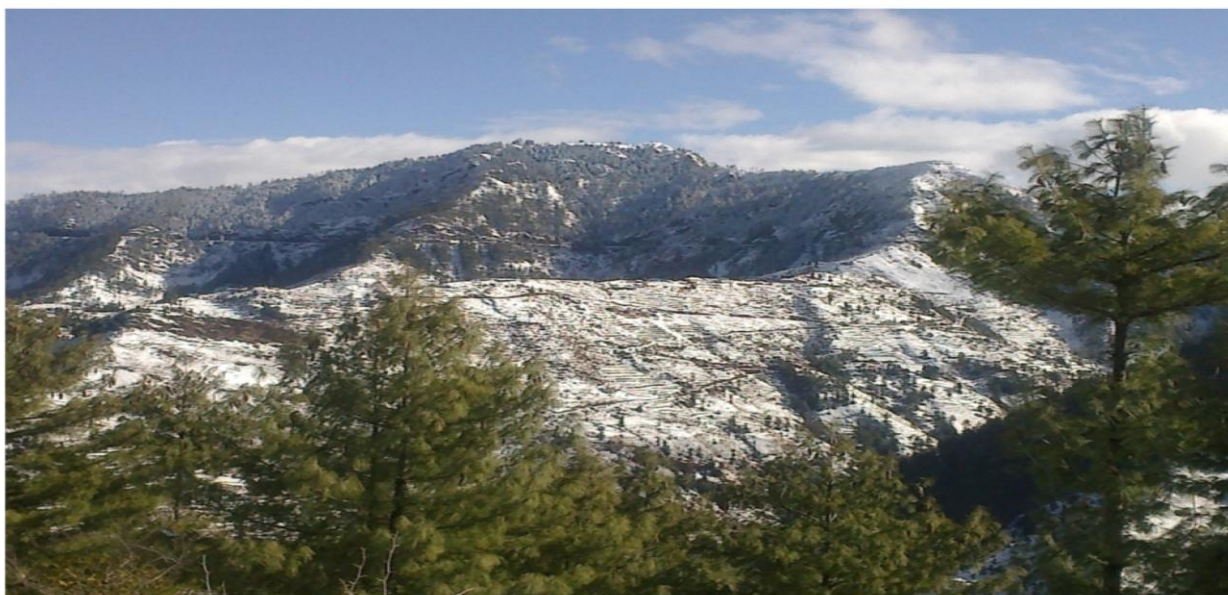


HIMACHAL PRADESH FOREST DEPARTMENT



WORKING PLAN THEOG FOREST DIVISION



VOLUME - I (FROM 2016-17 TO 2028-29)

By

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*“What of thee I dig out,
Let that quickly grow.
Ever, let me not hit thy vitals
Or thy heart.”*

-- Atharva Veda

INTRODUCTION

Theog Forest Division is situated mostly in the West of Shimla District with its Head Quarter at Theog 30 Km. from Shimla on Shimla-Narkanda N.H.-22. Total geographical area of the tract of this Working Plan is 66393.0 ha which includes 33681.52 ha forest area. It forms part of the catchment of Giri River, the tributary of The River Yamuna and Kelwi-Kiartoo-Gumma Khad forms the catchment area of Gumma Khad, the tributary of The River Satluj. The tract of this Working Plan forms catchment area of Giri Water Supply Scheme and catchment area of Gumma Water Supply Scheme which meet the water supply of Shimla Town, the Capital of Himachal Pradesh. Therefore, the scientific management of the forest to save this tract from pollution and environmental degradation is of paramount importance.

Attempt has been made to make the Revised Work Plan as comprehensive as possible keeping eye on the prescriptions of previous Working Plan, and the past system discussed therewith, instructions contained in National Working Plan Code, suggestions received from the Pr. CCF (HoFF), APCCF, (WP& S) Mandi, C.F. W.P. (South) Solan which were considered as key sources for Revision of the Plan. For instance, new chapters on Activities of H.P. State Forest Development Corporation, Five Years Plan, NTFP, Forest Protection, JFM and Wild Life Management have been introduced for the first time.

Emphasis throughout the revision and writing Compartment History Files have been given to regenerate and tend the crop till maturity and harvest it without endangering mountain ecosystem and extract the future yield on sustainable basis. 31% area of forests has been allotted to Bio-Sphere Conservation Working Circle to conserve the bio-resources and the mountain eco system. Thus no felling except salvage removals has been prescribed in this Working Circle. Similarly 22% forest area has been allotted to Plantation Working Circle to restock degraded forests by raising artificial plantation. Also 1/3rd area of PB-I where regeneration was found inadequate have not been prescribed for concentrated seedling/ regeneration felling. To distribute the growth potential of a particular site to be distributed amongst the superior species which are to be retained as future crop till maturity is to be achieved by carrying out tending and subsidiary silvicultural operations.

The un-demarcated Protected Forests forms more than 50% forest area which needs to be demarcated and notified as Demarcated Protected Forests during the first ten years period of this Working Plan. The estimated future expenditure to be incurred on this activity has been discussed in detail under Chapter-XII.

Information in this Revised Working Plan have been drawn from numerous references, books, previous working plan and notes kept by me over the years since college days. I claim no originality in writing this plan except for the arrangement and presentation of the subject matter.

It is hoped that the prescription of this plan will go long way in better scientific and technical management of forest by adopting silvicultural principles of forestry, which will result in a formation of forests, with complete crop and canopy density. And, also it will strengthen the economy of the State without endangering the Himalayan ecology.

*Theog,
October 21st, 2014.
Singh*

Awasthi

Pratap

And

Shakti

ACKNOWLEDGMENT

We take this opportunity to record our regards and sincere thanks to Sh. R.K. Gupta, IFS Principal CCF (HoFF), H.P. for entrusting me this important task to revise the Working Plan of Theog Forest Division. We are particularly grateful to the forest officers namely, Sh. Tejender Singh, IFS the then Addl. Pr. CCF (WP & S) Mandi and Sh.Arvind Kumar Alipuria Addl.Pr.CCF(WP&S) Mandi for their constant guidance and inspiration to get this document completed within a period of two years, Dr. Lalit Mohan IFS, Addl. Pr. CCF, Chief Wild Life Warden H.P. for his valuable suggestion and vetting the chapter on Wildlife Management. Sh. Y.P. Gupta IFS, C.F. (W.P.) South, Solan(from August 2012 to April 2013)helped in addressing various shortcomings in the Draft Working plan. After that Sh.R.K.Gupta,the then Conservator of ForestsWorking plan South Solan(from January 2015 to July 2015)further improved the draft working Plan. Finally Sh. Harsh vardhan Kathuria present Conservator of Forests Working plan South Solan,facilitated in giving Final Shape to the Working plan Document, made presentation in the o/o APCCF Regional office MOEF and Climate Change Dehradun, and Final approval of the Working Plan from the Committee headed by Sh.S.P.Vasudeva IFS Pr.CCF(HOFF) Shimla.We are also thankful to CF Working Plan South and Sh.Prem Raj Mahajan DFO HQ and Sh. Mahender Kumar Negi, Range Forest Officer o/o CF Working Plan South for their sincere efforts in scrutiny of the working Plan document before its final printing.

We are gratefully acknowledge the valuable feedback which we got from the books of following Authors on the subject matter for write-up and sketches for this compilation.

1. Foresters Companion	-----	A. R. Maslekar, IFS.
2. Forest Management	-----	Ram Prakash, IFS, Formerly Principle Northern Forest Rangers College, Dehra Dun.
3. Principles & Practice of Silviculture Northern	----	L.S. Khanna, IFS. Formerly Lecturer in Forest Rangers College, Dehra Dun
4 Glossary of Technical Terms in forestry	-----	FRI Publication, Dehra Dun
5 Growth &Yield Statistics of Common	----	F R I Publication Dehra Dun Species.
6 Studies in Himalayan Ecology	-----	Dr. Tejvir Singh, Formerly Director Institute & Development Strategies. Himalayan Studies & Regional Development Garhwal University, Srinagar Garhwal.
7 Forest &Allied Laws IFS	-----	Sushil Kumar Shingla IFS & Surinder K Sharma
8 Manual on Propagation, Value Addition resources	----	Publication of Institute of Himalayan & Market Linkages of Medicinal Plants Bio- & Technology, Palampur (HP)

With great reverence We are particularly grateful to Sh. Ram Prakash, IFS author of the book on Forest Management the contents of which have enriched our knowledge on the subject matter and who coincidently taught us Forest Management during training period at Northern Forest Ranger Collage Dehra Dun in the year 1979-80.

We are thankful to Sh. Jangvir Singh Dulta HPFS and Shakti Awasthi HPFS Assistant Working Plan Officers for their sincere and hard work for compilation of data and updating Compartment History Files and Stock Maps.

We also convey our appreciation to all the Range Forest Officers of Theog Forest Division, Field Staff as well as the ministerial staff who in addition to their routine duty were instrumental in feeding back various information's and statistics required for compilation of the Plan.

We convey our appreciation to Sh. Sohan Lal Dy. Ranger, I/C Working Plan Unit for his understanding the pros-cons of Working Plan and doing outstanding job in compilation of various Working Plan data. we also convey our appreciate to Miss Ruchika Sharma, Computer Assistant who by her sincere and hard work typed this document time and again till the draft plan was given its final shape. Appreciation also goes to Sh. Daulat Ram Peon who helped a lot in compilation of Working Plan Data.

Finally, it is however likely that We might have not acknowledged all the persons through oversight or inadvertently, but to bring out the revision of this working plan has been a result of team work and encouragement, we received from all.

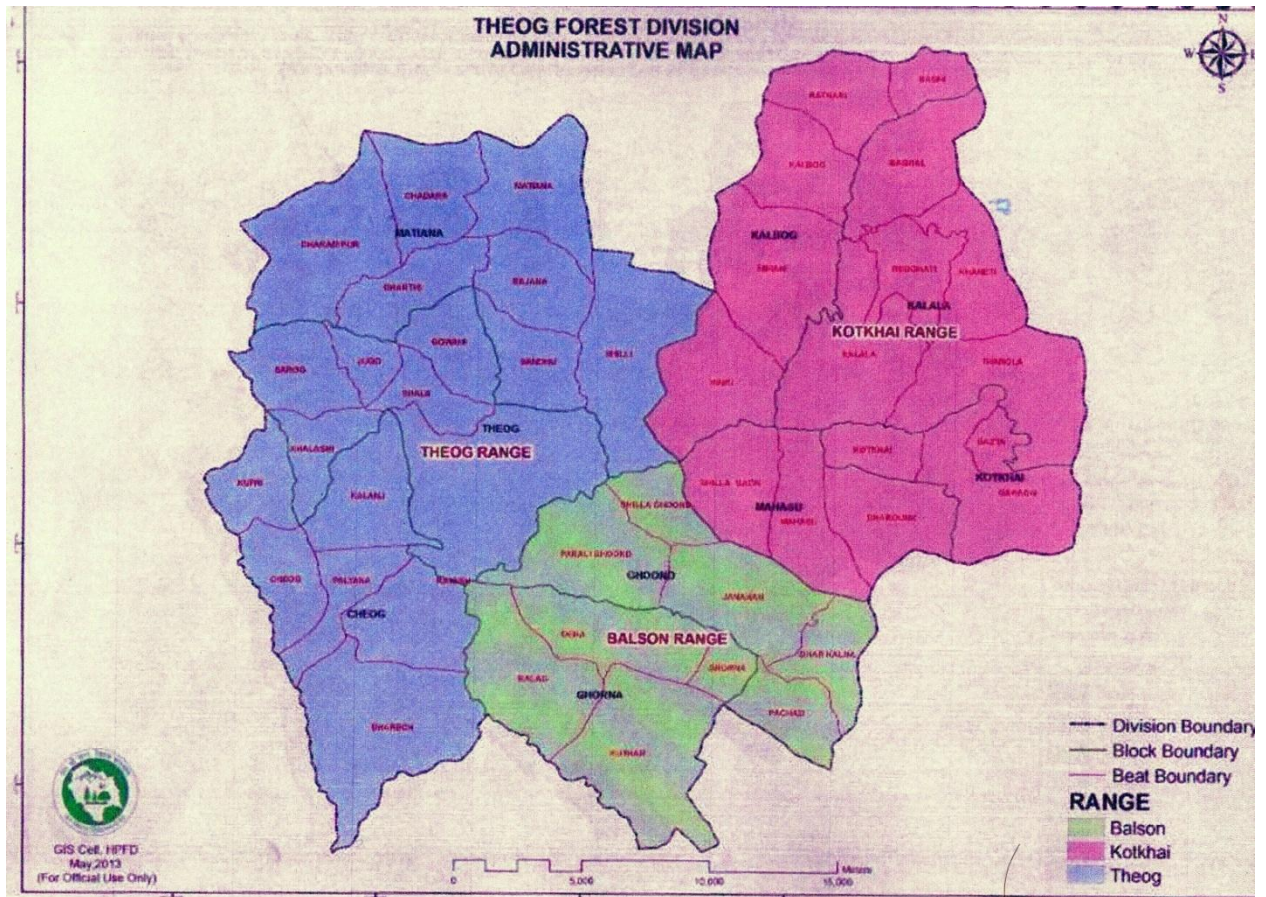
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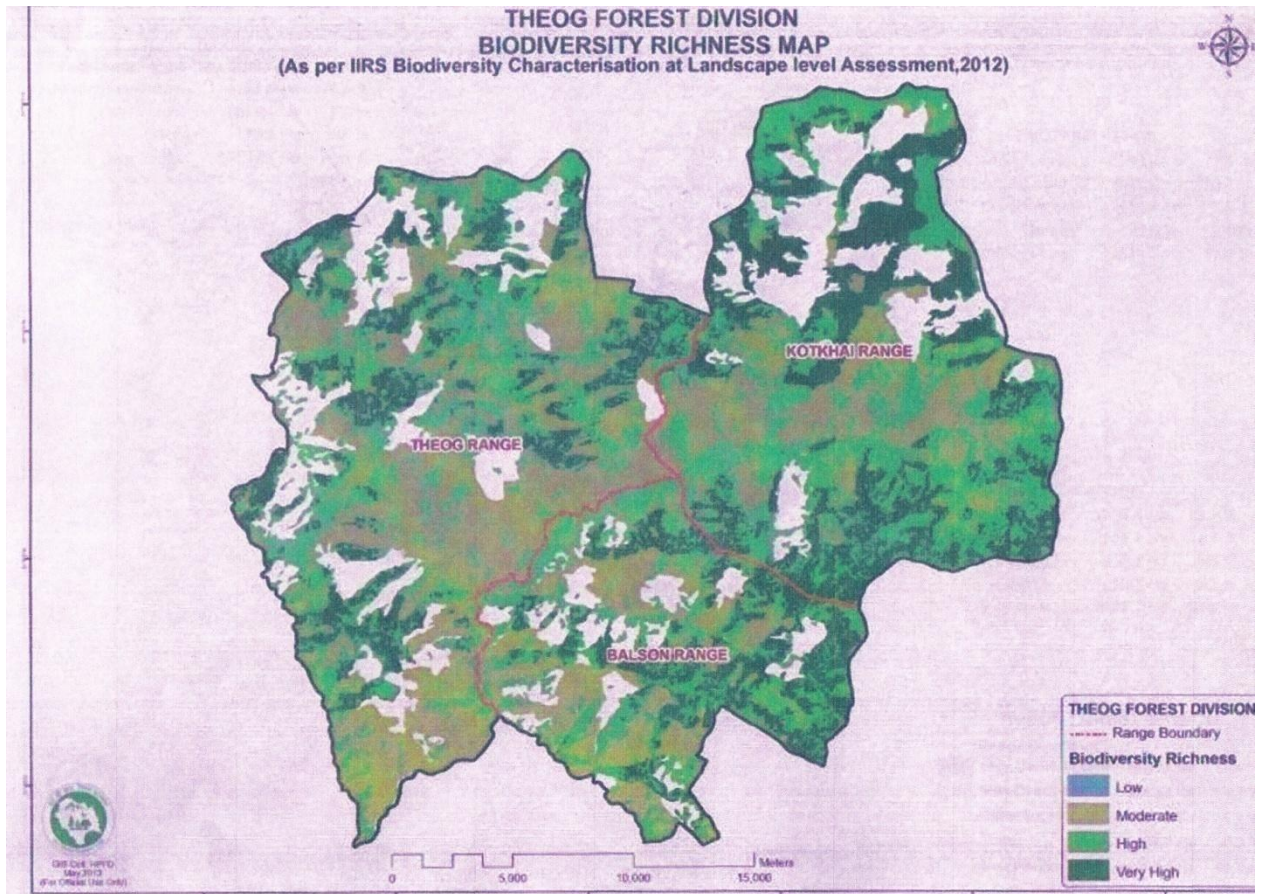
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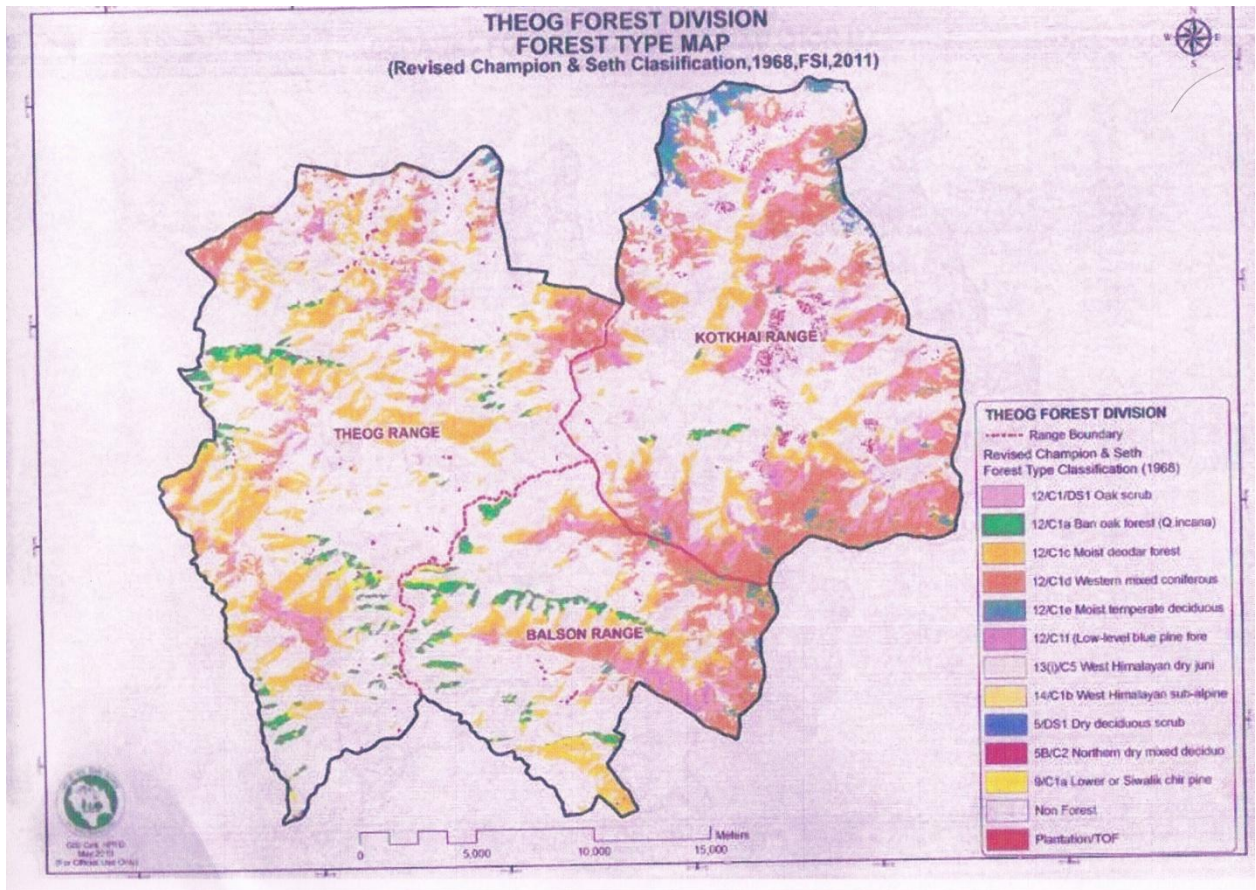
Pratap Singh (HPFS) WPO

**And
Shakti Awasthi (HPFS) AWPO**









GLOSSARY OF VERNACULAR TERMS

1. Bat	Footpath
2. Banjar	Wasteland
3. Baoli	Small spring
4. Balli	Pole with diameter of 10-30 cms
5. Chak	Included Cultivation
6. Charand/ Chugan	Grazing land, pasture
7. Chhang	Lopping
8. Dabar	Pond
9. Darat	Shickle
10. Dehat	Un-demarcated Protected forests, Village Forests.
11. Devta	Local deity
12. Dhar. Dharti	Ridge
13. Dhulan	Manual Carriage
14. Dimdima	Odd sized billet roughly squared
15. Dogri	Temporary second residence
16. Gaddi, Kinaura	Nomadic Shepherds
17. Ghall	Timber floated down river or stream
18. Ghasni/ Ghain	Grass land
19. Ghati	Saddle or pass
20. Gorkha	Nepali labourer
21. Ghrat	Water mill
22. Gujjar	Nomadic buffalo grazier
23. Hakri	Small triangular billet
24. Hoaka	Pipe for smoking
25. Illaqua	Locality
26. Jagti	Torch wood
27. Jungle Mehduda	Demarcated protected forests
28. Jungle Mehfuza	Reserved Forests
29. Karam	A revenue unit of measurement usely 146.05cms
30. Karri	Roughly squared scant
31. Khal	Ravine or Gully
32. Khala	Wide and deep ravine
33. Khad/ Gad	Deep mountain stream

34. Kair/ Kiar	Irrigated field
35. Kilta	A conical wooden basket carried on the back

36. Kuhal	Water channel
37. Mela/ Jattar	Local fair
38. Nala/khad	Small stream
39. Nautor	Land granted for fresh cultivation
40. Shamlat	Village common land
41. Thach	Grassy blank inside forest
42. Tibba	Peak of hill

GLOSSARY OF BOTANICAL TERMS

LIST OF IMPORTANT TREES, SHRUBS, HERBS AND CLIMBERS FOUND IN THE TRACT

BOTANICAL NAME	COMMON NAME	REMARKS
(1)	(2)	(3)
<i>Abies pindrow</i>	Tosh (Silver fir)	For news print and packing cases
<i>Acacia catechu</i>	Khair	Katha is extracted from heartwood
<i>Acer caesium</i>	Maple	For gun butts and furniture
<i>Aesculus indica</i>	Khanor Horse chestnut	Wood for household purpose fruit for cattle
<i>Ailanthus excelsa</i>	Ailanthus	Fast growing species used as fuel
<i>A. lebbek</i>	Siris	Wood for furniture leaves for fodder.
<i>Alnus nitida</i>	Kunish (Alder)	For slope stabilization leaves
<i>Bauhinia variegata</i>	Kachnar, Karial	for fodder and buds for vegetable.
<i>Betula utilis</i>	Bhojpatra	Bark for writing, wrapping and roofing
<i>Bombax ceiba</i>	Semul	Wood for match sticks, leaves for fodder
<i>Buxus sempervirens</i>	Shamshad (boxwood)	Wood for making combs
<i>Cedrela serrata</i>	Darle (mill toon)	Wood for furniture leaves for fodder.
<i>Cedrus deodara</i>	Devdar, diar Kelo	As constructional timber.
<i>Celtis australis</i>	Khirak	Wood for toys & churn sticks, leaves for fodder.
<i>Cornus medica</i>	Nimbu	Wood for fuel and fruits eatable.
<i>Cornus capitata</i>	Khagsa (dogwood)	Leaves as fodder, fruit eaten.
<i>C. macrophylla</i>	BhutiaBadam (hazel nut)	Fruit is eaten.
<i>Cupressus</i>	Saru (Himalayan Cypress)	As timber & as incense.
<i>Dalbergia sissoo</i>	Shisham	As timber & furniture.
<i>Dandrocalthus strictus</i>	Bans	Timber for Baskets, leaves as fodder, seed eatable.
<i>Debrogeasia hypoleuca</i>	Siaru	Leaves for fodder
<i>Emblica officinalis</i>	Ambala	Fruit eaten and used in medicine.
<i>Flacourtia ramontechii</i>	Kandel	Leaves for fodder
<i>Ficus palmate</i>	Fagara	Fruits eatable by birds
<i>Ficus religiosa</i>	Pipal	A sacred tree
<i>Ficus auriculata</i>	Tiamble	Fruit eaten by birds
<i>Fraxinus floribunda</i>	Ash	Used for agriculture implements.
<i>Grewia optiva</i>	Beul	Inner bark yields fiber used in rope making
<i>Ilex dipyrena</i>	Kanderu	----
<i>Juglans regia</i>	Akhrot	For gun stocks and furniture, fruit is eaten.
<i>Jacaranda mimosae</i>	Gulmohar	Avenue tree
<i>Mangifera indica</i>	Aam	Timber for packing cases, furniture. Fruit eatable.
<i>Morus alba</i>	Darek, Bakain Tut (Mulberry)	Leaves for fodder. Silk worm tree; wood for furniture
<i>M. serrata</i>	Kinu (Hill mulberry)	Furniture & fruit eatable.
<i>Myrica opida</i>	Kaphal	Fuelwood & fruit eatable.
<i>Mallotus philippinensis</i>	Kambhal	
<i>Olea cuspidate</i>	Kahu (olive tree)	Oil in medicine, leaves for fodder.
<i>Ougeinia oojeinensis</i>	Sandon	Fodder trees
<i>Pieris ovalifolia</i>	Aria Rohini,	Bark for tanning
<i>Picea smithiana</i>	Rai (spruce)	For news print, air-craft frames & packing cases.
<i>Pinus wallichiana</i>	Kail (Blue pine)	As timber, also yield resin
<i>P. roxburghii</i>	Chil (Chirpine)	
<i>Pistacia integerrima</i>	Kakkar	Galls used in medicine, leaves for fodder.
<i>Phoenix humilis</i>	Khajoor	Fruit eatable, leaves for broom.
<i>Populus ciliata</i>	Pahari Pipal (poplar)	Leaves for fodder wood for packing cases.
<i>Prunus armeniaca</i>	Chuli (Wild apricot)	Fruit is edible.
<i>P. cornuta</i>	Paja (birdcherry)	Fruit eaten by birds.
<i>Punica granatum</i>	Daroo (wild-pomegranate)	Fruit is eaten, bark for tanning
<i>Pyrus pashia</i>	Kainth	Walking sticks.
<i>Prunus persica</i>	Aru	Fruit is eaten, wood for fuel.
<i>Quercus dilatata</i>	Mohru	Agriculture
<i>Q. glauca</i>	Bani	Implements as firewood & charcoal.
<i>Q. leucotrichophora</i>	Ban	Leaves for fodder
<i>Q. semicarpifolia</i>	Kharsu	
<i>Rhododendron</i>	Buras	Flowers are eaten and used in medicine.
<i>Rhus punjabensis</i>	Titri	-
<i>Robinea pseudoacacia</i>	Robinia	Exotic Fast growing species, fodder; wood as fuel.

<i>Salix alegans</i>	Binus, majnu (willow)	Leaves for fodder, twigs for basket making.
<i>Sapindus mukorossi</i>	Ritha (Soap-nut-tree)	Fruit used for washing especially silk and woolen.
<i>Syzygium cumini</i>	Jamun	Fruit is eaten.
<i>Terminalia belerica</i>	Behra	Medicinal fruit, fuelwood for timber.
<i>Terminalia chebula</i>	Harar	Medicinal fruit, fuelwood for timber.
<i>Ulmus wallichiana</i>	Impol, Marn (Himalayan alm)	Leaves for fodder
<i>Zizyphus mauritiana</i>	Ber	Fruit edible, leaves for fodder
(ii) SHRUBS		
<i>Agave americana</i>	Ramban	For soil conservation
<i>Adhatoda vasica</i>	Basuti	In medicine
<i>Artemisia vulgaris</i>	Chamror (artemisia)	In medicine
<i>Arundinaria falcata</i>	Nirgal, Ringal (Hill bamboo) Cobra plant	For basket making
<i>Arisaema wallichianum</i>	Satmuli	In medicine
<i>Asparagus racemosus</i>		
<i>A. adscendens</i>		
<i>Berberis aristata</i>	Kashmal	Root extract used in medicine.
<i>B. lycium</i>		Leaves eaten by sheep & goats.
<i>B. chitria</i>		
<i>Bambusa arundinarea</i>	Bans	Baskets and sticks.
<i>Carissa spinarum</i>	karaunda	Berries eaten by birds.
<i>Colebrookia oppositifolia</i>	Bambker	-
<i>Cotoneaster bacillaris</i>	Renus	For walking sticks.
<i>C. microphylla</i>	Chamror	-
<i>Daphne cannabina</i>	Caula	-
<i>Desmodium tiliaeaeifolium</i>	Murt	-
<i>Deutzia corymbosa</i>	Philru	For hedges and soil conservation areas.
<i>Dodonea viscosa</i>	Mehndu	-
<i>Euphorbia royleana</i>	Thar	-
<i>Indigofera pulchella</i>	Kathi, Neel	-
<i>Jasminum pubescens</i>	Chameli	-
<i>J. hummile</i>		
<i>J. afficinale</i>		
<i>Lantana camara</i>	Phul lakri	-
<i>Lonicera angustifolia</i>	Pirlu	-
<i>L. quinquelocularis</i>	Taknol, Bhakra	-
<i>Murraya koenigii</i>	Gandhela	Leaves used as kari patta
<i>Myrsine africana</i>	Banwan	Fruit used in medicine
<i>Phoenix acaulim</i>	Khajur	Fruit is eaten, leaves for matting and brooms.
<i>P. humilis</i>		
<i>Punica granatum</i>	Daru	Seed used and medicine
<i>Plectranthus rugosus</i>	Chilchhri	-
<i>Prinsepia utilis</i>	Bhekhal	-
<i>Ricinus communis</i>	Castor	Oil used in medicine
<i>Rosa macrophylla</i>	Jangligulab	-
<i>Rubus ellipticus</i>	Lal anchu, akhi	Fruit edible
<i>R. Paniculattus</i>	Kala anchu, akhi	Fruit edible
<i>Sarcococca saligna</i>	Tiliari	Leaves eaten by musk deer.
<i>Skimmia laureola</i>	Shashru	-
<i>Spiraea canescens</i>	Takru	-
<i>S. lindleyana</i>	Longtri	-
<i>Strobilanthes</i>		-
<i>atropurpureus</i>	Mashna	
<i>S. alatus</i>		
<i>S. dalhousianus</i>		
<i>Viburnum continifolium</i>	Loz	-
<i>V. nervosum</i>	Throni	
<i>V. foetens</i>		
<i>Vitex negundo</i>	Bana	-
<i>Woodfordia fruticosa</i>	Dhau	For walking sticks and brushing teeth.
<i>Woodfordia floribunda</i>	Dhau	
<i>Xanthoxylum alatum</i>	Tirmir	
(iii) HERBS		
<i>Acyranthes bidentata</i>	Puth-kanda	-
<i>Aconitum heterophyllum</i>	Patis	In medicine
<i>Adiantum capillus</i>	Maiden hair fern	-

<i>Ainslaed aptera</i>	Kali, Ghatti (arrons rod)	-
<i>Aerissaema wallichianum</i>	Sarpator (Cobraplant)	-
<i>Asplenium polypo dioides</i>	Lingar	As vegetable
<i>Bergenia ligulata</i>	Pathar tor	-
<i>Baenninghausenia albiflora</i>	Pissu mar	Insect repellent
<i>Cannabis sativa</i>	Bhang	Fiber used for making ropes medicine weed
<i>Delphinium denudatum</i>	Larkspur	-
<i>Dioscoria deltoidea</i>	Tardi	In medicine
<i>Fragare indica</i>	Bhumla	-
<i>F. vesca</i>	Strow berry	-
<i>Geranium Nepalensis</i>	-	-
<i>G. wallichianum</i>	-	-
<i>Gerardiana heterophylla</i>	BichhuButi (Stinging nettle)	-
<i>Glycosmis pentaphylla</i>	Ban Nimbu	In medicine
<i>Hydrocotyle asiatica</i>	Brahmi	In medicine
<i>Impatiens thomsoni</i>	Jangli timber balsam	-
<i>I. racemosa</i>		
<i>Iris nepalensis</i>	-	-
<i>Mentha cylvestris</i>	Podina	In medicine
<i>Pteris creton</i>	Bracken fern	In medicine
<i>Podophyllum emodii</i>	Bankakri	Roots in medicine
<i>Rumex hastatus</i>	Malora	-
<i>R. nepalensis</i>	Sage	-
<i>Salvia glutinosa</i>		
<i>Saxifraga liqulata</i>	Pathar tor	-
<i>Solanum indicum</i>	Ban Tobacco	-
<i>Thymus serphyllum</i>	Ban jawain	-
<i>Urtica parviflora</i>	Kuga (common nettle)	-
<i>Valeriana wallichii</i>	Mushk Bala	In perfume
<i>Valeriana hardwickii</i>	Nakh nihani	-
<i>Verbascum thapsus</i>	Gidar tamaku	-
<i>Viola canescans</i>	Banshafa	In medicine
(iv) CLIMBERS		
<i>Bauhinia vahlii</i>	Majaup, taur	Leaves for making umbrella plate, and for fodder
<i>Clematis montana</i>	Garol	-
<i>Hedera helix</i>	Mithiari	-
<i>Hedra nepalensis</i>	Kural (Ivy)	-
<i>Rosa moschata</i>	Kuja	
<i>Smilax parvifolia</i>	Ram datum	
<i>Vitis himalayana</i>	Pan bel	

FOREST FAUNA

Zoological Names	Local Names	English Names
A. ANIMALS		
i) Carnivora		
<i>Felis bengalensis</i>	BaghBilli	Leopard Cat
<i>Felis chaus</i>	JangliBilli	Common Jungle Cat
<i>Panthera pardus</i>	LakkarBagha	Leopard
<i>Vulpes bengalensis</i>	Lomeri	Indian Fox
ii) Herbivora		
<i>Canis aureus</i>	Gidar	Jackal
<i>Cervus unicolor</i>	Sambar	Sambar
<i>Harpestes edwardsil</i>	Newla	Common Mongoose
<i>Hemitragus jemlahicus</i>	Thar	Himalayan Tahr
<i>Humambulus penanti</i>	Gilehari	Common Five stripped squirrel
<i>Hylopetes fimbriaty</i>	Een Koryal	Kashmir flying squirrel.
<i>Lopus nigricalttoy</i>	Khargosh	Rufoustailed Hare
<i>Macaca mulatta</i>	Bandar	Monkey
<i>Montiacus muntjak</i>	Kakkar	Barking Dear
<i>Mos homourus.</i>	-	Hill mouse
<i>Moschus moschiferus</i>	Kastura	Musk Deer
<i>Nemorhaedus goral</i>	Ghoral	Goral
<i>Nesekia indica.</i>	-	Indiam Mole rat
<i>Presbytis entellus</i>	Languor	Common languor
<i>Pteropus giganteus</i>	Chamgadar	Indian Flying Fox
<i>Pteromys petauriste</i>	-	Brown flying squirrel
<i>Selenarctos thibetanus</i>	Bhalu	Black Bear
<i>Sus scrofa</i>	Jangli suwar	Wild Pig
B. BIRDS		
<i>Anas acuta</i>	-	Pintail
<i>Anas creca</i>	-	Common tail
<i>Aneer indicus</i>	-	Barheaded goose
<i>Aquila chrysactus</i>	-	Golden eagle
<i>Capella ballinago</i>		Fantail snipe.
<i>Clamator jacobinus</i>	-	Pied crested cuckoo
<i>Columba leuconta</i>	-	Snow pigeon
<i>Columba lversmanni</i>	-	Eastern soock
<i>Columba livia.</i>	Malyo	Blue Rock Pigeon
<i>Corvus macrorhynchos</i>	Kaua	Jungle crow
<i>Cotumba rupestris</i> <i>truke stanica.</i>	Kabutar	Rock pigeon
<i>Cuculus canorus aureua</i>	Cuckoo	Cuckoo
<i>Francolinus franedinus</i>	Kala titar	Black partridge
<i>Gallus gallus</i>	Lal murga	Red jungle fowl
<i>Gyps himalayensis</i>	Gidh	Himalayan griffon
<i>Lophorus impejanus</i>	Monal	Himalayan Monal
<i>Lophirrale ucomilanos</i>	Kulsha	Kalij
<i>Milvus migrans</i>	-	Black kite
<i>Pavo-cristatus.</i>	Mor	Peafowl
<i>Picus squamatus</i>	Kathphora	Scaly bellied green wood pecker.
<i>Pistaculla himalayana</i>	Tota	Saity headed parakeet.

<i>Psittacula cyangicephala</i>	Tota	Blossom headed parakeet.
<i>Pucrasia macrolopha</i>	Palash	Koklass pheasant
<i>Scooppax rusticola</i>	Sham Kukra	Wood cook
<i>Spilornis cheela</i>	-	Crested serpenteagle
<i>Streptopelia chinensis</i>	Ghugi	Spotted dove
<i>Streptopelia orientila</i>	Tota	Blossom headed parakeet.
C. REPTILES		
SNAKES		
<i>Ancistrodous himalapanus</i>	Sapp	Himalayana pit viper
<i>Bungarus cacrules</i>	Krait	Common Indian krait
<i>Naja naja</i>	Kharpa	Indian Cobra
<i>Pyyas macosus</i>	Sapp	Rate snake
LIZARDS		
<i>Agamo tuberculata</i>	-	Rock Lizard
<i>Hemidactylus brooki</i>	-	Common house gecko
<i>Onlotas vessicoloan</i>	Girgit	Common Indian Monitor
<i>Techydrmous spp.</i>	-	Blood sucker
<i>Varanus monitor</i>	Goblida	Common Indian Monitor
D. FISHES		
<i>Allia caile</i>	Barangali	Fish
<i>Bagarious bagarius</i>	Goach	Fish
<i>Barilius barila</i>	Bhareli	Fish
<i>Barilus vegra</i>	Lohani	Fish
<i>Cirrhunis mrigala</i>	Mrigal	Moigal
<i>Clumpsoma motona</i>	Dhung	Fish
<i>Crossochelus latius</i>	Dogru	Fish
<i>Garra gotyla</i>	-	
<i>Glyptothroax conirostris</i>	Mochi	Fish
<i>Labeo boga</i>	Bhnnga	Fish
<i>Labeo dero</i>		
<i>Namachilus botia aureus</i>	Bhareli	Fish
<i>Punjagensis</i>	-	
<i>Puntius ticto</i>	Ticto	Fish
<i>Salmo trutta faric</i>	Maohes	Salmo trout
<i>Tor mosal</i>	Chitratu	Fish
<i>Torputitora</i>	Mahasheer	Fish

STATISTICS AT A GLANCE

Sr. No.		Area in ha.
1.	Total Geographical Area	66393.00
2.	Total Forest Area (RF/DPF/UPF)	33681.52
3.	Percentage of forests area to the total Geographical area.	50.73%
4.	Forest area by Legal Status	31681.52
a)	Reserved Forest	3176.2
	Percentage of RF area to the total	i) Forest area 9.43%
		ii) Geographical area 4.78 %
b)	Demarcated Protected Forest	10789.77
	Percentage of DPF area to the total	i) Forest area 32.03%
		ii) Geographical area 16.25 %
c)	Un-demarcated Protected Forest	19715.55
	Percentage of UPF area to the total	i) Forest area 58.53%
		ii) Geographical area 29.69 %
5.	Area by Working Circles	
a)	Deodar/Kail working Circle	i) Total area 12918.19
		ii) Percentage of Total Forest area 38.38%
b)	Fir/Spruce Working Circle	i) Total area 2017.27
		ii) Percentage of Total Forest area 5.98%
c)	Chil working Circle	i) Total area 520.80
		ii) Percentage of Total Forest area 1.54%
d)	Ban(Oak) Working Circle	i) Total area 232.4
		ii) Percentage of Total Forest area 0.69%
e)	Bio Sphere Conservation Working Circle	i) Total area 10621.66
		ii) Percentage of Total Forest area. 31.53%
f)	Plantation working Circle	i) Total area 7371.2
		ii) Percentage of Total forest area. 21.88 %

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CHAPTER – I THE TRACT DEALT WITH

1.1. Name and Situation

Theog Forest Division is situated to the South-East of Shimla District with its Head Quarter at Theog 30 Km. from Shimla on Shimla-Narkanda N.H.-22. Present Working Plan is the Revision of Working Plan for Theog Forest Division written by Dr. Lalit Mohan (1996-2011) and deals with all Reserved Forests (RFs), Demarcated Protected Forests (DPFs) and Un-demarcated Protected Forests (UPFs) of that Working Plan. In addition the area of Ratnari & Baghi Beat of Tikkar Range, Rohru Forest Division have been merged with the territory of this Division vide HP Govt. letter No. FFE-A (A) 1-3/98 dated 21.12.1999 and 6.4 ha of Shimla Forest Division have been added to UPF-134 Chehar in Kufri Beat of Theog Forest Division. However, it does not include those forests of Dr. Lalit Mohan's working plan which fall in the jurisdiction of Shimla Forest Division as these forests have been discussed and described separately under the Revised Working Plan of Shimla Forest Division. An area 1630.88 ha. transferred from Rohru Forest Division falls within the administrative boundaries of Civil Sub-Division Theog and 6.4 ha. transferred from Shimla Forest division falls in the administrative boundary of Civil Sub-Division Shimla Rural.

- 1.1.1. Boundaries:-**The area of the forests of this Working Plan lies between North Latitude $30^{\circ}-56'-55''$ and $31^{\circ}-17'-50''$ and East Longitude $77^{\circ}-16'-10''$ and $77^{\circ}-37'-30''$. Boundary of Theog Territorial Division is described herein below:

North and North-West	:- Shimla Forest Division.
South-West	:- Rajgarh Forest Division.
South-East	:- Rohru Forest Division.
East	:- Kotgarh Forest Division.
West	:- Chopal Forest Division.

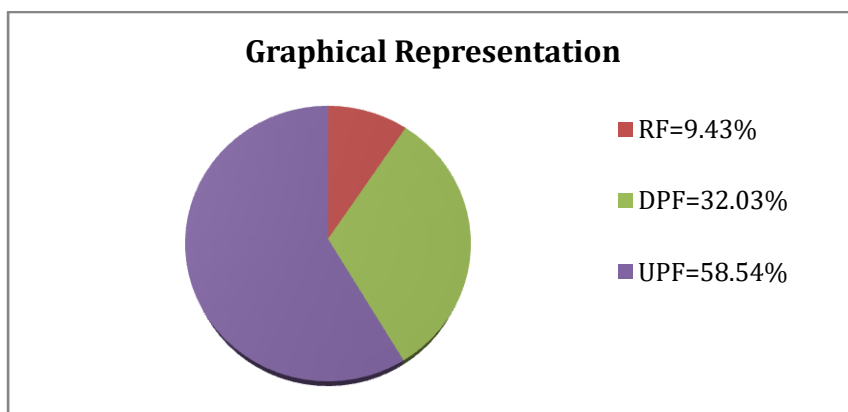
GPS co-ordinates at Division H.Q. Theog read as under:

North Latitude	$31^{\circ}07'591''$.
East Longitude	$77^{\circ}21'242''$.
Elevation (Height)	7143 feet (2197 m).

- 1.1.2** The total geographical and Forest area of this working plan is 66393.00 ha. (66.40sq.km) and Forest area is 33681.55 ha. is tabulated as under:- **table-1.1.**

Table-1.1
Geographical and Forest Area (ha.)

Geographical area		Reserved Forest			Demarcated Protected Forest			Undemarcated Protected Forest			Total forest area in (ha)
		Gross area	Including cultivation	Net Area	Gross area	Including cultivation	Net Area	Gross area	Including cultivation	Net Area	
Area as per previous Working Plan	64000.00	3183.6	7.4 ha	3176.20	11206.74	773.9	10432.84	18435.2	-	18435.2	32044.24
Area transferred from Rohru Ft. Divn.	2386.6	-	-	-	356.93 h	-	356.93	1273.95	-	1273.95	1630.88
Area transferred from Shimla Ft. Divn.	6.4	-	-	-	-	-	-	6.4	-	-	6.4
G. Total	66393.0	3183.6	7.4	3176.2 0	11563.67	773.9	10789.77	19715.55	-	19715.55	33681.52



1.2 Configuration of the Ground

The entire tract is mountainous. The slopes are moderate to steep and at place precipitous, particularly in the northern portion viz. Shalli Dhar and Southern Chambi Dhar.

1.3 Geology, Rock and Soil

1.3.1 Geology and Rock

The Theog Division is dominated by Shalli, Jaunsar, Shimla and Jatog groups of rocks apart from their development of Blaini Formation. Khirki formation under the oldest group of rock is better developed along the Western and Southern boundaries of Theog

Forest Division while Shalli group is exposed along Eastern & the North-Eastern part of the Division. Rest of the area is dominated by Theog group of rocks. The major rock formations are as follow:

1.3.1(a) **Khirki Formation**

It is the oldest, medium grade meta sedimentary sequences occupying the highest tectonic position in the area. It is better developed along the Eastern and Western boundaries of Shimla Division and well exposed in and around Theog particularly in the Balson & Kotkhai Ranges. Khirki formation is found along Chammbi and Dandi Dhar of Balson and Kotkhai Range. In Theog area, the quartzite and lime stone are dominant. Khirki formations and Manal formations are dominated by Shale, Phyllite, limestone, schist, gneiss and amphibolites are well exposed at Kalbog, Kotkhai, Mahasu and Chambi areas. A brief description of litho units is given below:

Age	Group	Formation	Lithology
Middle	Jutogh	Khirki Formation	Quartzite, amphibolites, subordinate schist locally carabonaceous
		Manal Formation	Quartzite, schistone at places carabonaceous dolomite band.

This type of formation forms micaceous clayey loam soils which are fertile and support dense Oak, fir, spruce and deodar forests are particularly DPF Drabala DPF Chadaha R-13 Chmbi Kubar, Baghi & Ratnari areas.

1.3.1(b) **Shimla Group**

This group is exposed along both the limbs of the North West to South East extending regional Shimla. The rocks of Shimla group are aranaceous in nature. The litho units are given below:

Age	Group	Formation	Lithology
Upper Proterozic	Shimla	Chhaosa	Shale, silt stone, quartzite greywacke.

A large area of Theog and Balson Range is covered by Shimla group of rocks. The lithology is dominated by lime stone. The Chhaosa formation is exposed at Cheog, Dharech and South of Malaun. It is also exposed on west, South-West and South of Ghund and west of Deha.

The soil from this rock is generally clayey to clayey loam and supports mainly Chil and Ban forests.

1.3.1(c) Jaunsar Group

This group is well exposed at Chhaila and Ghund near Deha. The Basal formation of Jaunsar group is characterized by shale, sand, quartzite, limestone.

1.3.1(d) Balaini Formation

It is exposed and extends to the North-Western direction. It comprises of bleached dark gray shale with dinucitite bands. The Balaini formation swerves outside the Southern boundary of Shimla division and again re-enters the divisional boundary SW of Deha. This type of rocks gives clayey loam soil and supports deodar, Kail and Oak forests.

1.3.2 Soil

“A forest soil is a living, dynamic, bio-logical unit, always undergoing change through forest vegetation and silvicultural treatment.” The description and the profile of the soil strata in this Working Plan is described and discussed as under:

1.3.2. (a) Parent rock and soil relationship:

Area is underlined by different rocks or geological deposits of different petro logical origin and show variation in physical and chemical properties of resulting soils, hydro logical features and forest growth. Nature of soil derived from particular kind of rock may differ markedly according to climatic conditions and length of weathering undergone.

1.3.2. (b) Siliceous, sedimentary and metamorphic rocks:

Sand stones, conglomerates and quartzites are found in the area of this Working Plan. They are good for pines.

1.3.2. (c) Calcareous, sedimentary and metamorphic rocks:

These rocks constitute limestone, dolomite, chalk, calciferous Shale, crystalline and lime stones. Soils are good for Broad leaves and grass lands.

1.3.3 Soil depth:

Soil depth is medium i.e. 30 to 90 cm deep in general and shallow in few places and deep in some pockets.

1.3.3. a Soil texture:

Soil is sandy loam to sandy clay loam.

1.3.3. b Soil profile:

Generally top of the soil consist of organic matter, beneath which there is decomposed leaf Litter. Beneath it, is eluviation zone consisting of horizon of mineral soil, sub soil eluviation which is compact, consists of the substances leached from eluviation zone. Below it, is parent rock of Siliceous, sedimentary, calcareous and metamorphic nature.

1.4 Climate & Rainfall

The climate varies a lot depending upon the altitude and aspects. It is mostly temperate in the higher elevations and sub-tropical at the lower ones. The places at higher elevation, especially the northern aspects are cooler than those situated at lower elevations. Generally snowfall occurs during winter months in area above 1800m elevation whereas along Giri and Sutlej catchment, the winter is comparatively moderate.

1.4.1 Summer

Summer season starts in April and lasts for three months till June. In the higher elevation the weather remains pleasant but in lower valleys along the river Giri, strong dusty winds blow. The maximum and minimum temperature remains between 40°C to 10°C. Sometimes the spell of drought prolongs and volume of water in streams, nallas, khads, which create problem of drinking water and also adversely the survival of plantations. The hailstorms are common during summer period.

1.4.2 Monsoon

The monsoon season begins from July and continues till middle or end of September but pre- monsoon showers are received in late June. During this season, the sky is overcast with clouds, the air is highly humid and the weather is foggy and misty. The relative humidity remains as high as 80%. Due to rains, the temperature also falls and remains around 22°C to 15°C. Main precipitation is due to monsoons and about 60% of the entire precipitation is received during these three months. This is the best period for the growth of plants because of optimum temperature and humidity.

1.4.3 Winter

The winters are long which begin from October and continues upto March. The weather remains cold and severe, especially at elevation

higher than 1800 meter. The precipitations in the form of snow are received in mid December to mid of March at higher elevations; lower elevations have rains during this period. The melting of snow begins by the end of March, depending upon the aspect and altitude. During winter the minimum temperature goes below to 0°C while the maximum temperature remains below 10°C .

1.4.4 Rainfall

Rainfall data (in mm) for the year 2008 to 2013 has been collected from Hydromet Division India Meteorological Department Shimla for different places as per table - 1.2 given below:

Table-1.2
Rainfall Data of Different Places (in mm)

YEAR	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
	R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F %DEP.	R/F DEP.
2008	92.9 33	44.5 -24	2.1 -97	39.5 -10	102.9 62	248.0 110	148.1 -46	284.2 34	243.7 117	12.9 -63	6.1 -51	12.7 -52
2009	14.8 -79	19.0 -67	39.0 -49	36.2 -18	42.0 -34	39.5 -67	127.3 -54	110.2 -48	270.3 141	7.8 -78	18.0 44	2.6 -90
2010	17.1 -76	87.7 50	9.3 -88	20.7 -53	49.8 -22	155.0 31	303.5 10	280.4 32	261.6 133	26.5 -24	8.3 -34	52.8 101
2011	31.1 -55	60.7 -14	35.6 -56	33.7 -30	73.4 13	143.4 37	150.8 -34	270.2 43	101.7 -10	3.4 -90	0.1 -99	9.1 -68
2012	107.4 55	33.3-53	21.8 -73	73.4 52	5.3 -92	42.8 -59	169.3 -25	272.8 44	102.3 -10	2.8 -91	2.4 -83	16.3 -42
2013	87.0 53	43.0-03	30.6 -13	83.6 62	15.8 -82	32.9 -79	179.3 -35	280.8 49	112.4 -16	12.9 -99	9.2 -73	26.5 -40

Source:- Meteorological Department Shimla.

1.5 Water Supply

The area generally depends for the water supply mainly from snow and rainfall. The catchment area of the Giri River and Kiartoo-Sainj-Gumma-Nauti Khad with its streams, nallas and springs forms the perennial source of water supply of Shimla town, the capital of H.P., in addition to meet the supply of the inhabitants of Theog & Kotkhai Tehsil with human population 1,20,290 and cattle population 77,461, as per census carried out during the year 2011.

1.5.1 The supply of drinking water in the catchment area of this division is satisfactory. There are many perennial sources springs, nallas, khads which meets the requirement of drinking water though gravity as well as lift water supply schemes.

1.5.2 Some of the major water supply schemes, meant for drinking water and irrigation purposes, are given in **table-1.3**.

Table-1.3
List of Major Water Supply Schemes

Sr. No.	Name and Type of Scheme	Source of Water
1	LWSS for village Palana Khaprol in G.P. Kiar.	Kiari Khad
2.	LWSS for village Galu Khurd, Galu Kalantac in Theog	Nallah
3.	LWSS for Village Halai Majholi in G.P. Sariun.	Kiartu Nallah
4.	LWSS for Theog town	Baloo, Chikkar Khad
5.	LWSS for Tikkar Alloo in G.P. Deurighat	Nallah
6.	GWSS Tiyali Manglooti in G.P. Tyali Gravity	Spring
7.	GWSS Cheora Katori in G.P. Cheog	Nallah
8.	GWSS Drawl Alotio in G.P. Nahal	Spring
9.	GWSS Brar Chunger G.P. Shillaroo	Nallah
10.	LWSS Kathori Mahrog	Nallah
11.	GWSS Kambal Banyan	Nallah
12.	GWSS Chilla Chadrain in G.P. Deothi	Nallah
13.	LWSS Koti in G.P. Koti	Shalot ka Nallah
14.	GWSS Kotkhai Town	Giri Khad Nehari
15.	GWSS Darbar II	Marathu Nallah
16.	GWSS Darbar I	Majhun
17.	GWSS Badharana	Pandli Nallah
18.	GWSS Kothai	Spring Source Pandli
19.	GWSS Pandli	Spring Source Pandli
20.	GWSS Kotla Karali	Kotla Nallah
21.	GWSS Pungrish Seog	Kotla Nallah
22.	GWSS Anai Chaithla	Kotla Jungle
23.	GWSS Kotla, Karali Harijan Basti	Jungle Katach
24.	LWSS Pandli	Katach Nallah
25.	GWSS Bhog Beder Chatri Dhar	Old Nallah
26.	GWSS Dharonk Beder	Jungle Katach
27.	GWSS Aung	Prem Nagar Khad
28.	GWSS Prem Nagar	Spring
29.	GWSS Lower Bag Domehar	Domehar Nallah
30.	GWSS Upper Domehar	Domehar Nallah
31.	GWSS Kotbarlot	Jalthar Nallah

32.	GWSS Kundli	Domehar Nallah
33.	GWSS Lok Nagar	Khanog
34.	GWSS Shawal Chamat	Sawal Nallah
35.	GWSS Majholi	Kalot Nallah
36.	GWSS Kalot Barlot Jalthar	Jalath Nallah
37.	GWSS Jalthar Majholi Kalot	Jalath Nallah
38.	GWSS Khanog	Jalath Nallah
39.	GWSS Jalath	Jalath Nallah
40.	GWSS Kalamu I & II	Jalath Nallah
41.	GWSS Chalnair	Giriganga
42.	GWSS Baga	Jalath Nallah
43.	GWSS Chailnair	Chailnair
44.	GWSS Kotjubbar	Tunna Nallah
45.	GWSS Kadavli	Kadavli Nallah
46.	GWSS Grey	Giriganga
47.	GWSS Greog	Pindia Nallah
48.	GWSS Shaun I	Pindia Nallah
49.	GWSS Toru Nallah to Gandua Kajurah	Mohali Nallah
50.	GWSS Shoshan Parsholi	Chajurath Nallah
51.	GWSS Joni	Spring Source Joni
52.	GWSS Joni Shoshan	Giriganga
53.	LWSS Jony Shoshan	Giriganga
54.	GWSS Salyana Charu Bag	Spring Source Barvi
55.	GWSS Parshan Jathavi	Dhalla Dhank
56.	GWSS Gazta Parshal Santari Mandroli Pattidhank	Jungle
57.	GWSS Mandroli	Dholla Dhank Nallah
58.	GWSS Dalsar	Dalsar Nallah Source
59.	LWSS Jashla Chaknoti Phase I	Jashla Nallah
60.	LWSS Jashla Chaknoti Phase II	Kangi Nallah
61.	LWSS Parali	Train Nallah/ Kharmini
62.	LWSS Giri Khad to Nehra ghati	Giri Khad
63.	WSS. PC. NC. Habitation in GP Baghar Kiari & Panog	Dhalli
64.	LWSS Tharola	Tahu Nallah
65.	GWSS Darkoti	Giri
66.	GWSS Halai Bhonta	Chandal
67.	GWSS H/Basti Tharola	Tahu Nallah
68.	LWSS Tehtoli Pujarli Ghalera	Kupar Nallah
69.	GWSS Kiari Kkudi Kharyana	Patti Dhank
70.	GWSS Dewandli Khuthandli	Tahu Nallah
71.	GWSS Lohath	Bihari Giri Source
72.	GWSS Roni Pujarli	Mandroli

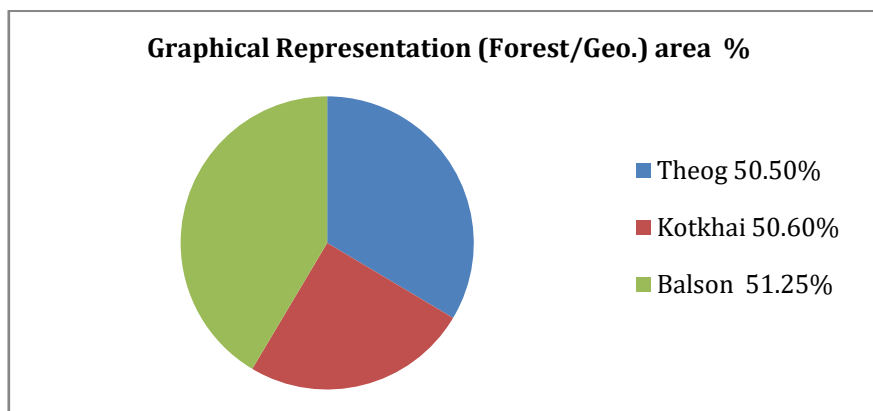
Source: Offices of Executive Engineers IPH Division No.1, Shimla and Jubbal Division.

1.6 Distribution of Area

The total geographical area and forest of Theog Forest Division, Range wise along with the types of forests (by legal classification) of this division, is given in **table-1.4**.

Table-1.4
Rangewise Summary of RF's, DPF's and UPF's (Ha.)

Forest Division	Range	Geographical area (Ha.)	RF (ha.)	DPF (Ha.)	UPF (Ha.)	Total Forest area (Ha.)
Theog	Theog	22367.00	551.60	3661.80	7087.40	11300.80
	Kotkhai	27603.00	2624.60	4566.57	6772.55	13963.72
	Balson	16423.00	-	2561.40	5855.60	8417.00
Total		66393.00	3176.20	10789.77	19715.55	33681.52



Source: Divisional receod.

1.6.1

Summary of changes occurred during last plan period

Due to administrative reasons, area of Ratnari and Baghi Beat of Rohru Forest Division was transferred to this division. Also, some area of Shimla Forest Division was merged with this division. Like-wise the forest area of Mahasu Block of Balson Range was transferred to Kotkhai Range within this division. The detail is summarized herein below:

Table- 1.5
Statement of Areas Tranferred (Ha)

Sr. No.	Division/Place from where forest area transferred	Particulars of Notification	Name of forest area	Extent in ha.	Remarks
1.	Rohru Forest Division	Vide HP Govt. notification No. FFE-A-(A) 1-3-98 pt. dated Shimla 171002, 21.12.1999.	Ratnari & Baghi Beat of Tikkar Range	1630.88 ha.	Detail of the forests have been reflected in the Appendix-I i.e. Divisional Area Statement.
2.	Shimla Forest Division	DFO Shimla endst. No. 10053-54 dated 13.02.2013.	Part of UPF-Chehhar	6.4	UPF-134 Chehar measuring 90.6 ha was already under Theog Forest Division and 6.4 ha transferred from Shimla Forest Division have been added to this Forest and now the area of UPF-134 Chehar is 97.0 ha.
3.	Mahasu Block of Balsaon Range to Kotkhai Range (within division)		Mahasu Block	1951.10	Transfer of Mahasu Block of Balson Range to Kotkhai Range with in Div.

Source: Divisional record

The area transferred to this division from other division or within division tabulated above has been incorporated in Appendix–I Divisional Area Statement Vol.-II page 1 to 20 of this Working Plan.

1.7 State of Boundary Pillars

State of boundary pillars, in general is critical. Although all the Reserved Forests and Demarcated Protected Forests are demarcated by boundary pillars. But maximum boundary pillars are either in deplorable condition or have been found missing or destroyed, especially where the boundaries of the forests adjoins to Malkiyati land. One such glaring example was noticed in R-4 Tir Mahasu C-I & C-II where all the boundary pillars adjoining to private land were found missing and seems to have been destroyed by the, local people. This issue needs to be tackled on priority and all the Forest Guards/ B.O's / R.O.'s are to make answerable to this said state of affairs. DFO should take immediate steps to locate all the missing boundary pillars with the help of survey sheet, boundary Pillar register and Beat manual. Previously the boundary pillars were constructed in loose stone masonry now these should be constructed/repared in R.R. masonry with cement mortor. DFO may ask for the budget accordingly in the annual plan of operations. GPS co-ordinates for each Boundary Pillar must be recorded and register to be maintained in each beat by the I/CBeat Forest Guard. This work should be taken on priorty to avoid the encroachments in forests.

1.7.1 The total forest area is 33681.52 ha. ,which includes RFs, DPFs, and out of this 19715.55 ha is Un-demarcated Protected Forests which forms

58.53% of total forest area of this division. These un-demarcated Protected Forests should be got demarcated and to be converted in the DPFs on priority and its entry is to be incorporated in the revenue record. Divisional Forest Officer may take up the matter with higher authority as well as with the revenue/Settlement Department to get the demarcation work done and make its corresponding entries in the revenue records. Efforts be made to convert these UPFs in to the DPFs on priority basis and after demarcation of these UPFs, steps to construct new boundary pillars is required to be taken. This is one of the essential and important tasks for better and efficient management of forests of this division and should be targeted to be achieved within the period of five years of this plan and avoid encroachments from these forests.

1.8 Legal Position

After the merger of all Princely states of Shimla Hills, Himachal Pradesh was created on 15th April 1948 and the ownership vested with Govt. of Himachal Pradesh of such lands which were covered with trees or were devoid of tree growth but not assessed for land revenue. Such forest areas required notifications under Chapter IV of IFA 1927 except for forests declared RF's & DPF's in the past.

Briefs of various notifications vide which reserve/protected forests have been created and other notifications which are relevant to this para are given herein under:

- 1.8.1(a)** Notification Dated Shimla - 4, the 25th February, 1952, No. Ft.29-241/BB/49. This notification was issued as per provisions under Chapter-IV under Section 29 of the Indian forest Act (XVI of 1927) as applied to H.P. wherein all Forest lands or waste lands in H.P. which are the property of Govt. or over which the Govt. have proprietary rights to be declared as Protected Forests as per section 1&2 of section 29 of IFA 1927.
- 1.8.1(b)** Notification Dated: Shimla - 4, the 25th February, 1952, No. Ft. 29-241/B/C 49. This notification was issued under Section 30 (a) of the Indian Forest Act (XVI of 1927) as applied to H.P. wherein all the trees were declared to be reserved in the protected forests which were notified Protected vide Notification No. Ft. 29-241-BB/49 dated the 25th February, 1952.

1.8.1.(c) Notification Dated Shimla-4, The 25th February, 1952.No. Ft. 43-241-A/49-3. This notification was issued under section 32 of the Indian Forest Act (XVI of 1927) wherein Rules were made to regulate the various matters for Protected Forests as applied to Himachal Pradesh, and these rules were made applicable to the areas such as old Kumarsain, Khaneti, Sangri, Darkoti, Theog, Ghund, Balson, Madhan, Keonthal, Koti, Ratesh and Bhajji States including the pepsu enclaves which were declared as protected forest by Himachal Pradesh Govt. vide Notification No. Ft. 29-241-BB/19 dated the 25th February, 1952.

1.8.1.(d) Notification Dated: Shimla - 4, the 25th February, 1952, No. Ft.43-241/E/ 49. This notification was issued under Section 30 (c) of the Indian Forest Act (XVI of 1927) as applied to H.P. wherein breaking up or clearing for cultivation for building, for herding cattle or for any other purpose was prohibited in protected forests by Himachal Pradesh Govt. vide Notification No. Ft. 29-241-BB/19 dated the 25th February, 1952.

All the notifications under section 29, 30 & 32 of IFA 1927 referred above have been given in Appendix-XIX, Vol.-II page No. 235 to 244 of this plan.

1.8.2 From the bare perusal of the briefs of these notifications referred above it reveals that these notifications are general in nature and not exhaustive and specific. In these notifications all the forest and waste land has been declared as Protected Forests. Whereas nature, name of forest/compartment and its extent in area does not mention in these notifications. Therefore, the notifications made under section 29, 30 & 32 needs to be modified after obtaining legal opinion of the Law Department. Thus all the Reserved Forests, Demarcated Protected Forests and Un-demarcated Protected Forests with their nature and extent of area are to be modified and notified under section 29 sub section 1&2 as per detail given in Appendix-I-Divisional Area Statement in Vol.-II page No. 1 to 20 and are further required to be published in Rajpatra. This requirement is being questioned in the Court of law during trial of various forest offences and the present notifications are not being specific the accused cannot be convicted and thus are let scot free. Thus the effort in putting the cases challan in the court of law becomes futile exercise.

1.8.3 The first forest settlement was done in 1890 by G.G Miniken, Deputy Conservator of Forests in Tara Devi Range which was under Patiala

State. At that time, the waste land was classified as 1st and 2nd class forests. In 1909, the revenue settlement was conducted and these 1st and 2nd class forests were declared as State property subject to the rights of the users. Mian Budhi Singh, IFS revised the forest settlement report and according to which the I and II class forests were declared as Reserved and Demarcated Protected Forests respectively. All other common waste lands were recorded as Shamlat Deh and the rule for management of those forests (third class forests) were also framed vide ljalas-i- khas on Home Minister Arazdasht No. 422 dated 17th October 1912 (Patiala forest rule). The Shamlat Deh lands have been transferred to the Govt. under HP Village common land (vesting and utilization) Act, 1974.

- 1.8.4** Kotkhai State was annexed by the British in 1928, at the instance of the then Rana, but he retained ownership of the forests and rights to the same vested with Kotkhai State upto 1947. The forests of Rantu, Saliana, Chambi Kuar, Kalala and Tomru were demarcated between 1879 and 1894 and were declared as reserved forests vide Punjab Govt. Notification No. 175 dated 15th April, 1985. Certain rights and concession were admitted in these forests, though reserved. The un-classed wastelands (later on classified as UPFs) remained the property of the Govt. but were not demarcated. This area was merged with Himachal Pradesh on 26th January, 1950.

1.9 Rights and Concessions

The erstwhile rulers of the State of Madhan, Koti, Keonthal, Theog Balson, Ratesh, Ghund, Kotkhai, Darkoti, Khaneti and Patiala (enclave) had granted some rights and concession to the villagers in the forests of their respective States. These rights were approved by Superintendent, Hill States, and Shimla and were recorded in the record of rights which are given state-wise in Appendix-V page 106 to 173. After merger of these states, the Govt. of H.P. vide its Notification No. Ft. 43-241-A/49-3 dated 25.02.1952, approved these rights and concessions as such for exercise in the forests declared as Protected Forests, subject to certain conditions, important among them are:

- i) The rights were restricted and it was decided that produce so obtained as right, cannot be bartered, sold, given as gift and also the right holder cannot disposed of it by other means.

- ii) Trees can be granted from DPFs in case, these are not available in UPFs.

1.9.1 In general, considering the whole tract, the forest areas have been classified into three broad categories viz. Reserved Forests, Demarcated Protected and Un-demarcated Protected Forests, and their status with regard to the exercise of rights is as follows:

1.9.2 Reserved Forests

These forests are the exclusive property of the Government and no rights are admitted except in the flowing cases:

- Kotkhai Range
- (a) Grazing, lopping and felling of timber for house construction/repair is allowed to right holders in R-16 Kalala.
 - (b) Grazing, grass cutting, lopping for fodder and fuel, felling of trees for house construction and repair allowed to right holders over half the area in R-12 Rantu and cutting of under wood for fuel over entire area.
 - (c) Same rights as Rantu RF-12 are admitted in R-14 Saliana, R-15 Tomru and R-13 Chambi- Kufar.

1.9.3 Demarcated Protected Forests.

In these forests, rights have been admitted for each forest according to the record of rights prepared at the time of ascertaining of rights under section 29 of the Indian Forest Act. In Keonthal State, these forests had been divided into first class protected forests (Mahfuzas) and second class protected forests (Mahdudas). Rights were admitted on a very limited scale in the “Mahfuza” forests while the “Mahduda” forests were open to all rights of user. The underlying object of constituting the “Mahfuza” forests appears to have been that these forests would ultimately be converted into Reserved Forests. Such first and second class protected forests existed in Patiala (enclave) also. In Madhan State, “Mahfuza” forests were free from all rights.

1.9.4 Un-demarcated Protected Forests

These forests were primarily meant to meet the requirements of right holders and, consequently, are heavily burdened with rights of all description. The boundaries of these forests are not fixed and the control

of the forest department in these forests has been lax. Because of liberal and even excessive exercise of rights, some of the forests are now practically treeless or bear scattered trees and needs to be rehabilitated through massive afforestation drive.

1.9.5 As elsewhere in the State, the rights and concessions admitted in the forest settlements are appended to the ownership of cultivable land and are recorded to the ownership in favour of the land holders. Detailed record of rights for each erstwhile state is given in the respective forest settlements and extracts of these are reproduced in the Appendix- V (e) page 106-173.

1.9.6 The nature of rights and concessions enjoyed by the villagers in the Reserved, Demarcated Forests and Un-demarcated Protected Forests are more or less same throughout the tract, though they differ in extent from village to village as detailed in the various settlement reports. In general the rights and concessions recorded in the various forest settlements are of the following type:

- a) Grazing of cattle
- b) Fodder for cattle
- c) Fuel wood for domestic use
- d) Dry fuel wood for cremation
- e) Timber to meet bonafide domestic or agricultural requirements
- f) Wood for making charcoal
- g) Collection of needles for bedding cattle
- h) Collection of honey, herbs and nirgal and
- i) Right of way to water sources etc.

1.9.7 It is evident from the forest settlement reports that it was the intention of the settlement officers that all rights should, as far as possible, be met with from the second class protected forests or the Un-demarcated protected forests and , only if the resources therein were insufficient, the rights were to be met with from the demarcated protected forests.

1.9.8 In first class forest the number of cattle permitted for grazing is generally fixed, and the area over which this right may be exercised is also specified. Grazing of browsers, that is camel, sheep and goat, not kept for agricultural requirements is prohibited. In case of second class forests, the right holders can graze all over the area of the forest by any number of cattle which are kept for agricultural requirements except browsers. The grazing of nomadic flocks is prohibited in first and second class forests. A fee according to schedule of rates of the forest

department is recovered when such flocks pass to other territories through or along.

1.9.9

As per various forest settlement reports, it is clear that the intention of the settlement officers was to admit the rights in UPFs only and if the resources were insufficient the rights were given in DPFs and also in some reserved forests. Because of geometric increase in the human population, the demand of forest produce has increased manifold. It is also observed that there was no proper control on exercise of rights in the past.

Further, as a result of the joint family system breaking up, the land holdings have been divided and consequently demand of timber has gone up. Due to these reasons, the UPFs are no longer in a position to satisfy the demands of right holders and the conditions of many of the DPFs and RFs are also deteriorating. The continuous exercise of rights has direct impact on the management of forests.

1.9.10

Timber

Right holders have right in the respective forest as per their rights recorded during settlement for construction and repair of their house till 2006. The trees of different species and different classes were being given on nominal rates ranging from Rs. 1 to 6 per tree. With the intervention of Hon'ble High Court this system of timber distribution to right holders was banned. Consequently at the instance of Hon'ble High Court the State of H.P. formulated a new policy vide its notification No. FFE-B-E (3)-43/2006 Volume-I dated 2nd January, 2010. Under this policy the entry of the right holders to the forest was prohibited and timber was proposed to be distributed in converted form. The quantity of timber for new house was fixed 3M³ after 30 years and for maintenance/repair 1 M³ after 15 years. The rates to be charged from right holders were fixed 30% of the rates at which timber is sold by HPSFDC Ltd. to general category and for BPL family, 10% of the rates at which timber is sold by HPSFDC Ltd. Grant of Timber to the right holders suffering from natural calamities was kept free of cost. Notification of the policy is appended as appendix-XIX (n) page 276-279. Recently the policy has been again revised vide notification No. FFE-B-E(3)-43/2006 Volume-II dated 26.12.2013. According to this policy for construction of new house un-converted tree (standing volume) upto 7M³ can be given once in 15 years. Whereas for repair of

old house the standing volume of timber up to 3 M³ once in five years can be given. As per this policy Rs. 500 per M³ for standing volume for Deodar and Rs. 250 per M³ of standing volume for other species have been fixed. Right holders suffering from natural calamities shall be given trees free of cost. Notification of the policy is appended as Appendix-XIX (n) page 276-279.

1.9.11 Grazing

The rights to graze domestic cattle have been admitted in UPFs, DPFs and also in some of the RF's of this Division. The cattle population has decreased to more than 50% as per figure tabulated in table 3.3 under Chapter-III page-68. Wherein the cattle population in the year 1993 was 1, 98,666 which have decreased to 77,461 during the year 2007 as per information gathered from District Animal Husbandry of Shimla. Thus the grazing pressure on the forests has been minimized to some extent. However, the migratory cattle are causing adverse impact on the condition of these forests.

1.9.12 Lopping

Though, the lopping is admitted to a limited extent only but in actual practice the people indulge in indiscriminate and heavy loppings of all species, especially Oak for fodder and fuel. The lopping is more prominent near the habitation. Due to heavy lopping, most of the Kail is fungus infected and rotten. The right of lopping the trees for fodder and litter has been admitted only in respect of Oak, Fir and Spruce. Heavy and continuous lopping of these species near the villages is resulting in the death of trees. It is necessary to prohibit the indiscriminate lopping of Ban Oak trees.

1.10 Forest Maps

The survey of all the RFs, DPFs and UPFs pertaining to this working plan, has been conducted by Survey of India and all these forests have been projected on the maps in the scale of 1:15000. As the demarcation of most of the UPFs has not been done, so the estimated area has been taken into account. Thus, there are chances that the area of these UPFs may change after their proper demarcation.

1.10.1

Stock maps of the forests have been prepared on 1:15,000 scale survey sheets. This will help in locating the forests in the field because the survey sheets have got all the details as compared to stock maps

prepared on tracing clothes. These stock maps are placed in the respective compartment History files.

- 1.10.2** The following maps given in table-1.6 are available which cover all forests of this working plan.

Table-1.6
List of Maps Prepared by Survey of India, Covering the Tract

S. No.	Survey Sheet No.	Scale	Year of Survey	Year of Publication
1	53E/8/1	1:15000	1972	1979
2	53E/8/2	1:15000	1972	1979
3	53E/8/3	1:15000	1971	1979
4	53E/8/3	1:15000	1972	1979
5	53E/8/4	1:15000	1972	1979
6	53E/8/5	1:15000	1972	1979
7	53E/8/6	1:15000	1972	1979
8	53F/5/4	1:15000	1972	1979
9	53F/8/6	1:15000	1972	1979
10	53E/8/NE	1:15000	1985-87	1990
11	53E/12/NW	1:15000	1985-87	1994
12	53E/12/2 & 53E/12/5	1:15000	1972	1979
13	53E/12/3	1:15000	1971	1979

1.10.3 Digitalization of Maps

The digitalizations of Maps of the Division have been completed through the IT wing of Forest Department.

1.11 Compartment History Files

The compartment history files of each compartment of forest have been written as per present field condition of the forests.

- 1.11.1** The important thing to be done is that the detail of work done in a particular forest should immediately be incorporated in the compartment history files of the respective forests in the Ranges and thereafter Divisional copy should be completed in a time bound manne

CHAPTER-II - A

FLORA AND FAUNA

A FOREST FLORA

2A.1 INTRODUCTION

The hills are usually devoid of these species in lower portion Chil up to elevation 2000mts in western slopes . Where elevation 1200mts to 2100mts some pure ban oak forests on northern slopes. middle elevations are occupied mainly by Deodar and Kail while at higher elevation from 2500mts to 3000mts Spruce and silver Firs are predominant conifers species . In higher elevation up to 3600mts Kharsu oak is also found scattered as well as in patches. Some birch mixed with Kharsu oak and Rododendron (brass) is also found in the upper limits. Trees are gradually being replced by scubby growth of evergreen speices.

2A.2 **General Discription of the Growing Stock.**

The composition and condition of the crop varies due to variation in controlling factors such as altitude, aspect, climate, geological formation etc. which gives rise to various forest types. The forests, throughout the tract are both coniferous and broad-leaved which can be grouped into Western Himalayan subtropical Chir pine forests and Western Himalayan Temprate types. The forests which are inaccessible and away from the habitation are densely stocked as are found in parts of Kotkhai Range, Kalala Block, Kotkhai Block and part of Balson Range & Theog Range (Cheog Block); whereas the forest on Eastern aspects on precipitous slopes, rocky portion have stunted growth and with very thin density. According to Champion and Seth classification of the Indian Forest type, the forests of the tract may be broadly classified into following types, **(Table-2A.2).**

TABLE - 2A.2
FOREST TYPES AND SUB TYPES IN THE TRACT

Major Groups	Group	Type of Forest	Sub Type	Remarks
Montane Sub-Tropical Forests	9-Sub- Tropical Pine Forests.	9/CI Himalayan Sub-Tropical Pine Forests.	9/CI b - upper or Himalayan Chirpine Forest.	This sub type occurs between 1200m to 1800m sometimes ascending upto 2300m on Southern aspect.
Himalayan Moist Temperate Forest	Group: 12	12/CI Lower western Himalayan Temperate Forest.	Sub type 12/CI a -Ban Oak (Q Leucotrichophora) Forests.	Usually it is found from 1800m to 2300m but descends down to 1100m in vally on Northern aspect.
			12/C1b- Mohru Oak (Q. dilatata) Forests.	It occurs in the altitudinal zone 2000m to 2500m.
			12/C1c-Moist deodar Forests.	Its altitudinal zone varies from 1200m to 3000m but most commonly it is found 1800m to 2500m.
			12/Cid-Western mixed coniferous Forests.	It occurs in the altitudinal zone of about 2400m to 3000m or more.
			12/C1e-Moist temperate deciduous Forest.	This sub type occurs from 1800m to 2850 m.
			12/C1f- Low level blue pine forests.	This occurs in Ban Oak, Mohru Oak and mixed coniferous zone
		12/C2 Upper West Himalayan Temperate forests.	Sub type: 12/C2a-Kharshu Oak. 12/C2b- West Himalayan	This occurs between altitude 2500m to 3160m. This occurs on higher ranges between 2600m to 3160m.
			12/DS2 Himalayan temperate parkland.	
			12/EI Cypress (Cupressus torulosa) Forests.	
			12/2s I Low level blue Pine (Pinus wallichiana) Forests.	

2A.2.1 9/C Ib HIMALAYAN CHIL (Chirpine) FOREST

Chil (*Pinus roxburghii*) forests are found at the elevation ranging from 1000 m. to 2000m. These are extended upto ban oak zone in the higher zone and overlap with tropical dry deciduous forests at lower altitudes

covering an area of about 550 ha. The Chil forests are found mainly in Dharech, Tiyaali, Dharmapur & Sarog (Theog Range).

In general, the Chil forests are pure except in depressions and nallas where Chil is mixed with or replaced by broad leaved species. The top canopy is of Chil and its associates. Occupying the understory in depressions and Nallas are *Quercus leucotrichophora*, *Rhododendron arboretum* and *Pyrus pashia*. Chil is also mixed with *Pinus wallichiana* and *Cedrus deodar* along the upper fringe where it occupies the exposed spurs. Shrub growth under the Chil forest is either absent or sparse and is comprised of *Berberis aristata*, *Princepia utilis*, *Rubus paniculatus*, *Woodfordia fruticosa* and *Xanthoxylum alatum* etc. The ground cover is either thin or absent at many places due to biotic.

The Chil forests get burnt frequently because these are highly susceptible to fire. The fire is either due to negligence or deliberate attempts made by villagers to get more production of grass. This results in poor density of stocking and absence of regeneration has come up well e.g. DPF Khaneor. The forests are generally pole to middle aged and under stocked. The density varies from 0.3 to 0.5 whereas quality varies from III to II.

2A.2.2 12/C1a BAN OAK (*Quercus leucotrichophora*) FOREST

Quercus leucotrichophora is a climate climax, occupying the lowest portion of the temperate belt and occurring above the *Pinus roxburghii* belt and from 1500 m to 2300 m. altitude. Such type of forests covers about 300 ha. area. The ban oak forests in the tract area found around Kharapatthar, Khaneti, Tharu, Nagrela, Halaila, Balson, Shilli mehla, Kotkhai, Balson & Theog Range. Ban forests in this division are in good condition but suitable to lopping near habitation. The crop varies in age from young coppice to mature trees. *Rhododendron arboreum*, *Pieris ovalifolia*, *Pyrus Pashia*, *Cornus capidata* and *Myrica nagi* are some of the common associates of ban. However, the undergrowth is dense comprising of *Berberis lyceum*, *Myrsine africana*, *Rubus niveus*, *Baenninghausenia albiflora*, *Indigofera* sp. *Gerardiana*, *Lonicera quinquelocularis*, *Daphne cannabina*, *Desmodium tilliaefolium*,

Viburnum cotonifolium etc. The common climbers are *Hedera helix*, *Smilax parvifolia* and *Vitis himalayan*.

2A.2.3 12/CIb MOHRU OAK (*Quercus dilatata*) FOREST

In these forests the elevation ranges from 2500 m to 3000 m. The Mohru oak is found pure but sometimes mixed with Kail which is generally confined to spurs and warmer aspects. In the lower zone oak is mixed whereas in the upper zone kharsu oak and fir are found mixed with Mohru. Mohru oak in the pure form is found near Gajta (near Kharapather) and Garaog. Patches of Mohru oak mixed with other species are found in R-13 Chambi Kupar, Mahasu & Balson areas.

The common associates of Mohru (*Quercus dilatata*) are *Quercus leucotrichophora*, *Q. semicarpifolia*, *Abies pindrow*, *Picea smithiana*, *Rhododendron arboretum* and *Taxus baccatta*. The undergrowth is not very dense. It consists of *Viburnum cotinifolium*, *Sarcococca saligna*, *Daphne cannabina*, *Desmodium tiliaefolium* etc. Mohru forests, away from habitation are well stocked whereas the trees are heavily lopped for fuel and fire wood near habitation.

2A.2.4 12/CIc MOIST DEODAR (*Cedrus deodara*) FOREST

This sub type covers an area of about 12000 ha. The elevation varies from 1500m to 2600m. Deodar forms almost pure and large compact blocks particularly near Kufri, Cheog, Kalala, Ratnari, Baghi, Deha, R-13 Chambi Kupar, Ghorna, Mahasu, and Gadhakuphar. *Pinus wallichiana* and *Pinus roxburghii* occurs on exposed sites and spurs towards the lower limit of deodar zone whereas oak and spruce are found in the upper fringe. The understory is almost absent except in valleys and depressions where it consists of *Quercus leucotrichophora*, *Quercus dilatata*, *Rhododendron arboretum*, *Cornus capidata*, *Aesculus indica*, *Prunus cornuta*, *Juglans regia* etc. The shrub growth is sparse and comprised of *Berberis lyceum*, *Prunella utilis*, *Sarcococca saligna*, *Desmodium tiliaefolium*, *Myrsine africana*, *Indigofera gerardiana*, *Salvia glutinosa*, *Lonicera angustifolia*, *Viburnum nervosum*, *Daphne cannabina*, *Skimmia laureola* etc. The ground cover

is mainly, composed of *Viola Serpens*, *Fragaria indica*, *Alnslea aptara*, ferns and grasses etc. The main climbers are *Hedera helix*, *Vitis parvifolia*, *Clematis montana* and *Rosa moschata*. Though, the upper story is almost pure of *Cedrus deodar* in some forest of Kotkhai Range it is mixed with *Pinus wallichiana* which is dominating.

The forests which are away from habitation are generally well stocked whereas the trees are lopped near habitation. The age class varies from young to middle age with scattered to mature or over mature trees. The reason for less availability of higher class deodar tree is the heavy demand of these trees by right holders. Though, these forests do not suffer much because of biotic interference but heavy lopping is noticed in Reserved Forests, the grazing is heavy which interfere in natural regeneration. The deodar is of site quality I/II, but the growth is faster in Giri Catchment as compared to the Sutlej Catchment.

2A.2.5 12/CId WESTERN MIXED CONIFEROUS FOREST

This sub type covers an area of about 5000 ha. between the elevations 2100m to 3100m. which extend even higher, where *Abies pindrow* is scattered amongst *Quercus semicarpifolia*. *Picea Smithiana* is the main species occupying most of the area whereas *Abies pindrow* is confined to the upper fringe and mixed with broad leaved species in Nalas. *Cedrus deodar* and *Pinus wallichiana* in mixture with *Picea smithiana* are available along the lower fringe. The broad leaved associates are *Quercus dilatata* *Q. semicarpifolia*, *Acer spp.*, *Juglans regia*, *Morus serrata*, *Corylus colurna*, *Aesculus indica*; *Prunus spp.* Etc. *Taxus baccata* forms the understory. The undergrowth consists of *Viburnum nervosum*, *Desmodium tilliaefolium*, *Lonicera angustifolia*, *Arundianaria falcate* and *Strobilanthes spp.* Etc. The ground cover mainly consists of *Skimmia laurceola*, *Geranium wallichianum*, *Viola Serpens*, *Fragaria viscose*, *Rubus niveus*, ferns and grasses. There are few species of ground orchids and Climbers which are rare and are *Hedera nepalensis*, *Vitis spp.* and *Jasminum officinalis*.

Forests of this type are found in parts of Chambi- Kuppar RF, near Baghal, Chaknoti, Kharapathar, Mahasu, and Kalala. The trees are

generally mature and most of the large sized trees were felled in the past for packing cases, thereby reducing the density of these forests. However, since 1990, there is complete ban for felling of fir/spruce trees for packing cases. This will improve the condition of these forests. In some of the forests, there are grazing grounds where nomadic gujjars graze their buffaloes in summer; Natural regeneration is not satisfactory because of heavy felling and grazing.

2A.2.6 12/C1e MOIST TEMPERATE DECIDUOUS FOREST

This type occurs on gentle moist slopes, damp depressions and along nallas between 1800m to 2750m. The common species are *Aesculus indica*, *corylus colirna*, *Acer caesium*, *Juglans regia*, *Prunus cornata*, *Abies pindrow*, *Picea smithiana*, *Lyonia ovalifolia*, *Cornus* spp. *Rhododendron arboretum*. The conifers are confined to spurs and better drained sites. Shrub growth is light and generally consists of *Viburnum foetens*, *Rubus niveus*, *Spiraea sorbifolia*, *Berberis chitria*, *Sarcococca saligna*, *Strobilanthes atropurpureus*, *Jasminum humile* etc.

These forests are available in Chambi – Kuppar, tomru Reserve Forests and Gahan Jarahi DPF of Kotkhai Range. In general, the forests are good except at places where lopping has been done by the “Gujjars” for fuel and fodder. Soil is good. So, the natural regeneration of broad leaved species is fairly good. The regeneration of *Abies pindrow* and *picea smithiana* is coming up at the places where the soil is exposed due to grazing. This type covers approximately 1000 ha area.

2A.2.7 12/C-2a KHARSU OAK (*Quercus semicarpifolia*) FOREST

Kharsu oak occurs between 2750m and 3160m. altitude and covers approximately 200 ha. It is found especially along the warmer aspects of the higher ridges such as Chambidhar, particularly from Baghal Tibba to Kharapather. The crop is mostly dense. Few trees of *Abies pindrow* and *Picea smithiana* are also mixed and scattered with Kharsu. The other associates are *Rhododendron* spp., *Acer caesium*, *Prunus* spp., *Ilex dyprena*, and *Taxus baccata* etc. The shrub growth consists of *Viburnum* spp., *Sarcococca saligna*, *Salix vaginata*, *Skimmia laurcola* etc. The

common herbs are *wallichianum* etc. The understory is almost absent except the dwarf bamboo which is found in cooler places. These forests are suffering because of lopping and grazing. The extents of damages are more in the forest which are near the habitation. The low seed production and constant grazing are the reasons of failure of natural regeneration.

2A.2.8 12/C2b WEST HIMALAYAN UPPER OAK/FIR FOREST

This type occurs approximately between 2500m and 3000m. altitude along the higher ridges of Chambidhar in Balsan and Kotkhai Ranges and covers approximate area of 1800 ha.. *Abies pindrow* is found singly or in groups and strips with an admixture of *Picea smithiana*, *Quercus semicarpifolia* and other broad leaved spices. In the lower portion, *Abies pindrow* is mixed with *Pinus wallichiana*. The broad leaved associates are *Quercus semicarpifolia*, *Q. dilatata*, *Acer* spp., *Corylus colurna* and *Aesculus indica* etc. The undergrowth is comprised of *Rhododendron companulatum*, *Salix elegans*, *Sikmmia laureola*, *Rumex nepalensis*, *Lonicera angustifolia*, ferns and grasses.

The trees are mostly mature and form fairy dense canopy with few exception where the forests are subject to grazing and lopping by nomadic gujjars. Natural regeneration of broad leaved spices is deficient.

2A.2.9 12/DS2 HIMALAYAN TEMPERATE-PARKLAND-PASTURE LAND

This type consists mostly of blank pastures with scattered and stunted trees of broad leaved and coniferous spices which exist in small extent on the Southern and Western slopes. It occurs over high ridges of the tract at the elevation of 2200m to 2600m, like, Chambidhar, Shalidhar, Biruki dhar, Manudhar, Kolidhar. During rainy season, there is a thick herbaceous growth including grasses, with scattered bushes and shrubs. This type is a degradation stage of the Himalayan moist temperate forests. (12/C Id) due to cumulative effect of grazing, fire and winds. It covers an area of 1600 ha. approximately.

Due to continuous grazing in these blanks during summer, the area is extending gradually occupying the place in the adjoining well stocked

forests. These areas are now no more suitable for regeneration of tree species because of heavy biotic interference

2A2.10 12/EI CUPRESS (*Cupressus torulosa*) FOREST

Cypress is found almost pure on very steep and precipitous lime stone rocks along the northern aspect of Shalidhar and Vagtikkar dhar. It covers an area of about 250 ha. and form an edaphic climax. It is mixed with *Picea smithiana* on higher elevations whereas at lower elevations, it is mixed with *Abies pindrow*, *Pinus wallichiana* and *Cedrus deodara*. The broad leaved associates are *Quercus dilatata*, *Aesculus indica*, *Acer pictum*, *Prunus pedus*, *Cedrella serrata* which are found in depressions and nallas.

As this type is found on steep and inaccessible areas, hence, these cannot be exploited. Though, the forests do not have economic value but are important from soil conservation point of view. Natural regeneration is generally satisfactory.

2A.2.11 12/2SI LOW LEVEL BLUE PINE (*Pinus wallichiana*) FOREST

This type occurs between 1500m to 2500m covering an area of about 5000 ha.; which is characterized by almost pure Kail crop which forms secondary serial type. The quality is mostly II/III. It is also found scattered in higher zones of *Quercus leucotrichophora*, *Quercus dilatata* and mixed conifers. This type owes its occurrence to the destruction of the pre-existing climax forests by natural and biotic forces. It is found extensively between Theog and Matiana, around Kotkhai and in part of Balson and Theog Range as well. Though, the forests occur mostly pure but mixed with *Cedrus deodar* and *Quercus leucotrichophora* at lower altitude and *Quercus dilatata* and *Picea Smithiana* at higher altitude. The broad leaved associates which are found in depressions and nallas are *Quercus leucotrichophora*, *Q. dilatata*, *Pieris ovalifolia*, *Rhododendron arboretum*, *Aesculus indica*, *Juglans regia* etc. The undergrowth consists of *Berberis* spp., *Myrsine africana*, *Lonicera* spp., *Indigofera* spp., *Viburnum* spp. etc.

The trees of different age classes varying from young to mature are present. Natural regeneration particularly on exposed and open sites exists in profuse. In many of the deodar forests mixed with Kail, particularly in Kotkhai and Balson ranges, the regeneration of Kail is good and these forests of deodar are being replaced by Kail. This may be because of large scale felling of deodar trees to right holders in the past.

2A.3 Status of Natural Regeneration

In case of Kail natural regeneration is in abundance and resultantly it has invaded the crop of Deodar as well as Oak Working Circles. But the natural regeneration in Rai/Fir Working Circle is completely lacking. Therefore to regenerate the Rai/Fir Forests where natural regeneration is not coming up, artificial regeneration is required to be carried out. This work was not done and consequently various unwanted weeds invading the area. These areas are to be regenerated by artificial planting of tall plants raised in polythene containers. Such areas are to be planted with suitable species either through patch sowing or by artificial planting raised in containers such as polyphone bags. The areas where natural regeneration has been found inadequate have been described in detail under Plantation/Overlapping Working Circle.

2A.4 Injuries to which crop is liable

The important agencies causing damage to the forests are given below:

2A.4.1 Fire

Fire occupies a prominent role among the causes of injury to Chil forests and even to the Ban and Deodar forests in the tract. Forest fires commonly depends upon the spell of draught, prevailing temperatures, wind conditions, the type of forest and the amount of grass, fallen wood and other inflammable material present on the forest floor. There are two distinct fire seasons the pre monsoon (April to Commencement of Monsoons) and the post monsoon (October to the Commencement of winter rains). Of the two, the former is more important and the more damaging fires occur during this period. The deodar forests mixed with kail are subjected to fire more as compared to pure deodar forests.

Broadly speaking, almost all the forest fires are caused by man either accidentally, negligently or deliberately. To get the flush of tender grass, the local people burn the grass of Ghasnis and the fire usually spread over to the adjoining forests. It causes damage to the regeneration, sapling and even to the trees. It is reported that fire in 1921 and 1970 caused widespread damages. Fire also causes the replacement of higher forest types by lower ones and also encourages the spreading of *Lantana camera*. The forests around Deha in Balson Range are especially susceptible to fire. The following **table-2A4.1** shows the extent of areas burnt during the period 1996-97 to 2012-13.

T A B L E – 2A 4.1
Statement of Areas Burnt

Year	Number of Fires	Area burnt (in ha.)
1996-97	2	60.0 ha.
1997-98	1	10.0 ha.
1998-99	3	58.0 ha.
1999-2000	5	31.0 ha.
2000-01	4	55.0 ha.
2001-02	-	-
2002-03	1	25 ha.
2003-04	4	27.0 ha.
2004-05	5	11.0 ha.
2005-06	-	-
2006-07	-	-
2007-08	1	5.0 ha.
2008-09	2	20.5 ha.
2009-10	18	89.0 ha.
2010-11	5	9.5 ha.
2011-12	3	85.0 ha.
2012-13	8	17.0 ha
Total	62	426.5

(Source:-Divisional Record)

2A.4.2 Encroachment on Forest Land:- There is heavy pressure on forest land, which is being encroached upon by local residents. A detail of encroachment where more than 10 bigha's forest land was encroached and FIRs were lodged on the direction of Hon'ble High Court in the court of JMIC Theog, is given as under:

T A B L E – 2A4.2**Detils of Encroachment**

Sr. No.	Name of Range	No. of cases	Area in ha.
1.	Kotkhai	102	121-99-34 ha
2.	Balson	32	37-2-57 ha
Total		131	159-19-91 ha

(Source: - Divisional Record)

Fifteen cases of encroachment which were challaned in the court of Collector-cum-DFO/ACF are given as under?

T A B L E – 2A.4.3

Encroachment cases in the court of DFO-cum-Collector	No. of cases	Area
	15	1.45.88 ha

(Source: - Divisional Record)**2A.3.3 Illicit Felling**

The detail of illicit felling which was detected during the previous plan period is given in table 2A4.4 below:

TABLE – 2A4.4

Year	Deodar	Volume in (M3)	Kail	Vol.	Chil	Vol.	Rai	Vol.	B.L.	Vol.
1996-97	-	-	10	13.649	18	7.962	-	-	-	-
1997-98	19	40.11	16	35.23	-	-	-	-	-	-
1998-99	20	13.77	2	1.984	-	-	-	-	-	-
1999-2k	21	41.268	23	39.94	2	0.61	-	-	-	-
2000-01	25	45.97	26	41.17	-	-	-	-	-	-
2001-02	11	14.56	14	37.84	-	-	-	-	-	-
2002-03	26	52.79	12	26.94	-	-	-	-	-	-
2003-04	30	40.95	10	20.39	-	-	13	10.32	29	11.21
2004-05	10	16.41	23	14.28	1	0.308	-	-	-	-
2005-06	8	14.92	9	5.85	-	-	9	5.07	-	-
2006-07	30	31.99	49	51.73	-	-	-	-	-	-

2007-08	23	38.93	3	4.21	1	0.308	-	-	-	-
2008-09	8	9.51	2	1.984	-	-	1	0.365	-	-
2009-10	39	61.92	4	3.09	-	-	-	-	-	-
2010-11	235	422.15	60	64.30	-	-	-	-	3	0.731
2011-12	4	2.10	10	4.35	-	-	-	-	-	-
2012-13	21	42.34	2	3.95	-	-	-	-	-	-
Total	530	889.68	275	370.87	22	9.17	23	15.75	32	11.94

Source: - Divisional Record.

2A.4.4 Grazing

People of the tract possess a number of cattle, sheep and goats. Majority of the cattle are being fed through stall feeding. Thus the pressure of grazing has been reduced to some extent. However over grazing can be seen frequently nearby habitations. The pressure of grazing is more in UPF's & DPF's because of encroachments are on rampant. The impact of the grazing is more nearby habitations and has added to the denudation and soil erosion by the graziers and Gaddies who graze their cattle, Goat, Sheep as per permits being issued to them as a matter of right traditionally. Thus, grazing by gujjars and Gaddies needs to be controlled.

2A.4.5 Lopping

The local people carry out lopping of the trees for fodder, fuel and to procure manure by cattle. The leaves of ban oak are used as fodder whereas its branches/twigs are used as fuel wood. Kail trees are also lopped for getting needles for spreading under their cattle to procure manure and because of this, Kail trees are infected with fungus. Moreover, even the deodar trees are also lopped for fuel wood purpose.

2A.4.6 Grass cutting

Though, this practice is beneficial but the damage is caused by inadvertent cutting of seedling during grass cutting operation.

2A.4.7 Quarrying

The quarrying for building stones and slates for roofing is also done which causes damage to hill side and forest growth especially in UPFs.

2A.4.8 Cultivation and Road Construction

The forest areas at lower elevations and near habitations are interspersed and even honeycombed with cultivations which is being carried on even moderately steep slopes. It causes formation of gullies and slips in the forest area and thus results in soil erosion. The Road construction activity also causes considerable damage to the plantations and tree growth as the debris is generally dumped down the hill. Further, the road cutting causes more surface run off leading to soil erosion.

2A.4.9 Animals and birds

The damage caused by these agencies is not of much importance. However, monkey and langures (Baboons) pull up young seedlings to eat the roots. The porcupines also nibble the roots of the young plants. Pheasants eat seed sown in nurseries and plantation areas. Black bear peels off the bark of deodar and Kail to suck the sap of trees.

2A.4.10 Insects

The insects also do damage by eating up the seed, cutting of the roots of the young seedlings, defoliation of the trees and the saplings, infesting the bark of the trees and injuring the roots and the tender branches through which the fungi and other parasites enter. The defoliator *Ectropis deodarae* attacks on deodar and causes damages particularly in Kalala forest. Cock chafer grubs and wire worms damage roots of young seedlings in nurseries. Dead, dying and felled trees of Chil are attacked by the pinhole or shot hole borer (*Platypus biformis*) causing damage to the timber.

2A.4.11 Fungi

The attack of fungus is more frequent through the openings caused due to heavy and indiscriminate lopping. The most damaging fungus of the Kail is *Trametes pini* which causes heart rot. The lopping carried out during July/August is more damaging because the infection spreads during these months. Thus, the lopping that too silviculturally should be restricted to winter or spring seasons only. The fungus infection is very

common in the Kail forest of Kotkhai and Balson ranges where the intensity of the lopping is high. In badly drained sites, deodar saplings are killed by the deodar root fungus called *Fomes annosus*. The leading shoot of the deodar is attacked by mother fungus called *Peridermium cedri* which causes “Witches brooms” and thereby killing the trees. Other fungi are not of much consequence except for *Trametes pini*.

2A.4.12 Climbers

Hedera helix, *Vitis semicordata* and *Rosa moschata* are some common climbers found in the forests of the tract. These climbers suppress young plants and retard the growth of the trees. Climber cutting is to be done during the period of this Working Plan.

CHAPTER -II B

FOREST FAUNA

B. FOREST FAUNA

2B.1 General Description

A wide range in altitude with varied tropical to temperate flora offers diverse type of wild animals and birds capable of thriving under different climatic conditions ranging from tropical to arctic climate and from densely wooded area to sparse tree growth. The undisturbed forest in the past gave safe harborage to wild creatures and provided guarantee of their survival. With the advancement of civilization, there are hardly few forests left free from intrusion by man. This has a disastrous effect on the wild life. The increase in human population and breaking of forest land for agriculture has also reduced the domain available to the wild life. The spruce, fir and Kharsu forest were full of musk deer, serrow, panther, tragopan and Monal. The lower areas were rich in black bear, goral, wild boar, barking deer, koklash, kalij, chakor, partridge and red jungle fowl. Their number has reduced to alarming low level with the passage of time. The important wild life species are described below:

(a) MAMMALS

2B.1.1. Leopard or Panther (*Panthera pardus*)

It is also known as Bragh locally. It is found upto an elevation of 2,500 m and resides in isolated rocky hills. It is bolder than tiger and its fulvous coat is marked with dark spots grouped in rosettes. The tail is also more or less ringed. Average male is more 2m long weighing about 57 kg. Panther breeds all the year round and in one litter 2 to 4 cubs are born every year. It generally remains in the neighborhood of villagers, carrying off sheep, goat, calf and dogs etc. at nights. It seldom attacks human beings without provocation. It has been ruthlessly killed for its ornamental skin and also for the safety of the goats and sheep in the forest. Although it has been declared protected animal, it is subjected to heavy onslaught.

2B.1.2 The Himalayan Black Bear (*Selenarctos thibetanus*)

Commonly known as Kala Bhalu is a big animal found in high hills between 1,500 to 3,000 m and lives solitary in the caves deep in the forests except during mating seasons. The body is covered with thick coat of black hairs with V shaped mark on the chest. The males may measure slightly over two meters in length and weight upto 200 kg. Females are a little smaller and lighter. Bears hibernate during winter. It descends down to lower elevations after snow fall. Though it prefers oak stands, it inhabits coniferous forests also. Being omnivorous it lives on variety of food such as wild fruits, berries, honey insects, rodents, even birds and small mammals. During monsoon these animals come down to maize fields and do considerable harm. During spring and early summer black bears damage the saplings and poles of deodar and Kail by peeling off the bark to lick the sap or resin exudes. It is very furious when provoked. Females are more dangerous than males. It is killed by poachers for its skin, gall bladder and fat.

2B.1.3 Himalayan Pine Martin (*Martis flavigula*) Vern Gott Kru

It is commonly found in ban oak, Chil or even open Kail and deodar forests between 1,200 to 2,500m elevations. It is of larger size than domestic cat with long tail. The colour is deep brown black with yellow at the throat. The predator thrives on birds and their eggs, mice, squirrels, rodents and small mammals like young ones of the deer and goat antelope family chasing them over to long distances. It is hunted for the fur. It has been declared as a vermin.

2B.1.4 Porcupine (*Hystrix Indica*)

Locally known as Seh, Sehl or sail. It is robust, heavy and terrestrial. It is found in the tract upto an elevation of 2500 m. The whole of its back is covered with long and well developed quills which may be nearly 60 to 70 cm long. It feeds on vegetables, principally on roots and damages the young plants in nurseries and plantations, especially of walnut, Chil, deodar etc. The animal is found of gnawing bones and when alarmed it

utters a gruntling sound, erects its spines and inflicts injuries. It weighs about 10 to 15 kg. and is locally very much valued for its meat.

2B.1.5 The Large Red Flying Squirrels (*Petarurista albiventer*)

It is a nocturnal animal found upto 1,500 m heights and becomes active after sunset. It files from tree to tree eating fruits and also insects hiding under the bark. The acorns of all the oaks are eaten by this animal. During autumn, the fruits of Walnut, hazelnut, horse chestnut and maple are also eaten. The damage done to forest is compensated as it eats injurious insects.

2B.1.6 The Goral (*Nemorhaedus goral*)

It is stocky goat like animal, smaller than domestic goat with stout limbs and coarse hair. It is found from 1,000 to 3,000 m elevations. Gorals are found in groups with off springs of different ages feeding on rugged grassy glades or rocky grounds in the midst of forests. Its ideal habitat is thick undisturbed forests with glades of open grassy lands which it prefers to graze at dawn and dusk. It spends most of the day time in secluded spots in dense forest. The mating season is from October to December and the young ones are dropped in April to June. The animal is often hunted for its meat in winter when forests are under snow and it descends down to the villagers.

2B.1.7 Musk Deer (*Moschus moschiferus*)

A small animal found on steep hills above 25000 m elevation known as Kastura. These animals lead solitary and secretive life and generally inhabit steep and rocky slopes. This deer is very agile and runs fast and is not easy to shoot. Musk deer eats mostly grasses, shrubs such as wild rose, lichens and herbs. The habit of using the same place for droppings makes it an easy prey of the poachers. It is much sought after for its musk which is found in males only. The musk is produced by the secretion of the musk gland situated beneath the skin. It is generally snared by the poachers and killed for the musk pod which is a very costly. It has been declared a protected animal and shooting and capturing is prohibited throughout the year. The musk deer has been

hunted almost to extinction and no recent sightings have been recorded in the tract.

2B.1.8 The Barking Deer (*Muntiacus muntjack*)

It is known as Kakar found between 800 to 2500 m elevations. Its colour is deep chestnut becoming darker on the back and pale and dull below. Its shoulder height is about 50 to 57 cm. The antlers rarely exceed 13 cm. Generally it utters a subdued chinking noise but when alarmed and in flight the sound becomes a bark like cry from which the name barking deer is derived. The animal lives mostly in forests having very thick understory and comes out to graze in the out skirts of forests in open clearing during night. It is a solitary animal is rarely found in herds. The animal is diurnal in habit and its food is mainly grass, tender leaves of trees, shrubs and wild fruits. It is unmatched for flexibility and prowess of creeping through the tangled stands. The mating season is during winter months and young's are born in spring. During winter it descends down. Being small in height, it cannot run fast on snow and gets stuck up and gunned down easily. It is killed for its meat. The high incidence of poaching has reduced the population an alarming low position. The destruction of the habitat of this animal is also the reason for its reduced population.

2B.1.9 The Sambhar (*Cervus unicolor*)

This is the largest Deer, carrying magnificent antlers. Its coat is coarse and shaggy and the general colour is brown with yellowish or grayish tinge. A full grown average male weighs about 230 to 240 kg. The horns are about 90 cm. This animal was quite common upto an elevation of 2,000 m. Due to complete occupation of habitat by the domestic animals, increase in the cattle population, better mobility of people due to roads, more guns and the lust for cheap meat, this animal has been badly hunted in the past.

2B.1.10 The Indian Wild Boar (*Sus scrofa cristatus*)

Also known as Jungli Suar. It is a notorious and an omnivorous wild animal living in grassy, bushy and also thickly wooded areas. It feeds on field crops, wild roots, tubers and even insects. It is grayish black, the skin being covered with a sparse growth bristles which form a conspicuous mane. Wild boar is a prolific animal giving at least two litters every year, one in the beginning of rains and other after the rains. A well grown male is about 80 to 90 cm. at shoulder and may weigh upto 200 kg. it is generally found in herds and causes a lot of damage to agricultural crops, forest nurseries and plantations.

2B.1.11 COMMON INDIAN HARE (*Lepus nigricollis*):

Locally known as Khargosh, serru or Kharha. It is found everywhere but it more pronounced in lower regions. It is a small size animal having about 40 to 50 cm. length and about 2 kg of weight. It feeds on grasses, seeds and fruits. It is hunted for its meat. It is harmful to nurseries and plantation

2B.1.12 WOLF (*Canis lupus*)

An animal, little larger than domestic dogs and earthy brown in colour, was common in the area but due to its alleged preying on the domestic animals, it is been made nearly extinct.

2B.1.13 THE JACKAL (*Canis aurous*)

Known as Gidar. It is little smaller than the domestic dogs and grey in colour. Very conspicuous due to their howling during dusk or dawn near villages. Their number has increased due to lack of competition by other animals which have been hunted down by the man. They do considerable damage to the crops and also lift the domestic poultry.

2B.1.14 RED FOX (*Vulpes vulpes*)

Lomari is an animal known for its cunning and agility. It is little smaller than jacal and richly red in colour. It lives mostly on small rodents, insects, marmots and even flying squirrels. Fawns of a barking deer and

rabbits are also sometimes haunted and devoured by foxes. It also preys on small birds and pheasants. It is found between 1,500 to 2,700 m but moves down to even lower heights during winter.

2B.1.15 THE HIMALAYAN PALM CIVIT (*Paradoxurus hermaphroditus*)

It is a little larger than the common house cat and is blackish in colour. It feeds on small mammals and also fruit and leaves of forest trees.

2B.1.16 THE WILD CAT (*Felis chaus*)

It is known as Jungli billi, slightly bigger than the domestic cat and has long legs. The colour of its fur is yellowish gray. The tail is ringed with black towards the end and has a black tip. The ears are radish, ending in a small pencil of black hairs. The underside on the body is pater with vestiges of strips. It is distributed all over but avoids severe cold during winters. Its habitat is forests fringes, open grass land and rocky outcrops. It preys on small mammals, birds and even on poultry near villages. Due to diminishing natural diet, its population has decreased. It is found upto 2500 m altitude.

2B.1.17 THE LEOPARD CAT (*Felis bengalenis*)

It is known as Chita billi, about the size of domestic cat with rather longer legs. Its skin marking resembles that of panther. It lives mostly on small birds and rodents.

2B.1.18 MONGOOSE (*Herpestes edwardsii*)

It is light grey to dusty brown small animal locally called Neola. It eats rats, snakes and small birds. It is found all over the division except snow bound areas.

2B.1.19 THE COMMON OTTER (*Lutra lutra*)

Locally known as Udbilao. It is water loving animal found near the Giri river. Hair on the back is rough and long. The other lives in rocks and boulders on the river edge and feeds on fish, crabs, frogs, rodents and sometimes, vegetable matter.

2B.1.20 THE MONKEY (*Macaca mulatta*)

The common species found is *Rhesus macaque* -Bandar which is in plenty all over due to protection affords to it on religious grounds. Its population has also increased due to reduction of its natural predators namely panther. It avoids snow and moves down during winter. Monkeys do considerable damage to the agricultural crops, garden fruits and plantations. They live in groups in open areas to the dense forests and feed on tender leaves, wild fruits and tubers. Oak acorns are the favorite food.

2B.1.21 THE LANGOOR (*Presbytis entellus*)

Like monkey, Langoor are also found from shiwaliks to high Himalayas but move down during winter though on lesser scale. They live on leaves, buds, fruits and flowers of forest trees, shrubs and even herbs. The ban oak acorns, horse chestnut, maple, robinia, walnut and hazelnut seed are the favorite dietary items. They live in a large group. These animals are shy and less troublesome, compared to monkeys. However, they do damage to the agricultural crop, fruit trees and forest plantations.

2B.1.22 The Himalayan Weasel (*Mustela siberica*)

This thin, sleek mongoose like animal is reddish brown in colour with slightly paler under parts. It lives in deodar, fir/spruce forests and is often seen on the fringes of alpine pastures, from 1600 m upto 4000 m. Weasels prey on rates, mice, birds and birds eggs and even small lizards and insects. It often enters chicken coops in the villages, killing chicken in discrimately.

(b) BIRDS

2B.2.1 MONAL (*Lophophorus impejanus*)

Monal is the prettiest of all the birds found in the tract. Its habitat lies above 2500 m extending upto snow line in summer but descending to lower altitudes during winter. It is frequently found fir, spruce deodar, kail and oak forests but occasionally makes appearance in the vicinity of grassy glades. It is of the size of large domestic fowl with a short, broad and square out tail. It is characterized by brilliant metallic green head,

the glistening purple upper part, cinnamon coloured tail and velvety black breast and a crest of beautiful feathers. The female looks like a huge partridge, plain brown in colour. It is mottled and streaked dark and pale with a white throat and short crest of normal feathers. When flushed the female flies to the nearest trees and perches on a bough convenient to her and as such is easy to shoot. It breeds in May and June. Monal eats tubers and seeds in temperate and alpine pastures. In autumn it feeds on grubs or maggots, roots and young shoots of various shrubs and grasses, corns and berries. In winter these birds migrate to lower elevations and sometimes feed in the wheat and barley fields where these are shot indiscriminately. Though it is the State Bird protected by law, yet it is poached for its beautiful dark green plumes.

2B.2.2 THE KOKLAS (*Pucrasia macrolopha*)

It is found mostly in deodar and sometimes in fir zone and prefers moist wooded forest with undergrowth. This pheasant is a nice table bird. The male has dark green head with fawn coloured central crest and a white spot on each side of the neck at the commencement of head. The front of the neck, breast and belly are of chestnut colour. The rest of the body is streaked with black and grey. The tail feathers are black with narrow white tips with central part reddish brown. The female is mottled with black and brown with buff streaks above, eyebrows are buff and throat white. The breeding season is from April to June. In autumn and winter they are found in small flocks.

2B.2.3 THE CHEER PHEASANT (*Catreus wallichii*)

It is a big bird about 90 cm long tail of about 60 cm. The head has long narrow pointed crest with bare red skin around the eye in both the sexes. The colour is Buffy white, barred with black above. The lower part is buff barred with steely black. It has got a special preference for bushy areas and open forest. In the recent past the bird has been nearly wiped off by the poachers in some of the localities. Its habitat is also heavily disturbed by grass cutting and cattle grazing. It has been declared as endangered species by I.U.C.N. (1979) Red data Book 'Aves'.

2B.2.4 THE WHITE CRESTED KALEEJ (*Lophura leucomelana*)

It is known as Kulsha (male) and Kaleshi (female). The male is black above glossed with steel blue and black tail. It has a white rump, long white tipped. Most of the under surface is dirty white, the throat and belly being brown. The female is reddish brown. The male has a long narrow dropping crest of white hairy looking feathers. It is found in higher reaches and inhabits in thick bushes and shrubs. It nests from March to June and live in pairs or family flocks. Heavy poaching had reduced the number of birds to a great extent.

2B.2.5 THE RED JUNGLE FOWL (*Gallus gallus*)

It is known as Jungli Murga or Kukar and is common upto 2000 m altitudes. It is a favorite bird of shikaris. It is believed to be the ancestor of all domestic fowls, found in pairs or parties. It is a very shy and cunning bird, scuttles into cover on slightest disturbance or suspicion. The male is black below and orange and red above. The tail has long coverts with dark metallic green colour hanging along each side. The wings are mixture of glossy red, dark metallic green, black and chestnut. The hens are plain streaked brown with rufous brown under parts. It roots on thick crowned trees of bamboo clumps; feeds on grains, vegetable shoots, insects etc. Nesting season is generally from March to May.

2B.2.6 THE BLACK PARTRIDGE (*Francolinus francolinus*)

Commonly known as kala Titar, it is found up to 1800 m frequenting the grassy and scrub patches near civilization. It is a small game bird, about half the size of a village hen, generally black and spotted white. The hens are paler and speckled black and white. It feed on grass seed, grains, white ants, termites and other insects. It is a swiftly running bird relying upon its legs to escape, lives singly or in pairs. Nesting season is April to July.

2B.2.7 THE CHAKOR (*Alectoris graeca*)

Chakor is a mountain partridge being one of the best table birds. It is a large, plump, pinkish, gray brown with rib like bars on flanks. Bills and legs are crimson. Its colour on the upper part and upto breast is plain

gray. The lower parts below the breast are buff and the flanks are beautifully banded with gray, buff, black and chestnut. It is distinguished at once by the beautiful bearing of flanks. The male and female are alike and in size it is bigger than house myna measuring 35 cm. The bird is very prominent due to its call in the evening and at times even during day. It prefers the barren rocky slopes with scattered bushes and grasses. It is a resident bird of Himalayas found between 1,500 to 3,000 m. Generally it is seen in parties regularly visiting the civilized fields for food. It feeds on seeds and grain as well as tender roots, green shoots and leaves of grass and food crops and a variety of insects and larvae. The breeding season is from April to August, early at low altitudes and late in the high hills. Seven to twelve eggs are laid at a time.

2B.2.8 THE HILL PARTRIDGE (*Arborophila francolinus*)

It is known as Peora, found beyond Chil forests upto an elevation of 2,000 m living in small flocks and roost at night. It has got special preference to bushy areas, oak forests and dense coniferous stands.

2B.2.9 JUNGLE BUSH QUAIL (*Predicula asiatica*)

It is known as Bater and is of the size of rain quail. The bird has fulvous brown, mottled black and buff feathers above and white below. In females the lower parts are pale pinkish. It is found in open deciduous and dry scrub forests. It lives in convoys of 5 to 20 which rest together and rise suddenly when almost trodden. Feeds on grass seeds, tender shoots and grains April to August.

2B.2.10 THE COMMON OR GREY QUAIL (*Coturnix coturnix*)

It is almost the tailless partridge like bird called Bater. It is buffish brown in colour with pale reddish brown and black streaks. It is found in pairs or parties in grass land and cultivations and hides very well in grass and bushes. It flies straight for a short distance. Their population swells during winter when they migrate from central and western Asia to this region. It feeds on grains, grass seeds and insects etc. Nesting season is from March to May. RAIN QUAIL (*Contrunix coromandelica*) which migrates locally is also found in the lower regions but rather very rare.

2B.2.11 BLUE ROCK PIGEON (*Columba livia*)

Commonly known as Kabutar has a slaty grey colour with glistening metallic green purple and magenta sheen on the neck and breast. It lives gregariously on rocky cliffs and precipices. It is found in upper reaches in large flocks regularly visiting cultivated fields in search of food. It also lives in semi domesticated conditions and favours old buildings and rock holes. It generally feeds on grass seeds, cereals, pulses etc. Nesting season is not well defined.

2B.2.12 DOVE (*Streptopelia spp.*)

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

2B.2.13 THE WOOD COCK (*Scolopax rusticola*)

Locally it is known as Sham Kukra. This bird is equal to Chakor in size. It is brownish with black and rufous markings. It is found in Silver fir and Kharsu forests.

2B.2.14 THE WEDGE TAILED GREEN PIGEON (*Treron sphenuraj*)

Also known as Harial and found mostly in ban oak forests in summer. It is essentially a fruit eating bird.

AQUATIC BIRDS

2B.2.15 Ducks, Teals, Goose and Cranes are known to visit perennial rivers and streams but are rare now.

2B.2.16 These are of two types' i.e. Raptors and non raptors. Raptors are the birds of prey such as Hawks. Kestrels, eagles, falcons, vultures and owls.

Other birds of common occurrence are house and jungle crows (*corvus* spp.) the jungle babbler (*Turdoides* spp.), bulbuls (*chloropsis* and *Phynonitus* spp.) king crow (*Dicrurus* spp.), golden oriole (*oriole* spp.)

the common myna (*Acridotheres* spp.), the common baya (*dloceus* spp.) the wood packer (*dinopium* spp.) parakeets (*Pisttacula* spp.) common king fisher (*Althene* spp.), Indian moorhens (*Gallinula* spp.), herons bagula (*Egretta* spp., etc. These birds too are equally important from aesthetic, forest cleanliness and health, farming, bird watching and balance of nature, point of views. Some of the important raptors and non raptors are described below.

2B.2.17 THE HIMALAYAN GRIFFON VULTURE (*Gyps himalayensis*)

It is the largest bird with long naked neck and un-feathered bald head. A large gathering on an old carcass of a domestic animal is the common sight. The other varieties of vultures observed in the tract are the Indian griffon, long billed vultures and lammergeyer.

2B.2.18 THE BLACK EAGLE (*Ictinactus malayenges*)

It is a grey coloured bird in size nearly equal to vulture. It lives mainly on alive smaller birds, their young ones, rodents and snakes.

2B.2.19 THE GOLDEN EAGLE (*Aquila chrysetus*)

Also known as Girja is a very black-looking large and powerful eagle with size of vulture seen above the tree level. It is of fierce appearance with its flat head, sharply hooked beak and feathered legs armed with sharp claws. A longish tail and often light patches in the wing and tail quills assist recognition. Its colour is deep chocolate brown. Its food is mainly large birds like pheasants, partridges and even crows. It also carries away animals like fawns of barking deer goral, musk deer, foxes and martens. Frogs, lizards and snakes are readily devoured. It avoids heavy forests and camp sites.

2B.2.20 THE SHAHIN FALCONS (*Falco peregrines*)

It is larger than house crow, slaty blue above with black head, rusty red below. Its favorite habitat is vast steep banks with rocky outcrops. It lives mainly on chakor, partridges and other small birds. Other falcons commonly met are hobby and Kestrel.

2B.2.21 THE FOREST EAGLE OWL (*Huhua nepalensis*)

It is of a vulture size and is dark brown in colour with two black horns like tuft above its head. Under parts are tawny white barred with blackish brown. This bird is of nocturnal habits and lives mainly on pheasants or large birds and small animals especially the young ones of barking deer etc. the other owl found in the area are scops owl, great horned owl and sculys wood owl.

2B.2.22 PARROT/PARAKEET (*Psittacula himalayana*)

This bird is found in the lower hills and is a menace as it eats away the seed of Chil by extracting it from the cones with its very strong beak.

2B.2.23 THE JUNGLE CROW (*Corvus macrorhyniches*)

It replaces the common house crow (*Corvus splendens*) as a scavenger although the house crow is also found during summer.

2B.2.24 WOOD PECKER (*Picus squamatus*)

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

(c) REPTILES**2B.3.1 THE COMMON INDIAN KRAIT (*Bungarus caeruleus*)**

It has highly polished scales. It inhabits more or less open country at low altitudes, seldom ascending above 1,500 m. A highly poisonous snake found in lower part.

2B.3.2 THE HIMALAYAN PIT VIPER (*Ancistrodon himalayanus*)

Also known as saap. It is found between 2,000 to 3,000 m elevation. Although nocturnal in habit, it comes out at times to bask in the Sun.

2B.3.3 THE INDIAN COBRA (*Naja naja*)

Locally called kharpa or Nag. It is highly poisonous snake found in warmer lower hills. It is absent in snow bound areas. Being very fond of water, it is found near water sources in the hot dry weather before the break of monsoon.

2B.3.4 THE RAT SNAKE (*Ptyas mocosus*)

It is widely distributed and usually frequents the open country in the vicinity of human habitations. It is the common snake in the warmer lower tracts, also called Dhaman. It is non poisonous.

2B.3.5 THE VINE SNAKE

It is a thin rope like green snake with a pointed snout and is commonly found in the rice fields along the Sutlej valley.

2B.3.6 The Common Indian Monitor Lizard (*Varanus monitor*)

It is found both in forest as well as outskirts of Villages. Also called Gobilda.

2B.3.7 Girgit (*Colotas vessicoloen*)

This is bigger than house lizard and found outside of the houses but near habitations, fields and forests, associated with vegetation. It also changes colours as per environment where it lives.

2B.3.8 The Common House Lizard (*Gecko hemidactylus*)

It is found at all elevations and in almost all the buildings.

(d) FISH

2B.4 The only fish which can be considered as a game fish in the Giri River and its tributaries is the Kali macchi (*Schizothorax plagiostomus*). It

breeds in April-May and in September in small pools by the river. Masheer (*Barbus*) is found in the Sutlej River.

2B.5 Injuries to which the Fauna is liable

The biggest injury, to which our wild life is exposed, is man himself. A brief resume of the damages done to forests fauna are listed below:

2B.5.1 Hunting/ Poaching

The destruction of wild life at the hands of bonafide residents is common because most of them posses arms. Although, most of the arms are used for crop protection but these are sometimes also used in shooting game. The wild animals are shot for their meat or other valuable products like fir, musk, medicines and trophies or only for sport. Carnivorous animals are killed because they are dangerous to people and farm animals. Other animals are killed to save agricultural crops and orchards. Number of species have either become extinct or on the verge of being extinct. Poaching is done by outsiders also.

2B.5.2 Fire

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

2B.5.3 Epidemics

It is not a common feature in wildlife but Sambhar and other members of deer family may suffer infections and contagious diseases like rinder pest through domestic cattle grazing in the forests. No cases of epidemics have been reported in the tract.

2B.5.4 Atmospheric influences

The adults are seldom affected by the climatic disturbances but the young ones suffer casualties mostly from frost. The bird hatching is

adversely affected by heavy rains. Drought causes the drying up of natural water holes.

2B.5.5 Animals

The ecological balance maintained by the predator prey relationship has been disturbed by man. Carnivora prey on herbivore and herbivore eats grasses and fodder trees; thus, there is food chain in ecosystem. Indiscriminate shooting of particular animal species like sambhar and deer etc. has recoiled on depletion of food for carnivore like panthers etc. and is one of the causes for the extinction.

2B.6 Protection and Management of the Fauna

Wild life Protection Act, 1972 has an impact in protecting Wildlife. Because of ban on shooting of wildlife in H.P., the number of many species of wild animals has also increased. It is suggested to protect the wild animals as they are also part and partial of the forest and required to maintain the balance in the ecosystem.

CHAPTER – III

UTILISATION OF THE PRODUCE

3.1 **Agricultural Customs and wants of the Population**

Majority of the population resides in rural areas in the tract of this Working Plan. Therefore, the economy is based primarily on agricultural and horticultural crops. The industrial and commercial activities are not of much importance. Therefore, the dependence of the people on these activities is negligible. However some persons are engaged in Government Jobs.

- 3.1.1** The farmers possess small to marginal land holdings. There are very few farmers having land holding more than 2ha per family. The agriculture fields are generally un-irrigated except in few cases where irrigation channels have been constructed along the rivers / nallas. The growth of ancient traditional crops like maize, paddy, wheat etc. has decreased to a great extent. Instead, the farmers have switched over to vegetable growing and vegetables like cauliflower, Patta Gobi, Peas have become the source of main cash crops which is giving very lucrative and profitable dividends to the local peoples especially in Theog and Balson Range of Theog Tehsil. However in illaqua of Baghi, Ratnari, Darkoti, Chalnair, Grawag, Khaneti, Tehtoli, Mahasu, Kiari, Kalbog & Himri Panchayats of Kotkhai Tehsil excels in Apple production. These areas have earned their reputation at National & International level for qualitative & quantitative production of Apple. A State level Sabzi Mandi is under construction at Prala (near Sainj) Sainj-Chhaila road which will become the Focal and Central point for storage packing and further gradation & distribution of Apple and vegetables from this Sabzi Mandi to the far flung area at National and International level. There is adequate and latest technical knowhow and various plant protection and Fruit processing centers have been opened by the State Govt. There is also a good scope of floriculture and many farmers have switched over to raise various kinds of flowers in Green Houses which are being exported outside the State of H.P. Thus earnings from vegetables, Horticulture products and floriculture have boosted the economy and

living standard of the local people of Theog & Kotkhai Tehsil to far heights.

3.1.2 In general, the ancient simple houses made up Stone walls, with wooden binders and with roofing of slates have been replaced with pucca RCC buildings in most of the areas of the tract of this Working Plan.

3.1.3 People depend on forests mainly for timber, fuelwood and fodder. However the demand for fuelwood has been reduced to great extent due to use of LPG which has reached at every nook and corner of the locality. In addition, stones, leaf litter, slates and various other minor forest produce are also important items for which the local people are dependent on forest for their day to day requirements.

3.1.4 Timber to Right Holders was being granted as per ancient traditional Rules since the 1st settlement as per right recorded in the settlement report. As per this tradition Right Holders were free to cut the trees from the forest at very nominal rates till 2006. This policy was changed and new policy/Rules were notified vide notification No. FFE-B-E (3)-43/2006-Vol-I dated 02.01.2010. This policy provides for that no Right Holder will enter the forest and the Right Holder will be given timber in converted form. The policy further provides that the Right Holder will have to opt to avail T.D. Rights from one forest irrespective of the fact that he may have agriculture land / rights in another revenue estate. The quantity was restricted to 3M³ for construction of new house and 1M³ for repair of old house. Under this policy 30 % of the weighted average market rate is to be charged from the general category, 10% from BPL families and free of cost to Fire and flood sufferers. The timber distribution to Right Holders as per the policy has been started in this division from the year 2011. Now, recently the policy has been again revised vide notification No. FFE-B-E (3)-43/2006 Volume-II dated 26.12.2013. According to this policy, for construction of new house un-converted tree (standing volume) upto 7M³ can be given once in 15 years; whereas for repair of old house/cowsheds, standing volume of 3 M³ once in five years can be given. As per this policy Rs. 500 per M³ standing volume for Deodar & Rs. 250 per M³ standing volume for other species has been fixed. Right holder suffer from natural calamities shall

be given trees free of cost. Notification of the policy is appended as Appendix-XIX (n) page 276-279.

TABLE – 3.1
T.D. GRANTS IN M³

Species	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	02-03	03-04	04-05	05-06	06-07	2007-08 to 10-11	11-12	12-13	Total
Deodar	7831.16	6327.64	3926.78	1327.42	2601.0	1151.56	3276.38	1164.44	1867.37	6317.7	1484.65	-	227.78	1138.9	37617.77
Kail	41909	3298.75	2579.52	1308.12	943.76	639.62	1328.9	309.25	254.5	633.34	534.4	-	-	-	162270.6
Chil	284	1.27	1.42	-	1.42	-	-	-	-	-	-	-	-	-	685
Spruce	275	-	164	-	183	-	-	-	-	-	-	-	-	-	622

Total volume of all species granted in Theog Forest Division w.e.f. 1996-97 to 2012-13=53858 M³.

3.1.5 The demand of non right holders being met with mainly by depots maintained by HP States Forests Corporation Ltd. The corporation also supplies timber to non-right holder for their bonafide use.

3.1.6 The human population of the tract as per census of 1981, 1991 & 2011 is given in the following **table – 3.2**.

TABLE – 3.2

Human Population of the Tract

Name of Tehsil	1981 Census	1991 Census	2011 Census
Theog	57,138	68,737	81,139
Kotkhai	28,583	33,354	39,151
Total	85,721	1,02,091	1,20,290

Source: From the record of Tehsil Kotkhai & Theog.

3.1.7 Large number of cattle's have now been reduced and replaced with Jersey and other hybrid cows/buffaloes. The local people have in general abandoned keeping sheep and goats. The animal population of the tract for the year 2007 is given in the following **table – 3.3**.

TABLE-3.3
Number of Domestic Animals in the Tract

S. No.	Kind of Animals	No. of Animals for the year 1993	No. of Animals for the year 2007
1.	Buffaloes	18,761	1,794
2.	Cows	1,35,382	60,589
3.	Goats	19,586	6,959
4.	Sheep	23,006	2,019
5.	Horses/ Mule	656	1,172
6.	Others	1,275	4,928
Total		1,98,666	77,461

Source: District Animal Husbandry Office, Shimla.

During summer herds of nomadic ‘gujjars’, graze in high forests and alpine pastures whereas the herds of goats and sheep of migratory gaddis graze in the lower forests in winter. This leads to excessive pressure of grazing in forests, particularly those which are situated near the habitation. The grazing fees per animal which is charged from the migratory graziers are Buffalo Rs. 8/-, Oxen and Cows Rs.1/-, Goats Rs.0.40/- and sheep Rs. 0.20 whereas calves are allowed to graze free of charge.

3.2 Market and Marketable Products

With the elimination of contractorship agencies. The commercial exploitation of the forests has been transferred to Himachal Pradesh State Forest Development Corporation Ltd. since 1982. When the H.P. Forest Produce (Regulation of Trade) Act. 1982 came into force and since then all the timber harvesting i.e. felling, conversion, extraction of timber and resin is being managed by the H.P. State Forest Corporation Ltd.

3.2.1 Non Timber Forest Produce (NTFP)

Beside above, Non Timber Forest Produce (NTFP) like Guchhies, Daru seeds, Banakasha, and Mushkbala walnut fruits and herbs from forests are collected/ extracted for their domestic use by the Right holders and local people sell the medical herbs/fruits collected seasonally as per

prescribed four year cycle. The extraction, royalty charges and export of these NTFP is being controlled under Rules, H.P. Forest Produce Transit (Land Routes) Amendment Rule, 2012 notified by the Govt. vide notification No. Fts. B (F)-13-49/98 Loose dated 26.12.2013.

3.3 Demand and Supply of Forest Produce and Pressure on Forest.

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 demand of timber requirement for construction/ repair of houses has increased manifold. The yield position of PB-II, PB-III is on plus side in both Deodar- Kail and Chil working circles. The major marketable forest produce is coniferous Timber. The harvesting and marketing is being done by the HPSFDC Ltd.

3.3.2 Fuel wood and charcoal: - Most of the oak forests of Theog, Balson and Kotkhai Ranges were being managed for fuelwood and charcoal supply. The felling and conversion of green oaks have been banned and the oak speices has been nationalized. However the extraction of fuelwood and charcoal from salvage trees is being done by the HPFDC Ltd. The LPG has reduced the requirement so many folds of fuel wood but in the villages the villarers are enjoying the privilege of getting free fuelwood from the forests. In the past the Ban oak species heavylopping and indiscriminate felling left little scope to fell more Ban oak speices. which are the main source of fuel wood and charcoal in the tract. Ban oaks speices are comletly protected species are notified vide letter no Fts (13-38/84 dated 11-3-86.

CHAPTER-IV

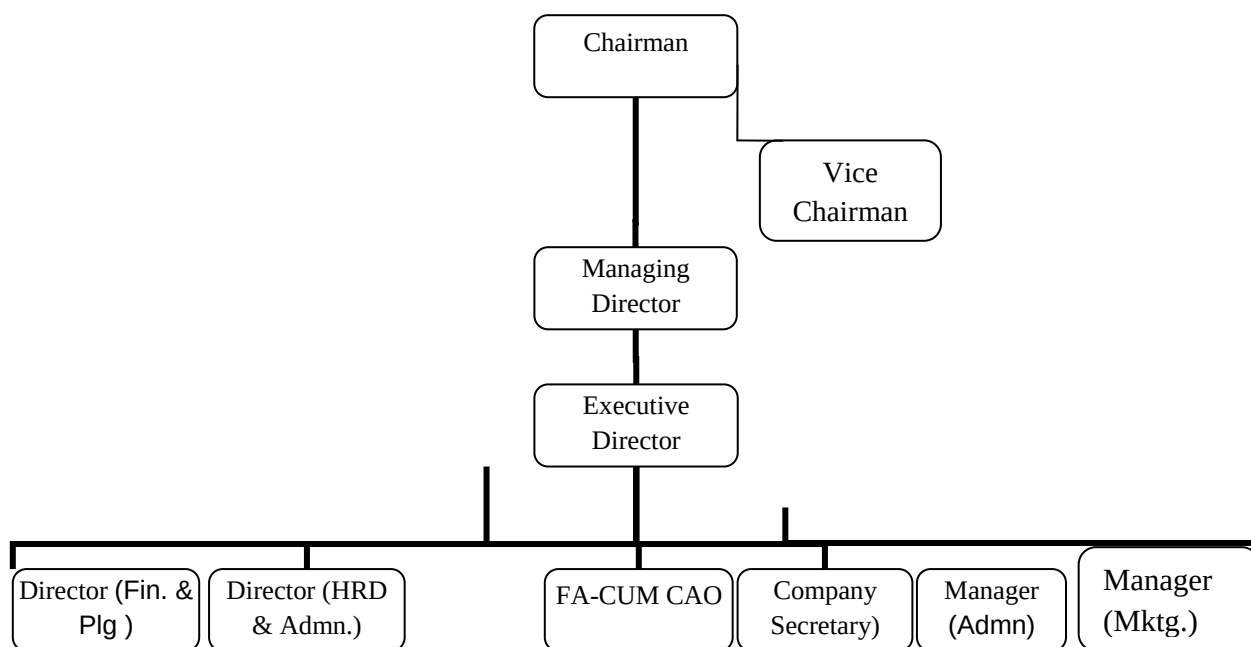
ACTIVITIES OF FOREST DEVELOPMENT CORPORATION IN HARVESTING AND MARKETING OF FOREST PRODUCE.

4.1 General description.

The H.P. State Forest Development Corporation Limited, an undertaking of the HP Government came into existence on 25th march 1974, under the Companies Act, 1956. The present administrative set up structure of H.P. State Forest Development Corporation Limited has been mentioned herein below:

Table-4.1

ADMINISTRATIVE ORGANIZATIONAL STRUCTURE:



FUNCTIONAL:

Director (North)	Director (South)	Director (Mkt.)	General Managers
DM Dharamshala DM Chamba DM Mandi	DM Shimla DM Sawra DM Chopal	DMDhanot DM Baddi/Swarghat DM Mantaruwala	R&T Factory Bilaspur R&T Factory, Nahan

DM Sundernagar	DM Solan	DM Nurpur/Bhadroya
DM Kullu	DM Nahan	DM Udaipur
DM Fatehpur	DM Rampur	
DM Hamirpur		
DM Una		

4.2 MAIN OBJECTIVES

The Corporation has been mainly created with the following objectives:

- I To carryout extraction and marketing of timber and resin/rosin on scientific lines by adopting suitable modern techniques.
- II To eliminate the Contractors' Agency in respect of works of timber extraction and resin tapping.
- III To obviate the chances of illicit felling of trees, illicit tapping of resin and other malpractices.
- IV To work the forests on commercial lines by re-cycling of funds for works and also by raising funds from financial institutions as per their requirements time to time.
- V To generate employment to the local skilled and semiskilled labour and at present the HPSFDC is providing regular jobs to its 3500 employees. The H.P.State Forest Corporation Ltd. took over the complete working of the Government Forest w.e.f.25-1-1983. As per the policy of the Government the timber extraction work was transferred to the H.P.State Forest Development Corporation in a phased manner. The Corporation has been working salvage lots comprising of dry diseased, uprooted and damaged trees, handed over to it by the HP Forest Department for working. The lots of green trees made of trees coming in the road alignments approved under Forest Conservation Act are also exploited through the Corporation. On an average, app. 11000m³ standing volume is being felled and converted every year by the corporation, which is sold in auction through Sale Depots and also supplied to the Govt. Department, non right holders, small scale industries etc. The work of felling and conversion of timber is done by professionally skilled labour and its carriage to road side depots is done either by manual labour or by mule and in some cases, where possible through waterslides and Khad floating. All these works are done through Labour Supply Mates under the direct supervision of the corporation staff.

4.3 **Harvesting & Marketing of Forest Produce**

Harvesting and marketing of forest produce i.e. Timber and Resin lots are being exploited out through HP State Forest Development Corporation, Divisional Manager Forest Working Division Shimla. In addition, green trees coming in the road alignments approved under Forest Conservation Act are also handed over for exploitation. The lot-wise volume/trees marked w.e.f. 1996-97 to 2012-13 is given in Volume-II appendix-XVIII page 223 to 234.

4.3.1 **Extraction of Resin**

Resin lots are handed over annually to H.P. State Forest Development Corporation at royalty rates fixed by the state Government for every year. Earlier the resin extraction was done by cup and lip method which proved to be disastrous to many forests. Now there is a complete shift to rill method of resin extraction which gives good yield as well as obviates the likely damage by fire and wind. The instructions of Resin tapping is contained in Panjab leaflet NO. 13 which be followed. For the year 2013, 7866 resin blazes have been handed over to the Forest Corporation for extraction of resin. The work of resin extraction generates employment opportunities for the general public of the area. On an average 480 mandays per annum are generated per section of resin tapping and carriage of resin upto road side. The detail of resin blazes handed over to HPSFDC from 1996 to 2013 is given in the table 4.3 below: **Table -4.3**

Table-4.3

Detail of Blazes Year- 1996-2013

S.no	YEAR	No. OF BLAZES
1	1996	5382
2	1997	5467
3	1998	5302
3	1999	5302
4	2000	Nil
5	2001	Nil
6	2002	Nil

7	2003	Nil
8	2004	Nil
9	2005	4210
10	2006	4210
11	2007	4210
12	2008	4210
13	2009	4210
14	2010	4210
15	2011	3370
16	2012	3370
17	2013	7866

4.3.2. Methods of Exploitation and their costs.

Since the nationalization of the Forest extraction, all the logging operations are being done by the H.P State Forest Development Corporation Ltd. (an H.P. Govt. undertaking). Similarly resin tapping too is done by the Forest Corporation.

TABLE – 3.6

Timber Extraction Cost (2011-12)

S. No.	Name of Work	Timber cost Per m ³ (Rs.)
1	Lopping and felling.	90/-
2	Logging squaring & conversion with standared size and Non standared size Axe etc.	3363/-
3	Carriage from forest to roadside over distance 1Km.	600/-
4	Carriage by trucks from road side to Depot to Baddi & Mantaruwala	649/-
5	Contingency charges and Establishment.	2252/-
	Total	6954

Source. (HPSFDC Ltd.)

TABLE – 3.7

Resin Extraction Cost (2011-12)

Sr. No.	Name of work	Cost per quintal (Rs.)
1	Setting up of crop including collection charges.	3500.00

2	Resin Extraction up to R.S.D.	200.00
3	Store Charges	100.00
4	Carriage Charge From R.S.D. to Factory.	300.00
5	Establishment Charges.	110.00
6	Miscellaneous Charges.	90.00
Total		4300.00

(Source: HPSFDC Ltd.)

4.4 Past and Current Prices

The following table-4.4 indicates the royalty of standing trees of various species and table-4.5 indicates royalty of resin blazes at which these trees are handed over to HPSFDC Ltd. and the royalty charged accordingly from the year 2007-08 to 2012-13.

TABLE-4.4

Royalty Rates of Standing Trees (Rs. Per cum)

Year	Deodar	Kail	Fir/spruce	Chil
2007-08	4315/-	2388/-	677/-	431/-
2008-09	4315/-	2388/-	677/-	431/-
2009-10	5664/-	2944/-	836/-	626/-
2010-11	5903/-	3098/-	790/-	572/-
2011-12	5903/-	3098/-	1030/-	704/-
2012-13	5357/-	3096/-	1123/-	739/-

TABLE – 4.5

Royalty Rate of Blazes

Year	Rs.
2007	23.00
2008	27.70
2009	33.70

2010	35.00
2011	65.00
2012	50.00

4.4.1

Current Prices

Pricing Committee in its meeting held on 18.09.2013 has fixed the royalty rate for the year 2013-14 for different species in special hill tracts and remote localities as under:

Table-4.6

Royalty Rates

Species	Weighted average sale rates obtaining during 2012-13 (Rs. per M3)	%age of sale rates fixed	Rate fixed for 2013-14 Rs. per M ³	
			Normal area	Remote & special hill tracts
Deodar	Rs. 24151/-	23%	5555	1333
Kail	Rs. 15723/-	20%	3145	881
Fir/Spruce	Rs. 10506/-	11%	1156	358
Chil	Rs. 6299/-	11%	693	215
Eucalyptus	Rs. 7161/-	25%	1790	NA
Shisham, Tun	Rs. 11405/-	30%	3421	NA
Sain	Rs. 7148/-	28%	2001	NA
Sal	Rs. 8601/-	16%	1376	NA
Khair-MG	Rs. 29752/-	4%	1190	NA
Other B.L.	Rs. 2287/-	20%	457	142

Minutes of the pricing committee meeting held on the 19.09.2013 are appended in Vol.-II Appendix-XIX (o) page 280 to 284.

The rate fixed by the Pricing Committee needs to be revised in view of the prevailing market rates to make Forest Corporation a competitive organization.

As a test check some lots should be worked by HP Forest Department itself to come out with the result of working to compare the same

with the working of Forest Corporation to determine and arrive at true and realistic value of the timber/produce.

Prevailing Market rates of Standing Trees per M³ of different species Conifers and market rate of Broad Leave for the year 2009-10 to 2011-12 is given below in Table - 4.7 and 4.8 respectively.

TABLE – 4.7
Market Rates of Standing Conifers Trees (Rs/Cum)

Name of Species	Year		
	2009-10	2010-11	2011-12
Deodar	44031/-	47624/-	47624/-
Kail	38044/-	38044/-	38044/-
Chil	15372/-	15372/-	18630/-
Fir/spruce	17271/-	17271/-	22437/-

TABLE – 4.8
Market rates B/L Species (Rs. /m3)

Name of Species	Year		
	2009-10	2010-11	2011-12
Ban/Kharshu/Mohru	18000	18000	18000
Shisham/Walnut	21663	21663	23711
Sal	10839	10839	14957
Sain	11229	11229	14849
Kokath	5254	6109	6888
Kikar	7818	3443	4704
Eucalyptus	6076	7093	10381
Mango	7877	9577	10424
Poplar	8907	8907	8907
Jamun	2024	3443	4704
Neem	1804	3443	4704
Simbal	17992	17992	17992
Tun	6503	6503	6503
Mapple	2356	9545	9545
Khair	26557	26557	28113
Siris and other Misc.B.L Species	3443	3443	4704

4.4.2 Marketing of Forest Produce

The timber extracted by the HPSFDC Ltd. is marketed through sale depots located at various places like Kanlog (Shimla), Baddi, Mantaruwala. The resin is processed and further sold through R&T Nahan and Bilaspur factories.

4.4.3. The auction rates and supply of timber to various Department for commercial uses and for Departmental/ Public undertakings being sold by HPSFDC Ltd. till the year 2012-13 is given in the table 4.9 below:

Table-4.9
Market rates of Sawn Timber (Rs. per m³) of different species of Conifer & Broad Leaves.

KINDS AND SIZES IN CMS	SPECIES (RATES /m ³)			
	Deodar	Kail	Fir	Chil
1.SAWN SIZES (St. size)				
305x26x13	55000	50000	25000	23000
244x26x13	50000	45000	23000	21000
305x21x13	45000	40000	22000	20000
244x21x13	43000	38000	21500	19500
Sawn Size (Non St. Size)				
366x21x10	40000	35000	21000	19000
305x21x10	42000	37000	21500	19500
244x21x10	35000	30000	19000	18000
183X21X10	35000	30000	19000	18000
305x16x10	40000	35000	20000	18000
244X16X10	37000	32000	19000	17000
2. AXE HEWN				
305-366X13X13-16X16 & up	45000	35000	15000	10000

183-244X13X13-16X16& up	35000	25000	13000	8000
3. DIM DIMAS				
(All Sizes)	33000	25000	10000	9000
4. HAKRIES				
85 Cms & Above	15000	13000	9000	3000
Below 85 Cms	12000	9000	7000	2700
5. LOGS				
275 Cms & above length	37000	25000	15000	13000
Below 276 Cms. Length	27000	20000	13000	10000
6. SIDE SLABS				
All Sizes	21400	18000	7700	4600
7. ROUND BALLIES				
305-366X55	20000	15000	9000	7000
244X55	15000	12000	7000	5000
Round Ballies (Mid girth 13x13,16x16 & 19x19 cm)	15000	9000	6000	4000

4.5 Result of Socio-Economic Survey

During the Working Plan period from 1996-97 to 2012-13 in total 97770.9161M3 timber under salvage lots and road alignment lots were marked and handed over to the HPSFDC for extraction, harvesting and sale through its Sale Depot at Baddi. The total species-wise marked standing volume and roylity realised during this period is given below:

Table-4.11

Specieswise Royalty Amount Realised

Sr. No.	Spp.	Volume in M3	Royalty Charged
1.	Deodar	15695.479	7,99,15,494.00
2.	Kail	49147.4451	16,05,05,017.00
3.	Rai/Fir	31090.471	3,20,74,249.00
4.	Chil	1023.287	11,89,422.00
5.	Oaks	43.738	38,216.00
6.	Broad Leaved	770.74	2,80,204.00
Total		97770.9161	27,40,02,497.00
Sr. No.	Spp.	Volume in M3	Royalty Charged
1.	Deodar	15695.479	7,99,15,494.00
2.	Kail	49147.4451	16,05,05,017.00
3.	Rai/Fir	31090.471	3,20,74,249.00
4.	Chil	1023.287	11,89,422.00
5.	Oaks	43.738	38,216.00
6.	Broad Leaved	770.74	2,80,204.00
Total		97770.9161	27,40,02,497.00

Thus this Division has earned Rs. 27, 40, 02,497/- revenue realized as royalty amount from the HPSFDC during this period of the Working Plan. The timber extraction work provides employment to skilled and semi skilled labourers engaged for felling, conversion and carriage of timber to road side depot. Thus, it has generated employment to local people for conversion, carriage to road side, transporters to

transport timbers to road side depot and employment to manual labours deployed at various sale depot. Thus in addition to revenue earned by the State Govt. it has also provided employment to hundreds of local skilled and semi skilled labourers. It is also providing employment to 2700 regular employees of HP State Forest Development Corporation. Therefore, the timber harvesting operations plays vital role in social and economic upliftment of local people by generating employment in addition to being a source of revenue for the State of H.P. Due to developmental activities in the fields of Horticulture, Vegetables, Health and Education there is marked improvement in the living conditions of the inhabitants of this Division. A principal has involved that socio-economic development shall have to be made closest possible harmony with forests and environment.

4.6 Lines of Export

The timber extracted from this Division is marketed through HPSFDC Ltd. Himkashat Sale Depots, Baddi and Mantaruwala etc.

CHAPTER –V

FIVE YEAR PLANS

5.1 General Description.

Planning in India derives its objectives and social premisis from the directive principles of the State Policy enshrisnd in the Constitution of India Article 18 and Article 39(a), (b),(c) are cited in the resolution of 15th march 1950 by which Planning Commission was set up. These are--

“The state shall have to promote the walfare of the people by scuring and protecting as effectively as it may a social order in which justice, social, economic and political shall inform all the institution of natural life”(article 58 of Constitution).

The State shall in particular, direct its policy towards scuring-----

- a) That the citizen men and women equally have the rights to an adequate means of livelihood.
- b) That the ownership and control of the material resources of the community are so distributed as best to sub-serve the common good.
- c) That the operation of economic system does not result in the concentration if wealth and means of production to the common determent.

The national planning process was started in 1951 in India with the formulation of First Five Year Plan. The first three five planslaid thurst on the promotion of agriculture and industrialization, environment-related issues pertaining to the improvement of human environment such as sanitation, public health, nutrtnon, water supply and housing got due priorty in national programmes under the Three five year plans. However environment protection did not receive any significant recognition under the development planning except the forest development and soil conservation.

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 as well as artificial means.

Till early seventies, the emphasis was on planting commercially important species such as deodar, Kail, Chil, fir and spruce etc. Growing demand of forest produces in the state especially that of timber resulted in focus on large scale plantation of commercially important species. Although the plantation programme started from the 1st five year plan but it gained momentum from IIIrd plan onwards. The brief description of the activities under taken right from 1st Five Year Plans is given as under:

5.1.1 Ist Five Year Plan (1951-56)

After the merger of princely states the forests of the tract were densely stocked and exploited commercially. The forests of deodar, Kail and Chil working circles were managed under the system of simple thinning and improvement fellings. Oak forests were managed under selection working circle to meet local demands of fuel and fodder. Sowing and planting of deodar and broad leaved species was prescribed in all working circles and the results thereof were generally satisfactory but in some areas success were found only partial for obtaining the maximum production of timber and bringing about a more normal distribution of the age classes.

5.1.2 IInd Five Year Plan (1956-61)

During this period, the conifer forests were exploited for revenue with emphasis on plantations in blanks. The artificial regeneration in the form of patch sowing and planting had been carried out in Chil and deodar forests. However, deodar planting was not found successful. Regeneration felling was not prescribed anywhere in conifer forests.

5.1.3 IIIrd Five Year Plan (61-66)

The commercial working of all conifer species was continued with thrust on natural regeneration to be supplemented with artificial regeneration by way of sowing and planting in blanks. Though thinning and improvement felling were prescribed but were not carried out. The actual markings were selective in taking out mature trees with the result these forests had become deficit in mature stock and young crop

remained un-thinned. Sowing and planting operations had also not yielded any appreciable results.

5.1.4 IVth Five Year Plan (1969-74)

Removal of deodar was on higher side to meet the demand of right holders where as Kail and fir/ spruce were removed less than the prescription. In Chil working circle the removal was normal and satisfactory. The plantation working circle was created with main object of management to rehabilitate the poorly stocked and degraded forests to meet the local requirements.

5.1.5 Vth Five Year Plan (1974-1979)

For the period from 1966 to 1980 the yield removed in respect of conifers is far in excess than prescribed. The emphasis had already shifted to raise plantation on blank degraded forests. However results of plantations were not much satisfactory due to inadequate protection and heavy pressures of grazing. The plantations were also not carried out as per prescriptions.

5.1.6 VIth Five Year Plan (1980-85)

With the launching of social forestry project, the social forestry working circle was created (Pankaj Khullar's Working Plan 1981-1995) with the Focus shifted towards raising of fuel, fodder, small timber and grasses to meet the domestic needs of rural communities. Results were satisfactory and to some extent it was a good drive to meet the demand of fuel, fodder and timber. During this period the green trees of Rai/Fir to meet the demand of packing cases of Apple growers were cut and removed in large scale. The yield removed was far excess than prescribed in the Rai / Fir W.C. This resulted in denudation of forest land and was not covered by natural and artificial regeneration. Therefore it needs to be rehabilitated and regenerated by raising proper Nursery stock and requires a compressive and exhaustive plan.

5.1.7 VIIth Five Year Plan (1985-90)

As no seeding fellings, final fellings or other commercial fellings have been done because of ban on green felling even then the removals was higher. The regeneration was not good because of lack of protection. The social forestry works were in full swing. Emphasis was on raising fuel, fodder, small timber and grasses in UPFs and degraded forests.

5.1.8 VIIIth Five Year Plan (1992-97)

There was huge deviation in yield prescribed and removed from 1981-82 to 1992-93 from almost all the forests of different working circles which revealed that removal was higher in deodar, kail, chil and other B/L species. Sowing and planting of deodar was also not successful where the protection was not ensured. The JFM approach also started in the division and 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 management committees and their participation in planning and implementation was started.

5.1.9 IXth Five Year Plan (1997-2002)

The activities of ODA/DFID continued in the pilot phase and in the consolidation and Development plan. The works of afforestation, soil conservation, entry point activities carried out by the VFDCs as per approved microplan.

5.1.10 Xth Five Year Plan (2002-2007)

Both the JFM programmes, DFID & SVY created mass awareness about forestry but the focus was again on raising plantation besides soil conservation works and entry point activities. The contribution in works to the tune of 5 to 15 % was desired but could not be perused properly. CAT plan of Kol Dam was also implemented with emphasis on afforestation & soil and water conservation in catchment area of Sutlej River falling under the territory of this division.

5.1.11 XIth Five Year Plan (2007-2012)

During this period afforestation work was under taken on large scale under CAT plan in this Division. Plantation raised under CAT plan from 2004-05 to 2008-09 is given in **table-5.1**.

Table-5.1

Detail Of Plantations Raised under DFID

Year	Afforestation (ha)	Pasture Development	Total (ha)
2004-05	111	-	111
2005-06	230	-	230
2006-07	318	11	329
2007-08	230	30	260
2008-09	661	-	661
Total	1550	41	1591

5.1.12 XIIth Five Year Plan (2012-2017)

Under this plan several issues have been flagged during the planning commission consultations with different stake holders which deal with Land, mining, forest and wild life management, climate change, waste management, reduction of population, conservation of forests and biodiversity etc. These must be viewed in the light of enormous inter connection that exist within the broader dynamics of environmental management. Important issues that require focused attention during the Twelfth plan are:-

- i) Securing ecology of watershed and catchment.
- ii) Cumulative Environmental Impact Assessment (CEIAs) for vulnerable regions.
- iii) Carrying capacity studies in the selected river basins
- iv) To control water quality and quantity through pollution control of water resources.
- v) Restoration of wet lands and lakes etc.
- vi) Management of waste water discharge from industrial and commercial into major water bodies.

During the plan period, the revised working plan will be operative and the recommendations/suggestions given in the twelfth five year plan will be achieved during working plan period.

5.2 Suggestions for Future: - Priority of Forest settlement & revenue entries.

- 5.2.1.** All the RF's and DPF's are to be entered in the Revenue record. At present 58.53% of the total forest area of this Division is UPF which is to be converted and notified as DPF.
- 5.2.2.** The tract of this Working Plan consists of many very good forests of Deodar, Deo/Kail especially. In the past five year plans emphasis was laid on afforestation departmentally or through JFM. Some soil and water conservation works have also been carried out in the past. But unfortunately the tending operation has been ignored. Because tending operation essentially covers operations both on the crop itself and on the competing vegetation. There are certain forests under this division i.e. R-16 Kalala, R-13 Chambi Kupa etc. where large number of seedling per area have grown up. These large numbers of saplings has limited the moisture, food and light available for tree growth due to intense competition. Therefore to avoid this adverse effect thinning of A Grade & B Grade is to be carried out in immature stands for the purpose of improving the growth and form of the trees that remain, without permanently breaking the canopy. No doubt the thinning operation will maintain and improve the hygienic condition of a forest and will reduce the fire hazards. This should also be one of the major priorities during the next five year plan to manage the forest of this division in a scientific manner.

CHAPTER – VI

STAFF AND LABOUR SUPPLY

6.1 Staff.

The staff position as it stood on 1.4.2013 is given in table-6.1.

TABLE – 6.1
Staff Position of Theog Forest Division

Sr. No.	Category of Post	Sanctioned Strength	Existing Strength	Variation
1	D.F.O. HPFS	1	1	-
2	A.C.F.HPFS	1	1	-
3	Forest Ranger	3	3	-
4	Dy. Ranger	12	13	+1
5	Forest Guard	48	35	-13
6	Supdt. Gr. II.	1	1	-
7	Sr. Asstt.	2	1	-1
8	Jr. Asstt / Clerk	5	4	-1
9	Kanungo	1	-	-1
10	Patwari	1	1	-
11	Driver	1	1	-
12	Peon	4	8	+4
13	Chowkidar	4	5	+1
14	Khalasi	2	-	-2
15	Sweeper	2	-	-2
16	Mali	2	2	-
17	Forest Worker	30	21	-9

6.1.1 Executive Charge.

This Division consists of Three Ranges viz Theog, Kotkhai and Balson (at Deha).List of Divisional Forest Officers who has held the charge of Divisonal Forest Office Theog is given in Table No:-6.2

Table-6.2
DFOs Posting Status

Sr.No.	Name of DFOs	Period	
		From	To
1	Sh.B.D.Bhartiya	01.06.1984	09.08.1984
2	Sh. Viney Tandan	15.10.1984	05.01.1987
3	Sh.Tejinder Singh	09.02.1987	12.01.1990
4	Sh.AC.Sharma	02.02.1990	29.04.1993
5	Sh. P. K. Sharma	30.04.1993	01.07.1997
6	Sh. V.K.Singh	01.07.1997	23.07.1998
7	Sh. C.B.Panday	24.07.1998	24.04.2000
8	Dr. Chandresh Sharma	25.04.2000	06.08.2000
9	Sh. K.S.Thakur	07.08.2000	27.08.2001
10	Sh.Ashok Chauhan	27.08.2001	14.07.2005
11	Sh. B.L.Verma	26.07.2005	09.11.2005
12	Sh. D.K.Khatta	10.11.2005	11.07.2007
13.	Sh. B.R.Chaudhary	12.07.2007	05.03.2009
14.	Sh. B.L.Verma	10.03.2009	03.06.2009
15.	Sh. H.K.Sarwata	04.06.2009	16.09.2009
16.	Sh. B.L.Verma	17.09.2009	31.01.2010
17.	Sh. D.R. Kaushal	01.02.2010	18.09.2010
18.	Sh. N.P.Bharot	19.09.2010	11.11.2010
19.	Sh. L.R.Chauhan	12.11.2010	30.09.2011
20.	Sh. J.S. Dulta	05.03.2011	07.04.2011
21.	Sh. P.S. Verma	30.09.2011	30.04.2014
22.	Dr. Neeraj Kumar Chadha	02.05.2014	01.04.2015
23.	Sh. K.R. Kaundal	09.04.2015	To continue

6.2 Ranges, Blocks, Beats and Check Posts

The following table 6.3 gives the present number of Ranges, Blocks, Beats, Check Posts and Van Thana. Which are meant for administrative control and execution of various afforestation and other developmental works?

TABLE – 6.3**Detail of Range/Block/Beat**

Division	No. of Ranges	No. of Blocks	No. of Beats	No. of Check Posts	No. of Van Thana	Total
Theog	3	9	44	-	2	58

6.2.1 No separate staff has been provided for Van Thanas and powers under I.P.C are not notified which could be exercised by the field staff of Forest Department. Even field staff in beats is inadequate and insensitive; eleven beats are without Forest Guard at present. For better management of forest; old establishment of Ranges/ beats/blocks needs to be strengthened with adequate staff equipped with arms and dignified uniform. Vacant Territorial beats needs to be filled up by recruiting fresh Forest Guards and does not require policing but the existing Laws, Rules and Acts under IFA 1927, FCA 1980 and Wild life act 1972 provides enough powers to the forest officers. Hence, the requirement of the day is to restore the old traditional means of protection forestry which at first instance needs demarcation of all type of forest land and its corresponding entries in the revenue records. Second priority should have been to deploy adequate staff in each beat/block, Range and Division, which at present is lacking and no sincere efforts seems to have been taken in this regard. It is therefore emphasized that there must be a regular forest guard in each beat, who should be provided with all amenities like accommodation and Arms. The pattern of providing and wearing of uniform and stay at his H.Q should be strictly enforced. Uniform should be provided to all field staff including forest workers.

6.3 Labour Supply

There is problem of labour for executing field work because the local labour is attracted by the apple growers, potato and other cash crop growers paying them much higher wages. In addition to this, there is acute shortage of labour because of improved economy of the villagers in the apple and other cash crop growing zone due to which they are not

working as daily paid casual labour in the forest department, especially in Theog Forest Divisions. Therefore, the main source of labours in Theog Forest Division are the “Gorkhas” who come every year and are engaged in seasonal departmental works.

6.3.1 Labour wages are steadily going up due to intense employment and steep rise in prices. The rate paid to daily unskilled casual labour was Rs. 45.75 w.e.f. 01.04.1995 per day, again which has been increased to Rs. 170 per day vide H.P.Govt. Notification No. FIN (PR) B (7)-33/2010 dated 24 May, 2014. Now the unskilled daily Labour wage rate again increased to Rs. 200/- per day vide H.P.Govt. Notification No. FIN (PR) B (7)-33/2010 dated 12-04-2014.

6.3.2. Schedule of Rates:-

The common schedule of work and labour rates for the year 2012-13 of Shimla Forest Circle are applicable to carry out the departmental works with admissible increase as these rates are based on daily wage rates which increases time to time as per Govt. Notification.

CHAPTER – VII

PAST SYSTEM OF MANAGEMENT

7.1 General History of the Forests

Present Working Plan is the Revision of Dr. Lalit Mohan's Plan for Theog Forest Division (1996 to 2011). Prior to this the tract was covered under Pankaj Khullar's Working Plan (1980-95) under Shimla forest territorial division. Due to reorganization Theog Territorial Division was carved out from Shimla Territorial Division and was notified a separate Territorial Division vide CCF/HP notification No. Fts. SC-a (i) 1/83 dated 28.04.1984. Therefore, in the present revision of Working Plan Theog (Territorial) Division comprises of Theog, Madhan, Balson, Ghund, Kotkhai, Darkoti, Khaneti and part of Patiala (enclave) & Keonthal State. During 1999 Ratnari and Baghi beats of Rohru Forest Division Tikkar Range, were merged with this division of Kotkhai Range vide notification No. FFE-(A) 1-3-98 PT dated 21.12.1999. And also 6.4 ha area of Shimla Forest Division have been added to UPF-134 Chehar, Kufri Beat under Theog Range of this Division. Now, therefore, the total geographical area of this Division has increased from 64000 ha to 66393.0 ha and whereas the forest area has increased from 32045.10 ha to 33681.52 ha.

7.1.1 The past history of these forests is not known prior to 1885. It is presumed that unrestricted and selective fellings took place in the most of these forests. The recorded management of the forests which is available is that of Kotkhai State, where regular forest management was prescribed as early as 1885. After this the Working Plan/Schemes were prepared for the forests of other states and by 1937, these forests of the tract were brought under various silvicultural systems. Forests and revenue settlements also initiated simultaneously.

7.2 Past System of Management and their Results

The past history of these forests for the areas covered by each Working Circles has been discussed below in detail.

7.2.1 Sutlej Catchment Forests.

The forests of the erstwhile States of Madhan, Theog and Part of Keonthal forms the part of Sutlej catchment of this division. (Raina's Working Plan, 1952 to 1966). Prior to 1952 they were covered by different plans/schemes. However, nothing is known about the history of these forests prior to 1886 except that indiscriminate fellings were done at the will of the Rulers and public.

7.2.2A Madhan State Forests

20 Forests covering 2274 acres were demarcated in 1904 and a record of rights for these forests was completed in 1911.

7.2.2.1 Period from 1912-13 to 1931-32 (Wright's working Plan)

The DPFs were divided into three working circles.

- i) Deodar working circle comprising mature deodar in Kiari forest.
- ii) Mixed working circle comprising mixed or pure crops of deodar, Kail, Chil and oak. Thinning on a 10 years cycle was prescribed over 130 acres in this working circle.
- iii) Oak working circle include mature ban and pole crops of mohru in Kachi-Kalind and Sarog forests respectively which were prescribed to be worked under coppice with standards system, leaving 25 standards per acre.

7.2.2.2 The entire forest area was divided into two felling series, one half felled in 1912 and the remaining in 1920. 50 trees of Class-I, each deodar and oak were to be felled annually in deodar and oak working circles respectively.

7.2.2.3 Results of Working

The prescriptions were generally followed as per previous, except that young pole crops remained unthinned for want of market demand.

7.2.3 Period from 1932-33 to 1951-52 (Rai Sahib Prem Nath and Bakshi Sant Ram's Working Scheme):- Two working circles were constituted as under:-

- i) **Mixed Working Circle (2056 acres):-** Comprising all the deodar, Kail fir and Chil forests. The treatment so prescribed were cleaning in saplings and young pole crops, improvement felling in mixed crops, favoring the most valuable species and thinning in pole crops.
- ii) **Oak working circle:** -Comprising 218 acres area of Sarog and Kachi Kalind forests of Ban and Mohru. Thinnings in the coppice and pole crops and improvement felling in the older crops were prescribed.

7.2.3.1 Results of working

The sequence of felling in the mixed working circle was generally carried out except that large proportions of diseased Kail were left standing. The uncontrolled lopping of Kail caused widespread fungal infection.

7.2.4B Theog States Forests

To protect the forests of Theog States, a record of rights was prepared in 1903-04 and the forests were managed under rules laid down by the Govt.

7.2.4.1 Period from 1904-34

The forests were managed on a system of simple thinning on a 10 years cycle, aimed at bringing the forest to maturity and stocking the blanks. In 1926, light seeding felling were carried out in Roru forests.

7.2.4.2 Period from 1934-35 to 1950-51 (Pring's Working Scheme):- Two working circles were framed as under:-

- i) **The Kail and Deodar Working Circle:** -In 120 acres area "Quartier-Bleu-Treatment" was prescribed with the object of

regeneration blanks and removing the mature and over mature trees from such areas which were to be closed against grazing. Annual yield was not prescribed and was to dependent upon the silvicultural requirements of the area. As the Class-I trees so the regeneration felling were meager.

- ii) **The Thinning Working Circle:** -“C” grade thinning on a 15 year cycle was prescribed in 1700 acres and the annual yield was fixed by area. The thinning were heavy creating large gaps in the canopy. The diseased Kail trees were left almost untouched.

7.2.4.3 **Results of Working**

The young deodar plants came into existence as a result of regeneration operations as for example in Rohru and Barhan DPFs where artificial planting of deodar was also carried out aerial which provide an indication to the feasibility of conversion of more Kail areas into deodar forests. As a result of heavy marking in thinning working circle, the forests became under stocked.

7.2.5C **Patiala (Enclave) Forests**

There is no record available on the working of the forests prior to 1905. The only assumption is that heavy fellings where done to meet the local demand of timber, firewood extra and also the tree were sold by the contractors.

7.2.5.1 **Period from 1905-1935, (Fazal-ud-Din’s Working Plan)**

It is the first Working Plan when the forests of the State were brought under scientific management. The following working Circles were constructed:-

- A) Deodar Working Circle.
- B) Chil Working Circle.
- C) Oak high forest Working Circle.
- D) Oak coppice working circle.
- E) Scrub Working Circle.
- F) Bamboo Working Circle.

a) Deodar Working Circle

It comprised of Deodar, Kail, Fir and Spruce forests. These forests were worked under selection system where thinning and improvement fellings were prescribed. The deodar was given preference over kail Spruce, Oaks etc. in mixed crops.

b) Chil Working Circle

The forest having Chil as predominant species, were allotted to this working Circle. The crop being irregular, selection following system with a felling cycle of ten years combined with improvement felling was the system prescribed, for obtaining the maximum production of timber and to bring out a more normal distribution of the age classes. The exploitable size was fixed over 180 cms girth.

c) Oak high forest working circle

These forests were managed under selection come improvement felling on a 15 years felling cycle.

d) Oak coppice Working Circle

These forests were managed under coppice with standard system with a rotation of 30 years. The annual felling coupe was 13-20 hec. Retention of 10 standards per ha. and saplings were 22.5 cm girth was also prescribed.

e&f) Scrub Working Circle and Bamboo Working Circle

As the forests allotted to both of these Working Circle are not confined to the Theog division. So these are not being discussed here.

7.2.5.2 Result of working

The selection fellings were carried out as per prescription in deodar Working Circle. The selection and improvement fellings were not carryout as per prescriptions in Chil Working Circle. Due to lack of demands, less felling were done as compared to prescription in the Oak high forest working circle and Oak Coppice working Circle.

7.2.6 Period from 1936 to 1955 (Budhi Singh's Working Plan)

The following working circles were constructed:

- a) Deodar Working Circle.
- b) Chil working Circle.
- c) Oak Working Circle.
- d) Protection working circle.
- e) Scrub Working Circle.
- f) Bamboo Working Circle.
- g) Khair working circle.

a) Deodar Working Circle

Deodar, Kail and mixed with fir/spruce forests were allotted to this working circle. Selection system was prescribed as the system of management of felling cycle of ten years was adopted.

b) Chil Working Circle

The pure of mixed chil forests were allotted to this working circle. Selection system with a felling cycle of ten years was prescribed of these forests. The rotation was fixed as at 130 years.

c) Oak working circle

This comprised of two felling series. Oak high forest working circle areas of fazal-ud-Din Working Plan which contained all age classes intimately mixed were constituted as felling series 1, and the oak coppice working circle areas of his plan which had been worked under coppice with standard and contained only young crop, were constructed as felling series II under this working circle. The forests were worked under selection come improvement felling with a felling cycle of ten year and exploitable diameter of 55 cms in felling series I. Coppice with standard system was adopted in felling series to with exploitable diameter of 50 cm. Mixture of deodar and Kail was to be maintained. Chil was to be discouraged in these forests.

d) Protection working circle

The forests without trees growingly or poor tree growth were allotted to this working circle. The management was to aim at protection of soil and preservation of forests cover in general by rotation closures. No felling

expect for right holders were prescribed. Sowing and planting of suitable species was prescribed.

(e),(f)&(g) Scrub, Bamboo Khair working circle

As the forests allotted to these working circles are not confined to this Division, so these are not discussed here.

7.2.6.1 Result of working

Thinning or improvement fellings prescribed for deodar working circle were not carried out and the growth suffered due to congestion in younger classes. In chil working circle excess yield was removed as compared to prescribed yield and the irregular crop could not be converted into regular crop. The prescriptions of felling and silvicultural operations were almost carryout in Oak working circle. As no proper record was available, so the achievements of sowing and planting under protection working circle could not be assessed.

7.2.6.2 Past yield

The total numbers of trees removed from DPFs and Dehat forests of Koti, Madhan and Theog State; collectively during the period 1932 to 1948 is given in the **table 7.1**. The record of Patiala (enclave) forests is not available.

Table – 7.1
Total number of trees removed from 1932 to 1948

Species	DPFs	Dehat Forest	Total
Deodar	39409	15514	54923
Kail	76677	48697	125374
Chil	10271	6921	17192
Rai	3948	425	4409
Oaks	16228	4037	20265
Total	147358	75649	223007

7.2.6.3 Past Revenue and Expenditure

The total and average annual expenditure in respect of Koti, Madhan and Theog States is given in table-7.2. The record of Patiala (enclave) forests is not available.

Table-7.2

Sr. No	Name of State	Revenue (Rs.)	Expenditure (Rs.)	Surplus/deficit (Rs.)
1.	Madhan			
	i) Total (1932-47)	44518	63360	- 18841
	ii) Average annual	2782	3960	- 1177
2.	Theog			
	i) Total (1935-47)	35294	14754	+ 20540
	ii) Average annual	2715	1135	+ 1580

7.2.7 Raina's Working Plan (1952-66)

A single integrated working plan for the Theog forest division was prepared by Raina comprising the forests of erstwhile Princely State of Koti, Madhan, Theog (part) and Patiala (enclave) forms part of Sutlej catchment. Following three working circles were constituted.

7.2.7.1 The Thinning and Improvement Working Circle

Chil, Kail and deodar forests comprising an area of 8,621 acres was allotted to this working circle. The treatments prescribed were, cleanings in saplings and young pole crops, improvement felling in favour of more valuable species in mixed crops and thinning in pole crop. Deodar plantation was prescribed in blanks and in areas occupied by fungus attacked or diseased Kail. Exploitable size and age were not determined but were taken as 24" d.b.h. corresponding to 120 years of age. The yield was prescribed by area and estimated to be 70 cft. per acre. Marking were prescribed purely on silvicultural principles with the object of developing the growing stock. A felling programme was prepared and each forest was prescribed for felling once in 10 years. Lopping of Kail was allowed as per lopping rules framed under the record of rights with

the object to control excessive lopping. Under the subsidiary silvicultural operations, areas containing isolated trees or small patches of Kail poles with dense growth of shrubs were prescribed for artificial restocking with deodar supplemented by such Kail as may come in naturally. Resin tapping from Chil trees was also done in small scale and proposed to be expended.

7.2.7.2 Results of working

The thinning and improvement fellings as prescribed were not followed upto 1965-66. The actual markings were selective in taking out mature trees with the result that these forests become deficit in mature stock and young pole crop remained un-thinned. That total annual volume removed (including trees granted to right holder) is in excess than the prescriptions as given below in **table – 7.3**.

Table-7.3

All Conifers	Prescribed (cft.)	Vol. removed (cft.)	Deviation (cft.)
Annual Vol.	57543	103935	+ 46392

Lopping rules also could not be followed which resulted heavy lopping in Kail and caused fungus attack. Sowing and planting operations also not yielded any appreciable results.

7.2.7.3 Oak Working Circle

Ban and Mohru oak forests were allotted to this working circle. It was divided into coppice felling series with an area of 1,031.5 acres which was managed under coppice with standard system and local felling series with an area of 1,062 acres in which thinning and improvement felling were prescribed. Rotation for coppice and standard was fixed at 60 years and 180 years respectively. No rotation was fixed for local felling series. Yield was fixed by area. $1/60^{\text{th}}$ of the total area in the coppice felling series and $1/10^{\text{th}}$ of the total area in local felling series was to be gone over annually. After felling, the blanks above 5000ft. were prescribed for sowing/planting with deodar where as ban sowing was prescribed below 5000 ft.

7.2.7.4 **Result of working**

In the coppice felling series the areas prescribed have been worked but the sowing or planting of deodar has not been given due attention, proper protection and weeding and cleaning were particularly neglected. Hence, the results on the whole are not encouraging. In the local felling series the area worked during the first 14 years in excess of the prescription by about 1,700 acres which means about 120 acres annual excess on an average.

7.2.7.5 **UPFs (Dehat Forests)**

The forests in UPFs were not allotted to any working circle but thinning and improvement fellings on silvicultural basis were advised in all such areas. Lopping cycle of 3 years was drawn up for all species.

7.2.7.6 **Result of working**

The marking were not done on silvicultural considerations and lopping was unrestricted which resulted poor condition of Dehat forests.

7.2.7.7 **Special works of Improvement Undertaken**

Six inspection paths were prescribed but none was constructed. A sum of Rs. 6,648 (Rs. 475 per annum) was spent on repair of existing roads. However, following buildings were constructed.

Sr. No.	Particulars	Year of const.	Cost
1.	Range office cum residence, Theog.	1952-66	Rs. 11,500/-
2.	Clerk quarter, Theog	1952-66	Rs. 10,000/-
3.	Forester quarter, Theog.	1952-66	Rs. 6,000/-
4.	Forest Guard Huts at Theog, Bhekhalti & Sarog (3 Nos.)	1952-66	Rs. 3,638/-

7.2.7.8 Past Yield

Total yield of conifers removed during the period 1953 to 1965 (except 1952 of which figures are not available) is given in **table – 7.4**.

Table – 7.4

Sr. No.	Species	Volume (cft.)
1.	Deodar	4,21,165
2.	Kail	7,38,095
3.	Fir	99,656
4.	Chil	92,241
Total (for 13 years)		13,51,157
Annual average		1,08,935

7.2.8 Keonthal State Forests

Before 1898, heavy and selective felling of all big and marketable trees was carried out. In 1898, the management of the State was taken over by British Govt., excess felling were stopped and a protective establishment appointed. A forest settlement Report was prepared by Mian Durga Singh in 1902 and a working plan was prepared by Mayes in 1905.

7.2.8.1 Period from 1905 to 1934 (Mayes Working Plan)

Regular management began in 1905 and seven working circles were constituted. All pure deodar, Kail and Chil forests were allotted to working circle I, II and III respectively. All oak forests were allotted to working circles IV (Tarab) V (Junga) and VI (remaining oak areas). All forests of Rawin Pundar were allotted to working circle VII. Thinnings and improvement felling were prescribed in all coniferous and oak forests on a 10 year cycle except for oak forests of working circle V Junga) where coppice with standard system was applied. Selection fellings were prescribed in working circle VII. Yield in all working circle was fixed by area Exploitable size was fixed 6 feet girth for deodar, Kail and Chil and 4.5 feet girth for oak.

7.2.8.2 Results of Working

The forests responded favorably to the treatment and general improvement was noticed. Fir trees were cut, deodar planted in fir burnt blanks, and road and buildings constructed.

7.2.8.3 Past Yield

The yield was regulated by area and no volume check was provided and also not recorded in control forms. An abstract of the number of trees removed by purchasers from the Reserved and DPFs of Fagu and Matiana ranges during the period of 15 years from 1918-19 to 1932-33 is given in **table-7.5**. Record is not available for earlier period.

Table-7.5

Year	-----Species-----					
	Deodar	Kail	Chil	Ban	Fir	Misc.
Total No. of trees 1918-19 to 1932-33	146896	70166	30612	121162	4667	77630
Annual average	9793	4677	2040	8077	311	5175

7.2.8.4 Past Revenue and Expenditure

The total average annual figures of revenue, expenditure and surplus for period 1901-02 to 1932-33 (excluding the period from 1904-05 to 1909-10 for which figures are not available) for the whole working plans area (including Rawin Pundar) are given in **table-7.6**.

Table-7.6

Year	Revenue	Expenditure	Surplus
Total 1902-03 to 1932-33	8,13,392	3,14,456	4,98,936
Annual Average	31,284	12,094	19,190

7.2.8.5 Period from 1935 to 1964 (Saigal's Working Plan)

The following six working circles were constituted.

7.2.8.6 Improvement Working Circle

All deodar and Kail forests, covering an area of 3286 acres of Junga and Fagu- Matiana ranges, were allotted to this working circle. Two felling series viz. Deodar felling series and Kail felling series were formed. Thinnings and improvement felling in favour of deodar were prescribed on a 10 year felling cycle Exploitable diameter was fixed at 20” for both deodar and Kail. No rotation was fixed and yield was calculated by area. Sowing and planting of deodar was recommended.

7.2.8.7 Results of Working

Artificial regeneration of deodar in Kufta DPF has come up fairly satisfactory.

In Kadharab DPF, the fungus attack was removed but deodar planting was not successful. The working has been generally satisfactory. Felling record from 1935 to 1950 is not available. The working plans expired in 1964 and in 1965 felling were carried out under annual felling programme in accordance with the principles of expired working plan and annual area prescribed for felling has been adhered to. The volume removed during the period is given in **table – 7.7**.

TABLE – 7.7

Species	Volume (cft.)
Deodar	1,96,554
Kail	83,499
Fir	11,645
Chil	3,710

7.2.8.8 Chil Working Circle

Pure Chil forests of old Junga and Fagu-Matiana ranges, covering an area of 3979 acres were allotted while other PBs were not allotted to this working circle. Rotation was fixed at 125 years and only PB-I areas (25 years) allotted while other PBs were not allotted. Chil was to be managed under shelterwood system and natural regeneration was

proposed to be supplemented by sowings. Exploitable diameter was fixed 24" d.b.h. The annual yield from PB-I was fixed at 8000 cft. No year wise programme of felling was laid down. Seeding and secondary fellings were left to the discretion of the DFO subject to condition that the prescribed yield should not exceed. In other PBs thinning were prescribed, yield was calculated by area i.e. an average of 165 acres ($1/15^{\text{th}}$ of the area) per year on a 15 year cycle.

7.2.8.9 Result of Working

The working in PB-I and other PBs in general has been quite satisfactory. PB-I areas burnt during 1920-21 were prescribed for plantation with deodar and Kail. Deodar has failed while Kail is coming up. Records of felling from 1935 to 1950 are not available. During the period 1951 to 1964, the yield removed is much in deficit as compared to prescribed yield from PB-I. Total volume removed from entire working circle from 1951 to 1965 is given in **table-7.8**.

TABLE-7.8

Species	Volume (cft.)
Deodar	51,828
Kail	20,048
Fir	590
Chil	67,948

7.2.8.10 Oak working Circle

All valuable ban and Mohru forests situated in old Junga range, covering areas of 4828 acres were allotted to this working circle. Two felling series viz (a) Coppice felling series and (b) Local felling Series were formed. Coppice with standard system was prescribed for coppice felling series and rotation was fixed at 60 years for coppice and 180 years for standards. Thinnings and improvement felling on a 15 years cycle was prescribed for local felling series and no rotation was fixed. Yield was prescribed by area in both the felling series. The average annual coup being $1/60^{\text{th}}$ of the total area in coppice felling series and $1/15^{\text{th}}$ in the local felling series.

7.2.8.11 Result of Working

Record of felling for the period 1935 to 1950 is not available whereas prescriptions of felling by area have been followed from 1951 to 1965. The sowing and planting of deodar in coppice coupes was unattended. The rotation of 60 years for coppice was rather high when the object was only to utilize the produce for firewood and charcoal. Working in the local felling series has been generally satisfactory.

7.2.8.12 Selection Working Circle

All pure Kail forests of Pundar valley and one compartment in the Rawin area, allotted to this working circle. As these areas are now outside the jurisdiction of Theog forest division, therefore not discussed here.

7.2.8.13 Afforestation Working Circle

It covered all the forests in Shilla pargana of old Fagu-Matiana ranges, which were burnt during 1920-21. The burnt areas were confined mainly to spurs and high lying glades. Exploitable diameter and rotation was not fixed. The main object was to restock the area with Kail and deodar was also introduced at many places. The wooded portions of the forests were to be thinned during three years from 1947-48 to 49-50. The yield was prescribed by area according to the thinning schedule.

7.2.8.14 Results of working

The total volume removed from this working circle from 1951 to 65, mainly for right holder, is given in **table-7.9**.

TABLE-7.9

Species	Volume (cft.)
Deodar	6,067
Kail	72,751
Fir	5,921
Chil	8,351

Complete record of sowing/planting is not available. However, a field observation reveals that though the attempts of deodar regeneration have been made but the results are encouraging. Kail is coming naturally in blanks.

7.2.8.15 **Protection Working Circle**

High lying, inaccessible, very open or steep forests, as also forests heavily burdened with rights, were allotted to this working circle. The object was the preservation of the existing forests with underlying aim to bring as many as of these forests as possible under systematic management at the end of working plan. The exploitable diameter was fixed at 30" d.b.h. for deodar and 24" d.b.h. for Kail. Thinning and improvement fellings in favour of deodar were prescribed. Deodar planting was also suggested by replacing inferior species. There was no prescription for yield but by amendment in 1943, the yield was fixed at 2000 tress of class IB per annum.

7.2.8.16 **Result of Working**

Record for 1935 to 51 is not available. The volume removed from 1952 to 1965 is given in **table – 7.10**.

Table-7.10

Species	Volume (cft.)
Deodar	5,514
Kail	9,810
Fir	18,541

The results of working have been fairly satisfactory, though lopping continued unchecked.

7.2.8.17 **Special Works of Improvement**

The roads and buildings constructed are given in **table-7.11**.

TABLE – 7.11

Sr. No.	Particulars	Length		Year of Const.	Cost (Rs.)
		Miles	K.M.		
1.	Kuthan I/Path	2	3.20	1905-34	2,000/-
2.	Forest Guard Huts at Kolmu, Bithu, Sandhu & Gadakhupar (4 Nos.)	-	-	-	15,913/-

A sum of Rs. 11,980 and 25,590 was spent on repair of existing road/path and buildings respectively during 1952 to 1965.

7.2.9 **Giri Catchment Forests (Theog Forest Division)**

The history of these forests which belonged to the erstwhile States of Balson, Ghund and Theog (Part) is discussed in the following paragraphs except for the Theog State which has already been dealt with under Sutlej catchment forests.

7.2.9.1 **Balson State Forests**

Forest conservancy in these areas started in 1886 and prior to that there was no proper forest management, the state and Zamindars cut the trees at will according to their requirements but no timber was exported. In 1886, the letters were issued to followed conservancy rules. From 1887 to 1889, 2,727 deodar trees were cut by traders. A further circular was issued in 1888 in accordance with which forests were demarcated and rights were regulated. From 1892 to 1901, the average number of deodar and Kail trees sold annually to contractors, were 60 and 169 respectively.

7.2.9.2 **Period from 1903-26 (Coventry's Working Plan)**

Selection cum improvement was the treatment prescribed and annual yield for export was fixed at 80 deodar and 700 Kail of over 24" d.b.h.

7.2.9.3 Results of Working

The yield was taken out within the prescribed limit upto 1921 but from 1922 onwards the yield was exceeded. Densely stocked and over mature spruce and silver fir forests were left untouched, mainly due to lack of demand.

7.2.9.4 Period from 1927-41 (Glover's Working Plan)

The following three working circles were constituted:-

- i) **The Regular Working Circle:** -Deodar and Kail forests covering an area of 6314 acres were allotted to this working circle. These forests were worked under shelterwood system with the object to bring normal distribution of age class and to encourage deodar particularly to replace diseased Kail. These forests were divided into 4 periodic blocks. The exploitable size of deodar and Kail was fixed at 24" d.b.h. corresponding to the rotation of 120 years. The yield was regulated by volume. The regeneration period in PB-I was prescribed as 15 years.
- ii) **Afforestation Working Circle:** -The forest burnt during 1921 comprising an area of 267 acres, like Ghorna forest, was allotted to this working circle. The object was to regenerate the area naturally and artificially, preferably with deodar.
- iii) **The Fir Working Circle:** -Spruce and fir forests covering an area of 3852 acres were allotted to this working circle. The exploitable size of fir and spruce was fixed 24" d.b.h.

7.2.9.5 Results of Working

The reduction of regeneration period in PB I areas from 30 to 15 years and removal of over wood within this period in regular working circle was not justified from the point of view of sustained yield. The fir forests were not worked. Fire burnt area in Ghorna was restocked.

7.2.9.6 Period from 1942-46 (Glover's Extension)

The forests were worked under Glover's extension scheme which replaced the Shelter wood system by selection system and the exploitable diameter was raised from 60 cms. To 70cms Heavy thinning (D/E grade) were prescribed for PB II and C/D grade thinnings for PB III and PB IV. All the forests were to be thinned in five years. As a result, most of the compartments, other than PB I, were heavily thinned and entire prescribed yield of deodar was obtained from them.

7.2.9.7 Period from 1946-50 (Partap Singh's Extension Scheme)

This scheme prescribed the removal of all silviculturally available trees whether in Secondary or final felling and irrespective of size in PB I, leaving only poles and saplings. Diseased Kail trees were also to be removed. The average annual yield prescribed for deodar (I and II class trees) was fixed 30,000 cft. and that for Kail (I and II class trees) was fixed 60,000 cft. Thinnings were not prescribed because of heavy thinning done in the past.

7.2.9.8 Results of Working

The fellings were almost within the prescribed limit. The results were good and regeneration established quickly.

7.2.9.9 Further management of the Balson state forests from 1951-52 to 1966 was prescribed under Raina's working plan for the Giri catchment forests of Shimla forest division and discussed in the following paragraph :-

7.2.9.10 Ghund State Forests

The history of these forests prior to 1890 is not known. McIntire in 1890 demarcated some 200 ha. Of forests in the state and record of rights was framed in 1907.

7.2.9.11 Period from 1909 to 1929 (Ghund Working Scheme)

This was the first working scheme for these forests. Thinnings and improvement fellings on 5 year cycle were prescribed.

7.2.9.12 Period from 1929-31

After the expiry of the first working scheme annual plan were drawn up by DFO Shimla.

7.2.9.13 Period from 1932-51 (Dewan Prem Nath's Working Scheme) Only one working circle was constituted for the entire demarcated forest area. Cleaning in sapling and young pole crop and thinning in pole crops on 10 years cycle was prescribed, favouring deodar against Kail and Kail against spruce in mixed crops.

7.2.9.14 Results of Working

The prescriptions were carried out almost regularly. Thinnings in pole crops were lighter but encouraged deodar and Kail. Mohru was subject to heavy lopping. On the whole the results of this scheme were good.

7.2.9.15 Past Yield, Revenue and Expenditure

The total number of trees felled including trees for rights holders from DPFs and Dehat forests of Balson, Ghund and Theog State, was deodar = 41,446, Kail = 1,55,018, fir = 25,071 and oak & misc. = 1,288. The annual revenue and expenditure figures are given in **table-7.12**.

TABLE-7.12

State	Revenue (Rs.)	Expenditure (Rs.)	Surplus/ deficit (Rs.)
Balson	40,700	6,542	+ 34,158
Ghund	2,097	440	+ 1,637
Theog	2,715	1,135	+ 1,580

7.2.9.16 Further management of Ghund State forest was under Raina's working plan, described in the following paragraphs.

7.2.10 Period from 1951-52 to 1966 (Raina's Working Plan)

This working plan includes the forests in the erstwhile princely States of Balson, Ghund and Theog (Part) draining into the Giri River. It was a revision of above mentioned scheme and plans. The forests were allotted to two working circles.

7.2.10.1 Regular Working Circle

The deodar, Kail and oak forests, covering an area of 8569 acres, were allotted to this working circle. These forests were managed under Punjab shelterwood system with 5 periodic blocks of 30 years each were constituted. Rotation was fixed at 150 years, corresponding to an exploitable diameter of 70 cms d.b.h. for deodar and Kail. Felling cycle was fixed at 15 years. The aim was to remove diseased Kail and to encourage deodar. The annual yield prescribed for deodar was 1, 47,000 cft. and for Kail was 31,400 cft. Yield of spruce and fir was not to be controlled and their removal was to be in the interest of more valuable deodar and Kail.

7.2.10.2 Result of Working

The prescriptions were not followed properly and much higher yield than prescribed was removed as given in **table-7.13**.

Table-7.13

Species	Prescribed Yield (cft.)	Average annual removed(cft.)	Annual Deviation (cft.)
Deodar	14,700	42,589	+ 27,889
Kail	31,400	59,610	+ 28,210

Seeding fellings were conservative. Thinnings in young crops were light which caused congestion in pole crops. Results of sowing and planting were also not satisfactory.

7.2.10.3 Fir Working Circle

The silver fir and spruce forests covering an area of 3484 acres were allotted to this working circle. These forests were

managed under selection system with the object to remove mature stock, taking into consideration the steepness of ground. However, shelterwood felling was suggested in the forests where deodar and Kail occurred in mixture with fir. The exploitable diameter was fixed at 70 cms. d.b.h. Rotation was not fixed. Below 9000 ft on suitable soil and aspect, deodar and Kail were to be introduced in place of fir and spruce. The annual yield was prescribed at 800 trees of 28" d.b.h. A sequence of forests was to be gone over in selection felling once in 15 years.

7.2.10.4 Results of Working

Less felling were carried out than those proposed. Against the prescription of 12000 trees (800 trees per annum) only 3065 trees were felled over a period of 15 years giving an average of 204 trees per annum. Apart from this, a total of 98 deodar and 185 Kail trees have also been removed which were not prescribed. Several roads and buildings were also repaired/constructed and the details are given in **table-7.14**.

TABLE-7.14

Sr. No.	Particulars	Year	Cost (Rs.)
1.	Inspection hut at Kalna	1958-59	10,500/-
2.	Range Quarter at Deha	1961-62	12,480/-
3.	Forest Quarter at Mahasu	1960-61	5,700/-
4.	Forest Guard Hut at Deha	1955-56	4000/-
5.	Forest Guard Hut at Ghund	1960-61	4000
6.	Forest Guard Hut at Mahasu	1960-61	4000/-
7.	Forest Guard Hut at Kalna	1960-61	4000/-
8.	A labour Hut at Deha	Figures not available	
9.	Khagna-Kalna Bridal path via Chadaha	-- do--	

7.2.11 Kotkhai (Tehsil) Forests

Prior to 1885, the forests were not worked under any systematic management. The local people felled trees at will for their own use or for mining the iron forges at Kotkhai. Revenue settlement was done in 1885 and the forests were placed under the control of the Tehsildar.

7.2.11.1 Period from 1886 to 1900 (Mc. Intire's Working Plan)

There was a separate working circle for each forest. Chambi Kupa forest being divided into two working circles. The working plan prescribed a simple system of thinning, improvement and selection felling.

7.2.11.2 Period from 1900 to 1921 (Coventry's Working Plan)

Two working circles were formed namely Kotkhai working circle and Nag Kelo working circle. The latter is outside the tract. Thinning in congested crops and improvement felling and selection felling were prescribed in Chambi Kupa and Kalala Reserve Forests.

7.2.11.3 Results of Working under the above two Working Plans

Both the working plans prescribed a system of thinning, Improvement and selection felling. An exploitable diameter of 24" was fixed. The old records are not available but from 1912-13 to 1920-21, it appears that 989 deodar class I and 1672 Kail class I trees were felled for export. These figures included trees removed from Nagkelo forests (Kotgarh). The prescribed yield has not exceeded. The removals of fir and oak trees were intermittent owing to lack of demand.

7.2.11.4 Period from 1921-1926

Though Coventry's plan expired in 1921 but its prescriptions continued upto 1926. The felling consisted mainly of deodar trees killed in extensive fires of 1921 and of trees marked in thinning and improvement felling.

7.2.11.5 Period from 1927-46 (Glover's Working Plan)

Two working circles namely, Regular and unregulated working circle were constituted. All valuable deodar, Kail and Chil forests were allotted to regular working circle in which thinning in a 10 years cycle were prescribed. Rotation was fixed at 120 years. Yield was prescribed by area. The broad leaved species, fir and some remote and poorly stocked forests of Kail, which were of no commercial value, were allotted to

unregulated working circle. The thinning was left to the discretion to the DFO essentially to meet demands of right holders. The blanks caused by 1921 fires were to be restocked with deodar by the end of 1931.

7.2.11.6 Results of Working

All the prescriptions laid down in the plan, were carried out sincerely, resulting improvement in the crop. The burnt areas were regenerated. The new roads and buildings were also constructed beside repair. The annual yield of conifers from Regular working circle is about 1 lac. cft. and from unregulated working circle is 69000 cft. The total and annual average revenue, expenditure and surplus/deficit from 1932-33 to 1946-47 is given in the **table-7.15**. The net annual surplus was thus Rs. 4109 as against the amount of Rs. 9000 anticipated in the working plan.

TABLE-7.15

Year	Revenue (Rs.)	Expenditure (Rs.)	Surplus/ deficit (Rs.)
1932-33 to 1946-47	2,07,861	1,46,230	+ 61,631
Annual average	13,857	9,749	+ 4,109

7.2.11.7 Period from 1948 to 1966 (Mohan Singh's Working Plan)

Following two working circles were constituted.

7.2.11.8 Regular Working Circle

All deodar, Kail, Chil and accessible fir forests were allotted to this working circle. "C" grade thinning was prescribed. Regeneration felling was prescribed for three sub compartments of Kalala Reserve. No allotment to Periodic Blocks was made. Rotation was fixed at 160 years. Yield was not deodar was prescribed for restocking the fire burnt areas.

7.2.11.9 Results of Working

Prescriptions of the plan were carried out regularly. The working has been generally satisfactory. Seeding felling prescribed for Kalala 8a and IIa was what conservative even than resulted fairly good regeneration. The secondary felling was carried out in Kalala C-IXa where regeneration had more or less established. Cultural operations like cleanings and unsalable thinning have been generally neglected. From

1957 to 1965, the total volume removed including the grant of right holders, is given in **table – 7.16**.

TABLE – 7.16

Species	Volume (Cft.)
Deodar	1,72,293
Kail	3,70,513
Fir	1,91,866
Chil	115

7.2.11.10 Selection Working Circle

Forests on steep and remote areas, not fit for intensive working, were allotted to this working circle. Exploitable diameter was fixed at 70 cms and selection fellings were prescribed. Rotation was fixed at 150 years for confers and felling cycle was of 10 years. Annual yield was prescribed 42,400 cft. for conifers and 38,600 cft. for broad leaved species.

7.2.11.11 Results of Working

Data from 1957-58 to 1965 is given in **table-7.17** reveals that the felling were less than the prescribed, mainly due to the difficult terrain and lack of demand for broad-leaved species.

TABLE-7.17

Year	Species	Prescriptions (Cft.)	Removal (Cft.)	Deviation (Cft.)
Total 1957-65	Conifer	3,81,600	1,26,455	- 2,55,145
	B/Leaved	3,47,400	12,980	- 3,34,420
Annual	Conifer	42,400	14,050	- 28,350
Average	B/Leaved	38,600	38,600	- 37,158

7.2.11.12 Special work of Improvement

The roads and buildings constructed during the plan are given in **table- 7.18.**

TABLE-7.18

Sr. No.	Particulars	Year of const.	Length (Km)	Cost (Rs.)
1.	Kalna-Sarhrudhar path	1948-49	3.0	Rs. 990/-
2.	Mihli-Pantha path	1927-46	2.5	Rs. 990/-
3.	Gumma-Jashla B/Path	1927-46	33.0	Rs.98310/-
4.	F.G. Hut at Kalala	1948-49	-	Rs. 1238/-
5.	Forester Quarter at Kotkhai	1961-62	-	Rs. 6980/-

7.2.12 Darkoti States Forests

Nothing is known about the early history of these forests. There was no working scheme ever prepared for these forests before 1954.

7.2.12.1 Period from 1937-38 to 1944-45

The working of these forests was controlled by DFO, Lower Bushar, on the basis of simple thinning and improvement – cum – selection fellings which resulted in steady improvement.

7.2.12.2 Period from 1955-56 to 1966

It was the first management plan for the forest of the area. All the forests were include in one thinning and improvement working circle. “C” grade thinning and improvement fellings were prescribed for deodar and Kail crops while selection fellings were prescribed for fir forests. All the

thinning were in order of preference to deodar, Kail and then to spruce. Oaks were to be retained in the under storey wherever existing. Yield was fixed by area. Sowing and planting were not prescribed unless some unforeseen calamity like fires etc. rendered it necessary.

7.2.12.3 Results of Working

The prescriptions of the working scheme have been followed regularly, so, the results were satisfactory and the forests showed improvement. The total volume removed from 1957 to 1965, is given in **table-7.19**.

TABLE-7.19

Species	Volume (Cft.)
Deodar	32,128
Kail	97,916
Fir	1,38,760

7.2.12.4 Special Works of Improvement

1. Kitchen for DFO's Hut at Darkoti Record not known.
2. Inspection Hut at Gazta (1957-58) Rs. 8,000/-

7.2.13 Khaneti State Forests

Reliable records about the early history of these forests are not available except the conclusion that unregulated felling to get revenue, were carried out before the Forest Conservancy came in force. Even afterwards upto 1935, most of the class I and II trees were removed under unregulated felling for revenue.

7.2.13.1 Period from 1935-36 to 1944-45 (Pring's Working Scheme)

The first working scheme which prescribed thinning in congested crops and closures and restocking of worst blanks in all forests of the state. An area of about 180 acres was to be thinned annually.

7.2.13.2 Results of working

The thinning was carried out towards the end of the cycle and there were no arrears. Out of 90 acres, 72 acres were sown/planted successfully. Resalan, Tharu and Bangal inspection paths were constructed. The total number of trees removed during the plan is given in **table-7.20**. The total and average annual revenue and expenditure for the whole State, during the plan period is given in **table-7.21**.

TABLE-7.20

Species	Trees Felled (Number)
Deodar	2,302
Kail	42,704
Fir	7,777
Chil	9
Oak	122

TABLE-7.21

	Revenue (Rs.)	Expenditure (Rs.)	Surplus/ deficit (Rs.)
Total (1935-44)			
Annual average	40,471	9,901	+ 30,570
	4,047	990	+ 3,057

7.2.13.3 Period from 1945-46 to 1966 (Puran Singh's Working Plan)

Two working circles were constituted.

7.2.13.4 The Improvement Working Circle

All deodar and Kail forests, covering an area of 2,193 acres were allotted to this working circle. Thinnings and improvement fellings were prescribed.

Yield was fixed by area. The blank areas were prescribed to be restocked preferably with deodar. Broad leaved species in this working circle were required to be retained and not felled merely to favour deodar or Kail.

7.2.13.5 Results of Working

The felling from 1957 to 1965 alongwith markings for right holders from 1953 to 1965 consisted in the removal of 9,501 cft. of deodar, 1, 34,690 cft. of Kail and 65,143 cft. of fir. The results were almost satisfactory.

7.2.13.6 Protection Working Circle

The forests situated on rocky and precipitous ground including natural and fire blanks, covering an area of 3,045 acres, were allotted to this working circle. These forests were comprised of silver fir, spruce, Kharsu and other broad leaved species. These forests were not worked during this period, though selection cum improvement felling was prescribed in the event when demand arose.

7.2.13.7 Special Works of Improvement Undertaken

Following works of improvement were undertaken:-

1.	Reoghati-Baghal I/Path (1961-61)	Rs. 13,827/-
2.	F.G. Hut at Baghal (1957-58)	Rs. 4,000/-
3.	F.G. Hut at Chaknoti (1959-60)	Rs. 3925/-

The prescription regarding construction of inspection paths and buildings have not been carried out.

7.2.14 Period from 1966 to 1980 (P.C. Sharma' Working Plan)

Sharma's plan revised and integrated the following seven working plans/schemes, some of which were operative even beyond 1966.

i)	Revised working plan for the Keonthal State Forest by D.D. Saigal.	1935-36 to 1964-65
ii)	Revised working plan for the Bhajji State Forest by Hari Singh	1940-41 to 1954-55
iii)	Revised working plan for the Khaneti State Forest by Puran Singh.	1945-46 to 1973-74

iv)	Fourth & Revised Working Plan for the forests of Kotkhai Tehsil of Shimla District by Mohan Singh.	1948-49 to 1967-68
v)	Second Revised Working Plan for the Giri catchment forest of Shimla Forest Division by V. Raina.	1951-52 to 1980-81
vi)	Revised working plan for the Sutjej catchment forests of Shimla Forest Division by V. Raina.	1952-53 to 1971-72
vii)	Working Scheme of Illaqua Darkoti Forests of Shimla Forest Division by Pritam Dass.	1955-56 to 1974-75

The following five working circles were constituted.

7.2.14.1 Regular Working Circle

This working circle includes pure or mixed crops of deodar and Kail, also mixed with fir and spruce which occurs on easy slopes and cover 8970.1 ha. area. The main object was the conversion of the forests to regular and even aged crops and to obtain maximum sustained yield. The forests were managed under Punjab Shelterwood system. Two felling series were formed. Rotation was fixed at 120 years with 4 definite periodic blocks of 30 years each. The exploitation size was fixed at 60 cms d.b.h. Yield was regulated by volume and prescribed separately for each PB excepted for PB II. Sowing and planting of deodar, Kail and even fir and spruce were prescribed at suitable sites to supplement natural regeneration.

7.2.14.2 Results of working

The area allotted to all four PBs was almost in proportion. The yield prescribed and removed from all PBs is given in **table-7.22**. From PB I, the deficit yield was removed in case of deodar, Kail and Chil where as excess felling was done in the case of fir 7 spruce which was mainly due to requirement of wood for packing cases. The marking in PB I was conservative. The regeneration in PB I have come up well in the forests which have been opened properly and protected well. Though, yield was

not prescribed from PB II, but the removals were done due to salvage markings, right holder demands and even for packing cases. Excess removal was also done in PB III forests. In PB IV, the thinning was prescribed in pole crops and final felling over established regeneration but these operations were not carried out in most of the areas. Deodar and Chil were removed in excess in PB IV where as Kail and Fir/Spruce trees were removed less than the prescriptions. Removal of deodar was higher to satisfy the demand of right holders.

TABLE-7.22

Yield prescribed and removed (m3) from 1966-1980 in Regular Working Circle.

P.Bs	Yield	Deodar	Kail	Fir/Spruce	Chil	Total
I	Prescribed	52800	51150	13050	1200	118200
	Removal	39669	32148	20275	1039	93131
	Deviation	- 13131	- 19002	+ 7225	- 161	- 25069
II	Prescribed	No felling prescribed				
	Removal	8300	6369	4677	349	19695
	Deviation	+ 8300	+ 6369	+ 4677	+ 349	+ 19695
III	Prescribed	4950	1875	3000	-	9825
	Removal	18294	11886	5397	210	35787
	Deviation	+ 13344	+ 11011	+ 2397	+ 210	+ 26962
IV	Prescribed	11925	10800	10800	-	33525
	Removal	15312	8055	7556	244	31167
	Deviation	+ 3387	- 2745	- 3244	+ 244	- 2358

7.2.14.3 Chil Working Circle

All pure or predominantly Chil crops, covering an area of 1646.4 ha, which were situated on easy ground, were allotted to this working circle. The forests were prescribed for management under the Punjab Shelterwood system. Two felling series viz. Giri and Sutlej felling series were formed. The main object was of the conversion of the existing irregular and under stocked Chil forests into comparatively even-aged stands with normal stocking and to obtain maximum possible sustained yield of resin and timber. The rotation was fixed at 120 years with four definite Periodic blocks of 30 years each. The exploitable size was fixed

60 cms. D.b.h. Yield was fixed by volume and was prescribed to be obtained from PBs I, III and IV. A sequence of fellings was also laid down. Resin tapping operations were also recommended as per technical order No. 13 the Punjab Forest Manual Vol. III.

7.2.14.4 Results of Working

Fewer yields were removed from PBI mainly because the prescription was very conservative. The markings in PBI areas were light. Regeneration in PBI forests was dense in places and missing elsewhere. No cleaning and thinning were done. The thinning in PB III has been overdone, mainly because of salvage markings and removals of tress for packing cases. Resin tapping by the French “Cup and Lip” method has resulted in heavy damages in the trees. The yield prescribed for Chil only and that actually removed is tabulated in **table–7.23**. Though no yield was prescribed for deodar and Kail but removals have been made as given in **table – 7.24**, mainly to meet the demand of right holders. Due to over felling, the crop was very open.

Table- 7.23
Yield of Chil Prescribed and Removed from Chil Working Circle in M3 (1966-1980)

	PB-I	PB-II	PB-III	PB-IV	Total
Yield prescribed	9000	No removal prescribed	1050	1650	11700
Yield removal	5212	2652	2013	4091	13968
Deviation	- 3788	+ 2652	+ 963	+ 2441	+ 2268

Table – 7.24

Yield of Deodar and Kail removed from Chil Working Circle in M³ (1966-1980)

Species	PB-I	PB-II	PB-III	PB-IV	Total
Deodar	118	187	151	438	894
Kail	9	162	572	97	840

7.2.14.5 Selection Working Circle

All the forests important for their aesthetic and protective value, covering an area of 23,444.7 ha were allotted to this working circle. The forests contain deodar, Kail, spruce, fir, chil, oak and other broad leaved trees, either pure or in mixtures. Two felling series viz, Giri and Sutlej felling series were formed. The object of management was protection and preservation of forests. The forests were prescribed to be managed under the Group Selection System, with shelterwood fellings in compact groups of mature trees on easy ground and true selection fellings elsewhere. Exploitable size was fixed at 70 cms dbh for all species and a felling cycle of 15 years was prescribed. The yield was prescribed by number of trees over 70 cms dbh. All fellings of trees 40 cms dbh and over in case of Deodar, Kail and Chil and 60 cms dbh in case of fir and spruce were also to be counted towards yield. The blank and open areas were prescribed for sowing and planting by suitable species.

7.2.14.6 Results of Working

Because of extraction of fir/spruce for packing cases, the concentrated fellings were done in some of the forests like DPF Khagna CIV, RF Chambi-Kupar CVIII, and DPF Gahan-Jarahi CIV etc. Which resulted to appear these forests like Regular Working Circle than those of the selection Working Circle? The regeneration was deficient and plantations were suffered due to heavy grazing. The yield prescribed and that actually removed in terms of number of trees is given in **table – 7.25**. Which shows that less yield was removed than prescribed, though concentrated fellings have been done in some forests.

TABLE-7.25

Removals from Selection Working Circle (1966-80)

Species	Prescribed Yield (Nos.)	Yield Removed (Nos.)	Deviation (Nos.)
Deodar	4950	4097	- 853
Kail	9525	4879	- 4646
Chil	2400	2213	- 187
Fir/Spruce	9750	5171	- 4579

7.2.14.7 Oak Working Circle

All the Ban and Mohru Oak forests, which were not allotted to any other, working Circle, were put to this Working Circle, covering an area of 3995.6 ha. The forests were divided into two felling series viz, coppice and local felling series. Each felling series was further sub-divided into two sub-series, namely Giri and Sutlej. The main object of the management was the supply of fuelwood and charcoal. Coppice with standards system was prescribed for coppice felling series while thinning cum improvement fellings were prescribed for local felling series. Sowing/planting of deodar was proposed in suitable localities. Rotation of 45 years for coppice and 90 years for standards was fixed. No rotation was fixed for local felling annual coupes were fixed as $1/45$ of the area under local felling series and $1/15$ of the area under local felling series. In the local felling series, the exploitable size was fixed at 60 cms dbh. Felling programme was made for both felling series.

7.2.14.8 Results of Working

Due to heavy pressure of grazing and lopping, quite a few of the coppice coupes have not regeneration satisfactorily. Cleaning and thinning have not been done as prescribed, resulting in congested pole crops. Deodar sowing and planting is successful in patches in some of the forests, though it was not a good prescription. Against the area of 1376.2 ha prescribed for coppicing and cleaning during the plan period, an area of 1740.2 ha was actually gone over which may be due to excess demand of fuelwood and charcoal in Shimla town.

7.2.14.9 Plantation Working Circle

Blank and poorly stocked forests covering an area of 8501.2 ha. were allotted to this Working Circle. The main object of management was to rehabilitate the poorly stocked and degraded forests to meet the local requirements. A choice of species according to altitudinal zones had been prescribed and plantation technique clearly spelt out. A plantation programme was also laid down.

7.2.14.10 Results of working

The results of plantation were not much satisfactory due to inadequate protection and heavy pressures of grazing. The plantations were also not carried out as per prescriptions.

7.2.14.11 Miscellaneous regulations

In para 317 to 342, of Sharma's plan, mention was made of petty fellings, grant of timber to right holders, demarcation and survey, forest boundaries, maps, nautors, encroachments, roads and paths, buildings, fires lines, soil conservation and particular emphasis was laid on repair and maintenance of boundary pillars, for which a quinquennial programme was drawn up. It was also advised that 13 demarcated protected forests of the division be got notified as Reserved Forests.

7.2.14.12 Results

Most of regulations have not been followed. As a result there has been marked increase in allotment of timber to right holders from all PBs, especially from PB II. The UPFs have not been demarcated and boundary pillars around RFs and DPFs have not been granted. Most of roads, buildings and fire lines etc. were not constructed as prescribed.

7.2.15 Period from 1981 to 1995 (Pankaj Khullar's Working Plan)

In this Working Plan the management of all Reserved, Demarcated Protected and Un-Demarcated Protected Forests of present Shimla Forest and Theog Division which was further divided into Shimla and Theog Forest Division vide CCF HP Notification No. FT. SC-A (i) 1/83 dated 28.4.1984. It also included the Gohach Block of Kotgarh Forest Division which was transferred to Theog Forest Division after P.C Sharma's Plan had been compiled. Though, this Working Plan was operative for the period 1981 to 1995 but it was approved in 1987. Keeping in view of objects of management and the method of treatment envisaged, the following seven working circles were constituted.

i)	The Regular Working Circle	9339.1 ha.
ii)	The Chil Working Circle	1522.7 ha.
iii)	The oak Working Circle	4549.2 ha.
iv)	The Protection Working Circle	29911.6 ha.
v)	The plantation Working Circle	8365.0 ha.
vi)	The Social Forestry Working Circle	5767.1 ha.
vii)	The Wild Life (Overlapping) Working Circle.	45322.6 ha.

7.2.15.1 The Regular Working Circle

All the Reserved and Demarcated Protected forests with predominance of deodar, Kail, Fir and Spruce, which lie on comparatively easy grounds were allotted to this working Circle. Some fir and spruce forests of Selection Working Circle of the P.C. Sharma's Plan including those forests which were worked for supply of 'geltus' to packing cases industry, were also added to this Circle. The forests were to be managed under Irregular Shelter Wood System with the fixed periodic blocks. Two fellings series viz, Shimla and Theog, corresponding to the two forest divisions were formed. Complete enumerations of all conifers and important broad leaved species, down to 10 cm dbh was carried out in standard 10 cm. diameter classes in all the forests allotted to this Working Circle.

7.2.15.2 Objects of Management

The special objects of managements were the conversation of existing irregular forests into regular and even aged crops, steady supply of wood for packing cases and replacement of diseased Kail with deodar and spruce in suitable localities, besides overall conservation of the environment and improving the density of these forests.

7.2.15.3 Results of Working

The area allotted to all the Periodic Block was almost equal and thus it was a proportionate allotment. The total yield prescribed and removed from 1981-82 to 1992-93 is given in the following table-7.26. It shows that the removal was higher in case of Deodar, Fir and even broadleaved

species. As no seeding fellings, final fellings or other commercial fellings have been done from PBI, PBIII and PBIV areas because of ban on green fellings even than the removals are higher. Deodar trees have been given to right holders even from PBI area whereas fellings of fir are higher because the trees were given for packing cases. In most of the PBI, the regeneration is not good because of less number of seed bearers or lack of protection. The salvage working is also accounted for higher removal. Thinnings and cleanings were prescribed in PBIV which does not seem to be carried out. Sowing and Planting of deodar is also not successful where the protection is not ensured.

TABLE – 7.26

Volume Removed w.e.f 1981-82 to 1992-93

Variation of yield		Prescription and removal (m3) from 1981-82 to 1992-93	
Species	Yield prescribe	Removed	Deviation
Deodar	59280	77110.97	+ 17830.97
Kail	53280	43576.81	- 9703.19
Chil	-	1005.74	+ 1005.74
Spruce	10380	7286.88	- 3093.12
Fir	1800	28596.37	+ 26796.37
B/L	-	399.42	+ 399.42

7.2.15.4 Chil Working Circle

This Working Circle included such forests which comprised of pure or predominantly Chil crop and was situated on easy slopes. The forests were managed under Punjab shelterwood system, with fixed periodic blocks. Two felling series viz. Theog and Shimla felling series, corresponding to respective forest divisions, were formed. A total enumeration was carried out down to 10 cms dbh.

7.2.15.5 Objectives of Management

The main objectives of management were the conversion of existing irregular forest into regular and evenaged crop, to conserve and improve the density of stocking in these forests and to protect the forests against fire hazard.

7.2.15.6 Results of Working

Against total yield prescribed for Chil (7920 cum) from 1981-82 to 1992-93, only 3175.28 cum was removed which means 4744.72 cum. was removed less. Though no yield was prescribed for Deodar, Kail and broad leaved species even then 1507.95, 546.34 and 197.74 cum respectively yield was removed w.e.f 1981-82 to 1992-93. No seeding fellings and final fellings were carried out. The main removals were for the grant or right holders and for packing cases besides salvage removals. The regeneration in PBI is good where full protection is provided. The commercial fellings have not been done, may be due to ban or green fellings. By introducing “rill method” for resin tapping; damages to the trees was reduced.

7.2.15.7 Oak Working Circle

This working Circle covered all Reserved, DPFs and UPFs predominated with Ban and Mohru Oaks. The forests were divided into two felling series viz. Theog and Shimla felling series. Each felling series was further divided into two sub felling series namely (i) Depot and (ii) Preservation Felling Series.

7.2.15.8 Objectives of Management

The main objectives of management were to increase the stocking of these forests, to meet the local demand, to meet the demand of Shimla, Theog, Matiana, Kotkhai and Suni etc. and also the preservation of the ecosystem.

7.2.15.9 Results of Working

Due to heavy pressure of grazing and lopping, quite a few of the coppice coupes have not been regenerated satisfactorily. There is almost disappearance of ban trees in some of the forest pertaining to Dhami Range which is because of heavy lopping in which due to Chil planting, these have become good Chil Forests. Such Forests have now been allotted to Chil Working Circle in present plan. The areas which have been coppiced well but singling and thinning have not been done as per prescriptions. Natural regeneration of Oak is lacking mainly because of lack of protection. Sowing and planting of oak is also not satisfactory. No yield was prescribed for Deodar, Kail, Chil and broad leaved species.

7.2.15.10 Protection Working Circle

The forests on steep and remote localities, along important streams, rivers, roads and around places of tourist interest were allotted to this Working Circle. These forests comprised of either pure or mixed crops of deodar, Kail fir, spruce, Chil, oaks and other broad leaved species. Two felling series, corresponding to the two Divisions, Shimla and Theog were formed.

7.2.15.11 Objectives of Management

The main objectives of management were the preservation of forest, conservation of soil, water etc, and improvement in the stocking of the forests and to provide aesthetic cover along the National High Way and around the places of tourist interest.

7.2.15.12 Result of Working

The sowing and planting has not been done as per planting programme. Though, removals were not prescribed but T.D. has been given from some forests and also fir and spruce trees were removed for packing cases. By allotting some forest in this working circle along the National High Way and around the places of tourist interest, have been preserved which also give aesthetic view of the surrounding. Regeneration is

generally deficient and plantations have suffered because of heavy grazing. The yield so removed is given in follow table.

Table-7.27

Volume removed (m3)

Species	Yield Prescribed	Yield removed	Deviation
Deodar	-	38325.54	+ 38325.54
Kail	-	33299.89	+ 33299.89
Fir	-	9816.56	+ 9816.56
Spruce	-	9131.849	+ 9131.849
Chil	-	36071.07	+ 36071.07
B/L	-	737.00	+ 737.00

7.2.15.13 Plantation Working Circle

Mainly blank UPFs as well as poorly stocked and degraded RFs and DPFs were allotted to this working circle. Two plantation series corresponding to the two Divisions, namely the Shimla and Theog were formed.

7.2.15.14 Objectives of Management

The main objectives of management were raising of plantations of economically important species and protection of hill sides against soil erosion.

7.2.15.15 Results of Working

Since 1980, large scale plantations of conifers and broad leaved species have been carried out but the planting programme as prescribed has not been adhered to. As against total plantation target of 1070.0 ha. w.e.f 1986-1995; 7971 ha Plantations have been done in Theog forest Division. Most of the plantations are not successful to the desired level because of inadequate protection, heavy pressures of grazing and sometimes due to wrong choice of species. The results are not much satisfactory in case of oaks and other broad leaved species while Chil plantations are mostly successful. Deodar plantations in general, are

satisfactory where as not much efforts have been made to raise successful plantations of fir and spruce. Though, removals were made from this working circle for packing cases.

7.2.15.16 The Social Forestry Working Circle

Mainly blanks and poorly stocked UPFs which were having fairly good soil and suited for raising broad leaved species were located close to villages and habitations. Corresponding to the two Divisions, two plantation series viz, Shimla and Theog were formulated.

7.2.15.17 Main Objectives of Management

The main objectives of management were, to raise plantations of broad leaved species to meet the fuel, fodder and timber requirements of the local population, to protect the hillsides against soil erosion and other degradation.

7.2.15.18 Results of Working

Large scale plantations were carried out under Social Forestry Project but the results are not much satisfactory mainly because of biotic interferences in UPFs, heavy demand of fuel, fodder and timber and lack of protection. Social Forestry Project was launched in 1985 and continued upto March 1993 and after that no plantation was raised under this project. It has been observed that some of the plantations raised under Social Forestry have given very good result.

7.2.15.19 The Wild Life (Overlapping) Working Circle

This Working Circle overlaps all other Working Circles of this plan except the plantation and Social Forestry Working Circles. The Wild mammals, reptiles, birds and fishes found in the tract had been described.

7.2.15.20 Main Objectives of Management

The main objectives of Management were the conservation of existing Wildlife in the forests, to create conditions in the habitat conducive to the undisturbed propagation and survival of Wild animals and to create

certain areas to be reserved for the scientific study and for aesthetic entertainment of the people.

7.2.15.21 Results of Working

Because of overlapping system of working, the results are not satisfactory. The prescriptions have not been followed in letter and spirit. Sanctuaries, so suggested have not been created except 90.40 ha forest area has been transferred to create Himalayan National Park at Kufri and 1062 ha. forest area has been transferred to Chail, wildlife sanctuary which were neither prescribed nor suggested. The number of wild animals seems to be increased, may be because of ban on shooting. In some areas wildlife is decreasing may be because of biotic interferences in the forests.

7.2.15.22 Miscellaneous Regulations

Various prescriptions regarding petty fellings, grant of timber to right holders, demarcation and survey, forests boundaries, maps, nautors, encroachments, roads and paths, buildings, fire lines, soil conservation works and repair and maintenance of boundary pillars have been mentioned in Chapter XIII of part II page 334 to 345. It was also advised that 13 DPFs of the divisions be got notified as Reserved Forests.

7.2.15.23 Results

Most of the regulations so prescribed have not been followed. There had been increase in allotment of timber to right holders even from PBII and forests of Protection Working Circles. The UPFs have not been demarcated properly and boundary pillars around Reserved Forests Demarcated Protected Forests have not been maintained to the desired level. There are large number of nautors and even encroachments in UPFs and DPFs. Most of the roads, buildings and fire lines as prescribed, have not been constructed. The notification of 13 DPFs as RFs has also not got done. In general, this aspect of the Working Plan seems to have been largely ignored.

7.2.15.24 Special Works of Improvement Undertaken

Sr. No.	Particular	Year of const.	Cost
1.	D.F.O. office at Theog	1991-92	Not available
2.	A.C.F. Residence at Theog	1990-91	Not available
3.	D.F.O. Residence at Theog	1991-93	Not available
4.	Types III quarter at Theog	1985-86	Not available
5.	Type II quarter (10 Nos.) at Theog	1986-91	Not available
6.	Type I quarter (Rahighat) at Theog	1985-86	Not available
7.	R.O. office-cum-residence at Theog	1987-88	Not available
8.	Range Office-cum residence at Chaila (Social Forestry)	1987-88	Not available

7.2.16 Period From 1996 to 2011 (Dr. Lalit Mohan's Working Plan for Present Theog Forest Division)

In this Working Plan the management of all Reserved, Demarcated Protected and Un-Demarcated Protected Forests of present Theog forest division has been discussed. The present Working Plan will be operative 2014-15. The present working plan will be operative from the year 2014-15 to 2029-30. Therefore, the yield removed and other activities carried out till 2013 have been taken into account during the revision of Dr. Lalit Mohan's Working Plan. Dr. Lalit Mohan while revising the working plan of Dr. Lalit Mohan constituted the following working circles:

- i) Deodar Kail Working Circle.
- ii) Chil Working Circle.
- iii) Fir and Spruce Working Circle.
- iv) Oak Working Circle.
- v) Biosphere Conservation Working Circle.
- vi) Plantation Working Circle.

7.2.16.1 Deodar-Kail Working Circle

This working circle covered all the predominate Deodar and Kail Forests occurring on moderate to steep slopes fit for working under the concentrated fellings in various RFs , DPFs and UPFs constituting mostly young to middle aged with scattered mature crop where stocking was generally moderate to fairly dense. Natural regeneration was found

mostly deficient. All forests of Deodar and Kail covering an area of 12301.0 ha. were allotted to this working circle. The forests allotted to this working circle were prescribed to be managed under Indian Irregular Shelterwood system. Compact groups of advance growth up to 30 cm dbh and 0.2 ha or more in extent were prescribed to be retained as advance growth. Individual poles or middle aged trees were not to be retained while carrying out seeding fellings. PB-I areas where seedling felling was prescribed were to be regenerated naturally supplemented by artificial regeneration operations. No felling was prescribed to be carried out in PB-II areas except salvage removal. Thinnings was prescribed to be carried out in PB-III wherever required. Final fellings alongwith thinning and cleanings as per requirement of the crop was prescribed to be carried out in PB-IV areas.

7.2.16.2 Objectives of Management

Without prejudice to the general objectives of management, the main objectives of management were:

- i) To convert the irregular and unevenaged crops into more or less uniform normal evenaged crops.
- ii) To restock the PBI and other blank areas as soon as possible by resorting to artificial regeneration.
- iii) To obtain progressive yield in perpetuity after meeting the legitimate demands of the local people.
- iv) To preserve and protect the forests to maintain the mountain ecosystem

7.2.16.3 Rotation and Allotment

The rotation of 120 years was fixed for all the species in this working circle. As the forest of this circle were in the process of conversion from irregular to regular and conversion partly achieved also and therefore conversion period was fixed as 75 years. Regeneration period of 30 years was considered sufficient to regenerate PB I area. The exploitable diameter was fixed 60 cm dbh. Definite allotment to all four PBs was made and area allotted to each PB is given below in table-7.28

Table-7.28
Area Allotment to Each PB (ha.)

PB-I	3072.70
PB-II	3055.35
PB-III	3063.30
PB-IV	3109.65
Total	12301.00 Ha.

7.2.16.4 Yield

The yield from this working circle was prescribed from all the PBs except PBII and PBIII where no commercial fellings was prescribed. Yield was regulated by volume, and was to be limited to the increment put on by the crop.

7.2.16.5 Yield from PB I

10% PB-I areas have been enumerated down to 10 cm dbh. Those forests which are having mostly middle aged to mature tree and were allotted either to PB-II of Regular working circle or other working circle as per previous working plan, now allotted to PB-I where seeding fellings have been recommended. The total area is 12301.0 ha in Theog. In such areas all trees are to be felled except.

- i) Seed bearers
- ii) On strategic locations like along nalas/ broken grounds etc.
- iii) Selection marking in steep precipitous slopes.
- iv) Advance growth.

The main volume to be retained will be of seed bears. On an average basis, 40, 30, 75, 40 and 22 trees per ha of Deodar, Kail, Fir, Spruce and Chil respectively are to be retained as seed bearers. The average dia class is to taken as IIB. Since the crop is heterogeneous or in patches; therefore, the trees will also be retained accordingly. Annual yield for Deodar 1000 cum, Kail 1200 cum and Spruce 50 cum was fixed.

7.2.16.6 Yield from PB IV

There will be removal of overwood and thinning in young crop in PBIV. 60 % overwood i.e trees of IIA and above require removal to free young poles from overhead shade. Annual yield for Deodar 800 cum, Kail 400 cum, Spruce 50 cum and Chil 100 cum.

7.2.16.7 Results of Working

As no seeding fellings, final fellings or other commercial fellings have been done from PB-I, PB-III and PB-IV areas because of ban on green felling even then the removals were higher. Deodar trees have been given to right holders even from PB-I areas. In most of the area allotted to PB-I, the regeneration is not good because of less number of seed bearers or lack of protection. Thinnings and cleanings were prescribed in PB-IV which does not seem to be carried out. Sowing and Planting of Deodar is not successful where protection is not ensured. The total yield prescribed and removed from 1996 to 2013 is given in the following table-7.29.

Table-7.29



Yield Prescribed For Removal (Cum)

Species	Deodar	Kail	Fir	Spruce	Chil	B.L.	Total
Yield Prescribed	82500.0	147000.0	1500.0	36000.0	-	-	267000.0
Removal	54732.14	65935.73	268.22	33546.52	8783.87	827.95	164094.43
Annual Average	- 27767.86	- 81064.27	- 1231.78	- 2453.48	+ 8783.87	+ 827.95	- 102905.57

7.2.16.8 Chil Working Circle

All forests bearing a predominantly chil crop and located on easy slopes were allotted to this working circle. It also includes the areas where chil plantations have been established. Moreover, some of the forests which were managed under coppice /oak working circle as per previous plans, and now having Chil as predominant species, have also been allotted to this circle. The forests covering an area of 302.3 ha. were allotted to this working circle. The forests allotted to this working circle shall be

managed under the Indian Irregular Shelterwood System. Advance growth upto 30 cm dbh occurring in compact groups of 0.2 ha or more shall be retained to form part of future crop. No isolated single tree or pole shall be retained. The forests shall be generally regenerated naturally and supplemented with artificial regeneration.

7.2.16.9 Objectives of Management

In keeping with general objectives of management, the main objectives of the management of the forest allotted to this working circle are:

- i) To convert the existing irregular crops into normal forests by obtaining normal growing stock, normal age class distribution and normal regeneration.
- ii) To improve the stocking of pure forests by artificial regenerations.
- iii) To obtain maximum, sustained yield of resin and timber.
- iv) To protect the forests including plantation areas against the fire hazard.

7.2.16.10 Rotation and Allotment

With a rotation of 100 years and regeneration period of 25 years, the whole working circle has been divided into four periodic blocks to achieve the set objectives.

7.2.16.11 Yield

The yield from this working circle will consist of yield from PB-I and PB-IV areas.

7.2.16.12 Results of Working

No seeding fellings and final fellings were carried out. The main removals were for the grant of right holders besides salvage removals. The regeneration in PB-I is good where full protection is provided. The commercial felling has not been done due to ban on green felling. By introducing rill method for resin tapping, there is less damage to the trees.

7.2.16.13 Fir / Spruce Working Circle

Those Reserved, Demarcated Protected and Undemarcated Protected Forests which were on easy slopes and have 55% or more pure or mix crop of Fir and Spruce, were allotted to this Working Circle. Due to heave felling of Fir/Spruce Forests during the period of Khullar's Working Plan the areas felled were not regenerated and WPO constituted a separate Working Circle for Fir and Spruce to bring these forests under proper management. The WPO prescribed that these forests needs to be regenerated and therefore prescribed to be managed under Punjab shelterwood system with floating method of P.B's. It was prescribed that only P.B.-1 will be allotted and rest of the forest will be unallotted. Forests covering an area of 1855.0 ha. have been allotted to this working circle.

7.2.16.14 Oak Working Circle

All reserved, demarcated protected and un-demarcated protected forests having Ban, Mohru and Kharsu oaks as predominant species have been allotted to this circles. Ban almost occurs pure in many forests of Theog (Shilli mehla), Kotkhai (Bani, Thanari) & Balson (Tali Kholna) Ranges of Theog Forest Division. The forest especially which are nearer to the habitation are under heavy pressure for collection of fuel wood and charcoal by the local villagers. The forest allotted to Oak working circle has been divided into two felling series namely (i) Commercial (ii) Biosphere conservation. 1st felling series will be managed under coppice with standard system and in 2nd category, no green felling is prescribed, however, salvage removals will be made. The forests covering an area of 376.80 ha. have been allotted to this working circle.

7.2.16.15 Objectives of Management

- i) To improve the stocking of the forest by both natural and artificial regeneration methods in the areas where the density is low.
- ii) To meet the rights of the local people for fuel, fodder, grazing and wood for agricultural implements.

- iii) Consistent with the above, to preserve and maintain the ecosystem and ensure soil conservation and steady supply of water in the springs and streams of the locality.
- iv) Consistent with the progress of regeneration, to ensure supply of fuel and charcoal to Shimla and other towns subject to Govt. policy regarding felling of Oak trees.

7.2.16.16 Rotation and Allotment

The rotation of Ban/ Oak is prescribed at 90 years for standards and 45 years for coppice in commercial felling series. As no green felling is prescribed for Biosphere conservation series so, no rotation is fixed.

7.2.16.17 Yield

Yield is prescribed by area. In commercial felling series, the average annual coupe will be $1/45^{\text{th}}$ of the area allotted to this series. For biosphere conservation felling series the size of the annual coupe will be $1/15^{\text{th}}$ of the area for the purpose of salvage markings only.

7.2.16.18 Results of Working

Due to heavy pressure of grazing and lopping, quite a few of the coppice coupes have not been regenerated satisfactorily. There is almost disappearance of Ban trees in some of the forests pertaining to Dhamsi range which is because of heavy lopping. There are areas which have coppiced well but singling and thinning have not been done as per prescriptions. Natural regeneration of Oak is lacking mainly because of lack of protection. Sowing and planting of Oak is also not satisfactory. Green felling of Ban/Oak was not done on commercial basis due to complete ban on its felling, however to meet the domestic and agricultural need of the right holders some removals have taken place.

7.2.16.19 Biosphere Conservation Working Circle

The forests which are situated on steep and precipitous slopes, near major streams and nallas, on either side of National / State high ways, railway line, areas susceptible to erosion, near habitations where the

biotic interference is high and around places of tourist importance etc. are allotted to this working circle. As no exploitation of forests is involved therefore, no silvicultural system is prescribed. Thus there will be no green felling except to meet the bonafide demand of right holders. The requirements will however, be met with as far as possible from salvage removals. The forests will be protected from soil and water conservation, aesthetic and tourist point of view besides maintaining the ecological balances. The forests of this circle represent almost all forests type which is found in the tract. Total area of this working circle is 9585.80 ha.

7.2.16.20 Objectives of Management

- i) Protection of hills from denudation and erosion.
- i) Conservation of moisture and regulation of flow of water in nallas and streams.
- ii) To preserve the environment around tourist centers and along the high ways to maintain and enhance their utility and beauty for tourist recreations and for wildlife.
- iii) To prevent indiscriminate lopping of trees.
- iv) To introduce value able species especially for the production of fuel and fodder by artificial planting in the blank areas.
- v) Consistent with the above to meet the demands of local right holders entirely on silvicultural principles regarding timber, fuel wood and grazing.

7.2.16.21 Yield

No yield was prescribed but removals have taken place.

7.2.16.22 Results of Working

Large scale plantations were carried out but the results are not much satisfactory to restock the forests fully mainly because of biotic interferences, heavy demand of fuel, fodder and timber and also lack of protection. Planting of various species except chil is also not successful to the desired level. Though, removals were not prescribed from this

working circle but timber to right holders has been granted to some extent besides salvage removals.

7.2.16.23 Plantation Working Circle

All blanks and poorly stocked Undemarcated Protected Forests, Demarcated Protected and Reserved Forests were allotted to this Working Circle. Also old plantations which had not been established and which had not covered under any other Working Circle were also allotted to this Working Circle. No silviculture system was prescribed to be adopted. Plantation activities were to be carried out every year with suitable species and with proper planting techniques. Total area of this working circle is 7624.20 ha.

7.2.16.24 Objectives of Management

- i) To develop and augment the forest resources of the area by afforestation in blank and poorly stocked areas.
- ii) To improve the soil cover by closing eroded areas and thus improving the general environment of these degraded areas.
- iii) To regulate the flow of water in the streams and rivers by resorting to large scale plantations.
- iv) Raising suitable species which can fulfill the local demand of fuel, fodder and timber etc.

7.2.16.25 Yield

No yield was prescribed but T.D has been given from some forests besides removals in salvage.

7.2.16.26 Results of Working

Large scale plantations of conifers and broadleaved species have been carried out but some of the plantations are not successful to the desired level because of fire, inadequate protection and sometimes due to wrong choice of species. The results are not satisfactory in case of Oaks and other broadleaved species. Deodar plantations are found satisfactory.

7.2.17 Special Works of improvement undertaken:- During this period of plan following works of improvement have been undertaken.

Sr. No.	Particular	Year of const.	Cost
1.	Forest Guard Hut at Tyali	1999-2000	2,50,000/-
2.	Gang Hut at Sariwan	1999-2000	1,92,000/-
3.	Gang Hut at Tyali	1999-2000	1,92,000/-
4.	Watcher Hut at Bhekhalty	1999-2000	1,50,000/-
5.	Watcher Hut Dharmpur at Dibba	1999-2000	1,50,000/-
6.	I/Hut at Kuthar	2003-04	Not Known
7.	F.G. Hut at Reoghatti	1998-99	Not Known
8.	Gang Hut at Deha	2008-09	Not Known
9.	Van Thana at Sainj	2010-11	-
10.	F.R.H. at Mahasu	2009-10 to 2012-13	-

7.3 Past Yield Revenue and Expenditure

7.3.1 Past Yield

No green felling was carried out during the plan period. However, trees have been removed under salvage marking, marking to right holders and trees have been cut illicitly. Thus the total yield prescribed and removed with deviation during the plan period 1996-97 to 2012-13 with annual average in given below in table-

The detail of salvage trees/volume marked during the plan period 1996-97 to 2012-13 and handed over to HPSFDC is given below:

Table-7.30

Salvage Removals

Sr. No.	Species	Volume removed(CuM)
1.	Deodar	15695.48
2.	Kail	49147.45
3.	Rai/Fir	30914.78
4.	Chil	1023.29

Detail of trees marked given to right holders during the plan period 1996-97 to 2012-13 is given below in table No.-7.31.

Table-7.31

Right Holder Removals

Sr. No.	Species	Volume Removed(CuM)
1.	Deodar	37617.77
2.	Kail	16227.06
3.	Chil	6.95
4.	Spruce	6.22

Detail of trees cut illicitly during the plan period 1996-97 to 2012-13.

Table-7.32

Illicit Removals

Sr. No.	Species	Volume Removed(CuM)
1.	Deodar	847.34
2.	Kail	366.92
3.	Chil	9.17
4.	Spruce	15.75
5.	B.L.	11.94

Thus total volume/yield prescribed; removed with deviation during the plan period 1996-97 to 2012-13 is given below:

Table-7.33

Yield Prescribed and Removed (CuM)

Species	Deodar	Kail	Fir	Spruce	Chil	B.L.	Total
Yield Prescribed	55500.0	112500.0	10500.0	52500.0	375.0	-	231375.0
Removal	54732.14	65935.73	268.22	33546.52	8783.87	827.95	164094.43
Annual Average	- 767.86	- 46564.27	- 10231.78	- 18953.48	+ 8408.87	- 827.95	- 85754.21

7.3.2 Past Revenue

The revenue realized from various sources from the year 1996 to 2013 is given below:

Table-7.34

Revenue Realised

Sr. No.	Particulars	Amount(Rs.)
1.	Revenue from registration fees, compensation cases, vehicle confiscated and auction to Govt. and other deposits in forest remittance	3,64,48,370/-
2.	Royalty of Salvage lots realized from HPSFDC	27,40,20,497/-
3.	Royalty of resin blazes realized from HPSFDC	31,32,438/-
Total		31,36,01,305/-

Source: Divisional record

7.3.3 Past Expenditure

The expenditure incurred during the plan period is given below:

Table-7.35

Expenditure Incurred

Sr. No.	Particulars	Amount
1.	Expenditure incurred on various non plan i.e. 2402 Soil, 2406 Forestry and wild life plan, 2402 Soil plan, 2406 forestry non plan, 102-18 BASP, 4406 Capital out lay 4216 Capital out lay 2235 Medical	39,05,73,795/-

Source: Divisional record

Table-7.36

Year	Past Revenue	Past Expenditure	Deficit (Rs.)
1996-2013	31,36,01,305/-	39,05,73,795/-	- 7,69,72,490/ -
Annual Average	1,84,47,135/-	2,29,74,729/-	- 45,27,794/-

Source: Divisional record

CHAPTER-VIII

STATISTICS OF GROWTH AND YIELD

8.1 **Quality Class Assessment**

Quality class assessment has been done in the same manner as adopted by Dr. Lalit Mohan in his Working Plan of Theog Forest Division. Though, the site quality has been estimated on ocular basis but random checking was done in some of the forests. Dominant/co-dominant trees of predominant species in some of the site quality of deodar in Sutlej catchment varies from quality II to quality I, in Giri catchment, the average being I/II. The average quality classes for Kail are II/III and Chil is II. The quality classes of fir and spruce has been determined and in general it is of site quality I/II. Fir/Spruce is mainly confined to Kotkhai and Balson Range and the quality so assessed has been recorded in the compartment history files.

8.2 **Density**

Density has been determined ocularly on the basis of the canopy closure as well as crop density and has been recorded in the relevant C.H. file.

8.3 **Enumerations**

The enumeration figures have been worked out on the basis of 10% stratified random sampling carried out in all the Working Circles. The enumeration in standard 10cm diameter classes, down to 10cm dbh, has been carried out in each forest. The enumeration figures have been recorded in the compartment history files of respective compartment of the forests and the enumeration result has been shown as Appendix-II Enumeration Result, Volume-II (page 21 to 105).

8.4 **Stock Maps**

Stock Maps of all the forests, reserved, demarcated protected and Undemarcated protected have been prepared on the survey sheets prepared by survey of India, in the scale of 1:15000. These stock maps have been placed in the concerned compartment history files.

8.5 Volume Table

The local volume tables as used in Mohan's plan for important coniferous and broad leaved species which were prepared by the Forest Survey of India, have again been adopted for the forests included in this working plan. The diameter classes will continue to be of 10cm because of standard practice.

Table- 8.1

Species-wise, Class-wise Volume Table (M³).

<i>Diameter Class</i>	<i>Cedrus Deodara</i>	<i>Pinus wallichiana</i>	<i>Abies Pindrow</i>	<i>Picea smithiana</i>	<i>Pinus Roxburghii</i>	<i>Acer Spp.</i>	<i>Quercus Leucotrichophora</i>	<i>Quercus Dilatata</i>	<i>Quercus Semicarpifolia</i>	<i>B/leave Species</i>
10-20 V	0.172	0.154	0.235	0.106	0.073	0.111	0.0815	0.104	0.106	0.115
21-30 IV	0.462	0.435	0.577	0.365	0.308	0.338	0.275	0.326	0.347	0.308
31-40 III	1.008	0.992	1.091	0.918	0.711	0.789	0.627	0.787	0.794	0.685
41-50 IIA	1.788	1.792	1.759	1.756	1.276	1.457	1.133	1.478	1.438	1.241
51-60 IIB	2.800	2.830	2.625	2.898	2.015	2.356	1.803	2.416	2.288	1.985
61-70 IA	4.021	4.076	3.651	4.334	2.921	3.478	2.631	3.592	3.334	2.915
71-80 IB	5.434	5.506	4.849	6.064	3.996	4.824	3.619	5.006	4.572	4.028
81-90 IC	6.208	6.284	5.511	7.039	4.596	5.581	4.172	5.803	5.262	4.654
91-100 ID	7.882	7.949	6.966	9.211	5.922	7.263	5.398	7.575	6.781	6.045
100 & IE above	9.708	9.744	8.591	11.676	7.416	9.169	6.783	9.585	8.480	7.611

Source: Working Plan by Dr. LalitMohan.

8.6 Fuel wood and Charcoal

The conversion factors for fuelwood and charcoal as given in Khullar's plan have been adopted as such. The weight per cubic meter of air dry ban wood is 10.83 quintals. The conversion factors for charcoal from all types of oak and other broad leaved species in the area are given below:

1 cubic meter stacked volume = 0.49 m³ solid volume

1 cubic meter stacked volume = 10.8 qtl.

1 qtl.air dry wood gives 20 kg. Charcoal

1 cubic meter stacked volume = 216 kgs charcoal

The class wise conversion factor for other miscellaneous broad leaved species, found in the tract, is given in the table below:-

Table- 8.2

CONVERSION FACTOR FOR FIREWOOD AND CHARCOAL

	Ban		Mohru		Kharsu		Kokath	
Species Diameter (cms)	Firewood (qtl)	Charcoal (qtl)	Firewood (qtl)	Charcoal (qtl)	Firewood (qtl)	Charcoal (qtl)	Firewood (qtl)	Charcoal (qtl)
10-15	0.572	0.114	0.853	0.171	0.788	0.158	0.972	0.194
15-20	1.188	0.238	1.404	0.281	1.512	0.302	1.523	0.305
20-25	2.236	0.447	2.603	0.521	2.819	0.564	2.559	0.512
25-30	3.704	0.741	4.449	0.889	4.676	0.935	4.104	0.821
30-35	5.605	1.121	6.934	1.387	7.096	1.419	6.134	1.227
35-40	7.938	1.588	10.066	2.013	10.055	2.011	8.672	1.734
40-50	12.236	2.447	15.962	3.192	15.530	3.106	13.403	2.681
50-60	19.472	3.894	26.093	5.219	24.710	4.942	21.449	4.289
60-70	28.415	5.683	38.794	7.759	36.007	7.201	31.482	6.296
70-80	39.085	7.817	54.065	10.813	49.378	9.876	43.502	6.700

Source: Working Plan by Dr. LalitMohan.

Note:

1. The above conversion factors are based on volume of trees calculated down to 5cms d. b .h.
2. Weight of firewood is in respect of solid volume.

8.7 Diameter Growth

Diameter Growth for Deodar and Chil as given in Khullar's plan has been adopted and the same figures will be utilized as given in the tables below:-

Table-8.3
D. b. h/D. s. h Relationship for Deodar (*Cedrus deodar*)

S. No.	Average D.b.h (cm)	Average D.s.h (cm)
1.	31.5	34.5
2.	31.5	36.5
3.	32.5	37.0
4.	34.5	41.0
5.	36.5	42.5
6.	37.5	41.0
7.	38.5	45.5
8.	38.5	39.5
9.	40.0	45.5
10.	40.5	42.5
11.	41.5	47.0
12.	42.5	43.5
13.	42.5	47.5
14.	43.5	48.5
15.	44.5	47.0
16.	45.5	51.0
17.	50.0	52.5
18.	51.5	55.0
19.	53.5	56.5
20.	53.5	60.0
21.	53.5	59.0
22.	54.5	61.5
23.	55.5	57.5
24.	56.5	59.0
25.	61.5	69.0
26.	61.5	66.5
27.	63.5	76.0
28.	64.0	73.0
29.	68.0	74.5
30.	69.0	70.5
31.	69.5	77.0
32.	70.5	73.0
33.	72.5	76.5
34.	72.5	89.0
35.	73.0	81.5

36.	73.0	78.5
37.	73.5	77.0
38.	82.5	86.0
39.	85.0	88.0
40.	88.0	90.5

Source: Working Plan by Dr. LalitMohan.

Note:

D. b. h = Diameter at 1.37m above ground level.

D. s. h = Diameter at 20 cm above ground level.

Table-8.4

D. b. h/D. s. h relationship for Chil (Pinus roxburghii)

S. No.	Average D.b.h (cm)	Average D.s.h (cm)
1.	31.0	33.5
2.	32.0	34.5
3.	32.0	33.5
4.	32.5	34.5
5.	34.0	35.5
6.	34.5	36.5
7.	34.0	38.5
8.	36.0	37.5
9.	36.5	39.0
10.	36.5	39.0
11.	37.0	39.0
12.	38.5	42.5
13.	39.5	43.5
14.	40.0	43.5
15.	48.5	44.5
16.	42.0	47.0
17.	42.0	46.0
18.	42.5	46.5
19.	42.5	45.0
20.	43.0	46.5
21.	43.0	46.0
22.	43.0	46.0
23.	43.5	45.5
24.	44.0	48.0
25.	44.0	45.0
26.	44.5	48.0
27.	44.5	47.0
28.	45.5	46.5
29.	45.5	47.5
30.	46.0	52.5
31.	47.5	51.0
32.	47.5	50.5

33.	47.5	48.5
34.	50.5	53.5
35.	51.5	55.0
36.	51.5	53.5
37.	52.5	54.5
38.	52.5	57.5
39.	53.0	60.0
40.	53.5	57.0
41.	53.5	56.0
42.	53.5	55.5
43.	54.0	57.5
44.	54.5	58.5
45.	55.0	57.5
46.	55.5	59.5
47.	55.5	59.0
48.	55.5	62.5
49.	58.5	63.5
50.	59.5	62.0
51.	59.5	63.0
52.	61.0	62.0
53.	61.5	63.5
54.	62.5	63.0
55.	63.0	66.5
56.	63.0	67.0
57.	63.0	70.5
58.	65.0	70.5
59.	67.5	73.0
60.	68.0	72.0
61.	71.5	78.5
62.	74.0	77.0
63.	75.0	78.8

Source: Working Plan by Dr. LalitMohan.

Note: D. b. h = Diameter at 1.37m above ground level.

D. s. h = Diameter at 20 cm above ground level.

8.8 CAI%

The annual yield from the forests can be to the extent of Current Annual Increment. (CAI). The CAI of Deodar, Kail and Chil have been compiled from FRI yield tables. CAI% of conifer species is given in table below:-

Table-8.5**CAI% of Different Species**

Diameter Class	Deodar	Kail	Chil	Fir	Spruce
10-20	6.55	7.81	4.56	3.99	4.72
21-30	1.96	3.676	3.75	3.99	4.72
31-40	1.346	2.25	2.69	3.91	4.69
41-50	0.69	0.878	2.26	2.16	2.57
51-60	0.609	0.448	1.99	1.85	2.09
61-70	0.609	0.448	1.56	1.31	1.36
71-80	0.609	0.448	1.14	1.16	1.20
81-90	0.609	0.448	0.92	0.51	0.53
91-100	0.609	0.448	0.66	0.50	0.51

Source: Working Plan by Dr. LalitMohan.

CHAPTER – IX

ESTIMATES OF CAPITAL VALUE OF THE FORESTS

9.1 As the forests give direct and indirect benefits, therefore, it is difficult to assess exact value of these forests in terms of money. However, some closeness to real value can be arrived by knowing the total growing stock of the tract.

9.1.1 The total growing stock has been calculated by extrapolating the results of enumeration arrived at on the basis of 10% stratified random sampling carried out in all PB's areas of Deodar-Kail, Fir/Spruce, Chil working circle and in other working circles of Ban (Oaks), Bio-Sphere and Plantation Working Circles. Therefore, the growing stock and estimated value of the forests are subject to some degree of variation. the growing stock enumerated as given in the table nos. 9.1 to 9.6

9.1.2 In view of above and applying market rates of 2014-2015; the capital value of the forests is worked out as given in table-9.7.

Species	Masrket Rates inRs per cum for Standing green trees for 2014-15
Deodar	55904/-
Kail	38044/-
Rai/Fir	22437/-
Chil	21117/-
Other BLKokat	3882/-
Oaks spp.	18000/-

Table-9.1
DEODAR/KAIL WORKING CIRCLE

Spp.	Particular	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
Deodar	No. of trees	491693	503535	402845	308553	147270	71994	30457	11807	4266	1128	1973548
	Vol.	84571.196	232633.17	406067.76	551692.764	412356	289487.874	165503.338	73297.856	33624.612	10950.624	2260185.19
Kail	No. of trees	455220	421653	246232	175357	95997	39891	16419	5214	2046	522	1458551
	Vol.	70103.88	183419.055	244262.144	314239.744	271671.51	162595.716	90403.014	32764.776	16263.654	5086.368	1390809.861
Rai	No. of trees	124408	110439	57786	34952	14743	10098	6135	3156	1486	319	363522
	Vol.	13187.248	40310.235	53047.548	61375.712	42725.214	43764.732	37202.64	22215.084	13687.546	3724.644	331240.603
Fir	No. of trees	23865	25627	23238	15643	8273	4999	2538	1056	642	115	105996
	Vol.	5608.275	14786.779	25352.658	27516.037	21716.625	18251.349	12306.762	5819.616	4472.172	987.965	136818.238
Chil	No. of trees	36451	27897	6993	2451	471	359	107	25	1	-	74755
	Vol.	2660.923	8592.276	4972.023	3127.476	949.065	1048.639	427.572	114.9	5.922	-	21898.796
Ban	No. of trees	93935	90659	45780	17188	4474	1319	484	147	65	30	254081
	Vol.	9957.11	31458.673	36349.32	24716.344	10236.512	4397.546	2212.848	773.514	440.765	254.4	120797.032
Broad Leave	No. of trees	51899	47984	20912	8367	1925	427	198	155	17	8	131892
	Vol.	5968.385	14779.072	14324.72	10383.447	3821.125	1244.705	799.524	721.37	102.765	60.888	52206.001
Total	No. of trees	1277471	1227794	803786	562511	273153	129087	56338	21560	8523	2122	4362345
	Vol.	192057.017	525979.26	784376.173	993051.524	763476.051	520790.561	308855.698	135707.116	68597.436	21064.889	4313955.725

Table-9.2
BIO-SPHERE CONSERVATION WORKING CIRCLE

Species	Parameters	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 or over	Total
		V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
1	2	3	4	5	6	7	8	9	10	11	12	13
Deodar	No. of Trees	263145	246807	144212	70516	19230	6587	3219	626	200	13	754555
	Volume	45260.93	114024.82	145365.68	126082.59	53844	26486.31	17492.03	3886.19	1576.39	126.2	534145.14
Kail	No. of Trees	432666	381458	197018	135973	50309	15313	4230	910	217	3	1218097
	Volume	66630.55	165934.23	195441.84	243663.59	142374.47	62415.77	23290.36	5718.42	1724.92	29.224	907223.37
Rai	No. of Trees	77605	72633	36441	27724	13898	6241	3209	1542	582	684	240559
	Volume	8226.11	26511.04	33452.83	48683.33	40276.4	27048.48	19459.36	10854.13	5360.79	7986.37	227858.84
Fir	No. of Trees	24953	27907	25434	17526	5335	2242	398	75	20	1	103891
	Volume	5863.95	16102.32	27748.48	30728.23	14104.37	8185.53	1929.89	413.32	139.32	8.59	105224
Chil	No. of Trees	31951	27763	13517	7576	1424	150	0	21	5	0	82407
	Volume	2332.41	8551	9610.58	9666.96	2869.35	438.14	0	96.51	29.61	0	33594.56
Ban (Oak)	No. of Trees	78891	102681	68795	31288	9342	3094	1183	150	76	0	295500
	Volume	8362.43	35630.29	54623.21	44992.13	23413.48	10315.39	5408.67	789.29	515.35	0	184050.24
Broad Leave	No. of Trees	43085	33504	18380	7211	1137	588	130	5	3	0	104043
	Volume	4954.76	10319.21	12590.29	8948.83	2256.94	1714.02	524.93	23.27	18.13	0	41350.38
T. Trees		952296	892753	503797	297814	100675	34215	12369	3329	1103	701	2799052
T. Vol.		141631.1	377072.9	478832.9	512765.7	279139	136603.6	68105.24	21781.13	9364.51	8150.384	2033447

Table-9.3
PLANTATION WORKING CIRCLE

Species	Parameters	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 or over	Total
		V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
1	2	3	4	5	6	7	8	9	10	11	12	13
Deodar	No. of Trees	80753	65999	20534	8226	2457	993	579	513	218	165	180437
	Volume	13889.52	30491.354	20698.27	14708.09	6879.6	3992.85	3146.29	3184.70	1718.28	1601.82	100310.77
Kail	No. of Trees	311431	260475	71393	38738	16519	4787	962	761	527	408	706001
	Volume	47960.37	113306.63	70821.86	69418.50	46748.77	19511.81	5296.77	4782.12	4189.12	3975.55	386011.5
Rai	No. of Trees	12126	9928	5687	3296	2239	2105	2038	1719	1552	1224	41914
	Volume	1285.36	3623.72	5220.67	5787.78	6488.62	9123.07	12358.43	12100.04	14295.47	14291.42	84574.58
Fir	No. of Trees	10602	6666	5039	2976	1759	1621	1447	1219	9788	898	42015
	Volume	2491.47	3846.28	5497.55	5234.78	4617.38	5918.27	7016.50	6717.91	68183.21	7714.72	117238.07
Chil	No. of Trees	157344	118919	21818	2613	324	20	-	-	-	-	301038
	Volume	11486.11	36627.05	15512.59	3334.19	652.86	58.42	-	-	-	-	67671.22
Ban (Oak)	No. of Trees	25633	14644	7077	3154	1953	410	0	1	-	-	52872
	Volume	2717.10	5081.47	5619.13	4535.45	4468.46	1366.94	-	5.26	-	-	23793.81
Broad Leave	No. of Trees	8397	5981	1925	1914	324	5	3	1	-	-	18550
	Volume	965.65	1842.15	1318.62	2375.27	643.14	14.57	12.11	4.65	-	-	7176.16
G. Total	Trees	606286	482612	133473	60917	25575	9941	5029	4213	12086	2695	1342827
G. Total	Vol.	80795.58	194818.7	124688.7	105394.1	7049883	39985.93	27830.1	26794.68	88386.08	27583.51	786776.1

Table-9.4

BAN-OAK WORKING CIRCLE

Species	Parameters	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 or over	Total
		V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
1	2	3	4	5	6	7	8	9	10	11	12	13
Ban (Oaks)	No. of Trees	30853	35195	15277	4769	2287	1942	754	457	19	0	91553
	Volume	3270.4	12212.65	12129.92	6857.82	5232.65	6474.62	3447.28	2404.72	128.83	0	52158.89
Deodar	No. of Trees	825	519	824	452	180	57	47	17	0	0	2921
	Volume	141.9	239.77	830.59	808.17	504	229.19	255.39	105.53	0	0	3114.54
Kail	No. of Trees	399	921	1779	970	565	158	51	59	6	0	4908
	Volume	61.44	400.63	1764.76	1738.23	1598.95	644	280.8	370.75	47.69	0	6907.25
Rai	No. of Trees	715	721	1979	2119	1546	1004	1017	810	152	0	10063
	Volume	75.79	263.16	1816.72	3720.96	4480.3	4351.33	6167.08	5701.59	1400.07	0	27977
Fir	No. of Trees	464	798	1653	1458	757	355	115	33	0	0	5633
	Volume	109.04	460.44	1803.42	2564.62	1987.12	1296.1	557.63	181.86	0	0	8960.23
Chil	No. of Trees	2129	580	290	0	0	0	0	0	0	0	2999
	Volume	155.41	178.64	206.19	0	0	0	0	0	0	0	540.24
Broad Leave	No. of Trees	1305	1797	1066	162	7	0	0	0	0	0	4337
	Volume	150.07	553.47	730.21	201.04	13.89	0	0	0	0	0	1648.68
	Total	36690	40531	22868	9930	5342	3516	1984	1376	177	0	122414

Table-9.5
CHIL WORKING CIRCLE

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 or over	Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
Chil	65359	46833	8791	2162	311	143	43	32	-	-	123674
Volume	4771.20	14424.56	6250.39	2758.71	626.66	417.7	171.82	147.06	-	-	29568.10
Deodar	1122	2183	2695	2696	1192	405	115	10	1	-	10419
Volume	192.97	1008.54	2716.56	4820.44	3337.6	1628.5	624.91	62.08	7.88	-	14399.46
Kail	1176	1088	2132	1328	307	120	45	-	-	-	6196
Volume	181.1	473.27	2114.93	2379.77	868.81	489.12	247.77	-	-	-	6754.77
Rai	5	4	1	1	-	-	-	-	-	-	11
Volume	0.530	1.46	0.91	1.75	-	-	-	-	-	-	4.65
Ban (Oak)	3054	-	3	-	-	-	-	-	-	-	3057
Volume	323.72	-	2.38	-	-	-	-	-	-	-	326.1
Total Trees	70716	50108	13622	6187	1810	668	203	42	1	-	143357

Table-9.6
Fir/Spruce Working Circle

Species	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 or over	Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
Rai	22949	27910	19642	17320	9782	6834	4057	1691	683	315	111183
Volume	2432.57	10187.13	18031.34	30413.9	28348.21	29618.54	24601.62	12802.92	6291.09	3677.91	166405.23
Fir	50867	66682	55429	49110	28471	14274	6887	3736	1424	448	277328
Volume	11953.74	38475.49	60473.02	86384.46	74736.37	52114.34	33395.05	20589.07	9919.56	3848.75	391889.85
Deodar	7703	10718	11974	10167	3750	1802	1067	674	222	91	48168
Volume	1324.9	4951.69	12069.77	18178.58	10500	7245.81	5798.06	4184.17	1749.79	883.406	66886.176
Kail	12815	14887	10117	9791	6164	3598	1981	896	334	118	60701
Volume	1973.49	6475.83	10036.05	17545.45	17444.12	14665.43	10907.36	5630.94	2654.94	1149.78	88483.39
Ban (Oak)	16160	17644	14927	12630	6390	3244	1957	1144	512	107	74715
Volume	1712.93	6122.45	11852.02	18161.93	14620.29	10815.48	8947.382	6019.71	3471.86	907.36	82631.412
Broad Leave	48243	40988	19126	9727	3007	1102	320	83	92	25	122713
Volume	5547.93	12624.29	13101.29	12071.19	5968.88	3212.32	1292.14	386.26	556.13	190.271	54950.701
Total Trees	158737	178829	131215	108745	57564	30854	16269	8224	3267	1104	694808
Total Volume	24945.56	78836.88	125563.49	182755.51	151617.87	117671.92	84941.61	49613.07	24643.37	10657.48	851246.76

Table-9.7
TOTAL CAPITAL VALUE OF FOREST FOR ALL WORKING CIRCLES

Species	Parameters	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 or over	Total	Market Rate for standing trees for 2014-15 (Rs.) per M3	Amount
		V	IV	III	IIA	IIB	IA	IB	IC	ID	IE			
1	2	3	4	5	6	7	8	9	10	11	12	13		
Deodar	No. of Trees	845241	829761	583084	400610	174079	81838	35484	13647	4907	1397	2970048		
	Volume	145381.45	383349.58	587748.67	716290.68	487421.2	329070.59	192820.05	84720.57	38676.97	13562.07	2979041.83	55904/-	166540354464/-
Kail	No. of Trees	1213707	1080482	528671	362157	169861	63867	23688	7840	3130	1051	3454454		
	Volume	186910.87	470009.67	524441.63	648985.34	480706.63	260321.89	130426.12	49266.56	24880.37	10240.94	2786190.02	38044/-	105997813120/-
Fir	No. of Trees	110751	127680	110793	86713	44595	23491	11385	6119	11874	1462	534863		
	Volume	26026.48	73671.36	120875.16	152528.16	117061.87	85765.64	55205.86	33721.80	82714.28	12560.04	760130.65	22437/-	17055051394/-
Rai	No. of Trees	237808	221635	121536	85412	42208	26282	16456	8918	4455	2542	767252		
	Volume	25207.64	80896.77	111570.04	149983.47	122318.78	113906.18	99789.18	62773.80	41035.0	29680.39	837161.25	22437/-	187833869662/-
Chil	No. of Trees	293234	221992	51409	14802	2530	672	150	78	6	-	584873		
	Volume	21406.08	68373.53	36551.79	18887.35	5097.95	1962.91	599.4	358.48	35.53	-	153273.02	21117/-	3236666363/-
Ban (Oaks)	No. of Trees	248526	260823	151859	69029	24446	10009	4378	1899	672	137	771778		
	Volume	26343.75	90505.58	120576.04	99263.70	55932.44	33370.0	20016.21	9992.53	4556.83	1161.76	461718.84	18000/-	8310939120/-
Broad Leave	No. of Trees	152929	130254	61409	27381	6400	2122	651	244	112	33	381535		
	Volume	17586.83	40118.23	42065.16	33979.82	12704.0	6185.63	2628.73	1135.57	677.04	251.16	157332.17	3882/-	61076348394/-
	Total Trees	3102196	2872627	1608761	1046104	464119	208280	92192	38745	25156	6622	9464803		
	Total Volume	448863.1	1206924.72	1543828.49	1819918.52	1281242.87	830582.84	501485.55	241969.31	192576.02	67456.36	8134847.78	157025/-	547138042517/-

G. TOTAL (in crores) = 54713, 80, 42,517/- Or say Rs. 54713.81 Crores.

PART - II**FUTURE MANAGEMENT DISCUSSED
AND PRESCRIBED**

CHAPTER-I

BASIS OF PROPOSALS

1.1 National Forest Policy

The first National Forest Policy was enunciated by the Govt. of India in 1894, which formed the basis of the future management strategies of the forest in India in 1904, special rules known as Shimla Forest conservancy rules were introduced by the Govt. of Punjab under the policy laid down in 1894. After independence the Govt. of India felt the need for reorientation of this policy in the light of revolutionary changes. Consequently National Forest Policy of India was formulated and notified vide Govt. of India No. 13-1/52-p dated 12th May 1952. Broadly, it prescribed the maintenance of forest cover over 60% of geographical area in area in order to prevent soil erosion and land degradation and to ensure the stability of fragile ecosystem of hilly States besides realization of maximum annual revenue in perpetuity consistent with the fulfillment of various needs.

As the forests in the country have suffered serious depletion because of relentless pressure arising from ever increasing demand for fuelwood, fodder and timber, inadequacy of protection measures, division of forest lands to non-forest uses without ensuring compensatory afforestation and essential environmental safeguards, and tendency to look upon forests as revenue earning resources, therefore, it was felt necessary to review the situation. Thus a new strategy of forest conservation became imperative and accordingly National Forest Policy was again revised and notified by Govt. of India No. 3-1/86 FP dated 7th December, 1988. The salient features of this policy are given below:

1. Two third of the area under forest cover in hilly States.
2. Environmental stability and maintenance of ecological balance.
3. Creation massive people's movement and involvement of women.
4. Modification of land laws.
5. Alternative avenues of income, suitably harmonized with the right land laws.

6. Strengthening of scientific forestry research and education.
7. Relation of rights and concessions to the carrying capacity of forests.
8. Protection, improvement and enhanced production of minor forest produce.
9. Forest management through approved working plans.
10. Wildlife and biological diversity conservation.
11. Establishing a strong forest data base.
12. Use of modern method to control forest fires.
13. Substitution of wood needs.
14. Public awareness.
15. Strict control of diversion of forest lands for country.
16. Increasing substantially forest tree cover in the country.
17. Covering the natural heritage of the country by preserving remaining natural forests.

1.1.1 H.P. State Forest Policy

Though, National Forest Policy of 1988 is also applicable to Himachal Pradesh but to meet the peculiar forestry situation within the state, the Govt. of Himachal Pradesh has also formulated Forest Policy for the Pradesh notified vide No. Fts. (8) 17-5/10 dated 3rd September, 1980. Salient features of this policy are as under:

1. To bring 50% of the total geographical area of the state under forest by 2000 A.D and to raise this percentage to 60% ultimately.
2. Felling to be carried out strictly in accordance with prescriptions of sanctioned working plan.
3. No felling upto 30 meters on either side of roads.
4. Settlement of two third of Undemarcated and un-classed forests by proper demarcation and settlement in 10 years.
5. Forest and Revenue settlement should be taken up simultaneously so that there is no conflict in the rights to be admitted under two settlements.
6. The requirement of local right holders to be met with judiciously keeping in view the conditions of forests and rationalization of provisions of rights and concessions.

7. There being hardly any scope for further extension of agriculture, the people should be encouraged to adopt some alternative professions.
8. Transfer of areas under reserved, demarcated protected forest and plantations for non forestry purposes to be totally banned.
9. Management of watersheds to be given due importance.
10. Game development and preservation to be accorded high priority.
11. Peoples participation in afforestation programmes.
12. Planting of fast growing fuel and fodder species to be preferred near habitations to meet the requirements of the local people.
13. Steps to be taken to reduce cattle population rationally.
14. To promote tourism along with improvement of forest vegetation.
15. No lease for the extraction of minerals to be granted without the prior consent of Forest Department.
16. Research facilities to be created to solve problems of applied nature.

1.2 Objectives of the Management

The total geographical area of H.P. is 55673 Km² out of which 37033 Km² has been recorded as forest area with forms 66.52% of total geographical area of the State. Only 14467Km² out of 37033 km² is under forest cover which forms 25.79%.

The total geographical area of Theog territorial Division the W.P of under revision is 66393.0 ha. The forest area by legal status is 33681.52 ha. Therefore, 50.73% area is recorded as forest area whereas 50.38% is covered actual under forest cover. The existing forests are under heavy pressure due to diversion of forest land for various developmental activities like construction of new road, widening to State highway to National High way and construction of Buildings, Hotels, Tourist resorts other Govt. institutions. In addition the forest land has been encroached especially in UPFs for agriculture and Horticulture purpose by the local residents. Pressure is also mounted on the forest to meet the timber and fodder requirement of the local people. Thus, keeping

in view of the objectives of National and State forest policy, present status of the forests of the tract and legitimate demands of the people the following general objective of the management are laid down:

1. To maintain the forest on scientific technical and economic principle of forestry.
2. To introduce and apply scientific research and individual experience which are dynamic and can result in maximum productivity of forest and ecosystem services.
3. To provide for the bonafide domestic and agricultural requirements of the local peoples including demands for timber for construction purpose, fuel, fodder and other forest produce subject to the capacity of the forest.
4. To conserve, sustain, protect and improve the quality and stocking of the existing forests and regeneration as near normal as possible through participatory forest management.
5. To create and manage normal forest by ideally constituting appropriate growing stock, age, class distribution and increment from which the annual and periodic removal or produce can be continued indefinitely without endangering environment and future yields. To ensure these objective, trees of all sizes, classes and crops of all age classes are to be ensured to present in correct proportion.
6. To practice normal series of age gradation. Hence to raise plantation every year till each year plantation, duly thinned and looked after silviculturally reaches maturity.
7. To increase size of carbon sinks so as to reduce green house effect.
8. To convert the abnormal forest to normal forest by removing the over mature trees and trees of older age gradation or age classes and to restocked the under stocked forest be preponderance of younger age classes. To maintained the environmental stability and restoration of the ecological balance through preservation of the forests. 9.

10. To maintain and improve the aesthetic beauty of Tourist places of the tract and nearby areas like Kufri, Fagu, Khara pathar, Mahasu besides improving the environment along the National and State high ways. Nature based tourism will be promoted in forest areas having such potential and eco-tourism societies as another institutional mechanisms will be established for sustaining it.
11. Consistent with the above, to obtain optimum sustained annual yield of timber and other forest produce.
12. To maintain ecological balance for the protection, preservation and improvement of wild life of the tract.

1.3 Methods of Treatment to be adopted

To achieve the above objectives of management, the following treatment and methodology will be followed.

1. All the coniferous forests which are on comparatively moderate slopes will be managed under shelterwood system.
2. All the forests which are on steeper slopes along the nalas or streams, along the National high ways or Railway line and around the Tourist places will be preserved and improved from Tourist, aesthetic, soil and water conservation point of view.
3. Ban Oak forests and broad leaved species due to indiscriminate felling in the past and also on the slopes, these will be protected from further degradation through effective closures.
4. Poorly stocked and blank forests will be re-afforested by planting suitable species to meet local demand of fodder, fuel, timber and forest based industries.
5. All poorly stocked and blank forests will be re-afforested by planting suitable species to meet local demand of fuel, fodder, timber and demand of forest based industries
6. Participation of community will be insured in the process of management, protection and conservation through participatory forest management.

7. Working with the local community to maintain ecological balance for the balance for preservation and improvement of wildlife.
8. Soil conservation works with focus on watershed management in a planned manner.
9. Survey, measurement and demarcation of forest land will be ensured under the provision of HP Land Revenue Act 1954 and construction of boundary Pillars in planned manner.
10. Encroachments on forest land will be detected and prosecuted in pursuance of the H.P.High Court orders.

1.4 Constitution of Working Circles

In conformity with the objective of management out lined above and as per guidelines of National Working Plan code, following Working Circle have been constituted.

1.	Deodar/Kail Working Circle.	12918.19 ha.
2.	Fir/Spruce Working Circle.	2017.27 ha.
3.	Chil Working Circle.	520.8 ha.
4.	Oak Working Circle.	232.4 ha.
5.	Bio-Sphere Conservation Working Circle.	10621.66 ha.
6.	Plantation Working Circle.	7371.2 ha.
7.	NTPF (For important NTFP like resin, tendu leave etc.) Working Circle (Overlapping).	
8.	Forest Protection (Fire, illicit felling, encroachment, illegal mining, poaching, Jhumming, etc.), Working Circle (Overlapping).	
9.	Joint Forest Management Working Circle. (Overlapping).	
10.	Wildlife Management Working Circle. (Overlapping).	

1.4.1. Deodar-Kail Working Circle

All the Reserved, Demarcated Protected and Undemarcated Protected forests with predominance of Deodar and Kail, either in mixture or pure and which are situated on moderate slopes, have been allotted to this Working Circle. Such forests which are on steep slopes, along the National Highways on source of important streams or around the tourist places, have been excluded from this Working Circle. Some of the UPFs have been allotted to this

Working Circle for proper management. Definite allotment to different periodic blocks has been made and yield is calculated for each PB. Punjab Shelter wood system has been adopted for the management of these forests to get intensive regeneration and maximum yield. The total area under this Working Circle is 12918.19 ha.

1.4.2 Fir and Spruce Working Circle

Those Reserved, Demarcated Protected and Undemarcated Protected Forests which are on easy slopes and have 55% or more pure or mix crop of Fir and Spruce, have been allotted to this Working Circle. Heavy fellings in Fir/Spruce forests have done in the past 15 years for supply of timber for fruit packing cases. The regeneration operation in these areas has been completely ignored. Both fir and Spruce has a peculiar problem of regeneration, which cannot be solved by grouping them with Deodar and Kail forests. Therefore, a separate Working Circle for Fir and Spruce forests has been constituted to bring these forests under proper management. In order to ensure regeneration, these forests will now be managed under Punjab Shelter wood system with floating method of allotting PBs will be followed, in which only PBI will be definitely allotted and rest of the forests will be unallotted. 2017.27 ha area has been allotted in this Working Circle. The artificial source of regeneration will be resorted to.

1.4.3 Chil Working Circle

All Demarcated Protected and Un-demarcated Protected Forests lying in easy slopes where Chil is the main species occurring either pure or in mixture and established Chil plantations, have been allotted to this Working Circle. Some of the UPFs having Chil as main species have been allotted to this Working Circle for their proper management. The forests which were worked under coppice/oak Working Circle, as per previous Working Plan and where oak is almost disappeared because of heavy lopping/fire and Chil plantations have been established, have also been allotted to this Working Circle. Definite allotment to different PBs has been made and yield has been calculated separately for each PB. Silviculture system adopted for managing these forests is Punjab shelterwood system with natural method of regeneration

supplemented with artificial. The total area allotted to this Working Circle is 520.8 ha.

1.4.4 Oak Working Circle

All forests with predominance of Ban, Mohru and Kharsu oak, have been allotted to this Working Circle. The total area of this Working Circle is 232.40 ha. This working circle has been put under two categories i.e. Oak Working Circle (Conservation) and Oak Working Circle (Commercial). The forest will be managed under coppice with standard system. The forest will be regenerated by naturally existing oak and no attempt will be made to introduce deodar, chil and other species in such areas, except oaks P/Bags tall planting. No green felling will be carried out in Oak Conservation Working Circle.

1.4.5 Bio-Sphere Conservation Working Circle

This Working Circle comprised of all Reserved, Demarcated Protected and Undemarcated Protected Forests which are situated on steep and precipitous slopes, along major roads/streams/nalas, near habitations around places of tourist importance and also those forests which have not been covered under other Working Circles. In this Working Circle, no silviculture system is adopted. Moreover, green felling will not be allowed from these forests except salvage removal for meeting the bonafide demand of right holders. These forests will be protected from soil and water conservation, aesthetic and tourist point of view besides maintaining the ecological balances. The density of these forests will be improved by raising plantation of suitable species through artificial means. The total area of this Working Circle is 10621.66 ha.

1.4.6 Plantation Working Circle

All blanks and poorly stocked undemarcated protected forests, Demarcated Protected and Reserved Forests have been allotted to this Working Circle. Old plantations which have not been established and not covered under any other Working Circle will also be allotted to this Working Circle. The total area of this Circle is 7371.2 ha. No silviculture system is adopted. However, areas to

be planted year-wise, method of planting, planting techniques of various suitable species is clearly mentioned.

1.4.7 Working Circles, their area and distribution

A statement showing the areas of Reserved, Demarcated Protected Forests, and Un-demarcated Protected Forests allotted to different Working Circles and sequence of fellings and their distribution in ranges is given in the table-1.1.

Table – 1.1

Statement Showing Working Circlewise/Classwise Area (ha)

Working Circle	RFs	DPFs	UPFs	Total
Deo/Kail	1480.80	6793.49	4643.90	12918.19
Fir/Spruce	696.80	1072.40	248.07	2017.27
Chil	-	81.50	439.30	520.8
Ban-Oak	-	26.0	206.40	232.40
Bio-Sphere Conservation	998.60	2816.38	6806.68	10621.66
Plantation	-	-	7371.2	7371.2
Total	3176.2	10789.77	19715.55	33681.52

1.4.8 Blocks and Compartments

Mainly the compartments are retained as such as per previous Working Plans except in some cases where these have been further divided or even merged as per requirement / status of the forests. All those forests which have not been covered under any Working Plan in the past have also been allotted to particular Working Circle and serially numbered.

1.4.9 Felling Series

This Working Plan exclusively pertains to Theog Forest Division. Hence no felling series has been prescribed.

1.5 Period of Working Plan

The revised Working Plan has been prepared for a period of 13 years commencing from 1st April, 2016 to 31st March, 2029. The working plan under revision expired on 31.3.2012. Therefore no Silvicultural fellings since then. The other operations like

plantations, control burning, repair of boundary pillars etc.were done on the basis of Annual Plan Operations. Therefore, there is no problem in making the plan operative prospectively. The removals done during the year 2012-13 to 2015-16 will count towards the removals of 2016-17 and deviations calculated accordingly.

A Mid term review of the working plan to assess and monitor the implementation of the prescriptions of the plan should be carried out during the eighth year of the plan period. The detailed report indicating area harvested and the area regenerated in a year shall be sent to this office by 30th April of every year.

CHAPTER II

DEODAR- KAIL WORKING CIRCLE

2.1. General Constitution of Working Circle

This Working Circle covers all the RF's, DPF's & UPF's where Deodar Forests predominates followed by Kail forests which are occurring on moderate to steep slopes and wherein P.B.-I and P.B.-IV areas mostly fit for working under the concentrated fellings. This Working Circle also includes some proportion of crop of Spruce, Fir, Oaks, Broad Leaved and Chil species. This working circle includes 305 forests/compartments/sub-compartments and listed in Appendix-I of Division Area Statement of Volume -II in the Working Plan. The total area under this Working Circle is 12918.19 ha. Statement by Ranges and as per legal status of the forest is given below in table 2.1.

Table-2.1

RANGE-WISE DISTRIBUTION OF RFs, DPFs AND UPFs TO DEO-KAIL WORKING CIRCLE AREA (Ha)

Ranges	RF	DPF	UPF	Total
Theog	490.20	2297.70	2459.70	5247.60
Balson	-	1969.30	863.10	2832.40
Kotkhai	990.60	2526.49	1321.10	4838.19
Total	1480.8	6793.49	4643.9	12918.19

2.2. General Characters of Vegetation

The crop is mainly Deodar and Kail occurring either gregariously in pure patches or in mixture with Spruce, Fir, Oaks, Broad Leaved and Chil species in descending proportions. In the upper riches Fir and Spruce is found mixed with deodar and Kail with some proportion of *Taxus baccata*. Along the nallas and depressions and at places dense crops of Ban oak pure or mixed with Mohru also found. Along the lower limits deodar is confined to sheltered places only. Chil is met within the lower altitudinal zone and is mainly confined to spurs and warmer aspects.

2.2.1. **Crop Composition**

Deodar and Kail being the main species and forms crop composition of more than 78%. Rest of the 22% crop constitute Spruce, Oaks, Broad Leaved, Fir and Chil which forms about 8.5%, 6%, 3.3%, 2.5% and 1.7% crop composition in the descending order.

2.2.2. **Age Class Distribution**

All the age classes are distributed, with predominance of young to middle aged trees with fair proportion of mature trees and few over mature trees. The age classes of each forest have been recorded in the concerned Compartment History Files.

2.2.3 **Density**

The density of each compartment / sub compartment was determined by ocular estimate and recorded in the compartment history files. The density in general varies from 0.4 to 0.9 with an average of 0.7 approximately.

2.2.3.1 Density-Canopy: - (Completeness of canopy) generally the forests in this Working Circle are having canopy density 0.75 to 1.0. Some forests have closed canopy and very few with thin canopy density.

2.2.3.2 Density-Crop:- (Trees stocking) Generally the forests are almost completely stocked and some of the forests are under stocked. The crop density varies from 0.5 to 1.0 with an average of 0.75 approximately.

2.2.4. **Growing Stock**

The total growing stock of all the trees under this Working Circle for all the species and for all the P.B.'s is 4313955.725 M3. Its P.B-wise and species wise detail has been given in table-2.2(b) under para 2.6.4.

2.2.5. **Status of regeneration**

Status of regeneration is fairly good except in few forests which need to be regenerated with artificial tall planting in polythene container in the size of 12x20".

2.2.6 Special problems

Some of the forests have been invaded with climbers like *Rosa muchata* (Kuja), *Hedera helix* (Mithiari) and *Vitis himalayana* (Pan bel) etc. Also Deodar is being invaded and suppressed by gregarious growth of Kail saplings and poles which needs to be cleaned and cut back in favour of Deodar.

2.3. Sequence of Felling and cutting sections

Cutting section/compartments for each year, then for 1st five years, 2nd five years and 3rd five years prescribed for felling have been given in the table of sequence of fellings in table No. 2.15 & 2.16, 2.17 under para 2.13.

2.4. Blocks and Compartments

The detailed description of periodic blocks compartments/sub compartments, are in ha, has been given in appendix-I Divisional Area Statement, Volume-II (page 1 to 20).

No change has been made in the existing boundaries of the forests and compartments. All the forests and compartments as per Dr. Lalit Mohan's Working Plan have been retained under this Working Circle and the forests of Rohru Division which merged with this Division have been added to this Working Circle during the Revision of present Working Plan and have been given forests/compartment numbers in continuity with forest numbers of Kotkhai Range.

2.5 Main objectives of Management

Without prejudice to the general objectives of management, the main objectives of management will be:

- i) To convert the irregular and un-evenaged crops into more or less uniform, normal evenaged crops.
- ii) To restock the PB I and other blank areas as soon as possible by resorting to artificial regeneration.
- iii) To obtain progressive yield in perpetuity after meeting the legitimate demands of the local people.
- iv) To preserve and protect the forests to maintain the mountain ecosystem.

- v) To adopt and practice silvicultural tending operations like pruning, cleaning, thinning and climber cutting in favour of superior and healthy grown species and thus to distribute growth potential of the site amongst the species / trees which are to be retained till maturity without creating permanent canopy gap.

2.6 Analysis and valuation of the Crop

2.6.1. Stock Maps

Stock maps of all the forests allotted to this working circle have been prepared on 1:15000 scale survey sheets and placed in the respective compartment history files.

2.6.2. Site Quality

The average site quality assessed for Deodar in the Theog felling series is I/II while that of Kail is II/III. Necessary entries in respect of site quality of all the forests have been made in respective compartment history files.

2.6.3. Age classes

The crop is mostly of all age classes. Sapling to pole crop predominates in P.B. - IV, pole to middle age predominates in P.B.-III middle aged to mature trees predominates in P.B.-II and whereas middle age, mature to over mature trees predominates in P.B.-I areas with some proportion of over mature trees.

2.6.4. Type of Enumerations

76 compartments have been allotted to P.B.-I after complete enumeration in 9 compartments was carried out during the revision of this working plan which is more than 10% of the total compartments. In the rest of the compartments partial enumeration have been carried out. In all other PB's i.e. PB-II, PB-III & PB-IV 10% enumeration was carried out in actual and for rest of the compartments partial enumeration was carried out and thus the enumeration data have been extrapolated accordingly. Enumeration Result for this working circle has been appended in Volume-II Appendix-II page No. 21 to 105. The total growing stock of various coniferous species PB Wise in Deo-Kail Working Circle

and for all species including Oaks and Broad Leaved has been tabulated below in table 2.2(a) and table 2.2(b).

Table – 2.2(a)
Total growing stock of various coniferous species
PB Wise in Deo-Kail Working Circle (Volume in cum)

PB's	Area	Para - meter	Deodar	Kail	Fir	Spruce	Chil	Total	Average per ha.
I	3587.25	No.	515405	330679	33015	131856	5455	1016410	283.34
		Vol.	731994.96	421452.66	37422.11	173220.69	2113.08	1366203.50	380.85
II	2609.89	No.	462448	274482	26922	36393	3838	804083	308.09
		Vol.	562181.778	283807.533	37419.75	33024.053	2003.303	918436.48	351.91
III	3356.30	No.	585467	343357	28916	69708	25144	1052592	313.62
		Vol.	590126.258	325269.082	39194.882	62297.662	6985.265	1023873.15	305.06
IV	3364.75	No.	410228	510033	17143	125565	40318	1103287	327.90
		Vol.	375882.20	360280.59	22781.5	62698.195	10797.145	832439.63	247.40
Total		No.	1973548	1458551	105996	363522	74755	3976372	1232.95
		Vol.	2260185.2	1390809.9	136818.24	331240.6	21898.8	4140952.76	1285.21

Table – 2.2(b)
Total growing stock of various species
PB Wise in Deo-Kail Working Circle including
Oaks & B.L. (Volume in cum)

PB's	Area	Para - meter	Deodar	Kail	Fir	Spruce	Chil	Ban-Oak	Broad Leaved	Total	Average per ha.
I	3587.25	No.	515405	330679	33015	131856	5455	44918	54877	1116205	311.15
		Vol.	731994.957	421452.656	37422.106	173220.693	2113.083	26384.732	24561.075	1417149.302	395.05
II	2609.89	No.	462448	274482	26922	36393	3838	31408	14789	850280	325.79
		Vol.	562181.778	283807.533	37419.75	33024.053	2003.303	14459.819	4613.842	937510.078	359.21
III	3356.30	No.	585467	343357	28916	69708	25144	79101	41758	1173451	349.62
		Vol.	590126.258	325269.082	39194.882	62297.662	6985.265	37548.839	15864.894	1077286.882	320.97
IV	3364.75	No.	410228	510033	17143	125565	40318	98654	20468	1222409	363.29
		Vol.	375882.201	360280.59	22781.5	62698.195	10797.145	42403.642	7166.19	882009.463	262.13
Total		No.	1973548	1458551	105996	363522	74755	254081	131892	4362345	1349.85
		Vol.	2260185.2	1390809.9	136818.24	331240.6	21898.8	120797.03	52206.0	4313955.73	1337.36

2.6.5. Status of Regeneration

During the period of Dr. Lalit Mohan's Working Plan due to ban on green felling; no concentrated felling/seedling felling have been carried out which was prescribed for P.B.-I and P.B.-IV areas. Thus, the status of regeneration has improved a lot and thick regeneration of sapling and pole have established especially in P.B.-IV and P.B.-III areas and in patches in other P.B.'s.

2.6.6 Comparison with previous data of Growing Stock

The comparison of latest enumeration and growing stock data with the previous working plan data is tabulated below. In view of the growing stock, density and age classes in those PB's which have completed 30 years in the previous Working Plan have now been allotted to the next PB. The comparison with previous and present growing stock is tabulated below in table No. 2.3.

Table-2.3
Deodar Kail Working Circle

P.B.'s	Area in ha.		Deodar		Kail		Spruce		Fir		Chil		G. Total	
			Total	Per ha	Total	Per ha	Total	Per ha	Total	Per ha	Total	Per ha	Total	Per ha
PB I	3072.70	A	380179	123.73	279888	91.09	101076	32.89	28989	9.43	5268	1.71	795400	258.86
		AA	426508	138.81	302890	98.57	108864	35.43	26923	8.76	1489	0.48	866674	282.06
	3587.25	B	515405	143.68	330679	92.18	131856	36.76	33015	9.20	5455	1.52	1016410	283.34
		BB	731994.96	204.05	421452.66	117.49	173220.69	48.29	37422.11	10.43	2113.08	0.59	1366203.50	380.85
PB II	3055.35	A	438518	143.52	304979	99.82	60124	19.68	21159	6.93	11302	3.70	836082	273.65
		AA	472439	154.63	374920	122.71	61180	20.02	15628	5.11	4610	1.51	928777	303.98
	2609.89	B	462448	177.19	274482	105.17	36393	13.94	26922	10.32	3838	1.47	804083	308.09
		BB	562181.778	215.40	283807.533	108.74	33024.053	12.65	37419.75	14.34	2003.303	0.77	918436.42	351.91
PB III	3063.30	A	621181	202.78	355820	116.16	84247	27.50	55901	18.25	31552	10.30	1148701	374.99
		AA	456793	149.12	244346	79.77	75228	24.56	40777	13.31	5585	1.82	822729	268.58
	3356.30	B	585467	174.44	343357	102.30	69708	20.77	28916	8.62	25144	7.49	1052592	313.62
		BB	590126.258	175.83	325269.082	96.91	62297.662	18.56	39194.882	11.68	6985.265	2.08	1023873.15	305.06
PB IV	3109.65	A	395041	127.04	523746	168.43	86217	27.72	7821	2.52	45004	14.47	1057829	340.18
		AA	228198	73.38	294430	94.68	36648	11.78	7949	2.56	6635	2.13	573860	184.54
	3364.75	B	410228	121.92	510033	151.58	125565	37.32	17143	5.09	40318	11.98	1103287	327.90
		BB	375882.20	111.71	360280.59	107.07	62698.195	18.63	22781.5	6.77	10797.145	3.21	832439.63	247.40
Total		A	1834919	597.7	1464433	475.5	331664	107.79	113870	37.13	93126	30.18	3838012	1247.67
		AA	1583938	515.94	1216586	395.73	281920	91.79	91277	29.74	18319	5.94	3192040	1039.14
		B	1973548	617.23	1458551	451.23	363522	108.79	105996	33.23	74755	22.46	3976372	1232.94
		BB	2260185.2	706.99	1390809.9	430.21	331240.6	98.13	136818.24	43.22	21898.8	6.65	4140952.69	1285.21

Note:- 'A' = No. of trees as per Dr. Lalit Mohan's Plan (1995).

'AA' = Volume of trees as per Dr. Lalit Mohan's Plan (1995).

'B' = No. of trees as per present Plan (2013).

'BB' = Volume of trees as per present Plan (2013).

2.6.7 Special Features

This is the major working circle and forms more than 38% of the total area of this tract. This working circle is important for the management point of view because yield is to be extracted from this working circle on sustainable basis and the forests are in the process of becoming normal forest with even aged crop which target is likely to be achieved during next 45 years. Therefore, seedling felling, final felling and regeneration thereof with uniform crop needs special emphasis.

2.7. Silvicultural System

The forests allotted to this working circle will be managed under Indian irregular Shelterwood System. Compact groups of advance growth upto 30 cm dbh and 0.2 ha. or more in extent will be retained as advance growth. Individual poles or middle aged trees will not be retained while carrying out seeding fellings. Efforts will be made to get PB I areas regenerated naturally and regeneration will be supplemented by artificial regeneration operations. No felling will be carried out in PB II areas except salvage removal. Thinning will be carried out in PB III wherever required. Final fellings alongwith thinning and cleanings as per requirement of the crop will be carried out in PB IV areas. The Indian irregular Shelterwood Silvicultural System has been prescribed to be adopted *to form normal and even aged forests* for the time to come.

2.7.1. Choice of Species

Species most suited to the locality alongwith Deodar and Kail as per principal species will be preferred. Broad Leaved will be introduced in Nalas and depressions.

2.8. Rotation and conversion period

A diameter of 60 cm dbh is suited for conversion into standard size sleepers and other large size scantling which are mostly in demand. According to the growth data given in Dr. Lalit Mohan's plan, this diameter is attained during 95 years by deodar and 93 years by Kail. Giving an allowance for regeneration failures and other risks, the rotation of 120 years has been fixed for all the species in this working circle. The forests of this circle are in the process of conversion from irregular to regular and have been achieved partly. Taking field position into consideration and by carrying out tending operations like cleaning, climber cutting, thinning and improvement felling in PB-IV & PB-III and concentrated felling in PB-I and final felling in PB-IV as per prescription of Working Plan; this objective of conversion of irregular to regular forest can be achieved during next 45 years. Hence now the conversion period is fixed as 60 years.

2.8.1. Regeneration Period

Regeneration period of 30 years is sufficient to regenerate PB I area, therefore, it shall continue.

2.9 Exploitable diameter

The exploitable diameter of the Kail and deodar is fixed 60 cm dbh.

2.10 Felling Cycles/Series

All the forests under this working circle have been prescribed to be worked under this Felling Series.

2.11. Division into Periods and Allotment to the Periodic Blocks

With the rotation of 120 years and regeneration period of 30 years, there will be 4 periodic blocks of 30 years each. All the forests have been allotted to definite periodic blocks. The area allotted to different PB is given in the table 2.2(a). The description of Blocks, Compartments, Sub-comptt., area in ha., Working Circle, periodic block have been mentioned in a tabular statement in the Revised Working Plan, Volume-II, Appendix-I page 1 to 20. Status of regeneration and reasons for allotment to a specific periodic block has been discussed in the concerned Compartment History Files.

2.11.1. PB I: The old PB I forests which have not been regenerated or the regeneration is not established, the areas where the crop density is very low and have blanks and gaps, have again been retained and allotted to P.B.-I (Type A) areas. The forests which were earlier allotted to P.B.-I in Dr. Lalit Mohan's Working Plan and where seedling felling had been prescribed have been retained still in P.B.-I (Type B) areas and have been prescribed for seedling felling during the period of this Working Plan under revision. Those forests which were allotted to P.B.-II areas in the Khullar's and Dr. Lalit Mohan's Working Plan and where the nature of crop composition corresponds to P.B.-I type have been allotted to this PB.

2.11.2. If an area is seriously burnt amounting to destruction or drying of 50% or more of the standing volume, it should be transferred to PB I for restocking and an equivalent area of PB I in which

regeneration felling are yet to be done should be transferred to PB II.

- 2.11.3.** PB II: Old PB II where the crop is not yet mature because of removal of mature trees in salvage removals etc. and also the areas where the crop is middle aged and approaching to maturity, have been allotted to this PB.
- 2.11.4.** PB III: Those forests have been allotted to this PB where the trees are mostly pole to middle aged.
- 2.11.5.** PB IV: All the forest where the majority of the crop has attained the pole stage with some proportion of middle aged trees has been allotted to this PB.

AREA-WISE ALLOTTMENT TO PERIODIC BLOCKS IS TABULATED AS UNDER:

Table-2.4

PB wise area allotment (ha)

Felling Series	Ranges	Area				Total (ha.)
		P.B.-I	P.B.-II	P.B.-III	P.B.- IV	
Theog	Theog	1229.10	1081.05	1399.30	1538.15	5247.6
	Balsan	1096.30	403.0	940.80	392.30	2832.4
	Kotkhai	1261.85	1125.84	1016.20	1434.30	4838.19
Total		3587.25	2609.89	3356.30	3364.75	12918.19

2.12. Calculation of yield

The yield from this Working Circle is obtained from all the PBs except PB II and PB III where no commercial fellings are prescribed. Yield will be regulated by volume, and will be limited to the increment put on by the crop. Yield is calculated in the following manner:

Von Mental's formul

i) $Y = 2GS/R$

ii) $Y = Ca1\%$ for QII crops in different diameter classes.

Accordingly the annual yield of conifers by the two methods shall be as under:

Table – 2.5**Annual Yield**

Species	Von Mental (M³)	CAI% (M³)
Deodar	37670	25372
Kail	23180	23065
Fir	2280	3240
Spruce	5521	7731
Chil	365	689

However the CA1% of different dia classes for conifers is given in the table – 2.6 as under:

Table-2.6

**No. and Volume of Conifer trees in Deo-Kail Working Circle
Sequence of Felling (Total area 12918.19 ha)**

<i>Species</i>	<i>Parameter No./Vol.</i>	<i>Diameters in C.M.</i>										<i>Total</i>
		<i>V</i>	<i>IV</i>	<i>III</i>	<i>IIA</i>	<i>IIB</i>	<i>IA</i>	<i>IB</i>	<i>IC</i>	<i>ID</i>	<i>IE</i>	
Deodar	No.	491693	503535	402845	308553	147270	71994	30457	11807	4266	1128	1973548
	Vol.	84571.196	232633.17	406067.76	551692.77	412356	289487.87	165503.34	73297.86	33624.61	10950.62	2260185.20
	CA1/M ³	5539	4560	5466	3807	2511	1763	1008	446	205	67	25372
Kail	No.	455220	421653	246232	175357	95997	39891	16419	5214	2046	522	1458551
	Vol.	70103.88	183419.055	244262.14	314239.74	271671.51	162595.72	90403.01	32764.78	16263.65	5086.37	1390809.86
	CA1/M ³	5475	6742	5496	2759	1217	728	405	147	73	23	23065
Spruce	No.	124408	110439	57786	34952	14743	10098	6135	3156	1486	319	363522
	Vol.	13187.25	40310.23	53047.55	61375.71	42725.21	43764.73	37202.64	22215.08	13687.55	3724.64	331240.59
	CA1/M ³	622	903	2488	1577	893	595	446	118	70	19	7731
Fir	No.	23865	25627	23238	15643	8273	4999	2538	1056	642	115	105996
	Vol.	5608.275	14786.78	25352.66	27516.04	21716.63	18251.35	12306.76	5819.62	4472.17	987.97	136818.26
	CA1/M ³	224	590	991	594	402	239	143	30	22	5	3240
Chil	No.	36451	27897	6993	2451	471	359	107	25	1	-	74755
	Vol.	2660.923	8592.276	4972.02	3127.48	949.07	1048.64	427.57	114.9	5.92	-	21898.80
	CA1/M ³	121.33	322	134	71	19	16	5	1	.04		689.37

2.12.1**Yield from PB I**

For the purpose of calculation of yield PB-I areas have been put under two categories.

Type A:

Those areas which were in PB I as per previous Working Plan and where regeneration was found inadequate and have not established where the seeding fellings were carried out in the past have again been retained in PB type A areas and no concentrated fellings are recommended in such areas. The DFO can however after personal inspection allow petty felling on lines of corrective fellings in these

forests. However, the removals if any, would count against yield of PB-I type B areas. In such type of areas where regeneration is inadequate, may be supplemented with artificial regeneration operations. The total area of this type of PB I is 1206.9 ha. in Theog felling series. As no felling is prescribed in such type of areas, so yield is not calculated.

2.12.2. Type B:

Those forests which were allotted in the Lalit Mohan's Plan to P.B.-I Type B and where seedling felling have been recommended plus those forests which were allotted to P.B.-II during the last 30 years have now been allotted to P.B.-I (Type B) areas. The total area of PB-I type B areas in Theog felling series are 2380.35 ha. The annual yield is calculated as follows:-

2.12.3. Due to ban on green felling those P.B. I type B areas which were prescribed for seedling felling in Dr. Lalit Mohan's Working Plan could not be felled during this Plan period. Therefore, the area/forest under P.B.-I type B have increased and forms $\frac{2}{3}^{\text{rd}}$ of the total area 3587.25 ha of P.B.-I. The other reason for increase of P.B.-I type B area is that some area of Rohru Forest Division has merged with this Division during the Working Plan period of Dr. Lalit Mohan's. This area (Type B) i.e. 2380.35 ha under Theog felling series will therefore be felled for regeneration in 15 years. In such areas all trees are to be felled except.

1. Seed bearers.
2. on strategic locations like along nalas/broken grounds etc.
3. Selection marking in steep precipitous slopes.
4. Advance growth.

2.12.4. The main volume to be retained will be of seed bearers on an average basis 40, 30, 75, 40 & 22 trees per ha of Deodar, Kail, Fir, Spruce and Chil are to be retained as seed bearers. The average dia class is to taken as IIB. Since the crop is heterogeneous or in patches so the trees will also be retained accordingly. The proportion in which these are to be retained can be arrived at from the proportions of their occurrence which is given in the table – 2.7.

- 2.12.5.** Total growing stock of conifers is 1366203.50 cum and percentage of various species is calculated as below (Table – 2.7).

TABLE – 2.7

Proportion of specieswise growing stock

Species	Growing Stock	Percentage
Deodar	731994.96	53.58
Kail	421452.66	30.85
Fir	37442.11	2.74
Spruce	173220.69	12.68
Chil	2113.08	0.16

- 2.12.6** But while carrying out markings we shall have to give preference to Deodar over other species, so this proportion is further modified and given in the following table – 2.8.

Table – 2.8

Species	Percentage
Deodar	60
Kail	30
Fir	2
Spruce	7
Chil	1

- 2.12.7** Applying this percentage to the entire crop, the volume to be retained as seed bearers comes under (Table – 2.9).

Table – 2.9

Volume of Seed bearer to be retained

Species	Vol./ ha to be retained in case of pure crop (cum)	Vol./ ha to be retained in this case on proportionate basis		Volume of seed bearers to be retained over an area of 2380.35 ha (cum)
		Proportionate factor	Volume/ha (cum)	
Deodar	112	60%	67.20	159959.52
Kail	84.9	30%	25.47	60627.51

Fir	196.88	2%	3.94	9378.58
Spruce	115.92	7%	8.11	19304.64
Chil	44.33	1%	0.44	1047.35

2.12.8. Ten percent of the total volume shall have to be retained on account of steep slopes, nallas etc. Thus the volume available for felling is calculated in following table – 2.10.

Table – 2.10

Species	Total Standing Volume (cum)	90% of Standing Volume (cum)	Volume of seed bearers (cum)	Volume available for felling (cum)
Deodar	461545.65	415391.08	159959.52	255431.56
Kail	270802.60	243722.34	60627.51	183094.83
Fir	9599.98	8639.98	9378.58	(-) 738.60
Spruce	89167.43	80250.68	19304.64	60946.04
Chil	1991.95	1792.75	1047.35	745.40

2.12.9 This volume is available for felling in 15 years. So the annual yield is prescribed as under (Table-2.11).

Table – 2.11

Volume Available for felling in 15 Years

Species	Volume available for felling in 15 years (cum)	Volume available annually (cum)	CAI % (Cum) Volume available annually	50 % of the CAI% (cum)	Prescribed annual yield (cum)	Remarks
Deodar	255431.56	17028.77	25372.00	12686.00	12500.00	
Kail	183094.83	12206.32	23065.00	11532.50	11000.00	
Fir	-Nil-	-	3240.00	-	-	The volume of seed bearer is at par with total volume available hence no yield prescribed.
Spruce	60946.04	4063.06	7731.00	3865.50	3700.00	
Chil	745.40	56.30	69.00	344.50	50.00	Though CAI% is on higher side but yield has been prescribed for the volume left after the seed bearer.

2.12.10 Yield from PB IV

There will be removal of overwood and thinning in young crop in PB-IV. While removing overwood, the trees shall have to be retained on strategic locations like along nallas, broken grounds etc. It is felt that there is need to remove part of the overwood to free young poles from overhead shade. Moreover, thinning C or C/D grade will also be carried out in young crop. It is estimated that 10% volume of III and below classes will be available for felling. Thus, the yield is calculated as under (Table-2.12).

Table-2.12
Total Growing Stock (PB IV)

Particulars	Deodar	Kail	Rai	Fir	Chil	Total
Total Volume of IIA & above classes	211002.901	180304.592	31169.181	15476.019	2009.743	439962.436
Total Volume of III & below classes	164879.3	179975.998	31529.014	7305.481	8787.402	392477.195

Volume available for felling

60% of volume of IIA & above classes	126601.74	108182.76	18701.51	9285.61	1205.85	263977.47
10% of volume of III and below classes	16487.93	17997.60	3152.90	730.55	878.74	39247.72
Total volume available for felling	143089.67	126180.36	21854.41	10016.16	2084.59	303225.19

2.12.10.1 It is expected that the regeneration in the entire PB IV area will get established in next 30 years. Therefore, annual yield from PB IV will be as under (Table-2.13).

Table-2.13
Sequence of Felling

Species	Volume available for felling in 30 years (cum)	Volume to be felled annually (cum)	Prescribed annual yield (cum)
Deodar	143089.67	4769.65	4000.00
Kail	126180.36	4206.01	3900.00
Fir	10016.16	333.87	300.00
Spruce	21854.41	728.48	600.00
Chil	2084.59	69.48	60.00
Total	303225.19	10107.49	8860

Increment is ignored as safeguard against over fellings to compensate for natural dropping, dying etc.

2.12.10.2 Yield from PB III

As per field observations, it is gathered that the crop is mostly young to middle aged. The crop in most of the forest is thin. Though, some yield can be available from some forests but it is not being prescribed because it will be negligible hence no yield is prescribed. But all type of removals ie hygienic or salvage will be counted against the prescribed yield of this Working Circle towards PB-I.

2.12.10.3 Yield from PB II

No yield is prescribed from PB-II as it forms the approach class to PB-I. However, all removals on account of hygienic or salvage fellings will be accounted against the prescribed yield from this Working Circle (in PB I).

2.12.10.4 Prescribed Yield

The prescribed annual yield (cum) thus comes as under (Table-2.14).

Table-2.14
Prascribed Annual Yield (CuM)

Species	PBI Type of Area		PB II	PB III	PB IV	Total
	A	B				
Deodar	-	12500.00	-	-	4000.00	16500.00
Kail	-	11000.00	-	-	3900.00	14900.00
Fir	-	-Nil-	-	-	300.00	300.00
Spruce	-	3700.00	-	-	600.00	4300.00
Chil	-	50.00	-	-	60.00	110.00
Total		27250.00	-	-	8860.00	36110.00

This yield is far low as calculated from Von Mantle's formula and increment which is given in Table-2.5. Moreover, the yield has been prescribed 50% of the CAI%.

2.12.10.5 Control of Yield

All removals down to V class trees will count towards the yield of this Working Circle. The yearly excess or deficit of each species will not exceed 25% and shall be carried forward in control forms and deviation statement adjusted at the end of every five years when it should not exceed 10%. The total deviation at the end of the Working Plan period should be within $\pm 10\%$ of the prescribed yield. No efforts should be made to obtain the prescribed yield, if the trees are not available silviculturally.

2.12.10.5.1 It is therefore, most essential that critical survey of felled PB I areas is carried out annually so as to assess the progress of regeneration. It is revealed that regeneration is not keeping pace with the felling; further felling shall be discontinued or deferred till such time by which regeneration in felled PBI areas gains momentum. If regeneration stocking is less than 75% at the end of the three years, or less than 55% at the end of two year or less than 50% at the end of first year, it shall mean inadequate regeneration under such circumstances, the area under felling will be reduced in direct proportion to the area under inadequate regeneration. All such deviation will have to be got approved from Pr. CCF through APCCF Working Plan and Settlement.

2.13 Table of Fellings

Yield will be controlled PB wise. Removals from PB II and III will count towards PB I. Similarly, yield of type A of PB I will also count towards type B areas of PB I.

Tabular statement of the sequence of fellings in PB I and PB IV for the whole of the Working Circle is proposed in the table-2.15.

Table – 2.15
SEQUENCE OF FELLING

P.B-I				Kind of Felling	P.B-IV			Kind of Felling
Year	Range	Name of forests	Area (ha.)		Range	Name of forests	Area (ha.)	
2014-15	Theog	R-10 Rajinder Rakh C-V	21.80	Seedling felling	Theog	D-29 Shalli-Ka-Tir	91.75	Final felling
	Kotkhai	D-183 Jaroth C-I	70.8	Seedling felling	Kotkhai	R-13 Chambi-Kupar C-III(a)	50.2	Final felling
	Balson	U-375 Ragsa	51.10	Seedling felling	Theog	U-64 Kandi Bhalot	37.8	Final felling
2015-16	Balson	D-134 Doba C-I	23.0	Seedling felling	Theog	U-68 Rajpura	28.4	Final felling
	Theog	D-51 Bhalech C-II	56.20	Seedling felling	Balson	D-147 Majheila C-II	29.2	Final felling
	Theog	R-11 Cheog C-IV	28.40	Seedling	Kotkhai	U-436 Santari	8.1	Final

				felling		Mandhrol		felling
2016-17	Theog	D-31 Bhalaiwat	49.40	Seedling felling	Kotkhai	D-169 Katach C-II	125.4	Final felling
	Kotkhai	U-430 Kuri-Mohli	39.70	Seedling felling	Theog	U-84 Parbhech	5.0	Final felling
	Balson	D-131 Deha C-II	93.0					Final felling
2017-18	Theog	D-29 Shali-Ka-Tir C-I	107.5	Seedling felling	Theog	U-94 Anoo	10.7	Final felling
	Kotkhai	U-467 Govindpur	79.1	Seedling felling	Kotkhai	R-13 Chambi-Kupar C-IX(a)	68.8	Final felling
	Theog	U-120 Kit	73.0					Final felling
2018-19	Kotkhai	R-16 Kalala C-IV	23.20	Seedling felling	Kotkhai	R-15 Tumru C-IIIC	16.2	Final felling
	Balson	D-139 Chadaha C-III (Part)	76.80	Seedling felling	Balson	U-373 Shilla	121.7	Final felling
				Seedling felling	Kotkhai	U-454 Alwang (Part)	78.75	Final felling
Total for 1st five years			793.0				672.0	
2019-20	Theog	D-53 Bharana C-II	25.0	Seedling felling	Kotkhai	R-13 Chambi-Kupar C-XII(c)	29.2	Final felling
	Balson	D-139 Chudaha C-III (Part)	9.4	Seedling felling	Kotkhai	U-454 Alwang (Part)	33.45	Final felling
	Theog	D-109 Majhroha C-I	43.60	Seedling felling	Theog	U-114 Chalawag	16.9	Final felling
				Seedling felling	Theog	U-77 Gowas Kufta	16.0	Final felling
								Final felling
2020-21	Kotkhai	D-186 Gohach C-I	59.10	Seedling felling	Theog	U-115 Bharyana	19.0	Final felling
	Theog	D-56 Tatal	45.0	Seedling felling	Theog	U-122 Tatal	26.7	Final felling
	Theog	U-127 Sharog	23.10	Seedling felling	Theog	U-126 Kiary	38.9	Final felling
				Seedling felling	Theog	U-125 Bagri	36.6	Final felling
2021-22	Kotkhai	U-455 Thanari	46.50	Seedling felling	Kotkhai	R-16 Kalala C-Xa	22.6	Final felling
	Balson	U-381 Mashalta	114.6	Seedling felling	Kotkhai	U-482 Reot	45.3	Final felling
	Theog	D-117 Kanag	51.40	Seedling felling	Theog	U-129 Manal Kasog	39.2	Final felling
				Seedling felling	Theog	U-340 Sharri	6.8	Final felling
2022-23	Theog	U-139 Khanor Nala	171.1	Seedling felling	Balson	U-404 Dasana	99.1	Final felling
	Kotkhai	D-179 Nagrella C-I	41.20	Seedling felling	Kotkhai	R-16 Kalala C-XIa	6.0	Final felling
	Theog	U-86 Sholwi	82.30	Seedling felling	Kotkhai	R-16 Kalala C-XIV	15.4	Final felling
				Seedling felling	Kotkhai	R-15 Tumru C-II	25.4	Final felling
2023-24	Balson	U-376 Ghorma	25.30	Seedling felling		D-175 Nagtir C-II	31.2	Final felling
	Kotkhai	D-187 Jarahi C-III	29.50	Seedling felling	Theog	D-54 Tungla	28.0	Final felling
	Theog	D-117 Kanag (Part)	25.9	Seedling felling	Theog	U-294 Nag	115.4	Final felling
				Seedling felling	Kotkhai	U-431 Kadeoli (Part)	20.9	Final felling
Total for 2nd five years			793.0				672.05	
2024-25	Balson	D-159 Nag Dhar	16.0	Seedling felling	Balson	D-128 Bawar	8.0	Final felling
	Theog	D-116 Kanag (Part)	34.7	Seedling felling	Kotkhai	U-431 Kadeoli (Part)	6.50	Final felling
	Balson	U-392 Meha-Kupar	182.20	Seedling felling	Balson	D-148 Chadren C-III	8.4	Final felling
2025-26	Balson	D-145 Lohala	15.0	Seedling felling	Balson	U-360 Ghog C-I	125.5	Final felling
	Balson	D-155 Kolhnu	36.0	Seedling felling	Theog	D-51 Bhalech C-I	24.2	Final felling
	Balson	D-147 Majhelia C-I	30.0	Seedling felling	Theog	D-57 Silu	13.4	Final felling

2026-27	Kotkhai	D-189 Nagrela C-I	40.9	Seedling felling	Theog	D-61 Sarog	13.4	Final felling
	Kotkhai	D-189 Nagrela C-II	73.7	Seedling felling	Theog	D-103 Sukha Jhal	119.4	Final felling
	Theog	D-109 Majroha C-II	40.6	Seedling felling	Theog	D-120 Gharol C-II	16.2	Final felling
2027-28	Balson	D-131 Deha C-III	44.6	Seedling felling	Theog	D-124 Chichar	126.2	Final felling
	Kotkhai	D-191 Ratnari I(b)	42.23	Seedling felling	Theog	U-74 Baranal	116.3	Final felling
2028-29	Kotkhai	U-500 Matlu C-II	34.80	Seedling felling	Theog	U-79 Soi	16.4	Final felling
	Kotkhai	D-191 Ratnari I (c)	57.73	Seedling felling	Theog	U-81 Odi Dhar	11.8	Final felling
	Kotkhai	D-192 Sona Batola 2b(II)	75.52	Seedling felling	Theog	U-97 Lanuu	34.9	Final felling
	Kotkhai	D-193 Baghi II (a)	40.87	Seedling felling	Theog	U-99 Koti	19.7	Final felling
				Seedling felling	Theog	U-112 Risheli	15.8	Final felling
		Total for 3rd five year s	794.35				676.1	
		G. Total	2380.35				2020.15	

Note: 1. In PB I areas, the fellings should follow regeneration of area.

Note : 2. If any forest from other PB except PB I, is burnt seriously or damaged and destroyed due to one or other reason, it should forthwith be transferred to PB I for the purpose of restocking and instead an equivalent area of PB I in which regeneration fellings are still to be undertaken, should be transferred to PB II.

Note: 3. In type A area of PBI, DFO can allow corrective fellings after personal inspection. This will be petty fellings and all removals will count towards yield of type B areas. The list of such areas is given below (table – 2.16).

Table – 2.16

Name of Range	Name of Forest	Compartment No.	Area in ha.
Balson	D-130 Chandni	-	24.20
	D-131 Deha	C-IV	27.20
	D-132 Barog	C-II	6.40
	D-133 Ghorna	C-II	21.40
	D-135 Dochaha	-	37.50
	D-140 Lakhoti	C-I	49.80
	D-140 Lakhoti	C-V	4.00
	D-141 Sajna	C-II	25.40
	D-142 Chambi	C-II	33.60
	D-144 Kalna	-	12.20
	D-148 Chadren	C-I	53.40
	D-149 Dabar	C-I	65.60
	D-154 Nao	-	18.60
Total			379.3

Kotkhai	R-12 Rantu	-	40.00
	R-13 Chambi Kupar	C-IVa	41.60
	R-13 Chambi Kupar	C-VI	80.60
	D-162 Koti	C-II	42.00
	D-164 Shirgul	C-IX	28.40
	D-166 Hara Ritha	C-IV	32.00
	D-166 Hara Ritha	C-V	22.20
	D-167 Darabla	C-III	18.20
	D-171 Kamhali	C-I	29.20
	D-172 Deora Nal	-	4.00
	D-185 Baghal	C-II	64.80
	D-186 Gohach	C-III	104.00
Total			507.0
Theog	R 10 Rajinder Rakh	C-VIII	44.20
	R-11 Cheog	C-I	24.20
	R-11 Cheog	C-III	40.40
	D-34 Bachlon	-	33.60
	D-35 Bagain	-	18.9
	D-37 Bharaiog	-	16.60
	D-52 Rohru	C-II	56.60
	D-58 Audh	-	26.60
	D-115 Kalhari	C-III	89.00
Total			350.1
G. Total			1206.9

Note: 4. The remaining PB IV forests will be prescribed for felling in the next plan in 15 years. The list of such areas is given below table-2.17.

Table-2.17

Name of Range	Name of Forest	Compartment No.	Area in ha.
Theog	U-111 Dhanot	-	10.9
Theog	U-80 Bagain	-	8.2
Theog	U-113 Kundli	-	8.6
Theog	U-137 Bithu Makrol	-	148.1
Theog	U-138 Jahu	-	182.0
Theog	U-286 Kadharab	-	28.6
Theog	U-302 Shai	-	38.4
Theog	U-320 Satrail	-	23.5
Theog	D-59 Gol Tibbi	-	45.0
Kotkhai	R-13 Chambi-Kupar	C-VIIa	38.8
Kotkhai	R-16 Kalala	C-Va	9.2
Kotkhai	R-16 Kalala	C-VIIIa	3.6
Kotkhai	D-164 Shirgul	C-V	28.4
Kotkhai	D-182 Rela	C-II	24.2
Kotkhai	D-184 Tharu	C-II	34.4
Kotkhai	U-406 Koti	-	76.1
Kotkhai	U-456 Reyog Badruni	-	193.0

Kotkhai	U-473 Kuri Jarahi	-	172.1
Kotkhai	U-474 Satral	-	26.3
Kotkhai	U-488 Jangroli	-	73.7
Kotkhai	U-466 Kufar Bag	-	64.5
Kotkhai	R-13 Chambi-Kupar	C-IVb	91.8
Kotkhai	R-16 Kalala	C-IX	14.6
G. Total			1344.60

2.14. Methods of Executive Fellings.

2.14.1. P.B. I.

The objective of felling in this block is to replace the existing crop by young and more uniform crop. The marking in these areas shall be carried out by DFO or ACF. The following general principles are given for the guidance of marking officer.

- i) There will be only one felling i.e. seeding felling in P.B. I. Final felling will be done in PB IV.
- ii) Well grown, healthy, tall, clean boled trees with well developed crown, preferably of IIB to IIA class, uniformly spaced will be retained as seed bearers. The number will be 35-45 trees in case of Deodar and Spruce, 25 to 35 trees of Kail and 70 to 80 in case of Fir and 20-25 trees of Chil per hectare. The spacing comes to 16-18 m, 18-21 m, 12-13 m, and 21-24 m in case of Deodar, Spruce, Kail, Fir and Chil respectively. The spacing of seed bearers should be less on hot dry aspect/steep slopes as compared to cold aspect, gentle moderate slopes. The spacing between seed bearers should be of about one crown width so as to allow sufficient light to reach the ground but the same time discourages unnecessary seed growth.
- iii) Spacing may be over looked to some extent to favour better seed bearers and the more valuable species. The order to preference of retention of seed bearer will be Deodar, Kail, Spruce and for depending of course on the fitness of site to suit these species.
- iv) In case of mixed forests of Kail and Deodar, opening of the canopy should be light so that Deodar regeneration gets a starts over that of Kail. In a predominately Kail crop, retention of Deodar as seed bearer should be preferred.

- v) Compact groups of vigorous growing pole crop upto 40 cm dbh & density not less than 0.6 and at least 0.2 ha in extent shall be retained as part of the future crop.
- vi) All dead, dying, diseased, malformed and fallen trees will be marked for removal.
- vii) A strip of 50 meters wide on either side along main roads and 25 meters wide on either side of Nallas and streams shall be left untouched.
- viii) On steep to precipitous (between 40°-45°) and broken ground, the marking be done on precipitous grounds.
- ix) Broad leaved trees not interfering with the conifer species or their regeneration should not be cut unnecessarily as they provide fuel / fodder to local people and also improve soil of these belts particularly in nallas/depressions which acts as barrier against fire.
- x) Wolf trees, isolated young trees will be marked for felling.
- xi) The marking officer will prepare a detailed note/map of the area showing advance growth/selection markings/nalas, road sides and patches of concentrated fellings.

2.14.2. PB IV

Final fellings shall be carried out in this PB where majority of the trees shall be of class V and IV i.e. upto 30 cm dbh. The felling of mother trees shall be done on the following principles.

- i) Over wood standing over young crop will be removed. Such over wood will be mainly of IIB and above classes.
- ii) If the young crop is very dense. D/C or C grade thinning among the coniferous plants should also be carried out at the time of final fellings.
- iii) Isolated tree of II and III class which will not merged with future crop and are likely to be potential wolf trees shall be removed.
- iv) Broad leaved species should not be felled but lopped if interfering in the growth of young plants.

- v) Mother trees will be lopped before felling so as to minimize the damage during fellings. Detailed marking note will be prepared by the marking officer.

2.14.3. PB II

There will be no removal from this PB except the salvage.

2.14.4. PB-III

As the crop is mostly under stocked in most of the forests allotted to this P.B., so, no yield is being prescribed. Salvage removals will, however, be carried out.

2.15. Subsidiary silvicultural Operations

The following subsidiary Operations will be carried out soon after the seeding felling in this period block:

- i) Removal of dead, damage and un-felled marked trees if any.
- ii) Cleaning and un-commercial thinning in young crop.
- iii) Climber cutting wherever necessary.

2.15.1. Slash disposal

In order to provide a clean seed bed, felling refuse should be disposed off immediately as per instructions given in H.P. Forest Manual Volume-IV.

2.15.2. Sowing and Planting

Good seed year does not always coincide with the year of fellings. In case the interval between felling year and good seed year is too much, then there is little hope for natural regeneration as by that time, the area becomes invaded by weeds and soil gets compact, so it is laid down that artificial sowing / planting will be done in unregenerate portions after about 5-6 years of felling. The sowing and planting will be done in the following manner:-

- i) For sowing, patches of 45x45x15cm should be made, 2.5 meter apart. The soil should be well pulverized and seed of Deodar should be sown in the soil before the onset of winter rains. Deodar should be preferred; however, Kail should be sown as per suitability of the site.
- ii) For planting Deodar seedling of one and half years to two and half years old with about 25cm in height should be planted before the onset of monsoons in pits of

30x30x30cm size. Nursery for this purpose should be laid out near to the area to be planted and also well in advance of the year when planting stock is required. The technique of planting will be as laid down in Technical order No. 3 and 4 in the Punjab Forest Manual vol. III.

In refectory areas, planting be preferred to sowings, raw humus, if any, should be scrapped before sowing/planting.

2.15.3. Weeding and Bush Cutting

All the plantations areas should be weeded in the early stages. Normally two weeding one in June/July and another in Aug./Sept. are considered sufficient for young plantations. It should be done judiciously and carefully so as not to disturb their roots. Removal of weaker plants from the patches where patch sowing is done, should be done alongwith the weeding operations. The weeding should be done at least for 4 years after closure or till such time as the seedlings are no longer in danger of being suppressed by shrubs. On warmer aspects and exposed sites, however, light shrub growth is essential to provide side shade to the young plants.

2.15.4. Cleaning

This operation should be carried out in the early stages both in congested natural regenerations and plantations and should be continued till the area is suitable for early thinnings. Best and vigorous growing plants should be retained. All forked, crooked, sickly and damaged plants should be removed in cleanings, so as to provide growing space to better plants. Nothing more than but is absolutely necessary should be cut in cleanings. In Deodar areas, Kail is coming up naturally in plenty, must be cut at the initial stage to avoid suppression of Deodar. Cleaning should aim at the gradual spacing out of natural seedlings (or sowings where the original stocking has been too dense) until the young trees are spaced approximately 1.2x1.2m when 2 m high. All the cut material be invariable and immediately removed outside the area to avoid fire hazards.

2.15.5. Thinning

The regeneration last cleaned at about 10-15 years of age, will be subjected to an early thinning when it attains d.b.h. of 10 cm, giving a spacing of about 1.5 to 2m between plants. Thereafter, thinning will be carried out only in PB IV at the time of final

fellings. Thinning will be carried out as per procedure laid down in Technical order No. I of Punjab Manual Vol. - III.

2.15.6. Regeneration Assessment

The regeneration survey of the felled PB I areas should be carried out every alternate year on 1:15,000 scale map to assess the progress of regeneration and to plan operations for the next year. Reason for failure should be sorted out and corrective measures taken forthwith.

2.15.7. Fencing

To get successful regeneration, all the PB I areas which have been felled for getting regeneration, should be closed with barbed wire fencing for protection against biotic interferences. Closure has to be effective and fences should be repaired regularly.

2.16 Artificial Regeneration

Artificial regeneration by patch sowing or planting by plants in P. bags will be required to be carried out to restock the blank areas and where natural regeneration followed after seeding felling is not established within 5 years of felling.

2.17 Other Regulations

2.17.1. Right holders Requirements

The demand of right holders should be met as per their right subject to silvicultural availability. No trees should be granted in closed area.

2.17.2. Closure

Effective closure is most essential for the success of plantation/regeneration area. It is thus imperative that the PB I areas are closed immediately after vacation by the exploiting agency. The area will have to be closed for cattle grazing till the regeneration is established. Normally this period is 30 years. Government notification for such closures should be got issued well in time to avoid litigations.

2.17.3. Grazing & Cutting

The PB I areas after felling and vacation of lot by the exploiting agency shall be closed for grazing till the regeneration is established. However, the controlled grazing will be allowed in other PBs as per rights of right holders. Similarly, there will be no restrictions on grass cutting in those areas which are not under regeneration. Grass cutting in closed area shall be allowed as per

discretion of Range Officer and that too under supervision of Forest Guard to avoid damage to young seedlings.

2.17.4. Lopping

Lopping generally is heavy near habitation and also in those forests which are on the road side. It should be stopped immediately, especially in Kalala RF as it makes trees susceptible to diseases and retards growth. However, lopping may be allowed to the right holders strictly on silvicultural principles and action as per rule should be taken if a person overlaps the trees.

2.17.5. Fire Protection

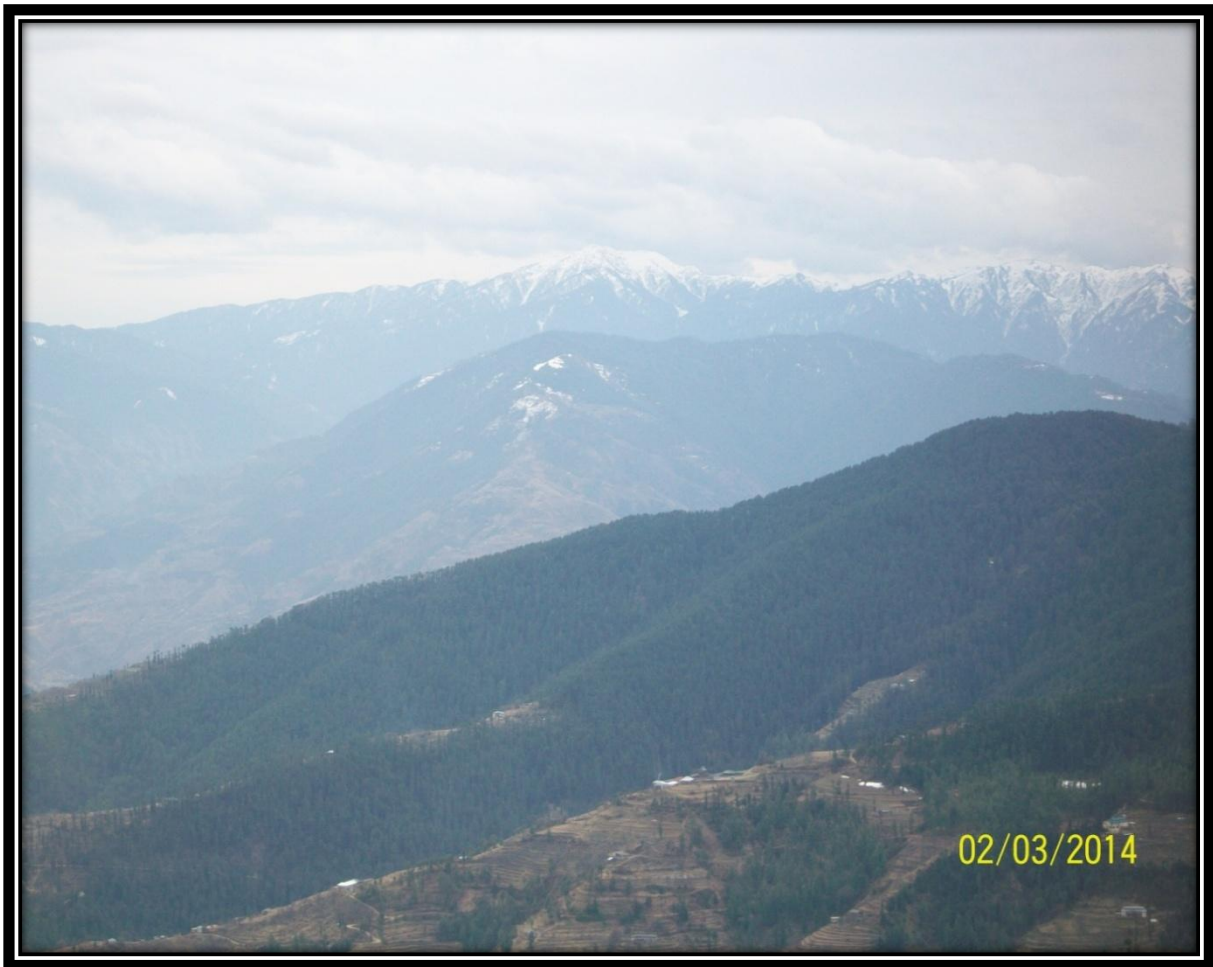
Forests will be protected from fires through the frequency or forest fire in Deodar forest is negligible. Young Deodar plantations and regeneration areas require special care and complete protection from fire. Special precautions are necessary in the areas adjoining Chil forests. Forest floors are to be kept clean of the debris and other combustible material. The fire lines, inspection and bridal paths should be kept clean to needless especially during summer. Firewatcher should be posted during fire season along with the fire fighting equipments. Above all, public co-operation is essential to keep fire out the area.



View of DPF-163 Kadahi and DPF-164 Shirgul Deodar/Kail Working Circle with very good canopy and crop density and site quality I/II. Located in Mahasu Block of Kotkhai Range.



A view of R-11 Cheog with mixed crop composition of Deodar and Kail (Deo/Kail) Working Circle.



Spectacular view of lush green Deodar forests. (Deo/Kail, Site quality I) Working Circle, R-11 Cheog, Theog Range in the fore front. In the background is the part of Rajgarh Division and thereafter view of Chud Dhar and Kakra Dhar peak of Chopal Forest Division.

CHAPTER – III

FIR/SPRUCE WORKING CIRCLE

3.1 General Constitution of Working Circle

All the Fir and Spruce forest occurring either as pure crop or in a mixture consisting of 55% or more fir and spruce, located on comparatively easier slopes, with the possibility of economic exploitation because of accessibility and considered fit for working under system of concentrated fellings, have been allotted to this circle. The forests of this working circle are mainly confined to Balson and Kotkhai Ranges and the total area under this Working Circle is 2017.27 ha. Statement by Ranges and as per legal status of the forest is given below in table-3.1.

Table 3.1
Range-wise Distribution of RF's, DPF's and UPF's to
Fir/Spruce Working Area (ha)

Ranges	RF	DPF	UPF	Total
Balson	-	364.0	-	364.0
Kotkhai	696.8	708.4	248.07	1653.27
Total	696.8	1072.4	248.07	2017.27

3.2 General Characters of the Vegetation

This forests included in this Working Circle conform to Champion and Seth's Type 12/C1d (Western mixed coniferous forests) and Type 12/2b (West Himalayan Upper Oak/Fir forests) with Type 12 C1e. (Moist temperate deciduous forests) found on moist localities in depressions, and along nalas. The detail; of floristic composition for forest type under this working circle have been discussed under Chapter-IIA Part - I Volume-I under para 2A.2.5, 2A.2.7 & 2A.2.8. Silver fir and spruce are the main species of this circle. Silver fir predominates in upper parts and spruce down below. Silver fir descends below in cooler localities whereas Spruce ascends higher along the warmer spurs. Majority of the forests are the mixture of Fir and Spruce with narrow belt of Kharsu oak at the higher limits and Ban and Mohru mixed along the lower limits. At places, small patches of Kail and Deodar are found either pure or mixed. Stocking in general is moderate. Heavy felling of Fir/Spruce trees has been done in the past for packing cases and regeneration is lacking.

3.2.1 **Crop Composition**

Fir and Spruce being the main species and forms crop composition more than 55%. Ban Oak and Broad Leaved constitute crop composition of about 29%. Kail and Deodar constitute another 16% of crop composition wherein the Kail predominates.

3.2.2 **Age Class Distribution**

Pole age class and middle aged trees are in equal proportion and forms the 50% of the growing stock. There are some mature trees with some proportion of over mature trees.

3.2.3 **Density**

The density of each compartment/sub compartment was determined by ocular estimate and recorded in the compartment history files. The density in general varies from 0.4 to 0.8 with an average of 0.6 approximately.

3.2.3.1 Density-Canopy:- (Completeness of canopy) Generally the forests in this Working Circle are having canopy density 0.6 to 0.9. Very few forests have closed canopy.

3.2.3.2 Density-Crop:- (Trees stocking) Generally the forests are fairly stocked except those forests where felling was carried during 1980's for packing cases and are therefore under stocked. The crop density varies from 0.4 to 0.8 with an average of 0.06 approximately.

3.2.4. **Growing Stock**

The total growing stock of all the trees under this Working Circle for all the species and for all the P.B.'s is 851246.76 M³. The details of figures have been given in 9.6 Vol.-I page 144.

3.2.5. **Status of regeneration**

Regeneration is very poor especially in those forests where felling was carried out during 1980's for packing cases. These forest needs to be restocked by artificial toll planting in polythene container. For this purpose Fir/Spruce nursery have been especially prescribed to be raised in Grawag Beat, R-13 Chambi-Kupar.

3.2.6 **Special problems**

One of the major problems in Fir/Spruce Working Circle is to regenerate these forests naturally. And the remedy of which have been discussed under para 3.2.5 above. Some climbers which have hampered the growth of the trees need to be cut back.

3.3 **Sequence of Felling and Cutting Sections**

No felling has been prescribed during the 1st five years of the plan till the sufficient and healthy nursery stock of Fir and Spruce is not raised and made available for planting. The forest prescribed for felling is given in table-3.12 & 3.13 under para 3.13.

3.4 **Block and Compartments**

The boundaries of the forests and compartments will remain the same as given in the plan under revision except in very few forests where the crop is distinct; the changes have been made and recorded in the respective compartment files.

3.5 **Main Objectives of Management**

In consistent with general objectives of management, the main objectives of management are:

- i) To convert irregular/uneven aged crop, as far as possible into regular/evenaged crop.
- ii) To obtain sustained supply of wood and other forest produce.
- iii) To restock poorly stocked areas artificially.
- iv) To restock areas which have been indiscriminately and haphazardly felled for meeting requirement of packing cases.
- v) To keep, as far as possible, areas to be felled in, proportionate to area restocked within the frame work of this plan for a sustained future supply of wood.
- vi) To preserve and maintain the existing spruce and fir and fir forest to conserve the environment and ecology, to protect the mountains from erosion and land slides and to conserve the moisture of the locally.
- vii) To tend the regeneration of spruce and fir and restock blanks with spruce, fir, deodar, kail and valuable broadleaved species artificially.

3.6 Analysis and Valuation of the Crop: The regeneration of Fir and Spruce is deficient owing to the several inhabiting factors like heavy weed growth, accumulation of heavy felling and biotic interferences of which grazing and fires are most serious. Deodar and Kail trees are also found in groups on rocks and precipitous on exposed spurs respectively. Broad leaved species like Acer, Prunus, Juglans, Aesculus, Carpinus, Celtis Betula etc. occupy the sizeable areas along nallas and depressions. Kharsu is also found mixed with Fir and pure in few patches.

3.6.1 Stock Maps

All the forests allotted to this Working circle have been stock mapped on 1:15,000 scale survey sheets and posted in the respective compartment history files.

3.6.2 Site Quality

The site quality of the forest varies place to place, overall site quality conforms under this Working Circle as I/II of the FRI Quality classes.

3.6.3 Age Classes

The crop is very irregular and all the age classes from pole to middle aged to mature and few over mature trees are present in almost equal proportion with good proportion of mature trees and fair proportion of over mature trees.

3.6.4 Type of Enumeration: Complete enumerations of random sampled compartments has been done by sampling 10% of PB-I & PB-IV and in others 5% respectively. The results have been analysed statistically. The growing stock has been assessed by random sampling. In total 27 Compartments have been allotted to this Working Circle. Out of these compartments 9 compartments have been allotted to P.B.-I and 18 compartments to P.B.-Un-allotted. Whereas in 5 compartments complete enumeration was carried out in P.B.-I and P.B.-Un-allotted during Revision of this Working Plan. In those compartments where the enumeration was carried out during the Revision of previous Working Plan have been considered as such after deducting the removal under salvage marking, marking to Right Holders and trees felled illicitly. In rest of the compartments partial enumeration have been carried out and recorded in the C.H. Files. The increment put on the crop during the last 15 years have been kept in view and the enumeration data

have been updated accordingly. Enumeration result for this working circle has been appended in Volume-II Appendix-II. The total growing stock of various coniferous species PB Wise in Fir/Spruce Working Circle and for all species including Oaks and Broad Leaved has been tabulated below in table 3.2(a) and table 3.2(b).

Table-3.2 (a)
Total growing stock of various coniferous species
P.B.-wise in Fir/Spruce Working Circle
(Volume in Cum)

PB's	Area	Para - meter	Fir	Spruce	Deodar	Kail	Total	Average per ha.
I	644.67	No.	75344	31644	13673	18633	139294	216.07
		Vol.	142152.15	71033.39	26751.71	43312.25	283249.5	439.37
Un-allotted	1372.60	No.	201984	79539	34495	42068	358086	260.88
		Vol.	249737.77	94471.95	40134.55	45170.73	429515	312.92

Table – 3.2(b)
Total growing stock of various species
PB Wise in Fir/Spruce Working Circle including Oaks & B.L.
(Volume in cum)

PB's	Area	Para - meter	Fir	Spruce	Deodar	Kail	Ban-Oak	Broad Leaved	Total	Average per ha.
I	644.67	No.	75344	31644	13673	18633	37123	49882	226299	351.03
		Vol.	142152.15	71033.39	26751.71	43312.25	51095.32	26738.50	361083.32	560.11
Un-allotted	1372.60	No.	201984	79539	34495	42068	37592	72831	468509	341.33
		Vol.	249737.77	94471.95	40134.55	45170.73	31536.09	28212.2	489263.29	356.45

3.6.5 Status of Regeneration

It has been observed that the areas which were felled to meet the requirement of apple packing cases during nineteen eighties and early nineties could not be regenerated and hence regeneration has been found deficient and un-satisfactory. However, in some areas where felling was not carried out some seedling, sapling and even pole crop in groups have established well.

3.6.6 Comparison with previous data of Growing Stock

The comparison with the previous data of enumeration and growing stock as per Dr. Lalit Mohan's Working Plan and during the Revision of the present Working Plan is tabulated below. This working circle was introduced for the first time during the previous working plan and only P.B.-I and P.B.-Un-allotted were formed under this circle. The P.B.'s formed earlier has been kept as such whereas concentrated felling have been prescribed in P.B-I as has been prescribed in Lalit Mohan's Working Plan and no felling has been prescribed in P.B-Un-allotted. The comparative data regarding growing stock during the previous Working Plan and during the periods of this Working Plan is given in Table-3.3 below:

Table-3.3
Fir/Spruce Working Circle

P.B.	Area in ha.		Fir		Spruce		Deodar		Kail		G. Total	
			Total	Per ha	Total	Per ha	Total	Per ha	Total	Per ha	Total	Per ha
PB I	390.60	A	69154	177	21576	55	6453	16	10250	26	107433	275.04
		AA	118195.52	302.59	42693.30	109.3	12163	31.1	24206.83	61.97	197258.65	505.01
	644.67	B	75344	117	31644	49	13673	21	18633	29	139294	216.07
		BB	142152.15	220.5	71033.39	110.18	26751.71	41.49	43312.25	67.18	283249.5	439.37
PB Un-allotted	1464.40	A	205372	140	75435	52	43845	29	42685	29	367337	250.85
		AA	189625	129.48	75060	51.25	39964	27.29	39363	26.87	344012	234.91
	1372.60	B	201984	147	79539	58	34495	25	42068	31	358086	260.88
		BB	249737.77	181.94	94471.95	68.82	40134.55	29.23	45170.73	32.90	429515	312.92
Total		A	274526	317	97011	107	50298	45	52935	55	474770	525.89
		AA	307820.52	432.07	117753.3	160.55	52127	58.39	63569.83	88.84	541270.65	739.92
		B	277328	264	111183	107	48168	46	60701	60	497380	476.95
		BB	391889.92	402.44	165505.34	179	66886.26	70.72	88482.98	100.08	712764.5	752.29

Note:- 'A' = No. of trees as per Dr. Lalit Mohan's Plan (1995).

'AA' = Volume of trees as per Dr. Lalit Mohan's Plan (1995).

'B' = No. of trees as per present Plan (2013).

'BB' = Volume of trees as per present Plan (2013).

3.6.7 Special Features

This Working Circle was introduced during the previous Working Plan where the crop composition of Fir and Spruce was found to be more than 55%. This working circle needs special emphasis to regenerate those forests where trees were cut to meet the requirement of apple packing cases and the natural regeneration is

deficient therefore to keep up the ecological and biological balance the Fir and Spruce forests which are peculiar to the Western Himalayas needs special attention and its regeneration and conservation thereof.

3.7. Silvicultural System

Under this working circle only P.B.-I and P.B.-Un-allotted have been formed. P.B.-I area will be managed under Indian irregular Shelterwood System. Compact groups of advance growth upto 30 cm dbh and 0.2 ha. or more in extent will be retained as advance growth. Individual poles or middle aged trees will not be retained while carrying out seeding fellings. In general Fir/ Spruce forests cannot be regenerated through natural regeneration therefore, efforts will be made to get PB I areas regenerated by artificial plantation by raising plants in nursery in polythene containers. No felling will be carried out in P.B.-Un-allotted except salvage removal.

3.7.1. Choice of Species

Preferably Fir and Spruce will be chosen for planting where some proportion of *Taxus Baccata*, Maple, Bird Cherry, Horse chestnut and other species which are relevant to the site.

3.8. Rotation and conversion period

A diameter of 60 cm dbh is best situated for conversion into standard sized sleepers and other large size scantlings which are mostly in demand. As per growth statistics, this diameter is attained in 144 years for fir and 82 years for Spruce. The figure of 82 years in case of Spruce seems to arrived at from open forests given in P.C. Sharma's Plan (1966-80) of Shimla Division. As per other working plans this figure is about 100-110 years. Therefore, the rotation will be 150 years for all the species in Fir/Spruce Working Circle and exploitation diameter is fixed at 60 cm dbh.

3.8.1. Regeneration Period

Regeneration period of 30 years is sufficient to regenerate PB I area, therefore, it shall continue.

3.9 Exploitable diameter

The exploitable diameter of the Fir and Spruce is fixed 60 cm dbh.

3.10 Felling Cycles

All the forests under this working circle have been prescribed to be worked under Sequence of Felling as per table-3.6.

3.11. Division into Periods and Allotment to the Periodic Blocks

With the rotation of 150 years and regeneration period of 30 years, there will be 5 periodic blocks of 30 years each. At present this Working circles have been allotted into two periodic blocks i.e. P.B.-I and P.B.-Un-allotted. The description of Blocks, Compartments, Sub-compartment, area in ha., Working Circle, periodic block have been mentioned in a tabular statement in the Revised Working Plan, Volume-II Appendix-I Page 1 to 20.

3.11.1 P.B.-I

The areas of low density, where the regeneration is lacking, where large scale fellings have been done to meet the right holders demand and for supply of timber for packing cases and also such areas which predominates with mature to over mature trees, have been allotted to this Working Circle with an area of 644.67 ha.

3.11.2 P.B. Un-allotted

Remaining forests will be named as PB un-allotted. Though, the trees in this PB are young to middle aged but the crop is mostly irregular with predominance of middle aged class. The total area of this PB is 1372.60 ha. If any forest in PB un-allotted is destroyed by natural calamities like snow and fire etc., it will be transferred to PB-I and an equivalent area from PBI due for felling shall be transferred to PB un-allotted before felling.

The PB-I areas after establishment of the crop will be allotted to PB un-allotted and equivalent area fit for PBI will be transferred from PB un-allotted, thereby maintaining 1/5th of total area of the Working Circle in PB-I. Following table 3.4 gives the Range-wise allotment of areas to PB-I and PB Un-allotted. Appendix-II gives the details of forests allotted to PB-I and PB un-allotted page 76 to 84.

- 3.11.3.** PB II and PB III: No forests have been allotted to these P.B.'s.
- 3.11.4.** PB IV: Those areas of PB-I where felling will be carried out during this plan period will be allotted to PB-IV in the next Working Plan. However, the PB-Un allotted can be allotted regular PB's as per crop composition in the future plan.

Table-3.4
Range-wise Allotment of area in ha to Periodic Blocks

Felling Series	Range	Area		Total
		PB I	PB Un-allotted	
Theog	Balson	160.60 ha.	203.40 ha.	364.00 ha
	Kotkhai	484.07 ha.	1169.20 ha	1653.27 ha
Total		644.67 ha.	1372.60 ha	2017.27 ha

3.12. Calculation of yield

The yield from this Working Circle will be obtained from PB-I areas only. No commercial fellings have been prescribed for PB-Un allotted. Yield will be regulated by volume, and will be limited to the increment put on by the crop. Yield is calculated in the following manner:

- i) Von Mental's formula

$$Y = 2GS/R$$

- ii) $Y = \text{CAI\% for QII crops in different diameter classes.}$

Accordingly the annual yield of conifers by the two methods shall be as under:

Table – 3.5

Species	Von Mental (M ³)	CAI% (M ³)
Fir	5225.20	2688.55
Spruce	2218.73	1459.80
Deodar	89.81	220.56
Kail	1179.77	334.37

However the CA1% of different dia classes for conifers is given in the table – 3.6 under. Moreover, the yield has been prescribed 50% of the CAI%.

Table-3.6
No. and Volume of Conifer trees in Fir/Spruce Working Circle
Sequence of Felling (Total area 2017.27 ha)

Species	Para meter	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 or over	Total
		V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
Fir	No. of trees	9789	12203	12368	16001	11457	6712	3710	2217	761	126	75344
	Volume	2300.41	7041.13	13493.48	28145.75	30074.62	24505.51	17989.79	12217.88	5301.12	1082.46	142152.15
	CAI%	91.78	280.94	527.59	607.94	556.38	321.02	208.68	62.31	26.50	5.41	2688.55
Spruce	No. of trees	4753	5612	4849	5275	3738	3068	2256	1289	610	194	31644
	Volume	503.81	2048.37	4451.38	9262.90	10832.72	13296.71	13680.38	9073.27	5618.71	2265.14	71033.39
	CAI%	23.77	96.68	208.76	238.05	278.4	277.9	186.05	108.87	29.77	11.55	1459.80
Deodar	No. of trees	2164	2383	2304	2483	1657	1248	791	396	162	85	13673
	Volume	372.2	1100.95	2322.43	4439.6	4639.6	5018.21	4298.29	2458.37	1276.88	825.18	26751.71
	CAI%	24.37	51.57	31.25	30.63	28.25	30.56	26.17	14.97	7.77	5.02	220.56
Kail	No. of trees	2139	2598	2938	3520	2732	2055	1404	800	329	118	18633
	Volume	329.41	1130.13	2914.50	6307.84	7731.56	8376.18	7730.42	5027.2	2615.22	1149.79	43312.25
	CAI%	25.72	41.54	65.57	55.38	34.63	37.52	34.63	22.52	11.71	5.15	334.37

3.12.1 Yield from Fir/Spruce Working Circle

PB Un-allotted

No concentrated felling has been prescribed in PB-Un-allotted. The DFO can however after personal inspection allow petty felling on lines of corrective fellings in these forests. However, the removals if any, would count against yield of type B areas. The area of PB-Un-allotted is 1372.60 ha. As no felling is prescribed in such type of areas, so yield is not calculated.

3.12.2. PB-I

These forests were recommended for seedling felling in previous Working Plan but could not be felled during the plan period due to Ban on the felling. Now, therefore, again these forests have been prescribed for felling during the period of this working plan. The

area under this Working Circle (Commercial) is 644.67 ha. Type B, PBI.

3.12.3. Due to ban on green felling those P.B. I type B areas which were prescribed for seedling felling in Dr. Lalit Mohan's Working Plan could not be felled during this Plan period. Therefore, the area/forest under P.B.-I type B have increased and forms $\frac{2}{3}^{\text{rd}}$ of the total area 644.47 ha of P.B.-I. The other reason for increase of P.B.-I type B area is that some area of Rohru Forest Division has merged with this Division during the Working Plan period of Dr. Lalit Mohan's. This area (Type B) i.e. 2380.35 ha. under sequence of felling will therefore be felled for regeneration in 15 years. In such areas all trees are to be felled except.

1. Seed bearers.
2. On strategic locations like along nalas/broken grounds etc.
3. Selection marking in steep precipitous slopes.
4. Advance growth.

3.12.4. The main volume to be retained will be of seed bearers on an average basis 40, 30, 75, 40 & 22 trees per ha of Deodar, Kail, Fir, Spruce and Chill are to be retained as seed bearers. The average dia class is to taken as IIB. Since the crop is heterogeneous or in patches so the trees will also be retained accordingly. The proportion in which these are to be retained can be arrived at from the proportions of their occurrence which is given in the table – 3.7.

3.12.5. Total growing stock of conifers is 851246.76 cum and percentage of various species is calculated as below (Table – 3.7).

TABLE – 3.7

Species	Growing Stock	Percentage
Fir	142152.08	50.04
Spruce	71933.28	25.31
Deodar	26751.63	9.41
Kail	43312.66	15.24

3.12.6 But while carrying out markings we shall have to give preference to Fir/Spruce over Deo/Kail. So this percentage is further modified and given in the following table – 3.8.

Table – 3.8

Species	Percentage
Fir	60
Spruce	25
Deodar	5
Kail	10

3.12.7 Applying this percentage to the entire crop, the volume to be retained as seed bearers comes under (Table – 3.9).

Table – 3.9

Species	Vol./ ha to be retained in case of pure crop (cum)	Vol./ ha to be retained in this case on proportionate basis		Volume of seed bearers to be retained over an area of 644.67 ha (cum)
		Proportionate factor	Volume/ha (cum)	
Fir	196.88	60	118.12	76148.42
Spruce	115.93	25	28.98	18682.53
Deodar	112	5	5.6	36.10
Kail	84.9	10	8.49	5473.24

3.12.8. Volume shall also have to be retained on other accounts also. This is assumed that 20% of the total volume shall have to be retained on account of these factors. Thus the volume available for felling is calculated in following table-3.10.

Table – 3.10

Species	Total Standing Volume (cum)	80% of Standing Volume (cum)	Volume of seed bearers (cum)	Volume available for felling (cum)
Fir	142152.15	113721.72	76148.42	37573.30
Spruce	71033.39	56826.71	18682.53	38144.18
Deodar	26751.71	21401.36	36.10	21365.26
Kail	43312.25	34649.80	5473.24	29176.56

3.12.9 This volume is available for felling in 30 years. So the annual yield is prescribed as under (Table-3.11).

Table – 3.11

Species	Volume available for felling in 30 years (cum)	Volume available annually (cum)	CAI % (Cum) Volume available annually	50 % of the CAI% (cum)	Prescribed annual yield (cum)	Remarks
Fir	37573.30	1252.44	2688.55	1344.27	1250.00	
Spruce	38144.18	1271.47	1459.80	729.90	700.00	
Deodar	21365.26	712.17	220.56	110.28	100.00	
Kail	29176.56	972.55	334.37	167.18	160.00	

3.12.10 Control of Yield

All removals down to V class trees will count towards the yield of the PB-I. The removals from PB Un-allotted too will also count towards the yield. There should not be variation of 25% every year and shall be adjusted at the end of 5th year. However, total variation at the end of each five year period should not be more than 10% of the prescribed yield. If any forest of PB un-allotted is burnt seriously or damaged and destroyed due to any reason, it should be transferred to PB-I for regenerating the area.

3.13. Table of Fellings

Felling have been prescribed from the year 2019-20 onward keeping in view that it will take 4 to 5 years to raise Fir/Spruce plants in nurseries and to attain plant able size . Accordingly the sequence of felling has been prescribed as per table 3.12 given below:

Table-3.12
Table of Fellings in PB-I Areas

Year	Range	Number and Name of Forest/Comprtment	Total Area in (ha)	Area to be felled (ha)
2019-20	Balson	D-139 Chadaha C-IV	126.6	63.3
2020-21	Kotkhai	R-13 Chambhi Kupa C-X	137.6	68.5
		D-167 Darabla C-II	67.6	33.8
2021-22		D-177 Gahan Jarahi C-V	30.8	30.8
		U-U-496 Khogta Dhar	20.23	20.23
2022-23		U-497 Hattu C-I	94.83	47.5
		U-497 Hattu C-II	52.20	26.2
2023-24		U-497 Hattu C-III	80.81	40.81
2024-25	Balson	D-139 Chadaha (Part) C-IV	Part 63.3	63.3

2025-26	Kotkhai	R-13 Chambi-Kupar (Part) C-X	Part 69.1	69.1
2026-27	Kotkhai	D-167 Darabla C-II (Part)	Part 33.8	33.8
2027-28		U-497 Hattu (Part) C-I	Part 47.33	47.33
		U-497 Hattu (Part) C-II	Part 26.0	26.0
2028-29		U-497 Hattu (Part) C-III	Part 40.0	40.0
	Balson	D-139 Chadaha C-V	34.0	34.0

Table – 3.13
Fir/Spruce Working Circle P.B.-Un-allotted

Name of Range	Name of Forest	Compartment No.	Area in ha.
Balson	D-138 Khagna	C-IV	74.0
	D-141 Sujna	C-I	65.6
	D-141 Sujna	C-IV	21.8
	D-142 Chambi	C-I	42.0
	Total		203.4
Kotkhai	R-13 Chambi Kupar	C-V	108.4
	R-13 Chambi Kupar	C-VIII	46.6
	R-13 Chambi Kupar	C-IXb	64.8
	R-13 Chambi Kupar	C-XI a	38.4
	R-13 Chambi Kupar	C-XIb	81.0
	R-13 Chambi Kupar	C-XI c	42.0
	R-13 Chambi Kupar	C-XIIa	52.6
	R-13 Chambi Kupar	C-XII b	125.4
	D-166 Hara Raita	C-I	100.8
	D-167 Drabla	C-I	75.0
	D-167 Drabla	C-IV	232.0
	D-168 Paul Ke Niche	C-I	26.2
	D-168 Paul Ke Niche	C-IV	161.8
	D-177 Gahan Jarahi	C-II	14.2
	Total		1169.2
	G. Total		1372.6

The choice of portion of particular forests to be felled in different years is to be left to the discretion of DFO and should be selected by him giving preference to open/over mature patches. It will be preferred if these areas are selected and are bounded by natural or other prominent features.

3.14 **Method of Executing Fellings**

The Marking will be done by DFO/ACF which will be further checked by CF. The following guidelines are given for markings.

3.14.1 **PB-I Area**

1. Marking will be done under Indian Irregular Shelterwood System in two stages i.e. seeding and final fellings. In PB-I, however, only seeding fellings will be done.
2. (a) As para (ii) of 2.2.16.1 in Deodar and Kail Working Circle.
 (b) In case of mixture of the Fir and Spruce, preference will be given to Fir which results in higher volume productions due to more number of trees per ha.
 (c) In case, however, deodar and Kail are found occurring in good proportion which may be the case on steep slopes/hot aspects, then these species will be preferred as seed bearers.
3. Broad Leaved trees occurring mixture with Fir/Spruce shall not be marked rather retained as shelterwood because these create conditions like reducing acidity of soil for regeneration. However care is to be taken to open the canopy sufficiently and if need be lesser number of Fir/Spruce trees be retained in such cases as their place will be taken over by B.L. trees as shelterwood.
 Regarding regeneration, it is already specified that it will be secured artificially in the first instance because of uncertainty of natural one.
4. Compact groups of young poles under 30 cm d.b.h. and 0.1 ha in area having a density of minimum 0.6 shall be retained as part of future crop.
5. All dead, dying, diseased, malformed and fallen trees will be marked for removal.
6. Markings on rocky and precipitous slopes, along road and nallas and also in areas liable to erosion, shall not be done. However, on steeper slopes and broken grounds, marking will be done on selection principles.
7. An strip of 50m wide along either side of main road and 25m wide along nallas/streams shall not be marked for felling.

8. Before under taking any forest for seeding fellings, it shall be ensured that nursery stock is ready for planting the area immediately after the timber has been extracted from the forest. To achieve this objective, nurseries should be raised 4 to 5 years in advance of the expected year of vacation of lot in the vicinity of the area. Sufficient nursery stock be raised for subsequent mortality replacements as well. The stock of Fir be preferred where there is a choice between fir and spruce.

3.14.2. PB-Un-allotted Areas

No fellings is prescribed from this PB except salvage removals which will be accounted against the prescribed yield from this Working Circle.

3.15. Subsidiary Silvicultural Operations in PB-I Areas

Immediately after the fellings are over, the subsidiary silvicultural operations will be carried out in the same year or in the next year, as given below:-

- i) Removal of damaged and un-felled marked trees.
- ii) The disposal of slash after main fellings as per rules laid down in Forest Manual Volume-III.
- iii) Thinning/lopping or even removal of the inferior species interfering with the promising growth of young poles and saplings of conifers.
- iv) Climber/Shrub cutting and cleaning in the year following the main fellings and in the subsequent years as may be necessary to help the regeneration operations.
- v) All operations should be done so carefully so that no damage is caused to regeneration.

3.15.1 Artificial Regeneration in PB-I

The natural regeneration is scanty for deficient in almost all areas will be planted with Fir/Spruce artificially as soon as possible so that area could be fully regenerated. For it as far as possible, temporary nurseries should be raised near the planting sites, much in advance to reduce the cost on transportation and also to avoid damages to seedlings during transportation.

Before planting raw humus be scrapped out or control burnt. This is must to expose mineral soil to plant otherwise all attempts of planting will go waste. Planting will be done of site specific. Broad Leaved should be given due emphasis and about one and half year to two and half years old plants of species like Walnut, Maple, Bird Cherry etc. shall be planted in moist localities along nallas. Detailed treatment map (1:3750) shall be prepared indicating the areas which are to be stocked with different species. Tall plants of Spruce, Fir and Deodar attain the plantable height of 45 to 60 cm in 3.5, 4.5 and 2.5 years respectively and should be planted in pits of 60cm X 60cm and 45cmX45cm.

The natural regenerations of conifers/important Broad Leaf species are to be well protected and encouraged.

3.16 Other Regulations

3.16.1 Weeding

For the healthy growth of plants and establishment of regeneration, timely and regular weeding are of immense importance. The growing season is limited from April to September months and plants must be kept free of weeds during this period. Thorough weeding of young plantations of all species are essential. Two weeding every year i.e. pre and post monsoon weeding will be carried out till the plants overgrow the weeds. Similarly cleanings will also be carried out wherever necessary.

3.16.2 Thinning

Thinnings will be carried out in accordance with the general principles of thinning laid down in H.P. Forest Manual Volume-IV. For natural pruning and production of clean boled timber Spruce and fir requires much more side shade than Deodar and Kail. In young pole crops, where mixture of Fir and Spruce occurs by single stems, the thinning will be done to favour Spruce. Where the mixture is in groups, each group will be required to be thinned according to the silvicultural requirement of the species growing in a particular group. However, practically no thinnings are required in the existing crop.

3.16.3 Closure

All the areas taken up for regenerations will be closed for grazing for a period of 30 years in the same manner as per PBI areas of other Working Circles. It should be ensured that adequate area is

closed for regeneration every year. The fence must always be kept in good condition.

3.16.4 Grazing

The areas under this Working Circle are heavily grazed during summer months by the migratory graziers.

All areas under regeneration operations should be strictly protected against the grazing. Other areas should not be allowed to be overgrazed beyond the grazing capacity of the area.

3.16.5 Lopping

Lopping in some of the forest is also observed which is more confined to the forests which are nearer to the habitation. Efforts should be made to stop this practice to enable the trees to grow to their optimum.

3.16.6 Fire Protection

Generally the entire Working Circle lies beyond the fire zone, but as the coniferous species growing in the area are susceptible to fire, all the precautionary measures must be taken to protect the forests from fire. Extra care should be taken in areas being taken for fellings.

3.16.7 Right Holder's Requirements

The requirements of Right Holders will be met from these forests as per settlement provision. No trees will however, be marked from PBI areas after the markings for seeding felling have been done till the area is fully regenerated. Though, the timber requirement from these forests is less but, as far as possible, it should be met from the dead, dying, uprooted and snow damaged trees or those available in thinning and improvement fellings. No green trees be felled for meeting the local demands, unless it is strictly silviculturally available.

3.16.8 Regeneration Survey

The regeneration survey of the felled PBI areas shall be carried out as per para 57 of code for Working Plan procedure for Himachal Pradesh, every alternate year on 1:3750 scale map to assess the progress of the regeneration and to plan operations for next year. Reasons for failure of regeneration and corrective measures shall be indicated as the progress of regeneration is directly linked with fellings.



View of Fir/Spruce Working Circle across the nala upto top of the ridge constituting the forests DPF-167 Drabala, D-168 Paul-ke-Niche & D-166 Hara Raitha with site quality II and with a fair proportion of *Taxus Baccata* in the understory.

CHAPTER – IV

CHIL WORKING CIRCLE

4.1 **General Constitution of Working Circle**

All forests bearing predominately Chil crop and located on easy slopes have been allotted to this Working Circle. It also includes those areas where Chil plantations were raised in the past and have established well. The total area of this working circle is 520.8 ha.

RANGE-WISE DISTRIBUTION OF RFs, DPFs AND UPFs TO CHIL WORKING CIRCLE Area (ha)

Table-4.1

Ranges	RF	DPF	UPF	Total
Theog	-	81.5	97.0	178.5
Balson	-	-	287.3	287.3
Kotkhai	-	-	55.0	55.0
Total	-	81.5	439.3	520.8

4.2. **General Characters of Vegetation**

Chil is the principal species. It occurs in pure form or in mixture with Ban-Oak, Rhododendron, Lyonia and a few other Broad leaved associates in depressions. Towards the upper transitional zone, Deodar and Kail also appear alongwith Chil.

4.2.1. **Crop Composition**

Chil is the main species and forms composition of more than 80% which is mainly of artificial plantation origin. Some Kail and broad Leaved is also found in lower portion and Deodar, Oaks in the upper portion.

4.2.2. **Age Class Distribution**

Majority of the crop is in pole stage with some proportion of middle aged and very few mature trees.

4.2.3 **Density**

The density of each compartment / sub compartment was determined by ocular estimate and recorded in the compartment history files. The density in general varies from 0.3 to 0.9 with an average of 0.6 approximately.

4.2.3.1 Density-Canopy:- (Completeness of canopy) generally the forests in this Working Circle are having canopy density 0.50 to 0.75. Some forests have closed canopy and very few with thin canopy density.

4.2.3.2 Density-Crop:- (Trees stocking) generally the forests are partly stocked and some of the forests are under stocked. The crop density varies from 0.4 to 0.8 with an average of 0.6 approximately.

4.2.4. Growing Stock

The total growing stock of all the trees under this Working Circle for all the species and for all the P.B.'s is 48871.34 M³. It's P.B-wise and species wise detail has been given in Appendix-II, volume-II

4.2.5. Status of regeneration

Status of regeneration is fairly good except in few patches where it needs to be supplemented with artificial planting.

4.2.6 Special problems

During fire season especially when the dry spell prolongs Chil forests are prone to forest fires. Therefore five preventive measures like control burning, construction of fire lines is required to be taken in advance.

4.3. Sequence of Felling and Cutting Sections

In view of the age gradation mature trees are not available in this Working Circle. Therefore the crop has been allotted to PB-IV, PB-III & PB-II only. Therefore no felling sequence and cutting section have been prescribed under this working circle during this plan.

4.4. Blocks and Compartments

The nomenclature of blocks and compartments being followed at present shall continue. In general, there is no change in existing compartment and sub-compartment. However, in view of the predominance of Chil trees some forests have now been allotted to this Working Circle.

4.5. Main Objectives of Management

In keeping with general objectives of management, the main objectives of management of the forest allotted to this Working Circle are:

1. To convert the existing irregular crops into normal forests by obtaining normal growing stock, normal age class distribution and normal regeneration.
2. To improve the stocking of pure forest by artificial regeneration.
3. To protect the forests including plantation areas against the fire hazard.
4. To obtain sustained yield of resin and timber.

4.6. Analysis and Valuation of the Crop

4.6.1. Stock Maps

Stock Maps for all the compartments and sub-compartments on 1:15,000 scale survey sheets have been prepared and placed in the concerned compartment history files.

4.6.2. Site Quality

It was determined by ocular estimates while stock mapping and describing the compartments and is checked subsequently by measuring two dominant trees in the forest and then comparing them for the standard classes in the FRI yield tables. Site quality of each forest has been recorded in the respective compartment history files. The average quantity of Chil is II/III.

4.6.3. Age Classes

The crops are mostly of origin of artificial regeneration which have attained sapling to pole stage and is mostly regular and evenaged.

4.6.4. Type of Enumeration

There are 12 compartments in this working circle out of which complete enumeration was carried out in 3 compartments. In rest of the compartments sample/enumeration with ocular estimation was adjudged.

4.6.5. Status of Regeneration

The forests under this working circle have been regenerated through artificial planting under soil and social forestry schemes. The regeneration has established well and is satisfactory except intermittent gaps which need to be regenerated through artificial planting in P. bags.

4.6.6 Comparison with previous data of Growing Stock

During the Revision of this working plan some of the forests were re-shuffled/changed in view of the crop composition and their age classes as compared to the forests which were allotted to this working circle in the previous working plan. Hence no realistic comparison with the previous data could be made.

4.6.7 Special Features

The artificial plantations now have attained mostly pole stage need cleaning and thinning where the crops have become very congested and needs special care regarding fire preventive measures.

4.7. Silvicultural System

Irregular Shelterwood System will be prescribed when the crop will attain maturity classes and will be allotted to P.B.-I in future.

4.7.1. Choice of Species

Chil is the most suitable species for these areas and as such it will be preferred. However, Deodar has been introduced in depressions in some Chil forests which will be left as such and tended. No efforts shall be made to decimate the Ban Oak which has come up in a mixture with Chil in some of the Forests.

4.8. Rotation and Conversion Period

At present the Chil forests are in the process of conversion from irregular to more or less regular crops. However, on the basis of stump analysis data collected in the past it was been gathered that 60 cm d.b.h. is attained by Chil at the age of 94 years and since then the rotation is fixed at 100 years to be on conservative site.

4.8.2. Regeneration Period

It is estimated that in 20 to 25 years the Chil plants grow to be height of 5 meters at which stage the forests can be allotted to PB IV and the regeneration can be considered reasonably estimated. Thus, the regeneration period of 25 years has been fixed to stock PB I or blank areas.

4.9 Exploitable diameters

To produce timber for standard size sleepers and also obtain the maximum yield of resin, the exploitable diameter of 60cm d.b.h. has been fixed.

4.10 Felling Cycle

No felling have been prescribed hence no felling cycle will be followed during the present period of the plan.

4.11. Division into Periods and Allotment to the Periodic Blocks

With a rotation of 100 years and regeneration of 25 years, the whole Working Circle has been divided into 4 periodic blocks to achieve the set objectives.

4.11.1. PB I

In view of the age gradation/classes and existing crop dia no forests/compartments have been allotted to P.B.-I under this working circle during the plan period of this working plan.

4.11.2. PB II

In view of the age gradation/classes and existing crop dia no forests/compartments have been allotted to P.B.-II under this working circle during the plan period of this working plan.

4.11.3. PB III

The total area of this PB is 54.6 ha.; which is 10.50% of the total area of Chil Working Circle. Forests with pole stage to middle aged crops have been allotted to PB III.

4.11.4. PB IV

All forests having regenerations or Chil plantations which are established in the form of pole crop have been allotted to this PB. The area is 466.2 ha. this is 89.5% of the total area under this Working Circle.

4.12. Calculation of Yield

No forests/compartments have been allotted to P.B.-I hence no yield has been prescribed.

4.12.1. Yield from PB IV

The forest put under P.B.-IV under Chil working circle are of origin of artificial planting and have attained sapling stage with some proportion of pole crop and the stock available is not exploitable for the purpose of extracting yield from this P.B. Hence yield has not been prescribed from P.B.-IV during the period of this plan. The crop where it has become congested will be cleaned and A grade thinning will be carried out wherever required to distribute the growth potential of site among the trees which are to be retained till maturity. No resin tapping is prescribed under this PB as trees which are at pole stage may not be attaining tapable diameter of 35 cms.

4.12.2. Control of yield

No yield has been prescribed. Therefore control of yield has not been discussed.

4.13. Methods of Executing Fellings

4.13.1. PB I: - Under this working circle no PB has been formed. Hence the method of felling not been discussed being no relevant during the plan period of this working plan. This will be discussed in the future when the crop of this circle will attain maturity and will be allotted to PB-I.

4.13.2. PB IV: - No felling has been prescribed in view of the age gradation, crop dia and only tending operations like cleaning and early thinning (A Grade) is to be carried wherever required.

4.13.3. PB III: - Only salvage removals will be done.

4.14. Table of Fellings

No felling has been prescribed under this working circle and hence no sequence has been formulated.

4.15 Subsidiary Silvicultural Operations in PB-I

Since no forests have been allotted to PB-I. Therefore no subsidiary operations are not been carried out.

4.15.1 Slash Disposal

Chil needles and branches cut under cleaning/thinning should be disposed off without delay.

4.15.2 Effective Closure

To regenerate the blank gaps these areas should be fenced with RCC Fence Post in five strands of bribe wire to provide effective closure to protect the plantation to be raised in such blank areas.

4.15.3 Artificial Regeneration

The blank gaps are to be restocked by raising artificial plantation of Chil and other suitable species in polythene bags to restock the area in total.

4.15.4 Weeding and Bush Cutting

Two weeding for young regeneration i.e. during June-July and next during September/October will be done every year for the two subsequent years. Bushes interfering with establishment of regeneration will also be cut at the time of weeding. In planted areas, shrubs and bushes within a radius of 1 meter of the plants will be removed to reduce root competition with the young plants.

4.15.5 Cleaning and Pruning

Young regeneration areas and plantations of Chil will be regularly cleaned and pruned time to time as per requirement. By the times the plants are 3/2 to 2 meter tall, they should be spaced about one meter apart. All the cut material should be safely disposed off and the regeneration area be kept clean to safeguard against fire hazard. Lower one third portions of plants should be pruned to avoid fire risk. The cut material be thrown outside the area.

4.16 Other/Miscellaneous Regulations

4.16. 1 Grazing and Grass cutting

No grazing will be allowed in closed areas, till the regeneration is fully established. However, grass cutting may be permitted in these areas as per discretion of Range officer and that too under supervision of Forest guard. So that chil seedlings are not damaged or removed during grass cutting. In other OBs, the control grazing is permitted.

4.16. 2 Fire Protection

The chil forests are susceptible to fire of accidental and incendiary types. Therefore, the fire protection is of utmost importance and needs special attention. The fire protection measures prescribed in the detailed fire safety plan approved by the CCF/HP vide No .Ft .45 -1/58/5622 dated 09.01.1976 should be followed. The following measures are suggested for effective fire protection.

4.16. 3 Fire Lines

Sufficient number of fire lines should be provided in each forest as per their requirements. Care must be taken that the proposal of construction of fire line should not take shelter to construct motorable roads. All the fire lines should be maintained by keeping them clear of bushes, needles and other inflammable material.

4.16. 4 Control Burning

Entire Chil areas shall be control burnt departmentally at least once in three years except for the regeneration areas where the plants are less than 1.5-2m in height. Annual control burning in PBI areas with the regeneration of over 2.5 meter height shall be carried out till the regeneration attains an average height of 5 meter. The ground around the Chil trees tapped for resin will be kept clear of grasses, resin shavings and other inflammable material upto a radius of 2.5 meter at the time of setting of resin.

4.16.5 Most of the fire generally spread from Ghasnies which are burnt almost every year. Also during spring every year, the farmers set fire to the adjoining forests. It is, therefore, imperative to protect

the forests either by burning the ghasnies under proper supervision or isolating them from the forests zone by providing fire lines.

Detailed instructions for control burning are given in H.P. Forest Manual Volume-IV which be referred to. The triennial programme of control burning is presented as under. This can be modified as per inspection by DFO/CF.

Table-4.2
Triennial Programme of Control Burning
Theog Forest Division

Year	Range	Name of Forest	Area in Ha.
2014-15	Theog	D-39 Jhalru	14.9
-do-	-do-	D-110 Khaneor	60.6
-do-	-do-	D-111 Gharoli Dhar	6.0
-do-	-do-	U-82 Bharana	7.3
-do-	-do-	U-98 Phadgula	22.4
-do-	-do-	U-131 Kandaghat	17.4
-do-	-do-	U-132 Bagoti	11.3
-do-	-do-	U-303 Manla	23.1
-do-	-do-	U-304 Manglech	9.3
-do-	-do-	U-307 Dohan	6.2
-do-	Balson	U-366 Khanar	287.3
-do-	Kotkhai	U-485 Jubtu	55.0
Total			520.80
2017-18	Theog	D-39 Jhalru	14.9
	-do-	D-110 Khaneor	60.6
	-do-	D-111 Gharoli Dhar	6.0
	-do-	U-82 Bharana	7.3
	-do-	U-98 Phadgula	22.4
	-do-	U-131 Kandaghat	17.4
	-do-	U-132 Bagoti	11.3
	-do-	U-303 Manla	23.1
	-do-	U-304 Manglech	9.3
	-do-	U-307 Dohan	6.2
	Balson	U-366 Khanar	287.3
	Kotkhai	U-485 Jubtu	55.0
Total			520.8
2020-21	Theog	D-39 Jhalru	14.9
	-do-	D-110 Khaneor	60.6
	-do-	D-111 Gharoli Dhar	6.0
	-do-	U-82 Bharana	7.3
	-do-	U-98 Phadgula	22.4
	-do-	U-131 Kandaghat	17.4

	-do-	U-132 Bagoti	11.3
	-do-	U-303 Manla	23.1
	-do-	U-304 Manglech	9.3
	-do-	U-307 Dohan	6.2
	Balson	U-366 Khanar	287.3
	Kotkhai	U-485 Jubtu	55.0
Total			520.80
2023-24	Theog	D-39 Jhalru	14.9
	-do-	D-110 Khaneor	60.6
	-do-	D-111 Gharoli Dhar	6.0
	-do-	U-82 Bharana	7.3
	-do-	U-98 Phadgula	22.4
	-do-	U-131 Kandaghat	17.4
	-do-	U-132 Bagoti	11.3
	-do-	U-303 Manla	23.1
	-do-	U-304 Manglech	9.3
	-do-	U-307 Dohan	6.2
	Balson	U-366 Khanar	287.3
	Kotkhai	U-485 Jubtu	55.0
Total			520.8
2026-27	Theog	D-39 Jhalru	14.9
	-do-	D-110 Khaneor	60.6
	-do-	D-111 Gharoli Dhar	6.0
	-do-	U-82 Bharana	7.3
	-do-	U-98 Phadgula	22.4
	-do-	U-131 Kandaghat	17.4
	-do-	U-132 Bagoti	11.3
	-do-	U-303 Manla	23.1
	-do-	U-304 Manglech	9.3
	-do-	U-307 Dohan	6.2
	Balson	U-366 Khanar	287.3
	Kotkhai	U-485 Jubtu	55.0
Total			520.80

4.16.6 Removal of Pine needles

Local people should be allowed and encouraged to collect the pine needles for their domestic requirements and use as packing material for vegetables and fruits. This will reduce the fire hazards to great extent.

4.16.7 Fire Watchers

Adequate fire watchers should be appointed during the fire season with set of equipments for keeping fire lines, paths and roads clear off the inflammable material and watching the forests from strategic points with fire fighting equipments provided to them.

4.16.8 The right holders are required to render all possible help in detecting and extinguishing the forest fires. In case of non-co-operation, their rights should be suspended.

4.16.9 Proper education through extension and publicity media can go a long way in making people aware of damage due to fire, the intensity of which is usually clouded by their innocence.

4.16.10 Exercise of Rights and Concessions

There is tremendous pressure of Right holders demand on the forests at privileged rates. As per tendency, the selected markings are being done near to the habitation, roads, paths, thus the forests are depleting fast at such places. Such tendency should be curbed and T.D. should be met subject to the silvicultural availability of the trees. Dry and fallen trees should primarily be utilized to meet the right holders demand.

4.16.11 Regeneration Assessment

An assessment of regeneration has to be done regularly in all PB-I areas by the DFOs every third year. It is essential as the progress of regeneration will decide future P.B.-I fellings. If regeneration is inadequate further felling will be curtailed in direct proportion to the areas under inadequate regeneration. A report to this effect shall be made to CCF, Working Plan and Settlement to seek approval of the revised felling programme.

4.16.12 Resin Tapping

As the forest are of plantation origin; therefore, no tapping is prescribed in the forests allotted to PB IV. However in other PBs, the option is left to local DFO; if he feels that trees are available for tapping and sanctity of tapping instruction are maintained, he may prepare the tapping schedule and get its concurrence from conservator. Resin tapping will be carried out by Rill Method.



View of Chil Plantation in UPF-396 Balghar, Balson Range under Soil Conservation Scheme during 1980's.

CHAPTER – V

BAN/OAK WORKING CIRCLE

5.1 **General Constitution of Working Circle**

All reserved, demarcated protected and un-demarcated protected forests having Ban, Mohru and Kharsu Oaks as predominant species have been allotted to this Circle. This Working Circle constitute the category of sub felling series (i) Commercial (C) which was prescribed for felling in Dr. Lalit Mohan's Working Plan and was designated as Oak Working Circle (C). The sub felling series namely Bio-Sphere Conservation Working Circle (B) as designated in the previous Working Plan have now been deleted from this working circle and has been put together with the Bio-Sphere Conservation Working Circle of Theog Division. Now, total area of Ban/Oak Working Circle (C) is 232.40 ha. An abstract of area by felling series, sub series and as per legal status of forests is given in the following 5.1.

Table-5.1
Distribution of Area (ha) Oak Working Circle

Range	RF	DPF	UPF	Total
Balson	-	-	60.8	60.8
Kotkhai	-	26.0	48.8	74.4
Theog	-	-	96.8	96.8
	-	26.0	206.4	232.4

5.2 **General Characters of Vegetation**

The general character of vegetation has been described in Chapter II A of Part-I. The forest, especially which are nearer to the habitation are under pressure for collection of fodder and fuelwood by the local villagers. Many of the forests which are away from the habitations are generally well stocked. There are some very good well stocked forests with clean bole and commendable height. Example of such forests/trees can be seen in DPF-176 Bani and UPF-455 Thanari in Kotkhai Range.

5.3 **Sequence of Felling and Cutting Section**

No felling sequence and cutting section have been prescribed.

5.4 **Blocks and Compartments**

Now, four compartments namely U-291 Shilli Mehla, D-176 Bani, C-III, U-455 Thanari, C-II & U-390 Tali Kholna, C-I have been put under this working circle. The detail of growing stock has been recorded in the concerned compartment history files.

5.5 **Main Objectives of Management**

Besides the general objectives of management narrated in Chapter-I of part - II, the main objectives of management are:

1. To improve the stocking of the forest by both natural and artificial regeneration methods in the areas where the density is low.
2. To meet the rights of the local people for fuel, fodder, grazing and wood for agricultural implements.
3. Consistent with the progress of regeneration, to supply fuelwood on commercial basis to HP PWD and other Govt. Department subject to Govt. policy regarding felling of Oak trees.
4. Consistent with the above, to preserve and maintain the ecosystem and ensure soil conservation and a steady supply of water in the springs and streams of the locality.

5.6 **Analysis and valuation of the Crop**

5.6.1. **Stock Maps**

Stock maps of all the forests allotted to this working circle have been prepared on 1:15000 scale survey sheets and placed in the respective compartment history files.

5.6.2. **Site Quality**

Site quality is II/III. Necessary entries in respect of site quality of all the forests have been made in respective compartment history files.

5.6.3. **Age classes**

The crop is mostly in pole stage with some proportion on middle aged trees and very few over mature trees.

5.6.4. Types of Enumeration

Over 25% area under this working circle was completely enumerated and in rest of the area partial/ocular enumeration was carried out. The enumeration results have been given in Appendix-II of Volume-II page No. 74 & 75. The enumeration data is given in the following table No.-5.2.

Table – 5.2
Total Growing Stock of Ban (Oaks) Working Circle

Species	Parameters	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 or over	Total
		V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
1	2	3	4	5	6	7	8	9	10	11	12	13
Ban (Oaks)	No. of Trees	30853	35195	15277	4769	2287	1942	754	457	19	0	91553
	Volume	3270.4	12212.65	12129.92	6857.82	5232.65	6474.62	3447.28	2404.72	128.83	0	52158.89
Deodar	No. of Trees	825	519	824	452	180	57	47	17	0	0	2921
	Volume	141.9	239.77	830.59	808.17	504	229.19	255.39	105.53	0	0	3114.54
Kail	No. of Trees	399	921	1779	970	565	158	51	59	6	0	4908
	Volume	61.44	400.63	1764.76	1738.23	1598.95	644	280.8	370.75	47.69	0	6907.25
Rai	No. of Trees	715	721	1979	2119	1546	1004	1017	810	152	0	10063
	Volume	75.79	263.16	1816.72	3720.96	4480.3	4351.33	6167.08	5701.59	1400.07	0	27977
Fir	No. of Trees	464	798	1653	1458	757	355	115	33	0	0	5633
	Volume	109.04	460.44	1803.42	2564.62	1987.12	1296.1	557.63	181.86	0	0	8960.23
Chil	No. of Trees	2129	580	290	0	0	0	0	0	0	0	2999
	Volume	155.41	178.64	206.19	0	0	0	0	0	0	0	540.24
Broad Leave	No. of Trees	1305	1797	1066	162	7	0	0	0	0	0	4337
	Volume	150.07	553.47	730.21	201.04	13.89	0	0	0	0	0	1648.68
	Total	36690	40531	22868	9930	5342	3516	1984	1376	177	0	122414
		3964.05	14308.76	19281.81	15890.84	13816.91	12995.24	10708.18	8764.45	1576.59	0	101306.83

5.6.5. Status of Regeneration

During the period of Dr. Lalit Mohan's Working Plan due to ban of green felling no felling was carried out. As a result of which the forest have stocked satisfactorily and the regeneration has improve a lot.

5.6.6 Comparison with previous data of Growing Stock:

Some forests which were previously allotted to this working circle have been deleted from this working circle and added to Bio-Sphere Conservation Working Circle. Therefore, comparison with previous data stock cannot be made out.

5.7. Silvicultural System

No felling will be carried out and hence no silvicultural system has been carried out.

5.8 Rotation and Conversion Period

As per Working Plan code (para 73), the rotation of Ban Oak is prescribed at 70 years for standards and 35 years for coppice when it attains the average crop diameter of 28cm for the standards and 18.9 cms for coppice shoots. The rotation for coppice is fixed at 45 years and for standards at 90 years in commercial sub felling series which is as per Khullar's Plan. The crop diameter at the age of 45 years is estimated to be 22.5 cms which seems to be the appropriate size for harvesting of coppice shoots for fuel wood.

The standards will be expected to attain a crop diameter of 30.5 cm in 90 years, providing fairly large sized timber for local use and producing charcoal.

5.9 Felling Cycle

No felling cycle has been fixed.

5.10 Calculation of Yield

No felling will be carried out hence no yield is prescribed.

5.11 Table of Felling

No felling will be carried out hence no table is tabulated.

5.12 Method of Executing Felling

5.12.1 Commercial Sequence of Felling

Since no commercial felling has been prescribed hence no method of felling has been laid for carrying out of these areas.

5.13 Subsidiary silvicultural Operations

5.13.1 Sowing/Planting

Regeneration in most of the Oak forest is poor because of uncontrolled grazing and heavy lopping. Further, there is marked reduction in mother trees, Thus to increase the stock, the artificial method of regeneration shall be supplemented where the natural regeneration is inadequate. The technique for artificial regeneration of ban/oak is described below:

5.13.2 Seed Collection and Storage

Acorns shall be collected during December, January and will be dried in shade. Sealed tins should be preferred for storage of seed instead of gunny bags which may cause damage by rodents and insects. The seeds should be kept at low temperature and high humidity. Seed stored for one year gives a fertility rate of 60%.

5.13.3 Direct Sowing

Patches of 45 cm X 45 cm X 45 cm should be made at 3 meter apart and soil should be dug to a depth of 15-20 cms and well pulverized, cow dung and insecticide in proportionate, should be mixed with soil, keeping in view the requirements of the soil. The acorns should be sown about 2 cm deep, just before the onset of monsoon rains. For sowing 1.0 ha. of area, about 10 Kg of seeds are sufficient.

The seeds are germinated during the Monsoon and takes about two to five weeks. The seed collected in the same year gives 60-70% germination success. Weeding and bush cutting shall be done once during the first year and once during the second year after the monsoon is over. The sown areas should be protected against grazing, fire and other biotic interferences.

5.13.4 Nursery Technique

Raised nursery beds should be prepared. The soil should be fine and mixed with cow dung and insecticide as per requirement of the soil and site. Sowing should be done about 2 cm deep in soil during February-March in lines 25 cm apart with a spacing of about 5 cm between each seed. The nursery should be provided with light shade to avoid direct exposure to Sun. Moreover, the beds should

not be located under the trees to avoid damage to the young seedlings through dripping of water.

As per requirements, the beds must be irrigated after sowing till the onset of Monsoon rains. Over irrigation should be avoided. Germination is completed within 4 to 5 weeks. Weedings as and when required should be done. To avoid root competition the seedlings should be spaced to 10cm, when they are about 5cm tall. Seedling should be protected against defoliators and insecticides should be sprayed as and when required. When the plants are 2 to 3 years old and above 30 cms height can be planted in the field.

5.14 Tending Operations

5.14.1 Cleaning

Cleaning in coppiced areas shall be done in the 6th year of felling and 5 to 6 healthy and vigorous shoots per stump shall be retained. The sowing and planting will also be cleaned of congestion and shrub growth.

5.14.2 Thinning

Thinnings shall be carried out in the 15th year of the felling and depending on the density of the crop. The number of shoots on each stump shall be reduced to 2 to 3.

5.15 Miscellaneous Regulations

5.15.1 Closures

There must be effective closure for 10-15 years in coppice areas to protect the area against biotic interferences. Closures should be notified well in time.

5.15.2 Grass Cutting

Grass cutting should be restricted for at least first 2 to 3 years but may be permitted after that depending upon the success and that too at the discretion of Range Officer.

5.15.3 Lopping

Lopping should not be allowed in coppice areas. This is so as Oak has seeds on two year shoots. So strict enforcement of rights, the lopping may be allowed in other areas strictly on silvicultural principles.

5.15.4 Monkey Damage

All care should be taken to protect the young oak plants from damages caused by monkeys.

5.15.5 Right holder requirements

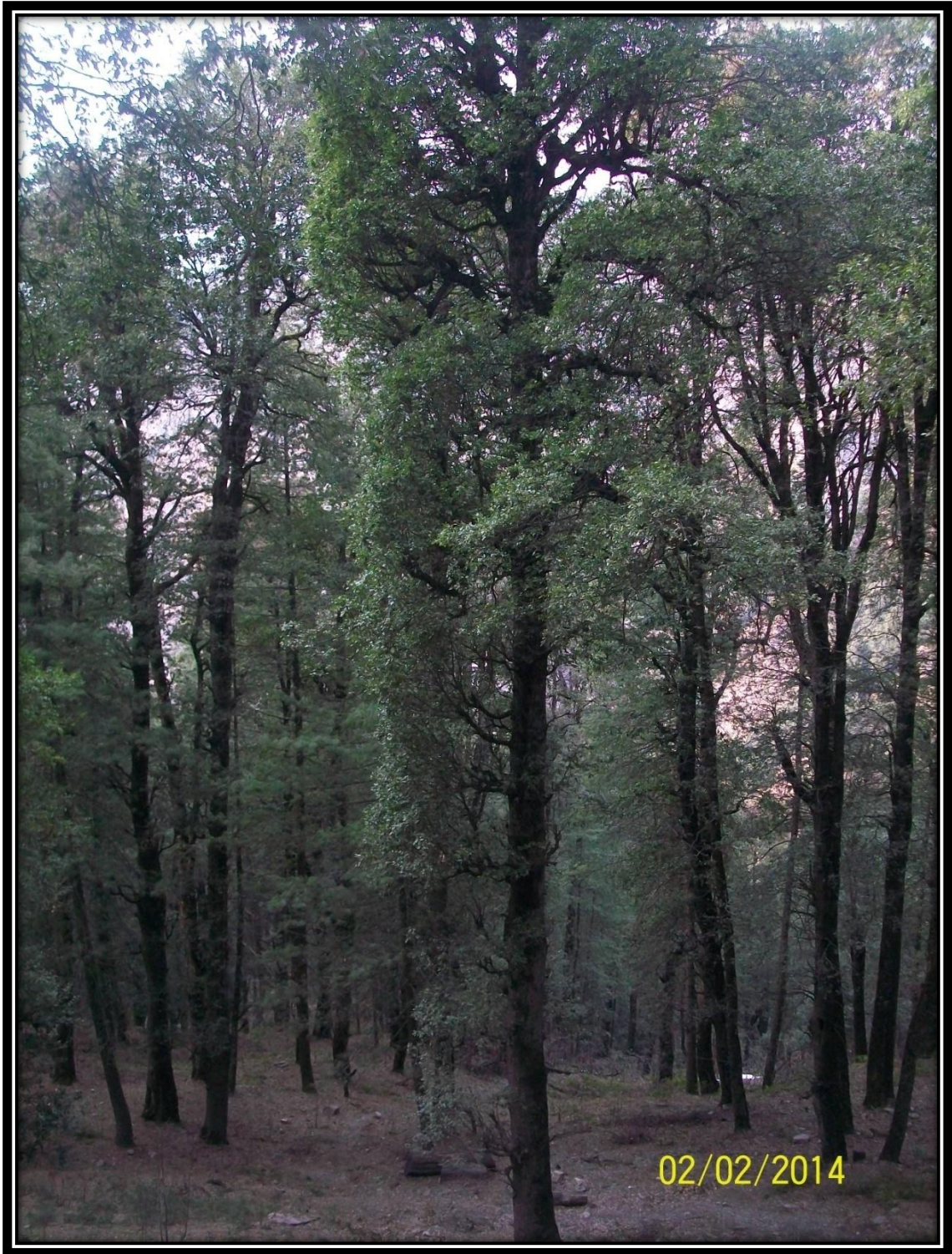
The requirements of right holders in respect of fuel wood and timber for agricultural implements shall be met with from the annual coupes or adjoining areas, before, commercial exploitation is done.

5.15.6 Regeneration Assessment

It is to be carried out by territorial staff for coppice areas after every 5 year. In case regeneration does not keep pace with fellings, corrective measures shall be taken to restock the area in prescribed time.



A view of thick forest of Mohru (*Quercus Semicapifolia*) with closed canopy. DPF-176 Bani C-I, Kotkhai Range, on the either side of state Highway between Gazta and Kharapathar.



A unique and rare view of Mohru (*Quercus Semicarpifolia*) D-176 Bani trees/forests with clean bole, vigorous growth and height upto 30.4 mt. (100 feet). No such trees are found elsewhere in the tract of Theog Forest Division.

CHAPTER-VI

BIOSPHERE CONSERVATION WORKING CIRCLE

6.1 General Constitution of the Working Circle

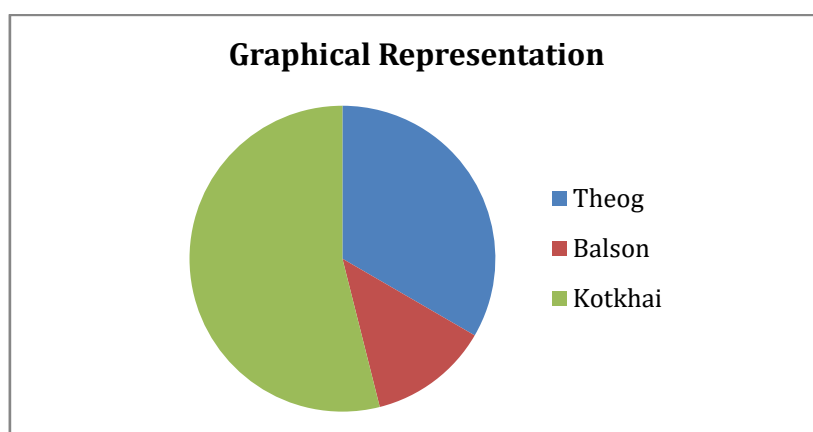
This working circle comprises all the Reserved, Demarcated Protected and Undemarcated Protected Forests which are situated on the steep and precipitous slopes, near major streams & nallas, on either side of National/State high ways, areas susceptible to erosion, near habitation where the biotic interference is high and around places of tourist importance etc. There is a mashroom growth of unplanned construction of tourist resorts, Hotels and tourist activities right from Kufri to Sandhu along National Highway have assumed an alarming situation and has become a threat. Hence it will be appropriate to quote Chapter-II objects on management by Sh. Ram Prakash page 14 which reads as under:

- (i) *In the watershed of municipal water supplies, irrigation and hydro-electric generation dams, the special objective being the maintenance of an undisturbed protective vegetative cover, all other forms of use must be subordinated to it.*
- (ii) *In forest areas of natural scenic beauty, wood-lands near urban habitation, recreation often being the dominant object, timber fellings, grazing and even hunting will have to be entirely stopped. Such forests serve as 'magnificent playgrounds for tired mankind seeking peace and spiritual strength' (V.S. Rao).*

Therefore, Govt. should frame a policy and no new tourist resorts should be allowed in this tract in view of the objectives cited above. It has been observed that the entire tract has been encroached from all sides and the issue needs to be reviewed/rechecked by the Department on priority basis. Govt. of H.P. should impose a ban on construction of any commercial activities in these areas. The total area of the circle is 10621.66 ha. Breakup of area Range-wise of different categories of forests is given in the table-6.1.

Table-6.1
Area Distribution

Ranges	Area in ha.			
	RF	DPF	UPF	TOTAL
Theog	61.4	1282.60	2208.0	3552.0
Balson	-	228.10	1124.8	1352.9
Kotkhai	937.2	1305.68	3473.88	5716.76
Total	998.6	2816.38	6806.68	10621.66



6.2

General Characters of the Vegetation

The general character of vegetation has been described in chapter-IIA of part- I. The forests of this circle represent almost all forest types which are found in the tract. Apart from conifers, some forests having Ban and Mohru crop have been allotted to this working circle occurs almost pure in many forests of Kotkhai, Balson and Theog ranges of Theog forest division. Some of the forests like Biran, Palo in Balson Range R-13 Chambi-Kupar, C-XIIIa, R-15 Tomru, C-IIIa, D-176 Bani, and C-II in Kotkhai Range and D-40 Narainty in Theog Range are the example where Ban and Mohru crop predominates. The description of individual forests has been placed in the respective compartment history files.

6.3 Blocks and Compartments

The existing blocks and compartments of forests allotted to this working circle have been retained as such, as given in the plan under revision.

6.4 Main Objectives of Management

Keeping in view of general objectives of management, the following main objectives of management are as under:-

- i) Protection of hills from denudation and erosion.
- ii) Conservation of moisture and regulation of flow of water in nallas and streams.
- iii) To preserve the environment around tourist centers and along the high way to maintain and enhance their utility and beauty for tourist recreations and for wildlife.
- iv) To prevent indiscriminate lopping of trees.
- v) To introduce valuable species especially for the production of fuel and fodder by artificial planting in the blank areas.
- vi) Consistent with the above, to meet the demands of local right holders entirely on silvicultural principles regarding timber, fuel wood and grazing.
- vii) To manage the forests of this working circle as a source of water conservation.

6.5 Analysis and Valuation of the Crop

6.5.1 Stock Maps

All the forests have been stock mapped on 1:15000 scale survey sheets and have been incorporated/posted in the concerned compartment history files.

6.5.2 Site Quality and Age classes

On the basis of assessment of the forests, the site qualities of Chil, Deodar, Kail, Fir, Spruce and Oak varies from I/II to III. The age classes vary from young to middle aged with fair proportion of mature trees and few over mature trees. Crop composition, site quality and enumeration data have been recorded in the concerned compartment history files of the forests.

6.5.3 Density

This has been ocularly assessed and incorporated in the concerned compartment history files. The density is moderate and varies from 0.5 to 10 with an average of 0.6.

6.5.4 Types of Enumeration

To know the growing stock of this working circle, 5 % enumeration has been carried out on the basis of stratified random sampling. The figures of enumeration so projected for each compartment of forests have been incorporated in the concerned compartment history files of the forests and also shown in the Appendix-II, Volume-II page 85 to 105. Total number per ha and volume of various species in Biosphere Conservation working circle is given in 6.2.

Table-6.2
Total and per ha. number and volume of various species in Biosphere Conservation working circle (Total Area-10621.66 ha.)

Species	Parameters	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 or over	Total
		V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
1	2	3	4	5	6	7	8	9	10	11	12	13
Deodar	No. of Trees	263145	246807	144212	70516	19230	6587	3219	626	200	13	754555
	Volume	45260.93	114024.8 ₂	145365.6 ₈	126082.5 ₉	53844	26486.31	17492.03	3886.19	1576.39	126.2	534145.1 ₄
Kail	No. of Trees	432666	381458	197018	135973	50309	15313	4230	910	217	3	1218097
	Volume	66630.55	165934.2 ₃	195441.8 ₄	243663.5 ₉	142374.4 ₇	62415.77	23290.36	5718.42	1724.92	29.224	907223.3 ₇
Rai	No. of Trees	77605	72633	36441	27724	13898	6241	3209	1542	582	684	240559
	Volume	8226.11	26511.04	33452.83	48683.33	40276.4	27048.48	19459.36	10854.13	5360.79	7986.37	227858.8 ₄
Fir	No. of Trees	24953	27907	25434	17526	5335	2242	398	75	20	1	103891
	Volume	5863.95	16102.32	27748.48	30728.23	14104.37	8185.53	1929.89	413.32	139.32	8.59	105224
Chil	No. of Trees	31951	27763	13517	7576	1424	150	0	21	5	0	82407
	Volume	2332.41	8551	9610.58	9666.96	2869.35	438.14	0	96.51	29.61	0	33594.56
Ban (Oak)	No. of Trees	78891	102681	68795	31288	9342	3094	1183	150	76	0	295500
	Volume	8362.43	35630.29	54623.21	44992.13	23413.48	10315.39	5408.67	789.29	515.35	0	184050.2 ₄
Broad Leave	No. of Trees	43085	33504	18380	7211	1137	588	130	5	3	0	104043
	Volume	4954.76	10319.21	12590.29	8948.83	2256.94	1714.02	524.93	23.27	18.13	0	41350.38
	T Trees	952296	892753	503797	297814	100675	34215	12369	3329	1103	701	2799052
	T. Vol.	141631.1	377072.9	478832.9	512765.7	279139	136603.6	68105.24	21781.13	9364.51	8150.384	2033447

6.6 Silvicultural System

No green felling will be carried out, therefore no silvicultural system has been prescribed. The requirement of the right holders will be met with from salvage removals only.

6.6.1 Treatments Prescribed

- i) The gaps in the forests will be filled up artificially. Sowing and planting will be resorted to. Species best suited to the areas will be preferred and no attempt will be made to replace the local species or to plant exotics.
- ii) The broadleaved species will be preferred in UPFs to meet the requirement of fuel and fodder. The forest shall be closed in phased manner to improve their stocking. However, the species required to be planted in the areas, have been recorded in the respective compartment history files.
- iii) Green felling will not be allowed from these forests except salvage removal for meeting the bonafide demand of right holders.
- iv) These forests will be protected from soil and water conservation, aesthetic and tourist point of view besides maintaining the mountain ecological balances.

6.7 Subsidiary Silvicultural Operations

6.7.1 Sowing and Planting

Regeneration in most of the forests of this working circle is satisfactory. However some forests are partly re-stocked and needs to be stocked by resorting to artificial planting in P. bags.

6.7.2 Direct Sowing

Patches of 45 cm x 45 cm x 45 cm should be made at 3 meter apart and soil should be dug to a depth of 15-20 cms and well pulverized cow dung and insecticide in proportionate, should be mixed with soil. The acorns should be sown about 2 cm deep, just before the onset of monsoon rains. For sowing 1.0 ha. of area, about 10 kg seeds are sufficient. The seeds are germinated during the monsoon and takes about two to five weeks. The seed collected in the same year gives 60-70% germination success. Weeding and bush cutting shall be done once during the first year and once during the second

year after the monsoon is over. The sown areas should be protected against grazing, fire and other biotic interferences.

6.8 Regeneration Assessment

It is also to be carried out by territorial staff for under stocked areas after every 5 years. In case regeneration does not keep pace satisfactorily corrective measures shall be taken to restock the area in prescribed time.

6.9 Tending Operations

6.9.1 Cleaning

Cleaning in coppiced areas worked in the past shall be done judiciously and vigorous shoots per stump shall be retained. The sowing and planting will also be cleaned of congestion and shrub growth.

6.9.2 Thinning

Thinnings also to be carried out in coppiced areas depending on the density of crop. The operations will be required in young crops, and shall be carried out as and when necessary. The number of shoots on each stump shall be reduced to two to three. The mention of required thinning has been made in the CH files and these removals by way of thinning can be best utilized for the fence posts.

6.10 Other/Miscellaneous Regulations

6.10.1 Grass Cutting

Grass cutting in the area under regeneration should be restricted for at least first 2 to 3 years but may be permitted after that depending upon the success and that too at the discretion of Range Officer.

6.10.2 Lopping

Lopping should not be allowed in the forests already heavily lopped. In case of Oak it has seeds on two year shoots. So strict enforcement of exercise of rights is required in the forests allotted to this working circle. The lopping may be allowed in other areas strictly on silvicultural principles.

6.10.3 **Monkey Damage**

All care should be taken to protect the young Oak plants from damages caused by monkeys.

6.10.4 **Right Holder Requirement**

The requirements of right holders in respect of fuel wood and timber for agricultural implements shall be met with from dead, uprooted and fallen trees.

6.10.5 **Fire Protection**

All the forests allotted to this circle and plantations carried out will be strictly protected against fire specially the chil and oak forests which are prone to fire.

6.10.6 **Soil Conservation Measures**

Soil conservation measures alongwith afforestation, will be taken up as per availability of the funds, in the forests which are denuded and under active erosion.

6.10.7 **Closure**

All plantation areas shall remain close till plants reaches a height where the damage of browsing, fire is un-excessive i.e till they reach a height of 3mts or more. However, grass cutting may be permitted at the discretion of RO subject to the condition that it may not cause soil erosion or may not hamper in the growth of the plantations. The list of forest/ areas requiring sowing /planting under this working circle is given in table-6.4.

Table-6.4

Areas for Sowing/ Planting

Name of Range	Name of Areas/Forests	Area in Ha
Theog	D-40 Narenty	40
	D-41 Dharali	10
	D-126 Guthan, C-I	20
	D-127 Ishta, C-III	10
	U-91 Kachi Kalind	10
	U-95 Shabhog	10
	U-104 Bandru	15
	U-123 Sainj Kufta	20
	U-128 Naur	10

	U-133 Khalashi	50
	U-135 Tikkar Chaura	50
	U-136 Tir Mahasu	30
	U-283 Kangar	5
	U-285 Chaunri	50
	U-300 Loharab	15
	U-305 Daleyan	15
	U-316 Raghora	40
	U-328 Kareli	50
	U-334 Dakana	20
Balson	D-161 Biran, C-I	25
	D-161 Biran, C-II	5
	U-358 Chakhana	20
	U-371 Chambi Bakhriya	50
	U-372 Kharori	25
	U-379 Shilguri	10
	U-380 Nerwa	10
	U-386 Deothi	50
	U-389 Janahan Chadren	25
Kotkhai	R-13 Chambi-Kupar, C-I	10
	R-13 Chambi-Kupar, C-XII d	10
	R-13 Chambi-Kupar, C-XIII c	10
	R-15 Tomru, C-I	15
	R-15 Tomru, C-V	20
	D-181 Rasalan, C-III	15
	D-183 Jaroth, C-II	15
	D-185 Baghal, C-I	20
	U-405 Jaharu	10
	U-408 Brahmu	10
	U-429 Chewar	10
	U-432 Jauni	20
	U-439 Banter Shil	10
	U-448 Tharola Balog, C-I	20
	U-448 Tharola Balog, C-II	10
	U-451 Jashla	25
	U-465 Bagain Jubbar	25
	U-468 Bindal Galeha	25
	U-472 Kalbog	20
	U-487 Tharmala	20
	U-494 Mihani	15
	U-Lambipash	50
	U-Jahu bag	50
	U-Johra	45
	U-Firodi	45
	Total	1215

CHAPTER – VII

PLANTATION WORKING CIRCLE

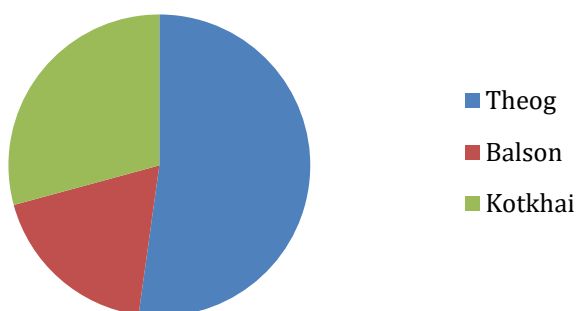
7.1 General Constitution

This working circle includes mainly blank Un-demarcated Protected Forests and degraded, barren or poorly stocked Reserved and Demarcated Protected Forests which require immediate attention and are not allotted to other working circles. This working circle also includes Fir/Spruce forests which were cut during eighties for apple packing cases and no plantation was carried to regenerate these areas. Natural regeneration in such areas is quite un-satisfactory. The area allotted to this working circle is 7371.2 ha. this includes the plantations areas not yet established and could not qualify for allotment to other W.C.'s. The range wise area allotted to this working circle is given in the following table-7.1.

Table-7.1
Range wise Area Distribution

Range	RF	DPF	UPF	Total
Theog	-	-	2225.9	2225.9
Balson	-	-	3519.60	3519.60
Kotkhai	-	-	1625.7	1625.7
Total	-	-	7371.2	7371.2

Graphical Representation



7.2 General Characters of Vegetation

These forests are either blank or poorly stocked by mixed deciduous species, with some coniferous trees. There is heavy pressure of grazing, lopping, grass cutting and browsing in these areas. These forests have been described in detail in chapter-II of part-I and detailed description of each forest is posted in the respective compartment history files.

7.3 Blocks and Compartments

The existing blocks and compartments have been retained as such in all forests. No new compartment or sub-compartment has been created.

7.4 Main Objectives of Management

Keeping in view the present status and biotic pressure put on these forests, the following main objectives of management are as under:-

- i) To develop and augment the forest resources of the area by afforestation in blank and poorly stocked areas.
- ii) To improve the soil cover by closing eroded areas and thus improving the general environment of these degraded areas.
- iii) To regular the flow of water in the stream and rivers by resorting to large scale plantation.
- iv) Raising suitable species which can fulfill the local demand of fuel, fodder and timber etc.
- v) To assess the old plantations and derive critical conclusions therein.
- vi) To eradicate Invasive Alien Species from forest Ecosystem and restore their productivity and biodiversity values.

7.5 Analysis and Valuation of the Crop

7.5.1 Stock Maps

Detailed stock map of each forest has been prepared on the survey sheet in the scale of 1:15000 and placed in the respective compartment history files.

7.5.2 Density and Quality

These areas are mostly blank or sparsely covered with trees and bushes. The quality in general is poor. Density is estimated ocularly which in general is below average and recorded in the respective compartment history files.

7.5.3 Enumerations

These forests are almost blank and 5% stratified random sampling has been carried out for the enumeration purpose to know the growing stock. Total and per ha. number and volume of various species in Plantation working circle is given in table-7.2.

Table-7.2
Number and volume of various species

Species	Parameters	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100 or over	Total
		V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	
1	2	3	4	5	6	7	8	9	10	11	12	13
Deodar	No. of Trees	80753	65999	20534	8226	2457	993	579	513	218	165	180437
	Volume	13889.52	30491.354	20698.27	14708.09	6879.6	3992.85	3146.29	3184.70	1718.28	1601.82	100310.77
Kail	No. of Trees	311431	260475	71393	38738	16519	4787	962	761	527	408	706001
	Volume	47960.37	113306.63	70821.86	69418.50	46748.77	19511.81	5296.77	4782.12	4189.12	3975.55	386011.5
Rai	No. of Trees	12126	9928	5687	3296	2239	2105	2038	1719	1552	1224	41914
	Volume	1285.36	3623.72	5220.67	5787.78	6488.62	9123.07	12358.43	12100.04	14295.47	14291.42	84574.58
Fir	No. of Trees	10602	6666	5039	2976	1759	1621	1447	1219	9788	898	42015
	Volume	2491.47	3846.28	5497.55	5234.78	4617.38	5918.27	7016.50	6717.91	68183.21	7714.72	117238.07
Chil	No. of Trees	157344	118919	21818	2613	324	20	-	-	-	-	301038
	Volume	11486.11	36627.05	15512.59	3334.19	652.86	58.42	-	-	-	-	67671.22
Ban (Oak)	No. of Trees	25633	14644	7077	3154	1953	410	0	1	-	-	52872
	Volume	2717.10	5081.47	5619.13	4535.45	4468.46	1366.94	-	5.26	-	-	23793.81
Broad Leave	No. of Trees	8397	5981	1925	1914	324	5	3	1	-	-	18550
	Volume	965.65	1842.15	1318.62	2375.27	643.14	14.57	12.11	4.65	-	-	7176.16
Trees												
G. Total		606286	482612	133473	60917	25575	9941	5029	4213	12086	2695	1342827
G. Total	Vol.	80795.58	194818.7	124688.7	105394.1	7049883	39985.93	27830.1	26794.68	88386.08	27583.51	786776.1

7.6 Silvicultural System, Rotation and Exploitable Sizes

The main objective is to raise plantations; therefore, silvicultural system, rotation and exploitable size are not prescribed at this stage. The forests will be managed to improve the growing stock by plantation and protection.

7.6.1 Choice of Species

The Choice of Species to be planted will vary according to the altitudinal zone and locality factors. Species best suited to the locality and which can fulfill the demand of fuel, fodder and timber will be preferred. Planting of exotic species will be avoided in general; the broad leaved species like Khair, Sheesham, Bamboos, Robinia, Darek etc. will be preferred in lower zone whereas Chil for rocky portions in between 800 to 1500 meters; Deodar and kail between 1500 to 2500 meters. However, fir/spruce and walnut etc. will be planted in between 2500 to 2800 meters. The specific entries regarding choice of species have been made in the general recommendations for different altitudinal zones are as under:

Altitudinal Zone Species recommended

1000-1500m	<i>Pinus roxburghil</i> (Chil), <i>Morus alba</i> (Mulberry), <i>Robinia</i> , <i>Grewia oppositifolia</i> (Beul), <i>Bauhinia variegata</i> (Karyal), <i>Ailanthus</i> spp., <i>Buxus sempervirens</i> (Boxwood), <i>Melia azadirach</i> (Drek) etc.
1500-2500m	<i>Cedrus deodara</i> (Deodar), <i>Pinus Wallichiana</i> (Kail), <i>Juglans regia</i> (walnut), <i>Acer</i> spp. (maple), <i>Fraxinus</i> spp. (Ash), <i>Robinia</i> , <i>Ailanthus</i> spp. <i>Quercus incana</i> (Ban) <i>Aesculus indica</i> (Goon) etc.
Above 2500 m	Fir, <i>Picea smithiana</i> (Spruce), <i>Pinus wallichiana</i> (Kail), <i>Juglans regia</i> (Walnut), <i>Acer</i> spp. (Maple), <i>Fraxinus</i> spp (Ash), <i>Prunus podus</i> (Jamu), <i>Aesculus indica</i> . (Goon) etc

7.7 Planting Programme

Planting shall be carried out in monsoon or in winter season. The conifers will generally be planted in monsoon and broad leaved in winter. The species considered suitable for planting have been indicated for each area and also recorded in the respective compartment history files. However, the DFO will have discretion to change the species and year wise sequence depending on circumstances, but the efforts should be to bring all these under well established plantation within the currency of this plan. A definite planting programme has been suggested; Range wise as given in the table-7.3.

Table-7.3

Areas for Sowing/Planting		
Name of Range	Name of Areas/Forests	Area in Ha
Theog	U-295 Kanashi	50.0
	U-297 Benour	40.0
	U-298 Khagna	30.0
	U-299 Aloti	50.0
	U-326 Gijeri	45.0
	U-327 Nehra	150.0
	U-343 Shilla Nal	22.0
	U-344 Nani	30.0
	U-411 Bagra	7.0
	U-412 Dhangwi	10.0
Kotkhai	U-414 Didi Dashout	10.0
	U-440 Darkoti	15.0
	U-447 Bajoa Kupri	25.0
	U-457 Bari Dakal	14.0
	U459 Ghasi Gaon	20.0
	U-460 Balneor	20.0
	U-461 Purag	35.0
	U-486 Badaun	30.0
	U-490 Chano Dhar	50.0
	U-491 Barchilli	50.0
	D-167 Drabla	25.0
	D-169	50.0
	D-170	25.0
	D-166 Hara Raitha	20.9
	R-15 Tumru	20.0
	R-13 Chambi-Kupar C-X	10.0

	R-11 Cheog	20.0
	R-13 Chambi-Kupar	10.0
	D-177 Gahan Jarahi	25.0
	D-186 Gohach, C-V	30.0
	D-187	25.0
	U-Lambipash	30.0
	D-131 Deha	50.0
	D-137 Kadaran	25.0
	D-138 Khagna	25.0
Balson	U-356	50.0
	U-361 Kishour	60.0
	U-362 Deothi	50.0
	U-364 Mohraugh	50.0
	U-367 Nano Mundoo	50.0
	U-368 Rail	50.0
	U-369 Dagwali	30.0
	U-394 Thana Dhar	60.0
	U-396 Balghar	40.0
	Total	1533.9

7.8 Control and Deviation

The annual target of areas prescribed for planting must be achieved every year and deficit of any one year must be made up in the following year. The excess or deficit achievements will be shown in the control forms and checked at 5 years intervals. Only successful areas of plantations will be counted against the prescribed target. The detailed reasons for deviation should be given and sanction of deviation obtained from competent authority.

7.9 Regeneration Assessment

Regeneration survey on 1:3,750 scale map shall be carried out every year till the plantation is established. Reasons of the failures, if any, should be recorded in the survey report and posted in respective compartment history files. All heavy failures will be personally investigated by DFO who will send report to CF for taking corrective steps.

7.10 Closure

Closures shall be got notified in advance of actual planting. Old plantations may be thrown open if these are beyond browsing damages. Effective closure is must in order to reduce the total

closure period of each plantation. However, the areas prescribed for planting will remain closed till the plantations are established i.e. reaches to a height of more than 3 meters.

7.11 Grazing and Grass Cuttings

Grazing will not be allowed till the plantation is at a level where no damage is caused by the animals. However, grass cutting in closed areas may be permitted when the plants have attained sufficient height and there is no chance of their being damaged by sickle. The permission of grass cuttings rests at the discretion of RO. The grass should be equally distributed amongst all the right holders. It is better if panchayats are associated for the purpose.

7.12 Fire Protection

7.12.1 The whole of the working circle shall be protected against fire by taking all possible preventive measures in advance. Maintaining cordial relations with the local people through participatory management, educating them properly and deployment of fire watchers are some such measures.

7.12.2 Fire lines of 5 meter width dividing the entire plantation areas into suitable blocks may be provided by clearing the bushes and other vegetations. Such fire lines are required to be made in areas which are prone to fire and particularly chil areas. These fire lines should be shown on treatment maps.

7.12.3 In the event of fire, timely action to extinguish the same will be taken through the help of right holders and JFMC's.

7.12.4 The offenders should be booked under the Indian Forest Act, 1927, H.P. Panchayati Raj, Act 1994 and under provisions of Indian Penal Code etc.

7.13 Plantation Technique

The bushes which do not serve any purpose will be removed along contours with width ranging from 1 to 1.5 meter apart 4 to 5 meter strips so that the planting be done uniformly throughout the area closed for planting. The normal height of plants should be 45 cm to 60 cm in case of conifers while 1 to 1.5 meter in case of broad leaved species. Selection of sites and choice of species are very

important aspect of raising plantation which should be done by DFO/ACF. Detailed instructions regarding plantation techniques are given in technical order No. 3 and 4 of the Punjab Forest manual Vol. III. Each species should be raised under favorable site conditions and in areas suitable to its silvicultural requirements.

7.13.1 Fencing

The area should be partially fenced with RCC fence post with 5 strands of barbed wire especially in those areas which are situated along road side. Those areas which are situated in far flung areas and where the carriage of RCC fence post becomes costlier and difficult to carry; those areas should be fenced with barbed wire with 4 strands in wooden fence post of good quality and size obtained from un-saleable thinning as prescribed in the Working Plan from PB-IV and PB-III areas.

7.13.2 Preparation of Site and Earth Work

The bushes and grasses should be cut around the planting sites and then these should be burnt at least six months in advance of planting. After the sites are cleared, the pit digging operations shall be done at least one month in advance of planting. Planting of conifer spp. will be done at a space of 3m x 3m along the contour in pits of 30cm x 30cm x 30cm dimensions whereas for broad leaved species the size may be 45cm³. In case of patch sowing; then square patches of 50cm x 50cm with 15cm to 20cm depth should be made at a distance of 3 meter along the contour. These patches should also be made at least one month in advance of sowing. Tall plants in bigger container should be planted in pit size 60x60x60 cm.

7.13.3 Sowing / Planting

Sowing / Planting is prescribed in monsoon i.e. July / August as well as in winter i.e. December / January. Though, the cost involved in sowing will be less but the survival through the planting will be more, thus planting will be preferred. For this, suitable plants will be raised in nurseries. The seeds should be collected from healthy trees to get good survival. The work must be done under close supervision of the field staff and must be regularly inspected by RO/ACF/ DFO.

7.14 Nursery Techniques

Site for temporary nurseries should be selected within or nearer to the plantation areas and the source of water, to reduce the cost of carriage and mortality of the seedlings. The plants requirements should be worked and entire operation be planned in advance. The nursery should be raised well before the actual planting depending upon the time required to get seedlings of plantable size. The instructions regarding nursery techniques are also given in technical order No.3 and 4 of the Punjab Forest Manual Vol.III.

Table-7

Nursery Techniques

Species	Time and Method of sowing	Time required
Chil	September, October in P. bags (4x9)	9 month for monsoon planting.
Bamboo	April, May in P. bags (4x9)	2 to 3 years.
Kachnar	September, October in nursery beds	2 to 3 years (root shoot cutting)
Poplars	February, March cutting in nursery beds	1 year (one year shoot and two Year root)
Walnut	December to February in nursery beds	2 to 2 ½ year.
Deodar	December in P. bags (4x9)	1 ½ year.
Fir	December, January in P. bags (4x9)	After 1 ½ years to be transplanted in P. bags. Plants will be ready for planting after 3 ½ to 4 ½ years.
Spruce	December, January in nursery beds (4x9)	3 to 3 ½ years. Plants will be ready for planting after 3 ½.

7.15 New Concept of Nursery

It is apparent that the degree of survival of plantations is directly linked to the quality of healthy 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. 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:

- i) It should be large in size (atleast 0.5ha) so that its cost is effective and also proper infrastructure including water supply, germination chamber (poly-house), Mali-hut, soil mixing yard, vermicompost etc can be developed.
- ii) 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.
- iii) 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.
- iv) Soil mixture is most vital component for raising healthy nursery stock. Thus care must be taken not to compromise with quality and quantity of soil, sand and vermicompost. The quality and quantity of soil, sand and vermicompost for different sizes of P. bags is given below in table-7.5.

Table-7.5
Ratio of soil mixture

Sr. No.	Size of P. bags	Net weight including all mixture	Ratio of soil sand and vermicompost			Insecticide
			Soil	Sand	Vermicompost	
1	4x9"	950 gms.	750 gms.	100 gms	100 gms.	1.5 Kg. for 1000
2	7x15"	4 Kg.	3.6 Kg.	200 gms.	200 gms	3 Kg for 1000
3	12x20"	14 Kg.	500 gms.	500 gms.	500 gms.	6 Kg for 1000

7.15.1 Digging, collection, carriage and sieving of Soil

A forest soil is a living, dynamic, biological unit always undergoing change through forest vegetation and silvicultural treatment. Thus the role of soil is very crucial and important to grow healthy and vigorous saplings in the nurseries. Essentially, for this purpose soil is to be dig out and collected from natural forest of conifers preferably from Deodar forests where soil and humus layer have accumulated and acquired depth of atleast 30 cms. In this division at present soil is being brought from Cheog Forest of Cheog Block and Theog Range for use in permanent nursery at Sainj. This practice should be followed for raising other nurseries and soil should be brought from the coniferous forests which are rich in soil/humus. Soil after sieving is to be mixed with

mixture of sand, vermicompost and required dose of insecticide in the proportionate ratio as per table No. 7.5 given above. Techniques for collection and treatment of seed and raising of nursery have been given in H.P. Forest Manual Volume-IV under Chapter - III which should be kept in view while raising nursery.

7.15.2 Creation of New Nursery

At present Sainj nursery under Theog Range is meeting the requirement of 80% nursery stock of entire division. In this nursery Deodar, Ban-Oak, Chil, Akhrot, Robinia, Ritha, Chulli, Daru, Bamboo, Kunish, Bel Patra, Amla, Kainth and bio-engineering species have been raised. This is one of the best centrally located and irrigated nursery with the provision of lift irrigation scheme. All other temporary nurseries are to be minimized. However, the Fir/Spruce forests which were felled to meet the requirement of apple packing cases during 1980's could not be regenerated due to non availability of nursery stock of Fir and Spruce. Also felling have been prescribed in Fir/Spruce P.B.-I areas during this plan period and for which the stock of Fir/Spruce plants is to be made available. Accordingly felling in Fir/Spruce Working Circle have been prescribed from the year 2019-20 onward keeping in view by that time the nursery stock raised will be available to plant in these areas. After discussing the issue with the field staff it was proposed that a new nursery be established near Gazta in D-175 Nagtir, C-I to raise the stock of exclusively, 80% of Fir and Spruce and the rest of 20% stock of *Taxus Baccata*, *Rhododendron* Horse chestnut, Chinar and Mapple in equal proportion.

7.16 Tall Planting

One of the main reasons for failure of plantations is that at present either planting is being done of naked roots plants or in smaller sizes in P. bags. The terrain of this working plan is hilly with shallow soil depth and the areas available for planting are very high, dry and degraded. To overcome this situation and to make the plantation successful, technically if a sapling which is raised in the bigger polythene container and has attained height of 45 to 60 cm is taken out for planting along with ball of earth then the quantity of soil moved from the nursery to the plantation site will provide the necessary soil nutrients and such plantations can be made a success right upto 100%.

7.17 Plantation Practices

To achieve this target it has become necessary that the number of plants per ha should be reduced from 1100 per ha to 400 plants per ha. This concept should be brought to the notice of Govt., HoFF. The field staff should be trained and educated to give better result during the period of this plan. Care should be taken that all the plants which have been carried to plantation site in P. bags with ball of earth should not be disturbed during planting, ramming should be restricted outside the ball of earth, instead of doing with foot it should be done with hands which will practically help the plant to get its nutrients from the ball of earth as it is, as it was getting in the nursery itself plus the sapling will get extra space for expansion of its roots.

7.18 Subsidiary Silvicultural Operations

7.18.1 Beating up

Beating Up of failures will be carried out for at least up to 5 years after the planting if the survival is less than 90%. Where the success is more than 90% no beating up is to be done unless the failures are in compact block of 0.2 ha. or more in extent. Therefore, suitable funds for maintenance of old plantations should be made in the annual budget estimates.

7.18.2 Pruning, Cleaning and Thinning

These operations will be carried out in old plantations. Pruning be done up to $\frac{1}{3}$ rd height of the chil plants when the crop has a mean height of 3 meter, cleaning and thinning should be done where the crop is dense and the height of plant is 5 meter or above one cleaning shall be enough.

7.18.3 Weeding

At least two weedings in the first year and one weeding during the rains in the following year are considered as essential.

7.18.4 Treatment Map

Treatment Map on 1:3,750 scales shall be prepared for each plantation area showing the plantable, unpalatable locations, soil depth, slope and species to be planted. This map should be maintained in the compartment history files/ plantation journals.

7.18.5 Plantation Journal

It is essential that whenever a site is selected for plantation a proper hard bound plantation journal is prepared for that site. The plantation journal must have a large sketch may be of the area showing boundaries and other details like nallas, rocky, 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 sixth and seventh year of the plantation, it should be transferred to the division office and kept properly in record there.



View of Sainj permanent nursery. Tall plants of Ban-Oak 3 years old about 1.20 mt. in height raised in 12x20" P. bags. This is the only nursery in Theog Division where Department has provided its own lift irrigation scheme. The area of the nursery is 1.0 ha.



View of Deodar tall plants about 3.5 years old, 1.20 mt. in height raised in 12x20" P. bags.

CHAPTER -VIII

NON TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE

8.1 General Constitution

Forests are not only source of commercial timber but are rich in valuable Non Timber Forest Produce. The present National forest policy of 1988 lays special stress on meeting the requirement of rural and tribal populations. The rights and concessions from forests should primarily be for the bonafide use of the communities living within and around forest areas and their rights should be fully protected. The Govt. of India has enacted the Scheduled Tribes And Other Traditional Forest Dwellers (Recognition Of Forest Rights) Act, 2006 and Scheduled Tribes And Other Traditional Forest Dwellers (Recognition Of Forest Rights) Rules 2008 to recognize and vest the forest rights and occupation in forest dwelling Schedule Tribes and other traditional forest dwellers who have been residing in such forests for generations but whose right could not be recorded; to provide for a frame work for recording the forest rights so vested and the nature of evidence required for such recognition and vesting in respect of forest land. Therefore meeting the domestic requirement of fuel wood, fodder, medicinal plants and NTFPs would be the first priority.

8.1.1 The area of this working Circle is equal to 33681.52 ha of Theog Division. This would be an overlapping working circle covering all the working circles and is constituted to ensure systematic development and exploitation of non timber forest produce species that occurs in the division. The main non timber forest produce found/extracted in the division are Guchhi, Banaksha, Resin, Medicinal plants, grasses, Anardana etc. The main emphasis/focus would be on medicinal plants.

8.1.2 The forests covered under this working plan have plenty of species giving minor forest produce like resin, medicinal plants, tannins, and grasses and many other important MFPs (NTFPs). The NTFP species occur throughout the tract, both in the forests and non forest area. A lot needs to be done in the field of conservation, development and management of NTFPs. This would be in

accordance with the National Forests Policy of 1988, wherein conservation and propagation of NTFPs and their contribution towards the local economy have been given due recognition and emphasis. In Theog Forest Division, resin, medicinal plants, bamboos, tannins and grasses are the important NTFPs cultivation propagation, harvesting and trading of which can boost the economy of local people to a great extent. Information on medicinal plants is not readily available and there is a need to study and document the occurrence, yield estimates, exploitation and marketing of valuable medicinal plants in the division.

8.2 Main Objectives of Management

The State has formulated Himachal Pradesh Forestry Sector Medicinal Plants Policy, 2006 which is aimed at conserving and strengthening medicinal plant resources based in forest areas as well as outside for use towards enhancing, economy, health and livelihood security of the people of the State on sustainable basis. The main objectives of management would be as under:

- i) To conserve and augment existing non timber forest produce including medicinal plants resource in its natural habitat i.e. in situ conservation.
- ii) To encourage cultivation of commercially important species of medicinal plants on private lands ex-situ conservation.
- iii) To develop a system of marketing even the concept of MIS like agricultural crops can be followed through Forest Development Corporation for wild harvest so as to reflect both the conservation costs and the community benefits and especially for adoption of cultivation on wasteland/additional land by farmers.
- iv) To encourage public-private-community partnership for building capacity for cultivation, value addition and processing of raw material before export from the state so that load on extraction is reduced.
- v) To promote the manufacture of essential oil, pharmaceutical cruet extract, herbal medicines for commercial use. There are 19 manufacturers in Himachal Pradesh who are manufacturing essential oil, phytochemicals, crude extract, herb traders & growers which is given in the table below:

MANUFACTURER OF ESSENTIAL OIL, PHYTOCHEMICALS, CRUDE EXTRACT, HERB TRADERS & GROWERS IN HIMACHAL PRADESH.

Sr. No.	Name & address of manufactures	Products
1.	Mr. Surender Mohan, M/S Hari Industries, Baggi, Distt. Mandi-175027 (H.P.)	Mfr. Essential Oil & Herb Extracts & Oleoresin
2.	Mr. Jitender Sodhi, Ayush Herbs, 25 Phase I, Ind. Area Nagrota Bagwan, Kangra,	Mfr. Phytochemicals, Herbs Extracts & Herbal Medicine.
3.	Manoj Nayer, M/S Namiex Chemicals (P) Ltd, Lodhwan, Nurpur, Distt. Kangra. (H.P.)	Phytochemicals
4	Mr. R. N. Kapoor, Grass root Industries, Plot No. 4 Phase III, I Area, Mandi.	Essential Oil
5.	Dr. Bimal Chander, M/S Kanha Aromatics, Vill & P.O. Seobagh, Distt. Kullu (H.P.)	Essential Oil
6.	Mr. Rajender Mohan, M/S Hitesh Aromatics, Vill. Nalsar, P.O. Baggi-175027, Distt. Mandi (H.P.)	Essential Oil
7.	Mr. Kailash Sharma, M/S Himalyan Lap Aromatics, Arsu, Distt. Kullu (H.P.)	Essential Oil
8.	Mr. Hans Raj Rana, M/S Mhamaya Traders, Vill. Salahar, P.O. Devdhar, Distt. Mandi-175029 (H.P.)	Cultivator large scale Crop of Medicinal & Aromatic Plants.
9.	Dr. Lal Singh, Director, Himalyan Research Group, Umesh Bhawan, Chotta Shimla, Shimla- 171002.	Cultivator & N.G.O.
10	Mr. Govind Goswami, Naina Aromatics Industry, Sakroha, Distt. Mandi (H.P.)	Essential Oil & Herb Extract
11	Manoj Gupta, M/S Himalyan Herbal Extracts, Vill. Tawan, P.O. Dhawan, Distt. Mandi (H.P.)	Essential Oil & Herb Extract
12	Mr. Vikas Gupta, M/S Sant Bhama Enterprises, Baggi-175027, & Herb Extract Distt. Mandi.(H.P.) E-Mail: sant I @sancharnet.in	Mfr. & Exporter Essential Oil

13.	M/S Mediroma Nirgalits International, H.40, Industrial Area Shamshi, Distt. Kullu(H.P.)-175126.	Essential Oil and Aromatherapy
14.	Mr. Madan Awasthi, Awasthi Cottage, Manali, Distt. Kullu(H.P.)	Cultivator
15.	Mr.K.G. Butail, Vill. Sungal, P.O. Sungal Tea Estate, Palampur (H.P.)- 176061.	Cultivator & Mfr. Essential Oil
16.	Mr.Shiv Bhushan, R.T. Aromatics E.O. Pvt., Ltd., Una, Distt. Una (H.P.)	Essential Oil
17.	Mr.B.M.Sood, Himachal Pharmaceutical, Ind. Area Distt. Kangra, Kandaruri, 176402.	Phytochemicals
18.	M/S Natraj Industries, Vill. & P.O. Badhu, Distt. Mandi (H.P.)	Essential Oil
19.	Mr. Vijay Kumar Sharma, Mountainous Herb (P) Ltd. Plot No.4, Phase III, I Area Rati. Distt. Mandi (H.P.)	Essential Oil

Source: A training manual for Forest Officers year 2005, a publication by institute of Himalayan Bio-Resources Technology Palampur (H.P.)

- vi) To maximize yield of medicinal plants through sustainable natural and artificial regeneration and scientific exploitation.

8.3 Blocks and Compartments

The entire tract of the division will be covered by taking beat as a unit.

8.4 Area Statement

This is overlapping working circle spreading over the entire tract of this plan hence, no area statement is required.

8.5 Analysis and Valuation of the Crop

The entire tract is rich in many useful herbs, shrubs and trees which are being exploited since decades. The area produces large quantities of Guchhi, Banaksha, Shigli, Mingli and Anardana etc. A list of commonly used or economically extracted medicinal herbs, plants occurring naturally are given in table-8.1.

Table -8.1
List of Medicinal Herbs, Shrubs and Trees

S. N.	Botanical Name	Common Name	Habit	Occurrence Zone	Uses
1	<i>Aconitum heterophyllum</i>	Atis	Herb	Sub alpine	Root- antipyretic used in diarrhea and cough.
2	<i>Angelica glauca</i>	Chora	Herb	Above 2200m	A stimulant, used in constipation
3	<i>Aloe vera</i>	Ghea Quwanr	Shrub	Upto 1200m	Plant is stomachic, purgative, anthelmintic used in pile and rectal fissures dried Juice has cooling effect, useful in fevers.
4	<i>Emblica officinalis</i>	Amla	Tree	Upto 1200m	Fruits-acrid, diuretic, laxative. Dried fruit used in hemorrhages, diarrhea, dysentery, jaundice and dyspepsia
5	<i>Berberis aristata</i>	Kashmal	Shrub	1800-3200m	Root, Bark extract known as Ransaunt used in skin diseases, jaundice and in eye infection.
6	<i>Cannabis sativa</i>	Bhang	Herb	Up to 1600m	Leaves used as a tonic, intoxicant, antispasmodic, analgesis and narcotic.
7	<i>Dioscorea deltoidea</i>	Shingli mingli	Climber	Upto 2200m	Tuber used to kill lice, produces diosgenin a steroidal drug.
8	<i>Morchella esculenta</i>	Guchhi	Fungi	1500-2500m	Used as delicious dish.
9	<i>Myrica nagi</i>	Kaphal	Tree	1000-2100 m	Edible Fruit
10	<i>Dactylorhiza hatagirea</i>	Salam Panja	Herb	Above 3000m	Roots
11	<i>Gentiana kurroo</i>	Karoo	Herb	Sporadic to alpine to sub alpine meadows, at lower altitude 2000-3000m	Roots-Stomachic, febrifuge used in urinary infections.
12	<i>Pistacia integerrima</i>	Kakar-singhi	Tree	Up to 1500m	Used tonic, expectorant, in coughs and asthma
13	<i>Podophyllum emodi</i>	Bankakri	Herb	Above 2200m	Rhizome and roots are purgative specially used in uterine cancer.
14	<i>Polygonatum vaticilatum</i>	Salam Mishri	Herb	2300-3000m	Leaves

15	<i>Rhododendron arboreum</i>	Buras	Tree	1200-2400m	Young Leaves- useful for headache, flower used for chatni and juice making.
16	<i>Rhododendron campanulatum</i>	Kali Jarri	Tree	Sub alpine	Leaves-Used in rheumatism, sciatica, syphilis.
17	<i>Bergenia ligulata</i>	Pathar Tor	Shrub	1800m & above	Whole plant.
18	<i>Taxus baccata</i>	Rakhal	Tree	2400-3000m	Fruits and leaves selective, antispasmodic, leaves used in asthma, bronchitis, cough and epilepsy.
19	<i>Thymus Serphyllum</i>	Ban ajwain	Herb	1200-1800m	Given in complaint of stomach and liver oil-applied toothache.
20	<i>Viola odoreada</i>	Banafsha	Herb	1000-3000m	Plant has antipyretic
21	<i>Valeriana wallichii</i>	Mushak bala	Herb	2100-3000m	Root stock
22	<i>Bauhinia</i>	Kachnar		Upto 1200m	Bark used as tonic, astringent, useful in skin diseases. Dried bark for dysentery piles, diahrrhea. Decoction of roots used in dyspepsia.
23	<i>Cynodon dactlon</i>	Doob	Herb	Cosmopolitan	De-cocktation of root is diuretic used in dropsy. Infusion of root used in bleeding from piles. Juice of plant is astringent used as in application to fresh cuts and wounds.
24	<i>Daturametal</i>				
25	<i>Meliazedaredcha</i>	Bakain (Darek)	Tree	Upto 1200m	Root, Bark/Fruit/ Flowers/ Leaves- Deodorant, Flowers and leaves applied as a poultice to relive nerves headaches, Seeds- used in remeterisum.
26	<i>Mentha spygetta</i>	Pahari Pudina	Herb	Cultivated in middle and lower	Used in Bronchitis and fever. Herb used as Stimulant, carminative and anticpecimodic
27	<i>Osimumsamcutam</i>	Tulsi	Herb	1800m	Leaves used as expectorant, Juice of leaves used in bronchitis, gastric disorders. Seeds- Demulcent , given in urinal treatments
28	<i>Rosa damascene</i>	Gulab	Herb	Sub mountain hills to high	Petals-applied externally as astringent. Gulukand

				hills temperate wet.	which is used as tonic
29	<i>Rosa mosachata</i>	Kujai Gulab	Herb	Upto 2500m	Patels- beneficial in burning of skin and in eye diseases
30	<i>Sampindus muroci</i>	Ritha	Tree	Upto 1300 m	Fruits-Expectorant, used in epilepsy.
31	<i>Tagetes irrecta</i>	Gaiinda	Herb	Available throughout in division	Flowers-Used in eye diseases for unhealthy ulcers, purifies blood. Leaves used in application boils.
32	<i>Tinospora cordifolia</i>	Giloi		Upto 1200 m	Stem-Stomachic, antipyretic, starch from roots and stem- used in diarrhea and dysentery.
33	<i>Fegopyrum euculentum</i>	Kutt			
34	<i>Prunus armeniaca</i>	Khumani	Tree	Upto 2500 m	Dytro- used as laxative
35	<i>Prinsepia utlins</i>	Bhekhal		Upto 3000m	Oil from the seeds-applied externally for erhumatihm
36	<i>Punicagranatom</i>	Daru	Tree	1000-2000 m	Seeds-stomachic
37	<i>Rosa damascena</i>	Gulab		Found in mid hills	Patles- applied as extrigentle
38	<i>Swertia augustifolia</i>	Pahari chirteea		1600-3000m	Plant-Bitter, tonic, stomachic laxative used in jaundice
39	<i>Artitemisa valugensis</i>		Herb	Upto 4000 m	Antispasmodic. Flowering tops used in asthma and brain diseases.
40	<i>Asparagus adcenanss</i>	Shatvar		1600-2600m	Root-Demulcent, used as tonic.
41	<i>Cederus deodara</i>	Deodar	Tree	2200-2800m	It's essential oil have antiseptic properties
42	<i>Delphinium denudatum</i>	Nirbissi	Shrub	1500-2000 m	Root-Bitter, used to toothache.
43	<i>Cotoneaster microphulia</i>	Mangu	Shrub		Branches used for making baskets. Leaf and fruit extract taken in diarrhea.
44	<i>Verbascum thapsus</i>	Jungli Tobacco	Herb	1800-3000m	Leaf juice applied to check bleeding, believed to be poisonous to livestock.

Source: A training manual for Forest Officers year 2005, a publication by institute of Himalayan Bio-Resources Technology Palampur (H.P.)

8.6 Stock Maps

As the medicinal plants are mostly herbs and shrubs found on annual or perennial basis, stock mapping is not possible due to scattered occurrence.

8.7 Methods of Treatment

8.7.1 Rotational Extraction

Unscientific and unsystematic extraction of medicinal plants is likely to reduce the yield and quality of the plants and may even lead to extinction of the species. A three year extraction cycle of the medicinal plants is proposed and extended to the plan period as given in the table-8.2.

Table-8.2
Cycle of Extraction of Medicinal Plants, Herbs, Shrubs and Trees

Range	Blocks	Years when Extraction will be allowed
Theog	Matiana	2014-15, 2018-19, 2022-23, 2026-27 & 2026-29
Balson	Ghoond	2015-16, 2018-19, 2021-22, 2024-25 & 2027-28
Kotkhai	Kotkhai	2016-17, 2019-20, 2022-23, 2025-26 & 2028-29
Kotkhai	Gohach	2017-18, 2020-21, 2023-24, 2026-27 & 2028-29
Theog	Cheog	2018-19, 2021-22, 2024-25 & 2027-28
Balson	Ghorna	2019-20, 2022-23, 2025-26 & 2028-29
Kotkhai	Kalala	2020-21 2023-24 & 2026-29
Kotkhai	Mahasu	2021-22, 2024-25 & 2027-29
Theog	Theog	2022-23, 2025-26 & 2028-29

8.7.2 In case of Daru-seed/ Anardana, annual extraction through village communities is proposed.

8.8 Artificial Propagation and Conservation

Keeping in view the economic importance and demand of medicinal herbs, it is desirable to encourage naturally occurring medicinal plants and other NTFP in suitable localities. The demand of medicinal plants have picked up with setting up of pharmaceutical industries in the State. The existing germplasm of different herbs endemic to the division needs to be conserved. Following measures are suggested for the conservation, protection and propagation of medicinal plants.

- i) Enthobotanical Survey for area of existence of various important usable NTFP along with established usage of different medicinal & aromatic plants.
- ii) Systematic rotational collection should be followed strictly on three year basis as above.
- iii) Heavy grazing and destruction of medicinal herbs should be checked as these species do not produce sufficient seeds/vegetative form of regeneration. Closure for biotic interference will be followed in specific area, range-wise.
- iv) The raising of nurseries/herbal garden, 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. Three such gardens are proposed in lower, middle & higher altitude of the Division, one in five year term basis after survey & site selection.
- v) Medicinal plant collectors should be educated and provided proper information or guidelines so that there is continuous regeneration of medicinal herbs and threatened plants are propagated ex- situ & planted in forests.
- vi) 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.
- vii) Exposure visit & training be arranged for such community based institution along with liaison with Agriculture & Ayurveda Department of the State.

8.9 Propagation Technique

Whereas method of propagation and harvesting of important plants be standardized after research in puts, the technique of propagation and harvesting of some important plants is described as detailed in table-8.3.

Table-8.3
Methods of Propagation of Medicinal Plants

Name	Method of Propagation	Harvesting/Collection	Uses
<i>Artemisia nilagirica</i>	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.
<i>Acorus calamus</i>	The species is propagated by sowing as well as planting rhizomes at 15cm deep at 30cm×30cm spacing during Feb.-March. If direct sowing is decided, then the soil is worked up to a depth of 15 cm. Sowing is done in patches which may be spaced at 30cm×30cm.	Harvesting is done after one year during Nov.-Dec.	The dried rhizome is generally used in the form of infusion. It produces best results in case of dyspepsia and chronic behavior.
<i>Aconitum heterophyllum</i>	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 behavior, cough.
<i>Angelica glauca</i>	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.
<i>Dioscorea deltoidea</i>	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.
<i>Heracleum candicans</i>	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 aphrodisiac & nervetonic
<i>Podophyllum emodi</i>	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.	

<i>Picrorhiza kurroo</i>	It is easily propagated by planting rhizomes in 15 cm deep pits at a spacing of 60cm×60cm during Nov.-Dec.	Collection is done after 3-5 years when rhizomes are fully developed.	Roots are used as stomachic, tonic, improve appetite and stimulate gastric secretion.
<i>Swertia Chirata</i>	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.
<i>Valerina Valeriana</i>	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 incense and in drugs for hysteria and nervous problems.
<i>Viola serpens</i>	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.

8.10 Other Non Timber Forest Producing Plants/ Products

In terms of local extraction of NTFPs, the most extracted species (by quantity) is Guchhi (*Morchella esculenta*). Due to transfer of export permit power of about 51 species to Panchayats the record of extraction of such spp. is not available readily but efforts be made to keep such record of extraction & export at least at Range & Block level in future.

8.11 Fungi

The forest area of this Division is very rich in a variety of Fungi, which consists of large number of edible or non-edible fungi. The non-edible fungi have many complex organic chemical compounds, which are of great medicinal value. The most important of all the fungi are Morchella species, which are commonly known as Guchhi. These are collected, dried and exported out and are discussed in detail below:-

The most common Morchella species

- i) *Morchella deliciosa*.
- ii) *Morchella esculenta*.
- iii) *Morchella conica*.

These grow naturally in the forest areas immediately after snow melting during the month of April and May. These are found mostly in the moderately dense forests, with deep fertile soil where these get the required nutrients from the humus. This is important

Minor Forest Produce, which play an important role in the village economy in the area.

8.12 **Action on General NTFP Conservation**

- i) A study to answer the questions raised must be commissioned as early as possible through research Institutes.
- ii) Participatory Action Research (PAR) study be undertaken to evolve and adopt and monitor non destructive ways of harvesting all species, as mostly extraction is done by labourers who is uneducated & may not be able to identify the right species.
- iii) NTFPs should be raised in large numbers in nurseries, as it is a very versatile species for use in Bio-engineering as well as for *ex-situ* conservation of germplasm.

8.13 **Future Line of Action**

Medicinal plants trade has tremendously expended worldwide, particularly during the last decade and this momentum is likely to be increased. This has necessitated especially in forest sector to adopt scientifically organized cultivation and propagation and processing of medicinal plants. Consequently efforts are needed to develop methods for *in-situ* propagation either in forest itself or *ex-situ* cultivation. There is a close relationship between the forest and pharmaceuticals and all efforts are to be made regarding **“Propagation, value Addition and Market Linkage of Medicinal Plants”**. The training, workshops and seminars organized by National Bio-Resource Development Board, Govt. of India, New Delhi and IHBT Palampur can prove very effective and helpful in promoting relevant technologies to conserve Bio-Resource gene pool comprising important medicinal plants in forests of Theog Forest Division. To promote the cultivation, propagation, harvesting and trading of which can boost the economy of local people to a great extent. Following steps, are required to be initiated:

- i) Immediate steps should be taken to identify the status of medicinal and aromatic plants found in the division.
- ii) For the important drug yielding plants, detailed scientific investigation is necessary for evolving better methods of cultivation, processing etc. that are most profitable to those

who undertake their cultivation as also the chemical screening of such plants.

- iii) Large scale cultivation of medicinal and aromatic plants should be encouraged so that their ruthless exploitation from the natural zone is checked.
- iv) In-situ conservation of medicinal and aromatic plants by regulating their exploitation to a time-circle frame.
- v) Proper training for identification, collection, storage handling and marketing should be arranged for local people. Formation of co-operatives will play an important role in eliminating the middleman and maximizing the returns.
- vi) Public awareness programme should be launched amongst the local people regarding conservation of rare medicinal plants and to inculcate the concept of gene-pool reserve amongst them
- vii) Nurseries and demonstration plots should be created at suitable places and from their planting stock of medicinal plants should be given to farmer at nominal rates as so to induce them to undertake the cultivation of these herbs on their holdings, where production of food crops is not economical.
- viii) Compilation of traditional source of knowledge and information regarding identification and utilization of medicinal plants by local people is necessary to keep indigenous technical knowhow alive.

The NTFPs should be given the due thrust and species yielding them should be included in the plantation programme. Nurseries should raise sufficient stock of medicinal and other plants of economic importance and make them available to the local population desirous of planting them. With many JFM schemes being under operation in the division, the stakeholders should be encouraged to include such species in JFM micro plans. The rural people of the area still used to take plant based traditional medicines for health care. Since they are still produced using old methods, their quality, efficacy and self life gets adversely affected. Hence there is a need to introduce low cost, appropriate and simple technologies to encourage this dwindling practice and bring in additional income of rural households. Collection, processing, value addition and marketing aspects of NTFPs need to

be studied and the forest department should provide all necessary help in this regard to training programmes on various aspects of NTFPs i.e. collection, refinement, value addition, storage and marketing should make growing and trading of NTFPs more remunerative.

8.14 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 altitudinal zones in addition to 32 spp. identified by NMPB (National Medicinal Plant Board, GoI) already to suit local conditions & as per consumption pattern in Theog Forest Division. In this Division the area below 1200m is marginally low and therefore some nursery stock of species like Amla, Bahunia, Bel, Kaphal need to be grown. However the major area of this division is between 1200 to 3360mts. Therefore species like *Taxus baccatta*, *Myrica nagi* (kaphal), Walnut, Bird cherry, Horse chestnut are to be encouraged. To make the plantation of these species successful it is required that these species be grown as tall plants in Polythene bags in the size of 20x12” before planting in the field.

A Database for consumption of NTFPs may be procured from local traditional dealers.

8.15 Calculation of Yield

No yield can be prescribed as the most NTFPs are extracted through right-holders. However, proper record of all the NTFPs extracted through Right Holders for which the export permit will be issued by the Department should be maintained in a separate register at Range level for each year. And its entry should be maintained annually and entered in respective compartment history files which will help in the geographical indication of different spp. in future and help to plan for their conservation in future.

8.16 Subsidiary Silvicultural Operations

No silviculture system as well as subsidiary operations are proposed, however, in situ as well as ex-situ conservation in herbal garden is proposed for important NTFPs spp.

8.17 Miscellaneous Regulations

This includes extraction or collection and export of NTFPs. The collection of NTFPs is allowed strictly as per provisions of Settlement report. The export is allowed under HP Forest Produce Transit (Land Route) Rules, 1978 against payment of specified export permit fee. Now the powers to issue permits rest with Panchayati Raj Institution in respect of certain species. Whereas vide Annexure-D Schedule-II list of trees has been enlisted for the Forest Produce for which the permit fee has been fixed.

Annexure-D Schedule-‘II’ See Rule 11 (5)

List of Forest Produce and Permit Fee thereon

Sr. No.	Botanical Name	Local/Trade Name	Plant Part	Permit Fee (Rs. Per Qntl.)
1.	<i>Abies spectabilis</i> /Abies pindrow	Talis Patra	Needles/leaves	125
2.	<i>Aconitum dienorrhizum</i>	Vatsnabh/Mohra	Tubers	7500
3.	<i>Aconitum heterophyllum</i>	Atis/Patis/Karvi Patis	Tubers	5000
4.	<i>Aconitum violaceum</i>	Mitha Telia/Mitha Patis	Tubers	1000
5.	<i>Acorus calamus</i>	Bach/Bare/Ghor bach	Rhizomes	150
6.	<i>Adhatoda zeylanica</i> = <i>A. vasica</i>	Basuti/Bansa	Leaves	125
7.	<i>Adiantum lunulatum</i>	Dungtuli/Hansraj	Fronds/(Leaves) Whole Plant	125
8.	<i>Aegle marmelos</i>	Bilgiri	Fruits	500
9.	<i>Aesculus indica</i>	Khanor	Fruits/Seeds	150
10.	<i>Ainselia aptera</i>	Sathjalori	Roots	150
11.	<i>Ajuga reptans</i>	Neelkanthi	Leaves	125
12.	<i>Alnus nitida</i>	Kosh Cones	Dry Cones	150
13.	<i>Angelica glauca</i>	Chora	Roots	150
14.	<i>Arctium lappa</i>	Jangli Kuth	Roots	125
15.	<i>Arnebia</i> spp. (<i>A. euchroma</i> , <i>A. benthami</i>)	Ratanjot	Roots	200
16.	<i>Artemisia brevifolia</i>	Seski	Flowering Shoots	125
17.	<i>Asparagus adscendens</i>	Shatavari/Sanspai/Safed	Root tubers	200

		Musli		
18.	<i>Atropa acuminata</i>	Belladona/Jharka	Leaves	125
19.	<i>Berberis</i> spp.	Kashmal/Daruhaldi	Roots/Stems	200
20.	<i>Bergenia ciliate</i> /B. stracheyi	Pasahnbhed/Patharchat	Roots	150
21.	<i>Betula utilis</i>	Bhoj Pattar	Bark	500
22.	<i>Betula utilis</i>	Birch Pine	Dry Cones	200
23.	<i>Bunium Persicum</i>	Kala Zira	Fruits	2000
24.	<i>Carum Carvi</i>	Shia Zira	Fruits	1000
25.	<i>Cedrus deodara</i>	Deodar Rosette	Dry Cone Part	150
26.	<i>Cinnamomum Tamala</i>	Tejpatra	Leaves	500
27.	<i>Colebrookia oppositifolia</i>	Bindi Phool	Leaves/Roots	125
28.	<i>Curcuma angustifolia</i>	Ban Haldi	Rhizomes	150
29.	<i>Dactylorhiza hatageria</i>	Salam Panja/Hath Panja	Roots tubers	6000
30.	<i>Dioscorea deltoidea</i>	Singli Mingli/Kins	Roots	900
31.	<i>Emblica officinalis</i> = <i>Phyllanthus emblica</i>	Amla	Fruits	150
32.	<i>Ephedra gerardiana</i>	Somlata	Twigs	200
33.	<i>Geranium nepalense</i>	Laljari/Raktjari	Toots	125
34.	<i>Girardinia diversifolia</i> = <i>G. heterophylla</i>	Bichhu Buti	Roots	150
35.	<i>Hedychium acuminatum</i>	Kapur Kachri/Kachur/Van Haldi	Roots	100
36.	<i>Heracleum</i> spp. (<i>H. candicans</i> ; <i>H. lanatum</i>)	Patishan/Patrala	Roots	100
37.	<i>Hyocymus niger</i>	Khurasani Ajwain	Seeds/Leaves	150
38.	<i>Hypericum patulum</i> / <i>H. perforatum</i>	Khaarera/Basant	Whole Plant	250
39.	<i>Hyssopus officinalis</i>	Juffa	Flowering Twigs	500
40.	<i>Iris germanica</i>	Safed Bach	Rhizomes	125
41.	<i>Juglans regia</i>	Akhrot/Khod	Bark	1000
42.	<i>Juniperus communis</i>	Hauber	Berries	250
43.	<i>Juniperus recurval</i> <i>J. Macropoda</i>	Bether Patta	Leaves	150
44.	<i>Jurinea macrocephala</i> = <i>J. dolomoea</i>	Dhoop/Guggal dhoop	Roots	500
45.	Lichens	Chalora/Chharila/Jhula/M ehndi/Stone flower	Thallus	500
46.	Mosses	Green Moss Ghas	Thallus	250
47.	<i>Mentha longifolia</i>	Jangli Pudina	Leaves	125
48.	<i>Morchella esculenta</i>	Guchhi/Cheun	Fruiting Body	10000
49.	<i>Murraya Koenigii</i>	Mitthi Nim	Leaves	150
50.	<i>Myrica esculenta</i> = <i>M. nagi</i>	Kaphal	Bark	200
51.	<i>Nardostachys</i>	Jatamansi	Roots.	1000

	grandiflora			
52.	Origanum vulgare	Ban Tulasi	Leaves	150
53.	Oroxylum indicum	Shyonak, Tatpalanga	Bark, Wood	125
54.	Paris polyphylla	Dudhia bach/Satva	Rhizomes	200
55.	Picrorhiza kurroa	Karoo/Kutki	Rhizomes	1000
56.	Pinus gerardiana	Chilgoza/Neoza	Seeds	1000
57.	Pinus wallichiana	Kail Cones	Dry Cones	1000
58.	Pinus roxburghii	Chil Cones	Dry Cones	1000
59.	Pinus roxburghii	Chill Needles	Dry Needles	05
60.	Pistacia integerrima	Kakarsingi	Leaf Galls	1000
61.	Podophyllum Hexandrum =P.emodi	Bankakri	Fruits	250
62.	Podophyllum hexandrum =P.emodi	Bankakri	Roots	450
63.	Polygonatum spp.	Salam Mishri/Meda/Mahameda	Rhizomes	1000
64.	Potentilla nepalensis	Dori Ghas	Roots	125
65.	Prunus cerasoides	Pajja/Padam/Padmakasht	Wood	125
66.	Punica granatum	Daru/Anar	Fruits/seeds	500
67.	Pyrus pashia	Kainth/Shegal	Fruits	125
68.	Rauyolfia serpentine	Sarpagandha	Roots	500
69.	Rheum spp.(R.australe =R.emodi/R.specifor me)	Revandchini	Roots	200
70.	Rhododendron anthopogon	Talis patra	Leaves	125
71.	Rhododendron arboretum	Brash/Burah	Flowers	150
72.	Rhododendron campanulatum	Kashmiri Patta	Leaves	150
73.	Salvia moorcroftiana	Thuth	Roots	200
74.	Sapindus mukorossi	Ritha/Dodde	Fruits	150
75.	Selinum spp. (S.vaginatum/S.tenuif olium	Bhutkesi	Roots.	400
76.	Swertia spp.	Chirata	Whole Plant	700
77.	Taraxacum officinale	Dhudhi/Dandelion	Roots	125
78.	Taxus Wallichiana= T.Baccata	Birmi/Thuna/Rakhal	Needles	600
79.	Terminalia bellirica	Bahera	Fruits	300
80.	Terminalia Chebula	Harar	Fruits	500
81.	Thalictrum foliolosum	Mamiri	Roots	350
82.	Thymus serpyllum	Banajwain	Aerial Parts(Herb)	125
83.	Tinospora cordifolia	Giloe/Guduchi	Stems	125
84.	Toona 291ehavio =Cedrela toona	Bari phool	Dried fruits	125
85.	Trillidium govanianum	Nag Chhatri	Roots/Rhizomes	8000
86.	Valeriana spp.	Mushkbala/tagar/Nihanu	Roots/Rhizomes	600

87.	<i>Viola</i> spp.	Banafsha	Flowers/aerial parts	2250
88.	<i>Withania somnifera</i>	Ashvagandha	Roots	200
89.	<i>Woodfordia fruticosa</i>	Dhatki/Dhai	Flowers	150
90	<i>Zanthoxylum armatum</i>	Tirmir	Fruits/seeds/wood	250
91.	All other medicinal plants not listed above	-	-	100



View seen in front is Ashwagandha (*Withania somaniferra*).

A medicinal plants used in rheumatism roots used as tonic, diuretic and narcotic. Leaves and roots also used as a local application to painful swelling.



Front view of Bel Patra plant (*Aegle marmelos*). Ripe fruits used as medicine which have cooling effect and laxative. This plant has grown in this nursery particularly for public distribution to which is known for its religious and medicinal importance.

CHAPTER-IX

THE FOREST PROTECTION (OVER LAPPING) WORKING CIRCLE

9.1 **General Constitution**

This is overlapping working circle covering all the working circles and is constituted to evolve the strategy to ensure the protection of forests against the Forest Fires, illicit felling and smuggling of the timber, resin and NTFPs, encroachments over forest land, protection of the forests from the invasion by climbers, alien species, and illegal mining.

9.2 **General Prescription**

In this Working Circle the problems like Forest Fires, illicit felling, smuggling of the timber, resin and NTFPs, encroachments over forest land, protection of the forests from the invasion of the alien species, and illegal mining will be discussed and analyzed and pragmatic strategy on this issue will be suggested in the foregoing paras.

9.3 **General Character of the Vegetation**

The Forest Protection Working Circle being an overlapping Working Circle, it represents all the forest types starting from subalpine to Western Himalayan forests.

9.4 **Main Objectives of Management**

The main objectives of management are as under:-

- i) Fire vulnerability of each forest to be assessed especially Chil areas and preventive measures against fires planned and put in the APO.
- ii) The assessment of the illicit felling cases is to be done and a strategy to be adopted.
- iii) There are cases of smuggling of the timber in this division, its legal course of action and strategy for curbing down such incidences.
- iv) Dealing with the encroachments, legal course of action and strategy to mitigate the problem.
- v) Regular assessment of spread of invasive alien species in this WC to be monitored atleast once in two years and priority given to their removal in APOs.

9.5 **Area Statement**

This working circle covers the entire tract of this Working Plan (Overlapping).

9.6 **Methods of Treatment**

The prescriptions in this chapter have been subdivided into following parts.

- i) Fire Management
- ii) Illicit felling and smuggling of the timber resin and NTFPs.
- iii) Invasive Alien Species Management
- iv) Encroachments over forest land.
- v) Illegal mining on the Forest Land.

9.6.1 **Fire Management**

Conserving forests mean conserving life. Forests are the storehouse of biological diversity, home to two-thirds of all plants and animals. Therefore it is the primary duty of foresters to save the forests from fire by taking preventive measures in advance. Because uncontrolled forest fires are the major threats to the forest wealth i.e. flora and fauna, disturbing the bio-diversity and the ecology and environment of a region. There are basically two seasons of the Forest fires in this division. The prominent one is the summers between April to June and another is the winters, November-December. The winter season is not that prominent because most of the time there are winter rains and snowfall, therefore the impact is comparatively low. In summers the forest fires in Hilly region has a very high impact as the terrain in the hills being sloppy, the fires spread very quickly and engulfs large tracts in no time as compared to the fires in the plains. This exposure of forest soil to the fire affects the soil structure and texture rendering it vulnerable to erosion and subsequently when the monsoon rains come; it washes away this loose soil. The Himalayas being the most recent and youngest mountain ranges are greatly fragile where the land mass is yet to find its final form and are consequently highly vulnerable to erosion. Thus this geological problem is further aggravated by the ill effects of uncontrolled fire.

Causes of Forest Fire

- a) **Manmade Fire-** The three most important factors for fire are Temperature, humidity and quantity of inflammable material. In summers all these three factors are highly favorable for forest fires thus bringing thresh-hold point for fire ignition. In the prevailing conditions of low humidity, High temperature and forest floor littered with highly

inflammable pine needles, a fire spreads is caused immediately when a source of fire like naked flame, cigarette or bidi, electric spark or any source of ignition comes in contact with inflammable material.

- b) **Natural Fire-** A few forest fires are because of the natural causes such as lightning which set trees on fire.

For the practical purpose the focus should be on the manmade fires.

The causes of the man made fires are discussed herein as under:

A. Deliberate:

- i) People have a feeling (to some extent rightly so) that burning of an area stimulates a fresh flush of grass which is a primary need for fodder over vast stretches of the state.
- ii) Similarly in higher reaches people do this for “Guchhies” in the belief that the fire stimulates the growth of this much delicious and highly priced minor forest produce.
- iii) In many areas of the state, a well established modus operandi for encroachment of forest lands has been evolved over the years. Burning of such prospective areas so as to render them devoid of vegetation is an early step in this subtle and gradual process of encroachment.
- iv) Since the marking of green trees has been stopped in the state and only dry trees can be marked, certain bad elements do not hesitate to put forests on fire in the hope of rendering the trees dry to facilitate them to get such trees felled.
- v) There is orthodox belief among people smoke raised from the fire will bring rains.

B. Unintentional mistakes of the people:

- i) Throwing cigarette/bidi etc. by people passing through fire prone areas.
- ii) Throwing lighted cigarettes/ bidis out of the passing vehicles which when falls on the inflammable material along the roadside, turns into forest fires.
- iii) Fire left unattended after working hours, by PWD labour engaged in road tarring which spreads to nearby forest with the strong wind.
- iv) School children putting fire for fun and then becoming uncontrolled many times.
- v) Burning of the ‘ghasanis’ in the peak summer season and then fire going out of control.
- vi) People lighting fire during picnic and fun and then leaving fire lighted which sometimes spreads as forest fire.

vii) People passing through forest in the dark burn torchwood for lighting their path. Sometimes sparks from such torchwood turns into fire.

viii) Inebriated conditions and can be expected to do things which defies normal human behavior.

“Since people are the main cause of forest fires, therefore prevention and control must mainly involve communities living near forests.” Investing in fire education and awareness will reduce the number of fires incidents and the cost of fire management.

Therefore community/people need to:

A. Educate them regarding:

- i) About the right season for burning of ‘ghasnies’.
- ii) The burning of the forest in the peak fire season means destroying the nests and the chicks of the birds, young born of the wild animals which are a sin.
- iii) The estimated loss occurring to the forest wealth due to the fire.
- iv) The adverse impact of the fires on the water retention capacity of the area and its consequent ill effect on agriculture/horticulture.
- v) Gradual depletion of palatable grasses due to repeated fires and eventual invasion of inferior and unpalatable species.
- vi) The addition of the carbon to the atmosphere due to fire.
- vii) The nutrient deficiency in the soil etc.
- viii) Responsibility as citizen as well as consumer of forest resources.
- ix) Making forest fire as one of the chapter in the school level curriculum.

B. Training :

- i) In fire fighting and provide the equipment to them.
- ii) Collection of the fire hazardous material and put that in proper use.
- iii) Linking this with the employment generation.
- iv) Making fire fighting as a community based activity.
- v) Involving the communities in the management of the forest.

“As long as people do not understand the dangers of using fire in the open without proper protection and often under extreme weather conditions, like hot summer temperatures of sometimes over 35 degrees, the fight against forest fires will continue to have only limited success” FAO report.

Women should be better trained in fire prevention because they play a key role in educating their children.

Two fold actions are required:

- i) Prevention
- ii) Remedial

Preventive measures: During the leaf fall deciduous and semi deciduous forests. That keeps on accumulating on the ground. If there are not proper rains the material does not degrade completely and becomes a ready material (fuel) for the forest fire in summer. Such areas be put to control burning in advance which will result in sprouting green grasses and will minimize the impact of fire in the peak season. The Controlled burning depends on seasons, weather, humidity, the amount of moisture in dead vegetation, and the fullness of the forest floor vegetation and is very carefully.

There need a strategy for addressing this problem. Some are:

- i) Control burning of the forests:
 - Season of control burning is the key thing. (In any case this work should be finished latest by second week of April.)
 - Identification of the areas to be control burnt.
 - The technique of the control burning is to be taught to the forest guards and the workers. (The control burning has to be done from top to downwards.)
 - The plan for all the forests is to be drawn and then effectively implemented having all the forest area control burnt every third year. The four year cycle in practice in is too long a period to reduce inflammable material in the changed scenario.
 - Presently the control burning is practiced and budget allocated for Chil areas only listed in the working plan. There are large areas outside the Chil working Circles, especially scrub areas, grasslands, which are equally prone to fire but are out of focus at present. Most of the fire incidents originate from such area and then travel to regular forests. But Forest department's approach, embedded as it is, in the production forestry era, does not foresee any need to reduce fire hazard in such areas which are outside the purview of working plans. Fires in such areas may not be very detrimental to our "tree crops" but when flames in such areas (or even in private ghasnies) lit up the night sky, the local newspapers are full of criticism of forest department next morning.
- ii) Maintenance of the fire lines:

- iii) The fire lines are to be identified and maintained every third year by collection of the combustible material and control burning the same. The list of identified Fire lines is given in para-13.7.3 of Chapter XIII.
- iv) Cleaning and thinning in congested crop should be carried out to avoid and minimize fire incidents. It has been observed especially in PB I and PB III area in Chil and Deodar/Kail Working Circle that due to lack of cleaning and thinning operations the crop has been so congested that in case fire breaks in such areas it becomes almost impossible to control such fires and the entire crop reduces to ashes.
- v) Effective publicity in the peak season among the communities, school children and tourists.

Remedial measures:

The front line staff needs to be geared up for the fire season in advance in the following ways:

- i) Holding the workshops well before the fire season and accessing the strengths and weaknesses.
- ii) The officers should bear the responsibility to minimize the weaknesses.
- iii) Effective planning at all the division level as well as Range level.
- iv) Timely Purchase of the firefighting equipment by assessing the need at Range level. The equipment should be handy and usable. Most of fire fighting tools purchased so far is hardly used in fire fighting as it is not designed for effective use in hilly terrain and is rather considered as a liability during fire fighting. Quality fire fighting tools are not readily available in local markets and good quality tools if sourced from major markets are quite expensive. Rather than giving meager budget to each DFO every year for purchase of fire equipment, which serves no purpose, quality and effective tools should be sourced from reputed suppliers under a realistic and well thought out procurement plan in a centralized manner.
- v) More focus on the areas which are fire prone and where control burning has not been done.
- vi) Lack of strategy, equipment, resources, manpower, and community response reduces the success of firefighting efforts. These results in de-motivating even a highly enthusiastic forest official who in sheer helplessness and frustration gradually develops a sense of apathy towards forest fires. Such situation will be a great setback in our effort against forest fires and needs to be guarded against.

- vii) Making a fully equipped team of at least 10 people which should be placed at Range level and should be engaged exclusively for the fire season and should not do any other work during fire season.
- viii) The areas which are not covered departmentally responsibility be given to the Communities/NGOs etc by paying them incentive in the form of Cash. This incentive needs to be substantial rather than token.
- ix) Having effective liaison with other organizations like Police or para military Battalions, Fire department, 301ehavior301s etc.

“The remedial as well as preventive measures are complimentary to each other and one cannot supplement the other”.

Now let us discuss the “Fire as a good tool”.

- i) In forest areas particularly the wild life habitats the fire is used as a major tool in preventing the natural succession and maintaining the grasslands.
- ii) Fire is a powerful, natural phenomenon. Scientists have gathered more information on the effects of fire on forest ecosystems; they have learned that fire exclusion might not have been the best practice for land management.
- iii) Fire exclusion causes thick vegetation and large amounts of dead fallen materials. The heavy vegetation and dead material increase the fuel quantity on the forest floor and may cause fires to ignite more easily.
- iv) In certain cases controlled fire is essential to maintain the biological diversity.
- v) Many trees are dependent on the heat of fire in order to open up their seed cones for regeneration (conifers). Vegetation modification also affects the ecosystem's insects and diseases, wildlife populations, soil structure, and nutrient recycling.
- vi) Control burning creates an open forest floor. This eliminates any fuel that could contribute to a high intensity fire in the future.
- vii) When the fire burns the organic material in the forest, nutrient rich ash is left behind. When the first rain comes, the nutrients in the ash dissolve into the soil for the new plants to use. This process is called nutrient recycling.
- viii) Another outcome of controlled burning is that new growth begins immediately after the fires have been extinguished.
- ix) Fires also burn the unwanted fungi and insects which may destruct the forests otherwise.
- x) The controlled burning does not release as much smoke as uncontrolled fires do.

- xi) Leave snags that provide nesting spots for woodpeckers and many other bird species.

SEVEN ACTION POINTS

- Use of modern technologies like GIS and satellite images for creating data base and planning.
- Planning the control burning activity and maintenance of Fire lines in well budgeted form.
- Plan Forest Fire fighting well in advance.
- Provide all equipments and facilities of mobility and communication to the fire fighting teams.
- Involve the communities in action as well as for educating.
- More stress on awareness during peak season.
- Evolve effective monitoring system.

Out of the total forest area of 33681.52 ha in Theog Forest Division 520.8 ha. (1.55 %) is under Chil Working circle in the plan under revision. It is estimated that about one to three tons needles fall per hectare per season depending on the density of the forest. Dry pine needles are a fire hazard to the forest. Every year hundreds of hectares of forest area gets fire burnt mainly in Chil area and also in Deo-Kail Working Circle due to accumulation of needle. The decomposition of pine needle is extremely slow. List of forests affected by fires in past is given in table-2A.2 of part 1. Each beat will be taken as unit in addressing fire problem. Wherein the beats have been categorized is very sensitive to prone to fire.

9.6.2 Strategy for Fire Management

The strategy for fire management will include the following:

- i) **Clearing of Roads:** Accidental fires in Chil forests are caused by lit cigarettes negligently thrown by passersby. As all Chil forests have sufficient fallen needles during summers (April –June), it easily catches fire and results in forest fires most of which are restricted to ground. To address this, both sides of roads upto 10m will be cleared off the pine needles twice a fortnight. The needles thus collected will be either control burnt in presence of forest official (FG/FW) or will be made use of in making check dams/vermicomposting/briquettes.
- ii) **Collection of Pine needles:** Another important and probably the most common reason for fires in Chil forests are the intentional fires lit by locals to get fresh flush of grass from the forests.

- iii) To combat such fires following strategies may be adopted singly or in combination:
 - a) **Involvement of Local People:** Since all such fires are caused by local people especially those having cattle, thus involving these stakeholders in fire management may help. Awareness programs combined with monetary incentives could be tried here. Fire management committees may be constituted at Panchayat level or existing /new JFMCs may be involved.
 - b) **Deployment of Fire Watchers:** In areas where cooperation from local people is not forthcoming or habitations too far from the forest to keep a vigil against fire, fire watchers may be deployment who will patrol the forests and alert the **Rapid Response Team** specially constituted at Range level during fire seasons.
 - c) **Use of Pine needles:** Another way of addressing the issue of fire is to make use of the pine needles. It could be in any form like handicrafts, fire briquettes, check dams etc.

Presently in H.P., handicrafts of Chil needles are being made by Kangra Mahila Sabha, Dharamsala and they have imparted such training to SHGs formed by MHWDP in Salooni, Chamba. After making a study of the economics of the enterprise, the same may be adopted in Shimla. However, as the exercise would involve identification of marketing channel etc, it is better to get it done through an NGO or any local Community based organization that are already into marketing of handicrafts.

Pine briquetting has also been tried in several places. This activity will not only save the forest but also help to improve seasonal livelihood of rural people. State Council for Science Technology & Environment has tried this enterprise in certain Panchayats. After making a study of the economics of the enterprise, the same may be adopted in Shimla. Similarly pine needle check dams, *Pirule* have been made in Uttarakhand Forest Department and have also been tried in Kalatop Khajjiar Wildlife Sanctuary. The collection of needles may be executed through JFMCs. This will result in dual advantage to JFMCs from Chil forests and will help in creating stake in Chil forests which otherwise generally being a mono-crop of timber species (which means no immediate use/ access to resource) are neglected by people.

In forest compartments that are under active resin tapping, HPFDC resin workers or resin agents should get such compartments cleared of fallen pine needles atleast twice in the fire season. This condition should be built into the agreement with the Corporation at the time of handing over the forest to them. Failure to comply should attract a penal price to the Corporation.

9.6.3 Illicit Felling and Smuggling of Timber, Resin and NTFPs:

With development of good network of roads, there has been an increase in incidences of illicit felling in table-2A.4.3 of Part-I give the incidences of illicit felling since 1997.

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 (H.P.2nd Amendment) Act, 1991 vide which DFO has been designated as Authorized Officer to hear the cases pertaining to illegal transportation of Govt. property i.e. timber, resin, khair wood and katha and may order confiscation of both forest produce and the vehicle involved. The detail of cases admitted and decided in the court of Authorized Officer under 52A has been given in Table NO-9-1 given below:

Table No-9.1
Detail of cases U/S 52A of the IFA

Ser No	Vehicle No & FIR No	Name of owner	Released on bond by AO	Released on bond by Court	Auction	Remarks
1.	Bolero Camper HP-09A-1117 141/04 dt 25-09-2004	Sh. Partap Singh	30-10-2004	-	-	Decided
2.	Truck Mazda HP-62-0465 FIR No.82/2004 Dt 15.10.2004	Sh. Kishan Kumar	30.10.2004	-	01 Dt 28-03-2008	Under Trail
3.	Tractor HP-24A-5915 FIR No.58/2010 dt 04-08-2010	Sh.Brij Lal	23.06.2011	-	-	Under Trial
4.	Truck No HP33-8381 FIR No. 106/05 dt 06-09-2005	Sh. Vinod Kumar	09.01.2006	-	-	Under Trial
5.	Truck No HR37-5836 FIR No.150/04 dt 14-10-2004	Sh. Ayub Khan	-	-	-	Under Trial
6.	Pick up HP 09A-2319 FIR No.21/2010 dt 07-02-2010	Smt Begi Devi	18-06-2011	-	-	Under Trial
7.	Truck Icher Hp 63-1948 FIR No 31/08 dt 24-02-2008	Sh. Sanjive Kumar	-	-	-	Under Trial
8.	Pick-Up No HP63-2708 FIR No. 141/09 dt 01.09.2009	Smt. Sarita Devi	-	-	-	Under Trial
9.	Truck No HP11-1314 FIR No.92/99 dt 08-05-1999	Sh. Jai Dev Kaundal	29-06-1999	-	-	Under Trial
10.	Truck No. HP37B-7215 FIR No 56/06 dt 22-08-2006	Sh Puran Singh	29-11-2006	-	-	Under Trial
11.	Truck NoPB10L-9645 FIR No. 83/06 dt 10-06-2006	Sh. Raj Kumar	06-02-2007	-	-	Under Trial
12.	Truck No. HR38A-0357 FIR No.24/08 dt 29-02-2008	Sh. Muni Lal	-	-	-	Under Trial/Untraceable
13.	Truck No PB07D-9755 FIR No. 173/06 dt 11-11-2006	Sh.Darshan Singh	-	23-06-2007	-	Decided
14.	Truck No. HR37A-6987 FIR No. 101/2007	Sh. Rajeev Sharma	1.10.2007	-	-	Decided
15.	Truck No. HR03F-0825 FIR No. 191/99 dt 23.09.1999	Sh. Labh Singh	01.03.2000	-	-	Under Trial
16.	Tempo Trex No. 9A-1175 FIR No172/06 dt	Sh. Mohinder Singh	-	-	-	Under Trial
17.	Truck TATA No. HR65-3853 FIR No. 06/2010 dt 07-01-2010	Sh. Jagmal Singh	-	-	-	Under Trial
18.	Truck No HP46A-0230 FIR No. 55/06 dt 14.08.2006	Sh. Jai Dev	-	-	-	Under Trial
19.	Tipper No.HP09A-1241 FIR No. 222/07 dt 28-11-2007	Sh. Rajinder Singh	-	24-06-2009	-	Decided

20.	Trax Cargo King HP63-1958 FIR No. 225/07 dt 30.11.2007	Sh. Virender Singh	22.02.2 013	-	-	Decided
21.	Pick up No. HP64- 0883 FIR No 59/2011 dt 21.04.2011	Sh.Rajesh Verma	28.01.2 012	-		Decided
22.	Truck No. HP51- 2616 FIR No. 163/2001 dt 09.10.2001	Sh.Chet Ram	04.04.2 002	-	-	Decided
23.	Pick-Up HR99-BY- 1742(T) FIR No. 69/2008 dt 24.04.2008	Sh. Rajinder Singh	05.07.2 012	-	-	Decided
24.		Sh. Guman Singh	Release d			Under Trial in Session Court Shimla
25.	Truck No. HP20- 5735 FIR No 15/2003 dt 30.01.2003	Sh. Hussain Mohd.	26.09.2 012	-	-	Decided
26.	Trala No.HR58B- 4087 FIR No. 169/09 dt 09.10.2009	Sh. Devinder Singh	-	-	07.09.201 3	Decided
27.	Truck No. HP63- 2014 FIR No. 72/09 dt 19-05-2009	Smt. Meena Devi	-	-	-	Under Trial
28.	Centro No.HP09A- 1744 FIR No. 141/09 dt 01.09.2009	Sh. Kameshwar	29.01.2 013	-	-	Decided
29.	Truck No. HPG- 3337 FIR No. 57/2003 dt 14.04.2003	Sh. Shyam Singh	-	-	01.08.201 2	Decided
30.	Truck No.HR3F- 0559 dt 20.04.2009	Sh. Chander Mohan	21.08.2 012	-	-	Under Trial in High Court Shimla
31.	Van No HP02-1320 FIR No. 26/97 dt 05.03.97	Smt. Savitri Devi	07.06.1 997	-	-	Decided
32.	Truck No HP51- 2465 FIR No.117/97 dt 18.10.97	Sh. Lok Pal Rathore	05.07.2 006	-	-	Decided
33.	Truck No. HP23- 1107 FIR No. 169/99 dt 21.08.1999	Sh. Jiya Lal	27.08.2 004	-	-	Decided
34.	Truck No. HP14- 1321 FIR No. 209/94 dt 13.05.1994	Sh. Jeet Ram	27-03- 1995	-	-	Decided
35.	Truck No. HMN- 485 FIR No. 66/96 dt 28.05.1996	Sh. Anil Thakur	10.11.1 998	-	-	Decided
36.	Truck No. HP20- 5519 FIR No. 177/2001 dt 13-11- 2001	Sh. Darshano Devi	14-07- 2005	-	-	Decided
37.	Van No. HP02-3723 FIR No. 236/93 dt 29.12.1993	Sh. Narender Gupta	01.02.1 994	-	-	Decided
38.	Truck No. HIS-7327 DR No.23 dt 02-05- 1997	Sh. Kanshi Ram	29.05.1 999	-	-	Decided
39.	Cargo King No. HP63-2020 FIR No. 07/08 dt 17.01.2008	Sh. Chet Ram	-	07.01.2010	-	Decided
40.	Maruti Car No. HP09-0855 FIR No.	Smt. Suman Kumari	29.11.2 004	-	-	Decided

	150/2004					
41.	Truck No. HP14-6895 FIR No.163/2000 dt 08.09.2000	Sh. Vinod Kumar Chettri	12.08.2002	-	-	Under Trial on JMIC Theog
42.	Truck No. HIS-1918 FIR No 185/2000 dt 12.10.2000	Sh. Sohan Lal Sood	-	-	-	Under Trial
43.	Mohindera Pickup No. HR61-ASQ9529 FIR No. 5/2006	Sh. Prem Chand	29.11.2006	-	-	Decided
44.	Truck No.HP11-3217 FIR No 49/2000 dt 20.03.2000	Smt. Satya Devi	-	24.01.2002	-	Under Trial
45.	Truck No. HP07-1612 FIR No.115/97 dt 10.10.1997	Sh. Surat Ram	21.11.2001	-	-	Decided
46.	Tempo No. HP09-3981 FIR No 51/2004 dt 14.06.2004	Sh. Rakesh Kumar	-	03.07.2004	-	Under Trial
47.	Tanker PB 13G2842 FIR No 51/2003 dt 06.04.2003	Unknown	-	-	07.08.2012	Decided
48.	TruckHP-65-0137 FIR No 34/06 dt 10-05-2006	Ranjeet Singh	-	-	-	Under Trial in JMIC Theog

9.6.3.1 Strategy

i) Task Force

A task force is to be constituted one each at Range level which will constitute Range Officer as the leader of the team who will choose seven members committee constituting of atleast 1 Block Officer and four Forest Guards and 2 Forest Workers on receiving any information regarding illicit felling, smuggling of timber and fire fighting or any other forest offences of serious nature. The team will rush to the spot. For this purpose team leader can higher the private vehicle under intimation to DFO. Similarly, a task force is to be constituted at divisional level under the leadership of ACF constituting of 3 members from each Ranges.

9.7 Climber Control

Climbers are menace in the patch of young regeneration areas as they seriously affect the growth of young plants and trees. They are very harmful to forest trees. There are certain varieties which some times, completely cover young regeneration and even fully grown trees which either kill it or branch it badly. These climbers toe in around the stem increasing in diameter with the result that makes a

grove on it and if they do not get broken even then they get close inside the stem. Thus they damage trees/timber considerably. Certain thick climbers either band the trees by their wait or completely cover their crowns and sometimes, even kill them by cutting out light or together. Some of the common climbers which are found in the tract of this Working Plan are:

1. *Rosa moschata* (Kuja)
2. *Hedera helix* (Mithiari)
3. *Vitis himalayana* (Pan bel)

These climbers which are found frequently in the tract of this Working Plan in addition to causing the damage discussed above create unhygienic condition and such areas are more prone to fire and when the fire breaks out it spreads from ground fire to crown fire. Therefore from the better management point of view, to create suitable hygienic conditions, to liberate the trees from these climbers and to distribute the growth potential amongst the trees of superior species these and other climbers are required are to be cut back. Thick climbers are generally at two places i.e. one year the base and other about a meter above it. Though cutting back is fairly effective for thick climbers, it is not so effective for thin climbers which should generally be unrooted after tracing the tubers or roots during the rainy season or snow season when the ground is soft. For this purpose a plan of five years is to be chaked out and all such forests which have been invaded by these climbers are to be enlisted. DFO while purposing APO may ask the Range Officers to send the list of such forests, so that the areas infested and invaded by these climbers are irredicated within 1st five year period of this plan.

9.8 **Encroachment on Forest Land:**

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 till December 2013, in 131 cases measuring 169-19-9 ha. where the encroachment were detected more than 10 bighas in each case. In these cases FIR have been lodged and the cases have been challaned in the court of JMIC Theog at the direction of Hon'ble

High Court. In addition 74 cases have been decided in the court of the collector-cum-DFO where eviction orders have been passed. The concerned Range Officers should take it seriously and get the encroached land evicted and get it fenced and planted with forest species. One case is under trial in the court of collector-cum-DFO and 14 cases are under trial in the court of collector-cum-Tehsildar Theog. At present 1680 cases of encroachment are pending with the Range Officers, wherein they have been directed to get the demarcation and challan the same immediately in the court of collector-cum-DFO Theog.

9.8 .1

Preventive and 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, Kanngo who are on deputation with the forest department be delegated the powers of demarcation of forests to process encroachment cases expeditiously.

9.8.2 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) Immediate focus should be on the construction of new BPs in the New DPFs.
- iii) Railway girders can be used in encroachment prone areas and all BPs should be depicted in digitized maps of the area which will be maintained as a permanent record.
- iv) As a deterrent, FIRs should be registered as soon as an encroachment is detected. Court proceedings will then follow.
- v) Latitude, longitude and altitude readings of all Boundary Pillars(old and new) to be recorded in the BP register in place of traditional Backward and Forward bearing and database in the Division office.

9.9 Illegal Mining on Forest Land:

The Himalayas and its foothills are a treasure house of the minerals being exploited by human beings since times immemorial. With the advent of society, the methods of the extraction of the minerals became more and more mechanized which resulted in extraction of the minerals at a pace much faster than the pace at which the nature could meet itself with such a situation to recover from the onslaughts of human beings. It brought into sharp focus the conflict between development and conservation, which served to emphasize the need for reconciling the two into the larger interest of the society.

People have their right for the collection of building stones and slates for roofing which sometimes take the shape of the quarrying

which causes damage to the hill side and forest growth especially in UPFs. With increase in population and better living standard, the demand for minerals such as stone, sand and lime stone had greatly increased. The extraction of stones and sand is done unauthorizedly in a very surreptitious and clandestine manner at certain places by the sides of the link roads and along the nallas and streams which results in destruction of forests. Such activities need to be checked as its continuance would cause landslides and also turn the drainage channels into deep gullies to destroy surrounding vegetation. In addition to destruction of forests the mining activities result in soil erosion, air pollution and water pollution in the streams as well as the ground water. Under the Mining Act, powers have been vested now with forest guards to take cognizance of illegal mining within their respective jurisdiction.

9.9.1 Preventive and remedial measures.

- (a) The Range Officer should get the mining plan of the areas where permission is granted by the Mining Department.
- (b) The Front line staff has to have close liaison with the staff of the Mining Department so that the permissions granted by Mining Department are in the knowledge of the Forest Department.
- (c) The applicability of the FCA 1980 should be ensured.
- (d) To keep a watch on the stone crushers and the source of their raw material.
- (e) Close liaison has to be maintained with the PRIs and other NGOs to get the information as well as to take preventive steps.

9.9.2 Strategy

- (a) To ensure systematic and scientific mining, few amendments shall be required in Himachal Pradesh Minor Mineral (Concession) Revised) Rules, 1971. For this a close liaison with the Mining Department is required.
- (b) The District Level River/Stream Bed Mining Action Plan should be procured and its proper implementation in the field should be ensured.
- (c) Some of the sensitive River beds/Streams or the section thereof for extraction of minor minerals be declared closed for the specific period

which are sensitive from the Wildlife point of view as well as Soil Conservation point of view.

- (d) Mining in River/Stream beds shall be allowed with the prior approval under FCA 1980 with adhering to the conditions imposed there on.
- (e) Rehabilitation of the mined areas should be ensured in a time bond manner.
- (f) The species to be planted in the mined areas should be as per the soil condition and planning for the same be done in advance.
- (g) The areas where there is plenty of house constructions are on, especially around Shimla Township, specific sites for dumping the debris be identified and prepared for the dumping so that haphazard dumping is avoided stopped.

CHAPTER- X

JOINT FOREST MANAGEMENT (OVER LAPPING) WORKING CIRCLE

10.1 General Description

By definition Joint Management would mean involving people in the decision making process in the management of forests. The participatory forest management started in 1972 in India from west Bengal. A need for participatory forest management arose in Himachal, and the PFM started in H.P in 1985 through National Social Forestry (Umbrella) project. The project achieved its objectives by covering more than 1, 00,000 ha. area under plantations. During the implementation of this project more emphasis was given on achievement of physical and financial targets than social i.e. participatory and equity issues.

10.1.1 In the 1980s, the World Bank supported Social Forestry project (1984-92) and the Indo-German Integrated Dhauladhar project (1982-92) were implemented in H.P. In these projects the drawbacks of Umbrella projects were well addressed. Therefore in 1990s, World Bank funded IWDP Kandi project started in the Shivalik hills in which participatory approach was emphasized and all three issues i.e. physical targets of Forest Department, social and equity were taken all together as per guidelines of world bank.

10.1.2 The framework for JFM in H.P is provided by the Govt. of H.P order of 12.5.1993, which followed the Govt. of India (JFM) circular of 1st June 1990 from the then Secretary (Environment and Forests) enabling the spread of JFM to the Village Forest Development Committees (VFDC's) for Joint Forest Management in the Villages of Himachal Pradesh.

10.2 Strengthening of Joint Forest Management

- i) JFM should focus in and around pockets of poverty i.e. remote forested areas (better forest) and where livelihood dependence on forests is high. This would entail several genuine joint management activities (other than plantation) like collective protection against illicit felling, fires,

poaching etc. Issues of Rights, equity and benefit sharing are better addressed and conflicts resolved.

- ii) In participatory approaches the process is more important than achieving targets. Choosing and regularly training the right persons for the job is therefore critical.
- iii) Sharing of removals, including resin, intermediate and salvage fellings with VFDSs are necessary to establish long term stake of local communities in JFM.
- iv) Continual policy and rules adjustment and calibration to promote better market returns for wood and non-wood based enterprises. Example, the recent decontrol of bamboo trade and transit and efficient markets for value added products.
- v) Local leadership has to play a critical role in JFM. The successful examples of JFM or CFM show that local leadership roles have been crucial in making the change. It could be an enlightened, accepted local person, an elected representative, a dedicated NGO/CBO or even a committed forest officer. This is also important for sustainability of groups.
- vi) People are depend on Mohru-Oak forests for fodder on a large scale in this process most of these forest lopped with high intensity. Thus through JFM controlled lopping for forest can be managed.

10.3 Main Objectives of Management

The main objectives of the participatory approach to forests production and management are:

1. To give the local village communities a stake in the well being of the forest by giving a share of the produce.
2. To develop institutions at the local level to provide a forum for developing the participatory approach and to manage the sharing of responsibilities and benefits.
3. To enlist the help of committed non-governmental organizations, collages and schools, local women and youth clubs and other groups with a proven track record to start the dialogue between the Forest Department and the villagers.

4. To provide an effective treatment for waste lands, degraded forests and forest lands situated near villages through protection, afforestation, pasture development and soil conservation by active participation of local people.
5. To augment fuel wood, fodder and small timber production for use by local people.

10.3.1 The Govt. of H.P has notified Himachal Pradesh Participatory Forest Management Regulations 2001 and the Sanjhi Van Yojna Scheme, 2001 which have strengthened JFM approach to a great extent. These regulations are reproduced in Appendix-XII.

10.4 Implementations of JFM in Theog Forest Division.

The JFM has been implemented in the division through projects like Overseas Development Administration or DFID, Sanjhi Van Yojna and FDA. The micro plans were prepared in accordance with project philosophy, principles and mode of working by VFDC/VFDS. The list of VFDCs constituted under FDA is given in table-10.1. Activities like soil conservation, Afforestation, village development activities, fire protection, grazing have been undertaken in the past but it is observed that in almost all cases, the participation of committees remained upto fund flow. Out of total 14 committees, 7 are totally inactive at present as of December, 2013. 7 JFMCs have been active and provided funds upto 31st December 2013 to carry out works as per micro plans prepared by them. Efforts may be made to identify the potential areas where more JFMCs can be constituted for adopting JFM approach for the protection and management of the forests

Table No-10.1
List of JFMCs
As on 31st December, 2013

S. No.	Name of JFMC	Name of Beat	Name of Block	Name of Range
1	Himri	Himri	Gohach	Kotkhai
2	Mihani	Mihani	Gohach	Kotkhai
3	Kuthar	Kuthar	Ghorna	Balson
4	Kuftu Mehrough	Balag	Ghorna	Balson
5	Basmol	Kaleri	Theog	Theog
6	Odi Bagain	Kaleri	Theog	Theog
7	Hotti	Kalanj	Cheog	Theog

10.5 Future Scope

10.5.1 There is some scope for the JFM activities in the division. The forest areas where plantation and protection is the main focus are suitable/ potential sites for afforestation, soil conservation, grassland improvement, NTFP development besides other forests.

10.5.2 Potential Activities of JFM Committees

The JFM/PFM committees can be the future agencies of forest development, conservation and expansion. The potential activities to be executed through JFMCs can be:

- i) Afforestation activity (both departmental and MNREGA)
- ii) Soil & water conservation through treatment of micro watersheds in a catchment.
- iii) Recharging of water bodies like bouldies, ponds and underground water.
- iv) Minor construction work of road, paths and buildings.
- v) Awareness programme for forest protection, fire protection, propagation of medicinal herbs on a large scale.
- vi) Livelihood options like bee keeping mushroom cultivation, vermicomposting, cutting & pruning etc. through effective training.
- vii) Collection, value addition and marketing of NTFP.

10.6 Selection of JFM Working Areas

10.6.1 The following broad guidelines have been devised for selection of potential (pilot) areas:

- i) Interest of local forest staff in involvement in joint forest planning and management;
- ii) Interest of local people in involvement in joint forest planning and management;
- iii) Existence of ongoing 'successful' collective land management systems;
- iv) Resource poor areas where there are constraints on the forest and farming system in term of access to grazing and forest products;
- v) Relatively homogenous local communities.

10.6.2 The information will be gathered from village-level PRA studies; workshops held with range officers and forest guards, in conjunction with village visits and meetings to determine local people's perception of problems and possible intervention. User's definition of problems and approaches will provide the principal guide to action. Complex social environments will not be tackled in the initial stages. It is not expected that there will be 100% success rates in the establishment of Village Forest Development Committees. In some cases the field staff may have to withdraw from certain villages, because conflicts are too great. This should not be seen as a failure of the process, rather it is part of the process of adapting to and accepting village-level realities, where there is sometimes irreconcilable difference between groups. In order to reduce the risk of failure, planning exercises will focus on assessing the current and future needs of all the users of the forest resources (including women, poorer villagers and migratory graziers), and reaching consensus through negotiation in order to establish sustainable ways of managing resources for those who most need them.

10.7 Participatory Rural Appraisal (PRA):

10.7.1 Participatory Rural Appraisal (PRA) will be used as a way to facilitate communication between users and the Forest Department and to determine problems and priorities. At this initial discussion stage it is likely that only partial information will be obtained from the village, so it will be necessary to repeat the PRA exercise. Repeated PRAs would be used to continue the dialogue and build on the information base. PRA will be used to identify particular area needing more detailed socio-economic research.

10.7.2 Specifically PRAs will be used to:

- i) Finalize village selection
- ii) Build up baseline information
- iii) Identify forest users and their priorities
- iv) Provide the context for experimental learning for the staff and to create the basis for effective interaction between the department and forest users
- v) Identify local option for institution building
- vi) Draw up village level agreements.

10.7.3 **The key objectives of this PRA would be:**

- i) To identify local resource use system; access rules; differential control; legal and customary status of land of land; past and current tenurial status of land.
- ii) To document existing land use practices and management as a basis of their development.
- iii) To document current interaction between forest, farm and pasture; type of usage; division of labour.
- iv) To build a detailed picture of the socio-economic context of villages; identify different categories of household (i.e. household profiles); to identify and assess effectiveness of village institutions and leaders; to identify different levels of decision making in resource use and their relative importance, i.e. village council. Men, women, rich, poor.
- v) To identify user's priorities and means of reaching consensus.
- vi) To identify different users' constraints to participation, for example women's labour time, poorer people's lack of access to decision making.
- vii) To identify and assess effectiveness of existing village level institutions, cooperative action between villages as a means to build more effective village or user group organizations.

10.8 **PRA Process**

The PRA process will be iterative to provide a growing dialogue between the department and forest users. Initially, information may be coloured by misunderstanding and mistrust on both sides. It is only as familiarity and participation in the benefits of joint management become apparent to forest users that a relationship of understanding and trust will be built between the staff of the department and villagers.

10.9 **PRA Technique**

The PRA technique to be used in joint forest planning and management will include:

- i) Review of secondary data and existing information.
- ii) Direct observation.
- iii) Semi-structured interviews.
- iv) Group interviews (casual, focused, village).

- v) Use of key information's, local experts.
- vi) Use of local researchers.
- vii) Ranking: wealth ranking, pair-wise ranking, direct matrix ranking.
- viii) Livelihood analysis.
- ix) Seasonal diagramming (firewood, fodder, NTFPs, labour etc.)
- x) Transects (systematically walking through an area with a group of local people).
- xi) Participatory mapping, modeling; people's mapping and modeling.
- xii) Linkage chart (showing links between village organizations, between villages, and forest resources).
- xiii) Case studies and stories.
- xiv) Ethno-histories.
- xv) Brainstorming (especially joint sessions with villagers).

10.10 Role of Front Line Staff

Forest Guards will coordinate all inputs to the village and will act as the interface between villager and the department. They will be conduit for the flow of information both up and down the system. They will establish links with other village-level organizations and government extension agents where appropriate. The departments most likely to be involved are Animal Husbandry, Agriculture and Rural Development.

10.10.1 Forest Guards will have the following responsibilities:

- i) To establish effective and representative Village Forest Development Committees;
- ii) To maintain contact with joint forest management groups (VFDCs);
- iii) To provide technical advice as required;
- iv) To arbitrate between groups if conflict arises and requested;
- v) To collect information through PRAs;
- vi) To provide feedback to the department;
- vii) To facilitate the full participation of women and poorer people;
- viii) To liaise between villagers and the department.

Although these activities are all additional to the current work of forest guard; the experience elsewhere indicates that as the JFPM

process strengthens the more onerous protection workload of the guard will reduce.

10.11 Field level Training

Field level training will be carried out through participatory workshops which encourage an experience based learning approach. At outset these workshops may be facilitated by some JFPM Training specialist. Each person participating in the workshop should share his experience and knowledge with other participants including the facilitators. A series of workshops should be organized at different levels, such as:

- i) Circle-level workshops
- ii) Divisional-level workshops
- iii) range-level workshops
- iv) Beat-level workshops

10.12 Villagers Reorientation

Reorientation is not essential only for the staff; villagers will also need to be reoriented in their approach to the management of local natural resources, and in their perception of the role of the staff. The joint forest planning and management system forms a major part of this reorientation. Workshops should be organized for local leaders (local politicians, leaders, teachers, other key persons); and VFDCs. This will provide a forum where VFDCs can share experiences, learn from each other, and develop combined strategies and approaches to JFPM.

10.13 Micro Plan

- 10.13.1** Before a VFDC can manage a forest, it will be required to prepare a micro plan. The micro plan will be prepared jointly by Executive Body of the VFDC and the Range staff, and will be discussed with the General House. It will be finally approved by the concerned DFO. The information's gathered during the PRA exercise will be helpful in preparation of the micro plan. Locally drawn maps of the area may be useful to ensure that everyone understands what type of areas is to be managed.

10.13.2 The micro plan should

- i) Detail which households and villages have access and right to the forest lands and forest products;
- ii) Include detail on protection and decision-making mechanisms;
- iii) Detail forest management prescription;
- iv) Detail soil conservation measures if considered necessary by the VFDC
- v) Detail grassland management measures if considered necessary by the VFDC
- vi) Demarcate the responsibilities of the department and the villagers (forest users);
- vii) Detail unambiguous rights to the usufruct and harvesting of common plantation, grassland and forest area;
- viii) Detail clear rules and mechanisms for the distribution of benefits: intermediate and the final harvest, among users.

10.14 Duties and Responsibilities of JFM Committees

To make the JFMCs active and functional, each member of JFMC should shoulder certain duties and responsibilities.

10.14.1 Duties of JFM Committees

- i) To persuade the villagers to give available areas for plantation.
- ii) To assist the Forest Department in planning, protection, afforestation.
- iii) To help the F.D. in judicious use, of all existing rights and concessions, sharing of usufructs, eco-development of the area as per approved management plan.

10. 14.2 Responsibilities of JFM Committees

It will be the responsibility of committee to ensure:

- i) Just and fair distribution of the usufructs derived.
- ii) Ensure its management as per prescribed norms.
- iii) Settlement of all disputes between villagers
- iv) To honor all commitments.

10.15 Power to JFMCs

The committee should make its own bye-law with the concurrence DFO. The concerned DFO should carry out necessary procedure for granting powers of a forest officer as mentioned in HPPFM regulations, 2001.

- i) Power to register Damage report.
- ii) Power to summon the accused to the general house of JFMC.
- iii) Make recommendations to Range officer regarding compounding of damage in respect of offences committed on JFMC areas.

10.16 MOU between Forest Department and JFMCs

10.16.1 In the participatory mode, the scheme is being implemented by setting up Forest department agency (FDA) at Forest division level and JFMC at village level. As per the notified regulation titled HPPFM regulations, 2001 notified vide no. Fts. IIB/15-10/87 dated 23.8.2001, MOUs were signed between State Govt. represented by DFO of Forest Division in which FDA is being implemented and JFMC through its president during November 2009. Govt. of H.P has approved this MOU after getting vetted from the law Department the copy of which is annexed as Appendix-XIII. This MOU shall be valid for a period of five years from the date of signing as per terms and conditions detailed in the MOU for proper protection, maintenance, regeneration and management of plantation created under FDA and other forestry schemes within the jurisdiction of the JFMC.

10.16.2 In addition, a MOU has been signed between Forest Department and JFMCs for fire protection. No fire watcher is engaged in the area of JFMC. Further, a provision of honorarium/ assistance has been made to be paid to JFMCs for doing excellent works in fire fighting. The copy of MOU as executed with the JFMCs is appended in Volume-II , Appendix-XIX (m) page 269 to 275.

10.17 NTFPs

10.17.1 JFMCs can play an important role, in collection, marketing and propagation of NTFPs. Many villagers are dependent on collection of NTFPs to sustain their livelihood. So there is need to introduce such medicinal plants in the locality of JFM.

10.17.2 The JFM activities would concentrate on NTFP management and no alteration should be permitted in the basic silvicultural prescription but to promote regeneration, development and sustainable harvesting of following NTFPs:

- i) Medicinal and aromatic plants
- ii) Grasses
- iii) Fiber and flosses
- iv) Tans and dyes
- v) Gums and resin etc.

10.18 Development of Technology for Value Added Products

There is a lot of scope for development of technology for value added products. Various NTFPs are growing in the vicinity of JFMCs area. The value of original products collected directly from the forest is very less but if it is processed the value goes 2-4 time more than the original one. For example, Anardana, Amla Pickles, Murabba, Jam, Squash etc.

10.19 Eco-Tourism

There is need to develop specific sites for eco-tourism in JFM localities. Through various projects like stay home scheme, traditional food/ Ethnic food serving etc. through eco-tourism the villagers not only get employment but self business will raise their income and it will become a source of livelihood.

10.20 Vermi Compost

Almost each JFMCs member has domestic animals. So they are dependent on forest for grazing of animals, collection of grass and fodder from forests. By collecting leaves and grasses for preparing vermicompost the villagers can manufacture vermicompost at their door steps. Thus through training for preparation of vermicompost to the JFMCs members' large amount of vermi compost can be prepared and sold in market in view of its large demand. This activity will definitely increase the agricultural and horticultural production. Moreover, this will help to save and protect the micro and macro natural nutrients of the soil which will subside the adverse effects of use of artificial fertilizers, and therefore will go in the long run to boost the economy of local people and raising their living standard.

CHAPTER-XI

WILD LIFE MANAGEMENT (OVERLAPPING) WORKING CIRCLE

11.1. General Constitution

This Working Circle is constituted for emphasizing the necessity of conservation of wild life and collection of information for better management of Wild Life. The whole tract has a variety of wild animals and bird since the forests are distributed from elevation ranging from 1220 mt. to 2880 Mt. from M.S.L. Therefore this Working Circle overlaps all other Working Circles covering forest area 33681.52 ha. and also will extend to the area outside the forest especially for the purpose of addressing the problems of man, animal interface.

11.2. Importance and value of Wild Life

The Theog Forest Division is located to the West of Shimla district with species assemblage of flora and fauna representative of front ranges of Western Himalayas. The monsoon affected forests and alpine meadows of the Himalayan front ranges support a unique biota comprised of many distinct altitude-sensitive ecosystems and are habitat to many plants and animals. The Western Himalayas are considered an endemic bird area (EBA) by birdlife international, supporting many rusticated-range species, as well as a Conservation International Biodiversity Hotspot. This region as a whole has come under enormous pressure from human activities, both from the ongoing practice of traditional livelihoods, such as seasonal grazing, hunting and the collection of medicinal plants, as well as more recent developments such as the farming of temperate cash crops, commercial forestry, tourism and hydro-electric power development.

11.3 Distribution of Wild Life

The distribution of Wild Life has been described in detail in Chapter IIB of Part-I of the Plan.

11.4. Main Objectives of Management

The primary goal of management of wildlife in the Theog Forest Division is to conduct Wildlife surveys and mitigate human Wildlife conflicts.

In order to achieve this goal, it is imperative to integrate the functions at two fronts, i.e.

- A. Working with the local communities to reduce their dependencies on the forests to minimize human Wildlife conflict and
- B. Interventions to manage, monitor and protect wildlife.

A. Working with the local communities to reduce their dependencies on the forests to minimize human Wildlife conflict

- i. Help resolve man-animal conflict with emphasis on social and environmental justice for the poor people living in the Theog Forest Division.
- ii. Facilitate organizing of community based organizations, user groups of rural poor, preferably with strong linkages to the Panchayats. Establish the Wildlife conservation efforts at Panchayat level through the consultative process.

B. Interventions to manage, monitor and protect wildlife

- i. Maintain and protect the natural vegetation communities (remove exotics and Invasive Alien Species), populations of large ungulates (with emphasis on Sambhar, Ghoral) and pheasants.
- ii. Provide facilities and opportunities in natural areas for purposes of formal and informal education, research and study.
- iii. Protect (with the consent of the local community) the cultural, historic sites such as Sacred Groves for research purposes as elements of the cultural heritage of the region.

11.5. Management Practices and their Impact on Wild Life

The history of management of the forests of the tract has been discussed in detail in chapter-VII. The forests of the tract have been worked primarily for the extraction of timber. Since Theog Forest division constitute the forests which were earlier the parts of princely states like Theog, Balson, Darkoti, Khaneti, Ratesh and part of Keonthal and Patiala (enclaves). As such apart from meeting the needs of the local people for the timber some of the areas were earmarked for hunting by the rulers of the princely states. These areas still hold the potential wildlife. In addition to this

the forests of Theog Forest division remained major source of the livelihood of the poor people by way of NTFP/ MFPs collection. Collection of Guchi is another activity which encourages the local people to visit every nook and corner of the forests. Thus due to geometrical increase of human population and their dependence upon NTFPs and medicinal herbs have added to continuous biotic interference especially during the breeding season. On the other hand, several tree species are often valuable for wildlife e.g; leaves, flowers, fruits, bark, and roots. Tree species with soft timber substrates are used by cavity excavating birds, natural tree cavities are used by a variety of animals. The ground flora in some of the forests is abundant and varied and the miscellaneous broad leaved species form the middle story, such mosaics are the micro habitats of many important Wildlife species.

11.6 Threat Assessment to Wild Life

The local population is dependent on meeting their fuel wood and fodder requirements from the nearby forests. As a result, trees near the villages are heavily lopped. The forests near the habitations are also being cleared of lops and tops and other fallen wood which has an impact on the habitat of wildlife species which burrow holes in such fallen wood. Domestic live stock grazing in the forests also adds to the problem. There are 21 Nos. of guzzars with flock population of 587 Nos. of Sheep, goats, Buffalo, Cow, Bullocks and other animals which graze under this division every year. There are incidences of organized killing of the Wildlife especially leopards by the nomads “Bangalas” by putting snares. They also get indulged in killing of other endangered species like Jackals, Monitor lizard, Porcupine, Black bear etc for illegal trade. Stray cases of hunting of Pheasants during winter periods are also reported in this division. Degradation of the habitats because of the continuous biotic pressure on the forests had resulted in the total disturbance of the food chain of the Wildlife. As a result the species like leopard has made its niche near the habitations, leading to the cases of cattle/ dog lifting and sometimes attack on human beings resulting in human animal interface. Similarly, the monkeys and langoors are finding a little food in their natural habitat and are approaching nearer to

habitation, town and has become a great threat to damage agricultural and horticultural crops.

11.7 Management Strategy

In order to achieve the above objectives and goal, the strategic approach of wildlife management in Theog Forest Division will aim both at the FLS as well as local communities.

Accordingly, management prescriptions for the objectives mentioned above are given hereinunder:

11.7.1. Orientation and Sensitization of the Territorial front line Staff towards the Wildlife Monitoring and Management.

- i) **Training:** It has been observed that the FLS is not oriented towards Wildlife and sensitive enough to address the expected requirement in the present scenario. By organizing short training capsules and workshops for the FLS, an effort will be made to have basics of Wildlife management. For the effective management of wildlife it is necessary that the staff is suitably trained. Two type of training is envisaged for the staff to increase their managerial capabilities viz on the job training and formal training courses. Following on the job training should be arranged for the staff:-
 - Several wildlife offence cases fail in the courts for the reasons of inadequate processing, faulty procedures and wrong interpretation of legal provisions. Co-operation of a lawyer can be enlisted periodically to update the knowledge of staff on fundamental of laws and legal procedures. A failed case emboldens others to break the laws. Therefore, staff should be well versed in investigation, adducing evidence and material, dealing with offenders, compoundable and non compoundable cases.
 - Staff should be imparted training in matters like postmortem of animals, collection of samples of vital organs for histopathological, viral and bacterial examination, their preservation and dispatch, signs and symptoms of common wildlife diseases, external indicators of health. Such kind of training should be a continuous process rather than one time affair.
 - Training of staff is also necessary in recognizing wildlife evidences and their correct interpretation. Management decisions are often based on interpretation of field evidences

hence this aspect becomes critical. Monitoring of pugmarks, collection of scats, collection of skulls and jaw bones are some such evidences in which staff needs to enhance their skills.

- In addition to on the job trainings, it is essential that staff is sent on formal training courses in wildlife management. Several short terms specialized courses are now available at Wildlife Institute of India and in some other institution. Forest Training Center Sunder Nagar and Forest Training School Chail are now offering short terms training courses in wildlife. Field staff should be deployed to attend such courses.

11.7.2 By making the FLS sensitive towards the species identification, its status and significance. This will help in making decision regarding Management inputs, action plan for reducing human Wildlife interface, and also special efforts for the conservation of the endangered Wildlife species.

11.7.3 Research and Monitoring – Research and monitoring are among the weakest areas in wildlife management. The need is acknowledged but there is very little progress. The research need not necessarily be only biological as management and sociological areas are equally important. Research on a larger format involving species and community studies will need linkages with organizations possessing such research capabilities. However, small scale data collection and studies can be attempted at local level also. Encouraging the FLS towards indirect evidence collection, reporting and documentation of the same. Once the FLS is trained about the basics of the Wildlife Management, they can be encouraged towards the habit of evidence collection, observing the behavior of wild animals, reporting and sharing with others and if needed documenting the same. This will help in generating enough information to take the management decisions and to formulate action plan.

11.7.4 Making simple Interventions to improve the micro wildlife habitats.

- i) Maintain and protect the natural vegetation communities (remove exotics and Invasive Alien Species), populations of large ungulates like Ghoral etc. and pheasants. This activity will be done in association with other forestry activities

especially to remove exotics and invasive alien species. While carrying out this activity the Wildlife species requirement has to be kept in mind so that the species of grass and plants are planted to meet the requirement of the Wildlife species.

- ii) Protection of micro wildlife habitats from Forest Fire especially during breeding season. In Theog division there are some of the nicely maintained small chunks of forests in which a huge diversity exists. These areas can be managed as micro Wildlife habitats to facilitate the population of some of the endangered species especially the pheasants. List of such micro habitats along with the flagship species of that forest is given in table-11.1. These areas are to be protected from forest fire especially during the breeding season.

Table-11.1
Forests which should be managed as Micro habitats
Of the major Wildlife species

Sr. No.	Name of the Forest	Name of Range	Area in hectares	Flagship Wildlife species found in the area.
1	D-29 Shali ka Tir, C-I, C-II & C-III	Theog	295.0	Leopard, Kaleej, Red Jungle fowl, Monal.
2	R-11 Cheog, C-V, C-VI & C-VII	Theog	158.6	Leopard, Ghoral, Red jungle fowl, Koklas, Cheer.
3	D-115 Kaleri, CI & C-II	Theog	165.0	Leopard, Black Bear, Red jungle fowl, Koklas, Barking Deer.
4	UPF-291 Shilli Mehla	Theog	90.0	Leopard, Ghoral, Barking deer, Red jungle fowl, Cheer,
5	R-13 Chambi-Kupar, C-XIIc, C-XIIId & C-XIIIa	Kotkhai	248.8	Leopard, Black Bear, Kaleej, Monal, Koklas, Red jungle fowl.
6	R-16 Kalala, C-Xa to XVIb	Kotkhai	163.4	Leopard, Black Bear, Red jungle fowl.
7	DPF-186 Gohach, C-IV	Kotkhai	160.7	Leopard, Black Bear, Kaleej, Monal, Red jungle fowl, Cheer.
8	UPF- Hattu, C-II & C-III	Kotkhai	225.0	Leopard, Black Bear, Kaleej, Monal, Red jungle fowl, Cheer.
9	UPF- Chambi	Kotkhai	250.0	Leopard, Black Bear, Kaleej, Monal, Red jungle fowl, Cheer.
10	DPF-131 Deha, C-II, C-III & C-IV	Balson	164.8	Leopard, Kaleej, Red jungle fowl, Koklas.
11	DPF-138 Khagna, C-I, C-II, C-III & C-IV	Balson	248.6	Leopard, Kaleej, Red jungle fowl, Koklas, Black Bear.
12	DPF-139 Chadaha, C-I, C-II, C-III & C-IV	Balson	257.2	Leopard, Red jungle fowl, Koklas.

- iii) Planting some percentage of the preferred plant species. As per the policy of the state government that out of the total

plantations to be done in an area, at least 10% plants are to be of fruit bearing species, the species to be planted in a particular area is to as per the requirement of the Wild life species specifically found in that area.

- iv) Identification and protection of the Sacred Groves. There are some of the sacred groves identified in this division by WWF Himachal chapter. These groves are very important from the wildlife point of view and are the home of many microly endangered species, especially pheasants and the Vultures.
- v) Estimation of the species population which leads to human Wildlife Interface specifically and others in general to decide the management strategies. The monkey census is a half yearly feature now. Need is the proper documentation of the population trends pre sterilization and post sterilization of the monkeys. This will help in studding the impact of sterilization and making decision regarding improvements in future. The methodology to be followed for conducting census twice a year is enclosed as Appendix-XII Similarly normally the leopard census is carried out after five years but for quite some time this has not been done in the state. This need to be made a regular feature and in the present day technologies the camera trap methodologies is to adopted in place of traditional 'Pug Mark Method'.
- vi) Dry, hollow trees, fallen trees, those partially submerged in stream water, large hollow logs rotting on the forest floor, tall and large crowned big old trees, with flaking splitting bark, tree species that bear fruits, flowers, seeds, leaf or the bark of roots of some trees are of special significance to wildlife. Some such trees in a randomly distributed pattern should be retained in the forests.
- vii) Micro habitat elements of geomorphic origin like caves, dens, overhangs in rocks have a special significance for wildlife. Different species mainly carnivores use cave and dens as shelter, breeding site and secure place for raising the young ones. Flat shelves along the top of cliffs are used by vultures and eagles for roosting for nesting. Roof of over hung's can have hives of honey bees, nests of swallows, swifts, martins. It is therefore necessary to conduct a proper

survey to identify such key sites and to plan the forestry operations in such a way so as to cause least disturbance to wildlife and their habitat.

- viii) **Riparian Zones** - The riparian zones are among the most diverse, productive and vulnerable habitats and perform several critical ecological functions. The habitat use pattern in this system by people is often unsustainable hence the Riparian zones are constantly under threat. The felling rules prescribed in this working plan elsewhere provide for no felling in Bio-Sphere Conservation Working Circle and along the banks of the stream but the objective there is more for maintaining stability of banks and preventing erosion. But such zones also have biological values and ecological functions. These sites are more often than not used by pastoralists to establish cattle camps. Timber extraction is generally done by laying temporary roads in this zone along the valley bottoms. Riparian Zones are potential picnic sites. All important streams namely Kelwi-Dharmpur, Chikkhar-Koti-Kiartu, Kuthan, Baghi-Kalbog, Kupar-Grawag, Koku Nala, Deothi Khad, Pulwahal-Neripul and bank of Giri River and all the tributaries River Sutlej have been prescribed to be treated as Riparian Zones. Road alignments along these zones should be avoided. A No Felling Zone to a width of three times the top height of trees on either side should be maintained.
- ix) **Biological Hot Spots, Key Sites and Sensitive Sites**- These are small areas markedly rich in plant and animal diversity and often unique with respect to the plant and animal species association. These are small sites very vulnerable to change. Key areas have key functions to perform like roosting and nesting sites or breeding grounds of some particular species. Unless sufficient information is available about such areas, these are often ignored. These areas should be the integral strategy components in the other forests managed under different Working Circles as well.
- x) **Grassy Blanks- ‘Ghasanies’**- In forested areas, treeless openings or sites are called blanks or grassy blanks in forestry lexicon. These are called as ‘Ghasanies’ in the local terms. These areas are the potential habitats for many species

especially like Ghorals, Porcupines, and Cheer Pheasant. These are often prime target for plantation activity. But all care should be taken to understand the ecology of these areas before going for making any interventions. They all need to be managed for their associated characteristic structural, biological attributes, ecological functions and physical integrity in consonance with the stated objectives of management.

11.8

Working with the Local Communities to Reduce the Human Wildlife Interface and Incidences of Poaching.

- i) Facilitate organizing of community based organizations, user groups of rural poor, preferably with strong linkages to the Panchayats. Establish the wildlife conservation efforts at Panchayat level through the consultative process. There are many NGO's or other groups interested in becoming flag bearers of the Wildlife conservation. We need to make use of their potential at least in identification of the species, their population trends, and in anti- poaching campaign. Panchyats can act as moderators in reducing the human Wildlife interface provided if there is a continuous consultative process and dialogue with the 332ehavior332s.
- ii) To come up to the expectations of the communities in terms of human wildlife interface, by developing the expertise with in the FLS and making a quick response team. Whenever there is human Wildlife interface the territorial staff is totally dependent on the Wildlife staff. There is need to develop expertise among the FLS and a quick response team is to be constituted for the purpose.
- iii) To facilitate the compensation cases of the poor people and making a proposal for pragmatic rates of compensation. Wildlife compensation has been made as part of Public Guarantee Act in HP. There are many cases of cattle lifting by the leopard but only a few are reported because the rates of compensation are too impractical. These need revision to make it realistic.

11.9 **Reduction in the Dependence of Local Communities on the Important Habitats to avoid Human-Wildlife Interface.**

Good wildlife management is effective management of people's pressures on resources. If the pressures on forest based resources are not resolved to the satisfaction of ecological requirements and the local economic realities of peoples, there would be no habitats left to manage.

- i) By putting micro wildlife habitats on the minimum use for the right holders by providing the alternatives. The traditional rights of the local right holders are needed to be adjusted in the other forests at the time of next forest Settlement.
- ii) Provide alternate grazing lands to the migratory grazers other than the Micro Wildlife habitat. Efforts are required to be made to provide alternate grazing lands to the migratory graziers so that these micro habitats are kept intact.
- iii) Vaccination of the livestock both migratory as well as the domestic cattle. There is sizable population of domestic livestock as well as migratory graziers which in addition to other forest areas, also grazing in these micro habitats. If the grazing is unavoidable, the live stock going for grazing in these micro habitats should be vaccinated every year against the contact diseases.
- iv) To tackle the issue of live stock grazing, ways are to be found out as to how the existing cattle number could be reduced. One way could be by substituting them with smaller number of productive variety of cattle for economic and ecological gains. A beginning has already been made in this direction in the tract by introduction of Jersey Cows which are not sent for grazing to the forests but have to be stall fed. The futility of keeping large herds of unproductive cattle has to be impressed upon the people and alternatives popularized.
- v) The dependence on forests for fire wood requirement need also to be tackled by providing alternative fuels. Providing LPG connections can be one alternative.

11.10 Crop Depredation

The villagers in Theog Forest Division raise wheat, maize, potato, peas. Most of the people have raised Orchards or Apples and Pease and Apricot and also have opted for cash crops and off season vegetables. This has changed the whole pattern of the agriculture practices in this division. The time of growing these crops mostly depends on the altitude of the area. The crop depredation is mainly done by Monkeys, Wild boars and Black Bears. Other wild animals such as Ghoral, porcupine, Bats and parrots also do the damage to the crops. Main problem is because of Monkeys and the wild boars. Government of HP had allowed the killing of problematic Monkeys and wild boars but some animal right activists has taken the issue to the HP High Court and the case is still pending.

There are legal provisions to annihilate the small-bodied animals such as rats and many insects; the big-bodied animals are protected under the various Schedules of the Wildlife Protection Act. In this scenario the poor farmer living on the edge of the forest is faced with the problems of the crop depredation as well as the legal action in the event of his killing a wild animal.

11.11 Livestock Depredation

Due to increasing population pressures and consequent degradation of forest habitat, the wild animals such as Himalayan Black Bear or leopards have become “refugees” in their own habitats. It is a well-known fact that the wild animals avoid areas with disturbances. This means that when their habitat gets further restricted as a result, they venture into the human habitations. The wild animals also intrude into agriculture fields as the crops raised are more palatable, and they are located in easy locations. In addition to this the poor and marginal farmers in the villages keep livestock such as sheep and goats, which usually survive on grazing on the forest and pasture land. For wild animals find such domestic livestock as easy prey. The timing of the predations by the wild animals is very crucial to understand human-animal conflict. The leopard killings are mostly in July to September; the H. Black Bear made killings in almost same months. The wild carnivores remain active in the months of June to October when the livestock is in the forests/pastures of the forests.

11.12 **Compensation**

The occasional damage to live stock as well as to human life caused by the wild animals has earned them the resentment of local people. To reduce this man- animal conflict, and to compensate the sufferers, the government has substantially enhanced the rates of compensation for damage caused to human life as well as to livestock. These rates are appended as Appendix-XIII. However, a close look at the Department's rules reveals their inadequacy with reference to the damage done by the wild animals in the field. The rules provide for postmortem report, and verification by the high authority in the villages such as Pradhan/up-Pradhan of Gram Panchayat/ and a forest official, not less that the rank of a Forest Ranger. For a poor person, it is difficult to approach these high authorities, as a result we find that very few cases of damage by the wild animals are reported for the claim of compensation. Moreover, the rules have been framed for the damage of domestic animals done by the big-bodied animals, mostly the carnivores. This also reflects the inadequacy as most of the damage done relates to the crops and horticulture trees for which there is no provision of compensation. Human-wildlife conflicts have assumed different dimensions in terms of human casualties, livestock killings and agricultural and horticultural crop raiding at the interface of wildlife habitats and human use dominated landscape. Such a situation affects the diverse sections of the village society, differently. Those who live closer to the forest areas and away from the road-head are mostly poor and bear most of the burns of the human-wildlife conflict. Man-animal interface filter down to the base of the pyramid where the people are most directly affected by the depletion of physical resources, least able to fend off the ill-effects of man-animal conflict, and ill-equipped to take remedial action. Providing relief or compensation for damage to the crops and animals of the poor populations living close to the forests should become the priority for the Forest Officers.

11.13 **Dealing with Leopards in Theog Forest Division**

In Himachal leopard is the dominant predator sitting on the top of the food chain pyramid. This magnificent animal is reported from all corners of this division. The terrain and the altitudinal variation of Theog Forest Division, makes the leopard more versatile and mysterious. Dealing with leopards in Theog forest Division need

a strategy to be developed keeping in view the field conditions, prey base in the forest area and extent of Human –Leopard interface. In fact leopard is one of the major animal which remains of a permanent source of Man – animal conflict. To understand the extent of the problem is to have a population estimate of the Leopard. Till late Nineties the leopard census once in five years was a regular feature but later on this practice is confined to only Pas.

Although in Theog Forest Division, there are no cases of leopard turning in to man eaters but some incidences occur in a year for leopard attacking the human beings, cattle lifting and getting trapped in the houses or the cowsheds. Whenever there is any such incidence, there is a huge public pressure for the elimination of the animal. The HPFD has not been able to make the people understand the ecology of the leopard. One of the typical habits of the leopard is its being strong territorial animal. As such when a male marks its territory, about 4 to 5 leopards also exist on the periphery of the marked territory, by making their separate territory in the other area. Whenever there is elimination of any leopard from its territory the peripheral leopards also push their territory towards the vacant territory. This results in having many leopards in that area all of a sudden and that makes the operation more difficult. Therefore before taking a decision of eliminating a leopard from any area, it is important that a quick study is conducted before taking any decision.

To overcome this sudden pressure we need to have continuous interaction with the public, Panchyats and the local NGOs and need to create the awareness about the habits of the leopard. On the other hand although the DFOs (T) are the Wildlife Wardens but they hardly bears the responsibility to tackle the leopard problem. The normal practice is to pass the buck to the Wildlife staff. In fact DFOs (T) should remain equipped for any such situation. It has been observed in this division that Leopard problem is more when ‘Guzzars’ are not in the area, i.e. the time between October to March. During this period, the leopard tends to move near to the habitations and dogs being its preferred food, it roams around the houses having reared a dog. During this period at many times it has happened that the leopard targeting the dog, lifts the kid. Therefore, there is a need to educate the public about it. Most of the injuries

caused by the leopards to the human being is because of the retaliatory action of the human being on sighting a leopard. This leads to man- animal conflict.

There is need that at least two Leopard traps and one set of rescue equipments (like blow pipe and tranquilizing drugs) should be available with each Territorial Ranges. Rescue staff should be identified and a team of good efficient staff should be trained to meet any emergency situation. Two type of training to rescue team is required. One is training about the use of tranquilizing equipment including a formal training of the basics of the habits and habitat of the leopard including movies of the case studies and handling the situation. Then there is a need of refreshers courses at least once in a year to update the skills and also to have the practical training including the case studies.

One of the simplest exercises which should be done at Range level is that to develop the leopard incidence data base. The simplest way of doing this is that on the range map, a 'DOT' can be put whenever there is confirmed sighting or there is incidence of cattle lifting etc. This will generate a good data base and also the movement of the leopard can also be monitored. Once you observe that any leopard confining to a smaller area for the long time, it will mean that the animal is either old or is injured, as such a public warning can be issued and a close watch is to be kept on such animal.

There is a Rehabilitation and rescue policy of the Department which is available on the web page of the HPFD, http://hpforest.gov.in/Rescue_Release_Guidelines.pdf.

11.14

Monkey- Human Interaction

The monkeys have become a problematic animal for last 10 to 15 years in Himachal. Whether it is the townships or the rural areas now monkey menace is quite common. Not many efforts were made to address this problem in the past as this problem was never considered a public problem. The get going approach has lead the problem to get aggravated and the situation at present is that whether it is farmers or the people living in the townships, everyone is facing the monkey menace helplessly. The efforts made for last 6-7 years at Forest department level are too meager that it has no visible impact as such.

11.14.1 The Monkey Sterilization Programme

Before we go for the mitigation of the monkey problem we need to understand the root causes of the monkey population increase and the abrupt behavior of the monkeys. This programme needs to be expediting to control monkey population.

Causes of increase in Monkey population:-

- i) **Change in Land use pattern –**
 - a. Shift from traditional cropping pattern.
 - b. Off season cropping and high nutritional value cropping.
- ii) **Shift from wild to co-mensal –**
 - a. Due to increase in the human population even wild monkeys are now used to human habitations.
 - b. Monkeys are used to the human beings as well.
 - c. No struggle for food increases the life span
(Average lifespan in the wild is 4 years when they have to compete for food in the wild, where as when easy food is available in the form of garbage/manual feeding in the townships, they can live up to 10-15 years.)
 - d. Non availability of food base in the wild (WL Habitats have degraded both qualitatively as well as quantitatively).
- iii) **No garbage management in townships-**
 - a. Easy food availability leads to multiplicity.
 - b. Increases the life span.
- iv) **Bifurcation of the groups due to the Fragmentation of Habitat or other reasons.**
 - a. The bifurcated group tend to regain the minimum same size (Group 338ehavior)
 - b. Abnormal behavior when get separated from the group.
- v) **Manual Feeding-**
 - a. Due to religious reasons.
 - b. Increased tourism and increased number of the temples.
 - c. Disposal of the waste food.
- vi) **No predators of the Monkeys in the wild**

Monkeys are not the preferred food of leopard. Earlier large Eagles/Vultures used to pick up the infants of monkeys but now their population has gone down drastically.

11.15 **Some of the Facts about Monkeys are:**

- i) Mating is not confined to a specific season. Females are mature by three years of age, and males at two.
- ii) Females cycle similar to humans with menstrual cycles of around 28 days.
- iii) The monkey's average gestation period is six months (from 135-194 days) and most of the females in the group give birth to one baby in a year.
- iv) Males are the dominant sex, but they do not remain with troops permanently, so female monkeys lead these communities.
- v) Because troops include multiple mature males and females, their members are sexually promiscuous.
- vi) Females usually produce one young each year, which will be raised by its mother within the very social environment of the troop.
- vii) The typical lifespan of a rhesus monkey in captivity is approximately 15-20 years for males and 20-25 years for females.
- viii) The life span in the semi urban and urban areas can vary between 10-15 years where as in the wild 3 to 7 years.
- ix) The monkeys also exhibit typical 'group living' behavior like maintaining minimum population of the group (group size).
- x) In HP the population estimate of the monkeys is more than 3 lacs in which about 65 thousands are estimated in the townships and rest in the rural/forest areas.
- xi) In Theog Forest Division itself a survey was conducted on all the hot spots and during this census the monkey population was found 3761 as per census record 2012-13.

11.16 Mitigation Measures

We have to address all the above causes if we want to have the effective results. Before doing so actually we need to study all the above causes in detail and then we can come to the conclusion of making recommendation of some measure to control the population of Monkeys. However some of the recommendations are as under:

- i) If less than 70% animals of a particular group are not sterilized within 6 months (period of gestation) the impact of the sterilization will be minimal.
- ii) Right from capturing the monkeys, sterilization to release back at the same area the group identity has to be maintained and not to be mixed with the other group of the monkeys.
- iii) Though the females should be preferred for the sterilization but for the practical purpose both the sexes are to be sterilized to have maximum impact.
- iv) The post operative behavior of the monkeys needs to be studied especially after release.
- v) The success of the sterilization programme depends upon the percentage of the catches in a group in the first go.
- vi) The monkeys confined to the townships need a different treatment than the rural/forested areas.
- vii) The monkeys of the rural areas can be pushed back to the forest areas by making them scare and by increasing the natural food base in the wild.
- viii) The groups in rural areas which are habituated and feeds on the agricultural crop only may need to be scientifically culled. (the sterilization will not have considerable impact as it is very difficult to capture more than 70% of the group at a time in rural areas as the monkeys being semi co-mensal)
- ix) In the first go we should confine to the townships for the sterilization and release back.
- x) Modern technologies like drop nets need to be used for capturing the monkeys and to increase the catches.
- xi) Training of the staff for monkey capturing.

- xii) Focus should be the GROUP rather than number from different groups.
- xiii) Stop manual feeding (Donations be put in containers).
- xiv) The food accumulated in the containers be medicated with the contraceptive medicines and then monkeys be fed at some common place.
- xv) Creating a mass awareness about garbage disposal, no manual feeding, how to avoid monkeys' attacks and post care etc.
- xvi) Exploring the options for Export and Translocation to the NE states.

As pointed out earlier, the major animals responsible for Human- Wildlife interface are Leopards, Monkeys, Wild Boars and the Black Bears.

Some of the suggested measures for the reduction in the conflict between man and animals:

Proactive

- i) The villagers are already using deterrents such as making sounds at night, beating drums, lighting a fire, or putting up a scarecrow in their fields. The alternative access to crop fields can be of some use.
- ii) The Forest Officials need to take some proactive measures such as proper identification of the rogue animals, their tracking, and if needed "culling" or elimination.
- iii) Feasibility of setting up of cages/radio collaring of the problem animals may be explored. The Forest Officials and the local villagers need to put up a combined defense against such animals.
- iv) There is a need of regular census of ungulates and carnivores in the forests. The prey-predator relationship needs to be studied and worked out for the mountain animals along with the carrying capacity of their habitats.
- v) The issue of crop insurance has a lot of promise to resolve the man-animal conflict in the Shimla Forest Division. Possibility of paying a portion of the insurance premium by the Forests Officials for poor villagers should be explored.

Reactive

However, once the damage is done, the provisions of compensation should be an easy and straightforward process so that the poor villagers are able to receive the compensation easily and without delay. It is also important that the forest department functionaries ensure that the poor people not only attend Panchayat or Gram Sabha meetings in good number but also participate actively so that their voice is heard. Proper checks and balances can be evolved and the govt. can place the funds for compensation at the disposal of a Panchayat. The removal of problem animals may be considered in case such animals have been properly identified.

In fact, the main solutions lie in awareness about the large-bodied animals, their ecology and behavior; at the same time recognition of the fact that these are the poor villagers showing tolerance to the existence to the crop damaging bear or livestock lifting Leopard. This enhances the limits of human existence with the large carnivores. The future of man-animal conflict resolution lies as much in the involvement of the local communities in the wildlife habitat management, as in the measure that are taken to leave the wild habitats to the wild herbivores.

11.17

Pheasants

The Theog Forest Division has Monal (*Lophophorus impejanus*), Kaleej (*Lophura leucomelana*), Cheer (*Catreus wallichii*) and Koklas (*Pucrasia macroplopha*). The Red Junglefowl (*Gallus gallus murghi*), and Peafowl (*Pavocristatus*) can also be seen in the lower areas. The elders tell that Western Tragopan used to occur in the high reaches of the Theog Forest Division. These spectacular birds are known through their fragmented surveys done so far in different regions. The non-availability of information from other areas is perhaps for lack of attention by the forest officials. A species like Western Tragopan occurs in inaccessible areas which would make its survey rather difficult. Obtaining access to these areas make the job of their survey difficult. Similarly Cheer Pheasant are quite common in their grassland habitat, through a serious and systematic effort to collect baseline information about them is lacking.

11.17.1. Pheasant Census

The following method is advised for the staff to observe/record their pheasant observations, systematically.

11.17.2. Call Count

This method can be used for most of the pheasants which call during morning hours in their breeding season. The counts can be made from a strategic point in the habitat of the particular pheasant. The number obtained can be doubled for obtaining the estimate of breeding population (e.g., one male; one female). The following factors will influence observations.

1. Season of the year

The counts of calling males assume that all the existing males in the area will call every morning. In the Western Himalayas, the calling behavior of three species of pheasants during various months of the year is as following:

Cheer : January to May; September to December.

Koklas : January to June; September to December.

Western Tragopan : April to June.

2. Time of Day

Most Koklas observations are made during a short period of early morning. The males usually call at dawn for 15-20 minutes. The Western Tragopan starts its song in early morning and continues intermittently throughout the day during breeding period. Cheer pheasants call in chorus at dusk and dawn.

3. Position of Census Point

Surveys will be more successful if a strategic point is selected in the habitat of pheasant. This site should be identified on the day before the survey/census. The census point should allow the observer to hear the birds over as wide an area as possible. A point on a ridge usually allows the observer to listen to the pheasant calls on both the sides. It is possible to hear all the calling birds within a radius of 400 meters from the ridge; however, this can be reduced by the intervening ridges.

4. **Position of Observers**

When there are multiple observers taking part in census operation of pheasants, they must be positioned at an interval of about 500m to 600m. All the observers must have visited their observation points on the previous evening of the census day. They should be in position well before dawn so that all the calling pheasants are counted.

5. **Recording of Observations**

The observer should have good knowledge of identification of the calls of pheasants which s/he is likely to encounter in the field. The observers should practice counting the involved numbers of calling birds. An approximate range of each call and the direction of the call must be anticipated. A compass can be used by the observer.

- i) Date of observation.
- ii) Time of start and end of observations.
- iii) Altitude of the observation point.
- iv) Major vegetation types within the sample area.
- v) Weather conditions on the day of observation including wind speed, precipitation, cloud cover, temperature etc.
- vi) Marking of observation points on a large scale map of the area (marking of a conspicuous point such as a rock or a tree which can be located for subsequent census in the same area.)

11.17.3 **Dealing with Vultures and Other Rapprors for Ecological Balance**

The main Species of Vultures found in this division are Lammergeier, Egyptian Vulture; White backed Vulture, Long billed Vulture, Himalayan Griffon and Red headed Vulture. The population of vultures has reached the critical level especially the White Backed Vultures. Most of them are nesting outside Pas and need the attention of the territorial staff. The vultures nest and breed either on the old Chil trees finding some holes in it or

making nest on the dead old branches. Another typical site of nesting of vultures is the rocky cliffs on the southern or south western aspect. These birds nest in colonies. As such the typical nesting sites of the vultures need to be identified and protected.

One of the major threats these magnificent birds are facing is the use of the drug 'Diclofenac' on the animals on which the Vultures feed. The population of the White Backed Vulture has already reached at the most endangered level.

The main efforts which should be made in the field to protect Vultures are:

- i) Identification of the nesting sites of the Vultures.
- ii) Retaining the snags while carrying markings in the field.
- iii) De skinning of the dead animals should be mandatorily be got done.
- iv) Ban has imposed on use of dialoguing but need its true implementation.
- v) Protecting the nests and nesting sites from forest fires especially in summers.

11.18 Field Craft- How to Observe and Understand the Jungle

(Adopted from an account by Dr. AJT Johnsingh of WII)

When guards/officers/others venture into the forest they should be equipped with certain indispensable articles: a small sharp knife, a compass, a lighter or a match-box (covered in a water-proof polythene bag), leech-proof socks (if it is a leech country), a small rope, rain-coat (if it is in the rainy season or in an area of high rainfall), a good pair of field shoes and field dress (olive green or khaki), which will merge with the background.

Animals such as Himalayan Black Bear, Brown Bear and Leopard can move much faster than humans. At the first close encounter they may snort, roar or scream. These sounds when heard in the setting of the jungle can frighten us terribly and only experienced lucky persons who have survived these encounters will be able to tell us how weak and wobbly their knees became after the first nerve-wracking encounter. We should not think that we can easily outrun and escape these animals which, as said earlier, are much faster than we are. Also the terrain on which we will have to run-

with slope, many holes, sharp wooden stumps, tangle of creepers, dense tall grass, logs, and rocks- is not an ideal place to outrun these beasts which run with four legs while we have only two teetering legs.

Therefore, go with caution in a forest where there are dangerous animals. Please follow the dictum “I should see these animals before they see me and should hear them before they hear me”. Do not talk unnecessarily. Human voice can be heard, even from a long distance, by the jungle animals, in the “silence” of the forest. If there is a need to communicate, better whisper and signal. The objective of our visit to the forest is to see as many animals as possible and observe them. This can be accomplished only when we move as quietly as possible. We spend a fraction of our life looking for and observing animals in the forests. During this brief period, we should be as quiet as possible and observant of the events that happen around us. **Silence is an essential part of jungle-craft.**

In the jungle, smokers should become non-smokers. This is necessary for several reasons: by not smoking (i) the animals will not be alerted by the smell of the smoke, (ii) we avoid setting fire to the jungle, (iii) we show the utmost reverence to the jungle which we have resolutely determined to conserve. When we walk along a forest trail, particularly when the wind carries our smell down the trail, we should proceed with utmost caution. This is because animals like bear (particularly those which have had encounters with people earlier and therefore are not shy of people) can smell your approach and then either slink away or wait for your arrival. When the wind carries your smell down the path, walk slowly and silently, stop for a few seconds every 50-100 m, listen for sounds and then proceed. Most animals like bear make some sound and indicate their presence. All these can be heard if you walk silently.

Forest Rules

- i) Never approach dangerous animals like black bear (particularly with the cubs) very close when they are in a flat terrain. With caution it is possible to approach them in a hilly or rocky terrain where the chances of escaping these animals are much greater.

- ii) If there is a fresh blood trail on the path one should proceed carefully. A wounded animal (e.g. a bear wounded by a poacher) may be ahead of us and should turn aggressive if approached very close. The same is applicable to other potentially dangerous animals like the leopard.
- iii) A leopard carrying its fresh kill may cause the fresh blood trail. Approaching a leopard on its fresh kill could be dangerous.
- iv) While on a blood trail if there are alarm calls of monkeys, and birds ahead of us it could be an indication of the predator going ahead. Go with caution.
- v) If you are returning to your camp alone on foot late in the evening and if you see a dangerous animal (e.g. a bear with cubs), stop immediately. Stay at a safe distance. Hide behind a tree or rock, observe the animal and then by talking, by tapping on the tree with a stone or wood, or even by allowing the wind to carry your smell let the animal know that a human being is somewhere in the vicinity. The presence of the unseen human being makes most animals nervous and they make a slow but steady retreat away from your direction. Who will enter in to a patch of tall dense grass where you hear the hissing of a cobra but don't see the snake? We will move away from the area. The great naturalist Dr. George B. Schaller has successfully used the above technique of remaining unseen and scaring away the Himalayan black bears in Dachigam National Park, Kashmir, India.
- vi) Do not stumble through the forest without carefully looking at the path.
- vii) Climbing a steep hill slope by clinging on to trees, climbers and rocks. Particularly in a tropical habitat, needs to be done with great caution. Before placing the palms, which like the feet are not protected, to hold on to something, watch carefully. There could be a scorpion, a nettle plant or a wasp nest nearby.
- viii) People often fail to differentiate between chasing and charging by a bear. Charging may stop with a forward aggressive rush for 20-50 m but chasing can go much beyond that even for a few hundred meters which could be

very dangerous. When chased by an animal throw a conspicuous object (e.g. a white hand-kerchief) on a bush and run down a slope or run zig-zagging among the bushes. Put up as much distance as possible between you and animal. While chased, do not crouch inside a bush hopping to hide.

- ix) When chased by an animal, never try to climb a tree. A jungle - living tribal can do that but not a guard if he is recruited from a town or a Manager who is not used to tree-climbing. The fear would drain all the energy needed to climb.
- x) Sometimes you will be forced to walk through the forest at night. If you are in a group, stay together. As you walk along make some noise (talk, sing, or tap on a tree or rock at regular intervals). Don't surprise animals by walking in to them. Tap the ground periodically, as you walk along, either with your foot or a stick. The vibrations will keep the snakes away and most animals will also move away when they are warned from a distance.-

Practicals:

Each Forestguards/officers should be persuaded to tell interesting experiences he has had in the jungle during his career.



A vulture seen on NH-22 Theog-Narkanda 2 Km from Theog.



A group vulture seen on NH-22 Theog-Narkanda 2 Km from Theog.

CHAPTER-XII

GENERAL FINANCIAL FORECAST AND COST OF THE PLAN

12.1 Past Yield

The past yield prescribed from various working circles for Theog Forest Division for the period 1996 to 2013 is given in Chapter-VII of part-I in table-7.33.

12.2 Future yield

The annual expected yield of different species in each working circle of this Division is given in the table-12.1.

Table-12.1
Annual Yield prescribed (cum)

Working Circle	Species					
	Deodar	Kail	Fir	Spruce	Chil	Total
Deo-Kail	16500.00	14900.00	300.00	4300.00	110.00	36110.00
Fir/Spruce	100.00	160.00	1250.00	700.00	-	2110.00
Total	16600.00	15060.00	1550.00	5000.00	110.00	38220.00

12.3 Future/ Expected Revenue

The plan has been written keeping in view conserving and restocking the forests as per Govt. policy. However the annual yield is also prescribed in the forests wherever it is available, which is must to be extracted on silvicultural principles for improvement of the forests. If the prescriptions of this plan are strictly followed, it is expected there will be marked improvement in the density and growing stock of the forests besides getting sustained yield to fulfill the right holder and other requirements of the timber.

12.3.1 A Timber. Yield expected from P.B.-I areas

It is difficult to make any definite financial forecast since the prices keep in fluctuating. However, there has been general trend of hike in the timber prices. Taking into consideration the market price of standing trees for the year 2015-16, the annual future expected revenue is thus estimated as under:

Table-12.2

Species	Estimated annual yield (m3)	Average vol. of T.D. given each year (m3)	Balance Volume (m3)	Rate Rs/m3	Annual Future Revenue (Rs)
Deo	16600.00	5000.00	11600.00	55904	648486400.00
Kail	15060.00	5000.00	10060.00	38044	382722646.00
Fir/Spruce	5000.00	-	5000.00	22437	112185000.00
Chil	110.00	-	110.00	21117	2322870.00
Total	36770.00	10000.00	26770.00		1145716916.00

Thus, the estimated future revenue during the plan period (15 years) will be as under:

1145716916.00X15=Rs.17185753740.00 (Or say Rupees 17,186 crores)

12.3.2 Timber (B):-

Revenue realized from HPSFDC Ltd. a/c of royalty for the salvage trees marked during the year 2012-13.

Table-12.3

Sr. No.	Species	Volume (M3) marked/handed over	Royalty Rate	Amount
1.	Deodar	1199.29 m3	5357	6424602/-
2.	Kail	5526.68 m3	3096	17110601/-
3.	Rai	5710.93 m3	1123	6413371/-
4.	Fir	4.85 m3	1123	5445/-
Total		12441.75 m3		23529417/-

Thus, the estimated future revenue from HPSFDC during the plan period (15 years) will be as under:-

23529417.00X15=Rs. 352941255.00. or sayRs (353crores)

- 12.3.3 Resin:** During the year 2013, tapping season 7866 resin blazes were handed over to HPSFDC for resin tapping. The royalty amount worked out as under:

Table-12.4

Name of Division	Average No. of blazes handed over	Royalty Rates per blaze	Amount
Theog	7866	50.00	3,93,300/-

Thus, the estimated future revenue from HPSFDC during the plan period (15 years) will be as under:-

$$393300 \times 15 = \text{Rs. } 5899500.00.$$

12.3.4 Revenue from Other Sources:

The revenue collected from other sources like grazing fee, compensation, and rent of buildings etc. from this Division is given below:

Table-12.5

Particulars	Amount in Rs.
Grazing	30104.00
Sale of trees to right holders	72117.00
Compensation U/S 68 IFA 1927	552662.00
Rent of buildings	109320.00
Registration fees	20300.00
Miscellaneous Seized timber/auction of vehicle U/S 52A	408000.00
Receipt from distribution of seedling	177140.00
Miscellaneous receipt/ extension fees	507537.00
Total	1877180.00

Thus, the revenue after the plan period from other sources will be, Rs. 1877180.00x 15 = Rs.28157700.00

- 12.3.5** Total estimated future revenue during the plan period is given below:

Table-12.6

Particulars	Amount in Rupees
Timber	15182946445.00
Resin	5899500.00
From other Sources	28157700.00
Total	1521,70,03,645.00

This figure does not include revenue from felling of Ban oak working circle.

12.4 **Future Expenditure**

The estimated future expenditure which is likely to be incurred for the implementation of the prescriptions made in the plan has been divided into three parts i.e. expenditure required to be incurred on salary, T.A. Medical and other infrastructural facility to field staff, expenditure which is required for the implementation of the prescription made in this working plan and expenditure to be incurred on other normal plan and non plan activities of the division.

12.4.1 The expenditure on salary, T.A. and other expenses of the staff incurred during the year 2012 is given below:

Table-12.7

Particulars	Theog Forest Division (Rs.)
Salary	2,72,89,333/-
T.A	2,50,000/-
Medical Expenses	2,00,000/-
Livery/uniform	3,30,000/-
Law Charges	-
Rent Rate/Taxes	-
Office Expenses	4,50,000/-
Road & Bldg	7,00,000/-
Wages	1,03,93,100/-
M & S	17,11,500/-
Motor vehicle	3,57,350/-
Maintenance	75000/-
Minor Work	-
Other Charges	2230200/-
2235-Social Security & Welfare Medical Reimb. (Retiree)	102094/-
Total	4,54,69,377/-

Increase anticipated average increase in future 50% = 2,27,34,689/-
 The total expenditure of Theog Forest Division is Rs. 6,82,04,066/-
 and estimating future annual expenditure on the same value, the
 total plan (15 yrs.) expenditure will be Rs. $68204066 \times 15 = \text{Rs. } 1,02,30,60,990/-$.

12.4.2 The expenditure required for the implementation of prescriptions of the working plan is as under:-

12.4.2a Survey, Demarcation, Notification, entries of forests in revenue records and construction of boundary pillars

The total forest area under the plan is 33681.52 ha. which includes 19715.55 ha (**UPFS**) un-demarcated protected forests. These forests are to be surveyed, demarcated, notified and its entry is to be made in the Govt. record i.e. in the revenue record to authenticate its legal status in terms of its extent and boundaries. In addition there are 13965.97 ha. Reserved and Demarcated Protected Forests but it was found that even 50% of these forests have not been recorded in the Govt. /Revenue record. Such type of notification and record is required during legal proceedings in the various courts of Law. Considering in lum sum Rs. 5000/- per ha. to carry out survey, demarcation, notification, construction of boundary pillars, its entry in the revenue record and cost of working plan the estimated expenditure to be incurred is given below:-

Table-12.8
Estimated Expenditure

Sr. No.	Total area (in ha.) of Forests required to be surveyed and entered in the revenue record	Estimated cost	Total Expenditure required
1.	26698.00 ha.	5000/-	133490000/- or say 13.35 (crores)

This work is to be completed during the 1st ten years period of the plan and therefore annual expenditure will be Rs= 13, 34, 90000/- and per year it will cost Rs=1, 33, 49000/-

12.4.2b **Estimated expenditure to be incurred on tending silvicultural Operations like cleaning, un-saleable thinning and climber cutting.**

Under P.B.-IV 3364.75 ha area is in Deodar/Kail Working Circle 50% of which has been worked out 1682 ha. In view of the field observations it was found that there is a congested growth of sapling and pole crop which is creating hindrance in the growth potential of the growing stock which is to be retained as a future crop till maturity. Therefore, for better management of forests and to distribute the growth potential of the site amongst superior species like Deodar and Ban the cleaning and un-saleable thinning of inferior species like Kail is required to be carried out during the plan period with the rotation period of 5 years. Also it has been observed that some sapling and pole crop have been invaded by climbers like Rosa Moschata (Kuja) which need to be cut back. Thus total area of 5176 ha needs standing operation discussed above. The estimated expenditure based on the prevailing rate are given below:

Table-12.9

Sr. No.	Area proposed for carrying out tending operation	Period of Cycle to repeat tending operation	Net area in ha	Rate	Amount
1.	1682 ha	5 year	5046	1772.80	8925548/-

Tending operation will be carried out in 1682 ha in the 1st five years plan period and then subsequently it will be repeated after five years.

12.4.2c **Subsidiary Silvicultural Operation in P.B.-I**

In P.B.-I type B areas where concentrated/seedling felling is to be carried out subsidiary silvicultural operation like slash disposal, sowing and planting, weeding and bush cutting, cleanings, thinnings, regeneration assessment and fencing is to be carried out. Total area under PB-I of this type is 3026 ha under Deodar/Kail and Fir/Spruce Working Circle where subsidiary silvicultural operation is to be carried out during the next 15 years. Considering all the operations as above an estimate of Rs. 53,500/- per ha. is likely to be incurred to carry out these operations. Therefore the expenditure required to be incurred in given below in table-12.10.

Table-12.10

Sr. No.	Total are prescribed for felling under PB-I	Rate per ha. to carry out the subsidiary silvicultural operations	Amount
1.	3026 ha	53500.00	161891000.00

12.4.2d Budget allotted and expenditure incurred in this Division during the year 2012-13 under various plan and non plan scheme is given as per Table No.12.11 below:

Table-12.11

Major Head	Budget allotted/incurred
2059 Public Works Non Plan.	Rs. 75,000/-
2406- Forestry & Wild Life Non Plan.	Rs. 13,25,800/-
2402- Soil and Water Conservation Plan.	Rs. 2,85,000/-
2406- Forestry & Wild Life Plan.	Rs. 99,63,500/-
4406 Capital Outlay.	Rs. 13,80,800/-
Demand No. 15- Backward Area Sub Plan.	Rs. 7,12,500/-
Demand No. 32- Schedule Caste Sub Plan.	Rs. 8,91,946/-
G. Total:-	Rs. 1,46,33,746/-

The total expenditure on non plan and plan schemes for the year 2012-13 is Rs. **1,46,33,746/-** and estimated future expenditure on the same value, during the total plan period of 15 yrs. will be Rs. **1,46,33,746X15=Rs. 21,95,06,190/-**.

Thus total expenditure required during the plan period for implementation of prescriptions made in this working plan and normal Plan and non Plan activities of the division is given in table 12.12 given below:

Table-12.12

Sr. No.	Particulars	Expenditure required
1.	Salary, T.A. and infrastructure facility to staff.	1,02,30,60,990/-
2.	Survey, Demarcation, Notifications etc	13,34,90,000/-
3.	Silvicultural operations like cleaning, thinning climber cutting in P.B.-IV	89,25,548/-
4.	Subsidiary silvicultural operations in P.B.-I	16,18,91,000/-
5.	Expenditure on other normal plan and non plan activities	21,95,06,190/-
G. Total		1,54,68,73,728/-/-

12.5 Possible Resources of Funding

Funds will be demanded under the following budget head/sub-head

1. 2406 Forestry and wild life non plan.
2. 2406 Forestry and wild life plan.
3. 2402 Soil and water conservation non plan.
4. 2402 Soil and water conservation plan.
5. 4406 Capital outlay.

12.6 Cost of the Plan

The total expenditure incurred in preparation of Working Plan is given below:

Table-12.13

Particulars	Amount in Rs.
Salary	-Nil-
T.A.	-Nil-
Livery & Uniform	-Nil-
Motor vehicle	-Nil-
M & S	1,81,960/-
O.E.	1,84,728/-
Wages	30,76,623/-
Total	34,90,773/-

CHAPTER-XIII

MISCELLANEOUS REGULATIONS

13.1 Petty Fellings

Felling of petty nature, as given below may be treated as prescription of this working plan:

- i) Trees required meeting the demand of bonafied right holders.
- ii) Dry trees occurring here and there.
- iii) Dry or green trees required for ordinary small departmental works like construction of bridges, manufacture of charcoal etc. or to be given to other government Department.
- iv) Green trees required for scientific research at FRI or elsewhere and for the study of growth and statistical data by the working plan officer, research wing and other research organizations etc.
- v) Dry or green trees required to meet special free grants i.e. for the construction of houses destroyed by the natural calamities, repair and maintenance of religious and public utility places like temples, schools, sarai etc.
- vi) Dry or green trees for the construction of huts, their repair, ropeway spans and other petty needs of contractor's persons and labourers employed on departmental works and residing in the forests.
- vii) Trees coming in the alignment of new roads, bridal paths, widening of existing roads, erection of transmission lines, water channels other works of public utility.

- 13.1.1** These fellings should be carried out as per the instructions issued by the Govt. time to time. However, the approval of MOEF.Govt. of India should also be obtained in cases where "Forest Conservation Act 1980." is attracted . All such fellings shall be shown in compartment history files and control forms and shall count against the prescribed yield. D.F.O shall, however, exercise strict control over such fellings so that excessive fellings are not carried out under the garb of petty fellings.

13.1.2 Deviation

Any excess or deficit in fellings not prescribed in the working plan will constitute deviation. These may be of the following nature.

- i) Extensive fellings of wind fallen and dry trees killed by fires, fungi and insect attacks or other cases.
- ii) Fellings of unusual size and extent for special department works or removal along main electric lines or road alignment etc.
- iii) Special fellings to meet a sudden new demand of a particular or local Wood Based Industries or for defence purposes.
- iv) Stopping or curtailing clear fellings for plantations because of shortage of labour, funds or watering for the plantation works.

13.1.3 Application of sanction of deviation which can be foreseen must invariably be submitted sufficiently in advance through CF, so that sanction may be received before the deviation occurs. All fellings for whatsoever purpose made shall be properly accounted for in the control forms. Deviations for one year, for period of five year and for the entire period of the plan shall be not being more than 10% of the prescribed yield. A close watch shall be kept on the pace of regeneration and fellings shall be continued only if regeneration in areas felled is up to the mark.

13.2 Timber Distribution (T.D.)

With improvement in the living standard of the local people and development of area, the timber demand of right holders has increased manifold. This is particularly so because the right holders rates fixed long back are extremely low in comparison to the present market rate, which tempts the people, indulge in very liberal and wasteful use of timber and in some cases it is smuggled out also.

13.2.1 No proper record of T.D grant is maintained at Divisional/ Range/Block/Beat level. This results sometimes in misuse of T.D. It is therefore, suggested that every beat guard should maintain a T.D. register of permanent nature which should be page numbered and certificate be signed by R.O. This register should find a place indicating number, class and species of trees and year of T.D. granted to him, name of the forest from where T.D is granted and

whether the applicant is right holder of that forest or not and the details when T.D was granted earlier and of its utilization together with utilization details of current T.D. This should invariably be signed by the beat guard, Block officer and Range Officer. D.F.O should check it at the time of Range inspection or during tour in the field. This will certainly curb the misuse of T.D., if any.

- 13.2.2** The state has recently notified H. P. Forest (Timber Distribution to Right Holders) Rules, 2010 for the rationalization and regulation of grant of timber. Under these rules the periodicity and quantity of wood to be granted at concessional rate for a family for building a house and for repairs has been fixed to reduce the pressures on the forests.

13.3 Roads, Paths and Bridges

The construction of a network of roads in the tract has made the forests accessible. A number of bridle and inspection paths (Appendix-XII) page 194-196 covering the important forests and connecting the inspection huts and rest houses etc. have also been constructed in the past. However most of these are not in good shape and need immediate repair. It is therefore prescribed that all existing forest roads, paths and bridges should be maintained properly and D.F.O. should chalk out the biennial programme for repair and maintenance. Adequate funds should also be asked for. The new paths may be constructed to facilitate the inspection and protection of forests from fire and illicit fellings etc. as per need which may arise in future.

In addition, all the PBI and other regeneration/plantation areas should be provided with 1m wide inspection path along contour for proper inspection and execution of regeneration operations.

13.4 Buildings and Water Supply

Most of the buildings (except the new construction) are poorly maintained and some are in dilapidated condition. All such buildings need repair and maintenance regularly. D.F.O should chalk out the biennial programme for repair and maintenance of the buildings. All the buildings should be provided with required sanitary fittings. New buildings as required to be constructed at certain strategically important location may be constructed during the plan period in the interest of better inspection, management and protection of forests. In most of the rest houses/inspection huts,

water supply is irregular needs to be strengthened. This should be ensured by fitting overhead tanks which may supply water 24 hours. While selecting the sites for new buildings of permanent nature, availability of sufficient clean water should be given top priority.

13.5 Telephone/ Wireless

As far as possible all the ranges and check posts should be provided with telecommunication system for better protection and management.

13.6 Fire Protection

13.6.1 All the rest houses, inspection huts, Divisional/Range offices and other buildings should be provided with latest fire fighting equipments and staff should be given demonstrations and training for their use.

13.6.2 Fire also causes grave dangers to the forest wealth and it is essential to protect the forest from fire hazard, which is mainly confined to Chil and oak forests, although occasional fires do occur in Kail forests but these are not of much consequence. The danger is maximum during summer and dry months when utmost care and precaution for prevention of fires are essential. To solve this problem, local Panchayat should be taken into confidence for co-operation of local people who can help in extinguishing the fire besides adopting necessary measures like debris burning, control burning and maintenance of fire lines. It will also be fruitful to make available sufficient funds for engaging Fire watchers during fire season who can assist the staff in locating, preventing and fighting forest fires. They should control the forests and keep the roads, paths passing through the forests clear of needles, grass, bushes and dry leaves. A strict watch on local people should also be kept during fire season that deliberately lit fire in the forest for getting grass. Besides the fire lines around regeneration areas, as prescribed under the Chil working circle be maintained. Moreover, the following 10metre wide fire lines should be maintained where Chil forests adjoin large blocks of deodar, Kail and oak, and kept clear of inflammable material through annual burns.

13.6.3 Range wise List of Fire Lines.

a)	Balson Range	
i)	Alidhar to Pundar Ghatti	4 Km
ii)	Ghoond to Biran	3 Km
iii)	Kalna to Dandi	5 Km
b)	Theog Range	
i)	D-115 Kaleri, C-I	2.5 Km
ii)	D-126 Guthan, C-I, C-II	3 Km
iii)	D-110 Khaneor	2.5 Km
iv)	D-63 Tikkar	2 Km
v)	D-112 Gharail	2.5 Km
c)	Kotkhai Range	
i)	R-16 Kalala, C-VII to C-VIII	2 Km
ii)	R-13 Chambi Kupar	4 Km
iii)	D-186 Gohach	2 Km
iv)	Dhar Kalna Mahasu	-

13.6.4 DFO can add new fire lines as per necessity/requirement in the forests in above list. Though the detailed fire protection measures to be adopted have already been described in respective working circles but if needed DFO to adopt other methods as deemed fit keeping in view the condition.

13.6.5 Biological measures of the fire protection can also be adopted by creating mixtures of broad leaved species with chil and oak. The continuity of compartments should be broken by bringing evergreen vegetation especially in chil zones. In new plantations, a green belt of mixed broadleaved species at suitable intervals is maintained.

13.7 Demarcation and Survey

There are extensive areas under Un-demarcated Protected Forests in this division covered by this plan. These have not only been subjected to indiscriminate lopping but also subjected to unrestricted grant of 'nautors' and even encroachments. The results are therefore all to see a rapid deterioration and degradation of the vegetation in these areas. In order to safeguard against further denudation and depletion of forest wealth it is imperative that all the UPFs be got demarcated, mapped and delimited on the ground by the revenue / forest settlement authorities and be declared as

demarcated protected forests as early as possible. DFO should make efforts for the entry of all those DPFs/ RFs which are not entered in the revenue records should also be entered in the revenue records on priority basis.

13.7.1 Efforts should be made by DFOs to get all encroachments ejected in the forest lands as they have been given powers of collectors.

13.8 Declaration of Reserved Forests

The Reserved Forests of the erstwhile princely states falling in this Division except those of Kotkhai illaqua have not been notified as such even after the constitution of Himachal Pradesh. This formality needs to be completed without further delay with the underlying object of ultimately converting them in to Reserved Forests. The appropriate steps are taken for this purpose forthwith as this requirement has already being delayed inordinately. Particulars of such forests are given in the table-13.1.

Table-13.1
Reserve Forests which are to be recorded in Revenue Record

Sr. No.	Erstwhile State	Name of Range	Number & Name of Forests	Area in ha.	Entry as per Working Plan/C.H. Files of forest comptt.	Entry as it exist at present in revenue record	Recommendation/Remarks
1	Keonthal	Theog	R-4 Tir Mahasu (C-I)	41.2	Reserve Forest	DPF	These fifteen forests at present which have been entered as DPF in Revenue record are required to be notified and entered as Reserve Forests in the Revenue record.
2	Keonthal	Theog	R-4 Tir Mahasu (C-II)	20.2	Reserve Forest	DPF	
3	Keonthal	Theog	R-10 Rajinder Rakh (C-V)	21.8	Reserve Forest	DPF	
4	Keonthal	Theog	R-10 Rajinder Rakh (C-VI)	38.0	Reserve Forest	DPF	
5	Keonthal	Theog	R-10 Rajinder Rakh (C-VII)	19.4	Reserve Forest	DPF	
6	Keonthal	Theog	R-10 Rajinder Rakh (C-VIII)	44.2	Reserve Forest	DPF	
7	Keonthal	Theog	R-10 Rajinder Rakh (C-IX)	37.2	Reserve Forest	DPF	
8	Keonthal	Theog	R-10 Rajinder Rakh (C-X)	49.0	Reserve Forest	DPF	
9	Keonthal	Theog	R-11 Cheog (C-I)	24.2	Reserve Forest	DPF	
10	Keonthal	Theog	R-11 Cheog (C-II)	29.0	Reserve Forest	DPF	
11	Keonthal	Theog	R-11 Cheog (C-III)	40.4	Reserve Forest	DPF	
12	Keonthal	Theog	R-11 Cheog (C-IV)	28.4	Reserve Forest	DPF	
13	Keonthal	Theog	R-11 Cheog (C-V)	42.8	Reserve Forest	DPF	
14	Keonthal	Theog	R-11 Cheog (C-VI)	61.6	Reserve Forest	DPF	
15	Keonthal	Theog	R-11 Cheog (C-VII)	54.5	Reserve Forest	DPF	

13.9 Forest Boundaries

The boundary pillars in most the RFs and DPFs are not properly maintained. No boundary pillars have been fixed in UPFs. However, Forest Settlement at present in progress and as soon as UPF's will be notified as DPF's then boundary pillars may be constructed on priority. This work should be completed within ten years period of this Working Plan. It is because the repair is not being done regularly. For this purpose quinquennial programme should be laid down for repair and maintenance of boundary pillars and sufficient funds should be made available for this purpose. It is also prescribed that the boundaries should be checked and corrected with the help of survey of India maps on 1:15000 scale in conjunction with revenue records, and a detail record of the position of boundary pillars of each forests be maintained and recorded in boundary pillars registers at Divisional Range and Beat level. The boundaries should be surveyed and given GPS readings with respect to longitude and latitude and distance be measured between boundary pillars vis-à-vis each other, and recorded in the boundary pillar registers. The possibility of construction of cement concrete boundary pillars, especially along outer boundaries of forests and around the cultivations, may be explored and these may be constructed as early as possible.

13.10 Periodic Check of Boundaries

Little attention has been made for checking of boundaries of the forests. Therefore, it has been suggested that boundaries should be checked at regular intervals for proper maintenance and repair. The checking should be done as per norms fixed below in table-13.2.

Table-13.2

Forest Guard	100%
Dy. Ranger	50%
Range Officer	25%
ACF	10%
DFO	2%

A quinquennial programme of repair of existing boundary pillars and construction of new intermediate pillars should be prepared and

given effect during the plan period. This must be followed, especially on the outer boundaries of the forests and on the boundaries with cultivation. However, DFO may modify the programme with the approval of CCF (WP & Settlement), keeping in view of availability of the funds or other circumstances. Detail of boundaries of forest should be entered in the Beat guard Manual of the respective beats and boundary register maintained at Range and Divisional level.

13.11 Compartment and Sub-Compartment Boundaries

The boundaries between the compartments of a forest and even between sub-compartment are not marked properly. The compartment boards were found missing. So it becomes difficult to locate the compartments and sub- compartments in the field. Therefore, it is prescribed for proper intensive management that trees along outer boundaries of the forest should be marked with 15cm wide black band at breast height, and trees along boundaries of compartment with white bands. Similarly, the boundaries of sub-compartments should be marked with broken white bands. It is also suggested that the small boards should also be placed at conspicuous points, especially where roads/ paths cross the boundary, bearing the name, number, and area, allotment of forest / compartment/sub-compartment and name of range.

13.12 Maps

All the forests of the tract have been surveyed by survey of India and survey sheets on 1:15000 scales are available for all the RFs, DPFs and UPFs of the tract. Stock maps of all the forests have been prepared on the survey sheets itself (1:15000 scale) and placed in the respective compartment history files. The survey sheets on 1:15000 scales are also available in the divisional and range offices. Consolidated management maps on 1:15000 scale showing compartment wise allotment to different working circle of all the RFs, DPFs and UPFs has also been prepared.

13.13 Forest Settlement

Forest settlements of the tract are very old and the area falls under various erstwhile princely states which have different settlement reports or no proper settlement at all. Moreover, the record of rights varies from place to place. Because of manifold increase in human

and cattle population and for developmental activities, the demand of timber and other forest products has increased. Moreover, the condition of almost all the forests has changed drastically. In the interest of better management and control, a uniform and revised record of rights as per the present situation is essential. Thus, the settlement should be revised at the earliest alongwith the demarcation of Undemarcated Protected forests.

13.14 Nautors

Nautors have been granted in various forests freely and indiscriminately, especially in almost all UPFs. Even the well wooded and steep slopes have not been spared in some cases. Opinion of the Forest Department was not obtained before sanction of such Nautors in most of the cases. Those nautors which have been regularized should be demarcated well and boundary pillars should also be raised around them. In future, DFO should ensure that no Nautor is granted from any of the forests in contravention of the Forest Conservation Act. 1980.

13.15 Encroachments

Encroachments are common almost in all categories of forests. The UPFs specially are most affected with this menace. Boundary pillars have been displaced and encroached upon in RF's and DPF's. Part of the forests has been converted in to orchards and agricultural field. Even the reserved forests have not been spared. The encroachments detected during the stock mapping and inspection of the forests, have been mentioned in the compartment description. It was difficult to know the exact area of the encroachment in absence of revenue demarcation and due knowledge among concerned field staff of the Forest Department. Therefore, DFO should ensure to check and detect the exact number and area of encroachment in each forest. Recently, the power of collectors has been given to DFOs. Therefore, DFO of Theog Forest Division should take immediate action so that encroachments are ejected timely.

13.16 Research and Sample Plots

The old sample plots in some of the forests have now been abandoned. Therefore DFO, in consultation with Forestry University Nauni, solan and HFRI Shimla should lay out some sample research plots in some forests for growth and ecological

studies. Local volume tables for important species should also be prepared.

It is of utmost importance that seed for artificial regeneration is collected from genetically superior trees. All such trees should be marked with white paints and protected. A list of such trees of various species should be maintained in a separate register in the Range Office. These trees should not be felled for grant of T.D. or other reasons. Such plots will be excluded from all working plan operations.

13.17 **Preservation Plots and Monumental Trees**

Trees of extra ordinary dimensions and monumental values of various species shall be selected, preserved and proper record there of shall be maintained on standard form at Range and Divisional level. Few preservation plots of important species are suggested in table-13.3.

Table -13.3

Range	Block	Beat	Species	Forests
Theog -do- -do- -do- -do-	Cheog Matiana Matiana Theog Matiana	Cheog Chadara Rajana Gowai Rajana	Deodar Deodar Deodar Kail Kail	R-11 Cheog D-36 Jalsar D-122 Sharri D-49 Pap D-120 Gharol
Kotkhai -do- -do- -do-	Kalala Mahasu Kotkhai Mahasu	Kalala Dharonk Gazta Dharonk	Deodar Fir/Spruce Mohru Taxus Baccata	R-16 Kalala, C-XI D-167 Darabla D-176 Bani C-II D-164 Shirgul C-I
Balson	Ghorna	Deha	Deodar	D-131 Deha

Temple grooves are also being preserved. Only dead, dry and uprooted trees may be removed from temple groves. Record of all temple groves shall be prepared and maintained both at Range and Divisional level.

13.18 Meteorological Data

Data on precipitation, temperature, snowfall and wind is meager in this tract. The existing rain gauges are not maintained in proper condition and little or no data is recorded regularly. It is suggested that rain and snow gauges, maximum and minimum thermometer and hygrometer should be installed at all the range Headquarters and Forests Rest houses/ inspection huts where readings can be taken without interruptions throughout the year. The data should be compiled in the divisional office every month.

13.19 Medicinal Herbs and Plants

There are a large number of herbs, plants and trees in the tract yielding product of medicinal importance. The local people have right for extraction of these medicinal plants but their exploitation is not systematic and scientific. Moreover, the techniques of artificial regeneration of these species should be developed and seedlings should be raised in the nurseries so that the affected areas may get sufficient regeneration otherwise these species will extinct in near future. Further, in cases where digging of soil is involved for extraction of roots, it will cause erosion, so immediate steps should be taken for conservation of soil as per requirement of the area.

13.20 Grazing

Heavy grazing, especially in UPFs adjoining habitation, is responsible for absence of regeneration, disappearance of ground cover and consequent erosion of soil. The public should be educated on the advantage of stall feeding and their cooperation sought to regulate grazing on rotation basis. In closed areas, grass cutting should be allowed at the discretion of RO and that too under supervision of staff, to the extent possible without prejudice to the safety of regeneration/ plantation.

13.21 Lopping

It was also noticed that indiscriminate and unrestricted lopping of kail, oaks and even deodar is causing wide spread damage to the forest growth particularly near habitations. It is therefore, prescribed that strict control should be exercised and it should be allowed on silvicultural principle and restricted to the limits permissible under the record of rights as per respective settlement reports.

13.22 Resin Tapping

Resin is a valuable produce of Chil forests. The chil forests be tapped as per latest instructions. The old system of extraction of resin through cup and lip method has been completely replaced by Rill method. Though, the extraction work is being done by HPSFC, but a strict control is essential to see that the tapping is being done as per prescribed technique otherwise the trees will be over tapped which will cause death of the trees.

13.23 Soil and Water Conservation

Conservation of Soil and Water is an important aspect and object of forest management in this hilly tract. The gradual disappearance of vegetative cover over extensive areas due to biotic interference and developmental activities, have led to accelerated erosion of soil. The successful rehabilitation of depleted and degraded forests and reforestation/afforestation of blank areas as prescribed in the Plantation Working Circle and in some areas on Biosphere Conservation Working Circle will go a long way in providing effective vegetative clothing to the hill slopes and thereby ensuring better conservation of soil and water. Besides plantations, the areas which require soil conservation measures like engg. Works should be identified and steps should be taken to construct the engg. structures as per requirement of the site.

CHAPTER – XIV

ESTABLISHMENT AND LABOUR

14.1 **Establishment**

The position of the staff as stood on 1.4.2013 has been given in Table-6.1 of Chapter-VI of part I of this plan. The office work has increased to such an extent that the field staff especially the Range Officers remain preoccupied with this work rather than devoting more of their time in the field work. The remedy lies in cutting short the procedure by using computers and also atleast range clerk in the Range offices should be provided. Main emphasis in the plan is on improvement of stocking of forests, like large scale plantation in blank areas and various silvicultural operations under different working circles. This will overall increase the work load at all levels. In future forest protection and maintenance of the regeneration areas are going to receive higher attention and more concentration. Keeping this in view, more field staff at all levels especially trained for forest protection will be required in future. Among ministerial staff atleast two senior assistants are required to run the office business smoothly.

14.2 **Field Staff**

In this division there are 42 Territorial Beats, 9 Blocks and 3 Ranges. This division is one of the sensitive in H.P. At present eleven beats are lying vacant and another four beats have fallen vacant due to promotions of forest guards. What have been observed in general that most of the field staff is reluctant to serve under this division and thus Beats/Blocks/Ranges and even some time the division is being run in the absence of permanent DFO and ACF by making internal arrangement with the staff of adjoining areas? There is no denying the fact that some of the forest guards are having charges of two to three Beats. A bare perusal of Appendix -X page 189 reveals that during the previous plan period from 1995-96-2012-13 as many as twenty DFO's have been transferred/shifted from this division. This issue needs to be taken seriously at administrative level and to manage the valuable forests of this division, it is must to make a policy that all the posts of all ranks should not fall vacant and any official/officer should stay their atleast for a terms of three years. The lower staff alone

cannot be blamed for any sorry state of affairs and therefore responsibilities are to be shared down from DFO to Forest Guard. This aspect is to be examined at Govt. level and at the level of HoFF. Forest Guards and Deputy Rangers need constant supervision and guidance of Range officers, but it has been observed that the maximum Ranges are without Range Officers and Ranges are being run by Block Officers. Unless DFO and ACF do not understand the working difficulties of the field staff, sincere and good workers are not appreciated, those who are careless and indifferent to discharge their duty are not punished, the better management of the forest as per what is being prescribed in the revision of this Working Plan will remain a theoretical document. This is what has been observed in the implementation of previous Working Plans. Therefore, to make the prescription of working plan effective all the annual plan of operations, budget works, forestry silvicultural operations should be carried out strictly as per what has been prescribed in the Working Plan. It is admitted that some time it is not possible to carry out all the works as per prescription laid down in the Working Plan, and under such circumstances DFO is at liberty to make certain alterations and additions giving cogent administrative and policy decisions made from time to time by the Govt. of H.P. or Govt. of India (MoEF). But, just as the revision of this Working Plan is joint efforts of the entire field staff right from F.G./D.R./R.O's/ACF & DFO and ministerial staff of this division. All beats should be equipped with well trained Forest Guards. Refresher courses, seminars and workshops should be organized by the DFO. The result of works carried out and the improvements made thereof needs to be reviewed by DFO at the close of each financial year. It will be in the interest of better scientific management of the forest that HoFF and Govt. of H.P. and Govt. of India (MoEF) may review the outcome of the prescriptions made in the working plan atleast once in five years period of the plan.

14.3 Labour

There is an acute shortage of labour within the tract of this Working Plan. In general most of the people are Horticulturist and vegetable growers in large scale who have engaged Nepali labourers for all purposes even as their domestic servants. Therefore, local

labourers are not available during plantation season and other forestry works. Consequently, the field staff has to approach the big Horticulturist, agriculturist and contractors to engage mostly Nepali labourers to carry out the forestry operations.

CHAPTER – XV

CONTROL AND RECORD

15.1 **System of Control**

The system of control and maintenance of records as adopted in the state will be followed. Control is an integral part of the plan and record of all operations has to be maintained properly. It was observed that various records at divisional and range level were not maintained up to date. For facilitating the proper working and carrying out the prescriptions of the plan, the following records should be maintained regularly at divisional as well as range level.

15.2 **Control Forms**

To exercise proper check and control on the prescription of the working plan, the DFO will prepare the annual control form showing the prescriptions and suggestions of working plan. These forms will be maintained every year as prescribed in Himachal Pradesh code for working plan procedure and will be submitted to CCF (WP Settlement) for scrutiny through Conservator of Forests. The following control forms will be maintained.

- (i) Control Form Nos. 2, 2A and 2B which control fellings.
- (ii) Control Form No. 4 and C which control works of improvement and reproduction.

These forms are described in detail in Punjab Forest Manual chapter No.11

15.3 **Deviation Statement**

All the control forms shall be prepared for the financial year and submitted to the CF latest by 15th May every year together with (i) a deviation statement in triplicate, (ii) a certificate to the effect that all compartment history files are fully and accurately posted to date and the annual control forms for the year agree with the entries in the compartment histories, (iii) a note on the progress of operations prescribed in the working plan and (iv) explanatory notes.

15.4 **HP Forest Manuals**

HP Forest Manual Volume-I cover various policies, Forest Acts, notifications & Circulars. Whereas, Vol.-II, Vol.-III and Vol.-IV gives wide coverage on budgeting and accounting system, service

matters and technical orders respectively. These Manuals are to be kept safe in division as well as in all Ranges. These Manuals were documented in the year 1986 which are required to be updated by inserting all the notifications, amendments made thereafter.

15.5 Compartment History Files

The maintenance of Compartment History Files both at divisional and range levels are quite unsatisfactory. All the forms A to C are almost blank and in some cases haphazardly filled. Inspection notes are lacking in old C.H files. Their upkeep and storage in the range and divisional office have been neglected. The Compartment History Files have been prepared in duplicate for all the Reserved, Protected and Un-demarcated Forests. Stock maps on 1:15000 scale have been prepared on survey sheet itself and posted in the respective compartment history files. The new descriptions, enumerations results, allotments, treatment, density, regeneration status, quality, Underwood, undergrowth etc. have been recorded in all the compartment history files. It is prescribed that all the Compartment History Files should be properly maintained and posted up-to-date in April every year. Important notes on silvicultural operations, markings, progress of regeneration and other cultural and subsidiary operations should be recorded in these files by the inspecting officers time to time. During field tour and also at the office inspection, the DFO will ensure that compartment history files are properly maintained and kept up-to-date. The DFO is required to submit a certificate together with the control forms that all the compartment history files have been brought up- to-date.

15.6 Nursery Journals

This will be maintained for all the nurseries on prescribed standard format in accordance with Form I, II and III as prescribed under Chapter-3 of H.P. Forest Manual Volume-IV giving the origin of seed, date of sowing, germination percentage, total number of plants age wise and operations costs etc. The inspecting official/officer should record their observations in these journals.

15.7 **Plantation Journals**

These shall be maintained for all plantation areas on prescribed standard proforma for which compartment history files have not been prepared. For areas having compartment history files, the detail should be incorporated in such compartment history files. It should contain the following information's:

- i) Map of the area on 1:15000 scale showing prominent features.
- ii) Location, legal status boundaries, configuration, altitude, aspect, slope, geology etc.
- iii) Soil suitability maps on 1:3750 scale showing the unplatable blanks, scrubs, species to be raised and other treatment prescribed.
- iv) Regeneration survey map on 1:3750 scale showing regeneration/stocking position.
- v) A statement showing area planted and cost of planting item wise for each year.
- vi) A critical note by inspection officer/official on success or failure of plantations along with reasons for failure and corrective measures required for the success of plantations.

15.8 **Divisional Note Book**

The Divisional note book will be maintained on the prescribed form. No such record is maintained at present. This will contain a list of all the important activities which are given below:

- i) Auction results.
- ii) Lease rates for the various categories of Forests and resin blazes.
- iii) Out turn of resin sections, tree lots, coppice coupes etc.
- iv) Results of experiments carried out.
- v) Results of species/exotics tried and success achieved in different plantations.
- vi) Record of seed years of various species.
- vii) Survival and mortality rates in plantations.
- viii) Injuries to Forest crops or any other information like forest fires etc.
- ix) Total plantation targets.
- x) Budget allotment.
- xi) Construction of buildings/roads/paths.
- xii) Position of PBI.

- xiii) Any other important information regarding divisional working

This information will provide a bird's eye view of the divisional working and may prove helpful at the time of the revision of the Working Plan.

15.9 Fire Records

Records of fires will be maintained on the prescribed proforma both at the divisional and range level. Maps of the forests , showing the burnt areas will be filed in the concerned compartment history files and plantation journals alongwith the other relevant data such as the origin and nature of fire, extent of area burnt, damage assessment, how was it brought under control and the date and FIR No. lodged with police etc.

15.10 Register of Books and Maps

Register of Books and Maps will be maintained at the range and divisional level and should be kept up-to-date.

15.11 Register of Forests

The register of Reserved, Demarcated Protected and Undemarcated Protected Forests and even other forests like municipal forests, private forests etc. shall be properly maintained in the divisional as well as range office. All changes in area or boundaries should be recorded every year giving reference of government orders and notifications. A column should also be added regarding entry of the forest in the revenue record. If the forest is not entered in the revenue record, the effort should be made by DFO for its proper entry.

15.12 Register of Roads and Buildings

This will be maintained both in the Range and Divisional office and kept up-to-date. All roads and buildings constructed during the year shall be recorded in April every year alongwith cost of construction.

15.13 T.D. Register

It is to be maintained on prescribed proforma both at divisional and range level to regulate and check on T.D. grants. The entries of all the sanctioned T.D. should be made regularly in the relevant register.

15.14 Forest Guard Manuals

All forests guards, incharge of beats should have a book containing following information's.

- i) A beat map on 1:15000 scale.
- ii) List of forests with area and their allotment etc.
- iii) Forest maps showing the compartments/ sub compartments, boundary pillars, paths etc. traced from the compartment history files.
- iv) Record of rights and concessions allowed to the local people.
- v) Duties and powers of forest guard.
- vi) List of roads, paths and buildings of the beat.
- vii) Zamindari rates of trees and forest produce.
- viii) Standing instructions of Range Officer and Divisional Forest Officer.
- ix) List of Shamlat/ceiling lands and private forests with their Khasra Nos.
- x) Class wise volume and market rates of tree species of the region/ division.
- xi) Sowing/ planting and other silvicultural operations.
- xii) List of mother trees and standards.
- xiii) List of plantations and areas closed for regeneration etc.
- xiv) Total plantation target and allotment of the budget for the current year.
- xv) List of nurseries and availability of planting stock species wise.

15.15 Register of Boundary Pillars

This register will be compiled range wise and maintained at Divisional level. The longitude and latitude of GPS readings of boundaries pillars around each forest shall be recorded in it.

15.16 Research Journals

The Research Journals indicating detail of statistical data collected, measurement of monumental trees, insect and fungus diseases, frequency of seed years, percentage of timber extracted from various forests species wise viz-a-viz their standing volumes, other research work carried out and matters of great interest in the management of the forests shall be maintained.

15.17 Forest Block Book

Like beat manual, a Block book should also be prepared by every Block Officer Incharge of the Block. It should contain all the information of Block. The map of the Block should contain the entire individual Beat in it. It should be checked by the Range Officer and DFO when they are on tours.

15.18 Record of Capital Expenditure

It should be maintained on the prescribed proforma both at Divisional and Range Office. Entries with regard to expenditure incurred and allotment of fund should be made every month to have effective control on the expenditure of budget.

CHAPTER-XVI

SUMMARY OF PRESCRIPTIONS

Name of Working Circle/Chapter	Heading	Prescriptions	Paragraph	Page No.
(1)	(2)	(3)	(4)	(5)
Deodar-Kail Working Circle	Sequence of felling and cutting sections	One felling series viz. Theog felling series	2.3	157
	Silvicultural system	Indian Irregular Shelter wood.	2.7	161
	Rotation & Conversion Period	120 Years.	2.8	161-162
	Regeneration Period	30 years	2.8.1	162
	Division into Periods and allotment to the Periodic Block	Four PBs of 30 Yrs.	2.11	162-163
	Calculation of Yield and annual Yield of PBI	Deodar 12500 m3 Kail 11000 m3 Fir - Spruce 3700 m3 Chil 50 m3	2.12.9	167-168
	Calculation of Yield and annual Yield of PB IV	Deodar 4000 m3 Kail 3900 m3 Fir 300 m3 Spruce 600 m3 Chil 60 m3	2.12.10	168-169
	Prescribed Yield	Deodar 16500 m3 Kail 14900 m3 Fir 300 m3 Spruce 4300 m3 Chil 110 m3	2.12.10.4	169-170
	Control of Yield	Removal shall depend upon the progress of Regeneration.	2.12.10.5	170
	Table of Felling PB-I & PB-IV	Tabular statement for sequence of fellings in 15 years laid down.	2.13	171-174
	Method of executing felling in PB I	General Principles for seeding felling laid down.	2.14.1	174-176

	Method of executing felling in PB IV	General Principles for Final felling & thinnings laid down.	2.14.2	176
	PB II	No removal except salvage removal.	2.14.3	176
	PB III	No removal except salvage removal.	2.14.4	176
	Subsidiary silvicultural operations cleaning and thinning	Slash disposal, seeding and planting, weeding, bush cutting, cleanings, thinnings, fencing and tending Suggested.	2.15	176-178
	Others/Miscellaneous Regulations	Marking of trees to right holder subject to silvicultural availability, closure to be effective, grazing & lopping to be controlled and strict measures against fire protection.	2.17	179-180
Fir/Spruce Working Circle	Sequence of felling and cutting sections	One felling series viz. Theog felling series	3.3	186
	Silvicultural system	Indian Irregular Shelter wood.	3.7	190
	Rotation & Conversion Period	150 Years.	3.8	190
	Regeneration Period	30 years	3.8.1	190
	Division into Periods and allotment to the Periodic Block	Two PBs P.B.-I and P.B.-Un-allotted.	3.11.1 & 3.11.2	191
	Calculation of Yield	Fir 1250 m3 Spruce 700 m3 Deodar 100 m3 Kail 160 m3	3.12	192-193
	Control of Yield	Removal shall depend upon the progress of Regeneration.	3.12.10	196
	Table of Felling in PB-I	Tabular statement for sequence of fellings in 15 years laid down	3.13	196-197

	Method of executing felling in PB I	General Principles for seeding felling laid down.	3.14.1	198-200
	PB Un-allotted areas	No felling prescribed except salvage removal	3.14.2	200
	Subsidiary silvicultural operations in PB-I areas	Slash disposal, seeding and planting, weeding, bush cutting, cleanings, thinnings, fencing and tending Suggested.	3.15	200
	Others Regulations	Right Holders requirement, Closure to be effective, lopping, thinning to be controlled and strict measures against fire protection.	3.16	201-202
Chil Working Circle	Sequence of felling Series and cutting section	Theog felling series.	4.3	205
	Silvicultural system	Indian Irregular Shelter wood.	4.7	207
	Rotation & Conversion Period	100 Years.	4.8	208
	Regeneration Period	20-25 years	4.8.2	208
	Division into Periods and allotment to the Periodic Blocks	Four PBs of 25 Yrs. Each	4.11	208
	Yield from PBII and PBIII	No forest/compartment allotted to P.B.-II and only salvage removal will be done from PB-III.	4.11.2 & 4.11.3	209
	Calculation of Yield and annual Yield from PB I	No forest/compartment allotted to P.B.-I	-	-
	Annual Yield from PB IV	No yield prescribed	4.12.1	209
	Control of Yield	No yield prescribed from this Working Circle except salvage removal	4.12.2	209
	Method of executing felling in PB I	No PB has been formed hence the	4.13.1	210

		method of felling not been discussed		
	PB IV	No PB has been prescribed	4.13.2	210
	Subsidiary silvicultural operations in PB I	Slash disposal, Effective closure, artificial regeneration, weeding and bush cuttings, cleanings and prunnings, grass cutting suggested.	4.15	210-211
	Other/Miscellaneous Regulations	Regulations regarding grass cutting, grazing, fire lines, control burning fire watchers, right holder are laid down.	4.16	211-215
	Resin Tapping	Resin Tapping will be carried out by Rill Method.	4.16.12	215
Ban-Oak Working Circle	Sequence of felling and cutting section	Theog felling series.	5.3	217
	Silvicultural system	Indian Irregular Shelter wood.	5.7	220
	Rotation & Conversion Period	70 Years.	5.8	220
	Status of Regeneration	-	5.6.5	219
	Method of executing felling	No felling prescribed	5.12	220
	Subsidiary silvicultural operations	Sowing and planting, seed collection and storage, Direct sowing etc.	5.13	221
	Tending Operation	Cleaning thinning etc.	5.14	222
	Miscellaneous Regulations	Closure, grass cutting, lopping. right requirement	5.15	222-223

Bio-Sphere Conservation Working Circle	Special objects of Management	General objects of management laid down.	6.4	228
	Silvicultural System	No green fellings prescribed and hence no silvicultural system is prescribed only hygienic removals prescribed.	6.6	230
	Subsidiary Silvicultural operations	Sowing and planting.	6.7	230-231
	Tending operations	Cleaning and thinnings are prescribed	6.9	231
	Other/Miscellaneous Regulations	Regulations regarding, grass cutting, lopping, monkey damage, right holders requirements, fire protection etc. laid down.	6.10	231-232
	Soil Conservation Measures	Soil conservation Along with afforestation suggested in denuded and eroded forests.	6.10.6	232
	Closures	Closures and afforestation suggested	6.10.7	232
Plantation Working Circle	Special objects of Management	Objects of Management laid down.	7.4	235
	Choice of Species	Species for different altitudinal zones and locality suggested	7.6.1	237
	Planting Programme	Definite planting programme Range wise suggested.	7.7	238
	Regeneration Assessment	Regeneration assessment every year suggested till the plantation established.	7.9	239
	Closure	Area to be closed shall be got notified in advance.	7.10	239-240

	Plantation Technique	General principles laid down.	7.13	240-241
	Nursery Technique	General principles laid down.	7.14	242
	New Concept of Nursery	New Concept of Nursery laid down.	7.15	242
	Tall Planting	Tall Planting suggested to ensure success of plantation	7.16	244-245
	Subsidiary Silvicultural Operations	Weeding, beating up, pruning, cleaning and thinning advised.	7.18	245-246
Non Timber Forest Produce (Over Lapping) Working Circle	Special Objects of Management	General objects of management are laid down.	8.2	250-252
	Method of Treatment	Rotation for extraction of NTFPs is prescribed.	8.7	256
	Artificial Propagation and Conservation	Method for artificial propagation and conservation of NTFPs is suggested.	8.8	256-257
	Action on General NTFPs Conservation	Research study suggested to evolve better ways of harvesting	8.12	260
	Future line of Action	Measures to be taken suggested dealing with NTFPs scientifically.	8.13	260-262
	Miscellaneous Regulations	Regulations regarding extraction and export of NTFPs laid down	8.17	263-266
Forest Protection Working Circle (Over Lapping)	Special Objects of Management	Special objects of management laid down	9.4	269
	Method of Treatment	Treatment prescribed	9.6	270
	Strategy for Fire management	Strategy for Fire management laid down for protection of	9.6.2	276-278

		forests against fire		
	Climber Control	Preventive/Remedial measures suggested	9.7	281-282
	Encroachment on Forest Land	Preventive/ remedial measures suggested.	9.8	282-284
	Illegal mining on Forest Land	Strategy for control of illegal mining on Forest Land	9.9	284-285
	Strategy	Strategy to be followed prescribed.	9.9.2	286
Joint Forest Management (Over Lapping) Working Circle	Strengthening of Joint Forest Management	Strengthening of JFM for management of forest and related activities.	10.2	287-288
	Special Objects of Management	Special Objects of Management laid down.	10.3	288-289
	Implementation of JFM	Implementation of JFM suggested in Theog Forest Division	10.4	289-290
	Potential Activities under JFM	Certain potential activities laid down	10.5.2	290
	Selection of JFM Working Areas	Certain guidelines devised for selection of potential sites.	10.6	291
	MOU between Department and JFMCs	MOU to be executed between the department and JFMCs.	10.16	296-297
	Development of Technology for Value added products	Development of technology suggested for value addition	10.18	297
Wild Life Management (Over Lapping) Working Circle	Special Objects of Management	General objects of management laid down.	11.4	299-300
	Management Strategy	Strategic approach to be followed for wild life management prescribed.	11.7	302-307
	Compensation	Provision of compensation for damage to crops and animals prescribed.	11.12	310

	Dealing with Leopards	Methods to deal with leopards causing damage prescribed.	11.13	310-312
	Monkey-Human Interaction	Monkey menace and its root causes described.	11.14	312-313
	Mitigation measures	Mitigation measures for monkey-human conflict prescribed.	11.16	315-317
	Pheasant Census	Methods of pheasants census prescribed	11.17.1	318
	Dealing with Vultures	Methods for protection of vultures and other raprors prescribed.	11.17.3	319-320
General Financial Forecast and Cost of the Plan	Past Yield	Past yield of Theog felling series	12.1	326
	Future Yield	Future yield prescribed.	12.2	326
	Future/Expected Revenue	Revenue from timber, resin and other sources described.	12.3	326-329
	Future Expenditure	Expenditure to be incurred during plan period.	12.4	329-333
	Cost of the Plan	Expenditure incurred in preparation of Working Plan	12.6	333
Misc. Regulations	Petty Fellings	Should be done as per instructions issued by Govt. and shall count against the prescribed yield.	13.1	334
	Timber Distribution	T.D. should be granted as per silvicultural availability and T.D. rates should be increased.	13.2	335
	Roads, Paths & Bridges	New roads and paths as per requirement suggested.	13.3	336

	Buildings and Water supply	Construction or new building and maintenance of existing ones proposed as per requirement. Water supply to all buildings should be ensured.	13.4	336-337
	Telephone/wireless	All ranges and check posts should have Telephone/ Wireless.	13.5	337
	Fire Protection	Lying out of New fire lines and maintenance of old proposed.	13.6	337-338
	Demarcation& Survey	UPFs and Govt. common lands to be got demarcated and efforts should be made to eject all encroachments.	13.7	338-339
	Declaration of RFs	Notification of reserved forests, declaration of some DPFs as reserved forests proposed.	13.8	339
	Forest Boundaries	Boundary pillars to be repaired/ constructed and Boundary Pillars registers be maintained.	13.9	240
	Periodic check of Boundaries	Programme for maintenance/ construction of boundary pillars laid down.	13.10	340-341
	Compartment and Sub. Compartment boundaries	Tree along outer boundary of compartment to be marked with 15 cm black band at B.H. and along the boundary with white band. Boundaries of sub	13.11	341

		compartments should be marked with broken white bands.		
	Forests Settlement	Revised record of rights as per the present situation should be prepared.	13.13	341-342
	Nautors	All regularized nautors should be got demarcated and boundary pillars should be raised around them.	13.14	342
	Encroachments	All encroachments should be detected and ejected as soon as possible.	13.15	342
	Research & Sample Plots	Laying out of fresh sample plot/research, plots suggested.	13.16	342-343
	Preservation Plots & Monumental trees	Areas where preservation plots can be laid out suggested, listing and maintenance of Monumental trees suggested. Preservation of temple grooves suggested.	13.17	343
	Meteorological Data	Installation/ maintenance of rain gauges, snow gauges, max-mini thermometer and hygrometer suggested.	13.18	344
	Medicinal Herbs and Plants	Cyclic programme for the exploitation of medicinal herbs and plants suggested.	13.19	344
	Grazing	Controlled grass cutting in closed areas and stall feeding for	13.20	344

		cattle suggested		
	Resin tapping	Resin tapping only by Rill method suggested.	13.22	345
	Soil & Water Conservation	Engineering structures in addition to afforestation suggested in denuded areas.	13.23	345
Establishment and Labour	Staff as on 1.4.2013	Provision of additional staff, suggested.	14.1	346
	Field Staff	Refresher course training to field staff prescribed.	14.2	346-347
Control and Records	System of control	Control Forms, C.H files Nursery journals plantation journals, divisional notebook, register of Book and Maps, Fire Record Register of forests, Register of Roads and Buildings, T.D. Register Forest Guard Manual, Register of Boundary Pillars, Research Journals, Forest Block Book and Record of capital expenditure etc. should be maintained properly.	15.1 to 15.18	349-354