. The methods of fire protection and control burning suggested in Chil Working Circle shall be followed.

5. Plantation Paths:-

A Path should be aligned in each plantation area in March -April after slash clearance in the area is over. This will facilitate planting work as well as supervision and inspection.

6. Plantation Records:-

i) Plantation journal will be maintained for each plantation area on the standard form prescribed for the purpose. A location map on 1: 50,000 scale should also be prepared and prefixed to the journal.

ii) Plantation boards should be put at prominent places, and written in Hindi, giving name of plantation, area, year of commencement, and other details of work. A simple small wooden / tin board; written in Hindi by staff will be sufficient instead of commercial type of high priced one.

iii) Notes on germination, establishment, casualties' etc.be given regularly by the Range Officer, and inspection notes of visiting Officers are incorporated in the journal.

iv) A detailed map showing various species and its extent should be prepared on 1:15,000 scale and placed in plantation journal.

v) At present no proper record of plantations is kept which gives apprehensions that planting is done on papers. It is, therefore, very much important that proper check is kept by DFO himself, otherwise, it may lead to scandalous proportions which may lower image of the department in addition to irreparable loss to the programme of planting. Plantation once done be made successful by all means, otherwise, should not be done. This should be the principle. In case of failures, defaulters are dealt with strictly and losses be made good from the defaulters. No one should be spared; otherwise, it will be too late.

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CHAPTER VII

THE FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE

7.1 GENERAL CONSTITUTION OF WORKING CIRCLE

This working circle includes all forests which are not included in other working circles.Besides all forests situated on precipitous slopes which are not fit for working under any silvicultural system have also been included in this working circle. These forests allotted to this working circle are required to be preserved only for protection of hills from denudation and erosion because of their location on steep/precipitous slopes and at strategic points like source of various streams/nallahs and rivers

7.2 GENERAL GHARACTER OF VEGETATION

The forests allotted to this Working Circle have their scattered distribution throughout the tract, hence they represent almost all the forest types starting from scrub in lower elevations and extending upto higher elevations.These types are described in detail in Chapter-II of part-I.Generally speaking, while these are forests of Fir, Spruce, Quercus Species, Mapple Birds etc. in lower zone.The higher zone contains alpine scrubs and grass lands which are unproductive.

7.3 AREA STATEMENT

The total area allotted to this working circle is 569.81 ha. Which works out to be 4.35 % of the total forest area of the working plan. The break up of the forest areas allotted to this working circle is as under:-

Table-7.1

Range	**R.Fs in ha.**	**D.P.Fs in ha.**	**U.P.Fs in ha.**	**Total in ha.**
Kotgarh	--	222.32	---	222.32
Kumarsen	---	132.84	214.65	347.47
Total	**---**	**355.16**	**214.65**	**569.81**

7.4 BLOCKS AND COMPARTMENTS

No major changes have been made in the areas of blocks and compartments allotted to this Working Circle.

7.5 SPECIAL OBJECTIVES OF MANAGMENT

The special objects of management are as under:-

i) To protect the hill sides from further denudation and erosion by preserving and enhancing the forest cover and by undertaking soil conservation works in a planned manner, where ever necessary.

ii) To conserve moisture and streamline the flow of water in streams and *nalas* by protecting and enhancing vegetation cover in the watershed.

iii) To improve the growing stock in quality as well as in quantity by sowing and planting of suitable species.

iv) To protect the ban oak and other valuable broad leaved forests from indiscriminate exploitation and to preserve these as representative eco-systemS of the region.

v) To provide a suitable habitat for wild life and to protect non timber forest produce naturally growing in high altitudes.

vi) Consistent with the principles of soil conservation, to provide for grazing of sheep goats and buffaloes of local and migratory graziers who come to these areas and also to meet the genuine demands of right holders for timber and other forest products.

7.6 ANALYSIS AND VALUATION OF THE CROP

7.6.1 **Stock maps:-** The stock maps of all forests have been prepared on 1:15000 scale and placed in respective compartment history files.

7.6.2 Quality Class/ Density:- The general assessment of site quality class and ocular assessment of density have been made during field inspections in respect of each forest compartment or sub-compartment and recorded in the compartment history files.

7.6.3 Enumerations:- No enumerations have been carried out in these areas.The density of each compartment has been recorded in the compartment history files.

7.7 SILVICULTURAL SYSTEM

Since the object of management is to conserve the existing forests and to stock understocked area, no silvicultural system is prescribed. No commercial fellings will be carried out and only salvage marking will be carried out as and when required.

7.8 ROTATION AND COVERSION PERIOD

For obvious reasons these forests will be managed for physical rotation.

7.9 CALCULATION OF YIELD

As no silvicultural fellings are proposed, no yield is prescribed.

7.10 SEQUENCES OF FELLINGS

No sequences of felling are required.

7.11 PLANTING OF BLANKS

The chief value of these forests lies in their protective cover against denudation and erosion of hills. All sizeable blanks will be planted with local and suitable species such as Deodar, Kail, Fir, Spruce Bird Cherry, Maple etc. No sequence of planting is however given and is left at the discretion of D.F.O. because availability of closures is not definite.

7.12 ENCROACHMENTS

In recent years encroachment of forest land has emerged as a big threat to forest land. This is more so in UPF. However in PFs also the incidence of encroachment is not uncommon. Thus the boundary pillars of forests must be maintained regularly, if any shifting is noticed, action must be initiated immediately under IFA, 1927. In 2011 there were 38 cases of encroachment with Revenue Department while 149 cases were decided by Collector cum DFO Kotgarh and is pending for taking procession with R.Os. Together these encroachments amount to 0.60.00 ha area of D.P.Fs and 38.34.14 area of U.P.Fs

7.12.1 Preventive Remedial Measures:-

(i) The forest officials must be well conversant with boundaries of the forests under their jurisdiction. The range officers, block officers and forest guards must check the boundary pillars frequently and in case of damage to boundary pillars, immediate legal action to punish the guilty and repair work should be undertaken on priority. DFO/ACF should also inspect the boundary pillars while inspecting forests, plantations and other forestry works.

(ii) The old stone masonry pillars should be replaced with cement mortar after proper demarcation. The new boundary pillars of only cement mortar should be constructed in future.

(iii) The field staff should be made accountable and sensitive towards the ever increasing menace of encroachments. The forest guard must initiate legal action as soon as the encroachment is noticed by him. He should chalk out the damage report and report the matter to range officer through block officer. The block officer should immediately seek demarcation and Challan the case in the appropriate court. Range officer must act quickly to file the case in the court. The laxity at any level must be dealt with under CCS (CCA) Rules.

(iv) All the encroachment cases on forest land are within the jurisdiction of DFO as collector of the division under H.P. Public Premises and Land (Eviction and Rent Recovery) Act, 1971. Range officers should challan all such cases before collector for speedy trial.

(v) The powers of carrying out demarcation are vested with the revenue officers under H.P.Land Revenue Act, 1954 and as such, many times, the demarcation of forests is delayed due to their pre-occupation. It is therefore, suggested that the Tehsildar, Kanungo who are on deputation with the forest department be delegated the powers of demarcation of forests to process encroachment cases expeditiously.

7.12.2 Strategy:-

i) Repair all existing boundary pillars and construct more boundary pillars close to habitation. For this areas need to be identified that are prone to encroachments.

ii) Railway girders should be used in encroachment prone areas and all BP s should be depicted in digitized maps of the area which will be maintained a permanent record.

iii) As a deterrent, FIRs should be registered as soon as an encroachment is detected. Court proceedings will then follow.

iv) Latitude, longitude and altitude readings of all Boundary Pillars(old and new) to be recorded in the BP register and database in the Division office

7.12.3 Annual Programme for Boundary Pillars:-Statement showing time schedule for checking / repair of Boundary Pillars for R.Fs and D.P.Fs is given below for different ranges:-

Table-7.2

Year	**Name of Range**	
	Kotgarh	**Kumarsen**

	From B.P. No.	To B.P.No.	From B.P. No.	To B.P.No.
2012-2013	1	5	17a	19a
2013-2014	6a	7a	19b	21b
2014-2015	7b	10a	22a	23
2015-2016	10b	12b	24	30
2016-2017	13a	16	31	35
2017-2018	47	51	36	38b
2018-2019	52	56	39	41c
2019-2020	57	59c	42a	43
2020-2021	60	64	44	46
2021-2022	65	68	--	--
2022-2023	CN-29	CN-36	CN-1	CN-5
2023-2024	CN-37	CN-44	CN-6	CN-11
2024-2025	CN-44	CN-51	CN-12	CN-17
2025-2026	CN-52	CN-57	CN-18	CN-23
2026-2027	CN-58	CN-62	CN-24	CN-28

86 U.P.Fs have been converted/notified into D.P.Fs during the period of working plan under revision as per detail given in **Appendix-XVII**. Out of 86 newly notified D.P.Fs, 62 forests have been entered in revenue record and the remaining 24 forests are being entered.D.F.O should construct the Boundary Pillars in the newly D.P.Fs.

7.13 ILLICIT FELLING

With development of good network of roads, there has been an increase in incidences of illicit felling. Table 2.3 (part I) gives the incidences of illicit felling since 1996.

7.13.1 Smuggling of Timber: - The high price of timber in the market has attracted/created tendency to become rich overnight and hence the smuggling of timber takes place more than often. The illicit felling and smuggling are both related, many times organized. The incidences of smuggling have, however, reduced after the amendment in Indian Forest Act (H.P.2nd Amendment 1991) vide which DFO has been designated as Authorized Officer to hear the cases pertaining to illegal transportation of Govt. property i.e. .timber, resin, and may order confiscation of both forest produce and the vehicle involved**..** The detail of cases admitted and decided in the court of Authorized Officer Kotgarh under 52A is given below:

Table 7.3

Vehicles Seized during Smuggling of Forest Produce

FIR No. & Date	Vehicle No.	Forest Property Seized	Remarks
FIR No 74/98 dated 9.7..1998	H.P.-06-1466	Kail-7 Sleepr	The case of decided on dated 24.9.98 and truck confiscated to Govt. therefore the case remain under appeal before court of Session Judge kinnaur at Rampur and the appeal was dismissed.Presently the truck owner of truck No H.P.-06-1466 has filed Cr. Review No 65/2010 in Hon'ble High Court against the order of court of Session Judge Kinnaur at Rampur on dated 22.12.2009.
FIR No 82/05 dated 5.9.2005	H.R.-68-0285	Deodar-0.986 m^3	The case was decided on dated 29.5.07 confiscating the vehicle to Govt. thereafter appeal was preferred by truck owner before the court of Session judge Kinnaur at Rampur which has dismissed on dated 22.7.09 and applicant has filed Cr. MMO No 140/2009 in the Hon'ble HP High Court.
FIR No 40/09 dated 13.12.2009	H.P.-63-1425& H.P.-63-1891	Deo& Kail-10.50 m^3	The incomplete case has been filed by Inspector, SV &ACB shimla on dated 13.3.2010 in which the vehicle owner of H.P.-63-1891 (Pick Up) and H.P.-63-1425(Max Pick Up) have filed application for release for there vehicles. Accordingly the vehicle have been released on surety on dated 19.6.2010.The petitioner i.e. Inspector SV & ACB Shimla Has been directed to file complete case after demarcation at an early date.

(Source: Office Record, DFO Kotgarh)

7.13.2 Strategy:-

i) **Rapid Response Team**: There are 21 beats and 27 Forest guards in Kotgarh Forest Division. Thus there will a surplus of 6 Forest Guards. They will work in Van Thana as Rapid Response Team (which means they will also be provided with good communication network- mobile allowance, vehicle *etc*.) and will have exclusive responsibilities only of protection works including illicit felling, encroachment, forest fires, wildlife poaching etc.

ii) Stringent action against offender will act as a deterrent.

iii) Whenever any vehicle is apprehended or timber is seized, they should be disposed off immediately (after seeking permission from court) before there is any depreciation in their value. This will save space and time wasted in keeping them in custody.

7.14 SOIL CONSERVATION

Forests play a major role in the conservation of soil and water. Himachal Pradesh, being one of the Himalayan states, is crucially important for the water regime of the entire country as most of the important rivers originate and get recharged in the Himalayas only. However, of late a host of developmental activities have taken a heavy toll on the fragile Himalayan eco-system resulting in the drying up of many smaller rivulets, springs and by large scale soil erosion. The CAT Plans of various projects and comprehensive CAT Plan of Satluj river basin (under approval of the competent authority) can provide him a lot of technical input for suggesting engineering and bio-engineering models for the mitigation of soil erosion in the forest areas covered by the Plan.

7.14.1 Engineering Works:-Check Dams, silt detention dams, spurs, check walls embankments; breast and retaining walls are immensely helpful in soil conservation work and are prescribed according to site conditions. While preparing the annual treatment plan and detailed estimates of each site, these may be modified/ designed accordingly.

7.14.2 Treatment table:-The following sites have been identified for treatment and stalilisation in the currency of this working plan. These are given below:-

Table-7.4

Year	Range	Name of site	Area in in ha.	Engineering measures recommended
2013-14	Kumarsain	UPF Banolidhar	5.00	Check walls
		-do-	10.00	-do-
		DPF Ahar-30	2.00	Check dam
		UPF Banawan	1.5	Bushwood
	Kotgarh	UPF Chimla Nala	4.00	Check dam
		UPF Choun Nala	3.00	Check walls
2014-15	Kumarsain	DPF Chhicher C38b	5.00	Check walls
		UPF Kalmu	5.00	-do-
		DPF Chhicher 41b	8.00	Check walls/Dam
	Kotgarh	UPF Kepu Nala	5.00	-do-
		UPF Reog Nala	4.00	-do-
2015-16	Kumarsain	DPF Chhicher C-40	15.00	-do-
		UPF Dhanal	6.00	Check walls
		UPF Paneog	4.00	-do-
		UPF Ghareot	5.00	-do-

	Kotgarh	UPF Manjaban/salikhad	5.00	-do-
		UPF Shalru Nala	4.00	-do-
2016-17	Kumarsain	UPF Pauchi	4.00	-do-
		DPF Jogsha	6.00	-do
		UPF Sonadhar	10.00	-do-
	Kotgarh	UPF kaliMati	8.00	-do-
		UPF Sainj/Tharnala	10.00	-do-
		DPF Dewala	8.00	-do-
2017-18	Kumarsain	UPF Lower thathal	4.00	-do
		UPF Trambri	6.00	-do-
		UPF bajwa	4.00	-do-
		DPF NarentyC17A	10.00	-do-
		UPF Bargoh	2.5	-do-
		UPF Khotli	5.00	-do-
	Kotgarh	DPF Kelonal	7.00	-do-
		UPF Gharal	5.00	-do-
		DPF Mohal	6.00	-do-
		DPF Jhumanda	10.00	-do-
2018-19	Kumarsain	UPF Kuftu	4.00	-do-
		UPF Palged	6.00	-do-
		DPF HawanC42c	4.00	-do-
		UPF Chemtla	6.00	-do-
		DPF Ahar C-32	5.00	-do-
	Kotgarh	UPF Dlahar	3.00	-do-
		UPF Singhadhar	4.00	Brushwood/chek dam
		UPF Kanthru	3.00	Check Walls
		UPF Madwani	4.00	-do-
2019-20	Kumarsain	UPF Bargal	7.00	-do-
		UPF Mohal	8.00	-do-
		UPF Panudank	10.00	-do-
	Kotgarh	UPF Shmathla	6.00	-do-
		UPF Dalan	6.00	-do-
2020-21	Kumarsain	UPF lathi	7.00	-do-
		UPF Ghadalu	4.00	-do-
		DPF khudlu C26	5.00	-do-
		UPF choprinala	6.00	-do-
	Kotgarh	UPF Nalula	10.00	Check dam
		DPF Solku	8.00	Check dam
		UPF Dakon	6.00	Check walls
2021-21	Kumarsain	DPF Urshu	5.00	-do-
		UPF Thar	6.00	-do-
		UPF Khakher	3.00	-do-
	Kotgarh	UPF Bhali	7.00	Check walls
		UPF Revi	6.00	-do-
		UPF Reghta	8.00	-do-
2021-22	Kumarsain	UPF Chirri	3.00	-do-
		UPF Dhali	4.00	-do-
		UPF Barogdhar	3.00	Check dam/retaining walls
	Kotgarh	UPF Nagraon	3.00	-do-

		UPF Kaut	8.00	-do-
		UPF Kandyali	4.00	-do-
2022-23	Kumarsain	UPF Jangeli	1.00	Check walls and retain wall
		UPF Roprinala	5.00	-do-
	Kotgarh	UPF Jabbar	5.00	Check dam/check walls
		DPF Hattu 12a	8.00	Check dam
2023-24	Kumarsain	UPF Paresh	1.5	-do-
		UPF Bashandhar	3.00	-do-
	Kotgarh	UPF Palvi	5.00	-do-
		UPF Lauga	4.00	-do-
		UPF Rewali	6.00	Check dam
2024-25	Kumarsain	UPF Sonidhar	10.00	-do-
		DPF Ahar-c29	1.5	-do-
	Kotgarh	UPF Manan	4.00	Check walls
		UPF Bargaon	5.00	Check walls
		UPF Kunda	3.00	Check walls
2025-26	Kumarsain	UPF Duma	8.00	-do-
		DPF Baragaon	5.00	-do-
	Kotgarh	UPF Daro	4.00	Const of checkwalls
		UPF Nagroti	6.00	Const brushwood/checkdam
2026-27	Kotgarh	UPF Batari	4.00	Const of brushwood/c/dam
		UPF Kanahar	5.00	Brushwood/checkdam
		UPF Dhomri	5.00	-do
	Kumarsain	UPF Oddi Dank	5.00	-d0-
		UPF Teshan Band	7.00	-do-

7.15 OTHER REGULATIONS

7.15.1 Closure:- The areas taken up for protective and improvement works shall be closed for a period of 15 years or more depending upon the status of regeneration.

7.15.2 Grazing:-The areas closed for planting will be strictly protected from grazing.

7.15.3 Fire Protection:- The forests are not generally at risk of fire. However fire preventation cannot be ignored. In the dry season i.e May- June and October to December adequate number of Firewatchers should be employed. The detail has been discussed in para 2.18.1 in Chapter-II of part-II.

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CHAPTER VIII

JFM (OVERLAPPING) WORKING CIRCLE

8.1 GENERAL

In the process of resource management, the concept of Joint Forest Management is an intervention to evolve organized and collective thinking on the issue of forest management where all the ingredients of a sound management system i.e. scientific, professional options, social and anthropological dimensions and economic principal are synergies for deriving maximum benefits for the society keeping the sustenance of the resources in mind. It must be remembered that the sources to be managed are limited and claim over the resources are varied, no single solution or a particular practice of this management on control can satisfy the needs of all. The philosophy for JFM in essence aims at involving the people in resource generation activities through motivation, active involvement in the process of management and sharing of benefits to adequate institutional arrangements.

8.2 THE EVALUATION OF JOINT FOREST MANAGEMENT

In the colonial India the princely rulers proclaimed the power of eminent domain over the territories they ruled and specified hunting rights for themselves in the forests. Traditional customary rights of local people living in and around forest were respected and this enabled them to utilize the produce of the forests for their livelihoods. During the 19th and the early part of the 20th century these rights were modified, reduced and in some cases eliminated at the state to cover control of forest resources. This was finally consolidated in 1927 with the passing of the Indian Forest Act, which is still in force today.

A related development was the emergence of" Scientific" forest management by the state, which had the primary objectives of watershed protection and timber production. Local people's needs were provided for through concessions (rarely rights) and privileges administrated by the state. Through out most of this century forestry in India has developed within this framework characterized by state control. Since the extent of forest and consequently the growing stock was large as compared to the demand, the system functioned satisfactorily till fifties. The use of forest resources has also been influenced by the rapid increase in population in recent decades. With the explosion of population as well as expansion of industry, demand if

wood, particularly of fuel wood increased dramatically, resulting in uncontrolled exploitation of forests at an ever increasing pace. By the seventies, it was understood that treating forests products as a national resources for industrial development without proper concern for local demand would result in total destruction of forests, which, in turn would endanger environmental security of the country. So, a modified approach to forestry on the international scene, which in India was labeled Social Forestry, was adopted in the 1970's. This attempted to address the forest based needs of local people more directly but did this within the existing framework of State control through the forest departments. The forestry sector was dominated by this approach to forestry which can be rather starkly characterized as forestry for the people by the State on the People's land. Although not as successful as anticipated, many valuable lessons were learned and this Social Forestry legacy is being transformed into a more meaningful partnership between local communities and the forest departments as Joint Forest Management.

As pressure on the forest resource mounted in the 1960's and 1970's, foresters in different parts of India realized that conditions had changed to such an extent that the forest protection model they had inherited would not work. Rather than protecting the forests from the depredations of the local people (as the model described things) this minority of forward looking foresters realized that the local communities had to be directly involved in and benefit from forest protection and management.

The lead in experimenting with this was taken during the 1970's in West Bengal, Haryana and Gujrat where forests protection communities were formed and given the responsibility of protecting degraded forests, department land from illegal cuttings, fires, over grazing, and encroachments. In return they were granted access to a range of non timber forests products and in West Bengal to 25% share of the returns from the coppice fuel-wood harvest in regenerated Sal forests. Other forest protection movements also developed at the same time in Uttar Pradesh, and many tribal forest protection communities emerged spontaneously in part of Bihar and Orissa.

The success that these "experiments" generated gradually begin to influence opinion through out in India and the forestry debate reached substantial proportions in the 1980's. This culminated in the issue of a new National Forest Policy in 1988 which reversed the previous focus on timber production for commercial value and concentrated on ensuring environmental stability, maintenance of ecological balance and specified that the domestic

requirement of tribal and the poor living within the vicinity of the forests should have the first charge on the forest produce.

In 1990's this was complemented by another Govt. Order directing all states to undertake participatory forest management on degraded forest land based on the experiences of states such as West Bengal, Gujrat and Haryana. This order also encouraged forest departments to involve NGO's as intermediaries and facilitators.

This was the first time that the rapidly developing Joint Forest Management had been given official sanctions and marked a watershed in India's forestry development. Since that time 15 states have issued Govt. Orders for the implementation of JFPM. These JFPM initiatives have many of the following characteristics in common:-

i) The formation of local community based institution to participate with the forest department in forest management decision making;

ii) Rules and regulations about responsibilities and sharing decision making;

iii) Involvement of NGOs particularly in documentation, training ,research and community level organizing and facilitation;

iv) Reorientation and training of forest department staff and local communities;

v) The joint preparation of micro-plan for forest management which often or the basis of formal agreements between the forest department and the local institution;

vi) The formation of state level working groups to co-ordinate their Joint Forest management;

Joint Forest Management in India is a concept in its infancy which is continuously evolving on this basis of local experiences. No two states have identical forms of JFPM but the collective experience of these differences is enriching the concepts in all the states. In recognition of importance of the concept and the value of this learning process prominent NGOs; the Society for the Promotion of Waste-land Development has recently established a JFM network to facilitate the exchange of this experience.

8.3 OBJECTIVES OF JOINT FOREST MANAGREMENT

The basic objects of Joint Forest Management are given below:-

1. To evolve consensus on the basic issues to conservation of soil, water and forest resources.
2. To provide effective and immediate treatment for barren, wastelands, or degraded protected forests situated near villages through protection, Afforestation, pasture development, soil conservation by active participation of local people.
3. To maintain the environmental stability through preservation and wherever necessary, restoration of the ecological balance that has been adversely destroyed by depletion of the forests through involvement of local people in resource management.
4. To augment fuel wood, fodder and small timber production for use by local people.
5. To convert a hostile population living in the fringes of forests areas into friends and ultimately into resource managers and resource users.
6. To evolve policy and law, this will help in the continuity in the planning and implementation.
7. To make environment conducive for the adoption and implementation of the JFPM in the State and Area.

8.4 JOINT FOREST MANAGEMENT IN HIMACHAL PRADESH

Vide H.P. Govt. Order No. Forest (C) 3-4/80V dated 12.5.1993 a participatory Forest Management on barren or degraded land, it was decided by the Govt. to constitute Village Forest Development Committee for JFM in the villages of Himachal Pradesh for Planning, Protection, Afforestation and judicious use for Eco. Development of the areas situated near the villages so as to arrest their further Afforestation degradation and to augment fuel wood, fodder and small timber production of use by local people through their active participation.

8.5 ROLE OF WOMEN IN JFM

Women in general and those of rural areas in particulars play an important role in maintaining the family and thereby improving the village economy. It is often said that if a women is developed, the entire family is developed because it is only women who is most intimately connected with the basic needs. Thus, the woman as a mother in the house-hold

assumes the role of efficient manger and undertakes various functions for the welfare of the family.

The entire village abutting the forests actually depends on the forests for the tree based needs in the form of small timber, fuel, fodder, green leaf manure etc., unlike the women in urben areas; the rural women are solely dependent on the forests for their fuel needs to a very large extent. It is the woman who collects fuel wood and dried sticks for cooking purposes from forests. Many women also bring fuel wood from forests for their sustenance through wage earning, as they do not have any other alternative sources of employment. The rural women take care of cattle grazing in the forests. In many parts of the country women collect potable water from perennial jungle streams passing through the forests.

The women's attitudes towards forests has been changing conservation strategies at the National and State level. In the Himalayan region, rural men are very much interested in raising pine trees so as to get quick money at the time of harvests. On the other hand the women are interested in raising broad leaved trees like, Olea cuspidata, Acer species, Alnus nitida, Grewia, Oppositifolia, Pistacia integerrima, Albizzia stipulaata etc. which improves the diversity and result in perennial flow of water in mountain streams in the region and the woman have succeeded in this sphere of activity.

In short, women can play a dominant role in the implementation of J.F.M. because of their intimate association with forests. They depend on forests for various livelihood security services; they must get equal representation in the Village Forest Councils and have a choice in the decision making viz. in the selection of species and other silvicultural measures for upgrading the degraded forests vegetative cover and bio-diversity.

8.6 FORMATION OF F.D.A

Ministry of Environmental and Govt. of India Forests and has proposed creation of F.D.A. (Forest Development Agency) launched new scheme called Samanvit Gram Vanikaran Samiridhi Yojna (S.G.V.S.Y), all other schemes such as has been under this new scheme committees will form a federation and a proposal in the form of a project for :-

i) Integrated Afforestation and Eco-Development Project.

ii) The Area Oriented Fuel wood and Fodder Project Scheme.

iii) The scheme for Development on Non Timber Forest Produce including Medicinal plants.

iv) Scheme for Associate of Scheduled Tribe and RuraL Poor in regeneration of degraded forests.

v) Eco-Development in and around National Parks and Sanctuaries.

vi) Plantation programme through Ecological Task Forces will get discontinued.

8.6.1 Objectives:-The main objectives of the scheme would be to:

i) Arrest and reverse the trend of forest degradation due to the unsustainable removal of forest products by communities living in and near the forest areas by making the community responsible for monitoring removals from the forest;

ii) Provide sustainable and assured employment opportunities to the tribals and other weaker sections of the rural populations in such areas all round the year; and

iii) Create durable community assets for such populations, which would contribute to overall eco-development in the target areas.

iv) To involve the village community in execution of the scheme and make the exercise fully participatory.

v) Create an effective mechanism in order to ensure that the medium of the FDA is used to reach the beneficiaries by other government departments also.

8.6.2 Implementation of JFM in Kotgarh Division:- The JFM approach has been implemented in the division through projects like DFID & Sanjhi Van Yojna. The micro plans were prepared in accordance with project philosophy and works executed by VFDC/VFDS, the list of old JFMCs have given in sub para 7.8.6.5 in Chapter-VII of Part-I.Activities like soil conservation, afforestation, village development activities, fire protection, grazing have been undertaken in the past but almost in all cases, the participation of locals remained upto fund flow only. Most of the committees are totally inactive now. There is a need to revive, activate and involve these rural committees in forest management activities.

The following JFMCs are active in the Division:

Table -8.1

Active JFMCs in Kotgarh Forest Division (2010-11 to 2014-15)

Range	Block	Beat	JFMC
Kumarsain	Baragoan	Shiwan	Kanda
		Teshan	Teshan
		Ahar	Chamola
	Kangal	Kangal	Mogra
		Khudlu	Ropa
Kotgarh	Bharari	Sainj	Sainj
		Naula	Naula
		Saroga	Saroga
	Narkanda	Hattu	Jadoon
		Madoni	Gunda
	Shillaru	Shillaru	Jamoli
		Bijlidhar	Bijlidhar
		Sharmla	Sharmla

(Source: Office record DFO Kotgarh)

8.7 FUTURE SCOPE

8.7.1 There is tremendous scope for the JFM activities in the division. All the forests allotted to the plantation and protection working circles are suitable/ potential sites for afforestation, soil conservation, grassland improvement, NTFP development besides other forests.

8.7.2 Identification of JFM Areas:- The degraded forest areas as well as common village land located in the vicinity of the villages are potential sites for JFM implementation. The deficiencies and strengths of these areas with regard to soil condition, water availability, grazing pressure, fuel wood production and requirements need to be understood.

8.7.3 Non Timber Forest Produce: - JFM can play an important role in collection, marketing and propagation of NTFPs. Many villagers are dependent on the collection of NTFP to sustain their livelihood. They usually collect various medicinal herbs and sell it to the middleman who further sells in the market. The various medicinal herbs that are found or can be introduced in the tract, their method of cultivation, collection, harvesting have been discussed in Chapter X.

8.8 POTENTIAL ACTIVITIES OF JFM COMMITTEES

The JFM/PFM committees are the future agencies of forest development, conservation and expansion. The potential activities to be executed through JFMCs can be:-

i) Afforestation activity (both departmental and MNREGS)
ii) Soil & water conservation through treatment of macro and micro watersheds in a catchment.
iii) Recharging of water bodies like boulies, ponds and underground water.
iv) Minor construction works of road, paths, and buildings.
v) Awareness programme for forest protection, fire protection ,propagation of medicinal herbs on a larger scale
vi) Livelihood options like bee keeping mushroom cultivation, vermicomposting, cutting & pruning etc. through effective training.
vii) Collection, value addition and marketing of NTFP.

8.9 MODE OF WORKING

8.9.1 Traditionally Forest Department has been involved in protection of forests and the concept of involving people in forest management is relatively recent in Forest Department. Forest Department especially Forest Guards who have more regular and direct interaction with people have to adopt 'carrot and stick policy' which is not always easy. Thus it is desirable to involve local CBOs, NGOs etc. in implementation of programmes involving 'people'. Forest staff is not imparted specialized training on participatory management of natural resources, which is vital for success of any people centric programme. To start with the mode of working could be as follows which will further evolve with time:

i) 'User Groups': Whenever a plantation is raised or a water harvesting structure is constructed, it must be in consultation with local people, essentially with their end user. Such people should be constituted into User Groups, who will maintain assets, use them and if need be extend them. Thus Forest Department will be not only relieved of its function of monitoring each and every small plantation/ structure but will also be in a better position to connect with people. Such user groups will be registered and will have an account. Thus the budget received for plantation/ WHS etc can be directly transferred to their account. However, FD will monitor the quality

of work and give technical guidance. Plants will be provided from departmental nurseries

ii) **Vermicomposting:** In departmental nurseries a large amount of vermicompost is required (approximately to the extent of 500 tons for 0.5 ha nursery) and this demand is difficult to meet with departmentally. Thus training may be imparted to local people preferably to women on vermicomposting and the department can give them buy back assurance. This will give a livelihood option to local people.

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CHAPTER IX

WILDLIFE MANAGEMENT (OVERLAPPING) WORKING CIRCLE

9.1 GENERAL CONSTITUTION

This Working Circle is constituted for highlighting the necessity of conservation and collection of the data for better management of wild life. The whole tract dealt under this Working Plan is ideally suited for a variety of wild animals and birds since the forests are distributed from low elevation to the Alpine pastures. Therefore, this working circle overlaps all other working circles. In present scenario, wild life includes Faunal as well as floral life on the Earth. It is Biodiversity as a whole, which makes wild life.

9.2 IMPORTANCE OF WILD LIFE

Faunal and Floral life (Biodiversity) play a significant role in maintaining the balance of nature. The value and importance of it from scientific, aesthetic, economic and recreational points of view is immense and is recognized the world over and therefore, adequate protection, and the scientific management of it is absolute necessity. In wider perspective, it is Biodiversity conservation and development and also its further research, which makes it more important.

Forests provide an excellent opportunity to man to study living beings in their natural environment. In addition to this, there are material considerations as well, especially ecological. These animals and plants through the intricate food web maintain the delicate balance of nature and any breach in this chain can cause over- population of any one species, which may prove detrimental to human interests. Wild life is a source of sport and enjoyment to people and fetches revenue to the State as well. If the people are led to know the importance and worth of wild life they will appreciate it as an asset and put in efforts to conserve them.

9.3 DISTRIBUTION OF WILD LIFE

The distribution of wild life has been described in details in the begining of Part-I of the Plan.

9.4 SPECIAL OBJECTS OF MANAGEMENT

1. To identify problems of wild life management in the tract and try to formulate guide lines for its development consistent with the requirement of forestry and environment.
2. To ensure collection of scientific data for the maintenance and development of viable population of fauna for scientific, aesthetic, cultural, ecological and economic purposes.
3. To protect and improve upon (develop) habitat for the wild life conservation and its development.
4. To educate staff and public in the management of wild life.
5. To protect and improve upon existing population of endangered species of wild life both faunal and floral found in the tract.

9.5 WILD LIFE PROBLEMS OF THE TRACT

9.5.1 There is evidence to show that in the good old days, placid recesses of these mountains used to be dwelt by a rich fauna. But the increase of human population and multifarious development activities that took place in the region, had affected the existence of wild life. Indiscriminate poaching had brought many species of wild animals and birds on the verge of extinction. Due to inadequate staff, it has become difficult to protect wild life especially outside the sanctuary area.

9.5.2 Problems faced by Wild Life outside Sanctuaries:

Wild life does not get the same priority and significance in areas outside sanctuaries and national parks as it does in the notified wild life areas. As a result they remain an invisible part of forest ecosystem and whenever forests are subjected to any activity the impact of such activities on them is either undermined or ignored altogether. Habitat loss, due to diversion of forests land for other purposes, frequent forest fires, excessive lopping and hacking etc. is one of the prime impacts and as a result, the animals are either pushed deep into the forests or are left with no option but to venture out into villages. In the latter case, the carnivores resort to cattle lifting and at times pose a threat to human life too. In this process they render themselves also vulnerable to being poached and killed. This interface has led to a genesis of man-animal conflict and has not served the cause of wild life protection. Poaching of animals for

meat and sometimes as trophy in the division is not very common, if the numbers of cases registered are the criteria to go by. However, un-noticed cases of poaching can not be ruled out.

9.6 WILD LIFE MANAGEMENT PROBLEMS OF THE DIVISION

The Kotgarh Forest Division also faces the problems of animal depredation. Such incidents are consistently increasing and pose a great challenge in Wildlife management. The following four problems are the most pressing and demand immediate tackling.

a) **Leopard problem:** There have been many cases of damage to cattle by leopards in the division, who target these cattle in the forests or grazing lands. Instances of cattle lifting from cattle sheds are also no uncommon. Though injury and casualty in case of human beings has not been reported during the last 8-10 years, there have been a few instances when a leopard has created panic by venturing into the dwelling houses in villages and had to be captured by setting traps and cages.

b) **Monkey Problem:** Monkey population has increased manifold in the division and there are a lot of complaints of crop depredation by them. All along the Narkanda national highway, monkeys can be seen in herds and pose a threat to tourists and passers by. They have left the interiors of the forests and are seen biding their time for "doles" from tourists, many of whom feed them generously with bread, chanas, bananas, food etc. Some steps to curb and cull the monkey population are urgently required and wildlife management practices need to be enforced.

c) **Wild Boars:** These animals also pose a nuisance both in agricultural fields as well as forests areas, especially plantations. In the forest areas, they dig out the plants, while in the fields they destroy standing crop and vegetables. Sometimes, Wild Bores attack human beings. A lot of complaints are received for the elimination of this animal.

d) **Black/Brown Bears:** These animals also pose threat to human beings as these animals attack human beings in the forests or even in the agriculture fields as they do come to agriculture fields for feeding on agriculture produce. These animals also destroy pole crops of Deodar as they suck deodar oil from the wounds of Deodar trees and often they girdle the tree in the process and tree virtually dry up.

9.7 ACTS AND RULES REGARDING WILD LIFE MANAGEMENT AND CONSERVATION

Wildlife protection has been included in Article 51-A as a fundamental duty of citizens of the country. In pursuance of this constitution directive, in 1983 the Government of India, through its Wildlife Action Plan, formulated by the Ministry of Environment, laid down several sets of actions by which wildlife should be conserved.

The new National Forest Policy of 1988 also contains a number of references on wildlife and on bio-diversity for conserving the natural heritage by preserving the natural forests that are storehouses of a variety of flora and fauna. The main legislative measure adopted for the protection of wildlife was the enactment of Wild Life (Protection) Act. 1972.

The Wild Life (Protection) Act 1972 is being enforced in Himachal Pradesh since its promulgation by the Government of India. It came into force in the State in the year 1973 vide Notification No. G.S.R. 190(E), dated 2.4.1973, Gazette of India, Extraordinary, Part II section 3(I) page 517. The H.P. Wild life (Protection) Rule of 1975 provides shooting and hunting rules, which are applicable to all the Reserved and Demarcated Forests in the State (Vide Notification No. 6-9/73-SF dated 24.2.75). Hunting of any wild animal specified in schedule II, III and IV is prohibited. However there is a complete ban on hunting in the state since 1983 notified vide No. 6-2/73-SF-II dated 24.5.83. About a year later, the State Govt. vide its notification No. 6-2/73-SF-IV dated 21.6.84, has allowed hunting of a few identified species, which have been declared vermin or cause damage to crops in cultivate fields, in accordance with the provisions of the Wild Life (Protection) Act, 1972. In certain cases where the wild animal becomes a man eater, then it can be killed after seeking permission from the Chief Wild Life Warden to this effect.

9.8 TRADE IN WILD ANIMALS, ANIMAL ARTICLES

Every person is bound to declare in his control, custody or possession any animal, article or trophy to the Chief Wild Life Warden or an officer authorized on his behalf, who in turn will issue a certificate on ownership after proper enquiry. The DFOs have been declared authorized officers for this purpose.

Application for license to commerce or carrying on business as a manufacturer or dealer in animal articles has been completely banned and any earlier practice has been discontinued.

9.9 COMPOUNDING OF OFFENCE

The Chief Wild Life Wardens and all the wild life wardens and DFO in the rank of DCF are authorized to compound the offences and rates of compensation are fixed or revised every year by the competent authority.

Incidents of poaching and other wild life offences are not very common in the area.

9.10 GRANT OF RELIEF FOR DAMAGE

The loss of cattle due attacks by wild animals was drawing attention of the government for some time in view of public entreaties.

The Government has decided to grant compensation for losses of domestic animals and human beings done by wild animals vide notification No. Ft. (F) 6-7/82 dated 25.2.1988 and revised vide notification No. Ft. (F) 6-7/82-Loose dated 9.4.1996, which has been recently revised vide notification No. Fts (F)-6-7/82-II dated 28 Aug. 2001 in which rates of relief for injuries/loss of life in case of human beings significantly rose. The revised rates for different categories are annexed as **Appendix-XVII**.

The details of compensation paid for losses to animals and human beings done by Wild Animals for the period 2000-2001 to 2010-2011 is given below: -

Table -9.1

Compensation paid

Year	Loss of human beings/Human injury		Loss of domestic Animals.		Total	
	No.	Amount	No	Amount	No	Amount
2000-01	8	15000/-	6	12332/-	14	27332/-
2001-02	1	1875/-	2	10000/-	3	11875/-
2002-03	-	-	-	-	-	-
2003-04	-	-	-	-	-	-
2004-05	-	-	2	5500/-	2	5500/-
2005-06	-	-	2	5438/-	2	5438/-
2006-07	2	5175/-	2	5000/-	4	10175/-

2007-08	-	-	2	4000/-	2	4000/-
2008-09	1	33000/-	9	26000/-	10	59000/-
2009-10	2	10000/-	7	10750/-	9	20750/-
2010-11	1	5000/-	1	1000/-	2	6000/-

9.10.2 To ensure and encourage the reporting of offences under the Wild Life Protection Act, provision has been made in the H.P. Wild Life Protection Rule, 1972 to give rewards to informers, giving bonafide information about the offences. Such rewards may extend up to the amount of fine imposed by the Court. Government servants are not debarred from receiving such rewards.

9.11 STUDY MEASURES AND DATA COLLECTION

With a view to facilitate identification of various parameters for basing future management, the following study and data collection measures are being prescribed to be carried out by the wild life wing of the department: -

i) **MUSK DEER: -** Data regarding existing number of musk deer by census, their feeding behaviors and other habits etc. should be collected to evolve steps for their protections and increasing the number.

ii). **PANTHERS: -** The existing number of each and other predator species along with their prey population should be assessed. Cases of damage to the captive animals if any should also be listed. Prey-Predator ratios for these animals should be worked out periodically and steps should be taken out to keep it to the optimum level.

iii). Most of the animals and birds move to the lower elevation during winter. Seasonal migration of these animals and birds should be studied and recorded.

iv). Breeding seasons of animals and period of hatching in case of pheasants should be observed and recorded.

9.12 SCOPE FOR SCIENTIFIC STUDY AND RESEARCH

The idea of population study and game management is relatively new for Himachal Pradesh. Population study has to be done on the basis of the peculiar habitat of the animals or birds and the existing extent of the habitat available for the particular animals or the

birds. After studying their habitat, the population can be assessed by devising suitable sampling technique, which takes care of the habitat. As in case of pheasant, the calling at particular time and season of the year and then sex ratio can be studied and used for computing the population in the available habitat for pheasants. Similarly for animals the population can be computed by scientific study of their habitat. Efforts should be made to make study for the disease occurring to the wild animals and birds population for helping the future management of the wild life.

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CHAPTER X

NTFP (OVERLAPPING) WORKING CIRCLE

10.1 GENERAL

Earlier, the management of forests was based on production of timber and earning of revenue. The non timber forest products were considered to be much lesser importance. After 1980, the earning of revenue from forests and there management for commercial production of timber has been removed from the policy framework and objects of management. The 1988 National Forest Policy emphasizes on in situ conservation of natural eco-systems. Conservation and propagation of non-timber forest products and their contribution towards local/ tribal economy has also been given importance in the policy.

This would be an overlapping working circle covering all the working circle and is constituted to ensure systematic development and exploitation of non timber forest produce species that occur in the division. The main non timber forest produce found/extracted in the division are Resin, Medicinal plants, grass. The main emphasis/focus would be on medicinal plants and Resin.

10.2 BLOCKS AND COMPARTMENTS

The entire tract of the division will be covered by taking beat as a unit.

10.3 AREA STATEMENT

The working circle is overlapping, no area statement is required.

10.4 SPECIAL OBJECTS OF MANAGEMENT

The State has formulated Himachal Pradesh Forestry Sector Medicinal Plants Policy, 2006 which is aimed at conserving and strengthening medicinal plant resource base in forest areas as well as outside for use towards enhancing health and livelihood security of the people of the State on sustainable basis. The special objects of management would be:-

i) To conserve and augment existing non timber forest produce including medicinal plants resource in its natural habitat.

ii) To encourage cultivation of commercially important species of medicinal plants on private lands

iii) To develop a system of pricing the wild harvest so as to reflect both the conservation costs and the community benefits.

iv) To encourage public-private-community partnership for building capacity for cultivation, value addition and processing of raw material before export from the state.

v) To promote the use of commercially viable medicinal plants by the state owned and private pharmaceutical units and subsidiaries engaged in value addition.

vi) To maximize yield of medicinal plants through sustainable natural and artificial regeneration and scientific exploitation.

10.5 ANALYSIS AND VALUATION OF THE CROP

10.5.1 The entire tract is rich in many useful shrubs, herbs, fungi which have been exploited from time to time. The area produces large quantities of Banafsha, Kakar singhi, Anardana, Guchhi, Rakhal, Lichens, Berberis roots etc. A list of commonly used or economically extracted medicinal herbs, plants occurring naturally are as under:-

Table -10.1

Medicinal Plants of Kotgarh Forest Division

Botanical Name	Common Name	Habit	Occurrence Zone	Parts Used
Aconitum heterophyllum	Mithi Patish	Herb	Sub alpine	Root
Acorus calamus	Barian	Herb	900 to 2000m	Rhizome
Angelica glauca	Chora	Heb	Above 2200m	Whole plant
Artimisia nilagirica	Siski	Herb	1500-2500m	-do-
Asparagus adscendens	Sufed Musli	Shrub	Upto 1800m	Root
Berberis spp.	Rasaunt	Shrub	1800-3200m	Root
Cannabis sativa	Bhang	Herb	Up to 1600m	Leaves
Cinnamonium tamala	Tej patta	Shrub/Tree	Up to 2200m	Leaves
Dioscorea detoidea	Shingli mingli	Climber	Upto 2200m	Tuber
Ephedra spp.	Bhutshur		Above 2200m	Roots
Heracleum candicans	Patlain	Herb	2000-2500m	Roots
Mallotus phillipinensis	Kemal	Tree	Up to 1000m	Roots

Morchella esculenta	Guchhi	Fungus	1500-2500m	Fruiting body
Myrica nagi	Kaphal	Tree	1000-2100 m	Fruit
Dactylorhiza hatagirea	Salam Panja	Herb	Above 3000m	Roots
Picrorhiza kurrooa	Karoo	Herb	Above 3000m	Roots
Pistacia integerrima	Kakarsinghi	Tree	Up to 1500m	Fruit
Podophyllum emodi	Bankakri	Herb	Above 2200m	Rhizome
Polygonatum vaticilatum	Salam Mishri	Herb	2300-3000m	Leaves
Potentilla fulges	Bajardanti	Herb	1500-3000m	Roots
Rhododendron arboreum	Cheo	Tree	1200-2400m	Leaves
Rhododendron compaulatum	Saranger	Tree	Sub alpine	Flower
bergenia ligulata	Pathar Tor	Shrub	1800m & above	Whole plant
Swertia chrata	Chiryata	Herb	Sub alpine	Flower
Taxus wallichiana	Rakhal	Tree	2400-3000m	Leaves
Thumus surphyllum	Banajwain	Herb	1200-1800m	Seeds,leaves
Tinospora cardifolia	Gall	Heb	1500-2200m	Leaves
Viola serpens	Banafsha	Herb	1000-3000m	Flower
Valeriana wallichii	Mushbala	Herb	2100-3000m	Root stock
Valeriana hardwickii	Nihani	Herb	1200-3600m	-do-

10.5.2 Stock Maps:- As the medicinal plants are mostly herbs and shrubs found on annual or perennial basis, stock mapping is not possible.

10.6 CALCULATION OF YIELD

No yield can be prescribed as the most NTFPs are extracted through right holders. However, proper record of all the NTFPs exported through Panchayats and the department, should be maintained annually and entered in respective compartment history files.

10.7 SUBSIDIARY SILVICULTURAL OPERATIONS

As no silvicutural system is prescribed, no specific operations are proposed. However, when the medicinal plants are raised in the nurseries or plantations, the regular

operations like closure, weeding, bush cutting, protection from fire, grazing etc. are to be carried as in case of tree species.

10.8 ARTIFICIAL PROPAGATION AND CONSERVATION

Keeping in view the economic importance and demand of medicinal herbs, it is desirable to encourage naturally occurring medicinal plants in suitable localities. The demand of medicinal plants has picked up with setting up of pharmaceutical industries in the state. The existing germplasm of different herbs needs to be conserved. Following measures are suggested for the conservation, protection and propagation of medicinal plants:-

- Heavy grazing and destruction of medicinal herbs should be checked as these species do not produce sufficient seeds/vegetative form of regeneration.
- 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.

10.8.1 **Propagation Techniques** The technique of propagation and harvesting of some important plants is as under:-

Table -10.2

Method of Propagation of Medicinal Plant

Name	Method of Propagation	Harvesting/Collection	Uses
Artemisia nilagirica	The seeds are minute. The sowing is done in Feb./March. Seedlings are transplanted in June-July in pits at a spacing of 0.5m×0.5m.	The crop is harvested in October when the plants flower.	The flowers are used in extraction of drug used as wormicide.

Acorus calamus	The species is propagated by sowing as well as planting rhizomes at 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 cm. Sowing is done in patches which may be spaced at 30cm×30cm.	Harvesting is done after one year during Nov.-Dec.	The dried zhizome is generally used in the form of infusion. It produces best results in case of dyspepsia and chronic diarrhoea.
Aconitum heterophyllum	The species is propagated by direct sowing in patches at 30cm×30cm during Feb.-March.	Roots are dug out in the month of Oct.-Nov.	Roots are used as astringent, tonic and in diarrhoea, cough.
Angelia glauca	The species is easily propagated by sowing in patches at spacing of 3′×3′. Sowing is carried out in Feb.-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 60cm×45cm during March. About 15-18 Qtls. Of rhizomes are required for one hectare area.	Tubers are dug out in Nov.-Dec.	Tubers yield steroidal sapogenin which is a source for manufacture of oral contraceptive.
Heracleum candicans	The species is propagated by seeds and root cuttings. Seeds @ 10-15 Kg/ha are required. The root cuttings 2.5cm to 4 cm long should be planted in 30 cm deep pits at a spacing of 75cm×50cm in March-Apr.	After one year, the roots/tubers are dug in Oct.-Nov.	Roots are source of xanthotoxin, a furocoumarin which is used in treatment of leucoderma, fruits as aphrodiasic & nervetonic
Podophyllum emodi	The rhizomes are planted in 15cm deep pits in the zone of natural occurrence. The seeds germinate in about 3 years but if sowing is done in bores at low altitudes, it can germinate in 6 months, then the seedlings can be taken to sub alpine region and transplanted.	The rhizomes are collected when fully developed.	
Picrorhiza	It is easily propagated by	Collection is done after 3-5	Roots are used as

kurrooa	planting rhizomes in 15 cm deep pits at a spacing of 60cm×60cm during Nov.-Dec.	years when rhizomes are fully developed.	stomachic, tonic, improve appetite and stimulate gastric secretion.
Swertia chirayita	It is propagated by sowing of seeds in patches at a spacing of 30cm×30cm during Feb.-March.	Harvesting is done in following November-December.	The dried plant yields drug used as tonic, stomachic, bronchial asthma & liver disorders.
Valerina wallichii	The species is propagated by direct sowing or planting 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.	Rhizomes are dug out after 3-5 years when fully developed.	Dried rhizomes are employed for hair and perfumes, as incence and in drugs for hysteria and nervous problems.
Viola serpens	The species is propagated by sowing or planting root suckers at a spacing of 15cm×15cm during June-July.	Flowers are collected in Feb.-March in low lying area and in April-May in higher reaches.	Used for lung trouble, eye and ear diseases. Also used as blood purifier.

10.9 OTHER NON TIMBER FOREST PRODUCING PLANTS/PRODUCTS

10.9.1 **Gucchhi:-** Gucchhi is a highly valued morel mushroom that grows over wide swathes of the countryside under deodar or mixed coniferous forests. It grows in March or early April (depending upon the altitude) and is collected by local people (men, women and children) as soon as one is spotted. This has led to extant free riding and consequently, gucchhi collections are said to be dwindling all over the state. Another reason for the decline is the manner in which the morel is collected. It is wrenched off the ground, possibly also yanking out the substrate mycelium as well. There is neither time nor patience to allow the mushroom to shed its spores. So the next crops are getting less and less. If locals can be organised and trained to do two simple things, gucchhi might have a chance to bounce back. One, the species needs to be collected after it has shed its spores. This might vary according to weather and altitude, but the local people know when. Secondly, a simple training to get the collectors to use a blade to cut the mushroom stem (instead of yanking it out) is all that is needed to help the species recover. Of course to do this apparently simple job, there is a need to find out some good NGO or trainers who can

take up this with the collectors (who are numerous) and sort of organise them into monitoring collection methods as well.

The royalty or export permit fee rate on gucchhi is high: Rs 10,000 per quintal. While a quintal of gucchhi is a lot and given the current market rates (between Rs 5000 to 7000/kg), they might seem reasonable; but people are not tuned to paying such taxes on forest produce (agriculture income is tax free). This high rate is a reason why much of the gucchhi trade seems to have gone underground. There is, therefore, a need to review these export permit rates for gucchhi and bring about a more transparent system in its trade.

10.9.2 **Resin: -** Resin tapping is confined to small area in this division.The resin is extracted by Rill method. The resin blazes are frequently outshapped and cover more area than prescribed.This has damage the Chil trees.These blazes were earlier being tapped under the French method.The pace of healing and occlusion is slow.The forests should now be given rest for a period of five years for recovering and healing.The detail of resin extracted by H.P.S.F.D.C has already given in sub para 4.1.2 in Part –I.The yield of resin should be fixed 35 quintals per 1000 blazes so that there is no over exploitation of Chil trees for resin leading to their dry up. At present rill method of resin tapping is being followed. The standards of tapping as developed by FRI are not being maintained in the field. The notable deviations are as under –

i. The length and width of blazes is often more than 38 cm and 20 cm, respectively.
ii. The depth of rills is more than prescribed 2 mm.
iii. The distance between two rills is not always as per standards and quite often the rills inter-mingle with each other because the labour does not use the guide with the knife.
iv. The proportion of nitric and sulphuric acid in the solution to be applied to the rills is not as per guidelines. The amount of sulphuric acid is kept more than required and excessive quantity of acid solution is applied in order to extract more resin.
v. The minimal distance between two parallel resin blazes is not being maintained at 3 inch. In some trees no distance has been left between two blazes. The trees are being practically girdled and no cambium is left for healing in future.

The above defects in the resin tapping are causing immense damage to the chil trees. The first three defects are exposing more than required surface area of

trees. This leads to increase in fire hazards. The excessive application of acid solution and more proportion of sulphuric acid causes drying of the chil trees, sometimes as early as after 3-4 years of starting resin tapping. The last defect causes long term damage to the chil trees. In the absence of any healing distance between two blazes there is little healing if after several years of tapping.

The field staff should be made conversant with the standards of rill method. They should be asked to report the defective tapping as soon as it is detected in the field. They should also raise damage bills immediately and should not wait till the end of tapping season. The concentration of acid solution should be frequently checked. Wrong concentration of acid or excessive application should be treated as a defect to be penalized each time it is detected.

10.10 COMPAIGN FOR CONSERVATION AND PRESERVATION OF OTHER ENDANGERED SPECIES OF THE STATE

10.10.1 Threats to Taxus and Berberis

1. **Lack of Inventorisation** We know next to nothing about the approximate number of trees of *Taxus wallichana,* their regeneration status and their pockets of occurrence across the appropriate altitudinal zone in the division.
2. This tree, though on the List of THREATENED TREES (IUCN, RED LISTING FOR HP), is not enumerated as part of the enumeration done in forests. There appears to be no nursery stock grown nor are there any efforts for planting this species in appropriate locations.
3. Though collection and export of *Taxus* leaves has been banned since 1994 (?) and still continues, there are reports of its illegal collection and export, either as it is or in the name of Talis patra (*Abies pindrow* leaves), which is permitted and under present regulations export of which can be allowed by the Panchayat Pradhan.
4. *Taxus wallichiana* is a very slow growing tree and unless successful plantations of it are raised annually, in the long term, this tree will eventually disappear.
5. Berberis as one can see is being extracted in huge quantity. It is not clear how this is done, but there must be implications for soil conservation?

10.10.2 Urgent Action on Taxus wallichiana:-

1. There is an urgent need to locate pockets / distribution of this tree in the forests of Kotgarh, map these sites using GPS and inventory the trees class wise there.

2. A suitable nursery to be identified and stock of *Taxus wallichiana* raised from cuttings (done in February using rooting hormones). One lakh such cuttings to be raised in poly bags every year for the next 5 to 6 years. The nursery stock has to be retained for two and half to three and a half years in the nursery before planting out. Since this is a long term, cyclic affair with a long nursery period, it is important that cuttings are raised on the recommended scale annually.

3. If we have sufficient well grown stock of *Taxus*, it is feasible to grown live hedges of or with the species around our closed areas and also to encourage farmers to use this as a live hedge. A practice that can be incentivized in suitable areas through PES.

4. In view of 2 above, a planting schedule for *Taxus* can be developed after 3 to 4 years. But this must continue every year for a long time to come; across the next many future management plans.

5. In recent years, some private companies have introduced *Taxus* plants in Himachal imported from the North East. These are apparently being grown by farmers on their private land and then exported. It is important that this stock is not introduced in forests of the state, unknowingly or by design.

In order to avoid unrestricted heavy removal of leaves, the Govt. of HP has formulated policy regarding grant of permission for collection of *Taxus* leaves and export thereof vide letter No. FFE-B-F (13)-2/95 dated 4th June, 1996, which is reproduced as under:-

1. The export permission for each year outside the state (within country) for the export of *Taxus wallichiana* will be issued by the Govt. after proper scrutiny.
2. The collection permission of *Taxus wallichiana* leaves by the right holders will be allowed by the Principal Chief Conservator of Forests, HP after the prior approval of the Govt.
3. No collection of *Taxus wallichiana* be allowed in the forests where the right of collection of these leaves has not been admitted in the Forest Settlement and revenue records.
4. The leaves will be allowed to be collected only from trees with more than one metre girth at breast height and restricted to lower 1/3rd of the tree.
5. The collection of leaves will be allowed by plucking. In case a branch is cut on silvicultural consideration, it should not exceed a finger in thickness. No damage

whatsoever be allowed to be caused to the trees. The privilege is not an absolute right and, therefore, may be withdrawn by the Govt. in the event of abuse.

6. The collection be allowed to the right holders in the presence of forest guard and the representative of traders and no labour be allowed to be engaged for the purpose.

7. The *Taxus wallichiana* leaves which are collected from the areas by plucking in a particular year are to be kept under reserve for four years and their next turn for collection of leaves will come in the fifth year.

8. Four years collection programme will be prepared for collection of these leaves and in case due to some reason the plucking is not done in fifth year, the deviation permission from the Govt. like 10 year felling programme is necessary.

9. The collection of Taxus *wallichiana* leaves will be allowed from April to December every year in accordance with 4 years cycle. The plucked material would then have to be disclosed by the parties and export permission sought from the Govt. from April to December and shall have to complete the export by 31st January next.

10. The storing of Taxus *wallichiana* leaves be allowed at a depot specified by the DFO.

11. No removal of leaves be allowed from the depot without valid permission for export and realization of export permit fee of Rs. 600/- per quintal fixed vide this department notification of even no dated 17.8.93. The movement within Divisions/Circles will be regulated under the relevant transit rules.

12. The right holders have tendency to remove bark which shall not be allowed.

13. Since the leaves are used for preparing medicine and the collection and sale is remunerative, it should be allowed in scientific manner. It should be ensured that no damage is caused in collection and also no illicit collection and its export be allowed to take place. Collection by right holders may be allowed with against permission and forests be inspected during collection as endeavor to ensure collection on scientific basis only.

14. The quantity extracted from the various forests be entered in compartment history files and details also furnished on the close of season in February to the Govt.

10.10.3 Action on Berberis Conservation:-

1. A study to answer the questions raised must be commissioned soonest possible.
2. A PAR (Participatory Action Research) study be undertaken to evolve and adopt and monitor non destructive ways of harvesting this species.

3. *Berberis* should be raised in large numbers in nurseries, as it is a very versatile species for use in Bio-engineering.

10.10.4 Policy on Introduction of Medicinal Trees in Forests:- It is now the state policy that in different plantations of the forest department about 30% of the trees being planted need to be of medicinal value and also native to the tract where plantation is being done. There is thus a need to identify and grow suitable medicinal trees for different altitude zones in a particular forest division. While most trees may be technically "medicinal", it is important that species like deodar, kail, chil etc. which are normally grown in forest plantations are not reckoned as medicinal trees. In Kotgarh 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 Kotgarh would be Taxus wallichiana, of course!

10.11 MISCELLANEOUS REGULATIONS

This includes extraction or collection and export of NTFP's. The collection of NTFPs is allowed strictly as per provisions of Settlement report. The export is allowed under HP Forest Produce Transit (Land Rout) Rules, 1978 against payment of specified export permit fee.

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CHAPTER X+1

GENERAL FINANCIAL FORECAST AND FINANCIAL PLAN OF OPERATION

X+1.1 FUTURE REVENUE AND EXPENDITURE

An estimate of revenue and expenditure, based on present market rates has been made. It is very difficult to make an accurate financial forecast for a considerable long period in view of fast changing market trends.

X+1.2 EXPECTED REVENUE

The expected annual revenue based on the current prices is as under for the year 2012-13 is as under:-

Table X+1.1

FUTURE REVENUE

S.N	Particulars	Amount
	Timber and other forest produce	
1	Deodar 565 cum @ 5903 per cum	3335195
2	Kail 1140 cum @ 3098 per cum	3531720
3	Chil 180 cum @ 572 per cum	114400
4	Fir/Spruce cum @ 790 per cum	102960
5	B/L 300 cum @ 326 per cum	97800
6	7000 resin blazes @ 65.00 per blaze	455000
7	Misc.	150000
	Total	**7787075**

To assess the revenue for subsequent years, 10 % increase be given annually.

X+1.3 FUTURE EXPENDITURE

The expected annual expenditure is as under:-

Table X+1.2

FUTURE EXPENDITURE

S.N	Particulars	Amount
	Establishment	
1	Pay of staff	18000000
2	T.A	300000
3	Office expenses	100000
4	Uniform and liveries	70000

5	Rent and Taxes	--
6	Pay to contingent staff	50000
7	Motor vehicle	200000
8	Other charges	50000
Conservancy and Development		
1	Regeneration of Forests	300000
2	Plantation of Waste Land	1500000
3	Roads & Buildings Cost	150000
4	Repairs of Boundary Pillars	100000
5	Fire Protection	200000
6	Material & supplies	400000
7	Stores, Tools & Plants	100000
9		
	Total	**21520000**

X+1.4 COST OF WORKING PLAN

Table X+1.3

S.N	**Item**	**Amount**
1	Cost of enumeration works & field work	250000
2	Moter vehicle expenses	50000
3	Machinary	50000
4	Material and supply	50000
	Total	**400000**
	Cost of working plan for brought under Management (R.Fs,D.P.Fs & U.P.Fs) per ha.	**30.58**

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CHAPTER X+2

MISCELLANEOUS REGULATIONS

X+2.1 PETTY FELLING

Felling of petty nature, as detailed below may be treated as prescriptions of this working plan:

1 Dry or green trees for ordinary departmental use or given to other Government department.

2 Dry or green trees to meet the special free grant for construction of houses destroyed by natural calamities like fires, lightning etc as per settlement provisions or as per Government orders.

3. Trees falling along prospective road alignments, electric, and telephone transmission lines, water channels etc. However, no felling will be allowed till approval for transfer of forest land for non forestry purpose under the provisions of Forest Conservation Act, 1980. Special care must be taken while carrying out alignment of road to avoid unnecessary cutting of trees.

All the trees and poles marked for such purpose shall be recorded in the respective compartment History Files and such felling will appear in Control Forms. Silvicultural principles shall be strictly adhered to while carrying out such marking.

X+2.2 DEVIATIONS

Any large or unusual felling operation not prescribed in the working plan will be a deviation requiring prior sanction of the competent authority. The deviations may be due to:-

1. Large scale damage by fire and wind storms.
2. Special fellings to meet the sudden unexpected heavy demand of particular industries or for defense purposes.

3. Large scale felling of trees falling in the alignment of major roads and electric transmission lines.

X+2.3 DEMARCATION OF FOREST

Since the boundaries of U.P.Fs are not properly defined and delimited on the ground. The boundary pillars are not properly serially numbered and maintained creating confusion at all stages.This is a specialized job. Special task force comprising of A.C.F, Rangers and Deputy Rangers be constituted which will carry out complete checking and repair of boundary pillars.

X+2.4 BOUNDARY REGISTER

Boundary register for each forest shell be maintained separately. Also register containing tracing of forests shall be maintained separately range wise.

X+2.5 MAPS

Except for part of Kotgrh Range Survey sheets are not available on 1:15000 Scales. Therefore, task of forest Survey in the rest of area should be assigned to survey of India, as is being done in the other Divisions.

X+2.6 RAIN GAUGES

No Rain gauges have been installed in this Division. It is recommended that rain gauges should be installed at Kumarsain, Kotgarh, Narkanda, & Shalaroo stations and maintained properly.

X+2.7 FIRE PROTECTIONS

Even the primitive methods of fire protection are not being taken care of. The budgets under fire lines and controlled burning have been almost finished. There is need to maintain fire lines, fire watchers in the fire prone areas. Publicity and Extension for education of local population regarding fire protection needs to be done.

X+2.8 ENCROACHMENTS

Encroachments have become a rule rather then an exception. Due to Non-Demarcation of UPF's the hunger of land is slowely bringing down the forest area. Special task force consisting of forests, police and revenue officials to be constituted to tackle the menace of encroachments.

X+2.9 RESEARCH PLOTS

At present there is no research plot in this division. It is necessary to emphasize the fact that experimental and sample plots and their demarcated surrounds are under the complete control of the Silviculturist and are thus excluded from all operations prescribrd in the working plan.However one apple orchrad exists in this division as per **Appendix-IV** attached.

X+2.10 ROADS, PATHS, & BUILDINGS

X+2.10.1 Roads: - The construction of a large number of roads has already been under taken by P.W.D. department in the tract dealt within this plan. These will suitably open forests rather any further construction of roads will affect the forests adversely. So there is no need to construct any new motorable road on the forest area.

X+2.10.2 Paths: - Number of bridle and inspection paths covering all important forests have been constructed in the past. The existing roads and paths are detailed in **Appendix-XII**. These should be kept well maintained. The inspection path should be constructed as far as possible along contours in such a way that whole of the forest is covered.

X+2.10.3 Buildings: Buildings have been constructed in the past. The existing buildings are detailed in **Appendix-XI.** The following buildings are proposed to be constructed. D.F.O may modify this according to administrative needs:-

Table X+2.1

S.No	Range	Name of Building	Location	Number
1	Kumarsain	Forest Guard Hut	Shiwan	1

2		Forest Guard Hut	Ahar	1
3		Mali Hut	Chhachar	1
4		Chowkidar Hut cum store	Kumarsain	1
5	Kotgarh	Peon cum Chowkidar Quarter	Kotgarh	1
6		Mali Hut	Naulla	1
7		Forest Guard Hut	Hattu	1

X+2.11 BAN ON GREEN FELLINGS

The govt. of H.P. had imposed a complete ban on green fellings from the year 1983-84 in high conifer forests.This resulted in complete stoppage of regeneration fellings and thinning. The ban has since been lifted by a cabinet dicision during 1997, yet due to an order of the Hon'ble Supreme Court of India in S.L.P. No 202 of 1995 titled as T.N. Godavarman v/s Union of India. There remains a complete ban on green felling till dated.

X+2.12 MID TERM REVIEW OF THE WORKING PLAN

Apart from the annual and concomitant monitoring by the State authorities. Various provision of this working plan shall be subject to a mid term reviews by the Government of India after every five year interval.

X+2.13 GO-SADANS

X+2.13.1 Problem of Stray Cattle: -

Ever increasing number of cattle in general and cow and its progeny in particular, roaming on the streets of towns cities and in forests as stray cattle is a serious menace to the environment, transport system and general living of people. It is a serious threat and challenge to society, which needs no elaboration. It is a country-wide problem, spreading from rural areas to metropolitan cities. It is also the crucial issue, generally put forward whenever the question of total ban on cow slaughter arises. Time and again, it has been said that stray cattle are indication

of the fact that these are unfit and their rearing is uneconomic. That is why the owners just push them out on the ultimate journey to the slaughter-house. Thus, first, it is desirable to examine whether these so called 'useless' cattle are really useless. It has to be recognized that, in the general field of agriculture 70% of farmers are made up by small and marginal farmers, landless labourers and they have access to a total of 30% of the land in this country. By force of circumstances 67% of these people own livestock. The general pattern of this activity is that these livestock units are distributed in twos or threes, which are financially non-viable with their traditional ways. These are the persons who get rid of their cattle. The day these people come to understand the economic viability of their cattle - of even dry cows and old oxen -the problem of stray cattle will start vanishing.

X+2.13.2 Strategies for dealing with stray and 'so-called' useless or dry cattle:-

In this background, the strategies to tackle the problem of Stray Cattle have to be implemented at all levels and as a combined effort of various agencies. The following strategies are recommended for the purpose of establishment of Village gosadans

Village Gosadans should be established in the manner proposed below:

1) Each village should have one Gosadan to take care of the stray cattle of the area. Also the seasonal left-outs can be accommodated therein.

2) The Gosadan has to be managed by the village community, with full involvement of the Village Panchayat. A 'Gosadan Committee' can be constituted in the meeting of Gram Sabha comprising persons from all walks of life. Technical persons such as from agriculture and veterinary side should invariably be co-opted on this committee. The State governments are required to make provisions regarding constitution of 'Gosadan Committees' in their respective Panchayati Raj Acts.

3) As per availability of land be attached to the Gosadan. Gram Panchayat can do it as in most of the States , grazing lands (gochar bhumi) are within their jurisdiction. This land can serve not only as the grazing ground but also as the source of green and dry fodder to some extent.

4) The problem of unauthorised occupations on the ‘Charagah’ or Gochar lands can be taken care of by ‘fast track courts.’

5) In the villages where ‘charagah’ land is not sufficient, the wastelands can be converted for development of grass and fodder trees. Waste lands could be converted into fertile lands by various convergent natural nutrients prepared by ‘gobar-gomutra- chhach, Amritpani’ etc.

6) While arrangement of such land should be the responsibility of the revenue agencies, maintenance part may be entrusted to the Village Panchayat. Some sort of mechanism should be developed for linking the maintenance of Charagah land with the grants-in-aid given to a particular Gram Panchayat.

7) As the Gosadan will take care of the stray cattle, which otherwise could have caused damages to the standing crops of the village farmers, it should be mandatory for every farmer to donate one trolley of fodder and one bag of cereals to the Gosadan at the crop harvesting time. Of course, it can be in proportion to the agricultural land area possessed by the village farmers.
8) The Go-sadan, so established, can be developed into breeding centre of good local indigenous breeds. It can also develop good breed bulls, meant for service of the whole village.

9) To augment its resources, the go-sadan can prepare bio-fertilizers and bio-pesticides, which can be sold to local farmers at very concessional rates. Thus, there would not be any problem of marketing for the products of Gosadan.

10) Go-sadan can have a bio-gas plant of a suitable size to take care of its energy requirements for fuel, light and water pumping. Agencies like K.V.I.C., DRDAS and Non-Conventional Energy Development agencies can assist these Go-sadans in establishing Bio-gas plants.

11) No cash subsidy should be given to these Go-sadans. Instead H.R.D. training and provision of infrastructure should be there. In fact, it should be an independent enterprise. Let the village own it after having a considered view on the importance of the Gosadan in their village economy.

12) In the proposals prepared at Gram Panchayat and Block level, plans for organisation of Gosadans included in the district plans, should be taken up on priority.

13) Public contributions and donations from individuals and organisations will be the main source of funding for organisations of Gosadans. As it would be an important institution for rural development, funds may be earmarked for establishment of gosadans in the M.P. and M.L.A. quotas also.

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CHAPTER X+3

ESTABLISHMENT AND LABOUR

X+3.1 ESTABLISHMENT

The list of existing Ranges, Blocks and Beats is given in Appendices VIII . The position of sanctioned staff and existing staff has been given in Chapter-VI of Part-I is satisfactory and need no further division. The beats, Blocks and Ranges are small and administratively convenient. So no further reorganization of beats Blocks and Ranges is suggested. The range officers have per force to devote more time in the office at the cost of field works. The office work at Range level increased considerably. Therefore all Range officers should be provided Range Clerks. Services of all the permanent Forest Workers should be utilized in nurseries and for miscellaneous forest protection and regeneration operations.

X+3.2 LABOUR

The position of labour supply has been discussed in Chapter-VI of Part – I. All the exploitation and harvesting works are being done by H.P.S.F.D.C.and labour supply mates of Forest Corporation, for carry out exploitation of Forests have to import labour from Mandi, Kangra and Chamba Districts. The present rate of unskilled daily wage labour is Rs. 120 per day which is likely to be revised from time to time.

Many developmental schemes are in operation in the tract under various departments, thus there is some shortage of labour.Gorkha labour frequents Kotgarh area for apple picking and packing operations. The apple season starts from August onwards. So Gorkha labour can be employed in July to complete planting.Permanent labour gangs should be maintained in case of nurseries which require expertise.

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CHAPTER X+4

CONTROL AND RECORDS

X+4.1 SYSTEM OF CONTROL

It has been unfortunate that some of the prescription of working plan under revision were not given a serious trial while others were completely ignored. Obviously, the objects of management as set out could not be fully realized. Some of the forest journals do not contain complete information about various operation carried out in the past while some entries are not accurately recorded. Control should be considered as an integral part of plan and record of all operation must be maintained.

X+4.2 CONTROL FORMS

To exercise proper check and control on the prescription and suggestion made in this working plan, control forms will be prepared every year by D.F.O who will submit before 30th April every year the control forms 2(a), 2(b), 4 and C together with the deviation statement as laid down in chapter X of National Working Plan code, 2004.

X+4.3 COMPARTMENT HISTORY FILES

Compartment wise compartment history files have been prepared in duplicate for all RFs, DPFs and UPFs on standard pattern laid down in chapter chapter-IX of National Working Plan code, 2004. The summary of the works carried out and results there of during the preceding working plans have been recorded in the history files. Inspecting officers will invariably write inspection notes on the standard proformas prescribed in this chapter copies of which will be placed in the concerned compartment history files.

It is prescribed that one set of history files shall remain in the office of D.F.O and second set in the office of concerned R.O. It will be responsibility of D.F.O and R.O to maintain and post each and every compartment history file in his own office.

X+4.4 DIVISIONAL NOTE BOOK

This is mainly a record for use DFO which shows auction results, estimation of out turn of coupes, result of experiments carried out if any , records of annual seeding of important species, injuries to crop, divisional statistics notes on the trial of exotics and their performance and any other important information regarding divisional works. This record can be very useful and handy at the time of working plan revision.

X+4.5 FIRE RECORDS

A complete record of fires will be maintained in the compartment history files both in the Range office and Divisional office. Maps of forests burnt showing extent of area burnt will be filled in the compartment history files concerned along with relevant date such as place from which fire originated, nature of fire, damage caused by fire, duration of fire and how it was fought and brought under control.

X+4.6 GUARD BOOK

Guard book and forest guard book Manual is an important and handy record of beat statistics and activities like details of forests, forest boundaries included cultivation encroachments record of right/ concession sowing/ plantation, nurseries seed collection, beat maps showing forests, boundary forest roads and paths etc. Rights and concessions allowed, R.Os standing instruction and market rates etc. Every Forest Guard should maintain it for his beat and D.F.O will check these manuals during field tours and ensure that these are properly maintained.

X+4.7 REGISTER OF BOOKS AND MAPS

Register of books and maps will be maintained at Range and Divisional level and kept upto date. All roads, bridle paths, inspection paths and buildings constructed during the year should be shown in maps in April every year.

X+4.8 REGISTER OF R.Fs AND D.P.Fs

Register of Reserved and Demarcated Forests will be properly maintained and all changes in the area or boundaries recorded every year giving reference of Government orders and notifications.

X+4.9 REGISTER OF ROADS AND BUILDINGS

Register of roads and buildings will be maintained at Range and Divisional level and kept upto date. All roads and buildings constructed during the year should be entered in April every year alongwith cost of construction.

X+4.10 NURSERY JOURNALS

A nursery journal for each nursery shall be maintained wherein the details of all the nursery operations like sowing, germination, weeding, pricking etc. shall be incorporated along with cost.

X+4.11 PLANTATION JOURNALS

Plantation journals will be maintained for all the plantation areas according standing instructions on the subject and contained the following informations:-

(i) Location, legal status, boundaries, configurations, aspect, slope, rock, geology and soil, drainage and deapth of soil.
(ii) Soil suitability and treatment map.
(iii) Map showing prominent natural features.
(iv) A statement showing area planted and cost of planting item wise for each year.
(v) A critical note on success or failure of plantation and corrective steps if any required to be taken for the success of plantation.

X+4.12 RESEARCH JOURNAL

The research journals should be maintained in the division and relevant research activities conducted/undertaken should be entered.

X+4.13 DIVISIONAL FCA CASES REGISTER

This will contain data regarding diversion of forest land allowed and compensatory afforestation details and trees permitted by GOI to be felled in the area concerned and CAT Plan details, if there is any.

X+4.14 INSPECTIONS

Performa as for recording field inspection of important categories of works have been devised as under which only be used by officers to report field inspection.

I) Performa for reporting field inspections

Plantations (outside working plan area)

(A) Basic information

i) Date of inspections
ii) Name of plantation
iii) Year of planting
iv) Exact location
v) Approach indicating on foot journey
vi) Nearest rest house and staff quarter
vii) Distance from nearest habitation
viii) Altitude: General Aspect
ix) Boundaries: N S E W
x) Scheme under which planted
xi) Closure notification No.
xii) Detailed description of original vegetation

(B) Works done

i) Plants planted
ii) Spacing followed
iii) Vegetative works done
iv) Engineering works done
v) Sowing done
vi) Fencing done & fencing material used
vii) Inspection path made
viii) Misc. works done

(C) Detailed observations:

i) Reg. choice of species
ii) Reg. growth of plants
iii) Reg. survival percentage
iv) Reg. Spacing

v) Regarding natural regeneration

vi) Regarding advance growth

vii) Regarding grasses and bushed

viii) Regarding inspection paths

ix) Regarding fencing

x) Regarding biotic interference

xi) Regarding climber cutting, weeding, cleaning pruning

xii) Regarding thinning

xiii) Regarding vegetative works

xiv) Regarding engineering works

xv) Regarding misc. works.

D *Directions*

II Performa for reporting field inspections

Plantations (Inside working plan area)

A. Basic information

i) Date of inspection

ii) Name of plantation

iii) Prescribed year of planting

iv) Year of planting

v) Exact location

vi) Approach indicating of foot journey

vii) Nearest rest house and staff quarter

viii) Distance from nearest habitation

ix) Altitude

x) General aspect

xi) Boundaries: N S E W

xii) Scheme under which planted treated:-

xiii) Closure notification No.:

xiv) Working Circle Series:

xv) Series

xvi) PB:

xvii) Working plan para:

xviii) Prescribed treatment:

xix) Detailed description of original vegetation:

B. Works done

i) Plants planted:

ii) Spacing followed:

iii) Vegetative works done:

iv) Engineering work done:

v) Sowing done

vi) Fencing done and material used

vii) Inspection path made

viii) Misc. work done.

C. Detailed observations

i) Reg. Whether treatment carried-out as per prescription:

ii) Reg. choice of species

iii) Reg. growth of plants

iv) Reg. Survival

v) Reg. spacing

vi) Reg. Natural re-generation.

vii) Reg. advance growth

viii) Reg. grasses and bushes

ix) Reg. inspection path

x) Reg. fencing

xi) Reg. biotic interference

xii) Reg. climber cutting, weeding, cleaning and pruning

xiii) Reg. thinning

xiv) Reg. vegetative works.

xv) Reg. engineering works

xvi) Reg. misc. works

D *Directions:-*

III Performa for reporting field inspections

PBI AREA

A Basic information:-

i) Date of inspection

ii) Working Circle

iii) Series:

iv) Forest

v) Compartment

vi) Area (ha)

vii) Altitude

viii) General aspect:

ix) Boundaries:- N: S: E: W:

x) Exact location:

xi) Approach indicating on foot journey:

xii) Actual year of treatment:

xiii) Detailed description of Crop:

B. Prescribed treatment

i) Para under which treatment prescribed:

ii) Prescribed year of treatment:

iii) Details of prescribed treatment

C. Treatment carried–out

i) Marking done

ii) Felling done:

i) Debris disposal done:

ii) Closure done:

iii) Planting done:

iv) Spacing followed:

v) Fencing done and material uses:

vi) Vegetative works done:

vii) Engineering works done:

viii) Sowings done:

ix) Inspection path made:

x) Misc. works done:

D. Detailed observations:-

i) Whether treatment carried out as per prescription:

ii) Reg. markings:

iii) Reg. Fellings:

iv) Reg. debris disposal:

v) Reg. bush cuttings:

vi) Reg. plants growth:

vii) Reg. sowings:

viii) Reg. spacing of planning and sowing:

ix) Reg. survival percentage:

x) Reg. natural re-generation:

xi) Reg. inspection path:

xii) Reg. fencing and material used:

xiii) Reg. biotic interference:

xiv) Reg. vegetative works:

xv) Reg. engineering works:

xvi) Reg. misc. works:

E. Directions

IV PROFORMA FOR REPORTING FIELD INSPECTIONS

PB IV Areas

A. Basic information:-

i) Date of inspection

ii) Working Circle:

iii) Series:

iv) Forest:

v) Compartment:

vi) Area (ha.)

vii) General aspect:

viii) Boundaries: N S E W

ix) Exact Location:

x) Approach indication on foot journey:

xi) Scheme under which treated:

xii) Actual year of treatment:

xiii) Detailed description of crop:

B. Prescribed treatment

i) Para under which treatment prescribed:

ii) Prescribed year of treatment:

iii) Details of prescribed treatment:

C. Treatment carried out:-

i) Felling done:

ii) Thinning done:

D. Detailed observations:

i) Reg. fellings done:

ii) Reg. thinning done:

iii) Reg. misc. observations

E. *Directions*

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CHAPTER X+5

SUMMARY OF PRESCRIPTIONS

X+5.1 SUMMARY OF PRESCRIPTIONS AND SUGGESTIONS

The following is the summary of prescriptions and suggestions.

HEADINGS	PRESCRIPTIONS	PARAGRAPH OF THE PLAN
THE CHIL WORKING CIRCLE		
Silvicultural System	Indian Irregular shelterwood system	2.8
Rotation & Exploitable diameter	120 years rotation and exploitable diameter of 60 cm d.b.h has been fixed.	2.9 & 2.10
Regeneration Period	30 years	2.11
Division into Periodic blocks	Four periodic blocks have been formed	2.13
Precribed annual yield	The prescribed annual yield in cum is as under:- **Period Block — Yield in cum** PB-I — 220 PB-II — -- PB-III — -- PB-IV — 20	 2.14.1 2.14.3 2.14.3 2.14.2
Sequence of felling in PB- I & PB-IV areas	Felling programme has been laid down	2.15
Method of executing felling in PB-I areas	General priniciples laid down	2.16.1
Method of executing felling in PB- IV areas	General priniciples laid down	2.16.3
Treatment of PB-II areas	No commercial fellings precribed	2.16.2
Treatment of PB-III areas	No commercial fellings precribed	2.16.2
Subsidary Silviculture operations in PB-I	Works to be carried out to general principles given	2.17
THE DEODAR-KAIL WORKING CIRCLE		
Silvicultural System	Indian Irregular shelterwood system	3.8
Rotation & Exploitable diameter	120 years rotation and exploitable diameter of 60 cm d.b.h has been fixed.	3.9 & 3.10

Regeneration Period	30 years	3.11
Division into Periodic blocks	Four periodic blocks have been formed	3.13
Calculation of yield	Yield has been calculated from PB-I and PB-IV	3.14
Precribed annual yield	The prescribed annual yield in cum is as under:- **Period Block** **Yield in cum** PB-I 860 PB-II --- PB-III ---- PB-IV 525	 3.14.1 3.14.3 3.14.3 3.14.2
Control of yield	Control of yield by volume, all diameter classes to count towards yield. Annual deviation +/- 20% and for blocks of five years 10%	3.15
Sequence of felling in PB- I & PB-IV areas	Felling programme has been laid down	3.16
Method of executing felling in PB-I areas	General priniciples laid down	3.17.1
Method of executing felling in PB- IV areas	Overwood removal and D grade thinnings	3.17.3
Treatment of PB-II areas	No green commercial fellings precribed	3.17.2
Treatment of PB-III areas	No green commercial fellings precribed	3.17.2
Subsidary Silviculture operations in PB-I	Works to be carried out to general principles given	3.18
Artificial regeneration in PB-I	This is to be carried out supplement natural regeneration after about five years	3.19
Regeneration Survey	Every third year in felled PB-I areas.	3.20.6
THE FIR-SPRUCE WORKING CIRCLE		
Silvicultural System	Indian Irregular shelterwood system in which regeneration will be mainly with artificial regeneration	4.8
Rotation & Exploitable diameter	120 years rotation and exploitable diameter of 60 cm d.b.h has been fixed.	4.9 & 4.10
Regeneration Period	30 years	4.11
Division into Periodic blocks	Four periodic blocks have been formed	4.13
Calculation of yield	Yield has been calculated from PB-I and PB-IV	4.14
Precribed annual yield	The prescribed annual yield in cum is as under:-	

	Period Block **Yield in cum** PB-I 665 PB-II ---- PB-III ----- PB-IV 3600	 4.14.1 4.14.3 4.14.3 4.14.2
Control of yield	Control of yield by volume, all diameter classes to count towards yield. Annual deviation +/- 20% and for blocks of five years 10%	4.15
Sequence of felling in PB I & PBIV areas	Felling programme has been laid down	4.16
Method of executing felling in PB-I areas	General priniciples laid down	4.17.1
Method of executing felling in PB- IV areas	Overwood removal and D grade thinnings	4.17.3
Treatment of PB-II areas	No green commercial fellings precribed	4.17.2
Treatment of PB-III areas	No green commercial fellings precribed	4.17.2
Subsidary Silviculture operations in PB-I	Works to be carried out to general principles given	4.18
Artificial regeneration in PB-I	This is to be carried out supplement natural regeneration after about five years	4.19
Regeneration Survey	Once every five year in felled PB-I areas.	4.20
Special treatment to PB-IV	Plantation programme	
THE OAK WORKING CIRCLE		
Silvicultural System	Coppice with standard system	5.8
Rotation & Exploitable diameter	45 years for coppice and 90 years for standards	5.9 and 5.10
Calculation of yield	There is a ban so no yield precribed	5.12
Precribed annual yield	Nil	-
Method of executing fellings	General priniciples laid down	5.14
Artificial regeneration	Plantation programme laid down	5.16
THE PLANTATION (OVERLAPPING) WORKING CIRCLE		
Silvicultural System	No silviculture system prescribed. Plantation will be raised by artificial planting and sowing	6.8
Choice of species	Species best suited for the site conditions and climate be planted	6.10

Sequence of planting	Planting programme laid down	6.12
THE FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE		
Silvicultural System	No silviculture system prescribed as the forest is to be preserved and protected.	7.7
GENERAL FINANCIAL FORECAST AND FINANCIAL PLAN OF OPERATION		
Future revenue and Expenditure		X+1.1
Expected Revenue		X+1.2
Future Expenditure		X.1.3
Cost of working plan		X+1.4
MISCELLANEOUS REGULATIONS		
Petty fellings	Defined	X+2.1
Deviations	Regulations made	X+2.2
Demarcation of Forests	Demarcation of DPFs and UPFs needs finished within five years of currency of plan	X+2.3
Boundary register	To be maintained and brought upto date	X+2.4
Maps	To be maintained and posted upto date	X+2.5
Rain Gauges	Station for new rain gauges	X+2.6
Fire protection	Effective steps suggested for better prevention	X+2.7
Encroacments	To be traced out and ejectments to be made	X+2.8
Research plots	Research plot suggested	X+2.9
Roads, Paths & Buildings	Maintenance of existing roads and buildings and construction of new buildings prescribed	X+2.10
Ban on green fellings	Ban on green fellings	X+2.11
Mid- term review of the W.P	Mid- term review suggested	X+2.12
Go-sadans	Strategies for dealing with Stray cattle	X+2..13
ESTABLISHMENT AND LABOUR		
Establishment	Necessity to increase of the staff is suggested due to work load	X+3.1
Labour	Permanent labour gangs for nurseries advised	X+3.2
CONTROL AND RECORDS		
System of control	Record of all operation be maintained	X+4.1
Control forms	Control form for fellings,subsidiary operations and regeneration and plantation works,as well as deviation statements prescribed	X+4.2
Compartment History files	Proper maintenance and upto date posting prescribed	X+4.3
Divisional note book	To be maintained as per order of C.F	X+4.4
Fire records	To be maintained in Ranges and Divisional office	X+4.5
Guard book	To be written up and provided to each beat	X+4.6

	guard	
Register of books and maps	To be maintained in Ranges and Divisional office	X+4.7
Register of R.Fs and D.P.Fs	To be maintained in Ranges and Divisional office	X+4.8
Register of roads and Buildings	To be maintained in Ranges and Divisional office	X+4.9
Nursery Journals	To be maintained in Ranges and Divisional office	X+4.10
Plantation Journals	To be maintained according to standing orders	X+4.11
Research Journals	To be maintained in Ranges and Divisional office	X+4.12
Divisinoal FCA cases register	To be maintained in Ranges and Divisional office	X+4.13
Inspections	Performa for inspection prescribed	X+4.14

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