HIMACHAL PRADESH GOVERNMENT
FOREST DEPARTMENT

WORKING PLAN
FOR THE **KUTLEHAR** FORESTS
OF
UNA FOREST DIVISION
VOL. I
(2014-15 TO 2028-29)

FINALLY SUBMITTED BY

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SH. R.K DOGRA (HPFS)
SH. YASHUDEEP SINGH (IFS)

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State Capital
Map not to Scale
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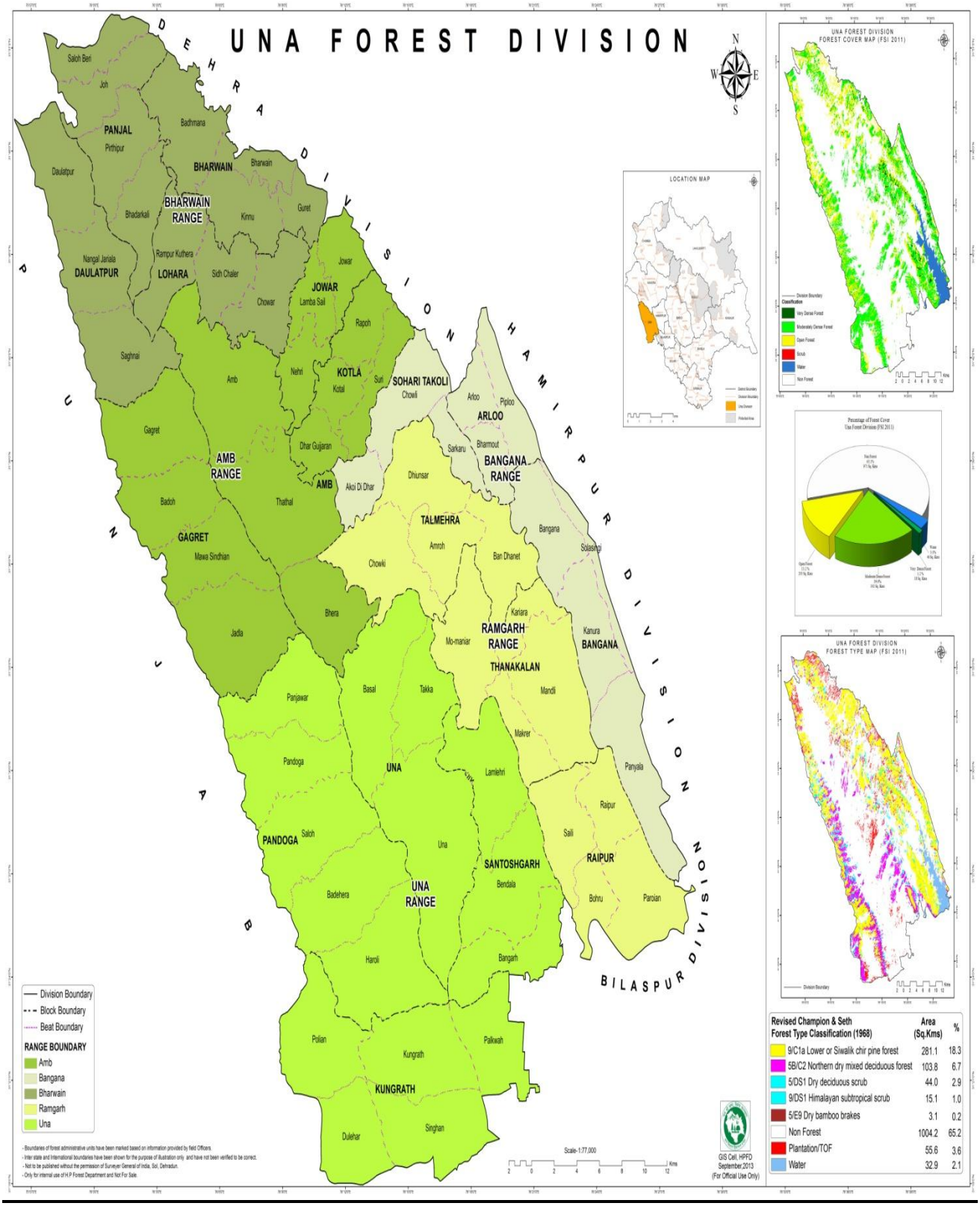
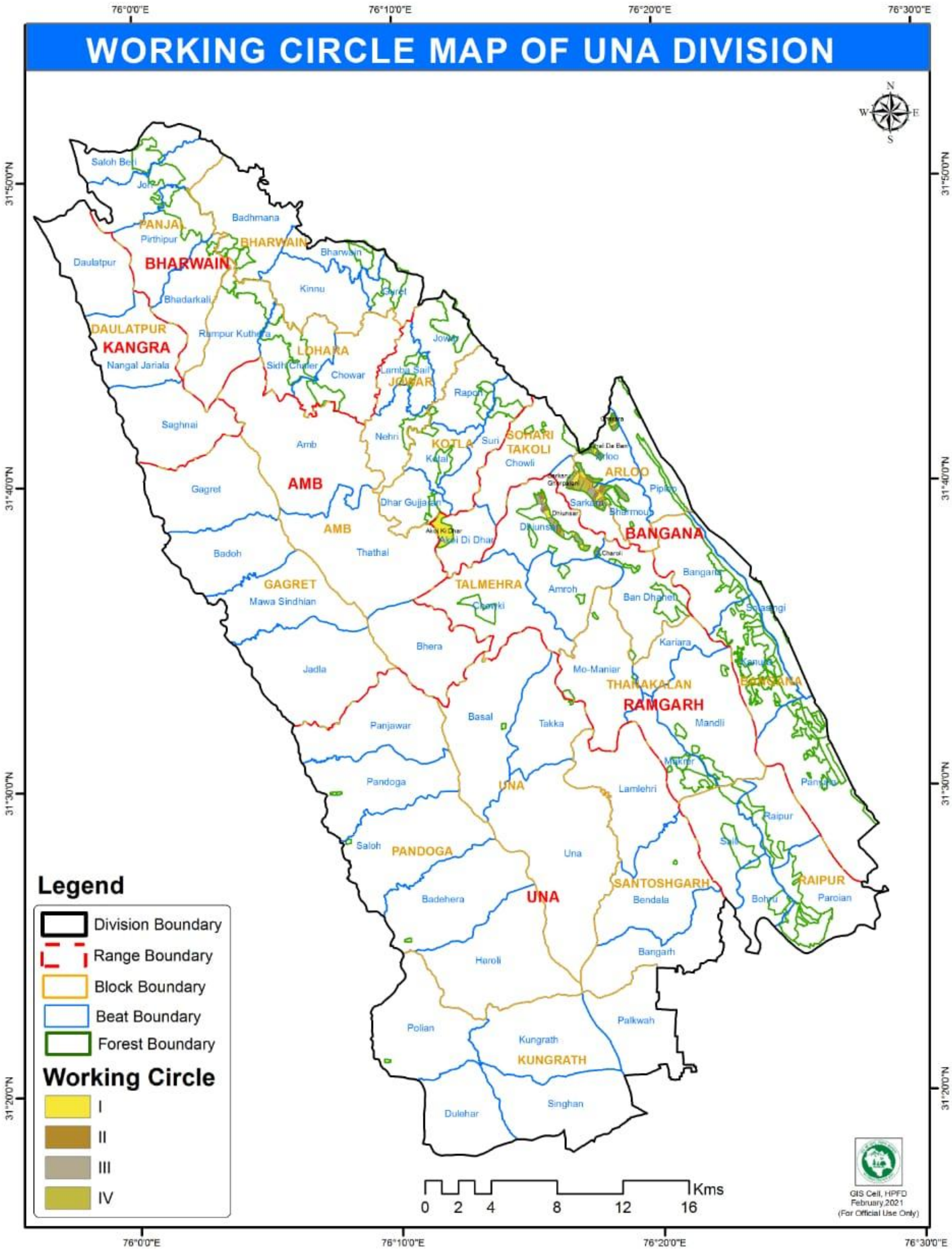
MAP OF HIMACHAL PRADESH

MAP OF UNA FOREST DIVISION

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I
II
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Kms
0 2 4 8 12 16
GIS Cell, HPFD
February,2021
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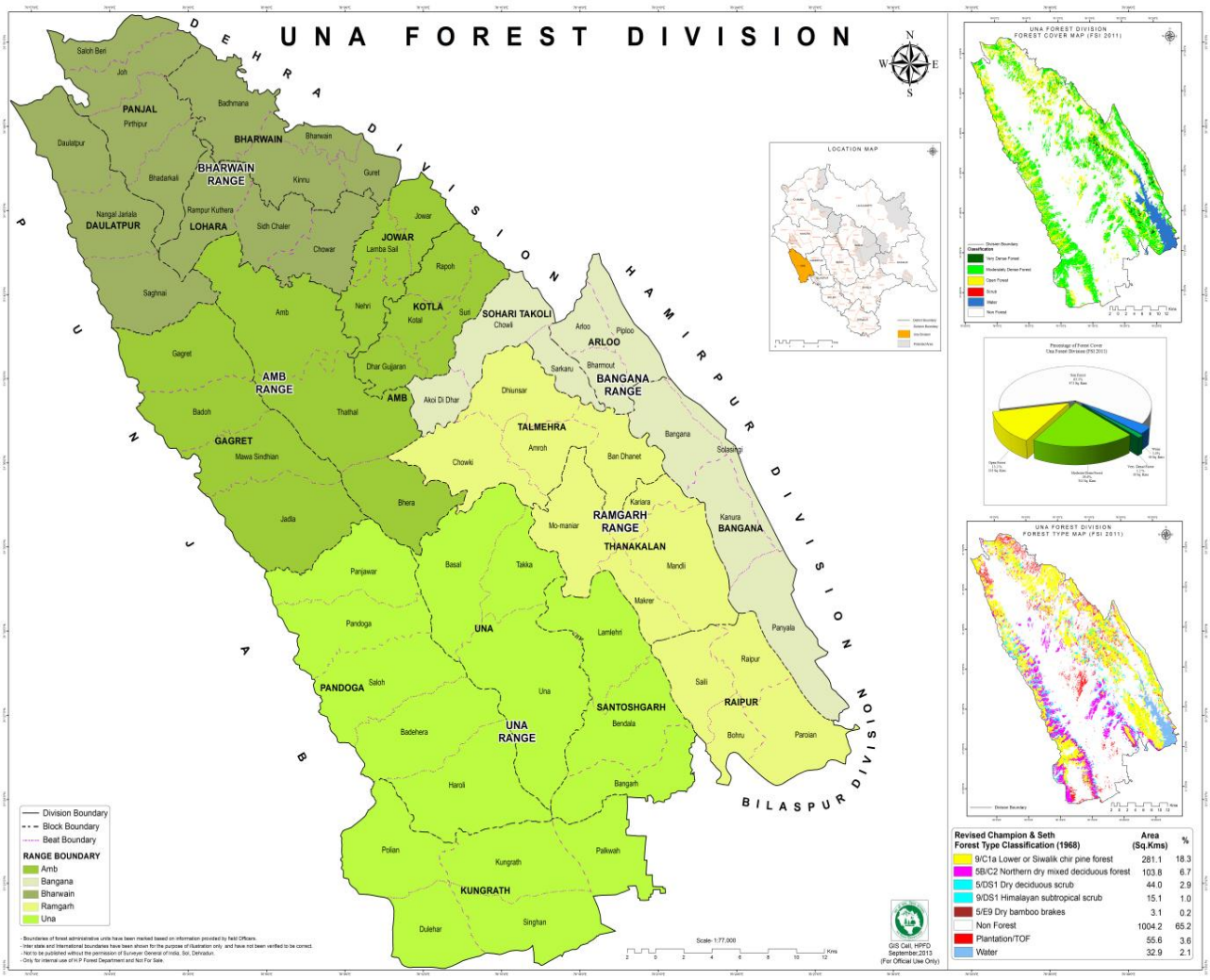
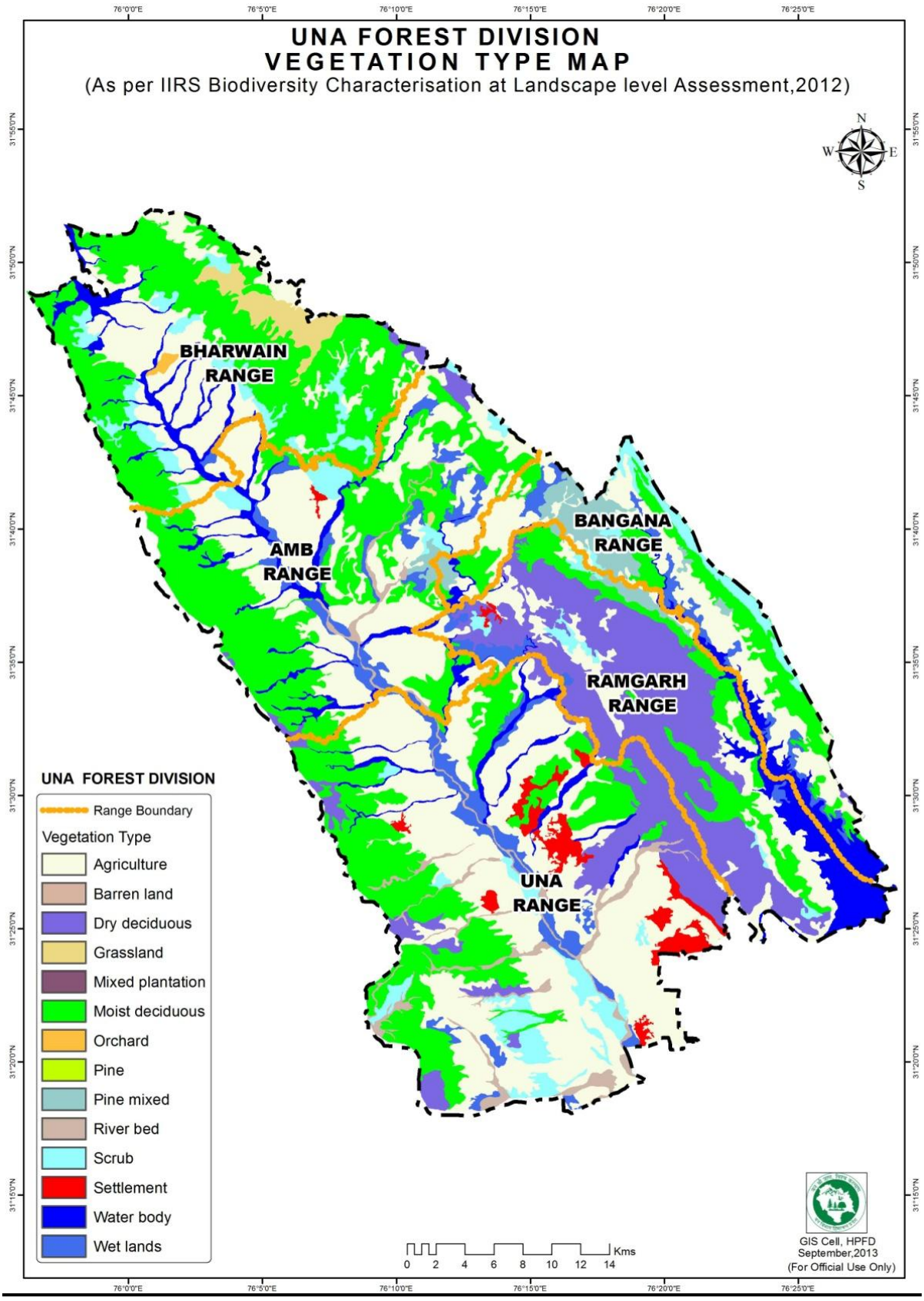
ADMINISTRATIVE MAP OF UNA FOREST DIVISION




UNA FOREST DIVISION
VEGETATION TYPE MAP
(As per IIRS Biodiversity Characterisation at Landscape level Assessment,2012)
BHARWAIN RANGE
AMB RANGE
BANGANA RANGE
RAMGARH RANGE
UNA RANGE
UNA FOREST DIVISION
Range Boundary
Vegetation Type
Agriculture
Barren land
Dry deciduous
Grassland
Mixed plantation
Moist deciduous
Orchard
Pine
Pine mixed
River bed
Scrub
Settlement
Water body
Wet lands
0 2 4 6 8 10 12 14 Kms
GIS Cell, HPFD
September,2013
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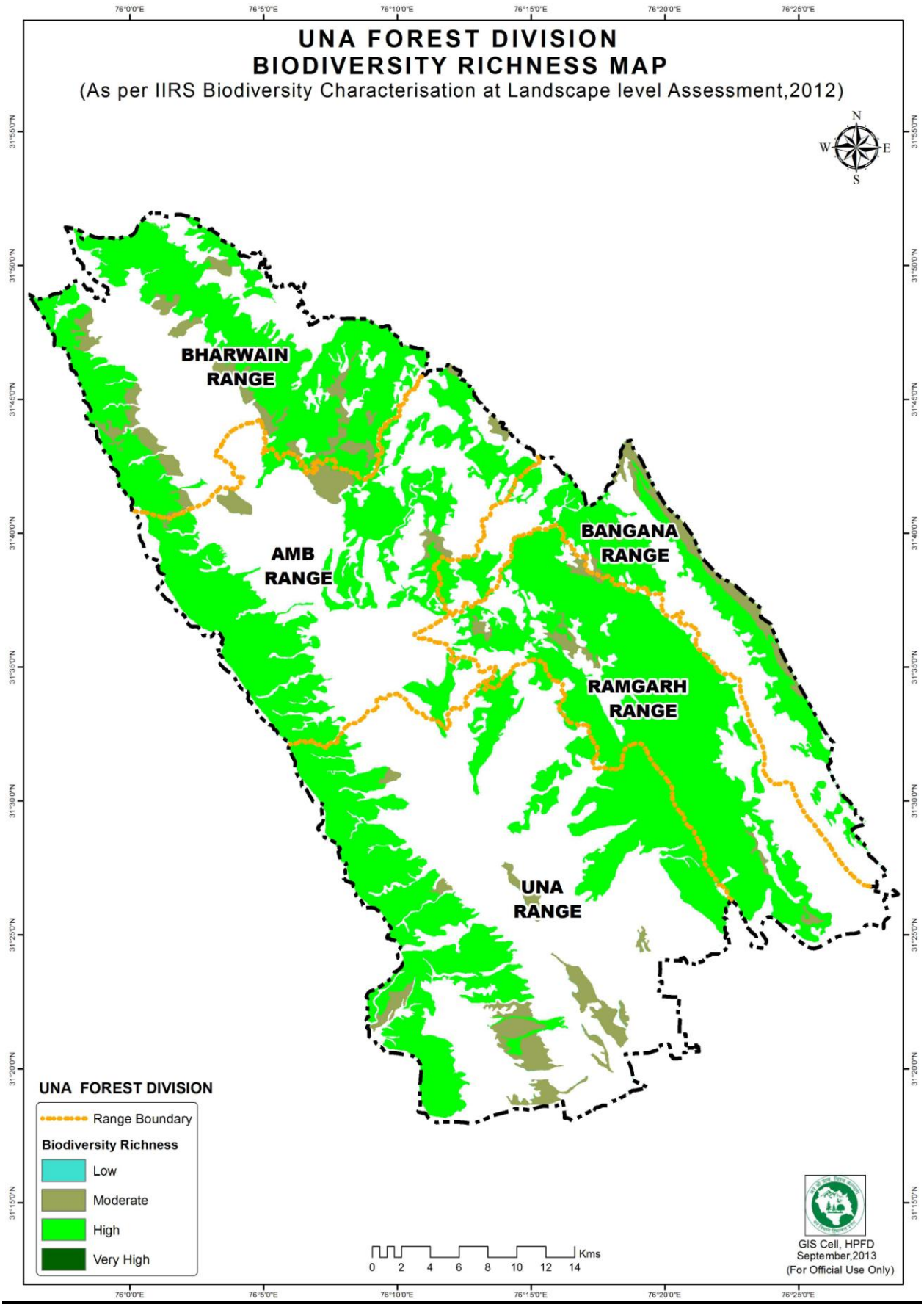
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(As per IIRS Biodiversity Characterisation at Landscape level Assessment,2012)
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AMB RANGE
BANGANA RANGE
RAMGARH RANGE
UNA RANGE
UNA FOREST DIVISION
Range Boundary
Biodiversity Richness
Low
Moderate
High
Very High
Kms
0 2 4 6 8 10 12 14
GIS Cell, HPFD
September,2013
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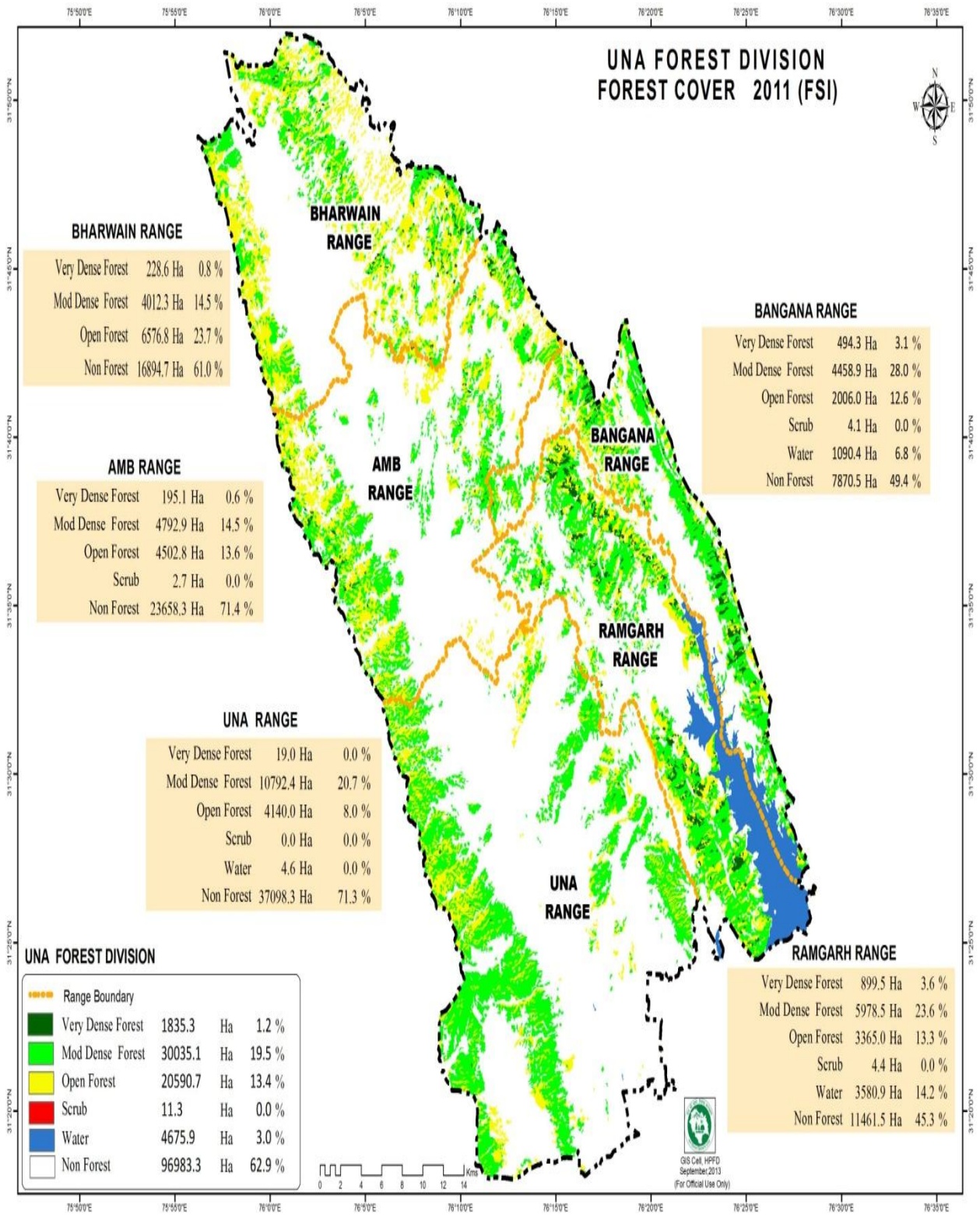
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BHARWAIN RANGE
Very Dense Forest 228.6 Ha 0.8 %
Mod Dense Forest 4012.3 Ha 14.5 %
Open Forest 6576.8 Ha 23.7 %
Non Forest 16894.7 Ha 61.0 %
BHARWAIN RANGE
AMB RANGE
Very Dense Forest 195.1 Ha 0.6 %
Mod Dense Forest 4792.9 Ha 14.5 %
Open Forest 4502.8 Ha 13.6 %
Scrub 2.7 Ha 0.0 %
Non Forest 23658.3 Ha 71.4 %
AMB RANGE
BANGANA RANGE
Very Dense Forest 494.3 Ha 3.1 %
Mod Dense Forest 4458.9 Ha 28.0 %
Open Forest 2006.0 Ha 12.6 %
Scrub 4.1 Ha 0.0 %
Water 1090.4 Ha 6.8 %
Non Forest 7870.5 Ha 49.4 %
BANGANA RANGE
RAMGARH RANGE
UNA RANGE
Very Dense Forest 19.0 Ha 0.0 %
Mod Dense Forest 10792.4 Ha 20.7 %
Open Forest 4140.0 Ha 8.0 %
Scrub 0.0 Ha 0.0 %
Water 4.6 Ha 0.0 %
Non Forest 37098.3 Ha 71.3 %
UNA RANGE
UNA FOREST DIVISION
Range Boundary
Very Dense Forest 1835.3 Ha 1.2 %
Mod Dense Forest 30035.1 Ha 19.5 %
Open Forest 20590.7 Ha 13.4 %
Scrub 11.3 Ha 0.0 %
Water 4675.9 Ha 3.0 %
Non Forest 96983.3 Ha 62.9 %
RAMGARH RANGE
Very Dense Forest 899.5 Ha 3.6 %
Mod Dense Forest 5978.5 Ha 23.6 %
Open Forest 3365.0 Ha 13.3 %
Scrub 4.4 Ha 0.0 %
Water 3580.9 Ha 14.2 %
Non Forest 11461.5 Ha 45.3 %
GIS Cell, HPFD
September 2013
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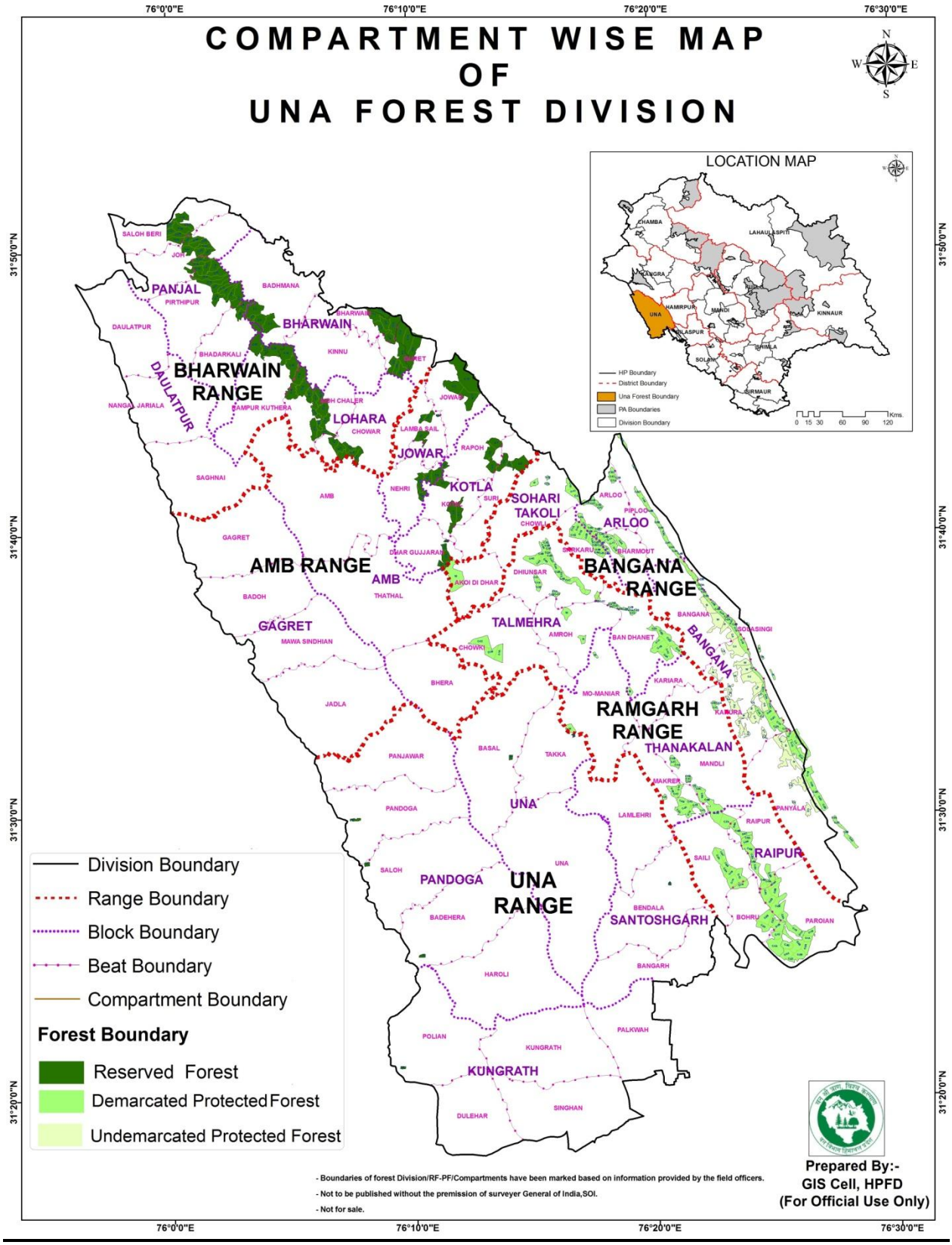
Kms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District Boundary
Una Forest Boundary
PA Boundaries
Division Boundary
Kms.
0 15 30 60 90 120
76°0'0"E
76°10'0"E
76°20'0"E
76°30'0"E
31°50'0"N
31°40'0"N
31°30'0"N
31°20'0"N
PANJAL RANGE
BHARWAIN RANGE
LOHARA RANGE
JOWAR RANGE
KOTLA RANGE
AMB RANGE
SOHARI TAKOLI RANGE
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TALMEHRA RANGE
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Undemarcated Protected Forest
- Boundaries of forest Division/RF-PF/Compartments have been marked based on information provided by the field officers.
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GIS Cell, HPFD
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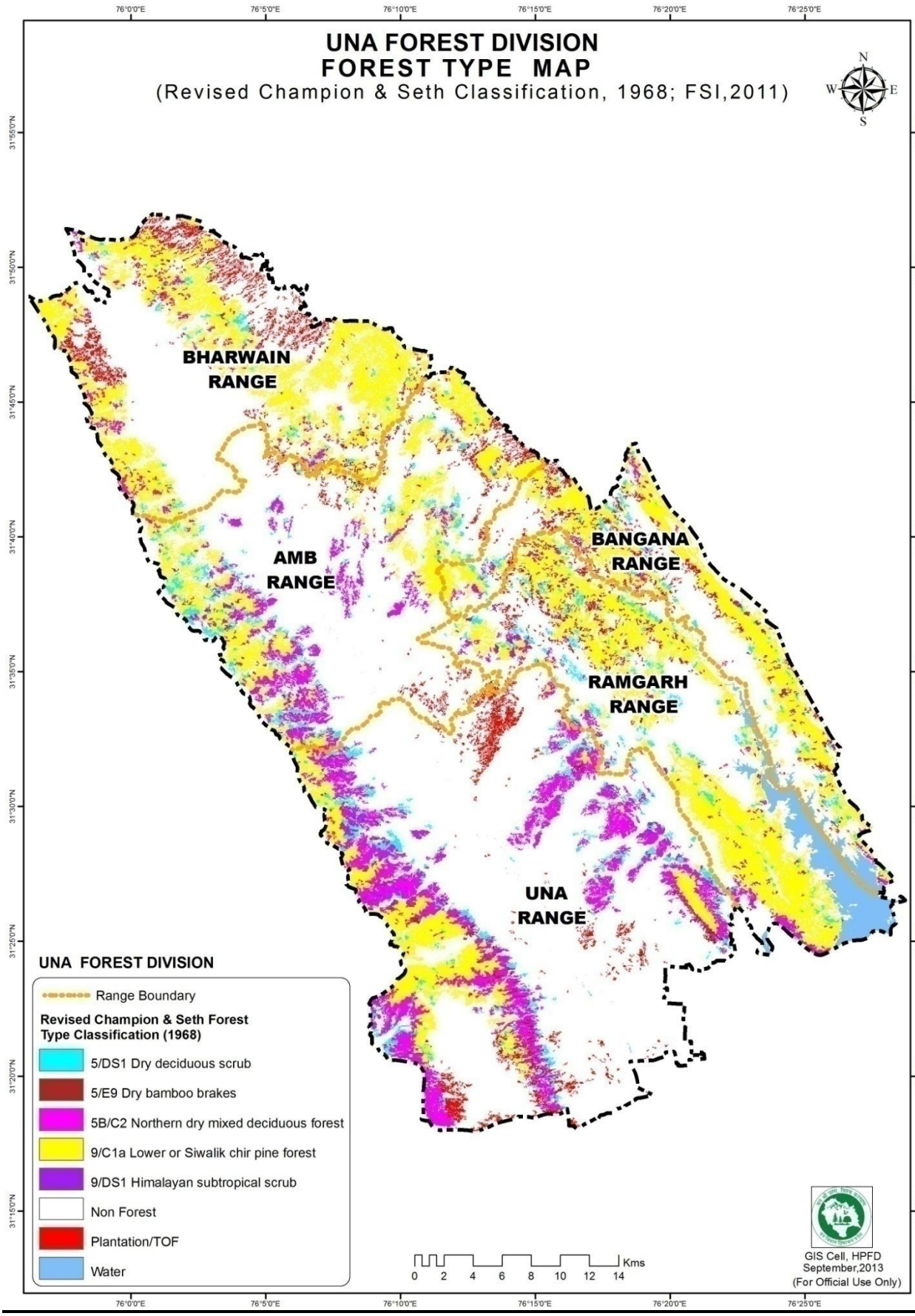
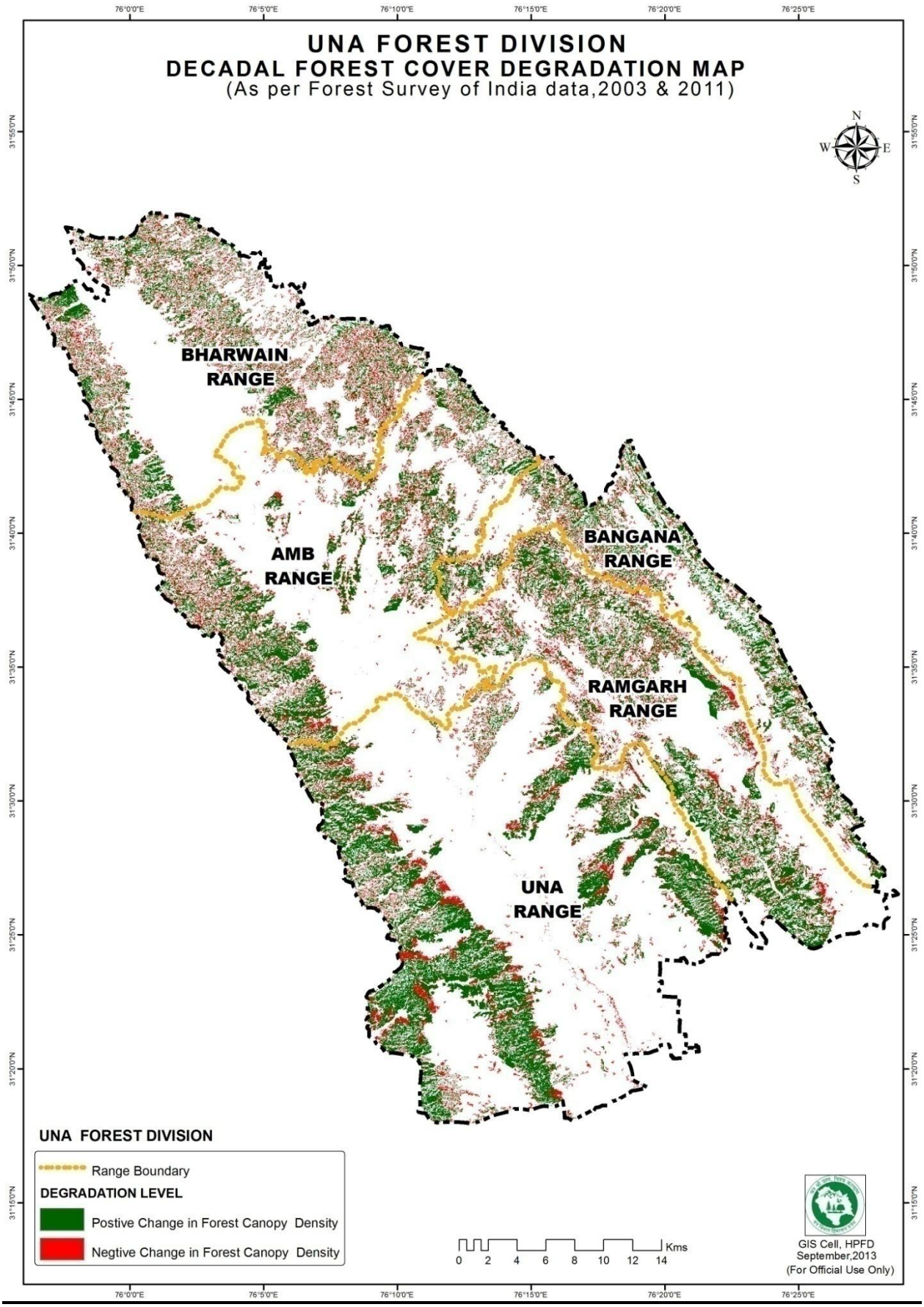

UNA FOREST DIVISION
FOREST TYPE MAP
(Revised Champion & Seth Classification, 1968; FSI,2011)
N
W
E
S
76°0'0"E
76°5'0"E
76°10'0"E
76°15'0"E
76°20'0"E
76°25'0"E
31°55'0"N
31°50'0"N
31°45'0"N
31°40'0"N
31°35'0"N
31°30'0"N
31°25'0"N
31°20'0"N
31°15'0"N
BHARWAIN RANGE
AMB RANGE
BANGANA RANGE
RAMGARH RANGE
UNA RANGE
UNA FOREST DIVISION
Range Boundary
Revised Champion & Seth Forest Type Classification (1968)
5/DS1 Dry deciduous scrub
5/E9 Dry bamboo brakes
5B/C2 Northern dry mixed deciduous forest
9/C1a Lower or Siwalik chir pine forest
9/DS1 Himalayan subtropical scrub
Non Forest
Plantation/TOF
Water
0 2 4 6 8 10 12 14 Kms
GIS Cell, HPFD
September,2013
(For Official Use Only)


UNA FOREST DIVISION
DECADAL FOREST COVER DEGRADATION MAP
(As per Forest Survey of India data,2003 & 2011)
BHARWAIN RANGE
AMB RANGE
BANGANA RANGE
RAMGARH RANGE
UNA RANGE
UNA FOREST DIVISION
Range Boundary
DEGRADATION LEVEL
Postive Change in Forest Canopy Density
Negtive Change in Forest Canopy Density
0 2 4 6 8 10 12 14 Kms
GIS Cell, HPFD
September,2013
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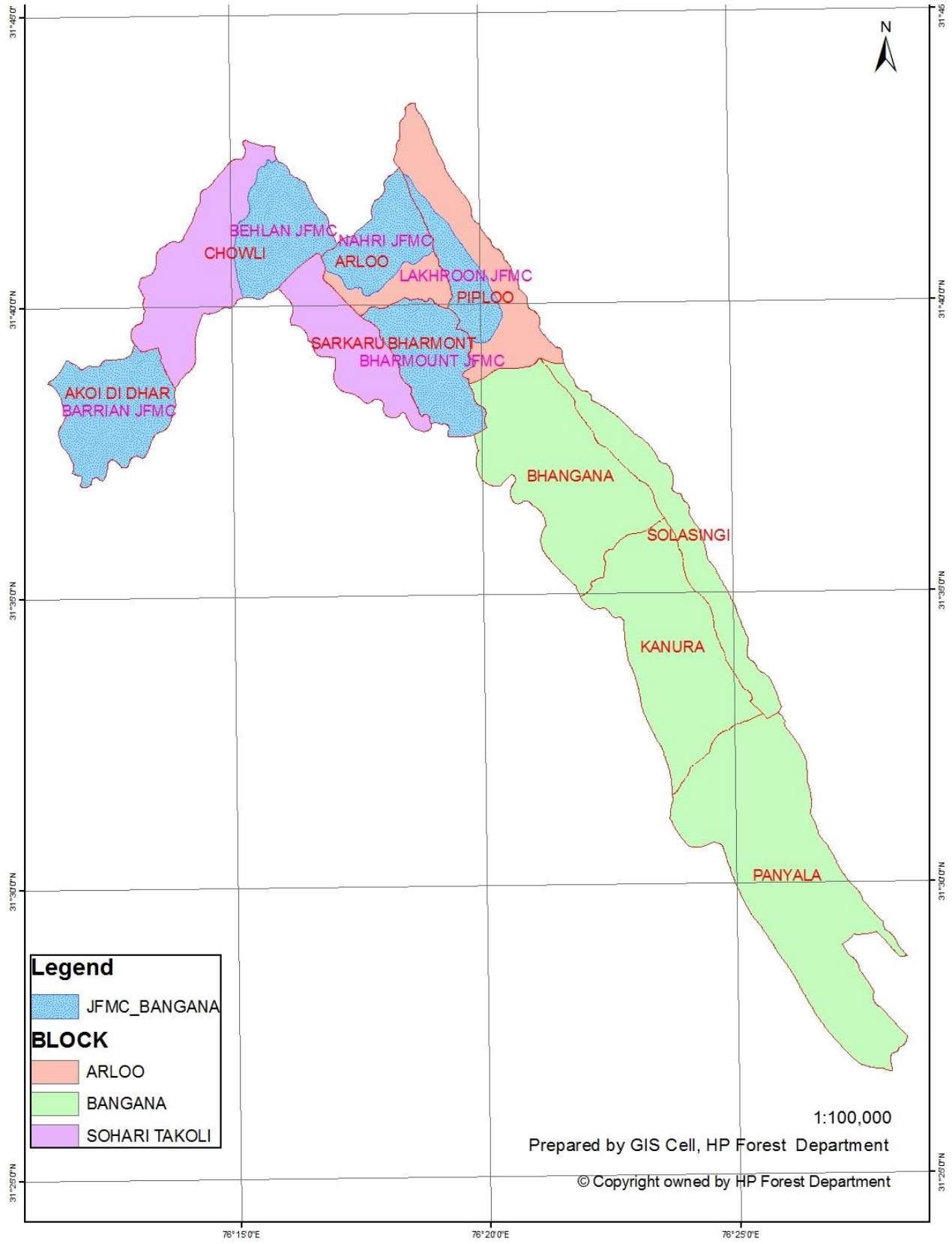
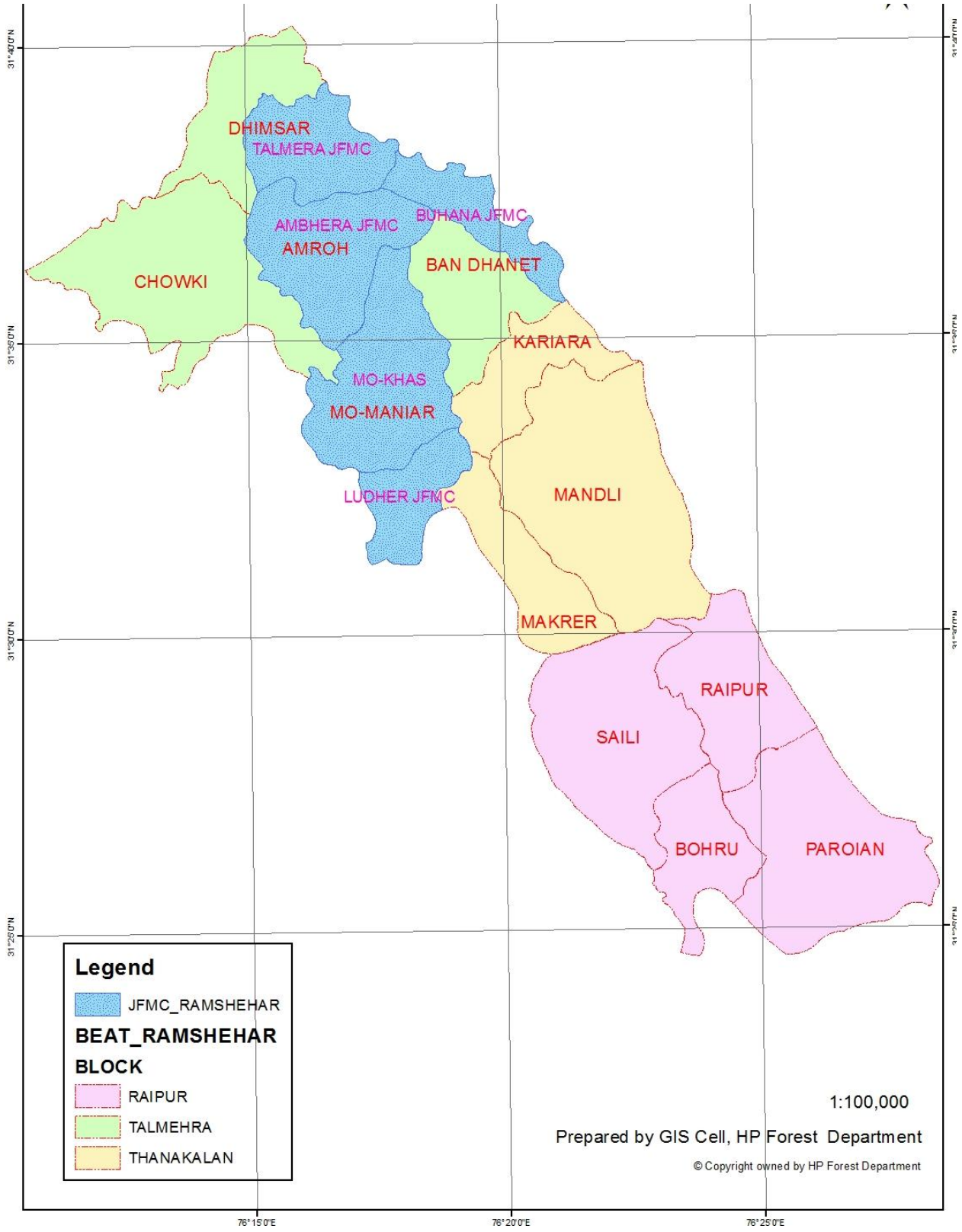
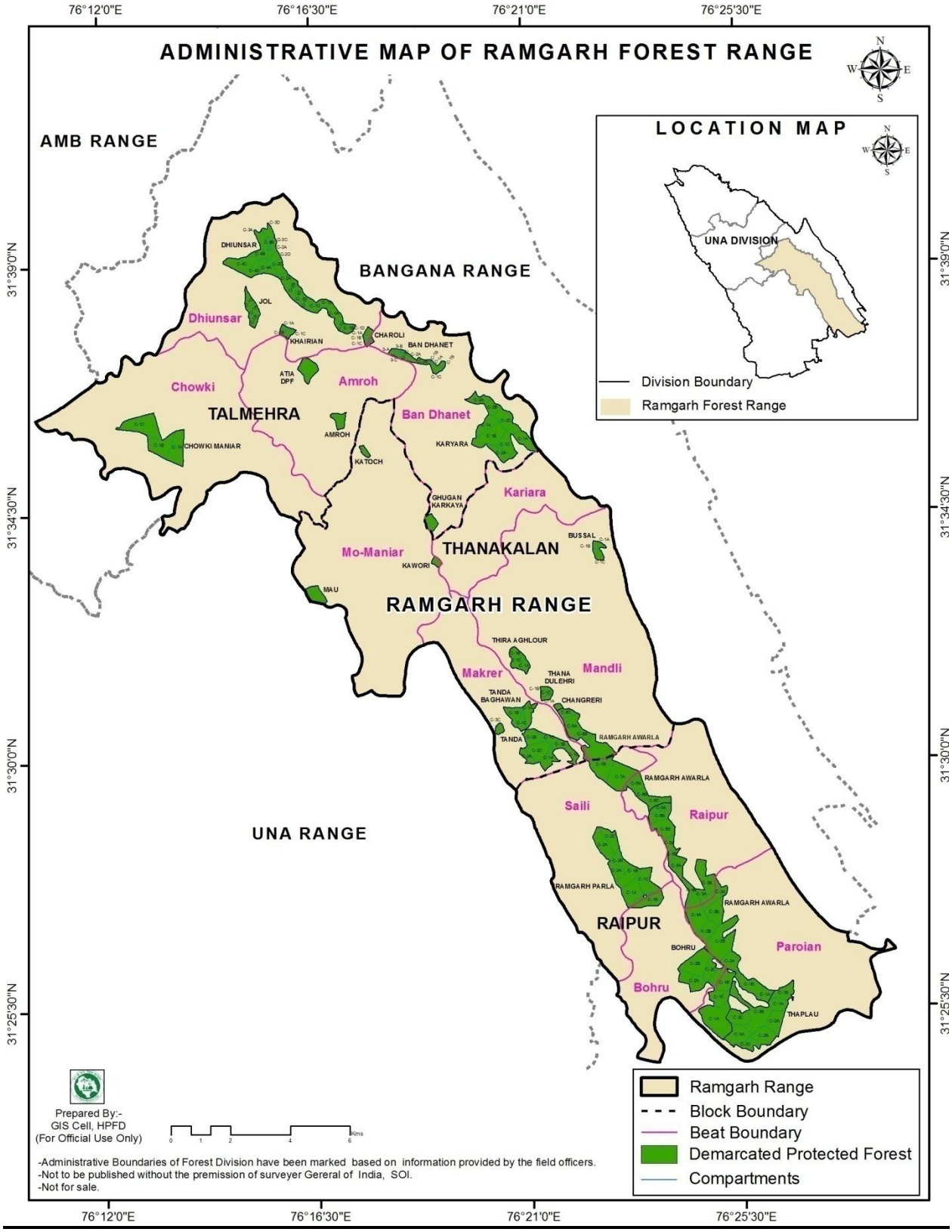
MAP OF BANGANA RANGE



MAP OF RAMGARH RANGE




ADMINISTRATIVE MAP OF RAMGARH FOREST RANGE
LOCATION MAP
UNA DIVISION
Division Boundary
Ramgarh Forest Range
AMB RANGE
BANGANA RANGE
UNA RANGE
TALMEHRA
THANAKALAN
RAMGARH RANGE
RAIPUR
Dhiunsar
Chowki
Amroh
Ban Dhanet
Kariara
Mo-Maniar
Makrer
Mandli
Saili
Raipur
Paroian
Bohru
DHIUNSAR
JOL
KHAIRIAN
CHAROLI
BAN DHANET
ATIA DPF
AMROH
CHOWKI MANIAR
KATOCH
KARYARA
GHUGAN KARKAYA
BUSSAL
KAWORI
MAU
THIRA AGHLOUR
THANA DULEHRI
TANDA BAGHWAN
CHANGRERI
TANDA
RAMGARH AWARLA
RAMGARH PARLA
BOHRU
THAPLAU
76°12'0"E
76°16'30"E
76°21'0"E
76°25'30"E
31°39'0"N
31°34'30"N
31°30'0"N
31°25'30"N
Prepared By:-
GIS Cell, HPFD
(For Official Use Only)
Kms
-Administrative Boundaries of Forest Division have been marked based on information provided by the field officers.
-Not to be published without the premission of surveyer Gereral of India, SOI.
-Not for sale.
Ramgarh Range
Block Boundary
Beat Boundary
Demarcated Protected Forest
Compartments

INTRODUCTION

This working plan revises Dr MP Gupta plan of Kutlehar forests of Una Forest Division covering the period of 1961-62 to 1990-91 and includes all the areas under the plan. This working plan covers an area of 16796.53 ha out of total 25376.39 ha of geographical area. This plan deals with DPFs & UPFs of kutlehar forests. Range wise breakup of the forest area (in ha) under this plan is as under:

Range	**Reserved Forests**	**Demarcated Protected Forests**		**Total**
Bangana	-	1716.06	3920.28	5636.34
Ramgarh	-	2674.72	8485.47	11160.19
G. Total		**4390.78**	**12405.75**	**16796.53**

The emphasis in the present working plan is on conservation and many changes have been made in this plan based on the present crop constitution, silvicultural requirements of the crop, guidelines of the national working plan code 2004 and lessons learnt from the past management. Accordingly, chapters on the activities of HP state forest development corporation ltd & five years plans have been included. The average growing stock in the chil working circle is 16.21 M^3/ha & 6.11 M^3/ha for legal & voluntary felling series respectively which is quite below the normal, therefore, no yield has been prescribed. However, salvage markings will continue & the approximate salvage removal of chil is estimated to be 1200 M^3 per annum. As no sequence of felling is required, a regeneration plan to restock the chil areas has been given. Apart from Chil, khair is the other important economic species of the tract. The annual yield prescribed for khair is 7900 trees per annum.

Since the PB-I areas are heavily infested with lantana, the detailed lantana eradication programme have been proposed under plantation (overlapping) working circle. Keeping in view the guidelines of National working plan code 2004, new mandatory working circles namely NTFP (overlapping) working circle, Joint forest management (overlapping) working circle, Forest protection (overlapping) working circle & Wildlife management (overlapping) working circle have been added along with the earlier working circles namely chil working circle, Bamboo working circle, Scrub working circle, rehabilitation working circle, Khair (overlapping) working circle &plantation (overlapping) working circle. Since, the people of the area are suffering from monkey menace, the control measures such as sterilization including plantation programme consisting of fruits trees for wildlife have been prescribed.

The management of the forests during intervening period i.e. 1992-93 to 2013-14 between the completion of period of earlier working plan & the proposed draft working plan was done as per three year felling programme for bamboo & regular salvage removal for chil, khair & other broad leaved species. The blank patches of forest were planted with fruit bearing species & other economical speciesas per the site specific requirement as per the available budgetary provisions and approved Annual Plan of Operations.

The revised working plan has been prepared for a period of fifteen years, commencing from 2014-15 to 2028-29. The working plan officer and his staff deserve all appreciation for completing the revision of the plan in time bound manner despite their engagement in discharging duties of territorial wing.

LIST OF FLORA OCCURING IN KUTLEHAR FORESTS

(A) TREES		
Local Name	**English Name**	**Botanical Name**
Khair	Cutch tree	*Acacia catechu*
Reer	White babul, Distllers's Acacia	*Acacia leucophloea*
Phalahi	Amritsar gum, Black Sally	*Acacia modesta*
Bael, Bil	Stone apple	*Aegle marmelos*
Kala Siris	Lebbek tree	*Albizzia lebek*
Safed Siris	White siris	*Albizzia procera*
Karmaru	Black siris, Ceylon rosewood	*Albizzia odoratissima*
Chhal	Axlewood	*Anogeissus latifolia*
Neem	Indian lilac	*Azadirachta indica*
Kachnar	Mountain ebony, orchid tree	*Bauhinia racemosa*
Kachnar	Mountain ebony, orchid tree	*Bauhinia variegata*
Dhak, Plah, Plash	Flame of forest	*Butea monosperma*
Chilla	Downy leaved false kamela	*Casearia tomentosa*
Alis, Amaltash	Indian laburnum	*Cassia fistula*
Lasura	Assyrian plum	*Cordia myxa*
Shisham	Sissoo tree, Indian rosewood	*Dalbergia sissoo*
Bis-tendu, Kala Dhao, Hadkinu	Mottled ebony	*Diospyros cordifolia*
Kinnu	Persimmon tree	*Diospyros chloroxylon*
Chamror		*Ehretia laevis*
Pariara	Flame tree	*Erythrina suberosa*
Jamun	Jambolan, Black Plum	*Syzygium cuminii*
Piaman	Rai Jamun	*Euginia operculata*
Safeda	Eucalyptes	*Eucalyptus spp*
Bar	Indian Fig, Bengal Fig	*Ficus bengalensis*
Daughla, Gular	Cluster Fig	*Ficus glomeratsyn* *Ficus racemosa*
Pipal	Sacred fig	*Ficus religiosa*
Tiamal	Elephant Ear Fig	*Ficus roxburghii*
Kangu	Batoko's plum	*Flacourtia ramontchi*
Dhau, Dhaman	Dhaman	*Grewia elastica*
Beul	Bihul	*Grewia oppositifolia*
Kembal	Indian ash tree	*Lannea grandis*
Barna		*Linociera crenulata*
		Linociera intermedia
Am, Amb	Mango	*Mangifera indica*
Drek, Dek	Indian lilac, Persian cedar	*Melia azadirachta*
Kamal	Monkey puzzle tree	*Mallotus philippinensis*
Kalam	Kaim	*Mitragyna parviflora*
Sohanja, Suhanan	Drum-stick tree	*Moringa oleifera*
Tatplanga	Indian trumpet	*Oroxylum indicum*

Sain, Sandan	Sandan	*Ougenia dalbergioides*
Khajur	Date Sugar Palm	*Phoenix acaulis*
Khajur	Date Sugar Palm	*Phoenix humilis*
Amla	Chinese laurel, currant tree	*Emblica officinalis*
Kakarsinghi	Pistachio tree	*Pistacia integerimma*
Kainth	Wild Himalayan Pear	*Pyrus pashia*
Simbal	Cotton wood tree	*Bombax ceiba*
Ambara	Wild mango, Indian Hog plum	*Spondias mangifera*
Phaldu, Kadamb	Kaim	*Mitragyna parvifolia*
Arjun	Arjuna myrobalan	*Terminalia arjuna*
Bahera	Belleric myrobalan	*Terminalia belerica*
Harar	Chebulic myrobalan	*Terminalia chebula*
Aisan, Sain	Indian laurel	*Terminalia tomentosa*
Pansra	Tilki	*Wendlendia exerta*
Dhalindu, Siaru	Dandal	*Xylosma longifolia*
Ber	Jujube	*Zizyphus jujuba*
Tuni	Indian mahogany	*Toona ciliata*
(B) SHRUBS & HERBS		
Basuti	Malabar nut	*Adhatoda vasica*
Ramban	Century plant	*Agave americana*
Neela phulnu, Cha Buti	Billy-goat weed, Chick we Goatweed, White-weed	*Ageratum conyzoides*
Nag-dona	Indian Worm-wood	*Artemesia vulgaris*
Nara	Giant cane, Spanish cane	*Arundo donax*
Satawar	Wild asparagus	*Asparagus adscendenc*
Rasaut	Indian Barberry, Chitra	*Berberis chitria*
Dudhli	White Butterfly Bush	*Buddleia asiatica*
Ailwan	Sickle senna, Wild senna	*Cassia tora*
Arloo, Relan	Fever-nut	*Caesalpinea sepiaria*
Gadoor		*Colebrookia oppositifolia*
		Cotoneaster spp
Shal-parni	Sal Leaved Desmodium	*Desmodium gangeticum*
Mehandar	Florida hopbush	*Dodonea viscosa*
Thor, Chhun	Royle's Spurge	*Euphorbia royleana*
Marorphali	East Indian Screw Tree	*Helicteres isora*
Kathu	Cassia Indigo	*Indigophera pulchella*
Ban Malti	Jasmine	*Jasminum humile*
Jamnotha	Physic Nut	*Jatropha curcas*
Punj-phulli	Lantana	*Lantana camara*
Durgari	Himalayan Mimosa	*Mimosa rubicaulis*
Gandhla	Curry Leaf	*Murraya koenegii*
Kaner	Oleander	*Nerium odorum*
Kuri, Har-shingar	Coral Jasmine	*Nyctanthus arbor-tristis*
Nagphan	Prickly Cactus	*Opuntia dillenii*
Kali-basuti	Bengal Pogostemon	*Pogostemon plectranthoides*
Arand, Arind	Castor Bean	*Ricinus communis*

Akha	Heart Leaf Raspberry	*Rubus paniculatus*
Bariara	Jelly Leaf	*Sida rhombifolia*
Kapur-mingar		*Strobilanthus auriculatus*
Banah	Five Leaved Chaste Tree	*Vitex negundo*
	Cocklebur	*Xanthium strumarium*
Tirmir	Winged Prickly Ash	*Zanthoxylum alatum*
Malah, Maleh	Jharber	*Zizyphus nummularia*
Basuti	Malabar Nut	*Adhatoda vasica*
Dhawi	Fire Flame Bush	*Woodfordia fruiticosa (*syn. *floribunda)*
(C) CLIMBERS		
Ratti	Crab's Eye	*Abrus precatorius*
Taur	Camel's Foot Climber	*Bauhinia vahlii*
Bel-Kum, Bel-Kungu	Gourian Clematis	*Clematis gouriana*
Akash-bel	Giant Dodder	*Cuscuta reflexa*
Kali-dudhi	Black Creeper	*Ichnocarpus frutescens*
Gauj, Salanga	Indian Beech, Indian Pongamia	*Millettia auriculata*
Salod	Indian Kudju	*Pueraria tuberosa*
Ram-datun	Kumarica	*Smilax macrophylla*
	Sarsaparilla	*Smilax vaginata*
(D) BAMBOOS		
Sotha, Bans, Bainj	Male bamboo	*Dendrocalamus strictus*
Maggar		*Dendrocalamus hamiltonii*
(E) GRASSES		
Lambh, Lambi	Three awns	*Aristida depressa*
Palwan	Indian couch grass, sweet pitted grass, Pitted beard grass	*Bothriochloa pertusa*
Dholu		*Chrysopogon montana*

****

LIST OF COMMON ANIMALS AND BIRDS OCCURING IN KUTLEHAR FORESTS

Local Name	English Name	Scientific Name
Bagla	Grey heron	*Ardea cinerea*
Bagla	Little egret	*Egretta garzetta*
Bandar	Macaque or Rhesus monkey	*Macaca mulatta*
Batair	Common quail	*Coturnix coturnix*
Bejoo	Ratel, Honey-badger	*Mellivora capensis*
Bhojanga, Hojanga	King Crow, Black Drongo	*Dicrurus macrocercus*
Billi	Cat	*Felis catus*
Bulbul	Red-vented bulbul	*Pycnonotus cafer*
Chamgadar	The Bat	*Pteropus medina*
Chhota fakhat	Indian spotted dove	*Streptopelia chinensis*
Chhuchhunder	Gray-musk shrew	*Suncus murinus*
Chua	Rat	*Rattus rattus*
Chua	Brown mouse	*Mus pletythrix*
Chua khana sanp, Dhaman	Common rat-snake	*Ptyas mucocus*
Chuhi	House mouse	*Mus musculus*
Ghuggi, Fakhta	Indian ring dove	*Streptapelia decaocto*
Giddar	The jackal	*Canis aureus*
Gilhari	Squirrel	*Funambulus pennanti*
Goh	Large bengal monitor lizard	*Varanus bengalensis*
Hudhud	Hoopoe	*Upupa epops*
Jangli murga	Red jungle fowl	*Gallus gallus*
Jangli-billi	Jungle-cat	*Felis chaus*
Kachua	Common land tortoise	*Testudo flagans*
Kaikil	Common King fisher	*Alcedo atthis*
Kakkar	Barking deer, Muntjac	*Muntacus muntjak*
Kala titar	Black partridge	*Francolinus francolinus*
Khargosh	Common hare	*Lepus nigricollis(L. ruficaudatus)*
Kirla, Girgit	Indian Chameleon	*Chameleon calcaratus*
Kirli	Common lizard	*Hemidactylus gleadovii*
Koel	Koel	*Eudynamys scolopacea*
Lakkar-bagha	Hyaena	*Hyaena hyaena*
Langur	Common langur	*Presbytis entellus*
Lomri	Fox	*Vulpes bengalensis*
Maina	Common myna	*Acridotheres tristis*
Mor	Common pea fowl	*Pavo cristatus*
Murgabi	Grey duck, Spot-billed duck	*Anas poecilorhyncha*
Nag	King Cobra	*Ophiophagus hannah*
Neol	Common mongoose	*Herpestes edwardsi*
Neol	Strip-necked mongoose	*Herpestes vitticollis*
Nilgai	Blue-bull	*Boselaphus tragocamelus*
Nilkanth	Blue jay, Roller	*Coracias benghalensis*
Pahari bulbul	Red whiskered bulbul	*Pyconotus jocosus*

Pahari kowa	Himalayan jungle crow	*Corvus macrorhynchos*
Pahari titar	Hill partridge	*Arborophila torqueola*
Phaniar	Common cobra	*Naja naja*
Safed bagla	Cattle egret	*Bubulcus ibis*
Sambhar	The Sambhar	*Cervus unicolor*
Sanp	Common Indian worm snake	*Typhlina bramina*
Sanp	Russells Viper	*Vipera russellii*
Selva kabutar	Blue rock pigeon	*Columba livia*
She	Porcupine	*Hystrix indica*
Suar	Indian wild boar	*Sus scrofa*
Tatihri	Red wattled lapwing	*Vanellus indicus*
Tendua, Bagh, Sher	Leopard	*Panthera pardus*
Titar	Grey partridge	*Francolinus pondicerianus*
Tota	Large Indian parakeet	*Psitaculla eupatria*
Tota	Rose ringed parakeet	*Psitaculla krameri*
Ullu	Spotted owlet	*Athene brama*

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GLOSSARY OF LOCAL TERMS.		
Sr No.	**LOCAL TERM**	**ENGLISH EQUIVALENT**
1.	Abadi	A village habitation.
2.	Abi	Irrigated.
3.	Adna Malik	Inferior owner.
4.	Ala Malik	Superior owner.
5.	Ala malkiyat	Superior ownership.
6.	Atiala/Tiala	A raised platform around a tree.
7.	Banjar Jadid	New fallow. Not cultivated for more than four successive year.
8.	Banjar Kadim	Old fallow. Not cultivated for the last eight successive year.
9.	Ban Kharetar	Hay land in the forest.
10.	Ban Muafi	Forest area owned by villagers.
11.	Ban Sarkar (Gair Mehdooda)	Un-Demarcated Protected Forests where land belongs to the individuals or a group of individuals and natural tree growth or planted by Forest Department belongs to the Government.
12.	Ban Sarkar Malkiyat (Mehdooda)	Demarcated Protected Forest where land belongs to individuals or a group of individuals and is assessed to land revenue.
13.	Barani	Un-irrigated land, dependent on rain.
14.	Bartan	Rights admitted in Forest Settlement.
15.	Bartandars	Right holders.
16.	Bauli or Bauri	A natural spring of drinking water.
17.	Bahand Banjar	Occassionally cultivated.
18.	Burjee	A boundary pillar.
19.	Behandar	Cultivated land
20.	Chhachhre	Broom for beating fire
21.	Chak	Part of land.
22.	Chak Ban	An area maintained as a forest jointly by few tikas.
23.	Chak dakhli	An area taken out from the tika and entered into other to facilitate revenue control.
24.	Chak kharji	An area taken out from the tika.
25.	Chak Shamlat deh	A piece of Ban Sarkar area surrounded by Demarcated Protected and Reserve Forest.
26.	Chalotu	A chil pole.
27.	Chand	Boundary pillar of tika.
28.	Changer	A rainfed inferior area.
29.	Charand	Grazing ground.
30.	Chheka	Counter fire during summers
31.	Chhachare	Locally made fire-broom
32.	Chillaru	Dry leaves of chil.
33.	Cho	A seasonal nallah not more than 50 feet in depth.
34.	Choharam	Share of the forest Rakha from the sale proceeds of forest produce.
35.	Chowkidar	A village watchman.

36.	Dandi	A foot path.
37.	Darya	A river.
38.	Devta/Bajhia	A local deity.
39.	Drat	A sickle for cutting bushes and trees.
40.	Drati	A sicle for cutting grasses.
41.	Gaddies	A community of migratory graziers keeping sheep and goats.
42.	Gair mumkin	Barren land under buildings, roads, paths and streams.
43.	Gair marusi	Tenants
44.	Ghanera	Ruins of village habitation.
45.	Gharal	A shed for cattle and stiring grass.
46.	Gharat	A water mill for grinding purpose.
47.	Gohar	A path.
48.	Goharn	A cattle shed.
49.	Goth	A grazing run.
50.	Gujjars	A community of migratory graziers keeping buffalloes.
51.	Hadbast number	A serial number given to a village, at the time of revenue settlement.
52.	Haldun	Flat fertile ground with deep soil.
53.	Har	Land laid waste due to flood
54.	Haq	Right.
55.	Haq Chuhram	Zamidari share means one fourth share in sale proceeds of trees and grass etc. in Ban Sarkar areas.
56.	Hath	A linear unit, approximately equal to (18 inches) 45cm.
57.	Jagnu	Chil splinters used for lightning fire.
58.	Jagir	A Estate awarded to an individual by the British for an act of bravery etc.
59.	Jagirdar	Owner of the Jagir.
60.	Jamabandi	Three years record of land maintained by revenue Depptt.
61.	Jhikla	Lower
62.	Jungle Mehdooda	Demarcated Protected Forest.
63.	Jungle Mehfooja	Protected forest.
64.	Jungle gair mehdooda and mehfooja	Undemarcated Protected Forest.
65.	Karam	A linear unit equal to 57.5 inches = 146.05 cm.
66.	Katha	Tannin obtained from Khair trees.
67.	Khad / Khalla	A stream perennial or seasonal.
68.	Kharetar	Hay field owned by individuals.
69.	Kharif	Autumn harvest.
70.	Khasra	A field number given on the village revenue records.
71.	Khola	A small valley.
72.	Kotwal	Manager of an area or Station House Officer.
73.	Lahr	Fields near the habitation.
74.	Lamberdar	A village headman who collects the revenue.
75.	Langhana	A Y-shaped wooden obstruction for cattle but a passage for men in brush wood fence.
76.	Makbooja	Possession.
77.	Mali	Gardener.

78.	Manu	Current years shoot of Bamboo.
79.	Marla	A revenue measuring unit 9 sq. Karam ($1/20^{th}$ of a Kanal)
80.	Mauza	A unit constituted by a member of tika for purposes of revenue administration.
81.	Nadi	A stream.
82.	Nallah	A small water channel or a torrent not more than 50 ft.in width
83.	Naun	A spring used for bathing washing purposes.
84.	Nautor	Breaking of land for purposes of cultivation off habitation for the first time.
85.	Palam	Irrigated Paddy area.
86.	Panch	A member of Panchayat.
87.	Panchayat	A body of Panches forming a village management committee.
88.	Patrah	Tree fodder.
89.	Patwar	A group of villages forming a Patwar Circle.
90.	Patwari	A revenue official incharge of a Circle.
91.	Quila	A fort.
92.	Rabi	Spring crop.
93.	Raja or Rajah	A ruler.
94.	Rakha	A person appointed for the protection of forests who collects grains from right holders and gets Choram from sale of forest produce for his services.
95.	Rang	Boulder/rock
96.	Sarhada	Trijunction pillar of three tikas.
97.	Sarpanch	A person head of the Gram Panchayat.
98.	Sawana	Gujjar,s encamping and grazing grounds.
99.	Shajra	A village field map.
100.	Sawanadars	Right holders of Sawana.
101.	Shamlat	A village common land.
102.	Taluqa	A management unit fixed by Revenue Depptt.
103.	Talab/Toba	Water pond.
104.	Thatch	Grazing grounds in the forests in higher reaches.
105.	Tehhdari	Owner of the all layers of soil.
106.	Tehsil	A sub division of a District made for the purpose of administration
107.	Terhai	Closed area.
108.	Terni	Grazing fee of sheep and goats.
109.	Tika	The smallest unit of area forming a part of mauza forpurpose of revenue administration (a village).
110.	Unclassed	Ban Sarkar area not declared as Protected Forests under IFA
111.	Uperla	Upper
112.	Zamindar	A land lord.
113.	Zamindari share	Out of revenue derived from sale of trees of grass etc. from Ban Sarkar area.

PART - I

SUMMARY OF FACTS ON WHICH PROPOSALS ARE BASED

CHAPTER I

THE TRACT DEALT WITH

1.1 NAME AND SITUATION

This working plan deals with the the Demarcated and Un-demarcated Protected Forests of Una Forest Division, Distt. Una, H.P. The forests of Kutlehar which have been covered are in Bangana&Ramgarh Ranges of Una Forest Division. The total Geographical area of the tract is 25,376.39 ha. The tract drains into rivers Sutlej, Swan and some part of it drains into river Beas. The tract lies between longitude $76^0$13'30" to $76^0$34'27" East and latitude $31^0$24'30" to $31^0$24'12" North.The head quarters of the Kutlehar Forests are at Una Forest Division, Una.

1.2 MAP REFERENCES

The tract has been surveyed by Survey of India during 1980 and is covered by Survey Sheet No. 53 A/6/NW; 53 A/6/SW; 53 A/6/NE; 53 A/11/NE; 53 A/2/SE & NE; 53 A/7/NE & NW; and 53 A/11/NW.

1.3 CONFIGURATION OF THE GROUND

The tract is mainly hilly with elevation varying from 543 m to 1162 m above mean sea level. The forests occur mainly on the slopes of Sola-Singhi, Ramgarh, Dhiunsar and Sarkaru Ghor plani dhars. The slopes are generally moderate to steep, but occasionally very steep. In between the above ridges, there is undulating cultivated land particularly in the valley by Sola Singhi and Ramgarh Dhars. Physiographical features of above noted Dhars are reproduced below:

Sola Singhi Dhar: It originates near village Banal at 963 m height and ends in Maseh Khad near Bhiambi village. The highest point is the Fort in village Dolu at 1162 m.

Ramgarh Dhar: It originates from village Olinda Bridge near Bhakra Dam and runs from South to North. It ends in Khurd-di-Khad near village Tand/Jogi Panga.

Bhindla Dhar: Part of Lola-Singhi Dhar near village Llsahan runs towards West at Behlan. It turns towards North-West ending in the Distt. Kangra.

Dhiunsar Dhar: It ends at village Baruhi near Garni Khad.

1.4 DRAINAGE

The tract forms a small part of the catchments area of river Satluj and Beas. Its greater part drains into Gobind Sagar through Lunkhar khad and Sir Khad. Part of north-eastern slopes of Sola singhi and Dhiunsar Dhars drain into river Beas through Man and Maseh khads forming part of catchments areas of Pong Dam. Part of western slopes of Ramgarh Dhar drains into Satluj down stream of Bhakra dam and form the catchments of Nangal dam. Other western slopes of Ramgarh and Dhiunsar dhars drain into river Swan through Chhatrara, Basal, Dhusara and Garni khads.

1.5 GEOLOGYAND ROCK

As per information supplied by the Superintending Geologist Punjab HP Circle, Chandigarh, the rock formations met within the area belong to Lower Shivaliks, Middle Shivaliks and Alluvium.

The geological succession is given below: -

2 Recent and sub recent: Alluvium

3 Upper Shivaliks: Boulder conglomerate Pinjore Stage-Sand stone with pleble beds.

4 Middle Shiwaliks: Dhok Pathan stage sandstone and conglomerate. Negri stags sandstone & intercalated clays.

5 Lower Shiwaliks: Satluj stage sandstones mostly massive green coloured with very little clays. Nalagarhi stage shales with thin bands of sandstones.

6 The Satluj stage on account of the hard and resistant nature of its constituents sand-stone is responsible for the more prominent ridges that traverse the area such as Sola Singhi dhar. This formation passes gradually upwards into the grey sandstone and the red clays of the overlying middle shiwaliks which later passes into upper Shivaliks sand rock, conglomerate and boulder beds.

7 The main structure units from west to east are Ramgarh dhar anticline; Lingur Syncline (faulted) Lunkhar khad thrust and Sola Singhi syncline. The axis of the Ramgarh dhar runs in north westerly directions close to the Ramgarh dhar with variable north-westerly pitch upto Talai with various formations from Nalagarh to Satluj stage sweeping around nthe axis-between Chukat and Talai. The lingur

synchline fault emerges from the Bhakra back thrust about a kilometer north of Satluj gorge and runs in a north westerly direction cutting out most of northwestern flank of the Ramgarh dhar anticline. The Kosar syncline situated between the Bhakra thrust and the Lunkhar khad thrust has a stong southerly ditch as is seen near Kusiala in the north. The area is primarily boulder conglomerates with sand stone and a little of clay mixture.

1.6 SOILS

As a result of detailed soil survey conducted by the All India Soil and Land use Survey Organization of Central Soil Conservation Board in the catchments of Lunkhar khad, 10 soil series with numerous phases have been differentiated. Detailed descriptions of the soil series and soil profiles can be seen in report No. 12 of September, 1962 of the above said organization.

Broadly speaking, alluvial and colluvial soils on sandstones and shales are met with. The soils are both calcareous and non calcareous. The texture varies from fine sand to sandy loam. Such soils tend to dry up soon with the general deficiency of moisture in dry periods of the year. From the available date, it will be advisable to determine suitability of different sites for raising different trees crops and to delineate the same, particularly for the scrub forests. The type and depth of soil are important factors to classify these sites. The existing natural vegetation also provides a useful guide to determine site suitably.

1.7 CLIMATE

The climate of the area on the whole is subtropical type but appears to be little cooler at higher elevations. Summer months are rather warm and winters bit cold. The minimum and maximum temperatures range from 2^0C to 40^0C.

1.8 RAINFALL

Monsoons are the main carriers of rainfallfor this area and major part of rainfalloccurs in the months of July to September as may be revealed from the table below. Afew showers at longer intervals, however, occur in the remaining parts of the year also. The average annual rainfall at Bangana situated at a distance of 32 kms from Una is 150 cms. The extent of rainfall, however, decreases with movement towards Una. Rainfall occurs in torrential down-pours and causes landslides and severe erosion.

Hailstones in the spring show common occurrence and cause considerable damage to the standing wheat crop.

The tract is subjected to heavy frost from December to the end of January and sometimes till the middle of February. It causes considerable damage to plantations, seedlings in the nurseries and also agricultural crops. The phenomenon of frost occurrence can not be lost sight while selecting sites for nurseries in the tract and also making choice of species to be raised on a particular site.

Table No. 1.1: Month wise rainfall based on 2001-2013 rainfall data (Rainfall in mm)

Months	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Jan	0	26.7	77.2	121.0	97.0	55.0	21.0	53.0	7.0	13.0	87.0	139.0	27.0
Feb	0	25.0	101.0	15.0	209.0	2.0	0	9.0	7.0	37.0	55.0	28.0	90.0
Mar	0	41.4	93.2	0	73.0	167.0	133.0	12.0	14.0	0	28.0	23.0	51.0
Apr	0	52.2	13.0	47.0	11.0	20.0	209.0	57.0	17.0	0	52.0	32.0	8.0
May	0	34.3	0	12.0	176.0	112.0	48.0	26.0	0	38.0	184.0	1.0	8.0
Jun	0	38.7	84.0	167.0	80.0	214.0	17.0	230.0	0	110.0	135.0	29.0	261.0
Jul	0	223.0	55.2	365.0	469.0	398.0	88.0	251.0	232.0	207.0	374.0	278.0	400.0
Aug	0	568.0	235.0	199.0	429.0	410.0	388.0	216.0	303.0	339.0	121.0	534.5	385.0
Sep	0	116.5	366.0	139.0	153.0	137.0	428.0	45.0	197.0	295.0	31.0	330.5	142.0
Oct	0	0	0	155.0	2.0	0	150.0	35.0	2.0	61.0	0	6.0	40.0
Nov	22.1	0	16.0	5.0	0	0	0	0	14.0	8.3	19.0	0	8.0
Dec	16.3	0	0	27.0	0	55.0	0	0	0	0	0	0	30.0

Source: *Una Forest Division*

1.9 WATER SUPPLY

In this area, there are large number of springs known as bawlies which are source of water in addition to the flow in streams like Lunkhar Khad and its tributaries. Water in many of the springs dries up during the summer, thus becoming inadequate for human and animal consumption. Most of streams are also seasonal and dry up in summer. A few, however, are perennial and are situated in the south-western part of the tract from Bihru Bag towards south. They take their origin from springs. These perennial streams are taken advantage of for irrigation which isalso used for wheat crop during dry spells insame areas by lifting the water from perennial streams, the water requirement is met.

With the completion of Bhakra Dam, store water is available to the population living along the periphery of Gobind Sagar through out the year. Small silt detention dams constructed as part of soil conservation works store water for some period of the year after rains.

1.10 DISTRIBUTION OF AREA

The following table shows the distribution of areas of forests, waste-lands and cultivated lands in the tract covered by this Plan:

Table No. 1.2: Distribution of Areas Kutlehar Forests

Sno	Particular	Area (ha)
1	Area of the Demarcated Protected Forests:	4390.78
2	Delimited under rotation Closure scheme.	
	a. Area of the UndemarcatedProtected Forests	12405.75
	b. Total area of protected forests	16796.53
	c. %age of area under the rotational closure scheme to total area under Protected Forests	26.14%
3	Area of uncultivated waste:	3080.51
4	Area of private waste and grass land	207.35
5	Area of cultivated lands:	5292.00
6	Total geographical area:	25376.39
7	%age of area	
	a. Protected forest of total geographical area:	66.19 %
	b. Delimited forests of total geographical area:	17.30 %

Source: *Una Forest Division*

The areas figures of the compartments and sub-compartments of DPFs as shown in the plan under revision have been taken as correct. Areas of compartments have been worked out from stock maps by dot gauge method and can be taken as approximate only. The area figures in respect of DPFs as shown in the plan under revision have been taken as correct. Areas of UPFs have been collected from revenue record. Some of the forest areas have been taken over by other departments for their projects such as construction of roads, buildings, bridges or execution of water supply schemes or given as Nautors prior to FCA,1980 or for any other purpose. However, transfer of some forest areas has taken place after coming into force of Forest Conservation Act, 1980.

The plan does not deal with areas vested to the HP Government under Ceiling on Land Holding Act, 1972 and under the Himachal Pradesh Village Common Lands

(Vesting and Utilization) Act, 1974. Areas having tree density less than 0.3 can be considered for planning afforestation programmes in future.

Further UPFs and DPFs dealt with under this plan do not fall wholly in Government ownership. As per the implications of HP Government policy decision followed by recommendations of Dharam Singh Report of 1989, all non-Chil UPF area in private ownership for which private owner have been paying land revenue to the Government will become their Malkiat and will be mutated in favour of respective individuals in the near future.

1.11 STATE OF BOUNDARIES

The boundaries of the DPFs were originally delineated at the time of Sheep Shank Forest Settlement(1815) by small pillars of mud and stone. These pillars were repaired and replaced at the time of preparation of rotational Closure Scheme in 1927-28 when the boundaries of Delimited Forests and of first closure series were marked and boundary register was prepared. The maintenance of boundary pillars has been generally neglected. The observations in the plan have been overlooked. There still does not exist boundary register for DPFSarkaru Ghorplani. Likewise the index map in the boundaries registers either do not have pillars numbers or the pillar number do not tally with those on ground. The periodic checking of the boundary line i.e. the distance between consecutive pillars and bearings from pillar to pillars was taken up but not completed for all the forests. The demarcation of areas under the second and their closure series of the plantation Working Circle of the included cultivation in the UPFs had not been done except in a couple of forests. The boundary pillars in some cases are fixed for a part without any intermediate pillars.

1.12 LEGAL POSITION

With the coming of the HP Village Common Land(Vesting and Utilization) Act, 1974, the ownership of the land of DPFs and UPFs hitherto owned by proprietors, now vests in the State Government. All trees growing in the protected forests are subjected to rights of *Bartandars*.

And whereas in T.N. Godavarman Thirumalpad V/s Union of India, the Supreme Court of India held that the Forest (Conservation) Act, 1980 must apply to all

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

1.13 RIGHTS AND CONCESSIONS

The principal rights were recognized by Sheep Shank at the time of Forest Settlement during 1912-15. Breaking up of land for cultivation in Demarcated Protected Forests is prohibited. In the Undemarcated Protected Forests, the Superintendent, Kutlehar Forests (Ex-Chief ruler) of a Princely Estate of Kutleharused to allow fresh cultivation under certain conditions detailed in Sheep Shank’s report which were adequate to prevent undue extension of cultivation. The Government also granted nautors under HP Nautor Rules, 1968 till the enactment of FCA, 1980; whereafter, concessions were discontinued.

Earlier, the building timber could be obtained under the permit of the Superintendent, Kutlehar Forests on payment of fixed zamindari fees for the construction and repair of dwelling houses, cattle sheds and other agricultural buildings. The safeguards provided against over demands are that ordinarily trees will not be granted more often than once in five years except under special circumstances such as in case of burning of the applicant’s houses.However,in case of such exigencies timber for new house was not given when the applicant had already got a suitable building in a reasonably convenient locality and of a size sufficient for the requirement of a bonafide agricultural holding.Trees that were given were utilized for the purpose for which the same had been granted and within the revenue estate where the cultivated land was situated. No timber or trees acquired by bartandars in exercise of their right may be sold, nor it be applied to other purpose for which it was granted.

All trees were classed together except that *Dodonea viscosa* and lambardars were authorized to give permit for cutting them. Trees on the other hand were marked by a

forest officer before being cut out in cases of crooked malformed and dry trees must be marked first.

a) Wood for burning of dead:Cutting as well as removal of any tree except Chil and bamboos to an amount sufficient for that purpose was procured without any permit, whereas notice of all such cuttings was given to rakhas or other Forest Officials within 10 days.

b) Chil and bamboos were marked and cut or lopped when no other suitable trees were available and the Raja reported to the Deputy Commissioner (now Divisional Forest Officer) the grant of all permits to cut or loss of such trees.

c) Chil was only given when the other trees were not available.

The record of trees given to right holders since 1932 is incomplete and it is, therefore, impossible to compare present demand with that in the past. There is little doubt that the demand had increased. The total demand by right holders is so great and large portion of it is satisfied from the Undemarcated Protected Forests. The burden on these forests had increased and the useful trees in these forests are fast disappearing. It is expected to increase in future. Detail of trees sanctioned to right holders from 1964 to1990-91 is tabulated below:-

Table No.1.3: Detail of trees sanctioned to right holders

Year	No. of trees	Volume(M^3)
1996-97	522	552.03
1997-98	1179	1129.72
1998-99	914	822.97
1999-2000	483	455.13
2000-01	287	256.5
2001-02	247	229.06
2002-03	108	120.2
2003-04	283	280.84
2004-05	115	129.75
2005-06	137	121.89
2006-07	0	0
2007-08	0	0
2008-09	0	0
2009-10	0	0
2010-11	0	0
2011-12	0	0

2012-13	0	0
Total	**4275**	**4098.09**
Avg. Per Year	**251.47**	**241.06**

Source: *Una Forest Division*

(a) Grazing: The proprietors of the soil of protected forests (*khudrodarakhtanmalkiatsarkar*)&proprietorsandagricultural tenants of cultivated lands assessed to land revenue in thevillages in which such forest situated have right of grazing in such forestexcept that all bamboos forests are closed from 15th*Har* to 15th*Aswin* i.e. from, 1stJuly to 30th September. The forest settlement provides that rights are exercised only for the agricultural and domestic requirements of *bartandars*& only in behalf of their own cattle they cannot be exercised for pastoral, as distinguished from agricultural purpose except in case of gaddies &Gujjars.

(b) Gaddis: The management of grazing by sheep and goats belonging to gaddis was with the Superintendent, Kutlehar Jagir Forests. They were allowed to graze in their hereditary runs as recorded in the detailed record of Rights on payment of dues fixedfrom time to time by the Government. The rates are the same as for the rest ofKangra i.e. Rs. 0.75 paise per goat and Rs. 0.08 paise per sheep. In passing to and from their runs, the gaddis have only a right of way & may not remain longer than one night at one place or at the mosttwo nights forSpecial reasons such as heavy rains or giving salt to their flock,if in case they remain in the protected forests beyond this time, they are liable to grazing dues. Successive halting place must be atleast five miles apart.Table No.**1.5** below gives the number of sheep & goats that grazed Kultlehar Forests from 1996-97 to 2011-12. The average number ofSheep & goats grazed annually by the gaddies is 6898& 6696 respectively. Total annual average of animals grazed comes to 13694 as against 15500 for the period 1954-55 to 1961-62. This is encouraging trend.

(c) Gujjar: Ban(nomadic)gujjars came to Kutlehar but many resident gujjars also graze number of buffaloes. These gujjars exercise rights by virtue of being proprietors of the soil.

Table No.1.4: Statement showing migratory animals during 1996-97 to 2013-14

Year	No. of animals grazed		
	Sheep	**Goats**	**Total**

1996-97	8797	9559	18356
1997-98	4725	4324	9049
1998-99	4414	4258	8672
1999-2000	4493	4258	8751
2000-01	6638	7192	13830
2001-02	8103	7813	15916
2002-03	8037	7813	15850
2003-04	7674	7496	15170
2004-05	6820	6660	13480
2005-06	7428	7133	14561
2006-07	6100	5913	12013
2007-08	7794	8274	16068
2008-09	6430	6340	12770
2009-10	6976	6612	13588
2010-11	6304	6035	12339
2011-12	9640	9059	18699
2012-13	8053	8400	16453
2013-14	9226	8753	17979
Annual Avg.	**7091.78**	**6994**	**14085.78**

Source: *Una Forest Division*

(d) Lopping: Broad-leave trees can be lopped by hand for obtaining twigs and leaves for fodder and manure subject to restrictions that no tree less than one hath(40 cms) in girth may be lopped. The branches cut not exceed finger thickness and trees are not to be lopped to more than half their height. No cutting instrument is allowed and twigs have to be broken by hand. In no case chil could be lopped without permission of the Superintendent, Kutlehar Forests. However, the enforcement of these restrictions is met with practical difficulties and in the scrub forests; the rules are more honoured in their breach than in observance and have not been successful in preventing damage which has rather increased.

(e) Sale of patrah: The Superintendent, Kutlehar Forests has a right to give licenses to non right holders to take leaves of Chhal(*Anogeossuslatifolia*) for tanning. Such licenses were issued for the forests on the western slope of the Ramgarh ridge and

the practice has resulted in indiscriminate lopping of these trees on account of which majority of these are stunted and malformed.

Special Rights of the Superintendent, Kutlehar Forests:-

The Superintendent, Kutlehar Forests could take from the protected forests all the timber and other forests produce for bonafide requirements. Hewas required to record all trees and bamboos cut for his use in the register maintained for the right holders. He could not, however, export this forest produce out of the jagir.

The acts which could be done without a permit are given in Sheep Shank's Report. Briefly these are:-

i. Grazing

ii. Cutting and removal of dry and fallen wood for fuel.

iii. Cutting and removal of any tree except chil and bamboo for burning the dead provides that when other trees are not available, chil may be cut for this purpose

All rights of users were subject to the condition that the right holders shall be responsible for the pay of rakhas of forests in which they have rights and are subject to limitations that may not be exercised to an extent that they may endanger the existence of the forests. Sheep Shank's Report(notification No.2839-F dated 31.8.1815) containing complete records of rights may be consulted for further details.

The settlement reports of Anderson and that of Sheep Shank for Kutlehar Forests along with printed file no.12- Punjab Civil Secretariat- Part III-Forest- Kangra district-Kutlehar Taluqua-year 1915-16 are valuable documents concerning Kutlehar forests.

Acquisition of Management of Kutlehar Forest from Raja Mohinder Paul (ex-Ruler) by H.P Government

In the late eighties, local public representatives of Kutlehar Constituency raised voice against the management of Kutlehar forests by Ex-ruler of Kutlehar and demanded acquisition of management by State Government. Their demand got momentum and after dueconsideration, the State Govt ordered acquisition vide notification No.Rev.D.(F)7-1/90 dated 19-1-1990. Accordingly, D.F.O. Una assumed management of Kutlehar

forests on 20-1-1990 under intimation to all quarters concerned through telegram dated 20-01-90.

Above said Govt. notification and action of DFO Una in pursuance of the said notification was challenged by the Ex-Ruler through CWP No.96 and 42 of 1990 filed in H.P. High Court vide its order dated 22-1-90, the Hon'bleCourt stayed the operation of notification in question.

Since the State Govt. sincerely wanted to acquire the management of Kutlehar forests in public interest, HPKutleharForests(Acquisition of Management)Bill,1992 was passed in the Assembly which culminated into HPKutleharForest(Acquisition of Management)Act,1992 with the assent of President of India on 6-9-1992. Said act was challenged by Ex-Ruler in HP High Court through CWP 707/92 on which the said court issued stay on 25-9-1992 and allowed the Ex-Ruler to continue the management of Kutlehar forests.

Through civil appeal no. 7225 of 1993 filed in the Supreme Court of India, State Government prayed for vacation of stay order dated 25.9.92 passed by H.P. High Court against the operation of above Act. Said civil appeal of State Government was allowed by the Supreme Court of India restraining both the parties not to cut and sell the trees pending disposal of writ petition by HPHigh Court. HPHigh Court disposed CWP No.707 of 1992 during August 1994 striking down clause 5 of the above Act which was observed to be unfair to the Ex-ruler.

State Government reviewed provision of compensation to Ex-ruler, amended clause-5 of the Act and introduced in the assembly the amendment of the act to the extent of Clause-5 and the same was passed during the Assembly session(Dec. 1994). President's assent to the amended Act was given on 22.2.1995 in pursuance of which State Governmentlaunched follow up action fixing 11.3.1995 as the appointed date of acquisition and empowering DFO Una to take over management of Kutlehar Forestsfrom the ex-ruler. DFO Una assumed management of Kuthlehar Forests on 11-03-1995 under intimation to all quarters concerned and served notice on Ex-Ruler vide No.13147 dated 11.3.95 to physically make over the management and all ancillary matters there to. The Ex-ruler again challenged the acquisition of the management through CWP No.127/95 in H.P. High Court and the said court has once again stayed the acquisition vide their order

dated 16.3.95 and have fixed the main case for hearing on 19.4.95. This is briefly the position as on today.

Notwithstanding repeated frustration of the State Government's efforts to acquire the management of Kutlehar forests over the past five year or so, circumstances are evidence to the State Government's determination to acquire the management of Kutlehar forests in the near future.

However, after enactment of the Himachal Pradesh Kutlehar Forest (Acquisition of Management) Act, 1992; Kutlehar Forests were taken over by the HP Forest Department on 6-2-1996. All control regarding grant of rights and concessions to residents as well as non-residents (gaddis, etc), rested with the Forest Department, thereupon.

1.14 NAUTOR LAND

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

1.15 THE FOREST (CONSERVATION) ACT, 1980

In the year 1980 a new Act was promulgated which made it mandatory to seek permission of the Central Government for diverting any forest land for non forestry purposes. During the last plan period total 19.57.31 haof UPFs has been diverted under the provisions of the Forest (Conservation) Act, 1980**.**

1.16 ENCROACHMENTS

Encroachment is not a major problem in the Kutlehar Forests and other Government lands in the tract. Vide Government of Himachal Pradesh Notification No. 1-21/71 LSG dated 8th June, 1994, the DFO's in Himachal Pradesh have given the powers of collector under H.P. Public Premises Land (Eviction & Rent Recovery) Act, 1971 to deal with the cases of encroachment on forest land only.

1.17 ZAMINDARI SHARE

H.P. Government vides their letter No. II-21/74 (Rev.-B) dated the Ist December, 1976 have stopped the payment of *zamindari* share to the Khewatdars beyond 1973-74. The contentions being that the lands, earlier being the property of the Khewatdars have

now vested in the Government. In this connection, the aforementioned note by Anderson that this was not a Malkana in recognition of their rights in the land but a voluntary grant to secure their interest and cooperation in forest conservancy is relevant. Thus, the withholding of Z*amindari*-share has incorrectly been linked with the vesting of land in the Government. Moreover, the payment of a share of revenue from the Unclassed Forests in 21 villages of Nurpur and 29 villages of Dehra Tehsils, where Reserved Forests were created, is a distinct right and not a concession (Z-share)as in other areas. The withholding of payment of Khewatdars and Lambardars in these villages is an infringement of settlement rights.

HP Govt. vide bill namely the Himachal Pradesh Abolition of Payment od Haq Chuharam Bill, 2011 has abolished the system of payment of haq chuharam to rakha as per clause (2) which is reproduced as under:

"…The system of payment of Haq Chuharam to Rakhas shall stand abolished with effect from 1st April, 2010 and they shall stand relieved of duties and obligations attached to them and shall have no liability in this behalf."

CHAPTER II-A

FLORA AND FAUNA

2.1 TREES

The tract has rich history of flora both in variety and extent. The so-called all round development over the past has adversely affected the flora of the tract.The forests of the tract comprises of *Pinus roxburghii (Chil),Acacia catechu (Khair), Anogeissus latifolia (chhal), Emblica officinalis (wild amla), Dalbergia sissoo (Shisham) etc.*Besides this, a number of other trees are found in the tract, list of which is given in glossary.

There are 10 Chil; 34 Scrub And 5 Bamboo forest as identified at the time of preparation of Rotation Closure Scheme. The position has, however, changed to slight extent due to change in locality factors. This is not of much consequence as the Rotational Closure Scheme constitutes the frame work of Working Plan.

Variation in the composition of forests and their distribution are governed by locality factors such as geological and soil formations and biotic influence etc. The biotic factors cause deterioration in the condition of vegetation by bringing in retrogression. Following main forest types based on Champion's Classification in "A Preliminary Survey of Forest Types of India and Burma, Indian Forest Records, New Series" are met with.

2.2 GENERAL DESCRIPTION OF THE GROWING STOCK

Northern Tropical Dry Mixed Deciduous Forests(Type 5B/C_2)

This type is found in old Trighais on Solasinghi, Ramgarh and Dhiunsar dhars between 600 m and 900 m elevation. In this type, the vegetation consists of mainly brush-wood and varying proportion of broadleaved trees which are generally branchy with low crowns and heights hardly exceeding 9 to 12 m. The main species met with are *Anogeissuslatifolia, Acacia catechu, Lannea grandis, Erythrinasuberosa, Cassia fistula, Aegle marmelos, Flacourtia ramontchi,*

Emblicaofficinalis, Zizyphusmauritiana, Diospyros montana, Casearіatomentosa, Mallotusphilippinensis, Pyruspashia and Dalbergia sissoo. Under storey comprises of *Carissa spinarum, Dodonea viscosa, Adhatoda vasica, Nyctanthesarbor-tristis, Murraya koenigii, Woodfordiafruticosa*. Main climbers are *Bauhiniavahlii, Ichnocarpus frutesens* and *Puerariatuberosa*.

On the northern aspect in particular, vegetation is characterized by the presence of few chil trees standing either singly or in groups. Similarly, in shelter wood localities on loose textured conglomerates formations, bamboo is met within mixture with other species in small groups as in compartment 1a and 1b of Sassal, Thappal and Paniala forests in areas subjected to excessive grazing and lopping as on western slopes of Ramgarh dhar. Vegetation has deteriorated to open scrub with comparatively small proportions of low trees, mostly characterized by the non-palatability of leaves and thorniness or by marked power of coppicing.

Dry Deciduous Scrub Forests (Type 5B/C2/DS1)

This is found mainly in the dry southern parts where biotic factors exert their influence in extreme form. Vegetation consists mostly of Carissa-spinarum, Dodonea viscose and *Adhatodavasica* with some *Flacourtia ramontchii, Cassiafistula* and other stunted scrub growth.

Himalayan sub-tropical Pine Forests (Type 1c1a)

This type is primarily confined to elevation between 390 m and 1820 m but is absent on soft sand stones. These forests are on the whole moderately stocked and contain middle aged and scattered mature trees. They correspond to F.R.I site quality III except in Akloi di dhar where quality is still worse. Groups of well grown younger trees are also met with along Nullahs and gentle slopes especially in Charara forests. Regeneration on the whole is satisfactory. It is poor in lower areas and excellent in higher elevations. The associates generally found are*Acacia catechu, Zizyphusmaurtiana, Terminalia tomentosa, Emblicaofficinalis, Diospyrosmontana, Anogeissus latifolia*undergrowth consists of*Carissaspinarum, Dodonea viscosa, Woodfordia floribunda, Mimosa rubicaulis,* and

Murrayakoenigii. Fire damage has been very heavy in lower elevations and the regeneration has to struggle hard to establish itself.

Chil forests can be further sub-divided into two types i.e. (i) the lower or unstable chil sub-type, (ii) the middle or intermediate chil sub-type of Mohan's classification given in the Working Plan of Kangra forests.

The lower unstable chil sub-type comprises of forests occurring on hotter aspects with comparatively branch malformed and poor quality chil trees with a large proportion of *Dodonaea viscosa*. Scrub also occurs in greater proportion replacing chil completely at places, mainly on account of heavy presence of adverse biotic influence like fires which are also responsible for retarding natural regeneration compartments 1b (SB); 1a (SB); 1c(SB) and 4b of Dhiunsar and 1b (SB) of Akoi di dhar are examples of this type.

Chil forests of middle or intermediate type are denser and contain trees better in slope and height than the forest type. Blanks are occasionally met with. Scrub occurs in open patches. *Carissaspinarum* is in greater proportion than *Dodonea viscosa*. If protected against biotic influence, they are capable of yielding natural regeneration of chil easily. DPFs Cheli, Satrukha, Charara and Chaplah-Garlan are examples of this type.

Dry Bamboo Brakes (Type 5/E9)

Bamboo (*Dendrocalamusstrictus*) occurs pure or mixed with usual scrub species in the eastern and south-western part of Ramgarh ridge and on western slopes of Sola-Singhi Ridge. It is gregarious and almost pure on northern aspects, in sheltered pockets and depressions on well drained slopes and loose textured conglomerates.

Under adverse conditions especially along the cultivated lands where the incidence of grazing is heavy, on or near the ridges and in warmer aspects, bamboo clumps become thinner in stocking until they are completely ousted by scrub associates like *Lanneagrandis, Diospyrosmontana, Diospyrostomentosa, Erythrina suberosa, Casearia tomentosa, Acaciacatechu, Aegle marmelos, Emblicaofficinalis, Murrayakoenigii* and *Nyctanthes arbor-tristis*. The bamboo is mostly of small size on Solasinghi and of moderate size on Ramgarh dhar

especially in Ramgarh Awarla forest on account of lack of tending operations, the clumps are generally congested and choked with dead and twisted shoots. The position has aggravated during the years 1986-87 onwards.Gregarious flowering occurred in 1910-11, 1951-52 and 1978-79 in all the forests as a result of which the bamboo appears to have deteriorated in quality and practically disappeared from western slopes of Ramgarh dhar where it was recordedearlier as existing in patches.

Each gregarious flowering disappears out bamboo from upper reaches of the forests where soil depth is generally low. This can be clearly observed in compartments 4a and 5a of Ramgarh Awarla forests. In areas clear felled during the plan, bamboo forests further extended to Paniala, Kanura, Solasinghi, Bhiambi and Ban are example of this manifestation.

2.3 ECOLOGICAL STATUS

Chil is the dominant species which occurs either singly or mixed with scrub forests comprising of *Anogeissus latofolia, Acaciacatechu, Lanneagrandis, Emblica officinalis, Diospyrosmontana, Cassia fistula*andbushes like*Carissa spinarum, Dodoneaviscosa, Murraya koenigii, Woodfordia floribunda, Mallotus philippinensis*and *Phoenix acualis* which tend to replace chil at places. Natural regeneration of Chil is adequate at places, but poor on the whole. Major part of the tract is occupied by fairly dense scrub forests which are poorly stocked at places. Bamboos also occur on a small area either pure or mixed with broadleaved species. In order of occurrence scrubs occupy first place whereas chil and bamboos stand second and third respectively.

Every compartment or sub-compartment has been properly described and stock mapped on 1:15000 scale taking well stocked areas with density over 0.7, moderately stocked areas with density 0.5 to 0.7 and poorly stocked area below 0.5. These stock maps and descriptions find their places in the compartment history files of the respective forests.

The following will give the distribution of areas of each type of forests by density along with cultural land, uncultured blanks and rocky out crops:-

Table No. 2.1: Crop density in different Working Circles

S.	Type of Forest	With Density (in ha)	Uncultivable rocky	Total

No.		Over 0.7	0.5 to 0.7	0.3 to 0.5	Below 0.3	Blank including cultivable Blank	
1	Chil W.C	137.02	747.41	1479.41	454.62	–	**2818.46**
2	Scrub WC	49.65	1278.66	3102.19	222.55	–	**4653.05**
3	Bamboo W.C.	24.09	1063.29	200.59	29.12	–	**1317.09**
4	Rehabilitation W.C	0	90.47	1065.38	6852.08	–	**8007.93**
	Total	**210.76**	**3179.83**	**5847.57**	**7558.37**	**–**	**16796.53**

2.4 BAMBOO FLOWERING

Gregarious flowering of bamboo occurred in the year 1979-80 in the following areas bearing of Bamboo Working Circle:-

Table No. 2.2: Areas showing gregarious flowering in Bamboo WC during 1979-80

S.No.	Forest/Compartment	Extent of bamboo bearing	Area flowered (Approx. ha.)
1.	DPXIII SolaSinghi	C1a	5
		C1b	4
		C2a	10
		C2b	17
		C2c	12
		C 3a	6
		C3b	21
		C3c	29
		C4a	8
		C4b	9
	Total		**121**

2.5 INJURIES TO WHICH CROP IS LIABLE

2.2.1 Fires: Chil forests are subjected to periodic fires which cause serious damage with heavy undergrowth. Fire damage results in completely wiping out seedling and saplings, killing large number of poles, trees by burning or damaging the cambium, reducing the density of growing stock especially near ridges, reducing the production and germination of seed by interfering with the fertilization of cones and destruction of micro-flora and fauna, thus impending soil humus forming processes. All these factors cause accelerated soil erosion in DPF Sarkaru-Ghor-Plani, Oil-da-ban, DPF Akoi di dhar, etc. Chil has been

replaced by scrub in DPF Dhuinsar. There has been severe set-back to the progress of regeneration in DPF Dhuinsar, Akoi-di-dhar and Charoli.

Experience shows that intentional fires are caused with a motive to get good grass, to derive away wild animal and to exhibit hostility towards neighboring villages or the local forest staff. Lack of controlled burning leads to the accumulating of needless which helps spread fires even if caused accidentally by passers-by or intentionally by mischief monger. There have been devastating fires in the tract in 1993-94, 1998-99 & 2012-13.

2.2.2 Grazing: Question of grazing is very intimately connected with the welfare of local population which is almost entirely agricultural. Light grazing does little damage in areas easily erodible soil. On the other hand, damage done by heavy grazing in low hills, particularly by goats and buffaloes is immense. Cattle devour the seedlings of bamboo, chil and graze wood species as soon as they appear. It results in the exposure of the top soil which is then washed down. The soil becomes unfit for the reproduction of tree species with the result that economically inferior scrubs species like *Carissa spinarum*, *Dodonea viscosa,Lantana camara* and *Adhatoda vasica* alone survive. Ultimately bare slopes subject to erosion and unfit for any use are left. Injury by grazing is always pronounced in the vicinity of habitations. Cattle population of the Una Forest Division including Kutlehar Forests as per 2007 census is given below:-

Table 2.3: **Cattle Population of the District**

District	Cow/oxen	Buffaloes	Sheep	Goats	Horses	Donkey	Total
Una	12682	20427	2543	12274	132	17	48075

(*Source: District Statistical Officer,Una*)

2.2.3 Grass Cutting: Grass cutting is harmful when seedling are intermingled and cut out along with grass. In case of chil there is danger of the seedlings being cut deliberately as chil crop hampers the growth of grass. In bamboo forests, the villagers also cut manus for use as fodder. Even in scrub forests, seedlings are often cut inadvertently along with the grass. This is still one of the reasons for poor regeneration in compartments 1,2 and 3 as compared to

compartment 5 and 6 of SolaSinghi forest and many other areas close to habitations and consequently subject to grass cutting.

2.2.4 Lopping: Heavy lopping of broadleaved trees retards their growth, prevents the production of seed and allows heavy rains to impinge directly on the ground causing soil wash. It ultimately results in soil depletion erosion and mortality of the trees. The restrictions imposed by settlement rules are seldom observed in Compartment no. 3 of Solasinghi forest, has been occupied by bamboos. Deformities in the existing growth of *Anogeissus latifolia* (Chhal) in compartment 3 of Solasinghi forest have been caused by lopping.

2.2.5 Drought: Drought causes considerable mortality amongst young seedlings particularly in chil and bamboo in April-June and November-December. Sandy soils are not very retentive of moisture and dry up during May and June. Construction of Bhakra Dam has changed the micro-climate and water regime of tract situated along the periphery of Gobind Sagar mitigating the effect of drought on vegetation at least in low lying areas.

2.2.6 Frost: Frost is common in the tract and cause severe damage to young seedlings and saplings of khair and other broad-leaved species.

2.2.7 Erosion: Geological formations go a long way in determining the extent and intensity of erosion in the tract. In hard sand stone formations, only sheet erosion is met with leading to the exposure of parent rock. No vegetation can, however, be brought back on bare rock to check run off. Instance of this type of erosion are met with DPFs Kariala, Jol, Tanda-Bagwan, Tira, Aghlaur and Basatar. In friable sandstone and red clay formation, damage is more serious. As soon as vegetation disappears, soil begins to erode, slip rapidly and the rain water cuts deep channels. Water absorbing capacity of the soil is decreased. Every shower of rain gives rise to floods that carries away with them tonnes of valuable soil. Increased runoff accelerates scouring action still further. In such areas, ridges are generally sharp edged with the presipitous sides cut deep by small nallahs. This type of erosion is spectacular in the northern and western parts of the valley i.e. DPFs Oel-da-Ban, Sarkaru Ghorplani etc.

2.2.8 Climbers and Weeds: *Bauhinia vahlii* is the biggest nuisance for the growth of trees particularly in DPFs Bhiambi and Sukrial where it has almost covered and checked the trees. The menace of *Puerariatuberosa* engulfing the trees has increased. In DPFs Solasinghi c 5, it has occupied the entire area after fellings in 1990. *Lantana camara* has spread in part of DPFs such as Solasinghi, Cheli-Satrukha, Paniala near the boundary with Bilaspur Forest Division DPFs Kanura, Behlan and Tanda Bagwan etc. It has fully occupied the parts of the forests and UPFs adjoining the parts. *Caessalpinia sepiaria* has occupied parts of D.P. Kariara, Solasinghi, Bhiambi, Sukrial and Matoh and adjoining UPFs. This weed is next to Lantana the spread of which needs to be checked and eradication done. *Phoenixacaulis* has occupied parts of DPFs Cheli-satrukha and Dhiunsar. *Ageratum conyzoides* has also spread in forests in past a few years and if not checked will inhibit regeneration.

2.2.9 Wild Animals: Porcupines, monkeys, langurs and pigs do damage to bamboo shoots of young plants of other species.

2.2.10 Winds: Windstorms in April and May cause considerable damage to the leading trees particularly badly tapped chil trees and roadside trees.

2.2.11 Illicit Fellings: As anywhere in the hilly rural population of the tract is substantially dependent on forests for their day today needs of timber for which provision exists in the concerned Settlement Report. But right holders resort to illicit fellings when their bonafide need of timber is not fully met with. There is also one unlucky section of the population i.e. on right-holders who resort to illicit fellings. There is third category of professional offenders. It will be worth mentioning here that the magnitude of illicit fellings in the tract is much lower than anywhere in the similar circumstances in the Pradesh. This happy situation is the result of dedication to the cause on the part of Una Forest Division and the fact that said Administration is virtually insulate to undesirable external pressures.

2.2.12 Encroachment: Exploding population means hunger for land leads towards illicit encroachments of forest lands are victims of this vicious cycle.

CHAPTER II B
Forest Fauna

2.1B FAUNA

The tract had an equally glorious history of fauna as that of flora. Since flora of the tract has suffered ruthless destruction over the past, fauna could not remain unaffected and escape the consequences. It also suffered adversely both in variety and extent.

An inventory of the important species of animals, birds, reptiles etc is tabulated in the glossary of common birds and animals at the beginning.

2.2B Mammals

2.2B.1 The leopard (*Pantherapardus*)is a member of the Felidae family and the smallest of the four "big cats" in the genus Panthera, the other three being the tiger, lion, and jaguar.The leopard was once distributed across eastern and southern Asia and Africa, from Siberia to South Africa, but its range of distribution has decreased radically because of hunting and loss of habitat. It is now chiefly found in sub-Saharan Africa; there are also fragmented populations in the Indian subcontinent, Sri Lanka, Indochina, Malaysia, Indonesia, and China. Because of its declining range and population, it is listed as a "Near Threatened" species on the IUCN Red List. It is distributed throughout the Kutlehar Forests of Una forest division.

The leopard is so strong and comfortable in trees that it often takes its kills into the branches. By dragging the bodies of large animals aloft it hopes to keep them safe

from scavengers such as hyenas. Leopards can also hunt from trees, where their spotted coats allow them to blend with the leaves until they spring with a deadly pounce. These nocturnal predators also stalk antelope, deer, and pigs by stealthy movements in the tall grass. When human settlements are present, leopards often attack dogs and, occasionally, people. The killing of domestic animals like goats, sheep and dogs by leopards is very common throughout the division. However no incidents of attack on human are reported.

Female leopards can give birth at any time of the year. They usually have two grayish cubs with barely visible spots. The mother hides her cubs and moves them from one safe location to the next until they are old enough to begin playing and learning to hunt. Cubs live with their mothers for about two years; otherwise, leopards are solitary animals.

Most leopards are light colored with distinctive dark spots that are called rosettes, because they resemble the shape of a rose. Black leopards, which appear to be almost solid in color because their spots are hard to distinguish, are commonly called black panthers.

The species' success in the wild is in part due to its opportunistic hunting behavior, its adaptability to habitats, its ability to run at speeds approaching 58 kilometers per hour (36 mph), its unequaled ability to climb trees even when carrying a heavy carcass, and its notorious ability for stealth. The leopard consumes virtually any animal that it can hunt down and catch.

Home ranges of male leopards vary between 30 km2 (12 sq mi) and 78 km2 (30 sq mi), and of females between 15 to 16.

2.2B.2 The Sambar (*Rusaunicolor*)-It is a large deer native to southern and southeast Asia. Although it primarily refers to Rusa unicolor, the name "Sambar" is also sometimes used to refer to the PhilippineDeer (called the Philippine Sambar) and the Rusa Deer (called the Sunda Sambar). The name is also spelled sambur, or sambhur.

The appearance and size of sambar vary widely across their range.In general, they attain a height of 102 to 160 centimetres (40 to 63 in) at the shoulder and may weigh as

much as 546 kg, though more typically 150 to 320 kg .Head and body length varies from 1.62 to 2.7 m .with a 22 to 35 cm tail.

The shaggy coat can be anything from yellowish-brown to dark grey in colour and, while it is usually uniform in colour, some subspecies have chestnut marks on the rump and underparts. Sambar also have a small but dense mane, which tends to be more prominent in males. The tail is relatively long for deer, and is generally black above with a whitish underside.

Adult males and pregnant or lactating females possess an unusual hairless, blood-red spot located about half way down the underside of their throats. This sometimes oozes a white liquid, and is apparently glandular in nature.

Sambar are found in habitats ranging from tropical seasonal forests (tropical dry forestsand seasonal moist evergreen forests), subtropical mixed forests (conifers, broadleaf deciduous, and broadleaf evergreen tree species) to tropical rainforests.[They are seldom found far from water. Sambar prefer the dense cover of deciduous shrubs and grasses, although the exact nature of this varies enormously with the environment, because of their wide range across southern Asia. Home range sizes are probably equally variable, but have been recorded as 1,500 hectares (3,700 acres) for males and 300 hectares (740 acres) for females in India.

Sambar primarily live in woodland and feed on a wide variety of vegetation, including grasses, foliage, browse fruit, and water plants, depending on the local habitat.[4] They also consume a great variety of shrubs and trees.

2.2B.3 Wild boar (*Sus scrofa*)is a species of the pig genus Sus, part of the biological family Suidae. The species includes manysubspecies. It is the wild ancestor of the domestic pig, an animal with which it freely hybridises. Wild boar are native across much of Northern and Central Europe, the Mediterranean Region (including North Africa's Atlas Mountains) and much of Asia as far south asIndonesia.

The body of the wild boar is compact; the head is large, the legs relatively short. The fur consists of stiff bristles and usually finer fur. The colour usually varies from dark

grey to black or brown, but there are great regional differences in colour; even whitish animals are known from central Asia. During winter the fur is much denser.

Adult boars measure 90–200 cm in length, not counting a tail of 15–40 cm and have a shoulder height of 55–110 cm. As a whole, their average weight is 50–90 kg.

Adult males develop tusks, continuously growing teeth that protrude from the mouth, from their upper and lower canine teeth. These serve as weapons and tools. The upper tusks are bent upwards in males, and are regularly ground against the lower ones to produce sharp edges. The tusks normally measure about 6 cm, in exceptional cases even 12 cm. Females also have sharp canines, but they are smaller, and not protruding like the males' tusks.

Wild boar piglets are coloured differently from adults, having marbled chocolate and cream stripes lengthwise over their bodies. The stripes fade by the time the piglet is about 6 months old, when the animal takes on the adult's grizzled grey or brown.

Adult males are usually solitary outside of the breeding season, but females and their offspring (both sub-adult males and females) live in groups called sounders. Sounders typically number around 20 animals, although groups of over 50 have been seen, and will consist of 2 to 3 sows; one of which will be the dominant female. Group structure changes with the coming and going of farrowing females, the migration of maturing males (usually when they reach around 20 months) and the arrival of unrelated sexually active males.

Wild boars are situationally crepuscular or nocturnal, foraging in early morning and late afternoon or at night, but resting for periods during both night and day. They are omnivorousscavengers, eating almost anything they come across including grass, nuts, berries, carrion, nests of ground nesting birds, roots, tubers, refuse, insects and small reptiles.

The process of giving birth to a litter lasts between 2 to 3 hours, and the sow and piglets remain in, or close to, the nest for 4–6 days. Sows rejoin the group after 4–5 days, and the piglets will cross suckle between other lactating sows.

Litter size is typically 4–6 piglets but may be smaller for first litter, usually 2–3. The largest litters can be up to 14 piglets. The sex ratio at birth is 1:1. Litter size of wild boars may vary depending on their location.

2.2B.4 Indian porcupine (***Hystrix indica***) - This destructive rodent is found in all areas of this division.It adapts itself to any type of land but favours rocky hill sides where it lives in burrows dug by itself.The burrows consist of a enrance gallery and a few bolt holes or emergency exits,the burrows or gallerie,sometimes,are 15-18 meters in length.The porcupines are characterized by the spines borne on the neck,back and hind quarters.The porcupines feed on field crops,fruits roots and tubers.They are very much destructive to field crops,and gardens when adequate food is not available in the forests.The young ones are born usually in spring.

2.2B.5 The Indian Hare (*Lepus ruficaudams*)-This rufoustailed hare is found all over the area.It likes bushy forest growth and generally lives in the neighbourhood of cultivations and villages.Early wheat and other crops in the field are badly nibbled by this animal it is ,in general,nocturnal in habit.It weighs from 1.5 to.2.5 kgs.and has a rufous brown coat mixed with black hair on back face.It is believed to give young ones-one to two number,in early winter months.

2.3B Birds

2.3B.1 The RedJunglefowl (*Gallus gallus*):- is a tropical member of the Pheasant family. They are thought to be ancestors of the domestic chicken with some hybridisation with the Grey Junglefowl.[2] The Red Junglefowl was first raised in captivity at least several thousand years ago in Asia, and the domesticated form has been used all around the world as a very productive food source for both meat and eggs. Some breeds have been specifically developed to produce these.

The range of the true species stretches from northeast India (where the pure species has almost certainly been diluted with cross breeding from domestic breeds) eastwards across southern China and down into Malaysia, The Philippines and Indonesia. Junglefowl are established on several of the Hawaiian Islands, but these are feral descendents of domestic chickens.

Males make a food-related display called 'tidbitting', performed upon finding food in the presence of a female. The display is composed of coaxing, cluck-like calls and eye-catching bobbing and twitching motions of the head and neck. During the performance, the male repeatedly picks up and drops the food item with his beak. The display usually ends when the hen takes the food item either from the ground or directly from the male's beak and is associated with copulations and more offspring.

Behaviour, not morphology, is the best predictor of paternity. Specifically, behaviours related to dominance and to signalling are critical, and the single best predictor is the rate at which males produce anti-predator alarm calls. This suggests that male alarm calling is a form of mate investment, increasing the survival of his chicks.

They are omnivorous and feed on insects, seeds and fruits including those that are cultivated such as those of the oil palm.

Flight in these birds is almost purely confined to reaching their roosting areas at sunset in trees or any other high and relatively safe places free from ground predators, and for escape from immediate danger through the day.

2.3B.2 The GreyPartridge (*Perdixperdix*)also known as the English Partridge, Hungarian Partridge, or Hun, is a gamebird in the pheasant family Phasianidae of the order Galliformes, gallinaceous birds. The species has been successfully introduced to many parts of the world for shooting, including vast areas of North America, where it is most commonly known as Hungarian partridge, or just "Hun". Widespread and common throughout its large range, the Grey Partridge is evaluated as Least Concern on the IUCN Red List of Threatened Species. This partridge breeds on farmland across most of Europe into western Asia, and has been introduced widely into North America. They are quite common in some areas of southern Canada and the northern United States.

The Grey Partridge is a rotund bird, 28–32 cm long, brown-backed, with grey flanks and chest. The belly is white, usually marked with a large chestnut-brown horse-shoe mark in males, and also in many females. Hens lay up to twenty eggs in a ground nest. The nest is usually in the margin of a cereal field, most commonly Winter wheat. The only major and constant difference between the sexes is the so-called cross of

Lorraine on the tertiary coverts of females – these being marked with two transverse bars, as opposed to the one in males. These are present after around 16 weeks of age when the birds have moulted into adult plumage. Young Grey Partridges are mostly yellow-brown and lack the distinctive face and underpart markings. The song is a harsh kieerr-ik, and when disturbed, like most of the gamebirds, it flies a short distance on rounded wings, often calling rick rick rick as it rises. They are a seed-eating species, but the young in particular take insects as an essential protein supply. During the first 10 days of life, the young can only digest insects. The parents lead their chicks to the edges of cereal fields, where they can forage for insects. They are also a non-migratory terrestrial species, and form flocks outside the breeding season.

Though common and not threatened, it appears to be declining in numbers in some areas of intensive cultivation such as Great Britain, probably due to a loss of breeding habitat and possibly food supplies. Their numbers have fallen in these areas by as much as 85% in the last 25 years. Efforts are being made in Great Britain by organizations such as the Game & Wildlife Conservation Trust to halt this decline by creating Conservation headlands. In 1995 it was nominated a Biodiversity Action plan species.

2.3B.3 Indian Peafowl (*Pavo cristatus*) a resident breeder in South Asia. The peacock is designated as the national bird of India and the provincial bird of Punjab.

The male (peacock) Indian Peafowl has iridescent blue-green or green coloured plumage. The peacock tail ("train") is not the tail quill feathers but the highly elongated upper tail coverts. The "eyes" are best seen when the peacock fans its tail. Like a cupped hand behind the ear the erect tail-fan of the male helps direct sound to the ears. The female (peahen) Indian Peafowl has a mixture of dull green, brown, and grey in her plumage. She lacks the long upper tail coverts of the male but has a crest. The female can also display her plumage to ward off female competition or signal danger to her young.

The peafowl are forest birds that nest on the ground but roost in trees. They are terrestrial feeders.

Peafowl are omnivorous and eat most plant parts, flower petals, seed heads, insects and other arthropods, reptiles, and amphibians.

2.3B.4 Kabutar or the Blue Rock Pigeon (*Columba livia*)- It is the common grey bird with glistening green purple and magenta sheen on the neck and breast.It is found in open and rocky cliffs.It also live in a semi domesticated condition and favours old buildings and rock holes.It generally feeds on cereals,grasses,pulses etc.Nesting season is not well defined.

2.3B.4 Ghugi Dove (*Streptopelia* spp) This common dove is found in pairs or small parties in open places and cultivated fields.It approaches houses and even verandahs if not scared.Its flight is straight and swift.Its nesting season is also not well defined.

Besides these,the Indian National Bird,the Peacock (*Pavo cristatus*) is also found in this area&other birds of common occurrence are house and jungle crows (*Corvus* spp), tree pies (*Dendrocitta* spp); the jungle babbler (*Turdoides* spp); the bulbuls (*Pycnonotus*spp); the magpie robin (*Copsychus*spp); king crow (*Dicrurus* spp); golden oriole (*Oriolus*spp).The common myna (*Acridotheres* spp.); the common baya (*Ploceus*spp); red rumped swallow (*Cechropis* spp.); the wood pecker (*Dinopium* spp); Parakeets (*Psittacula* spp); Common king fisher (Alcedo spp); Vultures (*Gyps* spp); eagles (*Aguila* spp)..etc which are equally important from aesthetic,forest cleanliness and health,farming and bird watching and balance of nature point of view.

2.4B Reptiles

2.4B.1 The Rock Python (*Python molurus*)is a large non venomous python species found in many tropic and subtropic areas of Southern and Southeast Asia. It is known by the common names Indian python, black-tailed python, and Indian rock python.

Indian Pythons commonly reach a length of 2.4–3 metres. In India, the nominate subspecies grows to 3 metres on average This value is supported by a 1990 study in Keoladeo National Park, where the biggest 25% of the python population was 2.7–3.3 metres long. Only two specimen even measured nearly 3.6 metre. Because of confusion with the Burmese Python, exaggerations and stretched skins in the past, the maximum length of this subspecies is hard to tell. The longest scientifically recorded specimen hailed from Pakistan and was 4.6 metres in length and weighing 52 kilograms.

Occurs in a wide range of habitats, including grasslands, swamps, marshes, rocky foothills, woodlands, "open" jungle and river valleys. They depend on a permanent source of water. Sometimes they can be found in abandoned mammal burrows, hollow trees, dense water reeds and mangrove thickets.

Lethargic and slow moving even in its native habitat, they exhibit timidity and rarely try to escape even when attacked. Locomotion is usually rectilinear, with the body moving in a straight line. They are very good swimmers and are quite at home in water. They can be wholly submerged in water for many minutes if necessary, but usually prefer to remain near the bank.

These snakes feed on mammals, birds and reptiles indiscriminately, but seem to prefer mammals. Roused to activity on sighting prey, the snake will advance with quivering tail and lunge with open mouth. Live prey is constricted and killed. One or two coils are used to hold it in a tight grip. The prey, unable to breathe, succumbs and is subsequently swallowed head first. After a heavy meal, they are disinclined to move. If forced to, hard parts of the meal may tear through the body. Therefore, if disturbed, some specimens will disgorge their meal in order to escape from potential predators. After a heavy meal, an individual may fast for weeks, the longest recorded duration being 2 years. The python can swallow prey bigger than its diameter because the jaw bones are not connected. Morever prey cannot escape from its mouth because of the arrangement of the teeth (which are reverse saw-like).

These snakes have often been killed for their fine skin and are endangered. The Indian Python is classified as Lower Risk/Near Threatened on the IUCN Red List of Threatened Species. This listing indicates that it may become threatened with extinction and is in need of frequent reassessment.

2.5B DAMAGE TO FAUNA AND FLORA

A brief mention of the **factors responsible for damage** to our rich heritage of flora and fauna is relevant. These are:-

i) Exploding human population has resulted in hunger for agricultural land which has encroachments and *nautor* at the cost of flora and fauna.

ii) Exploding cattle population of inferior cattle of the tract where stall feeding is not a common practice has always posed a serious threat to our flora and fauna.

iii) Eating habits of people in general are no less a factor. Owing to comparatively cold climate and martial race of Rajputs being in dominating proportion in the population, meat eating has been a habit for which they have been engaged in hunting since times immemorial.

iv) Liberal policy of granting crop protection guns to agricultural population is also responsible for a crop of bogus license holders whose only object is hunting.

v) Forest fires play havoc with both flora and fauna as fires destroy eggs, young ones unable to escape, bird nests floral seeds and biological life.

vi) Epidemics amongst wild life are not so common but *sambhar* and other members of deer family may suffer from infections and contagious diseases like rinder pest through domestic cattle grazing in the forests.

vii) Atmospheric influences exercise definite bearing on flora and fauna. The adults are not much affected by the climatic changes. Drought reduces water resources and wild life is killed at such localized water holes. Atmospheric changes also cause migration of wild life.Young ones are more prone to atmospheric changes. They suffer casualties mostly due to frost. Hatching of eggs is badly affected by rains. It is reported that jungle fowl used to hatch twice in a year almost two decades ago, but has now restricted to hatching during March/April only.

viii) Fauna has suffered the most at the hands of man since ancient age when fauna used to form the main source of food for the man living in the forests. With the rapid pace of development and increasing civilization, destruction of habitat of wild life took place at too much fast rate. More and more scientific methods of shooting and lust for shooting not only for food but also for money have been tremendously damaging both flora and fauna. Thus, man has damaged flora and fauna most by his overt and covert behavior.

As per guidelines in the National Working Plan Code, 2004, this Chapter has been vetted by PCCF (Wildlife)-cum-Chief Wildlife Warden HP.

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CHAPTER III

UTILIZATION OF THE PRODUCE

3.1 AGRICULTURAL CUSTOMS AND WANTS OF THE PEOPLE

All over the State, agriculture is the main stay of the population of the tract.

Since agricultural land is limited in this hilly tract, pressure on agricultural land is obviously heavy. For 17255 numbers of agricultural families in this tract, there is 7484 ha of agricultural land only and that works out to 0.434 ha per family as against district average of 3.40 ha and 78.39 ha of State. As a result of research and development in agricultural technology and connected infrastructure, agricultural output has significantly improved over the past. Main crops of the tract are wheat, rice, maize, pulses and sugarcane. Only maize is exported, while pulses and cane are imported.

As is common in the hills, there is excess number of cattle in the tract, majority of which are inferior in quality despite all efforts of Animal Husbandry Department over the past. The so-called cattle wealth of the tract may lack in anything but they do not lack in number. As per 1992 Cattle census, total cattle population of the tract is 51857. In addition, approximately 14600 migratory cattle from colder regions join in winter grazing. Stall feeding is quite limited and obviously this large and inferior cattle population sustains on forest grazing. Available grazing land of no standards may be termed good and adequate. These are poor depleted pastures grazed much beyond their carrying capacity. Also no worthwhile efforts have been made for the improvement of these pastures over the past. In nut-shell, future of animal husbandry is dismal unless cattle population is drastically reduced through progressive programmes of Animal Husbandry Department and available pasture are scientifically managed and improved to improve their carrying capacity.

Supplementary income of people has significantly improved through a variety of development works undertaken by different Government agencies over the past. As a result of improvement in economy of the tract, standards of living of general masses have improved. Majority of the people live in properly designed pucca houses. Small townships like Bangana, Thana Kalan, Lathiani and Chowki Maniar have sprung up.

Education is spreading. Mechanization of agriculture is also coming in, though at a slow pace.

With the development and increase of cattle and human population, pressure on forests is bound to increase in times to come. The existing human population as per 2011 census is given in table below:

Table No 3.1: Population of the tract

Year of census	District	Tehsil	Human population		
			Male	Female	Total
2011	Una(Part)	Bangana (whole)	45373	42365	87738

(*Source: Development Block, Bangana*)

Major wants of the people include constructional timber, timber for agricultural implements, fuel for daily cooking, marriages and cremations, grass and leaf fodder for the cattle, leaf-litter for manure, pastures for grazing cattle, collection of wild fruits and construction materials like sand, bajri and stones etc. To cater all these wants of the people of the tract is one of the objects of management of Kutlehar forests.

3.2 MARKETS AND MARKETABLE PRODUCE

Timber, resin,khairwood, katha, bamboo, fuel wood, charcoal, and bhabbar grass are major forest produce items of export. Item wise annual quantum of export of forest-produce from the tract for the last 10 years of Gupta Plan is given in Table below:-

Table 3.2(A): Quantity of Forest Produce extracted/exported

Year	Chil Timber	Resin	Khair	Others B.L.	Bamboo	Pulpwood	Charcoal	Fuel wood	Chil F.Wood.
	(m^3)	(Qtls)	(m^3)	(m^3)	Bundle.	(m^3)	(Qtls)	(m^3)	(m^3)
2001-02	1357.363	950.66	44.9835	130.994	18701	147.00	944.75	133.00	10.00
2002-03	1064.198	1158.11	120.7378	107.71	20458	238.00	782.00	60.50	0.00
2003-04	1062.559	119.27	101.5377	73.004	19402	103.00	412.25	86.95	0.00
2004-05	1524.606	1381.42	84.5031	100.63	21903	230.00	342.00	78.00	0.00
2005-06	903.197	1303.37	85.3639	51.554	21181	274.00	447.75	86.50	0.00
2006-07	1366.757	1711.4	31.0707	26.416	23854	278.00	588.00	18.00	0.00
2007-08	873.391	1690.92	90.1275	45.195	0	172.50	334.75	65.00	0.00
2008-09	1432.135	1659.30	60.1707	805.878	0	261.00	368.50	658.00	0.00
2009-10	1232.339	1513.33	233.2381	453.032	0	230.00	270.50	386.50	0.00
2010-11	1374.835	644.45	94.5447	51.401	24576	345.00	371.00	42.80	0.00
2011-12	771.769	603.52	65.2824	333.047	34772	181	243.00	28.50	0.00
	12963.149	**12735.75**	**1011.5601**	**2178.861**	**184847**	**2459.5**	**5104.5**	**1643.75**	**10.00**

(*Source: Forest Working Division, Una*)

The revenue generated by improvement felling of bamboos in Kutlehar Forests can be assessed by the following table, detailed as under:

Table 3.2 (B): Statement showing exploitation of bamboos in Kutlehar forests

YEAR	NO. OF BUNDLES EXTRACTED	REVENUE GENERATED (Rs.)	VAT (Rs.)	TOTAL (Rs.)
2005-06	21020	433408.00	17336.00	
2010-11	24670	812720.00	32509.00	
2011-12	34772	1795964.00	71839.00	
	80462	**30,42,092.00**	**1,21,684.00**	**31,63,776.00**

(*Source: Forest Working Division, Una*)

There is no local market for disposal of forest produce surplus, to local requirements. Markets for various forests produce item are available chiefly in the plains as in table below:-

Table 3.2(C): Markets of various forest produce

S.No	Item of forest produce	Available markets
1.	Chil timber and pulpwood	Yamuna Nagar, Pathankot
2.	Resin	Bilaspur, Nahan, Hoshiarpur
3.	Bamboos	Ambala and Hoshiarpur
4.	Bhabbar grass	Paper mill (Yamunanagar)
5.	Fuel wood and Charcoal	Yamuna Nagar, Hoshiarpur, and Amritsar
6.	Katha	Delhi

Consequent upon nationalization of forest produce, H.P. State Forest Development Corporation holds the monopoly of commercial exploitation of forests of the tract. Their system of disposal of forest produce is reproduced below:-

a) **Chil timber:** After exploitation it is brought to Sale Depot, Bhadroya where it is sold in an open auction.

b) **Resin:** The resin from Govt. side is sent to R&T Factories, Bilaspur and Nahan. The resin from private sale is being utilized by the small scale industries running in H.P.

c) **Khair:** 50% Khair is supplied to small scale industries running in Himachal Pradesh and rest is sold to contractors in open auction.

d) **Bamboos:** It is sold from registered roadside depots of H.P. State Forest Development Corporation in an open auction.

e) **Bhabbar grass:** Earlier it was disposed of by the Superintendent of Kutlehar Forests himself in an open auction. Now, the auction takes place under the authority of the HP Forest Department.

f) **Fuel wood and charcoal:** These are sold in an open auction conducted from time to time at Nurpur.

3.3 LINES OF EXPORT

There has been revolutionary development of network of roads which have significantly boosted up export of forest produce from the tract. Except roads, there are no alternatives modes of transportation available. Following table shows the particulars of roads crossing the tract:-

Table 3.3: Lines of export

S.No.	Name of Road	Length (km)	Remarks
1.1	Una-Bangana-Lathiani-Barsar	48	Metalled, all weather.
2.1	Thana Kalan-Bhakra	31	-do-
3.1	Una-Pirnigaha-Bihru	20	-do-
4.1	Lathiani-Kohdra	10	-do-
5.1	Bangana-Tutru	13	-do-
6.1	Hatli-Piplu	7	-do-
7.1	Dumkhar-Sohari	15	-do-
8.1	Barsar-Bhiambi(jeep able)	3	-do-
9.1	Chowki-Sohari-Bhindla	17	-do-
10.1	Chowki-Talmehra	9	-do-
11.1	Hatli-Kharol via Arlu (jeepable)	6	-do-
12.1	Charara-Nari	3	-do-
13.1	Jogi Panga- Mandli	10	-do-
14.1	Talai-Gharvasra	5	do-
15.1	Turtu-Bhiambi	3	-do-
16.1	Khurwain-Jol	9	-do-
17.1	Pirnigaha-Olinda	2	Partially metalled, fair weather road
18.1	Chhaproh-Doh	3	-do-
19.1	Kakrana-Ghugan	3	-do-
20.1	Thanakalan-Harot	3	Partially-metalled road
21.1	Ambehra-Harot	3	Metalled, all weather
22.1	Talai-Makrer-Tanda	2	-do-
	TOTAL	225	
PANCHAYAT SAMITI ROADS			
1.	Lathiani-Ghat road	1.5	Metalled, all weather
2.	Mandli Ghat-Bihru-Talai	4.6	-do-
3.	Sarai-Hatli road via Dohgi	4.5	-do-
	TOTAL	10.6	

Note: - These roads were previously owned by the District Board.

As a result of re-organization of States, these were transferred to Bangana Development Block. These are however, being maintained by HPPWD.

The road length in the tract is 265 kms. Since development is a continuous process, this will add to road length of the tract in times to come.

3.4 METHODS OF EXPLOITATION AND THEIR COST

Consequent upon nationalization of commercial forest produce exploitation, forest lots for exploitation of resin, timber, bamboos and fuel wood are handed over to HPSFDC every year. Forest Corporation makes their arrangement for working of the same. They employ labor through Labor Supply mates (L.S.M) fixed on the basis of auction of rates against sanctioned scheduled of rates. In the extent of failure of engaging labor through LSMs, Forest Corporation engages labor directly at sanctioned schedule of rates for the relevant year, 2010-11 is given as below:-

Table 3.4: Sanctioned schedule of rates for the year 2010-11

S.No.	Operation	Year	Upset Price
1	Resin tapping	2010-11	1310.01/Qtl
2.	Bamboo extraction	2010-11	47.02/Bdl
3.	Charcoal making	2010-11	421.21/Qtl
4.	Timber Extraction	2010-11	1192.03/cum
5.	Pulp wood/ Fuel Wood extraction	2010-11	349.12/cum
6.	Khair wood Extraction	2010-11	1306.36/cum

(*Source: Forest Working Division, Una*)

All forest harvesting operations are carried out by conventional methods and no mechanization has taken place except transportation of produce by trucks of H.P. State Forest Corporation or otherwise private trucks engaged on the basis of auction/ tender. Bhabbar grass is the only forest produce item harvesting of which is not nationalized.

3.5 PAST AND CURRENT PRICES

Based on annual weighted average prices of forest produce items obtained by Una Forest Working Division from year 2007 to 2011, are in table below:-

Table 3.5: Rates of forest produce during 2007-2011

S.No	Forest Produce	Prices obtained (Rs.)				
		2007	**2008**	**2009**	**2010**	**2011**
1.	Chil Timber (cum)	3400	5000	5000	5000	5836
2.	Khair (cum)	25079	27024	23701	20757	21712
3.	Bhabbar grass	15550	19950	45954	47900	21600
4.	Chil Charcoal (qtl)	1155	1237	1116	1094	1456
5.	Chil Pulpwood (cum)	1921	2048	1401	2495	1956
6.	Bamboo/Bundle	0	0	0	141.33	141.33

(*Source: Forest Working Division, Una*)

CHAPTERIV

ACTIVITIES OF HPSFDCIN HARVESTING AND MARKETING OF FOREST PRODUCE

4.1 HARVESTING

4.1.1 Timber Lots:

After nationalization of forests in 1983, standing trees are being handed over to HP State Forest Development Corporation at rates decided by the Himachal Pradesh Government from time to time. Only dry and fallen trees referred to as salvage are handed over to Divisional Manager, HPSFDC Ltd. Una, who has jurisdiction over this Division.Timber lots are handed over on or before 15th September each year. The H.P. State Forest Development Corporation carries out extraction through conventional methods and there is no sign of any mechanization being introduced in the future. Felling is done by axe or saw. The trees are cut in to logs of different sizes with the help of saws. These logs are further squared with help of axe and then sawn into scantlings by using pharnies. The details of Lots/volume handed over to HPSFDC Ltd. for extraction of Timber for the last fifteen years are tabulated in the Table No. 4.1

Table 4.1: Lots/Volume handed over to HPSFDC Ltd. during 1996-97 to 2011-12

(A)	**Timber Lots handed over to HPSFDC Ltd.**						
S.No.	Year	**No. of trees marking.**					
		Chil		Khair		Other	
		No.	(m^3)	No.	MG	No.	(m^3)
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1.	1996-97	5571	2298.681	1079	624.93	272	43.320
2.	1997-98	3749	3009.480	177	108.71	915	303.660
3.	1998-99	3229	2028.610	1566	760.79	1656	440.110
4.	1999-2k	6338	5712.590	1048	554.46	1377	341.399
5.	2k-2001	9742	6048.320	736	465.36	2257	1041.862
6.	2001-02	5347	3961.180	645	420.25	1135	323.143
7.	2002-03	4696	3489.890	1929	1182.04	1050	293.410
8.	2003-04	4917	2959.500	1416	876.86	726	179.206
9.	2004-05	5457	3486.800	1120	714.22	690	223.551
10.	2005-06	3513	2047.080	1262	753.62	737	193.819
11.	2006-07	5326	3108.100	366	256.32	249	64.165
12.	2007-08	3252	2014.520	1227	764.59	378	137.257
13.	2008-09	6062	2899.560	2095	1396.81	1606	1877.043
14.	2009-10	5911	2732.570	3279	2114.84	1179	1076.825
15.	2010-11	6127	299.930	1264	791.66	393	146.197

16.	2011-12	3321	1633.230	905	565.25	488	571.050

(*Source: Forest Working Division, Una*)

4.1.2 Resin lots

Resin blazes are sold annually to H.P.S.F.D Corporation at royalty rates fixed by Himachal Pradesh Government every year. Earlier the extraction was done by cup and lip method which proved to be disastrous for many forests. Now there is complete shift to rill method of extraction which gives equally good yield as well as obviates the likely damage by fire and wind. Since 1992, the detail of resin extraction is given in the Table No. **4.2**

Table No. 4.2: Resin extraction in the Una Forest Division during 1996-97 to 2011-12

S.No.	Year.	Total blazes (No.)	Resin Extracted (Qtls)	Yield (%)
1	2	3	4	5
1	1992	121963	4235.53	34.73
2	1993	143787	5277.82	36.71
3	1994	0	3741.65	0
4	1995	133453	4538.83	34.01
5	1996	76284	2420.29	31.74
6	1997	70451	2140.30	30.38
7	1998	73508	2439.16	33.18
8	1999	60388	1712.54	28.36
9	2000	38588	1249.33	32.38
10	2001	29590	945.88	31.97
11	2002	35690	1151.24	32.25
12	2003	33261	1194.25	35.91
13	2004	33122	1400.97	42.30
14	2005	31499	1322.70	41.99
15	2006	40489	1709.69	42.23
16	2007	40489	1708.67	41.20
17	2008	40489	1665.58	41.88
18	2009	38396	1513.33	39.41
19	2010	16522	644.45	39.01
20	2011	15964	603.52	37.81

(*Source: Forest Working Division, Una*)

4.2 MARKETING OF FOREST PRODUCE

There is little local market for the forest produce; the demand of local people being met mostly through exercise of rights under HP Land Preservation Act, 1978.Timber extracted from this Division is marketed through Sale DepotNurpur & Bhadroya. The annual sale turn for the year 2007-08 was1,18,41,509 as per data given by D.M. Una, and the Una division contributes to only 10 to 15 %. The resin is processed and further sold through R&T Nahan and Bilaspur factories.

Last 10 years actual bamboo extraction from Kutlehar Forests has been collected from HP State Forest Corporation which is tabulated below:-

Table No. 4.3

Commercial category-wise yield of bambooduring 2002-03 to 2011-12 from Kutlehar Forests by HPSFDC Ltd.

Year	Area felled (ha)	Bahi-I	Bahi-II	Commercial category-wise number of Bamboo Bundles Extracted								Total
				Majhola	Lathi	Chhati	Pore-I	Pore-II	Chhar	Kalan	Misc.	
2002-03	62.25	11905	3076	853	46	7	1315	31	0	205	3020	20458
2003-04	40.19	10160	3384	1105	108	0	2138	116	3	0	2388	19402
2004-05	85.65	10396	4088	1136	66	5	988	0	25	0	5199	21903
2005-06	73.65	11400	3701	736	22	0	625	13	0	0	4684	21181
2006-07	128.35	11681	5332	1572	85	0	1412	5	0	0	3767	23854
2007-08	0	0	0	0	0	0	0	0	0	0	0	0
2008-09	0	0	0	0	0	0	0	0	0	0	0	0
2009-10	0	0	0	0	0	0	0	0	0	0	0	0
2010-11	128.85	12162	4773	1590	71	0	374	0	0	15	5591	24576
2011-12	137.85	18357	6610	1605	105	0	485	19	0	0	7591	34772
Total Bundles	656.79	86061	30964	8597	503	12	7337	184	28	220	32240	166146
Total Bamboos	-	860610	464460	171940	15090	480	73370	2760	840	1100	967200	2557850
Total Wt.(Qtl)	-	19106	10331	3826	336	11	1629	61	19	24.42	21504	56,847
Total Bdls/ha	-	131	47	13	0.76	0.02	11	0.28	0.04	0.33	49	252
Total Bamboos/ha		1310	707	262	23	0.73	112	4.20	1.28	1.67	1473	3,895
Total Wt(Qtl)/ha		29.09	15.73	5.83	0.51	0.02	2.48	0.09	0.03	0.04	33	87

TABLE 4.4: Yield of forest produce from Kutlehar forests during 1992-93 to 2011-12

(ii) Sale

Sr.No.	Year	Forest Produce							
		Timber	Logs	Pulpwood	Charcoal	Resin	Khair	Others	Total Sale
1	2	3	4	5	6	7	8	9	10
1	1992-93	1320188.00	0	21660.00	134490.00	9318166.00	0.00	66742.00	10861246.00
2	1993-94	0.00	0	0.00	0.00	11611204.00	0.00	0.00	11611204.00
3	1994-95	8604468.00	0	38900.00	0.00	6360805.00	454668.00	1884510.00	17343351.00
4	1995-96	7421859.00	0	126390.00	497928.00	14978139.00	1162214.00	425370.00	24611900.00
5	1996-97	3813725.00	0	58650.00	459236.00	7744928.00	1046442.00	846688.00	13969669.00
6	1997-98	3124876.00	0	12600.00	362878.00	6848960.00	232804.00	759273.00	11341391.00
7	1998-99	2325949.00	0	1400.00	208413.00	7317480.00	806487.00	354544.00	11014273.00
8	1999-2k	5467202.00	0	5050.00	618890.00	3253826.00	605542.00	316449.00	10266959.00
9	2k-2001	8483480.00	0	142100.00	577940.00	2373727.00	667907.00	838497.00	13083651.00
10	2001-02	5157979.00	0	137160.00	479995.00	2175524.00	615722.00	90015.00	8656395.00
11	2002-03	2435740.00	1076081.00	130795.00	355915.00	2762976.00	1352447.00	435495.00	8549449.00
12	2003-04	2271718.00	703447.00	166450.00	213198.00	2627350.00	1991538.00	290246.00	8263947.00
13	2004-05	3645246.00	1385954.00	269055.00	199610.00	3082134.00	1880651.00	223571.00	10686221.00
14	2005-06	1012544.00	1877686.00	369365.00	404712.00	2910094.00	1859987.00	182811.00	8617199.00
15	2006-07	2521821.00	2125153.00	502900.00	679747.00	4616163.00	671371.00	88517.00	11205672.00
16	2007-08	1663474.00	1306056.00	358353.00	329021.00	5467744.00	2699271.00	17590.00	11841509.00

(*Source: Forest Working Division, Una*)

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CHAPTER V

FIVE YEAR PLANS

5.1 General

The Kutlehar Forests of the Una Forest Division have been managed for getting sustainable yield, being main source of revenue. The silviculture fellings were aimed at making the forests uniform and the regeneration achieved through natural means. Till the early seventies, the emphasis was on planting commercially important species such as Chil, Khair,Poplar, Shisham,Eucalyptus etc. The growing demand of forest produce especially timber in the State resulted the focus on large scale plantations. Although the plantation program was started right from 1st 5-years plan but it gained momentum from 3rd Plan onwards. The plan wise management of forests is depicted as under:-

5.2 Five Year Plans

After the merger of the State in 1949, the forests were densely stocked and exploited commercially. Therefore, Khair and Chil Working Circles were constituted and worked. Fuel and Fodder Working Circle to meet the local demand and Protection & Rehabilitation Working Circle to fulfill conservation objectives were created. There is nothing on record to show the system which was adopted. The year wise revenue and expenditure of the erstwhile Kutlehar Forests is tabulated as under:

Table 5.1: Statement of revenue and expenditure in Una Forest Division during 1996-97 to 2010-11

Year	Revenue(Rs.)	Expenditure(Rs.)
1996-1997	1343677	29674695
1997-1998	1214197	20751026
1998-1999	1033716	32181465
1999-2000	1415755	30753861
2000-2001	1879379	27973222
2001-2002	850328	24394279
2002-2003	3551655	23866237
2003-2004	2803647	25124423
2004-2005	3235758	29098693
2005-2006	5407007	36351315
2006-2007	9658978	39469937
2007-2008	1657441	24059264
2008-2009	2681228	57326855
2009-2010	2287316	63635532
2010-2011	1581770	31036125

Plantation: The emphasis had already been shifted to raise plantations on blanks degraded forests. The year wise plantation program was adopted w.e.f. 1995-96 onwards as under:

Table 5.2: Plantations carried out in Una Forest Division includingKutlehar Forestsduring 1995-96 to 2013-2014

Year	Total area planted (ha)
1995-96	189
1996-97	195
1997-98	203
1998-99	162
1999-2000	155
2000-01	108
2001-02	100
2002-03	85
2003-04	72
2004-05	206
2005-06	299
2006-07	301
2007-08	234
2008-09	202
2009-10	236
2010-11	105
2011-12	138
2012-13	183
2013-14	274

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CHAPTER VI

STAFF AND LABOUR SUPPLY

6.1 STAFF

KutleharForests comprises whole of Tehsil Bangana (Geographical area 38145.96 ha) with the forest area 16747.53 comprised of UPFs and DPFs in the Bangana and Ramgarh Ranges.

In the erstwhile Kutlehar*jagir*,the Superintnedent (ex-Raja) held an over all administrative and executive control of forests under technical control of concerned State Forest Department through the concerned Divisional Forest Officer. For the purpose, Raja was designated as Superintendent Kutlehar Forests and also declared as Forest Officer along with one Dy.Ranger, Two Foresters, 13 Forest Guards, 23 Rakhas and one Nursery Chowkidar with the provisions of Indian Forest Act,1927 vide *PunjabGovt. Notification No.4531-5 Ft (CH)-50/523 dated 1.10.1953* which empowers Raja to compound forest offences etc.

After the enactment of Himachal Pradesh Kutlehar Forest (Acquisition of Management) Act, 1992, the Kutlehar Forests were taken over on 6-2-1996 by HP Forest Department and administrative as well as executive control over all the Forests rested with the Divisional Forest Officer of the Una Forest Division. For managing the Kutlehar forests following set-up gives a brief view:

Table 6.1: Administrative set-up of Kutlehar forests in Una Forest Division

S. No.	Range	Block	Beats
1.	Bangana	Arlu	Piplu
2.			Bharmout
3.			Arlu
4.		Bangana	Bangana
5.			Solah-Singi
6.			Paniala
7.			Kanura
8.		Sohari-Takoli	Chouli
9.			Akoi-di-Dhar
10.			Sarkaru
11.	Ramgarh	Raipur	Raipur
12.			Bohru
13.			Saili
14.			Proian
15.		Talmera	Amroh
16.			Chowki-Maniar
17.			Dhiunsar
18.			Ban-Dhanet
19.		Thana-Kalan	Mo-Maniar

20.			Kariara
21.			Mandli
22.			Makrer
	Ranges = 2	**Blocks = 6**	**Beats = 22**

(*Source: Una Forest Division, Una*)

In order to operate above set up, DFO Una is maintaining field as given table below:-

The following statement shows the present sanctioned strength for Ranges involved in the Kutlehar Forests (Una Forest Division) of various categories of staff:-

Table No. 6.2: Cadre strength in Kutlehar forests of Una Forest Division

Sr. No.	Category of post	Sanctioned Strength	Existing Strength	Variation if any
	GAZETTED			
1.	D.F.O. Una	1	1	-
2.	A.C.F. Una	1	1	-
3.	Range Forest Officers	2	2	-
	Executive			
4.	Dy. Rangers	6	6	-
5.	Forest Guards	22	15	(-7)
	Ministerial (Una)			
6.	Supdt. G-II	-	-	-
7.	Sr. Assistants	-	-	-
8.	Jr. Asstt./Clerks	-	-	-
9.	Drivers	-	-	-
10.	Patwari/Kanungo	-	-	
11.	Peons	2	1	(-1)
12.	Malies	2	1	(-1)
13.	Chowkidars	2	2	-
14.	Forest Workers	22	4	(-18)
15.	Dak runner	-	-	-
16.	Electrician	-	-	-
17.	Sweeper	2	-	(-2)
Total		**62**	**33**	**(-29)**

(*Source: Una Forest Division, Una*)

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

6.2 EXECUTIVE CHARGES

There are 2 Ranges, 6 Blocks, 22 Beats in the Kutlehar Forests of Una Forest Division at present and their detail alongwith headquarters is given in **Appendix-V & VI**.

6.3 LABOUR SUPPLY: With the developmental activities going on in all the departments, the position of labour supply is becoming acute. However, for routine silvicultural and other forest works sufficient local labour is readily available except during the crop season. Labour supply mates of Forest Corporation for carrying out exploitation of forests have to import labour from Kangra, Mandi and Chamba districts. Labour for manufacturing Katha are imported from Uttar Pradesh. In addition, unskilled, semi skilled and skilled labour is also required for execution of annual forestry operation like raising of nurseries, plantation, cultural operation, enumerations, marking, repair of boundary pillars, construction and repairs of buildings, roads and paths etc. There is no dearth of local labour of any category for any operation but it is not adequately available during two harvesting seasons in March/April and September/October. Labour is imported from outside very often because local labour mostly remains busy in MNREGA works being carried in the area. Strangely enough, imported labour is cheaper in the long run by virtue of their being more efficient and readily available at work site as compared to local labour. Price index has shot up tremendously and price hike phenomenon may continue in future which might add to the cost of forestry operations in times to come unless the same is kept under check through feasible mechanization.

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

Table No. 6.3: Daily wage rates of skilled and unskilled labour followed in Una Forest Division

S.N.	Category of daily labour	Rates per Day (Rs)
1	Un- skilled	210
2	Quarry man (Khangir)	210
3	Driller(for Air Pump)	210
4	Sprayman	210
5	Carpenter Ist Class	331
6	Carpenter 2nd Class	265
7	Mason Ist Class	331
8	Mason IInd Class/Stone Chisler	265
9	Painter Ist Class/ Distemperer	331
10	Painter IInd Class/white washer	225
11	Plumber Ist Class	252
12	Bar binder	225
13	Sawmiller	252
14	Electrician Ist Class(I.T.I)	300

S.N.	Category of daily labour	Rates per Day (Rs)
15	Surveyor	300
16	Driver	265
17	Feller(Girani)	210
18	Logger	210
19	Climber	210
20	Sawyer (Charani)	225
21	Dresser (Pachhani)	210
22	Chowkidar (Office, Depot,Nursery etc)	210
23	Khalasi,Zoo Animal Attendant/Fire Watcher /Grinder forchips flooring /Mate / Calliperman / Mali, Sweeper/ Enumerator /Enclosure sweeper	210

(*Source: Finace Dept., GoHP Dated 7.4.2017*)

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CHAPTER VII

PAST SYSTEM OF MANAGEMENT

7.1 GENERAL HISTORY OF FORESTS

The Kutlehar*jagir* was transferred from Hoshiarpur district to Kangra district in 1868 and management of the forests of the jagir-tappas entrusted to the Raja and through an erroneous interpretation of the orders of 1869, the forests in the remaining twelve khalsatappas which formed part of Kutlehar*taluka* got also included. The Raja then started managing orders in sixteen tappas mainly as his game preserve and tried to keep them intact to a greater extent. This was facilitated by the absence of export of timber or charcoal and limited exercise of rights of bartan by the right holders. After rights of villagers were clearly defined in 1915, it was not possible to ensure the same protection as was in the past. With increasing population and a rise in the standard of living, there was a corresponding increase in demand for timber and other forest produce. This caused deterioration of the forests except the closed portions of bamboos forests and trihais which escaped the burden of over increasing heavy incidence of rights.

With the annexation of Punjab by the British Lyall settlementwas carried out, as explained in paragraph 60 of Lyall's Settlement Report, 133 small blocks of trihais covering 1674-15 ha.in 131 tikas had been marked and brought under protection in the year 1859-60. Subsequently, on the report of Stenhouse and Anderson, Government passed orders for further demarcation in Kutleharjagir vide their letter No.567 dated December 26,1884. In Anderson's fresh demarcationduring Kangra Forest Settlement of 1883-87, 23 blocks of demarcated forests were formed by adding other waste land to 98 trihais. The remaining 33 trihais in different tikas were retained as such and kept closed to all rights with the inception of the Rotational Closure Scheme prepared by Aggarwal and Kundan Singh in 1928. However, on account of disappearance of pillars, the actual closure did not extend over full areas notified as closed in 'Sheepshank's Report of 1915.

7.2 ROTATIONAL CLOSURE SCHEME OF 1927-28

In 1927-28 a rotation Closure Scheme was prepared by Agarwal and Kundan Singh on the lines of Rotational Closure Scheme for the forests of Kangra District by Mitchel and Walters in the interest of Forest Conservancy. This scheme was approved in general by Punjab Government vide their letter No.28863-Fts dated October 13,1920.

Now new areas were demarcated but 5047.47 ha (4460.18 ha of demarcated forests and 585.29 ha. of un-demarcated protected forests) were covered by the scheme, in accordance with

Punjab Government letter No.219-261-E.20 dated May 22, 1918. The selection was mainly confined to the Demarcated Protected Forests, but on account of denudation and area being surrounded partly or wholly by demarcated protected forests some un-demarcated protected forests had to be incorporated in Rotational Closure Scheme.

The scheme prescribed closure of a part ($1/3^{rd}$ in case of scrub forests and $1/4^{th}$ in case of chil forests) of the forests delimited for the purpose in rotation in such a manner as not to cause villagers any great inconvenience while ensuring the permanency of the forests. This scheme was based on the grazing requirement of each individual tika or a number of tikas with inter changeable grazing rights. The following areas were closed in the first period of the closure:-

Chil working Circle	: 169.00 ha for protection
	131.51 ha for 30 years.
Bamboo Working Circle	: 226.62 ha for 10 years.

Closure in un-demarcated areas proposed in the report was considered as maximum permissible under the rules.

7.3 PAST SYSTEMS OF MANAGEMENT AND THEIR RESULTS:-

The first attempt at forest conservancy was made under forest rules issued in 1855 and brought into force in 1859 and 1860. Under these rules, the entire waste was to be divided into three parts and each part closed for a period of three years at a time. A larger area was actually closed under the orders but the closure were never changed and there original closure or Trihais were finally modified by Government as closed on the recommendations of Anderson in 1897 and remained closed up till 1917. The scientific management was introduced in 1903-04 when first working plan was prepared.

The management of the forests has been with the Raja since 1868. The jagir came under the control of Court of Wards in 1937 as the Raja was a minor. The supervision of Court of Wards continued up to April 30,1954 whereas the management was handed over back to the Raja on becoming a major and continued to be with him till 1992. Account of the past management under different working plans is given below:-

7.3.1 Hart's Working Plan 1903-04 to 1922-23: For the first time, Demarcated Protected Forest of Kutlehar were brought under a regular working plan in 1903 when these forests were included with Kangra and HoshiarpurDistricts forests in Hart's Working Plan. The forests were allocated to Pine, Bamboo and Shrub working circles.

i) **The Pine Working Circle:** Improvement fellings and thinnings were prescribed in preference to selection system, but were not carried out because of difficulty of getting the forest closed. On account of poor quality of stock and remoteness of the forests, thinnings were also not carried out regularly. Repeated fires played havoc. Unregulated markings for right holders deteriorated the forest considerably.

ii) **The Bamboo Working Circle:** Annual selection fellings and cleaning were prescribed, but not followed strictly. Sanction was accorded to the purchasers to cut the number of bamboos, they applied for. The purchasers accordingly removed the best, the biggest and the most accessible bamboos. There was practically no demand for smaller sizes which formed as large portion of the crop and this resulted in congestion of the clumps.

iii) **The Scrub Working Circle:** In this working circle, protection was the main object aimed at. The open areas were usually heavily grazed and were repeatedly deteriorating. Coppice with standards system was prescribed for closed portions, in case demand for material arose. Neither any demand had arisen nor any fellings undertaken.

From the above account, it is evident that prescriptions of this working plan were not carried out satisfactorily.

7.3.2 Aggarwal's Revised Working plan 1932-33 to 1951-52: In 1930 K L Aggarwal prepared a Working Plan dealing with 4969.66 ha of delimited protected forests for the period 1932-33 to 1951-52. It was based on rotational closure scheme prepared in 1920. The forests were put under three working circles as under:

i) **The Pine Working Circle:** For this circle comprising of 1232.65 ha light improvement fellings-cum-thinnings combined with regeneration of selected areas were prescribed. In all, 11240 chil trees were removed by the purchasers and the right holders. 97.93 ha and 608.64 ha were allotted to regeneration and Improvement Felling series respectively for which felling rules were prescribed. 57.46 ha were required to be regenerated artificially but only 12.14 ha were sown during 20 years without any success. Hardly, any other prescription was carried out as a result of which very little chil regeneration came up in closed areas. Whatsoever regeneration came up suffered heavily from repeated fire. Fire

protection measures were rarely carried out in a proper way although some fire lines were cleared. 220.10 ha were burnt from1938-39 to 1950-51. As regards resin tapping, rules laid down in Punjab Forest Leaflet No.13 were not strictly followed. A large number of trees were illicitly tapped.

ii) **The Bamboo Working Circle:** Bamboo forests occupying 437.45 ha were closed annually for 3 months during rains. Biennial cuttings and cleanings where necessary were prescribed. This felling cycle was subsequently changed to three years by the Chief Conservator of Forests, Punjab also laid down that the cleanings and fellings would be carried out simultaneously as one operation. No order for execution of fellings was followed and they were erratic. During the political unrest, many forests were burnt. As a result, the clumps got too much congested and choked with dry bamboos. Flowering in 1951-52 was almost gregarious. No artificial regeneration was prescribed.

iii) **The Scrub Working Circle:** It included Scrub forests over 3112.80 ha. The object mainly was protection of forests of the first closure series requiring protection were to be closed for ten years initially. This closure period was reportedly further extended by 30 years. Cultural operations were neither proposed nor undertaken because they were considered more expensive than Raja could afford. According to Govt letter No.28863 dated 16.10.1980 blocks from XXIII to XXIX were proposed to be closed indefinitely but through wrong interpretation of the orders only 1/3rd of the areas against these forest blocks were given in the closure notification. This mistake was never realized. Where closure had been effective for 15 to 20 years, vegetation responded remarkably well. The density of scrub improved and valuable trees species like khair and shisham came in.Protection of closed area in out of the way places had however, been rather bad.From the above, it is clear that the prescription of Aggarwal's Working Plan were not given fair trial.

7.3.3 Gurbachan Singh's Working Plan 1952-53 to 1961-62:-The general objects of management of the plan were as follows:-

i) To protect and improve all forest areas included in the Rotational Closure Scheme and also to prevent denudation, erosion and desiccation of the area in the interest of the general welfare of the local inhabitants.

ii) To ensure the regeneration of all areas closed in accordance with the Rotational Closure Scheme where ever the old crop had either reached its physical maturity and was over exploited or was not well stocked.

iii) To provide to the fullest extent compatible with objects No.(i) and (ii) for the bonafide domestic and agricultural requirements of the local inhabitants for timber, firewood, grass and grazing.

iv) To realize the maximum revenue by the sale of the forest produce as far as this is possible with due regard to the first three objects.

To achieve the above objects of management, the following three Working Circles were constituted:

i) **The Chil Working Circle**

The area of 1273.12 ha was allotted to this circle. The system of management adopted was shelter wood system aiming at regeneration of all the forests of the current closure series. Seedling, fellings were not prescribed because forests were already open and it was considered difficult to get complete regeneration in remaining 10 years of closure. Protection against grazing, grass cutting and fire was prescribed during the first 3 years of the plan. Unclosed areas were to be treated under improvement-cum-thinning felling with strict fire protection.

Some unclosed forests of the first closure series and those rendered open by fires were prescribed for protection through closure for 10 years. Rotation for chil was fixed at 120 years and the whole area divided into 4 fixed periodic blocks. Each periodic block was to be closed for 30 years in accordance with rotational closure scheme. Areas that were measuring 294.20 ha were included in PB I. One compartment(1a) of DPF Thethu(16.59 ha.) was added to this PB for closure for 10 years protection. All areas other than PB I(1124.20 ha.) were grouped together under PB others.

The yield was regulated by area and detailed felling rules were prescribed. Each periodic block was divided into 2 quinine coupes, each comprising of one half of the area of a compartment to be marked every fifth year so that whole area could be gone over once in 10 years. No seeding fellings were prescribed but secondary felling where necessary and final fellings in areas with regeneration of at least 1.8 m height and having undergone cleanings and departmental burning were prescribed. For other PBs, thinning in congested groups and removal of dead, dry suppressed and malformed trees was

indicated on silvicultural grounds. Retention of 125 trees per ha in PBII 187 trees, P.B.III and 400 trees in PB.I were laid down. In all the PBs trees marked were to be retained to meet the demand of right holders for 6 years and sold thereafter if remained unfilled. Sowing in PBI (12.14 ha) of compartment of D.P.XIII Akoi-di-dhar and 0.04 ha of compartment 5 of D.P.XVIII SarkaruGhorPlani, where the chances of natural regeneration getting established were remote was prescribed. Operations were shown as carried out in accordance with the prescriptions but with no success. Failure can be attributed to faulty execution, fires, delayed sowings and non-removal of excessive bush growth.

Closure in compartment 1a of DPF Thethu Forest(16.59 ha) which remained open in Aggarwal Plan was enforced as late as 1956-57 with the result that the time left for chil regeneration to get established was reduced to 6-7 years. Instead of chil the area has been partly covered with dense scrub growth. In DPF Chatrah, bushes had come up in patches for want of proper tending closure. Weedings, cleanings, climber cuttings and thinnings were prescribed over 31.56 ha but were never carried out. Consequently *Bauhiniavahlii* and *Pueraria tuberose* has covered chil saplings poles and even big trees. For want of proper tending groups of young crop got congested.

Protection of chil areas from fire particularly those under regeneration were to receive the greatest attempt. This prescription was not properly carried out.The area burnt from 1952-53 to 1961-62 was 428.29 ha of seven demarcated protected forest, 542.05 haof un-demarcated protected forests except for compartment 1 of CheliSatrukha. The other PB I areas have been adequately regenerated so as to justify their transfer to PB IV after the expiry of present closure. Moreover, in compartment 1a of Thethu; 4a and 5a of SarkaruGhorplani and4a of Dhiunsar allotted to PB I scrub has come in profusely.

ii) **The Bamboo Working Circle:**

The area 566.68 ha of Thapal and RamgarhAwarla forests were allotted to this circle. The treatment prescribed was the extraction of silviculturally available bamboos provided there was a demand for them. Selection-cum-thinning fellings were prescribed to ensure maximum shoot production and healthy growth removal of dry malformed, twisted and gnarled bamboos was prescribed. Ten years closure was prescribed for all bamboos bearing areas because of gregarious flowering. Culms were not indicated for felling if less than 4 years old. Three years felling cycle was prescribed.

As a result of closure, ample natural regeneration of bamboo from seed had come up, except in few plots along ridges and cultivated lands in RamgarhAwarla compartment 4a and 5b parts of Thapal and RamgarhAwarla forests closed for 10 years have been invaded by scrub growth because of lack of tending operations.

Bamboo in areas allotted in Scrub Working Circle and not effected by flowering, remained closed to grazing for three months in the rainy season. All these areas are fairly stocked with congested clumps.

iii) **The Scrub Working Circle:**

The circle comprised of 3071.97 ha and method of treatment prescribed was protection to reduce and stop denudation and erosion of area and restocking of the area with more valuable trees species. Felling of khair even for right holders and katha manufacturer was restricted and prescribed to be carried out only under improvement felling where removal of dry, dead trees and those not required for seed was to be done.

Out of 3071.97 ha, 1022.11 ha was prescribed for closure in accordance with Rotational Closure Scheme. Forests of the second closure series requiring protection and recuperation only were to be closed. Closure of some of the forests which remained open in Aggarwal Plan was suggested instead of the second closure block. This period of closure was fixed at 10 years. The old trihais, which were less than 10.11 hain areas were closed indefinitely. Some trihais which were more than 10.11 ha completely denuded were also suggested for closure in toto.

Artificial regeneration of *Acaciacatechu*, *Dalberigiasissoo* in nullahs and *Pinusroxburghii* on favourable patches inaddition to *Bombax ceiba* and *Terminaliabelerica* was indicated. Sowing of *Acacia catechu* and *Pinusroxburghii* were to be done in patches 3m apart in lines and about 3.6m apart along with contour. Broadcast sowing in the beginning of July was also suggested.

Although the Working Plan came in force from 1952-53 but the areas were actually notified for closure in 1957. So the prescriptions of sowing etc. for the first five years have been shown as completed in 1959-60 in one lot at cost of Rs. 916.Subsidiary silvicultural operations in the form of cleanings and thinning in dense patches of young khair regeneration were carried out over 104.91 ha, as prescribed. In addition, to meet the demand of right holders, 4 trees from compartment 1b of Bela and 439 trees from compartment 3b of Thapal forest were removed in 1952-53 which were neither prescribed nor suggested.

Improvement felling of *Acacia catachu* over 125.45 ha of Dhar Sola Singhi and Bhiambbi compartments 5 and 6 and other areas were not carried out in the year as prescribed. These fellings were mainly spread over from 1956-57 to 1961-62.

About 9924 khair trees consisting 4587m girth were felled during the plan period. There have been a few cases of illicit felling of khair trees. Whatever improvement in the scrub forests is noticed, it is entirely due to closures. Many prescriptions of the Working Plan remained a dead letter and were never carried out. Expenditure incurred by the Raja on the development, extension and improvement of the forests in this had been very less as given below:-

Table No. 7.1: Detail of expenditure of works

Budget head Building	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60	1960-61	1961-62	1962-63
B.IVa checking & repair to boundaries	–	–	–	706.70	213.13	372.13	253.67	138.32	372.02
B.IVb sowing & planting.	1.50	–	–	–	–	916.31	300.65	617.41	441.97
B.IVc Cutting & clearing of fire lines	428.28	227.25	717.50	187.50	132.75	156.2	598.23	173.73	101.50
(ii)Pay of F.W.	–	497.17	–	583.40	517.74	–	–	679.69	668.79
B.V.a Const. & repair to roads & paths	–	–	–	341.60	186.00	–	75.12	7724.90	17.48
B.Vb(i) Const. of blds.	1833.75	–	13257.26	–	9933.11	–	617.14	–	1093.00
(ii)Repair to Blds.	290.00	–	12.75	19.62	12.73	41.75	–	1924.65	670.23
Total	2583.63	721.42	13987.50	1778.28	10996.46	1485.44	1844.01	4248.11	3568.44

7.3.4 Dr.Gupta's Revised Working Plan 1961-62 to 1990-91

The Working Plan laid down the following general objects of management:-

a. To protect, preserve and improve forest vegetation of forest areas covered by rotational closure scheme by regeneration chil forests by exploiting scrub areas and replacing them with economically important and fast growing species so that maximum production is obtained and denudation, erosion and desiccation is decreased.

b. To satisfy bonafide demand for timber, fuel, fodder and grass for domestic and agricultural use of local population as far as silviculturally permissible.

c. To obtain maximum sustained revenue by proper management so far as this is possible with due regard to the first two objects especially by rationalizing resin extraction operations and bamboo exploitation.

With a view to achieve above objects, the following Working Circles were constituted:-

- The Chil Working Circle.
- The Bamboo Working Circle
- The Plantation Working Circle

The Undemarcated Protected Forests were practically not dealt with.

The Chil Working Circle: An area of 1273.12 ha was allotted to this circle. The system of management prescribed was the Punjab Shelter wood system with fixed periodic blocks aiming at regeneration of all the forest of the second closure series. The mode of regeneration was indicated to be natural and the regeneration indicated to be obtained by manipulating the canopy in the seeding fellings. The natural regeneration was to be supplemented by artificial means to obtain complete regeneration in PBI areas so that these might be allotted to PB IV and thrown open to grazing after the expiry of the closures in 1991. No change was proposed in boundaries of the forest blocks and compartments. Fresh stock maps on scale (4" = 1 mile) had been prepared. Chil was to be the main species for the Working Circle. A diameter of 60 cm at breast height for chil was taken as the exploitable size and for tapping the trees for resin 40 cm at breast height was felt suitable and tapping envisaged continuing for 50 years. The rotation of the crop was fixed at 120 years commencing from the year 1932. This should, however, be 1930-31 when scheme was approved. The rotation was subdivided into 4 periodic blocks with the area allotted to each block as under:

PB I	**PBII**	**PB III**	**PB IV**	**Total**(ha)
331.02	323.13	280.51	335.02	1273.12

The areas of PB II of Gurbachan Singh Plan were allotted to PB I. The seeding felling were provided to be established completed within the first ten years after 1964-65 thus allowing more than 15 years for the regeneration to be established up to 1991. Details of the areas invaded by scrub in the PBI(38.40 ha) have been given and artificial stocking was indicated in an area if there was no seed on the mother trees at the time of seeding fellings,

In the PB II areas, fellings were restricted to only malformed dead and dying chil trees mainly to meet the requirements of right holders. D grade thinnings were provided in PBIII along with the removal of all dead and suppressed trees.

The yield from PBI and IV was designated as final yield and that from PB II&III as intermediate yield. The yield was prescribed by area, with an indication that not more than 339.72 m^3 of chil in terms of trees of 30 cm diameter breast height and over are likely to be available every year on the basis of the observations made in the field. Obviously, this estimate was for first ten years after 1964-65, when seedling fellings on PB I areas were to be carried out.

The method of seeding fellings was laid down in the form of specific rules to be followed and sequence of fellings was laid down. These fellings were prescribed to be completed in the first ten years of the closure. The markings were prescribed to be done well in advance so that the right holders take advantage and do not fell sound trees for cremations and marriages. Subsidiary silvicultural operations were prescribed such as disposal of the felling refuse. Sowing of chil seeds were prescribed after cutting bushes in lines 1.52 m wide and 3m apart in areas requiring artificial regeneration.Tending of seedlings by carrying out weeding and spacing these cutting bushes and cleaning in PBI areas after the plants were 1.8 m high spacing them at 3 to 3.6 m apart. Other regulations consisted of effective fire protection, allowing light and controlled grazing after the young seedlings established themselves at the discretion of the DFO.Control burning in areas under regeneration, for which a triennial programme of departmental burning was given, as well as in the areas under regeneration on cooler aspects and moist situations when the saplings were about 1.5 m high. On warmer aspects first control burning was to be undertaken when the saplings attained a height of 3m. The removal of dead, dry and fallen trees was also prescribed.

RESULTS

The results have not been as desired due to faulty or non-application of prescriptions. The seedling fellings were carried out in a conservative manner. Consequently, corrective seeding fellings had to be carried out in late seventies. The natural regeneration was not supplemented by artificial means in a concerted manner of the areas felled from 1964-65 to 1973-74. DPF SarkaruGhorplaniC2b,3b,5b; DhiunsarC2b and C4b have not been fully regenerated. The worst among them are DPFs DhiunsarC4b(SB) and Akoi-di-dharC1b(SB) likewise of the 38.40 ha of scrub invaded area only 1/3rd had been regenerated. The progress was satisfactory in DPF DhiunsarC3b, about 50% in DPF CharoliC1b and 25% in SarkaruGhorPlaniC4b. There has been

no progress in DPFs DhiunsarC1b(SB) and Akoi di DharC1b(SB). A statement depicting an assessment of the progress of regeneration in PB I area is given below:-

Table No. 7.2: Progress of regeneration in PB I areas

S.No.	Name of the forest	Total area (ha)	Area of established regeneration (above 1.8 m high)	Area of regeneration (below 1.8 m high)	Area yet to be regenerated with intensive efforts	Uncultivable areas
1.	DPThethuC1b	19.41	11.00	8.41	–	-
2.	DP ChhatrahC1b	29.20	29.20	–	–	–
3.	DP CharaC1b	4.84	2.00	1.84	1.00	–
4.	DP CharoliC1b	6.87	1.83	1.54	3.50	-
5.	DP CheliSatrukha 1bNB	16.18	11.00	5.18	–	-
6.	-do- SB7	11.73	4.00	2.30	–	–
7.	DP Gill da ban C1b	12.14	6.14	6.00	–	–
8.	DPSarkaruGhorplaniC1b	30.74	16.00	11.00	3.74	-
9.	-do- C2b	30.74	7.00	9.00	4.34	-
10.	-do- C3b	14.16	10.00	2.00	2.16	-
	-do- C4b NB&SB	7.92	6.40	0.80	0.92	-
12.	-do- C5b	15.78	4.78	7.00	4.00	-
13.	DPDhiunsar1bNB	10.12	8.00	1.12	1.00	-
14.	-do- SB	8.09	3.00	-	5.09-	-
15.	-DP- 2B	20.63	5.00	18.00	2.63	-
16.	-do-3b	14..16	8.50	3.16	-	2.50
17.	-do- 4b	17.39	-	-	14.39	3.00
18.	Akoi di dharC1b NB	27.11	8.00	10.00	9.11	-
19	-do- SB	11.73	3.73	-	8.00	-
		329.54	166.20	88.35	63.26	5.50

The inhibiting factors for chil regeneration have been repeated fires, absence of clean seed bed, in some areas un-stable zone for Chil, death of good seed bearers rank growth of bushes and lack of desired and concerted efforts. The contributory factors have been defective seeding felling in which more trees were retained than needed and lack of follow up subsidiary silvicultural operations for supplementing natural regeneration with artificial methods.

The incidence of fires increased manifold during the plan period. Area of 1273.12 ha of forests allotted to the Chil Working Circle has burnt about 1 to 8 times. The regeneration areas have also been affected 2-4 times. The fire watchers do not seem to have been engaged in requisite strength. The fire lines have not been maintained in DPFOel da Ban as prescribed in the plan. These has however, been maintained except in DPFs Thethun, Chhatrah, CheliStrukha and Charara.

A number of chil trees in areas allotted to the Working Circle die due to damage by fire. The removals of dry and fallen trees amount to 47,730.041 m^3upto 2011-12 only. The removals have been still more in the subsequent period. The fires have adversely affected the seed bearing quality of the mother trees and other site conditions such as soil etc. In addition, the fires have led to growth of shrub and grasses which retarded the progress of chil regeneration by suppression such as in DPF Charoli and DPFSarkaruGhorplaniC4b(SB). The bush cutting operation was neglected.

The subsidiary silvicultural operations have generally been neglected and resultantly clean seed had not been available. The results have not been satisfactory due to the areas were not fenced,bush cutting was not done and small size planting stock.

Cultural operations in the form of weeding, pruning, cleanings and bush cutting have not been carried out in concerted manner. The removal of dry and fallen trees from the PB II areas have resulted in heavier fellings than prescribed which have opened up the crop.

Thinning in PB III were carried out until 1979 and thereafter stopped in view of CCF HP instructions on the ground that the opened up chil forests do not require thinning.

Control burning in areas not under regeneration was carried out in accordance with the triennial programme given in table of the plan from the year 1964-65 to 1975-76 whereafter it was stopped under the orders of the Chief Conservator of Forest, Himachal Pradesh. The orders were revoked after one year but not given effect in these forests for about five years. The programme laid vide table II of the plan was also defective as it did not cover all the chil areas.

Depending upon the establishment of chil regeneration secondary fellings which had to be undertaken after 10 years of the seeding fellings have so far been carried out in the plan period in the following areas:-

Table No. 7.3: Seeding felling carried out in PB I areas after an interval of 10 years

Year	Name of PB I areas	Area gone over (ha.)
1977-78	DP ChararaC1b	4.89
1978-79	DP ThethuC1b	19.41
	DP Chhatrah C1b	29.12
	DP CheliSatrukhaC1b NB	16.18
1979-80	DPCheliSatrukhaC1b SB	11.73
	DPDhiunsarC3b	14.16
	Total	**95.49**

The Bamboo Working Circle:

The area allotted to this circle was 575.05 ha located in DPFs Thapal and RamgarhAwarla. The main object of constituting this circle was to maintain the bamboo forests in a healthy condition so as to get maximum sustained yield both of meeting requirements of the right holders and traders. The bamboo areas were to be worked under selection-cum-improvement felling system on a triennial cycle. As gregarious flowering had occurred in all the bamboo forests in 1951, the size of clumps was small and these were not likely to give good sized bamboos for at least 6 years more. In view of this, it was indicated that cleanings in this period should receive special attention to ensure future yield. The yield of bamboos was fixed by area and it was estimated that 25000 bamboos per annum will be available after a period of 6 years in the plan period. The method of executing fellings and the felling rules were laid down. These areas were closed in 1954 for 10 years but during this period sufficient regeneration of bamboos did not come up uniformly all over areas. It was suggested that the blanks in the bamboo areas with deep soil and protected soil sites should be restocked artificially with bamboos. The method of restocking and a programme of planting bamboos were laid down and it was indicated that failures should be restocked in the succeeding years. Weeding and cleanings were prescribed. Apart from this the removal of overhead shade of misc. tree species was provided after retaining 44-45 such trees per ha which should be evenly distributed to afford protection to young clumps and to provide cover to the soil. In order to get regeneration, bamboo areas were to be kept closed for grazing for 3 months from 1st July to 30th September during rains. It was indicated that in case of blanks stocked artificially, the closure of 10 years should be necessary. In case of gregarious flowering immediate closure for 10 years was suggested. In no case lopping of bamboo was allowed.

RESULTS

The results of the implementation of prescriptions in this working circle are not as satisfactory what these should have been. The sale of bamboos from areas of this circle was taken up from the year 1964-65. The bamboo forests were sold to purchasers by open auction for working previously on the basis of area indicating the approximate number of bamboos of different classes likely to be available for felling. The felling rules were not followed by the purchasers with the result that congested clumps were not worked and the clumps worked in

each forest were over felled. The stocking of bamboos has deteriorated at places instead of improvement envisaged under the plan.

From 1984-85, the bamboos are worked by the HP State Forest Corporation Development Ltd. In the absence of adequate supervision and control, majority of the clumps are not worked by the labour of the corporation which resulted in congestion.

The bamboos had been extended in the area of this circle by sowing and not by planting as prescribed in the plan. The attempts made at restocking consisted on sowing of bamboo seed in DPF RamgarhAwarlaC2b and 3b in the year 1969-70 and DPF Thapal C1a over 0.09 ha and DPF RamgarhAwarlaC1a over 6.87 ha, C1b over 6.07 ha,C2a over 1.21 ha and C2b over 4.04 ha in year 1972-73. The name of operation whether it was sowing or planting was not shown but from the cost has been indicated.It appeared that sowing of bamboo was carried out in these areas. The requisite cleanings in the bamboo areas as prescribed in the plan had not been carried out at the appropriate time. Lopping of bamboos had been done which adversely affected the quality of bamboo shoots coming up in the clumps in the areas adjoining habitations. The production of *manus* (new shoots) is poor because of congestion, overworking, neglect of felling rules and damage by local people. In some areas of the Plantation Working Circle that carry bamboo crop and which had been worked on three years felling cycle, there has been gregarious flowering leading to the death of all the clumps except solitary clumps here and there. In DPF SolaSinghi C2a, C2b, C3a, C3b and Ban Maslana, part of these areas have only regenerated.

The Plantation Working Circle

The area allotted to this Working Circle was 2946.48 ha. Special objects of management under this working circle were to convert the existing vegetation gradually into economically more important growth so as to derive maximum production and financial return and to carry out soil conservation works in blanks. The method of treatment suggested was to clear fell the vegetation in contour strips and to stock the area artificially with economically important tree species. The entire area was to be gone over by 31.3.92. Areas under regeneration were to be closed for 10 years as provided in the Rotational Closure Scheme. The yield was prescribed by area. It was estimated that on an average the outturn of fuel would be about 44.7 quintals per ha. The fellings were connected with the artificial stocking of the area which was divided into 3 planting series namely RamgarhDhar Series 1426.09 ha, SolasingiDhar series 969.21 ha and DhiunsarDhar series 551.27 ha. Felling rules and the sequence of fellings were provided. The felled area was to be closed for a period of 10 years and since period of 2 years had already passed; the first closure series was to be for 8 years. In addition to sowing, planting of khair

raised in polythene bags was prescribed. Apart from this, planting of teak by stumps over 20.23 ha inRamgarhAwarlaC4(lower part) and eucalyptus was also suggested. The sequence of planting was to the sequence of fellings and the planting programme was to commence from the year 1965-66. It was suggested that the ridges and comparatively shallow soils should be planted with khair. Two weedings were provided in the first year and one in the second year. For getting planting stock, raising of permanent nurseries at Hatli, Mandli, and Lathiani or at some other suitable sites had been suggested. It was laid that grass-cutting, grazing and exercise of other rights in the areas under regeneration should be suspended. If considered desirable, the Divisional Forest Officer might allow grass cutting. Subsequently, after about 3 years, the method of felling in strips was substituted by coppice with standard system.

RESULTS

The object of conversion of existing vegetation in economically more important growth has not been achieved. Anywhere except in DPF ChowkiManiarClc,Sohari-Baduha(whole), Tanda-BagwanClc,Atia(Whole), KanuraCla, DPF Sola SinghiClb, Amroh(whole) and DulohiCla which constitute about 8% of the total area felled. In the rest of the area the extent of bushes and weeds has rather increased. The coppice with standard system that envisaged clear felling with retention of standards has proved unsuitable for the tract. The system has done damage by resulting in retrogression of site and consequent replacement of economic species with uneconomic species with shrubs and weeds. The plantation traditions has not established with the management. The small sized planting stock and poor quality earth work has resulted in high failure percent in areas on steep slopes with shallow soils such as DPFsBasaterChamiari, Kot, Matoh, Sukerial and Bhiambi;major part of Kariara, Teera-Aghlaur Clb, Jol, Bela, C1c and Choli Clb.

In majority of the forest areas, khair has failed over their greater parts and only a few saplings are to be seen along the paths or at favourable sites.

The species of khair has not been singled. Apart from the coppice of useful trees species and shrubs has covered these areas along with climbers like *Bauhinia vahlii* and *Puerariatuberosa*.

It is incorrect to presume that economic plantation of khair can be raised successfully every where in the areas of circle irrespective of site conditions. Khair has been planted all over the felled areas including steep slopes with shallow soils which are not suitable for this species. No prescriptions had been laid down to plant valuable tree species other than khair. The

prescription with regard to planting of teak has not been carried out. Eucalyptus was planted in a few areas of this circle but it failed almost entirely. The nurseries as prescribed vide para 87 of the plan were not raised.

Tending operations to favour the coppice of more valuable tree species viz-a-viz the coppice of inferior tree species and shrubs have been neglected. The cleaning of advance growth and its thinning has also not received due attention.

OTHER REGULATIONS

a. **Grazing and grass cutting:** Grazing in closed areas was strictly prohibited. Grass cutting was permitted from the closed areas at the discretion of Divisional Forest Officer. Bhabbar Grass used to be sold from 998.34 ha by auction. This was generally purchased by ShriGopal Paper Mill now M/s Ballarpur Industries subject to the conditions that the requirement of the right-holder in respect of grass would be met before removing any grass from this area. By this system income rose from 200.00 in 1942-43 to 1350.00 in 1952-53 and the average sale price for the 5 years prior to 1951-52 was Rs 1135.00.

   Since, 1952 the grass was being leased on annual rent basis to the same mill. The rent was fixed at Rs.1500in 1952 and was raised to Rs 2000in the year 1957-58. Subsequently lease money was realized on the basis of quantity of grass extracted by weight after allowing 10% drayage. The rate at the time of revision of this plan was Rs 0.67 per quintal up to 3359 quintals of dry grass removed from the forests and Rs 2.01 per quintal for quantities exceeding the above.

b. **Sale of khairtrees:** There had been increase in the price of khair trees which made the management to sell most of khair trees in attempt to derive maximum revenue and the number of khair trees left in the forest was not much.

c. **Maintenance of Paths:** Against two paths prescribed in the Working Plan for constructions, only one was completed in P IX RamgarhAwarla. Second path prescribed in DP XVIII SarkaruGhorplani was not constructed.

d. **Maintenance and checking of boundaries:** Control forms maintained in Beas Forest Division revealed that maintenance of boundaries was not done according to the sequence laid down in the Working Plan. Deviations are given below:

Table No. 7.4: Deviation in maintenance of boundaries

Year of checking as prescribed in the working plan	Remarks
1952-53 & 1953-54	Carried out in XII DPF Kanura C1a and 2b only in 1953-54 but not done in other forests.
1954-55 & 1955-56	No work done. Only distance between the pillars measured but broken pillars were not repaired.
1956-57	Carried out
1957-58	Carried out

v) Miscellaneous Regulations

a) **Arrangements for subsequent closures:**

Arrangements for subsequent closures of both Chil and Plantation Working Circles were indicated in the plan. According to these arrangements, the scrub forests were to be demarcated in three parts and the areas of Chil Working Circle allotted to PB I demarcated with boundary pillars. This has not been done for scrub forests. Apart from this the individual closure notifications of the coppice coupes for a period of 10 years from the year of felling have not been issued in any case.

b) **Roads and Paths:**

The prescription had not been carried out. However, the construction of Jeepableroad in Solasinghi and Bhiambi from Hatli to Charara was cancelled by the Conservator of Forests,Dharamshala vide para 25 of his inspection note for February and March,1974, copies sent vide his Endst.No.1778-80 dated 16-5-1974.

c) **Repair of Roads and Paths:**

The repairs to roads and paths have generally been neglected.

d) **Buildings:**

The Forest Guard Hut prescribed for construction at Tiar has been constructed at Khurwain in the year 1964-65, at a cost of Rs.5536.87 only. The Forest Guard Hut suggested at Olindahas not been constructed and in lieu of it, a Forest Guard Hut has been constructed at Pirnigah in the year 1966-67 at a cost of Rs. 5347 only. The prescription with regard to the construction of Inspection

Hut at Olinda has not been carried out. The Forest Guard Huts constructed are of poor quality and not in accordance with the design of huts in the Department of Forest Farming and Environmental Conservation. The Forest Guard Huts of similar nature have also been constructed at Chowki, Barsar and Piploo.

e) **Maintenance of Boundaries:**

It was prescribed that all the new PB I, PB II and PB IIIareas of Chil Working Circle and three closure series of the plantation working circle would be demarcated by loose stone masonary pillars by the end of 1965-66 positively to avoid confusion about the boundaries ofsuch areas. The construction of stone pillars to demarcate the above area has not been undertaken during the plan period except in case of some coppice coupes in DPF Solasingi and DPF Behlanetc.It was suggested that the existing included cultivation in the DPFs would also be demarcated by small pillars and completed by 1968-69. This also has not been carried out.

f) **Periodic checking and repairs to boundary pillars:**

The repairs of existingboundary pillars along the external boundaries and internal boundaries have been carried out according to the prescribed programme for this purpose but the checking of distance between the consecutive pillars and bearings of the external boundary lines has not been carried out except that this operation was taken up during 1979-80 when DPFs Thethu, DPF Chhatrah, Ban Maslana, Sasal and CheliSatrukha were taken up for this purpose after clearing the boundary lines. The boundary pillars are not correctly numbered and no where direction indicated which leads to confusion.No sign towards indicating compartment or sub compartment have been put up.The question of checking of maintenance of boundaries and pillars of included cultivation did not arise as these cultivations have not been demarcated.

g) **Boundary Pillar Register:**

The prescription has been carried out. The original boundary register in Urdu which was missing has not been traced.

h) **Grazing**

i. **GaddiGrazing:**The sheep and goats of gaddi have been enumerated in the year 1988-89. The suggestion with regard to eviction of gaddigraziers has not been given effect in view of its being impracticable.

ii. **Zamindara:** The suggestion has not been given effect. It was howeverimpracticable in the present democratic set up

iii. **Illicit encroachment of Ban Sarkar Area:** The encroachments on Ban Sarkar area as existing at the time of preparation of the plan under revision still continues because the preventing measures including prosecution did not prove effect. The tendency has not been curved as more encroachments have taken place in the plan period. Large numbers of cases of encroachments in DPFs have been referred to the Revenue Authorities for eviction under Land Revenue Act but so far, no eviction has been ordered by the authorities.

i) **Compartment History Files:**

The compartment history files have been maintained as prescribed in the plan, one set kept in Kutlehar Forest Office and the other in the Divisional Forest Office. However, the regeneration control form-C has not been properly maintained as it does not show the progress of regeneration correctly in different cases. Inspection notes written by Divisional Forest Officers and Conservator of Forests have not been filed in a few cases.

j) **Guard Book:**

The Working Plan prescribed the maintenance of a Guard Book for each Forest Guard, in-charge of a beat giving all the relevant information detailed in the plan. These books have been prepared and maintained in case of each beat. However the books have not been neatly and properly maintained in a few cases.

k) **Management of UPFs:**

The management of UPFs have not been dealt with properly and in details in the plan. In para 101 of the plan there is just a casual reference to the existence of the 13578.23 ha of UPFs against actually 15477.45 ha noted in para 7 of the plan. Stock mapping and enumeration of the area has not been considered necessary. Only 0.404 ha plots were laid in ten different forests in total area of 4.85 ha and the growing stock of Khair enumerated. The abstract of this sample survey has been given in the plan and on the basis of that, improvement–cum-selection felling prescribed in terms of trees of this Khair 25 cm diameter breast height and over. Half of the available khair trees of this diameter were to be felled and the other half were to be retained for seed production and to meet the demands of the right holders. A felling cycle of 15 years was fixed and the sequence of fellings was prescribed.

During 1985-86 the prescription was amended and the planting of khair at a spacing of 3m x 3m in the area worked for khair laid and the fellings linked with pace of planting.The fellings of khair trees from the UPFs have been carried out in accordance with the prescriptions of the plan. The details of the khair trees so removed from the UPF areas during the period of

plan are 25078 khair trees measuring 18,732.69 m only during the period from 1982-83 to 1990-91.

In the absence of closure, the khair coppice shoots have generally been damaged by cattle. Only two third of the shoots have survived in areas away from habitation. These have never been singled. Likewise the planting has been failure due to area not been fenced and poor quality planting stock put in. All sorts of species have been planted instead of khair only.

CHAPTERVIII

STATISTICS OF GROWTH AND YIELD

8.1 GENERAL

Chil and Khair are the economic species of this tract. Chil is important for the production of the resin and timber. Chil found in the tract corresponds to FRI quality III/IV except a few forests/ patches of quality III & II/III especially in Barsar tehsil area of the tract. Khair is important for the production of katha. The quality of both Chil and Khair corresponds by and large, to that of other forests of Una Forests Division which adjoins the tract.

8.2 DIAMETER GROWTH

8.2.1 CHIL: In view of the foregoing paragraph, diameter growth data followed in adjoining Hamirpur Forest Division Working Plan by Dr. Rakesh Kumar are reproduced below and recommended for use in the tract.:-

Table 8.1: Diameter growth data for chil

Age (Years)	15	19	25	32	40	48	57	67	78	90	103	117	132
Diameter OB	10	15	20	25	30	35	40	45	50	55	60	65	70

8.2.2 LOCAL VOLUME TABLE FOR CHIL: Local volume table prepared for Hamirpur Forest Division from general volume for chil and adopted Kutlehar Forest areas of Una Forest Division is recommended to be adopted for the entire tract. The same is reproduced below:-

Table No. 8.2: Local volume for chil

D.B.H	**V**	**IV**	**III**	**IIA**	**IIB**	**IA**	**IB**
CLASS (cm)	10-20	20-30	30-40	40-50	50-60	60-70	>70
Volume (m^3)	0.08	0.31	0.85	1.58	2.55	3.75	4.96

VOLUME INCREMENT PERCENT FOR CHIL: - The volume increment percent figures for each diameter class has been relied upon from the Palampur Working plan and are reproduced as under in Table 8.2

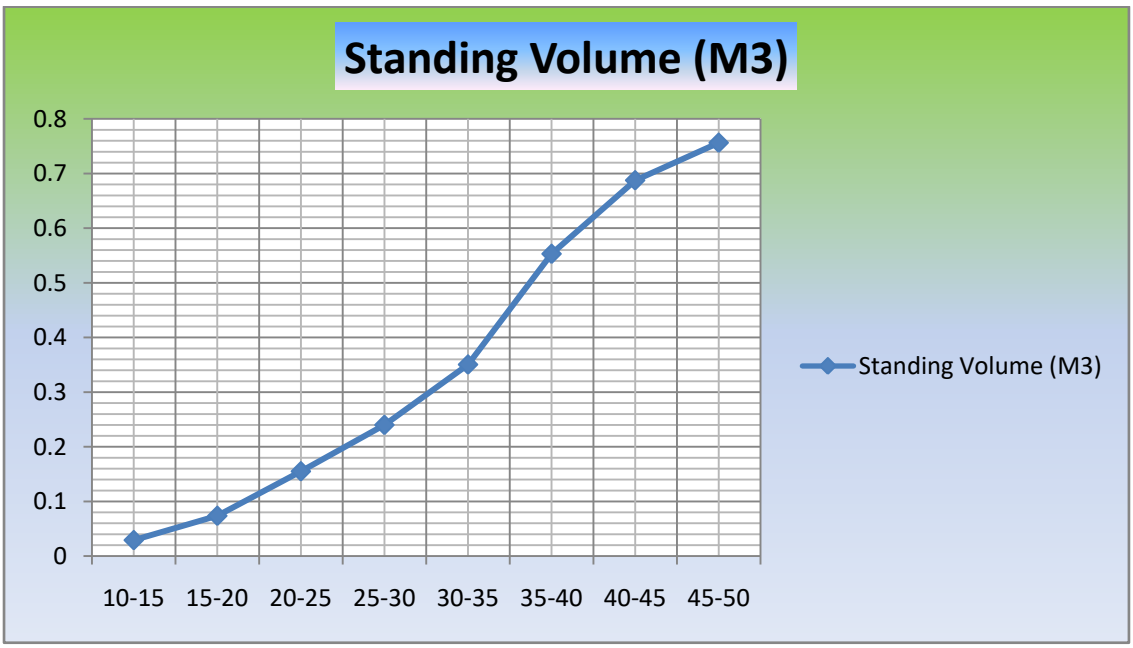
Table 8.3: Volume Increment Percent.

Diameter class (cm.)	10-20	20-30	30-40	40-50	50-60	60-70
Volume increment percentage.	6.51	3.87	3.22	1.80	1.23	0.56

8.2.2 KHAIR:-Thequality of Khair corresponds to that of adjoining areas of Una Forest Division. Therefore the volume table for khair as used in Una Forest division has been adopted and reproduced below.

Table 8.4: Volume Table for khair

Diameter (cms)	**Standing Volume (M^3)**
10-15	0.0291079
15-20	0.0736398
20-25	0.1550412
25-30	0.2399425
30-35	0.3504998
35-40	0.5530358
40-45	0.6876439
45-50	0.7564082

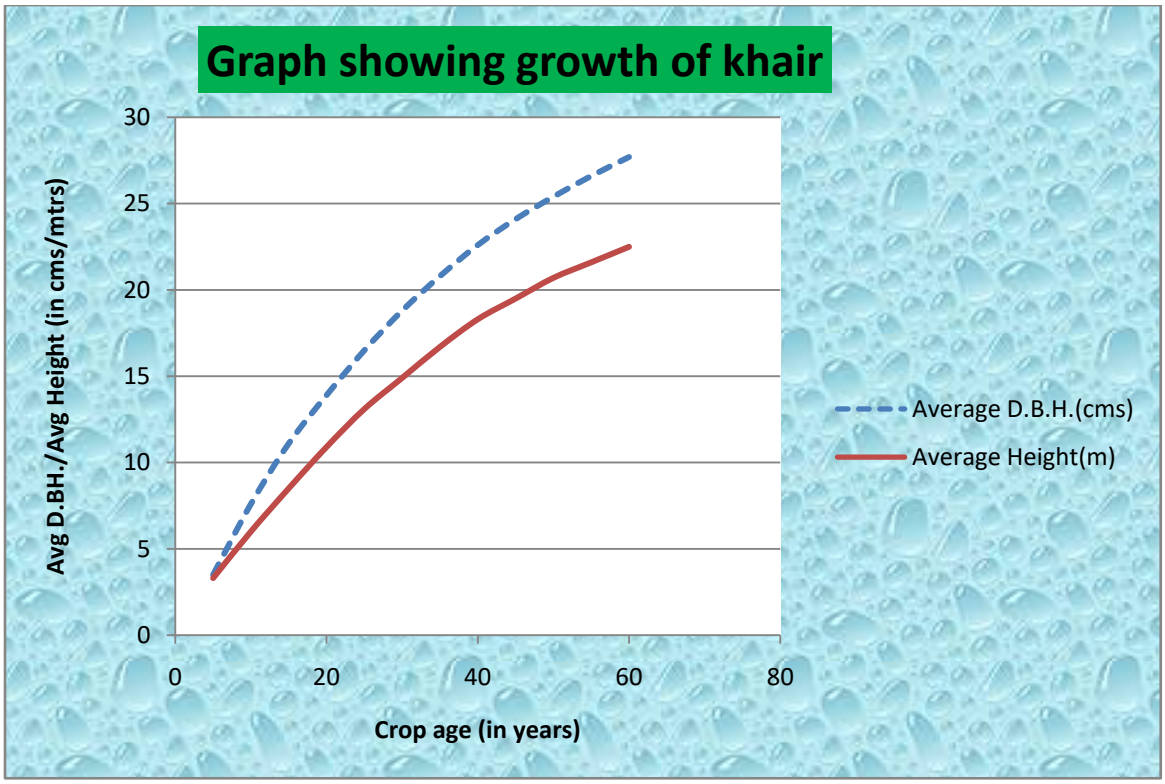


Graph 1

8.2.2.1 DIA. AGE RELATIONSHIP - Diameter-Age relationship as adopted in the plan under revision has been adopted as such. Similarly Diameter- Height relationship has been adopted from the working plan under revision.

Table 8.5:GROWTH STATISTICS OF KHAIR

Crop Age (Years)	Average D.B.H. (cms)	Average Height (m)
5	3.5	3.3
10	7.6	6.0
15	11.1	8.5
20	13.9	10.9
25	16.5	13.1
30	18.8	14.9
35	20.8	16.7
40	22.6	18.3
45	24.1	19.5
50	25.4	20.7
55	26.6	21.6
60	27.7	22.5



Following table show the average period in years taken by different diameter classes to enter into next higher class as derived from the above table:-

Table 8.6: DIAMETER CLASS – AGE RELATIONSHIP FOR KHAIR

Dia Class (cms)	Total Age on entering the class (years)	Years taken to enter the next higher class	Yearly mortality	Survival %age reaching higher class
25-30	47	-	-	-
20-25	33	14	2	72
15-20	22	11	2	50
10-15	14	8	2	34

8.2.2.2 LOCAL VOLUME TABLE FOR KHAIR: Local volume table for khair and miscellaneous statistics concerning the said species as given below are based on study of 10 khair trees of normal growth form and seemingly normal health in each dia class felled under different locality factors. However in diameter class 40-45 and 45-50 cms; 4 and 2 of trees respectively could only be available despite all out search in the forests.

8.2.2.3 KATHA YIELD:-The relationship established under the working plan for Katha yield has been worked out and reproduced as below :-

Table 8.7: YIELD TABLE FOR KATHA

Diameter (cms)	Standing Vol. (cum)	Heartwood (cum)	Wt. of H/wood (kg)	Wt. of dry katha (kg)
10-15	0.0291079	0.012	12.00	-
15-20	0.0736398	0.032	32.39	2.563
20-25	0.1550412	0.068	59.76	5.905
25-30	0,2399425	0.150	107.86	10.964
30-35	0.3504998	0.240	174.81	19.075
35-40	0.5530358	0.387	269.83	28.962
40-45	0.6876439	0.491	321.35	37.442
45-50	0.7564082	0.552	396.78	41.080

8.2.3 CHHAL: By virtue of economic utility and preponderance in scrub forests of the tract, Chhal is considered as one of the most important species of the tract. Accordingly, the necessity to prepare local volume table for Chhal has been realized.

Table 8.8: Local Volume Table for Chhal

Diameter (cm)	Tree height (m)	Wood billets (No.s)	Standing vol (No.s)	Stacked Vol (m^3)	Green Wt of wood billets (Qtl)	Remarks
10-20	12.58	13	0.179241	0.247	1.692	-
20-30	18.23	31	0.578289	0.817	6.478	-
30-40	18.24	44	1.036910	1.583	12.713	-
40-50	18.50	80	2.074755	2.843	21.925	-
50-60	18.81	82	2.242123	2.941	22.113	-
60-70	(19.12)	(84)	(2.409)	(3.039)	(22.301)	

(*Note: The figures in brackets are extrapolated*)

Notes:-

i. There is minimum dia fixed for fuel wood to be used as fuel wood or for fuel wood to be used for making charcoal. Practically, everything down to leaves burn but everything that burns can not be commercially termed as fuel wood. Similarly, fuel wood down to any thickness can be converted into charcoal by experienced labour but its quality would be too poor to be commercially acceptable.

ii. In the absence of any minimum dia/ mid-girth specification, all felled produce down to 7 cm (21 cm mid girth) has been treated as fuel wood fit to be used as fuel wood or for making charcoal. The basis for fixing minimum 7 cm diameter for fuel wood is that chhal fuel wood is generally not used as fuel wood. Chhal being the top class species of the tract for yielding the best quality charcoal, it is generally converted into charcoal. On the basis of detailed enquiries from the experienced contactors in the trade, minimum 7 cm diameter has been fixed for fuel wood fit for conversion into commercially acceptable charcoal. Chhal volume table has been worked out accordingly.

iii. For preparation of above volume table for chhal, 5 trees of normal growth form and apparently normal health were felled in each diameter class except in 50-60 cm dia class in which one tree only could be available.

8.2.3.1 MISC. YIELD STATISTICS FOR CHHAL

a) Fuel wood below 7 cms dia, which was considered unfit for making quality charcoal and can be called as small fuel wood has been weighed and measured separately for each class as under:-

b)

Table 8.9: Yield statistics for chhal

Diameter (cm)	Stacked vol of fuelwood (m^3)	Green wt. of fuelwood per m^3 (qtl)	Green wt. of fuelwood per m^3 (qtl)
10-20	0.0512	0.187	3.65
20-30	0.1610	0.595	3.70
30-40	0.2544	0.906	3.56
40-50	0.3012	1.155	3.83
50-60	0.5240	2.120	4.04
Average			***3.76 Qtl***

b) Out of total 236.153 Qtl of Chhal fuel wood billets extracted, 42.258 Qtls fuel wood was converted into charcoal in two types of charcoal Bhatties Viz (i) conventional under ground type Bhathi(ii) Coop(dome) made of Kacha or Pacca bricks. This was done to arrive at coal conversion percentage in said two types of Bhatties. The results are tabulated below:-

Table No. 8.10: Coal conversion percentage in bhatties

Type of Bhatti	Wt.of green chhal fuelwood converted into charcoal(Qtl)	Wt.of charcoal recovered(Qtl/Bags)	Remarks
Conventional under ground type bhatti	25.25.500	5.15.000 (20% conversion)	Charcoal Recovery in type(ii)Bhatti is 2% higher than that in type(i) Bhathi
Coop(dome)type Bhatti	17.75.500	3.19.300 (Conversion)	–do–

c) During felling/ billeting, heart-rot was noticed and status of rot observed is tabulated below:-

Table 8.11: Heart rot observed in different diameter classes for chhal

Diameter(cm)	Trees felled(No. s)	Status of heart-rot
10-20	5	No rot noticed.
20-30	5	20% trees rotten with 2.63 % billets rotten.
30-40	5	20% trees rotten with 3.20% billets rotten.
40-50	5	40% trees rotten with 3.03% billets rotten.
59-60	1	100% trees rotten with 17.07 % billets rotten.

Above status of heart-rot suggests that chhal trees in dia class 20-30 cm and above which are heart-rot prone, should be considered for felling in a suitable manner so that negative increment is avoided and vigorous coppice is obtained to regenerate the species in the felled areas. Blanket ban on the felling of green chhal as provided in the approved preliminary working plan report is extremely detrimental for future of chhal.

8.3 VOLUME FACTOR FOR BROAD LEAVED SPECIES

The volume has been adopted from Una Working Plan. The Volume factors of broad-leaved species are tabulated below:-

Table 8.12: Volume factor table for broad leaved species

D.B.H(over bark) (cm)	Class	Vol (m^3)
10-20	V	0.127
20-30	IV	0.318
30-40	III	0.835
40-50	IIA	1.770
50-60	IIB	3.030
60-70	IA	4.587
70 & over	IB & above	6.385

8.3.2 BAMBOOS

The existing criteria for classification of bamboos by girth and height will continue. Girth is measured towards the thicker and on the second internodes at a distance of 5 cm above the node. The prevalent commercial classification of bamboos is given below:-

Table 8.13: Commerical classification of bamboos

S.No	Commercial category	Particulars		No. of bamboos per bundle (Nos)
		Length (m)	Girth (cm)	
1.	Bahi No.1	2	13-15	10
2.	Bahi No.II	2	1013	15
3.	Majhola	2	8-10	20
4.	Lathi	2	6-8	30
5.	Chhar	2.8	5	30
6.	Pore No.I	4.3	8	10
7.	Pore No.II	3.7	5.8	15
8.	Chhati	2	6	40
9.	Kalan	4.3	over 1.5	5
10.	Dimdima	Any size		30

8.4 QUALITY CLASSES

All India quality classes as given in FRI yield tables for chil have been adopted. Quality class for each compartment/ forest has been determined occularly and recorded in the concerned compartment history files.

8.5 DENSITY

The density of crop in each compartment has been assessed ocularly and is recorded in the relevant compartment history files.

8.6 STOCK MAPS

Stock Maps of all DPFs and UPFs have been prepared on 1:15000 scale and placed in relevant compartment history files. Since UPFs are being included in the Working Plan for the first time, their maps were first traced from Revenue *khatta* and then reduced to 1:15000 scale using pentagraph for stock mapping.

8.7 ENUMERATIONS

The enumerations has been done as per instructions contained in ***National working Plan Code para 31,*** the sampling intensity of 5% with compartment / sub-compartment as a unit. The technique adopted is**Stratified Random Sampling** with compartment/sub-compartment as unit of enumerations. The total enumeration down to 10 cm dbh in 10 cm diameter classes, except khair, has been carried out for all economically timber yielding species. In khair, the interval of diameter class is 5 cm. In order to assess the growing stock enumerations to the extent of 10 to 15% done in the Working Circles where yield prescribed, whereas in other Working Circles the extent of enumerations to assess the growing stock is 5-8%. The details of enumerations has been given in concerned CH files and also attached in the Volume II as Appendix.

Hence it is proposed that intensity of sampling will be 10 to 15 % in in regular Working Circles where fellings are to be prescribed and other Working circles it shall be to the extent of 5 to 8 % in 10 cm diameter breast-height classes.

8.8 SOME CONVERSION FACTORS: - The Data for solid volume, stacked volume and of fuel wood for miscellaneous broad-leaved species has been relied upon from the Palampur Working Plan and same is reproduced below in Table:

Table 8.14: Conversion factors for stacked-solid volumes for broad leaved species

1	2	3
(i)	Solid volume/Stacked volume	1/2
(ii)	Air-dry weight/cubic meter Solid volume.	7.20 qtls
(iii)	Air-dry weight/cubic meter Stacked volume.	3.60 qtls.

CHAPTER IX

ESTIMATE OF THE CAPITAL VALUE OF THE FOREST

9.1 CAPITAL VALUE OF LAND UNDER FOREST

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

Gradation of Land	**Total Forest area in ha**	**Approx. Cost per ha in (**Rs.**)**	**Total cost (**Rs.)
D.P.F	4390.78	8,45,000.00	Rs. 3,71,02,09,100.00
U.P.F	12405.75	8,45,000.00	Rs. 10,48,28,58,750.00
Total	**16796.53**		**Rs. 1419,30,67,850.00**

9.2 CAPITAL VALUE OF THE GROWING STOCK

The capital value of the growing stock has been worked out on the basis of rates approved by the Standing Committee for the year 2011-12, over which an additional increase of 10% was madeand as per rates of bamboo supplied by HPSFDC is as under:-

Table 9.1: Species wise capital value of growing stock

S.NO.	**SPECIES**	**CHIL WC** (cum)	**BAMBOO WC (Clumps)**	**SCRUB WC** (cum)	**REHAB. WC** (cum)	**TOTAL** (cum)	**APPROX. VALUE** (Rs.)
1.	Chil	26190.96	518.48	28433.56	276725.08	331868.08	6800970924.00
2.	Khair	10842.46	2095.57	28985.57	55845.86	97769.46	3098734596.07
3.	B/L	46385.05				46385.05	351450246.84
4.	Bamboo	0	643122			643122	4863288564.00
5.	Chhal	0	10891.42	157207.42	228377.69	396476.53	3004023372.50
6.	Shisham	0	238.55	5524.52	11284.82	17047.89	444644771.77
7.	Aisan			8297.59	24268.54	32566.13	531931910.81
8.	Amla			1683.86		1683.86	12758270.45
9.	Simbal			2075.48		2075.48	15725496.86
10.	Safeda				4041.62	4041.62	46151662.94
TOTAL							**1916,96,79,816.24**

9.3 VALUE OF NON TIMBER FOREST PRODUCE

The main minor forest produce are resin and grass and their values are as under:-

Table 9.2: Values of main minor forest produce

S.N	**Type of Produce**	**Approx. value (**Rs.**)**
1	Resin	1125000.00
2	Grasses	73000.00
	Total	**11,98,000.00**

9.4 TOTAL CAPITAL VALUE OF FORESTS

Thus the total value of the Forest works out to be approximately Rs. Three Thousand and Thirty Six Crores. The detail is as under:-

Table 9.3: Capital Value of forests

S.N	Capital Value	App. Estimated value in Crores
1	Land	**14193067850.00**
2	Growing Stock	**19169679816.24**
3	MFP	**1198000.00**
	Total	**3336,39,45,666.24**

PART-II

FUTURE MANAGEMENT

DISCUSSED AND PRESCRIBED

CHAPTER-I

BASIS OF PROPOSALS

1.1 GENERAL OBJECTS OF MANAGEMENT

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

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

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

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

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

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

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

1.2 STATE FOREST POLICY

The Government of Himachal Pradesh has developed the Forest Sector Policy & Strategy 2005 in consonance with the Government of India Policy guidelines and by making important amendments to the previous HP Forest Policy of 1980. Within the framework of National Forest Policy, 1988 the basic objectives of the Forest Sector Policy of Himachal Pradesh are to:-

i) Conserve and improve the status of natural resources in the State especially forests, wildlife and biodiversity through effective watershed management practices.

ii) Conserve and manage forests scientifically, contemporarily and incorporating the best practices from within and outside the State, for the present and future generation, and to increase their values- historical, cultural, religious, economic and aesthetic – for communities and the environment on a sustainable basis.

iii) Strive for livelihood security of forest dependent communities through protection of rights to forest goods and services.

iv) Establish and support an integrated governance system that effectively involves all stakeholders in protecting, conserving, using, manging and restoring forests and other natural resources of the State.

v) Fulfill obligations under various national policies and laws, international instruments including covenants agreements and protocols related to the forest sector.

vi) Strive towards an appropriate land use in the state especially in the context of sustainable forest management, focusing on other primary land use sectors such as agriculture, horticulture, animal husbandry and those related to infrastructure development.

vii) Strengthen the capacity for research, training, extension, education and awareness of government and non-government institutions, related to the forest sector.

viii) Apply the best scientific information, resources, management practices and strategies available to implement the forest sector policy and create a mechanism to periodically review the policy keeping in view the changing circumstances and needs.

1.3 CONSTITUTION OF WORKING CIRCLES & METHOD OF TREATMENT

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

i) The Chil Working Circle

ii) The Bamboo Working Circle

iii) The Scrub Working Circle.

iv) The Rehabilitation Working Circle.

v) The Khair (overlapping) Working Circle

vi) The Plantation(overlapping) Working Circle

vii) The Forest Protection(overlapping) Working Circle

viii) JFM (overlapping) Working Circle

ix) Wild Life Management (overlapping)Working Circle

ix) NTFP (overlapping) Working Circle

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

Table 1.1: Areas of different Working Circles to be treated under this Plan

S.No	Name of Working Circle	Area in ha.			Total
		R.Fs	D.P.Fs	U.P.Fs	
1	Chil	-	887.36	1931.10	**2818.46**
2	Bamboo	-	1173.75	143.34	**1317.09**
3	Scrub	-	1672.57	2980.48	**4653.05**
4	Rehabilitation	-	657.10	7350.83	**8007.93**
			4390.78	**12405.75**	***16796.53***

1.3.1 The Chil working circle: -This includes all the pure Chil Forests or the forests containing Chil as 60% or more in composition in this Working Circle. The silvicultural system prescribed for this working circle is the Indian Irregular Shelter-wood System earlier known as the Punjab Shelter-wood System, main emphasis being on artificial regeneration of chil in the areas of the unstable zone that will be supplementing natural regeneration.

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

1.3.3 The Scrub working circle:-The forests which predominately support *chhal* and *khair* have been allotted to this working circle.

1.3.4 The Rehabilitation working circle:-Areas of different working circles of the working plan under revision as are subject to severe erosion and denudation are included in this working circle. By and large, the areas allotted are very refractory due to very shallow soil depth, massive rocky out crops and heavy weeds and bushes dominating as a result of excessive biotic interference.

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

1.3.6 The Forest Protection (overlapping) working circle:-This is overlapping working circle and hence includes the whole area under different working circles and covers all the forests of the division. The main objective of this working circle is to curtail the forest fire incidences, illicit felling, smuggling of forest produce and increasing encroachments on forest land.

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

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

1.3.9 The NTFP (overlapping) working circle:-This would be an overlapping working circle covering the entire working circle and is constituted to ensure systematic development and exploitation of non timber forest produce species that occur in the division. The main non timber forest produce found/extracted in the division are Resin, Medicinal plants, grass.

1.4 PERIOD OF WORKING PLAN

The period of the revised Working Plan will be 15 years from 1.4.2014 to 31.3.2029.The working plan under revision expired on 31.3.1991. There were no Silvicultural fellings since then and the salvage removals made w.e.f 1991-92 to2013-14 has been duly accounted in the Divisional Control Forms based on the prescriptions of previous Plan. The other operations like plantations under State schemes; Compensatory Afforestation; control burning, repair of boundary pillars etc. were done on the basis of Annual Plan Operations. Hence, there is no problem in making the plan operative prospectively.

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CHAPTER II

CHIL WORKING CIRCLE

2.1 GENERAL CONSTITUTION OF WORKING CIRCLE

All the pure chil forests or the forests containing chil as 60% or more in composotion have been including in this working circle. This working circle consists of all the chil bearing DPF's (887.36 ha) allotted to chil working circle in the plan under revision:

UPF's, which havealways been kept out of the preview of working plans in the past, are being brought under scientific management through this working plan for the first time in thehistory of Kutlehar forests. However, scattered pockets of UPF's less than 2.00 ha in extent, which were considered too small to be managed, have been left out. Accordingly, all chil bearing UPF's(1931.10 ha) and blank/poor density UPF's silviculturally suitable to be afforested with chil have been allotted to this working circle in addition to DPFs mentioned in the opening paragraph above.Thus total area of this working circle works out to be 2818.46ha. only.

2.2 GENERAL CHARACTER OF VEGETATION

Chil forests allotted to this working circle have been described in para 2.7 of Part II. The crop is mainly young to middle aged. The forests are mostly under stocked and normal distribution of age classes is lacking in general and in UPFs in particular. In case of UPFs, it needs to be specially mentioned that chil exists as a totally heterogeneous mixture of all age classes except in a limited number of forests.

The forests are situated on sand stone and loose conglomerates butare absent on soft sand stone and are prone to severe erosion where the crop density has fallen and *Carrisa spinarum* cover, which is second line of defence against erosion in chil forest, also fails to maintain hold on the soil due to its low density caused by fires or otherwise.Chil forests of Kutlehar inside Una district correspond to FRI site quality III except in Akoi-di-dhar where the site quality is IV.

The overall condition of the vegetation is that the forests are poorly stocked and mostly blanks with heavy biotic interference like grazing, fire, breaking up land for agricultural use

especially in UPFs. Defective resin tapping of trees for extraction of resin and uprooting of trees by wind and snow have caused a vast destruction of the crop.

2.3 FELLING SERIES AND CUTTING SECTIONS

There will be two closure felling series viz:

i) Legal closure felling series for DPFs and
ii) Voluntary closure felling series for UPFs.

2.4 AREA STATEMENT

The area of above felling series in different Ranges is tabulated below:

Table No. 2.1

Area by felling series and Ranges

Felling series	Range-wise Area (Ha.)		
	Bangana	**Ramgarh**	**Total**
Legal	631.27	256.09	887.36
Voluntary	848.93	1082.17	1931.10
Total Working Circle	**1480.20**	**1338.26**	**2818.46**

2.5 BLOCKS AND COMPARTMENTS

Numbering of forests, boundaries and nomenclature of blocks, compartments and sub-compartments in respect of DPFs included in the working circle had not been changed. As regards UPFs these have been included in the working plan for the first time and these have been named after nearest concerned Tikas during Settlement, their boundaries have been mostly maintained as such except in case of some unwieldy forests which have been divided into compartments. Further, there is considerable number of UPFs which do not exist in compact chunks but in clusters of independent chunks located close to one another which have been treated as compartments of the UPFs concerned. Numbering of UPFs has been done in English digit carried out in clock wise manner whereas numbering of DPFs has been done in Roman and in clock wise manner. Further nomenclature used for UPFs compartments is the some as already used for DPF compartments.

2.6 SPECIAL OBJECTIVES OF MANAGEMENT

Consistent with general objects of management, special object of management will be as follows:-

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

ii) To improve stocking of low density chil forests.

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

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

v) To obtain maximum possible yield of resin and timber on sustained basis

2.7 AREA OF ALLOTMENT

Total area of the working circle is 2818.46 ha constituted by all DPFs(887.36 ha) allotted to the Chil Working Circle in the plan under revision, all chil bearing UPFs(1931.10ha) with 50% or more chil stock and blanks in UPFs up to crop density 0.3 or less found silviculturally suitable for afforestation with chil.

2.8 ANALYSIS AND VALUATION OF THE CROP

i) **Stock Maps**:- All D.P.Fs and U.P.Fs allotted to this working circle have been stock mapped on 1: 15000 metric scale and the maps so prepared have been placed in the concerned history files.

ii) **Quality and Age classes**: Average site quality of chil in Kutlehar corresponds to FRI quality. Proper distribution of age classes is lacking specially in UPFs.

iii) **Density**: Density of each compartment is determined on the basis of ocular estimate and recorded in the concerned compartment history files.

iv) **Enumeration and their results**:

Complete enumeration of chil including its common broad leaved associates (Khair, Chhal,Shisham, Amla,Aisan) was carried out in compartments selected in stratified random sampling down to 10 cm dbh and results thereof have been recorded in the concerned compartment history files. Felling series wise general abstract of enumerations of the working circle is given below:-

Table No. 2.2

Abstract of Enumeration Result of Chil Working Circle

Felling series	P.B	Area(ha)	Spp	Classification of species									Total trees	Volume
				V	IV	III	IIA	IIB	IA	IB	IC	ID		
Legal	PB I	222.39	Chil	329	423	303	101	38	0	0	0	0	1194	541.38
			Khair	2110	783	183	19	0	0	0	0	0	3096	358.43
			Other B.L	8466	4043	910	57	6	0	0	0	0	13482	3240.45
	Total P.B.1			**10905**	**5250**	**1396**	**177**	**44**	**0**	**0**	**0**	0	**17772**	**4140.26**
	P.B.II	197.92	Chil	3001	2456	769	188	13	13	0	0	0	6439	1495.50
			Khair	1815	574	32	0	0	0	0	0	0	2421	220.05
			Other B.L	6273	2012	223	22	0	0	0	0	0	8531	1662.54
	TotalPB.II			**11089**	**5042**	**1024**	**210**	**13**	**13**	**0**	**0**	0	**17391**	**3378.09**
	P.B.III	214.00	Chil	2461	2128	729	277	35	11	0	0	0	5641	1553.22
			Khair	5687	1690	189	0	0	0	0	0	0	7566	708.49
			Other B.L	16225	6062	1034	196	7	0	0	0	0	23525	5220.57
	Total PB.III			**24373**	**9880**	**1953**	**473**	**42**	**11**	**0**	**0**	0	**36731**	**7482.28**
	PB.IV	253.05	Chil	3807	7142	3242	1739	1066	515	0	0	0	17512	10793.20
			Khair	6255	4079	1904	0	0	0			0	12237	1983.01
			OtherBL	15358	3643	1038	394	0	0	0	0	0	20431	4671.90
	Total PB.IV			**25420**	**14864**	**6183**	**2133**	**1066**	**515**	**0**	**0**	0	**50181**	**17448.11**
TOTAL LEGAL SERIES		**887.36**		71786	35036	10556	2993	1165	539	0	0	0	122075	32448.73

Felling series	P.B	Area(ha)	Spp	Classification of species									Total trees	Volume
				V	IV	III	IIA	IIB	IA	IB	IC	ID		
Voluntary	PB I	516.54	Chil	763	983	704	235	88	0	0	0	0	2773	1257.45
			Khair	4901	1820	426	41	0	0	0	0	0	7187	830.34
			Other BL	19664	9392	2113	132	12	0	0	0	0	31313	7518.41
	Total PB I			**25328**	**12194**	**3243**	**408**	**100**	**0**	**0**	**0**	**0**	**41273**	**9606.21**
	PBU	959.61	Chil	12808	10734	3500	1076	109	55	0	0	0	28282	7109.07
			Khair	25499	7578	849	0	0	0	0	0	0	33926	3176.96
			Other BL	51410	18397	2845	491	16	0	0	0	0	73160	15671.73
	Total PB U			**89718**	**36709**	**7194**	**1567**	**125**	**55**	**0**	**0**	**0**	**135367**	**25957.76**
	PB IV	454.95	Chil	6898	5645	1767	433	29	29	0	0	0	14801	3437.64
			Khair	11245	7334	3422	0	0	0	0	0	0	22001	3565.18
			Other BL	27611	6549	1866	708	0	0	0	0	0	36733	8399.45
	Total PBIV			**45754**	**19527**	**7055**	**1140**	**29**	**29**	**0**	**0**	**0**	**73535**	**15402.27**
Total Voluntary Series		**1931.10**		160800	68431	17492	3115	254	84	0	0	0	250176	50966.24
G.Total Chil W.Circle		**2818.46**		232586	103466	28048	6108	1419	622	0	0	0	372251	83414.97

2.9 Growing Stock: The species-wise total growing stock present in this Working Circle is tabulated below:

Table 2.3: Species wise GS in Chil WC

S.NO.	SPECIES	NO. OF TREES	VOLUME (cum)	AVERAGE/ha (cum)
1.	Chil	76642	26190.96	9.29
2.	Khair	88434	10842.46	3.85
3.	B/L	207175	46385.05	16.46
	TOTAL	**372251**	**83418.47**	**29.6**

2.9.1 CURRENT ANNUAL INCREMENT: -The Current Annual Increment for each Felling Series worked on the basis of rate of increment as given in Table 8.2 Chapter VIII of Part I is given in Table below-

Table: 2.4 Felling Series wise (cum)Current Annual Increment of chil

LEGAL FELLING SERIES

	DIAMETER CLASSES.									
	V	IV	III	IIA	IIB	IA	IB	IC	ID	Total.
1	2	3	4	5	6	7	8	9	10	11
No. of Trees.	9598	12149	5043	2305	1152	539	0	0	0	30786
Vol. in cum.	577.88	2308.31	3277.95	3319.2	2995.2	1908.06	0	0	0	14386.6
Increment Percent	6.51	3.87	3.22	1.80	1.23	0.56				
C.A.I.	37.62	89.33	105.54	59.75	36.84	10.69	0	0	0	339.77

VOLUNTARY FELLING SERIES

	DIAMETER CLASSES.									
	V	IV	III	IIA	IIB	IA	IB	IC	ID	Total.
1	2	3	4	5	6	7	8	9	10	11
No. of Trees.	20469	17362	5971	1744	226	84	0	0	0	45856
Vol. in cum.	1228.14	3298.78	3881.15	2511.36	587.6	297.36	0	0	0	11804.36
Increment Percent	6.51	3.87	3.22	1.80	1.23	0.56				
C.A.I.	79.75	127.66	124.97	45.21	7.23	1.67	0	0	0	386.49

2.10 SILVICULTURAL SYSTEM

The silvicultural system prescribed for this working circle is the Indian Irregular Shelter-wood System earlier known as the Punjab Shelter-wood System, main emphasis being on artificial regeneration of chil in areas of the unstable zone supplementing the natural regeneration.

2.11 ROTATION AND CONVERSION PERIOD

The rotation is kept as 120 years starting from 1930-31 when the second working plan by KL Aggarwal came into operation.

2.12 EXPLOITABLE DIAMETERS

Over a rotation of 120 years, chil is expected to attain 52 cms DBH under the site conditions of the tract dealt with. Regeneration period shall be 30 years.

2.13 FELLING CYCLE

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

2.14 DIVISION INTO PERIODS AND ALLOTMENT TO PBs

Division of areas into PBs already exists in respect of DPFs allotted to Legal closure felling series of this working circle. As per provisions of Rotational Closure scheme reiterated in the approved preliminary working plan report PBs have been simply advanced by one PB each mechanically irrespective of crop condition and its silvicultural requirement. Though over all position is satisfactory yet in a negligible number of DPF, compartment condition of crop and its silvicultural requirements demanded deviation from their mechanical allotment since silvicultural considerations are subservient to the provisions of Rotational Closure Scheme, no such deviation has been made and PBs have been advanced mechanically.

As regards UPFs constituting Voluntary felling series of this working circle, these were never before managed scientifically in the past and resultantly the crop is most heterogeneous and irregular lacking the requisite age class distribution. Their division into fixed PBs as existing in DPFs is not technically feasible. Therefore, a system of Floating Periodic Blocks has been adopted in respect of UPFs under Voluntary Closure Felling Series.

For allotment of areas to different PBs under legal and voluntary closure felling series, reference is invited to Appendix II.

2.15 CALCULATION OF YIELD: - The average growing stock of chil calculated on the basis of enumeration results in each Felling Series-wise is as under –

Table 2.5:**Average GS in Chil WS**

FELLING SERIES	AREA (ha)	CHIL GS (cum)	AVERAGE/ha
Legal	887.36	14386.6	16.21
Voluntary	1931.10	11804.36	6.11

The average growing stock per hectare of Chil in legal Felling Series is 16.21 cum and in voluntary Felling Series it is 6.11cum only which is much less than the normal growing stock for Chil corresponding to site quality III and C grade thinning (136m^3 per ha.). Similarly average growing stock present in Legal Felling Series, PB I and PB IV is 2.43 and 42.65, in Voluntary Felling Series PB I and PB IV is 2.43 and 7.55 m^3 respectively. Therefore no yield can be prescribed. However sincere efforts are required to regenerates these areas.

However salvage marking will continue and the approximate salvage removal of chil is estimated to be 1200 M^3 per annum

Status of regeneration in Chil areas:-

The efforts of regeneration of chil areas have generally been failures. The status of regeneration in PB I areas has been mapped on 1:15000 scale and the tracings have been kept in the respective compartment history files.

2.16 Regeneration Plan:-

The regeneration efforts during the period of plan under revision have generally failed. Therefore serious efforts for regeneration in chil areas have to be made during this plan. The salient feature of regeneration plan will be as follows:-

2.16.1 Planning for regeneration of a particular area should be done one year in advance. Since all Chil bearing forests have been very badly invaded by Lantana and Bahunia vahlii weed, therefore the first step towards regenerating these areas is to eradicate these weeds. The detailed Lantana eradication programme in PB I areas has been proposed in Chapter on Forest Protection from 2012-13 to 2014-15. In the first year the Lantana weed will be eradicated and in the second

year the area will be planted with Chil seedlings. All the PB I areas will be artificially regenerated in 5 years period.

1) Raising of Chil in polythene bags by sowing during 15th September to 15th October so that by 30th June seedlings may attain plantable height of minimum 9 inches. Genetically superior Chil seed from the forests of Bilaspur and Hamirpur divisions should be introduced in order to improve the quality of Chil. Before sowing of seeds P/bags should
2) Removal of Lantana weeds by using CRS method in the month of January-February. Useless broadleaved species like, Kamal, Kembal, Chilla etc. should be completely removed and the produce obtained can be utilized for preparing fence posts for regeneration area and also for other plantation areas of adjoining beats. Remaining produce may be converted into fuel wood and be handed over to H.P.S.F.C. Ltd or be sold in open auction. This operation must be frequently inspected/monitored by R.O./A.C.F. Debris should be collected and burnt. However useful broad leaved species should be retained and their natural mix with Chil and Khair be maintained.
3) Fencing and earth work should be done in March-April. Pit size be kept 30cm*30cm*30cm.Three/four strands B/wire fencing be adopted. Pits should be refilled during may-June.
4) Grading of seedlings in nursery should be done in the second fortnight of June. No seedling of size less than 12 inches should be selected for planting.
5) Planting should be done after first shower of monsoons.
6) Seedlings should be covered with branches of thorny spp. such as Garna (Carrissa) and Kangu (Flacourtia spp.) This deters monkeys from uprooting the seedling.
7) Grasses and bushes should be cut in presence of the Forest guard in the month of *October*. Seedlings must be saved from cutting along with grasses and bushes. Strict supervision of forest guard during the grass cutting season is necessary.
8) Weeding and hoeing should be done after grass/bush cutting, twice in first year and once for next 3 year (after plantations).

9) Failures should be beaten up for two years.

10) Bush/grass cutting should continue for six years, twice a year in March and September, or till the plants attain a height of minimum 3 mts.The

11) Repair of fencing should be done for six years.

1. The D.F.O. /A.C.F. must inspect the regeneration area first after site clearance and again after ore planting operations are completed and record his comments regarding adequacy/deficiencies in the plantation journal and also guide the field staff regarding corrective measures/improvements. A separate in section note must necessarily be issued on return to head quarters.

2. Similarly the D.F.O./A.C.F. must also inspect the nursery stock in June and record in nursery journal the suitability or otherwise of the stock for planting.

Five year regenerations programme starting from 2013-14 has been prepared and should be followed strictly.

The regeneration plan follows the sequence of cutting of Lantana weeds in PB I areas given in table No. **7.2** under Chapter on Plantation (Overlapping) Working Circle. Care has been taken while framing the regeneration plan to spread the work in maximum possible number of beats so that the work load gets distributed. Phasing of large regeneration areas has been suggested so that enough experience is gathered regarding response of areas/parts there of where regeneration efforts are made.

2.17 ANNUAL REGENERATION PROGRAMME:

The sequence of regeneration programme in Legal and Voluntary Felling Series is given as under:

Table No. 2.6:Regeneration programme of Chil Working Circle

Year	P.B.	No.& Name of forest	Compartment	Area(ha)
I LEGAL FELLING SERIES				
2014-15	**I**	XIV Charara	1.C	8.89
2015-16	**I**	XIX Oel da Ban	1.C(EB)	5.69
	I	–do–	1.c(WB)	7.68
2016-17	**I**	XXI Dhiunsar	1.c(NB)	8.89
	I	–do–	1.c(SB)	5.65
2017-18	**I**	–do–	2.c(Part)	10.00
2018-19	**I**	–do–	2.c(Part)	5.37
	I	–do–	3.c(Part)	5.00
2019-20	**I**	–do–	3.c(Part)	10.00
2020-21	**I**	–do–	4.c(Part)	10.00
2021-22	**I**	–do–	4.c(Part)	10.00
2022-23	**I**	–do–	4.c(Part)	9.55
2023-24	**I**	XXII Akoi diDhar	1,c(Part)	10.00
2024-25	**I**	–do–	1.c(Part)	10.00
2025-26	**I**	–do–	1.c(Part)	11.96
2026-27	**I**	XVIII SarkaruGhorplani	1.c (Part)	10.00
Total of PB I				**138.68**
2014-15	**III**	–do–	1.a (part)	10.00
2015-16	**III**	–do–	1.a(part)	11.96
2016-17	**III**			
2017-18	**III**	–do–	1.a(part)	10.00
2018-19	**III**	–do–	1.a(part)	11.96
2019-20	**III**	XIX Oel da Ban	1.a	12.54
2020-21	**III**	XXI Dhiunsar	1.a	12.14
2021-22	**III**	–do–	2.a(NB)	14.56
2022-23	**III**	–do–	2.a(SB)	12.14
2023-24	**III**	–do–	3.a(part)	10.00
2024-25	**III**	–do–	3.a(part)	10.00
2025-26	**III**	XXXIX Chaplah Garlan	Whole	5.26
2026-27	**III**	XVII Charoli	1.a	6.46
2027-28	**III**	XVIII Sarkaru Ghorplani	1.a(Part)	10.00
2028-29	**III**	XIV Charara	1.a	6.46
Total of PB III				**115.06**
2014-15	**IV**	XIX Oelda Ban	1.b	12.14
2015-16	**IV**	XIV Charara	1.b	4.84
	IV	XXI Dhiunsar	1.b(NB)	10.12
2016-17	**IV**	–do–	1.b (SB)	8.09
	IV	–do–	2.b	20.63

2017-18	**IV**	–do–	3.b	14.19
2018-19	**IV**	–do–	4.b	17.41
2019-20	**IV**	XXII Akoi di dhar	1.b(NB)	27.16
2020-21	**IV**	–do–	1.b(SB)	11.73
2021-22	**IV**	XVIII Sarkaru Ghorplani	1.b	30.34
2022-23	**IV**	–do–	2.b	30.33
2023-24	**IV**	–do–	3.b	14.97
2024-25	**IV**	–do–	4.b(NB)	7.65
2025-26	**IV**	XVI Charoli	1.b	6.80
2026-27	**IV**	XVIII Sarkaru Ghrplani	4.b(SB)	20.47
2027-28	**IV**	–do–	5.b	15.78
Total:PB IV				**252.65**
Total Legal Series				***506.39***

II Voluntary Closure Felling Series				
2014-15	P.B.I	Sar(Arloo)	C.1	20.50
2015-16		Karor Rajputan	C.1	19.10
2016-17		Nahri Devi Singh	C.1	15.75
		Charara	C.1	10.60
2017-18		–do–	C.4	10.50
2018-19		Chatehar	C.2	17.60
		Matoh	C.4	7.31
		Kot	C.2	5.50
		Nahri Dhian Singh	C.1	7.83
		Nahri Dhiansingh	C.4	2.73
2019-20		Paproli	C.1	5.11
2020-21		Bharmout	Whole(Part)	17.00
2021-22		–do–	–do–	17.00
		–do–	–do–	16.75
		Rajpura	C.1	2.80
2022-23		Umri di Behar	C.1(Part)	5.50
2023-24		–do–	C.1(part)	18.00
		Bhalkhun	Whole	12.30
		Deehar	C.1	4.00
		Rajpura	C.2	12.00
2024-25		–do–	C.5	8.12
2025-26		Ambehra Ram Kishana	C.4(part)	18.00
2026-27		–do–	C.4(part)	17.00
2027-28		Kaint	C.1(part)	19/00
2028-29		Karor Brahmana	C.1	19.00
Total P.B.I				**290.00**
2014-15	PB.IV	Lalshah	Whole	20.90

2015-16		Bahi	C.1	8.40
		Nahri Dhiansingh	C.2	2.81
2016-17		Nahri Devisingh	C.2	22.07
2017-18		Deehar	C.2	39.00
		Deehar	C.4	45.00
		Pantehri	C.1	5.23
2018-19		Rajpura	C.3	24.36
		Rajpura	C.4	22.59
2019-20		Matoh	C.3	23.12
		Karor Brahmna	C.2	4.50
		Behi	C.4	44.65
		Karmali	Whole	11.00
2020-21		Kokra	Whole	3.15
		Rachoh	C.1	40.00
2021-22		Kharol	C.3	4.72
2022-23		Baggi	Whole	2.40
	PB.IV	Chaplah Garlan	C.3	5.35
		Ludhar	C.4	42.20
		Saroh	C.3	25.00
		Sar(Arloo)	C.4	43.40
2023-24		Charoli	C.2	12.90
Total PB.IV				**452.75**
Total Voluntary felling series				***742.75***
TOTAL OF CHIL WORKING CIRCLE				**1249.14**

2.18 SUBSIDIARY SILVICULTURAL OPERATIONS-CLEANING ANDTHINNING

Following subsidiary silvicultural operations are prescribed:-

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

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

- The operation shall be carried out in winter only.

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

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

2.18.2 Sowing and Planting:-After site clearance, sowing and planting be done as under:-

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

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

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

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

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

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

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

2.19 ARTIFICIAL REGENERATION

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

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

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

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

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

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

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

2.20 OTHER REGULATION

2.20.1 Fire Protection:-Chil forests are vulnerable to risk of fire. Most of the damage from fires occurs during pre-monsoon summer months of April to June when lot of inflammable material is present on the forest floor. For past record of fires, refer to para 7.8.6.4. Fires can be accidental caused by sparks from falling stones lightening charcoal burning, fires by travelers, Shikaries, Honey hunters, labourers and throwing away of burning cigarette buts. Such fires can be controlled if detected in the starting stage. Other fires can be deliberate due to

business rivalry between people engaged in forest working, political reasons un-controlled burning of Ghasnis to induce nascent growth of grass, kindling of fires to drive away wild animals or to cover evidence of forest crimes. In such cases of incendiarism, results are really destructive over extensive areas and it is very difficult to control such conflagrations.

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

a) Direct Measures*:*

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

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

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

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

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

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

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

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

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

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

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

i) Method of tapping in force should be continued.

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

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

2.20.3 Control Burning: Biennial programme of controlled burning in chil areas in the legal and voluntary closure felling series is detailed below –

Table 2.7: Control burning programme in Chil WC

Year	Range	P.B.No	Name of forest	Comptt	Area(ha)
2014-15	Bangana	II	XVII Sarkaru Ghorplani	3d	9.76
		II	XXIIAkoi Di Dhar	1d	29.12
		II	XIV Charara	Id	6.11
	Ramgarh	II	XXI Dhiunsar	2d	21.08
		II	XXI Dhiunsar	3d	17.41
2015-16	Bangana	III	XVIIISarkaru Ghorplani	1a	29.93
		III	–do–	2a	17.82
	Ramgarh	III	XVII Charoli	1a	6.46
		III	XXI Dhuinsar	1a	12.14
2016-17	Bangana	II	XVIII Sarkaru Ghor Plani	4d	20.63

		II	–do–	5d	11.32
		II	XIX Oel Da Ban	1d	13.75
	Ramgarh	II	XXI Dhiunsar	4d	23.46
2017-18	Bangana	III	XXII Akoi Di Dhar	1a	29.93
		III	XIV Charara	1a	6.46
		III	XVIII Sarkaru Ghor Plani	4a(W.B.)	15.81
	Ramgarh	II	XXI Dhiusar	4d	23.46
2018-19	Bangana	III	XVIII Sarkaru Ghor Plani	3a	7.27
		III	–do–	4a (E.B)	16.15
		III	–do–	5a	15.78
	Ramgarh	III	XXI Dhiunsar	2a (N.B.)	14.56
		III	-do-	2a SB	12.14
2019-20	Bangana	III	XIX Oel Da Ban	1a	12.54
	Ramgarh	III	XXI Dhiunsar	2a (N.B.)	14.56
		III	-do-	2a SB	12.14
		III	-do-	3a	27.51
2020-21	Bangana	Unallotted	NahriDhian Singh	C.3	2.57
		-do-	Charara	C.2	9.80
	Ramgarh	III	XXI Dhiunsar	4a	24.65
		Unallotted	Krishan Nagar	C.5	8.80
		-do-	AmbehraRamkishana	C.5	22.00
2021-22	Bangana	Unallotted	Matoh	C.2	6.75
		-do-	–do–	C.5	4.50
		-do-	–do–	C.6	2.80
	Ramgarh	Unallotted	Kaint	C.2	60.00
		-do-	Bohana	C.2	35.80
2022-23	Bangana	Unallotted	Bhabba	C.2	17.00
		-do-	Karor Rajputan	C.2	10.60
		-do-	Paproli	C.1	10.70
	Ramgarh	Unallotted	Bohana	C.3	6.70
		-do-	–do–	C.4	5.60
2023-24	Bangana	Unallotted	Baderah	C.2	24.15
		-do-	Deehar	C.3	32.00
		-do-	Rajpura	C.6	69.76
	Ramgarh	Unallotted	Chouki	C.1	31.35
		-do-	–do–	C.3	4.50
		-do-			
2024-25	Bangana	Unallotted	Raunkhar	C.1	3.25
		-do-	Raunkhar	C.2	6.00
	Ramgarh	Unallotted	Takoli	C.3	86.00
		Unallotted	Ludher	C.1	64.10
2025-26	Bangana	Unallotted	Behi	C.2	15.50
		-do-	Kot	C.1	6.50
		-do-	Daroh	C.1	20.50
2026-27	Bangana	Unallotted	Saroh	C.2	27.00
	Ramgarh	Unallotted	Ludher	C.2	49.30
		-do-	Plata	C.1	39.00
2027-28	Bangana	Unallotted	Arlu Gurmukh	Whole	15.15
		III	XXXIXChaplah Garlan	Whole	5.26
	Ramgarh	Thathun	C.1	22.40	
2028-29	Bangana	II	XVIII Sarkaru Ghorplani	1d	18.60
		II	–do–	2d	16.58

	Ramgarh	II	XVII Charoli	1d	8.19
		II	XXI Dhuinsar	1d	15.37

2.20.4 Planting: -Planting of Chil would be done in all areas after waiting for three years for natural regeneration.

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

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

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

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

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

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CHAPTER III

BAMBOO WORKING CIRCLE

3.1 GENERAL CONSTITUTION:

D.P.F Thappal(part) and DPF Ramgarh Awarla (part)having total 575.30 ha area as already allotted to Bamboo working circle of the working plan under revision have been included in this working Circle. In addition, DPF Thapal(part) and DFP Ramgarh Awarla(Part),DPF Bohru(Part),DPF Kanura (Part), DPF Paniala(Part)and DPF Sola Singhi and Bhiambi all together measuring 509.15 ha and previously allotted to plantation working circle for reason of degradation and invasion by bamboos on a large scale. Further, seven UPF's together measuring 113.19ha and mostly adjoining DPFs have been allotted to the working circle. In nut-shell,above mentioned DPFs measuring 1173.75 ha and UPFs measuring 143.34 hahave been included in this Working Circle. Thus total area of the bamboo working circle comes to 1317.09ha.

GENERAL CHARACTER OF VEGETATION

It has been discussed in detail in Para 2.1 in chapter II of part 1. Unfortunately, bamboo working rules have not been seriously observed and cleaning not done during the currency of working plan under revision, which situation has resulted into considerable congestion in bamboo clumps and has affected adversely bamboo reproduction of *manus*. As per partial enumeration results for this working circle, the extent of congestion in bamboo clumps and distribution of bamboo and other economic species per ha in DPF's and UPF's is approximately as under:-

Table No. 3.1: Distribution of bamboo clumps and othereconomic species

Forests	Species	No.	Remarks
D.P.F' s (1173.75 ha)	Bamboo clumps	573130	Per hanumber of Bamboo clumps and other economic species has been derived from enumeration results of bamboo working circle
	Chil	434	
	Khair	12700	
	Chhal	16163	
	Shisham	1103	
U.P.F's (143.34 ha.)	Bamboo clumps	69992	Bamboo clumps and other economic species has been derived from enumeration results ofBamboo Working
	Chil	53	
	Khair	1551	
	Chhal	1974	

	Shisham	135	Circle.
Working Circle(1317.09 ha)	Bamboo clumps	643122	Per ha number of bamboo clumps and number of trees ofother economic species has been derived from enumeration results ofBamboo WorkingCircle.
	Chil	487	
	Khair	14251	
	Chhal	18137	
	Shisham	1238	

Further, the extent of congestion in the bamboo clumps has been studied during enumeration and abstract of enumeration showing status of congestion in clumps is given below:-

Table No. 3.2

General abstract of enumeration of bamboo clumps

Forest	Area (Ha)	No of Clumps		
		Open	Congested	Total
D.P.F's	1173.75	93759	479371	573130
U.P.F.'s	143.34	11450	58542	69992
Working Circle	**1317.09**	**105209**	**537913**	**643122**
Per ha.		79.88	408.41	

3.2 BLOCKS AND COMPARTMENTS

Numbering of forests, boundaries and nomenclature of blocks, compartments and sub-compartments in respect of DPFs included in this working circle has not been changed. As regards UPF's, these have been included in the working plan for the first time and these have been named after nearest concerned Tikkas during Settlement, their boundary have been settled on Tikka basis during settlement and same have been mostly maintained as such except in case of some unwieldy forests which have been divided into compartments. Further, there is considerable number of UPFs which do not exist in compact chunks but in clusters of independent chunks located close to one another which have been treated as compartments of the UPF concerned. Numbering of UPFs have been done in English digits and in clock-wise manner whereas numbering of DPFs as already done is in Roman digits and clock-wise manner. Further nomenclature used for UPF Compartments is the same as used for DPF compartments.

3.3 FELLING SERIES

There will be one felling series only for this working circle.

3.4 SPECIAL OBJECTS OF MANAGEMENT

The importance of bamboos for cottage industries, paper industries and other common usage need no emphasis. Apart from being a poor man's timber, bamboo is used in numerous ways by common man. It is rather sad to record that despite its importance and utility for the common man, this species has not received the attention it deserved. Bamboo Working rules have been generally flouted and silvicultural needs of the species such as cleaning etc. are rarely attended to.

Consistent with the general objects of managements, the special object of management of bamboos is to improve the health of bamboos by:-

i) Removal of all flowered bamboos.

ii) Removal of all dry and uprooted bamboo to reduce fire hazard

iii) Maintenance of bamboo growth where ever it exists and to extend the species within the areas allotted to this working circle.

3.5 AREA AND ALLOTMENT

Areas alloted to this working circle on the basisof compartment description, stock mapping and enumeration results are tabulated below:-

3.6 ANALYSIS AND VALUATION OF CROP

Stock maps for all the areas allottedto this Working circle have been prepared on 1:15000 metric scale and placed in the concerned compartment history files.

As regards valuation of crop, it is not satisfactory as there is congestion of clumps and presence ofdry culms in clumps.In the past,FellingRules seem to have followedmore in breach than in observance. For extent of congestion refer to table No.**3.2**.

This clearly shows that felling in the past have notbeen done properly. The clumps are choked with dead, dry and mature clumps to a considerable extent. Productivity can improve if prescribed felling rules are following rigidly infuture.

3.7 ENUMERATION AND RESULTS

Since yield in this working circle will be controlled by areas, enumeration has no relevance. However to assess the growing stock for any future planning, complete enumeration was carried out for randomly selected forests allotted to this Working circle to know the composition ofcrop in terms of bamboo and other economically important broad leaved species namely *chil,khair,chhal* and *shisham*. Results so obtained have been posted in the concerned compartment history files. For distribution

of bamboo and other species in this working circle is tabulated below in the Appendix **XI**

3.8 SILVICULTURAL SYSTEM

Bamboo of this working circle will be worked under selection-cum-improvement felling system keeping in view the special object of managementto maintain the forest in healthy condition in posterity. Each clump will be treated as anindependent unit of working.Improvement fellings and cleanings will be carriedoutsimultaneously. Retention of the culms in the clumps during its early life is essentialfor proper development of rhizome.

3.9 ROTATION

Calculation of rotation for bamboos is of theoretical interest only and has no bearing on the practical management of bamboos. In bamboos, rotation has reference to individual culms and not the clump. The clump attains its due height and thickness during the first year of its growth and deterioration sets in after the fifth year. On an average, the life of a clump is above 6 years. These old bamboos are marketable but not commercially liked. Four to five years old bamboos find good market. Old bamboos are not liked because they are not easy to work as a result of hardening of their walls by deposition of silica. Old and dry bamboos are fit for fuel only. Commercially speaking, clumps that are 4-5 years old should be felled whereas on silvicultural considerationsthree years rotation is good enough for well managed bamboo forests. Since forests of this working circle do not confirm to such ideal situation of management, 3 years rotation is ruled out. Now the choice is between 4 or 5 years rotation. It is genuinely feared that if the clumps are felled at the age of5 years, the congestion in Clumps is bound to set in and thus run to counter to thespecial objects to management of this working circle. So, striking a balance between commercial and silvicultural considerations, felling will nottake place on trienniel cycle but quinquenniel cycle i.e in thefifth year so that everynew shootcoming up in the rains after felling is atleast 4 years old by thetime theturn for felling comes again in the order.

3.10 CALCULATION OF YIELD

The yield is prescribed by area. Total area of the working circle being 1317.09 ha. and felling cycle prescribed being 4 years, annual cut worked out to be 329.27 ha or say 329 ha. To ensure sustained annual yield in terms of bamboos or their weight, the matter has been examined critically. It has not been found worthwhile todo sobecause bamboo working has been a financially losing proposition as per exploitation records of HP State Forest Corporation since 1984-85. Thus, annual bamboo yield in terms ofnumber ofbamboos or their tonnage will depend upon the degree of stocking of particular areas to be felled.

In order to assess anticipated bamboo yield, actual extraction data of HPSFDC as the basis has been taken. Last 10 years actual bamboo extraction data has been collected from HP State Forest Corporation which is tabulated below:-

In terms ofweight, above yield of bamboos per ha.can roughly be represented as under:-

Table No. 3.3: Results of bamboo extraction from sample plot in terms of weight per ha

Market category	Yield obtain per ha bamboos		Weight (Qtls)	Remarks
	Bundles	Bamboos		
Bahi-I	97	970	21.56	Estimation of weight of bamboos is based on two assumption: i. That weight of dry clums is 50% of the air dry(green) culms. ii. That 450 number of air(green) bamboos of all sizes weight 10 Qtls
Bahi-II	24	360	8.99	
Majhola	11	220	4.89	
Chhar	3	90	2.00	
Misc.	92	2760	61.33	
Total	**227**	**4400**	**98.77**	

As per extraction result bamboos of different commercial categories as given in Table No.3.5 as per last 10 years actual extraction data collected from HPState Forest Development Corporation, bamboo yield per ha comes to 252 bundles= 3895 bamboos= 87 Qtl. Bamboos of different commercial categories are given in Table No. 3.5. Since extraction data collected from HP State Forest Corporation is based on last 10 years of actual bamboo extraction it has been found advisable to rely upon the same for estimation of anticipated annual yield of this Working Circle.

Annual yield prescribed out of the working circle being 300 ha, annual anticipated yield of the working circle may be as under-

A) In terms of bamboo bundles:

= Yield per ha X Area prescribed to be felled annually

= 252 x 300 = 75600 bundles of different commercial categories.

B) In terms of number of bamboos:

= Yield per ha. x area prescribed to be felled annually

= 3895 x 300 = 1168500 numbers of bamboo of different commercial categories.

C) In terms of weight of bamboos :

= Yield per ha. x Area prescribed to be felled annually

= 87 x 300 = 26100 Qtls. Bamboos of different commercial categories.

3.10.A However, anticipated annual yield as indicated above is not to be used for yield control. Yield in this circle is prescribed to be controlled by area only i.e. 300ha per annum.

3.11 GREGARIOUS FLOWERING

Bamboo areas along Ramgarh Dhar have flowered gregariously on a large scale during 1994-95 Detail of gregariously flowered area is tabulated below:-

Table No. 3.4: Statement showing gregariously flowered areas

Name of forest	Comptt	Total area	Approx.area flowered(ha)	Approx. balance un-flowered area(ha.)
P XI Paniala	C.2b(SB)	17.85	9.60	8.25
	C.3a(NB)	5.65	3.60	2.05
	C.3a(SB)	26.72	4.80	21.92
	C.3	36.82	30.00	6.82
	C.3c	28.32	24.00	4.32
P.VII Thappal	C.1a	22.26	18.00	4.26
	C.1b	45.32	42.00	3.32
	C.2a	27.54	24.00	3.54
	C.3c	40.06	36.00	4.06
P.VIII Bohru	C.1b	48.96	43.20	5.76
	C.1c	19.83	13.20	6.63
	C.2c	37.23	24.00	13.23
P.IX Ramgarh Awarla	C.1a	17.88	15.60	2.28
	C.1b	35.50	31.20	4.30
	C.2a(NB)	20.96	18.00	2.96
	C.2a(SB)	28.00	24.00	4.00
	C.2b(NB)	19.35	16.80	2.55
	C.2b (SB)	79.69	70.80	8.89
	C.3a(NB)	6.42	4.80	1.62
	C.3a(SB)	36.54	32.40	4.14
	C.3a(SB)	39.30	34.80	4.50

	C.3b(NB)	62.60	55.20	7.40
	C.4a	39.25	34.80	4.45
	C.4b	28.55	25.20	3.35
	C.5a(NB)	9.66	8.40	1.26
	C.5a(SB)	21.90	19.20	2.70
	C.5b(NB)	53.65	46.80	6.85
	C.6a(SB)	12.49	10.80	1.69
	C.6b(SB)	25.43	21.60	3.83
	C.6c	23.87	20.40	3.47
Total		**917.60**	**763.20**	**154.40**

Past history of bamboo forests on Ramgarh Dhar reveals that these forests had last flowered gregariously during 1951 and were closed during 1954 for natural regeneration. It is also gathered that bamboo forests on Solasinghi Dhar had also gregariously flowered during early fifties. Since species of the bamboo on Solasinghi dhar is the same as on Ramgarh Dhar, it is likely that bamboo forests on Salasinghi dhar may also flower gregariously in the near future. Gregarious flowering taken place during 1951 and now during 1994-95 show that the physiological cycle of *Dendrocalamus strictus* in the tract is around 43 years.

*Dendrocalamus strictus*is known to flower both sporadically and gregariously at long intervals of 20-65 years. In case of gregarious flowering, the whole clump including the current year clumps dies the rhizomes from which the clumps arise also die after the ripe seeds have fallen. Thus gregariously flowered areas are wiped off bamboo and the situation warrants very serious efforts to regenerate the area after fellings. For successful regeneration of areas, it is necessary that flowered area should not be felled before June in the year of flowering because bamboo seed ripens by May-June and natural shedding of ripened seed in the area is the primary necessity for the natural regeneration of such areas. After felling, the areas need to be cleared of all bushes and debris for proper exposure of mineral soil to provide favorable condition of germination and then very effective closure for the success of natural/ artificial regeneration. Period of closure should be 10-12 years,the period which is taken by bamboo regeneration to reach first harvesting stage. For the purpose of this working plan, closure period is prescribed as 12 years.

3.12 TABLE OF FELLING

As mentioned under para 3.12 above 763.20 ha out of total 1317.09ha area of this working circle has gregariously flowered. Whole of the flowered area had to be

worked during 1994-95 irrespective of technical annual outcome prescribed for this working circle. In the mean-time i.e. from 2012-13 to 2026-27, following area of the working circle will only be available for felling on 4 year felling cycle irrespective of technically prescribed annual out of 300 ha.

Area of the working circle outside the flowered forests	**= 261.51 ha**
Area of un flowered patches within the flowered forests	= 154.40 ha.
Total	**= 415.91 ha.**

Accordingly table of felling for the working circle has been worked out in three parts given below:

Table No.3.5: Felling programme for bamboo working circle for 2014-15 to 2027-28

Year	Range	No & Name of Forest	Comptt.	Area(Ha.)
2014-15	Bangana	VI Paniala	2.b(SB) Part	9.60
			3.a(NB)part	3.60
			3.a(SB)part	4.80
			3.bpart	24.00
			3.c part	30.00
	Total Bangana Range:			**72.00**
	Ramgarh	VII Thappal	1.a(Part)	18.00
			1.b part	42.00
			2.a part	24.00
			3.c part	36.00
		VIII Boru	1.b part	43.20
			1.c part	13.20
			2.c part	24.00
		IX Ramgarh Awarla	1.a part	15.60
			1.b part	31.20
			2.a NB part	18.00
			2.a SB part	24.00
			2.b (NB) part	16.80
			2.b(SB)part	70.80
			3.a(NB) part	4.80
			3.b(NB) part	55.20
		IX Ramgarh Awarla	3.B(sa)Part	32.40
			4.a part	34.30
			4.bPart	25.20
			5.A(NB)part	8.40
			5.a(SB) part	19.20
			5.b(NB) part	46.90
			5.a(SB)part	10.90
			6.b(SB)part	21.60
			6.c(part)	20.40
		TotalRamgarhRange		**691.20**
		G.Total for the year		***763.20***

Year	Range	No &Name ofForest	Compartment	Area in ha.

2015-16	Bangana	VI Paniala	2.a	27.92
			2.b(NB)	8.85
			2.b(SB)part	8.25
			2.c	27.11
	TotalBanganaRange			72.13
	Ramgarh	VII Thappal	1.a part	4.26
			1.b part	3.32
			2.a part	3.54
			3.c.part	4.06
		VIII Bohru	1.b part	5.76
			1.c part	6.63
		UPF Chokhath	c.1	19.10
		TotalRamgarhRange		46.67
	TotalRamgarhRange			**118.80**
2016-17	Bangana	VI-Paniala	3.a (NB)part	2.05
			3.a(SB)part	21.92
		XII Kanura	1.b	18.65
			1.c (SB)	4.82
	TotalBanganaRange			47.44
	Ramgarh	VIII Bohru	2.c (Part)	13.23
		IX Ramgarh Awarla	1.a (Part)	2.28
			1.b (Part)	4.30
			2.a(NB) (Part)	2.96
			2.a (SB) (Part)	4.00
			2.b(NB) (Part)	2.55
			2.b (SB) (Part)	8.89
	TotalRamgarhRange			**38.21**
	Total for the year			**85.65**
2017-18	Bangana	VI Paniala	3.b (Part)	4.32
		XIII Dhar Solasinghi & Bhiambi	2.a (SB)	10.55
			2.b (SB)	4.15
			3.a	17.80
			3.b (NB)	11.37
	TotalBanganaRange			**43.19**
	Ramgarh	**IX Ramgarh Awarla**	3.a(NB) (Part)	1.62
			3.a(SB) (Part)	4.50
			3.b (NB) (Part)	**7.40**
			3.b(SB) (Part)	**4.14**
2018-19	Bangana	VI Paniala	3.c part	6.82
	Amendment made vide No.227 dt.23.4.99 by CF.WP.D/Sala.	XIII Dhar Solasinghi and Bhiambi	2.c SB	19.03
			3.b(SB)	8.45
	TotalBanganaRange			**34.30**
	Ramgarh	IX Ramgarh Awarla	5.a(NB)part	1.26
			5.a(SB)part	2.70
			5.b(NB)part	6.85
			5.b SB	8.15`
			6.a(SB)part	1.69
			6.b(SB)part	3.83
			6.c part	3.47

		UF Kusiala	C.2	26.10
		UF Kolka	C.3	12.40
		UF Jwalapur	Whole	10.00
		UF Paroian	C.3	8.87
	Total Ramgarh range			**85.32**
	Total for the year			**119.62**
2019-20	As perdetail given in 2013-14			
2020-21	As per detail given in 2014-15			
2021-22	As per detail given in 2015-16			
2022-23	As per detail given in 2016-17			
2023-24	As per detail given in 2017-18			
2024-25	As per detail given in 2018-19			

Year	Range	No.&name of forest	Compartment	Area(ha.)
2025-26	Bangana	VI Paniala	3.c	36.82
		XII Dhar Solasingi and Bhiambi	2.c(SB)	19.03
			3.b(SB)	8.45
	TotalBanganaRange			**64.30**
	Ramgarh	IX Ramgarh Awarla	5.a(NB)	9.66
			5.a(SB)	21.90
			5.b(NB)	53.65
			5.b(SB)	8.15
			6.a(SB)	12.49
			6.b(SB)	25.43
			6.c	23.87
		UF Kusiala	C.2	26.10
		UF Kolka	C.3	12.40
		UF.Jwalapur	Whole	10.00
		UF Paroian	C.3	8.87
	TotalRamgarhRange			**212.52**
	Total for the year			**276.82**
2026-27	Bangana	VI Paniala	2.a	27.92
			2.b(NB)	8.85
			2.b(SB)	17.85
			2.c	27.11
	Total Bangana			**81.73**
	Ramgarh	VII Thappal	1.a	22.26
			1.b	45.32
			2.a	27.54
			3.c	40.06
		VII Boru	1.b	48.96
			1.c	19.83
		UF Chaukath	C.1	19.10
	TotalRamgarh range			**223.07**
	Total for the year			**304.8**
2027-28	Bangana	VI Paniala	3.a(NB)	5.65
			3.a(SB)	26.72
		XII Kanaura	1.b	18.65
			1.c(SB)	4.82
	Total Bangana			**55.84**
	Ramgarh	VIII Boru	2.c	37.23

		IX Ramgarh Awarla	1.a	17.88
			1.b	35.50
			2.a(NB)	20.96
			2.a(SB)	28.00
			2.b(NB)	19.35
			2.b(SB)	79.69
TotalRamgarhRange				**238.61**
Total for the year				**294.45**

3.13 METHOD OF FELLING

During the days of exploitation of bamboo through contractors up to 1983-84, felling rules were followed more in breach than in observance. Contractor agency was eased out with great expectation from HP State Forest Corpn. But their performance has not been much better than that of contractor agency so technically speaking, quality of bamboo working continued to suffer in the past mainly due to purely commercial attitude of the working agencies. Further, the yield of bamboos and its revenue are also not significant. Ever since HPSFC took over commercial working of forests during 1983-84, they have been projecting a picture that bamboo working is a totally losing proposition and they have not paid any royalty for these forests. In the above back ground, it is only advisable to treat bamboo working not as a commercial operation but a purely silvicultural operation, revenue if any being only a bye product. As such, it is strongly felt and recommended that bamboo forests should be worked departmentally so that the special object of management to keep the bamboo forests in good health and to extend the bamboo within the working circle is duly realized.

3.14 FELLING RULES

As per approved preliminary working plan bamboo felling rules given in Gupta Plan were prescribed to be adopted as such except where warranted by change in the felling cycle. Said preliminary working plan report was challenged in the Hon'ble H.P.High Court by Supdt.Kutlehar Forests for its overall prescription in general and inrespect of Scrub Working Circle in particular. To sort out this technical controversy, Hon"ble Court appointed a commission of two eminent Forest Officers - Dr. DN Tiwari,IFS, Director-General,Indian Council of Forestry Research and Education and Mr. SC Gaur,IFS, Ex Chief Conservator of Forests,HP who examined the whole matter and submitted their recommendation to the Hon'ble Court.The recommendations in question were approved by the Hon'ble Court and made binding on both the parties.

Among the recommendations made by the Commission, they handed down a set of standard marking/felling rules for every working circle with the advice that while finalizing marking/felling rules for different working circles, W.P.O. may adopt marking rules handed down by them as these rules would improve productivity and sustainability of forests. Accordingly, it has been decided to adopt by and large the marking rules of Gupta Plan with only necessary changes in view of marking rules proposed by the commission and charge in the felling cycle. Apart from that, some more marking rules have been proposed for overall improvement in the quality of bamboo working and ultimate achievement of special object of management of the working circle.

Following marking/felling rules are framed to be adopted in respect of this working circle:

i) Coupes must be worked from top downwards and systematically efforts will be made to work a compartment in one particular year as provided in the felling programme to avoid congestion or deterioration of the clumps.

ii) Cleaning and felling will be done simultaneously and these will be constantly supervised by a forest official capable of deciding the silvicultural limits of exploitation.

iii) Felling will commence in the middle of October and should be finished as early as possible and in any case not later than the end of Feb. otherwise bamboo felled late are readily attached by borers. Extension in the working period of Bamboo should never be granted whatsoever

iv) Each clump will be treated as an independent unit of working. The total number of culms to be felled in a clump during the prescribed year should normally be equal to the last 4 years production, but this number may be exceeded in the case of congested clumps or be less in open clumps and those situated on steep groundand on the periphery of the forest subject to the following restrictions:

   a) Felling will be restricted to the bigger and denser clumps. Open clumps will not be touched in main felling except for removal of odd mature culms and cleaning , if necessary.

b) The numbers of healthy culms to be left in a clump will normally be equal to the total number of Manusand Chals.

c) The culms retained in the clumps will be uniformly distributed for effectivephysical support to Manus and Chals.

d) Totally dried clumps will be clear felled. A clump which is more than 2/3rd dry will be considered as totally dry and will be allowed to be clear felled. Clear felling of such dry clumps need not be confined to coupe of the year.

e) Bamboo clumps shall not be cut in the year of their flowering but all such clumps shall be clear felled after they have shed their seed and the cutting of such clumps need not be confined to the coupe of the year for obvious reasons.

f) If no new culm is found in a clump half of the old culms in the clumps shall be retained.

g) All insect attached, diseased and rotten clumps shall be cut irrespective of their utility.

h) All the worked clumps shall be cleared of lops and tops of cut bamboo dangling around which shall be heaped in to nullas and ravines and used or burnt to maintain forest hygiene and exclude fire hazards.

i) Digging out for extraction of rhizomes should be strictly prohibited.

j) Cutting of Manus for binding bamboo bundles be strictly prohibited. Ropes and climbers should be used for bundling. However mal formed Manus may be cut but maximum number of exploitable culms removable from a clump will then be correspondingly reduced.

k) All bamboo should be cut within minimum15 cm and maximum 30 cm. Theoretically, the cut should be horizontal just above the node nearest to prescribed level of cut which does not happen due to working difficulty. Therefore, a slanting cut come where in the middle of an inter-node or below be given in such a manner that the lowest level of the slanting cut is in line with the node below

so that there is no possibility of rain water to accumulate there and cause decay.

l) The cut should be clean given with sharp edged tools which must be supervised by official in charge of coupe.

m) Fellings must be specially cautions on hot aspects and near the ridges or wherever bamboo growth conditions are refractory.

n) No side cutting or cutting through the congested clumps will be permitted except under supervision of forest official.

o) Climbers infesting the clumps shall be cut and used for bundling of bamboos or disposed.

3.15 SUBSIDIARY SILVICULTURAL OPERATIONS

In the year following main fellings operations will be carried out:-

i) *Site Clearance:* Since bamboos keep flowering sporadically and viability of seed is poor, it is necessary that the ground be always kept clear. For the purpose all dead, dying, insect attached, twisted and malformed culms which have escaped during the main felling will be cut, collected and disposed. All debris left after main fellings, undecomposed thick layers of leaf litter and bushes should be cleared and disposed. Object of the operation is to expose the mineral soil to receive the seed which ripens and falls in May-June. Site clearance must be taken up and acc0mplished immediately on completion of main fellings by the end of February and which extension in felling period should never be granted.

ii) *Fashioning of split nodes:* All split nodes will be cut back to next nodes with sharp edged tools.

iii) *Planting:* Blanks will be identified in all the areas felled during a particular year and these will be planted up systematically during July of the year following the main fellings using 1.5 years old nursery raised bamboo stock so that at least 30 cm tall plants with reasonably developed rhizomes are planted. 3 seedlings per pit(30cmx 30cm) shall be planted at a spacing of 4m x 4m.

All areas of the working circle shall be planted within first 4 years of the plan period as per standard nursery and planting techniques.

Table No. 3.6: Planting Programme is laid down as under

Year	Forest	Comptt.	Area (ha)	Approx area to be planted (Ha)
2014-15	Planting programme will follow prescribed felling programme. Area felled in a particular year will be closed on natural/artificial planting in the succeeding year. Beating up of failures will be done in the year succeeding the year of planting.			
2015-16				
2016-17				
2017-18				

iv) *Technology of raising bamboos*: Standard nursery and planting techniques are a matter of common knowledge with the forest functionaries. Therefore, it is not necessary at all to add any appendix on the matter to this working plan.

v) *Weeding*: Two weedings one each in September and March are prescribed to be done in first year and thereafter one weeding in September for 2 years.

vi) *Closure:*

a) All fully stocked bamboo forest of this working circle should be kept strictly closed and protected for 3 month from July to Sept. every year to ensure protection of seeding and development of *Manus*.

b) Felled bamboo areas without any planting should be kept closed for 3 years from the year of felling.

c) Felled bamboo areas with gaps planted after felling should be kept closed for5 years from the year of felling.

d) Area wiped off bamboo as a result of gregarious flowering or devastating fires should be closed for 12 years after planting.

e) In all above cases, attempts be made to replace grazing by grass cutting through right holder who should be at liberty to sell their share of cut or standing grass, if they desire.This will earn public good- will and co- operation for effective protection of closed areas. Under no circumstances, the lopping of bamboo be permitted.

f) Planting up area should invariably be fenced with barbed wire.

g) Planting of Dendrocalamus strictus only is prescribed.

The tending of young clumps should start from 3rd year after planting so as to allow the clumps to develop.

3.16 MANAGEMENT OF BROAD LEAVED SPECIES

As revealed, general abstract of enumeration in table No. 3.4 there is considerable number of broad leaved species in this working circle such as Chil, Khair, Chhal, Shisham etc. These species should be managed as per the following guide lines.-

1) Since bamboos constitute main crop of the working circle, any trees of broad leaved species interfering with the growth of bamboos should be felled during main bamboos fellings or marked in T.D.to the right holders.
2) All dead, dying and diseased broad leaved trees should be felled during main bamboo fellings or marked in T.D. to the right holders.
3) Khair and chall are two species of considerable economic utility. These species in dia class 25 cms. and above are susceptible to negative increment and fungal attack. Therefore, these species dia class and above should be felled during main fellings on 33% selection basis i.e. one out of three tree only will be felled khair being a species of great economic utility will not be granted in T.D. to right holders whatsoever.
4) Except for salvage felling of broadleaved species, their removal on any other ground shall be subject to principles of soil conservation.
5) Chil will not be felled under any circumstances except in salvage fellings,.
6) Under no circumstances, planting of broad leaved species will be done in this working circle.

3.17 FIRE PROTECTION

Existing fire lines proposed to be supplemented with new fire lines prescribed under Appendix XII should suffice to ensure protection of bamboo forests against fires, provided net work of fire lines is properly maintained. Further instructions contained in CCFHP Standing Order No.5/80 dated 3-5-80 should be followed rigorously to protect the bamboo forests against fires.

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CHAPTER IV

SCRUB WORKING CIRCLE

With special object of achieving healthy and full stocking with economic species in scrub forests(density >0.3) not vulnerable to seriouserosion on one hand and to check serious soil erosion by planting of economic species in scrub forests(density ≤ 0.3) on the other hand the Plantation Working Circle of Working Plan under revision has been split up into Scrub Working Circle and Rehabilitation Working Circle.Accordingly, this working circle will consist of all the DPFs allotted to Plantation Working Circle of the Plan under revision except those proposed to be allotted to Rehabilitation Working Circle and UPF Scrub forests (density ≥ 0.3) not vulnerable to critical erosion and not requiring protection, rehabilitation and exclusion of biotic interference.

4.1 GENERAL CHARACTER OF VEGETATION

The condition of vegetation has been described in para 2.2 of Chapter II. The forests have been badly depleted and proportion of uneconomic species, bushes and weeds has increased which would render the treatment of these forests costlier.

4.2 BLOCKS AND COMPARTMENTS

Numbering of forests, boundaries and nomenclature of blocks, compartments and sub-compartments in respect of DPFs included in the working circle has not been changed. As regards UPFs, these have been included in the working plan for the first time and these have been named after nearest concerned Tikas during settlement. Their boundaries have been mostly maintained as such except in case of some unwieldy forests which have been divided into compartments. Further, there is considerable number of UPFs which do not exist in compact chunks but in clusters of independent chunks located close to one another which have been treated as compartments of UPFs concerned. Numbering of UPFs has been done in English digit carried out in clock wise manner whereas numbering of DPFs has been done in Roman digits and in clock wise manner. Further nomenclature used for UPFs compartments is the same as already used for DPF compartments.

4.3 FELLING SERIES

There will be two felling series.

4.3.1 Legal felling series for DPFs covered by Rotational Closure Scheme.

4.3.2 Voluntary felling series for UPFs.

4.4 SPECIAL OBJECTS OF MANAGEMENT

Consistent with the general objects of management, special object of management is to build up healthy and full stocking with economic species in replacement of inferior species in the present day context.

4.5 AREAS AND ALLOTMENT

The Range and Felling Series-wise abstract of areasallotted to this working circle is tabulated below:-

Table No 4.1: Area allotment of Scrub WC

RANGE	LEGAL FS (ha)	VOLUNTARY FS (ha)	TOTAL (ha)
Bangana	430.44	790.42	1220.86
Ramgarh	1242.13	2190.06	3432.19
TOTAL	**1672.57**	**2980.48**	**4653.05**

4.6 ANALYSIS AND VALUATION OF CROP STOCK MAPS

i) Stock maps on 1:15000 scale have been prepared and placed in the compartment history files concerned.

ii) Density of crop has been estimated occularly for every forest compartment/sub- compartment and recorded in the concerned compartment history files.

iii) Enumeration results: Since, yield in this working circle will be controlled by area, enumeration has no relevance. However, to assess growing stock for any future planning, enumerations were carried out depending upon prescription of preliminary working plan report and instruction received from CCF Working Plan,HP from time to time. Only economic species *Khair, Chhal,Shisham,Amla* etc were enumerated and results of enumeration have been posted in the concerned compartment history files. Abstract of enumeration results for economic species in the working circle is tabulated below:-

TableNo 4.2

General abstract of Enumeration Results of Scrub Working Circle

Felling Series	Area (ha)	Spp	V	IV	III	IIA	IIB	IA	IB	IC	ID	Total	Trees per ha
Legal	1672.57	Chhal	61607	84670	16488	12128	1888	514	368	0	0	177663	106.22
		Aisan	0	0	0	0	0	0	0	0	0	0	0.00
		Shisham	8449	3721	1937	1055	410	153	83	0	0	15808	9.45
		Chil	3214	2117	903	278	28	14	0	0	0	6554	3.92
		Amla	916	417	542	555	0	0	0	0	0	2430	1.45
		Simbal	0	0	69	153	83	56	194	0	0	555	0.33
		Khair	54359	14343	3069	632	0	0	0	0	0	72403	43.29
		Total	128545	105268	23008	14801	2409	737	645	0	0	**275413**	**164.66**
Voluntary	2980.48	Chhal	80343	42694	6873	989	187	37	28	0	0	131151	44.00
		Aisan	3842	5083	4775	1231	9	0	0	0	0	14940	5.01
		Shisham	662	364	131	28	0	9	0	0	0	1194	0.40
		Chil	9792	14222	10193	4598	2359	1147	9	0	0	42320	14.20
		Amla	0	0	0	0	0	0	0	0	0	0	0.00
		Simbal	0	0	0	0	0	0	0	0	0	0	0.00
		Khair	196516	47982	4402	112	0	0	0	0	0	249012	83.55
		Total	291155	110345	26374	6958	2555	1193	37	0	0	**438617**	**147.16**

Scrub Working Circle

Felling Series	Area (ha)	Spp	V	IV	III	IIA	IIB	IA	IB	IC	ID	Total	Trees per ha
	4653.05	Chhal	141950	127364	23361	13117	2075	551	396	0	0	**308814**	62.37
		Aisan	3842	5083	4775	1231	9	0	0	0	0	**14940**	3.21
		Shisham	9111	4085	2068	1083	410	162	83	0	0	**17002**	3.65
		Chil	13007	16340	11096	4875	2387	1161	9	0	0	**48875**	10.50
		Amla	916	417	542	555	0	0	0	0	0	**2430**	0.52
		Simbal	0	0	69	153	83	56	194	0	0	**555**	0.12
		Khair	250876	62325	7470	744	0	0	0	0	0	**321415**	69.08
		Total	**419702**	**215614**	**49381**	**21758**	**4964**	**1930**	**682**	**0**	**0**	**714031**	153.45

The species wise total growing stock present in this Working Circle is tabulated below:

Table 4.3: Species wise distribution of the GS of Scrub WC

S.NO.	SPECIES	NO. OF TREES	VOLUME (cum)	AVERAGE/ha (cum)
1.	Chhal	308814	157207.42	33.79
2.	Aisan	14940	8297.59	1.78
3.	Shisham	17002	5524.52	0.97
4.	Chil	48875	28433.56	6.11
5.	Amla	2430	1683.86	0.36
6.	Simbal	555	2075.48	0.45
7.	Khair	321415	28985.57	6.23
	TOTAL	**714031**	**232208.00**	**49.69**

4.7 SILVICULTURAL SYSTEM

The improvement felling system is prescribed in view of condition of the crop and objects of management. The system provides for restoration of economic forest capital by systematic replacement of rubbish of all sizes followed by cultural operation and planting of economic species. However,an exception to theabove prescription has been legally approved by Hon'ble HP High Court on the basis of field inspection and report of specially appointed Commission(Dr.D.N.Tawari,Director General, Indian Council of Forestry Research & Education; Mr.S.C.Gaur,Retd.IFS, CCF HP;and M Yales U.S.A. Chandigarh) on Kutlehar Forest in context of a petition filed by Supdt.Kutlehar Forest, in respect of *khair*.The said report of the commissionread with marking/felling rules in respect of *khair* in Scrub Working Circle reveals that *khair* trees of higher diameter (≥ 25 cm) have been attacked by *Ganoderma lucidum*(root rot fungus) and *Fomes badius* (heart rot fungus caused by lopping or other injury) and accordingly provides that *khair* trees (≥ 75 cm girth or 25cmdbh) if silviculturally available, may be extracted @ 33% (One tree out of every three). This deviation from the approved preliminary working plan report will not only save nation's loss to have occurred due to blanket ban on felling of Khair wrongly provided there in out but will also go a long way in regeneration of *khair* which is a vigorous coppice if felled in time i.e. before it grows beyond 25 cm DBH.*Khair* coppice is not only a supplementary mode of *khair* regeneration in scrub working circle but it is also surest and cheapest supplementary mode of regeneration.

On the above analogy, another deviation from the provisions of approved preliminary working plan report has been made for *chhal* in repect of which the justification is much stronger

forthereason that nursery technique of*chhal* is still a mystery for the forester and obviously artificial regeneration of *chhal* is impossible atleast for the present. For regeneration of *chhal* there is no option but to depend on natural regeneration of seed origin and to a bigger extent of*chhal* coppices. But *chhal* does not coppice if not felled in time i.e. before it grows beyond 25cm DBH. Moreover, *chhal* beyond 25 cm dia and up ishighly prone to heart rotwhich has been practically observed during preparation of localTable for *chhal*. If blanket ban on felling of chhal as wrongly prescribed in the approved preliminary working plan report was observed it would have setin slow death in *chhal* of scrub forests culminating into wiping out of more than 50% *chhal*. Therefore it is prescribed that *chhal* 25 cm dia and up shall also be felled @ 33%(one tree out every three).

4.8 ROTATION AND CONVERSION PERIOD

The rotation is of no consequence when silvicultural system provides for only improvement felling, the entire area will be built up in a phased manner over a period of 30 years.

4.9 FELLING CYCLE

Keeping in view the provision of closure for 10 years under decennial closure series of the Rational Closure Scheme, the entire area of the working circle will be gone over in 30 years.

4.10 YIELD CALCULATION

The yield will be controlled by area in both the felling series as under:-

a) ***Legal felling series:*** Total area of this felling series being 1672.57 haonly to be gone over in 15 years, annual prescribed yield comes to 111.50 ha only

b) ***Voluntary felling series:*** Total area of this felling series being 2980.48 ha only to be gone over in 15 years, annual prescribed yield comes to 198.70 ha; and total of 310.20 ha.

According to silvicultural system prescribed for this working circle 26 useless species (enlisted under marking rule No.2) worth rubbish and khair and chhal of 25 cm dia and above only are to be removed during improvement felling. It is impossible to assess in quantitative terms the yield of said 26 useless spp because these have neither been enumerated nor marked/worked by HPSFDC as per marking rules prescribed in this working circle which are drastically different from marking rules of scrub areas in the plantation working circle of working plan under revision.

4.11 YIELD OF *KHAIR* AND *CHHAL*

Quantitatively, yield of khair and chhal only can be roughly estimated in both the felling series on the basis of enumeration results of said species vis-à-vis prescribed marking rules subject to 33% removal of *khair*/*chhal* trees of 25 cm DBH and over. Felling series were enumeration abstracts of khair and chhal are given below:-

Table No.4.4

General enumeration abstract of *Khair* and *Chhal* in Legal Felling Series

Species	Dia class	Total trees		Area of felling series	Trees per ha.	
		No.	Vol(m^3)		No.	Vol(m^3)
Khair	V	54359	2772.309	1672.57	32.50	1.658
	IV	14343	2825.571		8.58	1.689
	III	3069	1387.188		1.83	0.829
	IIA	632	455.672		0.38	0.378
	IIB	0	0		0	0
	IA& above	0	0		0	0
Total Khair		**72403**	**7440.74**		**43.29**	**4.554**
Chhal	V	61607	7824.089	1672.57	36.84	4.678
	IV	84670	26925.060		50.62	16.098
	III	16488	13767.480		9.86	8.231
	IIA	12128	21466.560		7.25	12.834
	IIB	1888	5720.640		1.13	3.420
	IA & above	882	4707.398		0.53	2.815
Total Chhal					**106.23**	**48.076**

Table No. 4.5

General enumeration abstract of *Khair* and *Chhal* in Voluntary Felling Series.

Species	Dia class	Total trees		Area of felling series(ha)	Trees per ha	
		No.	Vol(m^3)		No.	Vol(m^3)
Khair	V	196516	10022.316	2980.48	65.93	3.362
	IV	47982	9452.454		16.10	3.171
	III	4402	1989.704		1.48	0.668
	IIA	112	80.752		0.04	0.027
	IIB	0	0		0	0
	IA & up	0	0		0	0
Total Khair		**249012**	**21545.226**		**83.55**	**7.228**
Chhal	V	80343	10203.561	2980.48	26.96	3.423
	IV	42694	13576.692		14.32	4.555
	III	6873	5738.955		2.31	1.926
	IIA	989	1950.930		0.33	0.655
	IIB	187	566.610		0.06	0.190
	IA & up	65	348.499		0.02	0.117
Total Chhal		**131151**	**32385.247**		**44.00**	**10.866**

As per marking rules, 33% of Khair and Chhal trees 25 cm d.b.h. and over are to be felled in both the felling series. Accordingly it is estimated that annually available produce of miscellaneous broad leaved species may include khair and chhal as depicted here under:-

Table No. 4.6

***Khair* and *Chhal* trees available for felling per ha**

Felling series	Species	Trees available per ha		33%of 25 cms d.b.h. & over trees per ha		Remarks
		No.	Vol(m^3)	No	Vol(m^3)	
Legal	Khair	43.29	4.554	5.64	1.883	It is presumed that 25 cm dbh and over trees constitute 40% ofclass IV(20-30 cm trees)
	Chhal	106.23	48.076	39.02	33.789	
Voluntary	Khair	83.55	7.228	7.96	1.963	
	Chhal	44.00	10.866	8.45	4.710	

Therefore, is as under:-

4.12 ESTIMATED ANNUAL YIELD OF KHAIR AND CHHAL

LEGAL FELLING SERIES

Area prescribed to be felled = 111.50 ha

Annually 33% of khair trees 25 cm dbh and over available for felling per ha = 5.64 trees= 1.883 m^3

Estimated khair available for felling annually = 628.86 trees = 209.955 m^3

Say =629 trees= 210 m^3

33% of Chhal trees of 25 cm d.b.h. and over available = 39.02 trees = 33.789 m^3

Estimated Chhal available for felling annually = 4350.73 trees = 3767.474 m^3

Say = 4351 trees = 3767 m^3

B) VOLUNTARY FELLING SERIES

Area prescribed to be felled =198.70 ha

Annually 33% of Khair trees of 25cm dbh and over available for felling per ha = 7.96 trees = 1.963 m^3

Estimated khair available for felling annually = 1581.65 trees = 390.048 m^3

Say = 1582 trees = 390 m^3

33% of chhal trees of 25 cm d.b.h. & over available for felling per ha = 8.45 trees = 4.71 m^3

Estimated chhal available for felling annually = 1679.02 trees = 935.877 m^3

Say = 1679 trees = 936 m^3

Therefore, annual expected yield of Khair and Chhal in scrub working circle comes to:-

Khair = 2211 trees = 600 m^3; Chhal = 6030 trees = 4703 m^3

This is a very rough estimate and it is of no consequence so far as control of yield is concerned. Yield in both the felling series of this working circle is to be controlled by area.

4.13 SEQUENCE OF FELLING

The green felling proposed in this working circle is subject to the directions and guidelines of the Hon'ble Supreme Court of India, Hon'ble High Court of H.P and Ministry of Environment and Forests, Govt. of India**.**The sequence of felling for DPFs under legal felling series has been framed keeping in view the felling programme prescribed under plantation working circle of the plan under revision. Same sequence of felling prescribed to be repeated here in respect of DPFs. However, slight adjustments here and there have been made in view of splitting up of plantation working circle and allotment of some of the DPFs to Rehabilitation working circle of this plan. As regards sequence of fellings in respect of UPFs under voluntary felling series, it has been so framed that as far as possible, contiguous areas within each Range are felled and closed for planting from year to year. Accordingly, sequence of fellings by prescribed felling series has been framed and is tabulated below:-

Table No. 4.7: Felling programme of Scrub Working Circle

Year	Range	No & name of forest	Compartment	Area(Ha.)
I Legal Felling Series				
2014-15	Ramgarh	XVI Ban Dhanet	1.b(SB)	6.40
		–do–	1.c	5.26
		–do–	3.a	4.05
		–do–	3.b	4.45
		–do–	3.c	6.07
	Bangana	VI.Paniala	1.a	41.02
		–do–	1.B	36.01
		XLII Bharmout	1.c	6.38
		XLIII Chhatehar	Whole	22.66
				132.30
2015-16	Ramgarh	XXXVI Khairian	1.a	11.73
		–do–	1.b	11.73
		–do–	1.c	10.93
	Bangana	XII Kanura	1.a (NB)	17.89
		–do–	1.c (NB)	10.55
		VI Paniala	1.c	30.74
				93.57
2016-17	Ramgarh	XXXIV Chowki Maniar	1.a	36.05

		–do–	1.b	41.66
	Bangana	XII Kanura	2.b	22.6
				100.31
2017-18	Ramgarh	XXXIV Chowkli Maniar	1.c	44.50
		XXXII Amroh	Whole	22.66
	Bangana	XII Kanura	3.a	24.95
		XII Kanura	3.b	14.58
				106.69
2018-19	Ramgarh	XXXII Atia	Whole	39.25
		XV Kariara	2.a(NB)	25.33
	Bangana	XXXVIII Sohari Baduha.	Whole	12.94
		XIII Dhar Solasingi & Bhimabi	1.c	30.35
				107.87
2019-20	Ramgarh	XV Kariara	2.b	41.69
		XV Kariara	1.a(NB)	24.50
	Bangana	XIII Dhar Solasingi & Bhimabi	5.b	25.39
		XII Kanura	3.c	11.75
				103.33
2020-21	Ramgarh	XV Kariara	1.c	40.46
		XXVIII Ghugan Kakrana	Whole	9.30
	Bangana	XIII Dhar Solasingi & Bhimabi	2.c(NB)	5.26
		XIII Dhar Solasingi & Bhimabi	3.c(NB)	15.39
		XIII Dhar Solasingi & Bhimabi	3.c(SB)	5.26
				75.67
2021-22	Ramgarh	XXIX Kawari	Whole	5.26
		XXXI Kathoh	Whole	5.26
		XXVI Tira Aghlour	1.a	12.15
		–do–	1.c	10.52
	Bangana	XIII Dhar Solasingi & Bhimabi	4.c	19.82
		XIII Dhar Solasingi & Bhimabi	5.c(NB)	3.62
		XIII Dhar Solasingi & Bhimabi	6.b	20.63
				77.26
2022-23	Ramgarh	XXVII Busal	1.a	4.40
		XXVII Busal	1.b	4.85
		XXVII Busal	1.c	4.05
		XXV Tanda Bagwan	1.a	20.23
	Bangana	XIII Dhar Solasingi & Bhimabi	6.c	13.75
		XLSari	Whole	8.49
				55.77
2023-24	Ramgarh	XXV Tanda Bagwan	1.b	21.45
		XXV Tanda Bagwan	1.c	15.78
		XXIV Thana Dulehri	1.a	4.45

		XXIV Thana Dulehri	1.b	3.64
		XXIV Thana Dulehri	1.c	4.45
		XI Tanda	1.a	20.63
		–do–	1.b	19.42
		–do–	1.c(NB)	12.99
	Bangana	XLII Bharmout	1.a	6.38
				109.19
2024-25	Ramgarh	VII Thappal	2.b	23.06
		–do–	2.c	20.23
		–do–	2.a	22.66
		–do–	3.b	45.72
		VII Boru	1.a	26.56
	Bangana	XLII Bharmout	1.b	10.12
				148.35
2025-26	Ramgarh	VII Boru	2.a	14.97
		VII Boru	2.b	52.61
		IX Ramgarh Awarla	6.a(NB)	16.85
		IX Ramgarh Awarla	6.b(NB)	8.15
		IX Ramgarh Awarla	7.a	47.75
				140.33
2026-27	Ramgarh	IX Ramgarh Awarla	7.b	46.94
		IX Ramgarh Awarla	7.c	50.80
		IX Ramgarh Awarla	8.a	23.47
				121.21
2027-28	Ramgarh	IX Ramgarh Awarla	8.b	17.41
		IX Ramgarh Awarla	8.c	19.49
		X Ramgarh Parla	1.a	38.84
		X Ramgarh Parla	1.c	37.23
				112.97
2028-29	Ramgarh	X Ramgarh Parla	2.a(NB)	22.27
		X Ramgarh Parla	2.a(SB)	17.81
		X Ramgarh Parla	2.b	19.42
				59.5

Year	**Range**	**No & name of forest**	**Compartment**	**Area (Ha.)**
2014-15	Ramgarh	Jol	1	60.00
		–do–	2	50.00
		Chhatehar	1	50.00
	Bangana	Malangar Brahmana	Whole	26.80

		Nanawin	2	7.40
		Sarsoli	2	2.20
		Awahar	Whole	12.75
				209.15
2015-16	Ramgarh	Ambehra Dhiraj	Whole	64.72
		Bhagnal	1	69.60
		–do–	2	51.00
		Atia	2	29.10
	Bangana	Hathlone	Whole	34.75
				249.17
2016-17	Ramgarh	Bharmar	2	4.75
		Baslahar	2	40.80
		Ramnagar	2	22.10
		Charoli	1	12.60
		Kherian	2	18.00
		–do–	3	19.65
		KrishanNagar	4	2.90
		Amroh	1	14.70
		–do–	2	73.30
	Bangana	Lakhroon	1	59.20
				268.00
2017-18	Ramgarh	Kukhera Rajputan	Whole	55.50
		Kukhera Jattan	Whole	88.10
		Dumkhar	1	17.00
		–do–	2	7.80
		–do–	3	4.30
	Bangana	Damohar	Whole	12.90
		Jhabrani	Whole	3.90
		Bhabba	1	10.00
		Charara	3	2.60
		–do–	5	7.75
				209.85
2018-19	Ramgarh	Panjrara	1	11.80
		Ghartholi	1	50.00
		–do–	2	90.00
		–do–	3	44.85
		Takoli	4	9.00
		–do–	5	87.00
	Bangana	Sar(Arloo)	2	12.50
		–do–	3	18.60
		AuraShiv Nagar	1	2.50
		–do–	3	2.13
		Dagroon	2	2.92

		Kharol	4	2.07
				333.37
2019-20	Ramgarh	Kawari	1	14.60
		–do–	2	13.90
		Changreri	Whole	16.45
		Nurghari	Whole	3.90
		Dohak	1	38.45
		Dulehri Brahmana	Whole	12.00
		Thana Khurd	Whole	18.55
		Makrair	5	25.50
		Makrair	6	36.00
	Bangana	Bahl	2	41.10
		Bhiambi	1	24.20
				244.65
2020-21	Ramgarh	Tanda Anokha	3	4.60
		Makrair	7	54.40
		Busal	1	37.55
		Busal	2	78.10
	Bangana	Bhiambi	2	31.00
		Chatehar	3	31.25
				236.90
2021-22	Ramgarh	Busal	3	30.75
		Baral	1	10.00
		–do–	8	7.00
		Mau Khas	2	130.00
		Malonia Sanhal	Whole	10.40
	Bangana	Chatehar	1	9.00
		Sihana	3	2.25
		Thana Uperla	1	4.50
		–do–	2	2.40
		Samma	2	2.75
		Alsahan	1	20.50
				229.55
2022-23	Ramgarh	Kolka	1	28.50
		–do–	2	33.50
		Raipur	3	56.25
		Kusiala	2	21.60
		Paroian	1	16.42
		Badhwar	2	2.25
		–do–	4	17.40
	Bangana	Neri	2	7.60
		Kharota	Whole	3.50
		Padiola	2	6.75

		Dharet	1	27.10
				220.87
2023-24	Ramgarh	Lidkot	2	48.30
		Boru	Whole	10.35
		Chaukath	4	38.45
		Tiar	3	100.00
	Bangana	Dharet	2	20.90
		Dharet	3	17.80
				235.80
2024-25	Ramgarh	Kathoh	2	72.30
		Lid Kot	1	78.40
		Rachhol	3	30.00
	Bangana	Dehan	2	5.40
		Ghugal	Whole	25.65
				211.75
2025-26	Ramgarh	Chakroa	1	100.00
		Gehra	1	13.65
		Gehra	2	5.75
		Plata	2	10.25
		Ghulehar	Whole	7.40
		Ghugan Kakrana	1	40.00
	Bangana	Tadeta	1	56.00
				233.05
2026-2027	Ramgarh	Chakroa	2	70.00
		Kothi	1	110.00
	Bangana	Tadeta	2	40.00
				220.00
2027-28	Ramgarh	Kothi	2	135.20
		Ghugan Kakrana	3	56.45
	Bangana	Sasan	2	34.13
				225.78
2028-29	Ramgarh	Sakohan	3	15.45
		Gharbasra	3	2.25
		–do–	4	2.75
		Chulhari	4	99.00
		Rachhol	2	73.00
	Bangana	Saroh	1	20.20
		Basatar	1	26.00
				238.65

4.14 METHOD OF EXECUTING FELLINGS

Method ofexecuting felling has been decided in view of special objects of management of and silvicultural system prescribed. Accordingly marking/felling rules are laid down here under for guidance of the marking officer:

1. Annual coupes will be clearlymarked on the ground by following as far possible,natural features. Where natural feature are not available, coupe boundary should be marked by clearing 1.5 mwide strip all around or by erectingsmall coupe boundary pillars or by giving two while paint bands (one at dbh and one belowstump height). The Marking Officer will personally ensurethat the couple of correct areas had been laid.

2. All useless uneconomic species in all dia classes shall be marked for felling to favour extension and healthy growth of economic species like*Khair*, *Chhal*, *Shisham*, *Siris*, *Simbal*, *Jamun*, *Aisan*, Mango and *Kikar* etc. Useless uneconomic species shall be removed in the order of preference in which they have been listed below:-

- *Acacia leucopholea*(Reur)
- *Ehretia laevis*(Chamorar)
- *Erythrina suberosa*(Pariara)
- *Butea monosperma*(Dhak)
- *Zylosma longipliam*(Dhalindu)
- *Spondias mangifera*(Ambara)
- *Lannea grandis*(Kembal)
- *Cassia fistula*(Alees)
- *Limoniacrenulate*(Barnah)
- *Mallotus philippensis*(Kamal)
- *Zizyphus* spp (Ber)
- *Ficus palmata*(Dougla)
- *Diospyroscordifolia*(Bistendu or Hirak)
- *Ficus glomerata*(Umar, Gular)
- *Ficus roxburghii*(Tiambal)
- *Pyrus pashia*(Kainth)
- *Flacourtia ramontchii*(Kangu)
- *Ficus cunea*
- *Aegle marmelos* (Bill)
- *Holoptelia,integridolla* (Pardesi,Raajain)
- *Eugenia operculata* (Piamanan)
- *Casearia tomentosa*(Chilla)
- *Randia dumetorum*(Rara)
- *Cordia myxa* (Lasora)
- *Oroxylum indicum* (Tatplanga)

3. Uncultivable portion will not be marked.

4. The dead malformed and over mature trees of species enlisted under rule(2) above shall be marked for felling.
5. Trees of useless uneconomic species interfering with trees of economic species shall be marked for felling irrespective of order of removal laid under rule(2) above.
6. Green trees uneconomic species will not be marked if their removal creates a lasting gap of the size not for planting with economic species.
7. Trees of khair and chhal of 25 cm dia and up shall be marked for felling to the extent of 33 % (one tree out of every three trees)
8. The stump of *khair* and*chhal* left shouldnotbe morethan 12 cm above ground level so as to ensure production of coppice shoots.
9. The coupe area should be cleared of all bushes and weed growth, except leguminous bushes. However, *Caesalpinia sepiaria*and *Mimosa rubicaulis* are a big menace in the forests and thesemustbe eradicated despite these being leguminous bushes.
10. Formarking of uneconomic species/marking number with financial year of markingshall be clearly engraved and marking hammer affixed at stump height on downhill side of all trees down to IV class so that there areno chances of illicit fellings. Trees below IV class shall only be hammered without being listed up.
11. Fellingsmaystart by September/October but must be completed before end of February every year and coppicing of coppicers isnot impaired.
12. After completion of extraction operation, debris burning should be carried out preferablyoutside the coupearea or atleast in nallasand depression. However areas where soil is loose and of friable nature, debris burning maynot be done. While carrying outthis operation, caremust be taken that stumps are not involved in burning otherwise, field evidence of marking will be destroyed and coppicers will not coppice.
13. Trees retained during marking shall not be enlisted.

4.15 SUBSIDIARY SILVICULTURAL OPERATIONS

1. ***Closure*:** Areas gone over as per prescribed sequence of felling and cleared of debris and bushes in February shall be taken up for closure operation. Closure of area is first and foremost operation which should be carried out and completed both physically andlegally by theend of April. Closures should be got duly notified initially for 10 year. The area should be securely fenced with barbed wire fixed to

wooden posts. Barbed fences shouldbe reinforced by interlacing of thorny bushes already cut from the area. Also live hedgeshouldbe realized along the fence by using species like *Ipomea,Jatropha, Vitex* etc. If single line planting of Eucalyptus touchingfence all around iscarried out, Eucalyptus trees can grow to fence post girth in 4-5 years and can be used as lived fence posts for fixing of barbed wire which normally comes down on the ground after wooden fence posts start tumbling down due to general rot or termite attach. This will also save repeated replacement of fence posts and will reduce burden onforests for extraction offence posts.

2. ***Planting:*** Introduction of economicallymostvaluable indigenous trees species to replace inferior species and to fill up the gaps is the special object of management of this working circle. Field plantation with density below 0.3 which will be part of this working circle shall be treated intensively keeping in view area wise causes of failures in the past.

After bush cutting and slash burning during February and closure during April, stacking will be done to ensure regular pit digging at a spacing of 2.5 m x 2.5 m in staggered manner all over except under shade ofretained trees. Pits of the size 45 cm x 45 cm will be dug preferably beforeJune and thesewill be left open up to mid-June for thorough weatheringandsolar disinfection ofdug out soil and interior of pits. Beyond of June, pits will be filled up with dug out weathered soil with stones sorted out. Mixing up of suitable quantity of B.H.C with soil beforerefilling will be helpful especially ifarea has bad termiterecord. Actual planting with nursery raised plants will be started with the onset of monsoons and should be completed by the end of July by all means so that total rain during August and September is availed of by plants in the field and have the maximum possibility ofestablishing well enough totide over dry spells before next monsoons.

3. ***Choice of species:*** Site conditions existing in areas of this working circle are almostsimilar to those of Re-habilitation Working Circle except that areas of circles are better stockedand less vulnerabletoerosion. Therefore forall practical reasons, it is prescribed that economically important indigenous species of the tract asenumeratedandgiven in **Table 4.3** should begiven preference in the plantation programmes.

4. ***Nurseries:*** For assured success of plantations, one of the basic necessities israising ofsturdy nursery plants with 1.5 year old root and 0.5 year old shoot. These nursery plants should be raised in polythene bags in temporary nurseries as close to planting areas as possible. However, one big central nursery ofabout 2 ha area beraised at Tiasar, Jogi-Panga, Bihru, Behi, Bangana or Lathiani. Following tips, if kept in view, can help achieve higher survivalrate of plantation:

i) Nursery plants should be graded in the nursery itself and plants of optimum size and specifications only should becarried to planting area.

ii) To save breaking of compact bag-fill and to save disturbance to plant roots during animal/manual carriage. Carriage in baskets should be stopped infavour of carriage in wooden cases and cartons. This will be advantageous when soil in polythene bags is ofloose consistency.

iii) If nursery soil is sandy, it should be mixed with suitable quantity of clay and farm yield manure so that there is compactness in the polythene bag soil and there is no damage to plant roots during transit due to soil being sandy easy to disintegrate.

iv) Nursery plants should be watered in the nursery about 24 hours before transportation so that soil in the bag becomes dry enough to impart requisite compactness needed for safe transportation and also retention of enough moisture to sustain the plan till rain comes after planting.

v) Plants should be carriedto planting area oneday inadvance of actual planting so that plants damaged intransitdespite all precaution becomes identifiable for rejection.

vi) Compacting of soil after planting should be through to exclude all excess airso that trapped excess air does not cause mortality due to drying.

vii) Planting should be avoided if level of moisture in the pit is unfavourable. Excess moisture or absence of moisture in the pit is equally detrimental.

viii) Plants carried to planting area should be lined up neatlyin correct and erect position and under shade till these are planted.

4.16 INSPECTION PATHS

For effective and frequent inspections, suitable graded inspection paths crisscrossing the closed areas should be constructed and maintained as integral part of plantations.

4.17 WEEDING AND BUSH CUTTING

This is most important because of high incidence of grasses and bushes. There should be two weeding- one during March and second during September in first year and one weeding in September every year for the next three years. Bushes will be cut twice once in March and once in September every year till plants spring every year till the plantation is grown to minimum height of 3m and is control burnt. Cut material should be disposed by using it to reinforce barbed wire fence or by burning it safely outside the plantation area to reducefire hazards.

4.18 SEQUENCE OF PLANTING

Sequence of planting would obviously follow the prescribed sequence of felling for this circle. Areas felled in a particular year shall be closed for natural/ artificial regeneration in the succeeding year.

4.19 MAINTENANCE OF EXISTING PLANTATION

For this para 4.19 may be referred to and followed.

4.20 MISCELLANEOUS REGULATIONS

Miscellaneous regulation would include:-

i) Grazing
ii) Fire protection
iii) Exercise of rights and concessions
iv) Assessment of survey of regeneration
v) Regular posting of compartment history files
vi) Frequent inspection

All these regulation have been discussed in Chapter **13** which be referred to for the purpose.

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CHAPTER V

REHABILITATION WORKING CIRCLE

5.1 GENERAL CONSTITUTION

Areas of different working circles of thisWorking Plan under revision as are subject to severe erosion and denudation are included in this working circle. By and large, the areas allotted are refractory due to very shallow soil depth at places, rocky out crops and heavy weeds and bushes dominating as a result of excessive biotic interference. Crop density in the areas varies from blank to0.3 and natural regeneration is deficient. Total area of this working circle is 8007.93 ha out of which 657.10 ha falls in demarcated protected forests and balance 7350.83 ha in un-demarcated protected forests.

5.2 GENERAL CHARACTER OF VEGETATION

The areas allotted to this working circle are steep generally exceeding 45^0slope and are virtually devoid of any worthwhile vegetation. The incidence of weeds and bushes is quite heavy. As a net result, these areas suffered from moderate to severe erosion and denudation.

5.3 BLOCKS AND COMPARTMENTS

Numbering of forests, boundaries and nomenclature of blocks, compartments andsub-compartments in respect of DPFs included in this working circle has not been changed. As regards UPFs, these have been included in the working plan for the first time and these have been named after nearest concerned Tikas-cum-Settlement. There boundaries have settled on Tikka basis during settlement and the same have been mostly maintained as such except in case of some unwieldy forests which have been divided into compartments. Further there is considerable number of UPFs which do not exist in compact chunks but in clusters of independent chunks located close to one another and which have been treated as compartments of the UPFs concerned. Numbering of UPFs has been done in English digits and in clock-wise manner whereas numbering of DPFs as already done is in Roman digits and in clock-wise manner. Further nomenclature used for UPF compartments is the same as used for DPF compartments.

5.4 CLOSURE SERIES

Two closure series are prescribed Legal closure series for Demarcated Protected forests and Voluntary Closure series for Un-demarcated Protected Forests. Since maximum of the forests allotted to this working circle are Un-demarcated Protected Forests whose closure is prescribed on voluntary basis, it is necessary that there is thorough understanding and cordial relationship with masses so as to have their consent for voluntary closures. Not only this, it should be the endeavour of the Department to keep the closure period at the minimum possible level subject to, of course, the silvicultural requirement of the crop. Initially the closure period shall be kept as fifteen years. Depending upon the progress of regeneration/plantation, closure period can be reduced to the area open for grazing, so that hardship to the right holders is minimum possible. On the other hand, closure period can be increased if warranted bythe condition of crop.

5.5 SPECIAL OBJECTIVES OF THE MANAGEMENT

Consistent with general objects of management, these will be:-

i) To stock well and rehabilitate the forests by raising plantations of economically important local species in a phased manner.

ii) To check erosion, that has been rampant inthese areas due to their poor vegetative cover.

5.6 ANNUAL YEILD

In view of crop conditions and special objectives of management, no yield is prescribed except salvage removal which will count towards yield.

5.7 AREAS AND ALLOTMENT

Areas allotted to this working circle on the basis of compartment descriptions, stock mappings and enumeration results are tabulated below:-

Table No. 5.1

Statement of area allotted to Rehabilitation Working Circle

Abstract of Closure Series

Range	Legal	Voluntary	Total
Bangana	380.29	2280.93	2661.22
Ramgarh	276.81	5069.90	5346.71
Total	**657.10**	**7350.83**	**8007.93**

5.8 ANALYSIS AND VALUATION OF CROP

All the forests have been stock-mapped on 1:15000 metric scale and the maps posted in the concerned compartment history files. Although no yield is prescribed and accordingly no enumerations were mandatory,yet partial enumerations have been carried out in all the forests

allotted to this working circle and enumeration results posted in the concerned compartment history files so as to know the level of stocking in these forests and plan future operations. Species wise general distribution as per enumeration results is tabulated below which are quite indicative of poor stock and suggestive of necessity to rehabilitate the areas by planting etc.

Table No. 5.2

Abstract of Enumeration Result of Rehabilitation Working Circle

Closure	Area(ha)	Spp.	V	IV	III	IIA	IIB	IA	IB	IC	ID	Total	Trees per ha
Legal	657.10	Chhal	26447	7220	4244	1558	19	0	0	0	0	39488	60.09
		Aisan	3746	3990	4506	3108	3183	0	0	0	0	18533	28.20
		Shisham	357	141	38	0	0	0	0	0	0	536	0.81
		Chil	38	9	28	0	0	0	0	0	0	75	0.11
		Amla	0	0	0	0	0	0	0	0	0	0	0.00
		Simbal	0	0	0	0	0	0	0	0	0	0	0.00
		Khair	36803	9604	526	9	0	0	0	0	0	46942	71.44
		Safeda	235	516	610	620	798	0	0	0	0	2779	4.23
		TOTAL	67626	21480	9952	5295	4000	0	0	0	0	**108353**	
Total Legal Felling Series:												**108353**	
Voluntary	7350.83	Chhal	127665	79461	29512	11246	6748	4886	28116	0	0	287634	39.13
		Aisan	814	853	1163	78	0	465	0	0	0	3373	0.46
		Shisham	4499	7523	4033	1590	1629	1629	0	0	0	20903	2.84
		Chil	14465	8609	14349	8881	26836	51500	3800	0	0	128440	17.47
		Amla	0	0	0	0	0	0	0	0	0	0	0.00
		Simbal	0	0	0	0	0	0	0	0	0	0	0.00
		Khair	130768	94353	57473	194	0	0	0	0	0	282788	38.47
		Safeda	0	0	0	0	0	0	0	0	0	0	0.00
		TOTAL	278211	190799	106530	21989	35213	58480	31916	0	0	**723138**	
Total VolantaryFelling Series:												**723138**	

Closure	Area(ha)	Spp.	V	IV	III	IIA	IIB	IA	IB	IC	ID	Total	Trees per ha
	8007.93	Chhal	154113	86681	33755	12805	6767	4886	28116	0	0	327123	41.37
		Aisan	4560	4843	5670	3185	3183	465	0	0	0	21906	3.42
		Shisham	4855	7664	4071	1590	1629	1629	0	0	0	21438	2.63
		Chil	14503	8619	14377	8881	26836	51500	3800	0	0	128516	15.62
		Amla	0	0	0	0	0	0	0	0	0	0	0.00
		Simbal	0	0	0	0	0	0	0	0	0	0	0.00
		Khair	167570	103957	57998	203	0	0	0	0	0	329728	41.99
		Safeda	235	516	610	620	798	0	0	0	0	2779	0.45
		Total	345836	212280	116481	27284	39213	58480	31916	0	0	831490	105.48
Total Rehabilitation Working Circle												**831490**	**105.48**

The species wise total growing stock present in this Working Circle is tabulated below:

Table No. 5.3: Species wise GS of Rehabilitation Working Circle

S.NO.	SPECIES	NO. OF TREES	VOLUME (cum)	AVERAGE/ha (cum)
1.	Chhal	327123	228377.69	28.52
2.	Aisan	21906	24268.54	3.03
3.	Shisham	21438	11284.82	1.41
4.	Chil	128516	276725.08	34.56
5.	Amla	0	0.00	0.00
6.	Simbal	0	0.00	0.00
7.	Khair	338727	55845.86	6.97
8.	Safeda	2679	4041.62	0.50
	TOTAL	**840389**	**600543.61**	**74.99**

5.9 METHODS OF TREATMENT

Following treatment is prescribed for the forest of this Working Circle

i. ***Tending ofadvance Growth*:** Advance growth existing in the closed area shall be cleaned, pruned properly for better growth.

ii. ***Closures*:** Areas will be physically closed for soil conservation works and afforestation as per prescribed sequence of treatment given inTable 5.4 while going so, closure cases shall be culminated simultaneously to ensure that areas are not only physically but also legally closedduring first year of the closure itself.

iii. ***Soil Conservation works*:** Soil conservation measures with main thrust on vegetative measures shall be carried out in thevery first year after closure as per sequence of prescribed treatment. To make a mention of the soil conservation work measures proposed, these will include loose stone checke dams and check wall, brushwood spurs, gully plugging and wattling on slips.

iv. ***Site clearance:*** During second year ofclosure,wood/bush cutting flush to ground will be carried through out the closed areas except on the steep slopes more vulnerable to erosion where strip cutting or local bush cutting within 1 meter of pit will only be done.Leguminous weeds/ bushes will be spared in the interest of soil health and wild lifie. However, *Lantana camara, Caesalpinia sepiaria* and *Mimosa rubicaulis* shall be eradicated, stock and harrel irrespective of all consideration except for consideration of erosion. Bush cutting, collection in nalas and disposal by burning will be completed during winter so that clear closed area is readily available for planting during following monsoons.

v. ***Planting*:**After bush clearance during second year of closure, plants of economically important local namely shisham, khair, kikar, siris, jamun, mango, neem,bahera, amla and bamboo shall be planted during monsoons at a general spacing of 2.5 x 2.5m. However, no planting will be done under crown/canopy projection of existing tree/vegetation. Bamboos will be preferred along nalas for effecive check on erosion. Sowing and broad-casting may be resulted to only under compelling circumstances like stringency of funds as these may not yield the desired results for the obvious reason that areas of this working circle are generally refractory not likely to respond well to do sowing and broad casting of seed.

vi. ***Aqrostological Measures:*** Planting of local grasses preferably Bhabbar grasses will be carried out simultaneously with planting to supplement existing grasses cover to that forest flora is fully covered and protected against erosion aprt from improving grass yield of the areas.

vii. ***Nurseries:*** It is very relevant to emphasize in view of general refractory nature of areas of this working circle that firstly nurseries should be raised on site as far as possible. Secondly, plants which respond to root-shoot cutting should be first planted in beds and their root shoot cutting should be planted in polythene bags in the following witner and 1.5 year old plants raised from root-shoot cutting in polythene bag.

viii. ***Mandatory Inspection:*** Of late, a very pupose oriented and productive system of mandatory inspection of plantation as amended and circulated vide Pr.CCF, HO Shimla's technical standing order No.1/93-94 dated March 2,1994 shall be followed to ensure effective supervision and ultimate success of plantation.

ix. ***Fencing:*** Three strands barbed wire fencing shall be done around the closed area and it should be reinforced by raising vegetative live hedge consisting of species like Ipomea, Jatrofa and Vitex etc.

x. ***Inspection paths:*** For effective and frequent inspection suitable graded inspection paths cris-crossing the closed areas should be constructed and maintained.

5.10 SEQUENCE OF TREATMENT

The sequence of comprehensive treatment inclusive of plantation, soil & moisture conservation measures for the areas under this Working Circle is tabulated below:-

Table No. 5.4: Sequence of Treatment in Rehabilitaiton WC

Year of treatment		Range	No. & name of forest	No. of Comptt.	Area (ha)
For closure	For planting				
I Legal Closure Series					
2014	2015	Ramgarh	XVI Ban Dhanet	1.a	6.07
			XVI Ban Dhanet	1.b(NB)	1.6
			XVI Ban Dhanet	2.a	12.09
			XVI Ban Dhanet	2.b	6.47
		Bangana	XX Behlan	1.a	23.87
					50.10
2015	2016	Ramgarh	XVI Ban Dhanet	2.c	12.59
			XV Kariara	2.a(SB)	7.88
			XXXV Jol	1.a	16.59
		Bangana	XX Behlan	1.b	28.73
					65.79
2016	2017	Ramgarh	XV Kariara	2.c	41.68
		Bangana	XX Behlan	1.c	29.14
					70.82
2017	2018	Ramgarh	XXXV Jol	1.b	18.21

			XXXV Jol	1.c	15.78
		Bangana	XXXVII Chauli	1.a	6.07
			XXXVII Chauli	1.b	10.52
					50.58
2018	2019	Ramgarh	XV Kariara	1a(SB)	27.1
		Bangana	XII Kanura	2.c	25.95
					53.05
2019	2020	Ramgarh	XV Kariara	1b	47.55
		Bangana	XII Kanura	3.a	14.99
			XIII Dhar Solasingi & Bhiambi	1.a	29.95
					92.49
2020	2021	Ramgarh	XXX Mau	Whole	53.41
		Bangana	XIII Dhar Solasingi & Bhiambi	1.b	28.8
					82.21
2021	2022	Ramgarh	XI Tanda	1.c(SB)	1.33
			XI Tanda	2.a	21.6
			XI Tanda	3.a	10.52
		Bangana	XIII Dhar Solasingi & Bhiambi	2.b(NB)	16.89
			XIII Dhar Solasingi & Bhiambi	4.a(NB)	5.26
					55.60
2022	2023	Ramgarh	X Ramgarh Parla	1.b(NB)	19.4
			X Ramgarh Parla	1.b(SB)	12.9
		Bangana	XIII Dhar Solasingi & Bhiambi	4.a(SB)	13.77
			XIII Dhar Solasingi & Bhiambi	4.b(NB)	8.75
					54.82
2023	2024	Ramgarh	X Ramgarh Parla	2.c	43.7
		Bangana	XIII Dhar Solasingi & Bhiambi	4.b(SB)	10.46
			XIII Dhar Solasingi & Bhiambi	5.a(NB)	10.35
			XIII Dhar Solasingi & Bhiambi	5.c NB	6.24
					70.75
2024	2025	Ramgarh	XI Tanda	2.b	30.35
		Bangana	XIII Dhar Solasingi & Bhiambi	5.c SB	22.68
			XIII Dhar Solasingi & Bhiambi	6.a	18.2
					71.23
2025	2026	Ramgarh	XI Tanda	2.c	28.73
		Bangana	XLI Chaplah	Whole	14.56

			Kuthlehrian		
			XLIV Bhiambi	Whole	15.38
					58.67
2026	2027	Ramgarh	XXIII Changreri	Whole	5.26
		Bangana	XLV Sukrial	Whole	4.04
			XLVI Matoh	Whole	6.07
			XLVII Kot	Whole	4.04
					19.41
2027	2028	Ramgarh	XXVI Tihra Aglour	1b	13.75
		Bangana	XLVIII Chamiari	Whole	4.95
			XLIX Basatar	Whole	11.33
					30.03

Year of treatment		**Range**	**No. & name of forest**	**No. of Comptt.**	**Area (ha)**
For closure	**For planting**				
II Voluntary Closure Series					
2014	2015	Ramgarh	Baslehar	C.1	78.00
			Baslehar	C.3	2.30
			Talap	C.1	5.00
			Talap	C.2	4.00
			Talap	C.3	2.75
			Chouki	C.2	7.80
			Chouki	C.3	2. 80
			Pallian	C.1	48.00
			Pallian	C.2	50.00
			Pallian	C.3	43.50
			Panjora	C.1	117.70
			Panjora	C.2	2.80
		Bangana	Dhundla	Whole	30.30
			Kangroo	Whole	23.10
			Sarsoli	C.1	52.30
			Sohrla Jhikla	Whole	9.10
			Sohari	Whole	14.75
			Hatli	Whole	20.70
					512.10
2015	2016	Ramgarh	Jol	C.3	54.20
			Chhatehar	C.2	40.00
			Chhatehar	C.3	52.25

			Chhatehar	C.4	2.25
			Umari di Behar	C.2	3.20
			Mehor	Whole	10.70
			Attia	C.1	5.80
			Ramnagar	C.1	11.50
			Badoa	C.2	13.50
			Sarnoti	Whole	12.70
			Chamboa	C.1	40.35
			Chamboa	C.2	3.25
			Kherian	C.1	5.60
			Behi	C.5	2.25
			Kuru	C.1	6.75
		Bangana	Beri	WHOLE	62.50
			Jhakhola	Whole	22.20
			Amjar	Whole	23.65
			Dohag Upperli	Whole	9.00
			Bhugrain Brahmna	Whole	16.15
			Maroon	Whole	23.65
			Narhoon	C.1	4.30
					425.75
2016	2017	Ramgarh	Kuru	C.2	101.25
			Kuru	C.3	6.50
			Kuru	C.4	29.50
			Dharoon	Whole	86.00
			Ambehra RamKishana	C.1	2.90
			Ambehra RamKishana	C.2	4.90
			Ambehra RamKishana	C.3	45.00
			Bhur	C.2	40.00
		Bangana	Narhoon	C.2	3.00
			Dhantol	C.1	9.10
			Dhantol	C.2	15.00
			Dhantol	C.3	9.35
			Kosan Ranotan	C.1	2.00
			Kosan Ranotan	C.2	2.40
			Kosan Brahmna	Whole	4.50
			Kotla Khas	Whole	6.35
			Dohag Jhikli	Whole	6.30
			Naily Jhikli	Whole	4.15
			Mushali khas	Whole	43.50
			Gharoh	Whole	8.70
					430.40

2017	2018	Ramgarh	Buhana	C.5	2.25
			Thathun	C.2	7.90
			Ghaneti	Whole	3.10
			Panjrara	C.2	97.15
			Harot	Whole	149.15
			Nalwari	Whole	22.59
			Hari Nagar	C.1	9.18
			Hari Nagar	C.2	9.19
			Bilkholi	C.1	2.60
			Bilkholi	C.2	2.50
			Rachhol	C.1	60.00
		Bangana	Chaplah Garlan	C.1	5.60
			Chaplah Garlan	C.2	23.85
			Chaplah Garlan	C.4	18.20
			Bout	Whole	30.10
			Marot Brahmna	Whole	37.50
			Hatli Patialan	Whole	8.20
			Hatli Kesru	Whole	11.75
			Hatli Sultan	Whole	21.40
			Lakhroon	C.2	7.90
					530.11
2018	2019	Ramgarh	Ambe-da-Behra	Whole	30.45
			Khurwain	C.1	41.25
			Khurwain	C.2	6.00
			Boul Nichli	C.1	54.10
			Boul Nichli	C.2	2.20
			Boul Nichli	C.4	2.35
			Bihru Kalan	Whole	6.00
			Dain	C.1	8.10
			Dain	C.2	3.00
			Dohak	C.2	31.25
			Badhghar	Whole	47.95
			Madhan	Whole	11.80
			Samlara	Whole	41.00
			Aisan	Whole	34.35
			Bangana	Whole	3.30
			Talmet (Mushali)	Whole	6.15
			Sar (Arloo)	C.5	10.50
			Aura Shiv Nagar	C.2	8.00
			Dhagroon	C.1	21.70
			Chak Sar	Whole	5.00

			Kharol	C.1	12.91
			Kharol	C.2	2.08
			Sai	Whole	18.47
			Bhiambi	C.3	12.90
			Chhatehar	C.4	15.75
			Chhatehar	C.5	2.35
			Jandana	C.1	3.04
			Jandana	C.2	14.63
			Sihana	C.1	5.00
			Sihana	C.2	12.45
					474.03
2019	2020	Ramgarh	Makrair	C.1	10.80
			Makrair	C.2	15.50
			Makrair	C.3	23.06
			Makrair	C.4	47.00
			Makrair	C.8	30.20
			Makrair	C.9	21.70
			Makrair	C.10	18.20
			Tanda anokha	C.1	34.20
			Tanda anokha	C.2	38.00
			Tanda anokha	C.4	6.75
			Ludher	C.5	89.20
		Bangana	Jarola	Whole	11.60
			Jatehri	C.1	4.61
			Jatehri	C.2	7.16
			Jatehri	C.3	5.91
			Pantehri	C.2	5.98
			Kanehra	Whole	5.00
			Pakhalag	C.1	12.92
			Pakhalag	C.2	9.50
			Behrar	C.1	11.49
			Behrar	C.2	16.51
			Jagrot	Whole	2.75
			Talpi	C.1	2.80
			Talpi	C.2	3.06
					433.90
2020	2021	Ramgarh	Mau Khas	C.1	40.00
			Mau Khas	C.3	110.16
			Mau Khas	C.4	2.19
			Aghlour	Whole	9.70
			Tihra Khas	–do–	47.40

			Chhaproh Kalan	–do–	33.65
			Chhaproh Khurd	–do–	4.20
			Nargota	Whole	2.65
			Baral	C.2	4.00
			Badhwar	c.1	9.15
			–do–	C.3	9.10
			–do–	C.5	5.50
			Doh	C.1	15.40
			–do–	C.2	3.30
			Thana Khas	C.1	2.35
			Thana Khas	C.2	5.00
			Ghugan Kakrana	C.4	3.75
			Ghugan Kakrana	c.5	3.40
			Sakohan	C.1	3.90
			Sakohan	C.2	2.90
		Bangana	Thana Jhikla	Whole	8.30
			Samma	C.1	6.00
			Samma	C.3	8.00
			Rerku	Whole	21.50
			Ghaloun	Whole	21.50
			Sukrial	C.1	16.53
			Sukrial	C.2	8.17
			Chokahan	Whole	8.50
			Alsahan	C.2	30.50
			Matoh	C.1	8.44
			Sepra	Whole	6.90
					462.04
2021	2022	Ramgarh	Ghugan Kakrana	C.2	120.00
			Paned	c.1	8.20
			Paned	C.2	13.50
			Paned	C.3	2.20
			Boul Upparli	C.1	16.00
			Boul Upparli	C.2	8.00
			Boul Upparli	C.3	5.00
			Boul Upparli	C.4	10.00
		Bangana	Neri	C.1	34.10
			Padiola	C.1	9.00
			Padiola	C.3	31.50
			Kohdra	C.1	36.70
			Kohdra	C.2	45.00

			Dehan	C.1	24.60
			Dehan	C.3	13.70
			Lathiani	Whole	11.10
			Heru Khas	C.1	3.65
			Heru Khas	C.2	2.35
			Pansai	Whole	88.70
					483.30
2022	2023	Ramgarh	Samoor	C.1	86.35
			Samoor	C.2	56.00
			Tiar	C.1	79.73
			Tiar	C.2	38.60
			Ghior	Whole	9.00
		Bangana	Naloot	Whole	39.35
			Jalagran	Whole	23.65
			Dediar	C.1	30.20
			Dediar	C.2	8.60
			Karsai	Whole	6.30
			Badehar Upperla	Whole	14.85
					392.63
2023	2024	Ramgarh	Boul Upparli	C.5	7.50
			Boul Upparli	C.6	17.00
			Boul Upparli	C.7	20.00
			Chak Khurwain	Whole	40.00
			Kathoh	C.1	3.40
			Khairian	Whole	69.85
			Bahl Khalsa	C.1	62.80
			Bahl Khalsa	C.2	113.20
		Bangana	Badehar Jhigla	Whole	2.40
			Dhuggar	C.1	7.25
			Dhuggar	C.2	18.20
			Kehlwin	C.1	4.35
			Kehlwin	C.2	16.80
			Kehlwin	C.3	2.55
			Tiassar	C.1	30.00
			Tiassar	C.2	6.00
					421.30
2024	2025	Ramgarh	Bahl Khalsa	C.3	210.80
			Bahl Khalsa	C.4	171.40
		Bangana	Tiassar	C.3	9.75
			Tiassar	C.4	5.00
			Turkall Upperli	Whole	4.35

			Banjal	C.1	8.75
			Banjal	C.2	3.50
			Banjal	C.3	4.25
			Banjal	C.4	9.15
			Ghatti	Whole	17.40
			Sasan	C.1	2.20
			Sar (Dhanet)	Whole	58.20
					504.75
2025	2026	Ramgarh	Bahl Khalsa	C.5	15.75
			Bahl Khalsa	C.6	4.50
			Gharbasra	C.1	18.40
			Gharbasra	C.2	6.70
			Gharbasra	C.5	4.85
			Gharbasra	C.6	6.75
			Gharbasra	C.7	58.75
			Chulhari	C.1	72.75
			Chulhari	c.2	6.75
			Chulhari	C.3	37.10
			Changar	C.1	112.90
		Bangana	Kheri	Whole	24.00
			Rachhoh	C.2	35.50
			Daroh	C.2	23.10
			Sukhnehra	Whole	24.10
			Chamiari	C.1	4.25
			Chamiari	C.2	9.20
			Talmet (Dhanet)	C.1	60.95
			Talmet (Dhanet)	C.2	10.00
					536.30
2026	2027	Ramgarh	Changar	C.2	156.40
			Changar	c.3	13.50
			Changar	c.4	2.25
			Changar	C.5	42.75
			Tanda	C.1	158.00
			Tanda	C.2	170.00
			Changar	C.6	3.40
			Changar	C.7	4.30
		Bangana	Basatar	C.2	20.00
			Chaplah Kutlehrian	C.1	47.20
			Chaplah Kutlehrian	C.2	2.25
			Chaplah Kutlehrian	C.3	40.50
			Chaplah Kutlehrian	C.4	5.95

			Berian	C.1	2.20
			Berian	C.2	2.85
			Bharmar	C.1	2.20
			Bhaloun	C.1	38.25
			Bhaloun	C.2	2.15
					714.15
2027	2028	Ramgarh	Changar	C.8	45.00
			Changar	C.9	2.25
			Changar	C.10	9.00
			Changar	C.11	2.25
			Lid Kot	C.3	54.75
			Jagat Khana	C.1	15.00
			Jagat Khana	C.2	11.42
			Chukath	C.2	9.25
			Chukath	C.3	5.30
			Tanda	C.3	152.50
			Androli	Whole	26.10
			Kusiala	C.1	14.70
			–do–	C.4	35.70
			Matehti	Whole	9.47
			Paroian	C.2	24.70
		Bangana	Bhaloun	C.3	22.50
			Bhaloun	C.4	11.25
			Baduha	Whole	5.40
			Baderah	C.1	12.60
			Baderah	C.3	3.60
			Behi	C.1	70.00
			Tokrian	Whole	5.25
			Krishna Nagar	C.1	14.95
			Krishna Nagar	C.2	13.00
			Krishna Nagar	C.3	5.60
			Chauli	Whole	6.17
					587.71

5.11 CHOICE OF SPECIES

The introduction of indigenous and most economically valuable trees species by planting will be main plank of management in this working circle.

Ecologically it is not possible to raise Khair artificially every where and it would be difficult to add Khair to anysizeable extent in these areas over and above its existing proportion in the crop. As such, other species will also be introduced depending upon

existing type of vegetaton, its ecological status, composition of existing crop, locality factors and above all what can be practically achieved under the circumstances. Other species considered suitable for introduction are Chil, Shisham, Chhal , bamboos(in moist and sheltered localities) Aisan, Simbal, Bahera,Siris, Beul for fodder, Tooni,Jamun,Mango,Kikar and neem for the areas lying at the foot hills. Each of the above mentioned species have assumed more economic value with the diversification of usage for forest produces such as packing cases, hard wood industry, veneering etc. apart from the conventional usage. It would be desirable to concentrate on indigenous species ratherthan to bring in exotic one like Eucalyptus, Nursery technology for all prescribed indigenous species stands standardized and the same be followed. Following general guidelines are laid down for planting in the field.

i) ***Khair, Kikar and Amla:*** It should be planted on deep soil on lower half of the slopes where it can be put on reasonably good growth and shouldnot be planted on sites with shallow soil and on top of ridges.

ii) ***Bamboos:*** More valuable species of bamboos should be introduced along nallas at suitable sites.

iii) ***Shisham*****:** It should be planted in depressions in the foot hills.It has come up well in over grazed UndemarcatedProtectedForests and Chil zone at places.

iv) ***Grasses:***Local grasses should be introduced along the contour lines after removing lantana & other invasive alien species.

5.12 SUBSIDIARY SILVICULTURAL OPERATIONS

The subsidiary operations for the maintenance of soil conservation works and maintenance tending of plantation are given below:

i) ***Maintenance of Engineering Structures*****:** Engineering structures prscribed under method of treatment shall be repaired without lose of time as neglected of damage works may result incomplete damage apart from adding tremendously to the cost of repairs.

ii) ***Weeding:*** Two weeding in the first year in late in Aug. and Sep.shall be carried out. In the secnod and third year, one weeding only shall be done in July/August.

iii) ***Beating up of failures:*** Beating up of failures should be done for two years after the planting.

iv) ***Bush-cutting:*** Bush cutting with in one meter of the plant once in second year and one in third year shall be carried out to keep the plants free of superession.

v) ***Fence repairs:*** Effective closureis the essence ofa closure. Accordingly no breach in the fence should be tolerated.

vi) ***Plantation Record*****:** Plantation Journals will be maintained for each plantation area on the standard form prescribed for the purpose.

a) Plantationboard should be put up at prominent plances in each and every plantation area showing name of plantation area in hactares,year of formation and the scheme under which formed.

b) Mandatory inspection of plantations has been prescribed under para 5.12 above. Inspecting officer should ensure to record their observation and write meaningful inspection notes on the plantation area every time visit and such Inspection notes should be incorporated in plantation journals.

vii) ***Cleaning and thinning*****:** Depending upon the progress of plantaion and the necessity for cleaning/thining with passage oftime, DFO(T) will ensure to carryout the same to save un-healthy and counter-productive competition.

viii) ***Climber cutting and pruning*:** Climber cutting and pruning should be carried out in every plantation are once in the firty year of closure. No sequence ofclimber cutting and pruning needs to be prescribed in view of sequence of treatment which may help determine plantation due for this operation in the fifth yearof treatment/closure.

ix) ***Grazing and Grass cutting:*** All plantation areas shall remain strictly closed for grazing for entire closure period. No grass cutting should be allowed subject to following conditions only:

(a) It will be permitted at the discretion of the Divisional Forest Officer,who will consider it only on written recommendations based on personal inspection of concerned Range Officer.

(b) When permitted, it will be allowed to be cut not in piece-meal for say today's requirementbut in the shortest possible period after it is dry for winter consumption so that Forest Guardconcerned is in a position to supervise the mass grass cutting operation.

(c) Area will be divided into widthdepending upon thenumber of right-holders concerned and allotment will be made by draw of lots.

(d) Right-holders shall be bound to locate young plants concerned under grass and cut grass within 1 meter of every plant before starting grass cutting. This will save the plants from being cut alongwith grass.

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CHAPTER VI

KHAIR (OVERLAPPING) WORKING CIRCLE

6.1 CONSTITUTION AND GENERAL CHARACTER OF VEGETATION

The area of this working circle is 8788.60 ha. This working circle overlaps Chil Working Circle, Bamboo Working Circle and Scrub Working Circle. The quality of khair of the area is good with trees growing to a height of 10 mtrs and DBH 25 cm without developing any rot or hollowness. Natural regeneration of khair is sufficient.

6.2 SPECIAL OBJECTS OF MANAGEMENT

There are two broad objects of managing khair in this working circle:-

6.2.1 To harvest mature and over mature khair trees growing sporadically or in small clusters which are not feasible to be worked in concentrated manner.

6.2.2 To increase the proportion of khair in suitable localities through suitable tending of natural crop and also carrying out of planting of khair in appropriate locations.

6.3 ENUMERATION

Total enumerations in 5 cm diameter classes down to 10 cm dbh have been carried outin PB I areas. In PB Unallotted areas, 40% random sampling was done and complete enumeration in 5 cm dia classes down to 10 cm dbh was carried out in the randomly selected compartments. In all ten compartments were randomly selected and total enumeration was done. The results of theswe enumerations were proportionately enhanced to get estimated number of khair trees. Thus the assessment of khair stock in PB I areas is exact where as in PB Unallotted areas its estimation should be fairly accurate.

Table No. 6.1: Khair GS in various Working Circles

Dia Classes	Chil WC	Bamboo WC	Scrub WC	Total
10-15	27419	3458	150925	**181802**
15-20	21673	4189	99951	**125813**
20-25	13211	2740	46167	**62118**
25-30	8226	2351	16158	**26735**
30-35	4365	724	6084	**11173**
35-40	2290	711	1387	**4388**
40-45	63	55	697	**815**

45-50	0	20	47	**67**
	77247	**14248**	**321416**	412911

Table No.6.2 – Results of enumerations in Khair Overlapping WC

Diameter	Class	No. of trees
10-20	V	307615
20-30	IV	88853
30-40	III	15561
40&above	IIA	882
	IIB	0
	IA	0
	IB	0
	Total	**412911**

6.4 ANALYSIS AND VALUATION OF CROP

The stock maps prepared for Chil Forests show the proportion of khair by horizontal andvertical hatches. The horizontal hatches indicated the percentage of khair mixture with chil between 25% to 50%, whereas the vertical hatches indicate the percentage of khair in mixture of chil below 25%.

6.5 SILVICULTURAL SYSTEM

Khair will be harvested under selection system. Cleaning and singling of young coppice shoots will be carried out.

6.6 ROTATION & EXPLOITABLE DIAMETER

The rotation period will be 30 years during which the exploitable diameter of 20 cm at breast height will be achieved.

6.7 FELLING CYCLE

The felling cycle of 15 years has been adopted. The felling programme has been framed so as to avoid overlapping with the Mauzas open for felling less than 10 year felling programme of private areas.

6.8 CALCULATION OF YIELD

The yield by number of selection trees has been calculated by Brandis Method as under:

Table No.6.3 – Number of Selection Trees as calculated by Brandis Method

Diameter class (cms)	No. of trees enumerated	Total age as entering class	Years taken losing the class	Survival co-efficient	No. of exploitable trees

20 & over	105296	33	--	72%	75813
15-20	125813	22	11	50%	62907
10-15	181802	14	8	34%	61813

The annual yield is fixed by the number of trees as under –

Yield	(Average number of trees reaching exploitable size annually) + (a fraction of surplus number trees of over the exploitable diameter),
During 1st 11 years of plan period	**i)** All trees of 15-20 cm class will enter into 20 cm and over class and during the remaining 4 years of plan period **ii)** During the remaining 4 years of plan period, $\frac{4}{11}^{th}$ of 10-15 cm class will also pass on to 20 cm dia and above
Total annual recruitment in 15 years period	$62907 + \left(\frac{4}{11} * 61813\right) = 85385\ trees$
Average Annual Increment	$\frac{85385}{15} = 5692\ trees$
For harvesting 5692 trees in 15 years of working plan period	$5692 * \frac{15}{2} = 42690$ trees of 20 cm and over, working stock of trees is required
Availability of 20 cm and over dia classes	75813 trees
Surplus in working stock	33123 trees
Annual removal of surplus stock	$\frac{33123}{15} = 2208$ trees
Total annual period	$5692 + 2208 = 7900$ trees
Total trees to felled during plan period upto 31-3-2027	$7900 * 15 = 118500$ trees

6.9 METHODS OF EXECUTING FELLINGS

6.9.1 All khair trees above 20 cm d.b.h. will be marked except those removal of which may cause soil erosion or permanent gap.

6.9.2 All dead, dry and fallen trees will be marked.

No uprooting or chipping of stumps will be allowed and the stumps left should not be more than 15 cm. above the ground level so as to ensure production of coppice shoots, however, in addition, the retention of number embossed on the low hill side will be ensure. The fellings must be completed by the end of February every year.

6.10 CONTROL OF YIELD

The yield will be prescribed by area and controlled by the number of khair trees subject to the availability of trees of exploitable diameter. The area will be gone over as per prescription. The khair trees, marked in salvage, which have the d.b.h. less than the exploitable diameter, should not be taken into account for the purpose of control of yield by numbers. However such number of trees removed under salvage will be indicated in the control forms separately.

At the time of five yearly review of working plan if the yield exceeds + 10% further fellings should be deferred till the deviation comes within this limit.

6.11 SEQUENCE OF FELLINGS

The sequence of felling for the areas of this working circle has been prepared in such a manner that no overlapping of prescribed areas occurs with the mauzas/ tikas due for felling under 10 year felling programme of private areas so that effective control over this menace of illicit felling in forests adjoining private areas is exercised. The following table gives the sequence of fellings:-

Table No.6.4 Sequence of Felling

Year	Range	Name of Forest	Comptt.	Area(ha)	Mauza
2014-15	Bangana	DPF Kanura	C1	17.89	Heru
		-do-	C1b	18.65	-do-
		-do-	C1c(NB)	10.55	-do-
		-do-	C1c(SB)	4.82	-do-
		DPF.Sari	Whole	8.94	Arloo
		UPF Bharmout	Whole	50.75	-do-
		UPF Hathloun	Whole	34.75	Muchhali
		DPF SarkaruGhorplani	C1a	29,93	Kharrelta
		-do-	C1b	30.34	-do-
		-do-	C1c	40.26	-do-
		DPF.Paniala	C1c	30.75	Heru
		-do-	C1a	41.32	-do-
	Ramgarh	UPF Rachhol	C2	73.00	Moh Khas
		UP Kathoh	C2	135.20	-do-
		UP Moh Khas	C2	130.10	-do-
2015-16		UPF Makrer	C6	36.00	-do-
		UP Kathoh	C2	72.30	-do-
		UP Kowari	C2	13.90	-do-
		UPF Daleri Brahmna	Whole	12.00	-do-
		UPF Kolka	C1	28.50	Kolka
		-do-	C2	35.50	-do-
		UPF Kushial	C3	21.60	-do-
		UPFRaipur	C3	56.25	Raipur
	Bangana	DPF Paniala	C1b	36.01	Heru
		-do-	C2a	27.92	-do-

		-do-	C2b(NB)	8.85	Dhugli
		-do-	C2b(SB)	17.85	-do-
		-do-	C2c	27.11	-do-
		DPF Sarkaru Ghoprplani	C2a	17.82	Kharelta
		-do-	C2b	30.33	-do-
		-do-	C2c	21.20	-do-
		UPF Tereta	C1	56.00	Heru
		-do-	C2	40.00	-do-
2016-17	Bangana	DPF Oel da Ban	C1a	12.54	Arloo
		-do-	C1c(WB)	7.68	-do-
		-do-	C1d	13.75	-do-
		UPF Rachhoh	C1	40.00	Dhar Chamukha
		DPF Solasingi Bhiambi	C6c	13.75	Muchhali
		-do-	C6b	20.63	-do-
		DPF.Kanura	C2a	14.99	Heru
		-do-	C2b	22.60	-do-
		-do-	C2c	25.99	-do-
		UPF Nahri Devi Singh	C2	22.07	Arloo
		UPF Badrah	C2	24.15	Beh
		UPF Basatar	C1	26.00	Dhar Chamukha
		UPF Droh	C2	23.10	-do-
		UPF Saroh	C1	20.20	-do-
		-do-	C2	27.00	-do-
	Ramgarh	UPF Lidkot	C1	78.40	Churan
		UPF Chuhardi	C4	99.00	-do-
		UPF Busal	C1	37.55	Bihru
		-do-	C2	78.10	-do-
2017-18	Ramgarh	UPF Busal	C3	30.75	Bihru
		UPF Sakoun	C3	15.45	-do-
2018-19	Ramgarh	UPF Katoh	C1	110.00	Moh Khas
		UPF Makrer	C5	25.50	-do-
		-do-	C7	54.40	-do-
		UP Malona Sanal	Whole	10.40	Sarohal
		UPF Takoli	C3	86.00	Takoli
		UPF Amroh	C1	14.70	Moh Maniar
		-do-	C2	73.30	-do-
		UPF Rachhol	C3	30.00	-do-
	Bangana	UPF Lakhroon	C1	59.20	Muchhali
		DPF Solasingi Bhiambi	C1c	30.35	Kotla
		-do-	C2a(NB)	12.98	-do-
		-do-	C2a(SB)	10.55	-do-
		-do-	C2b(SB)	4.55	-do-
		UPF Krishna Nagar	C4	2.90	Beh
		-do-	C5	8.80	-do-
		UPF Sasan	C2	34.13	Heru
		UPF Malanagar Brahmnan	Whole	26.80	Kotla
		UPF Nari	C2	7.60	Dhungli
		UPF Dharet	C1	25.00	-do-
		-do-	C2	20.90	-do-

		DPF Kanura	C3a	24.95	Heru
		-do-	C3b	14.58	-do-
		-do-	C3c	11.75	-do-
2019-20	Bangana	UPF Deehar	C1	4.00	Kharelta
		-do-	C2	39.00	-do-
		-do-	C3	32.00	-do-
		UPF Awahar	Whole	12.75	Kotla
		UPF Saroh	C3	25.00	Dhar Chamukha
		DPF Akoi Di Dhar	C1a	29.93	Beh
		DPF Chhatehr	Whole	22.66	Dhar Chamukha
		UPF Charara	C1	10.60	-do-
		UPF Samma	C2	2.75	-do-
		UPF Bhiambi	C1	24.20	-do-
	Ramgarh	UPF Tiar	C3	100.00	Moh Maniar
		UPF Kowari	C1	14.60	-do-
		UPF Sanal	Whole	10.40	Sanal
		UPF Chaugath	C4	38.45	Chouri
		UPF Gharwasra	C4	2.75	-do-
2020-21	Ramgarh	UPF Lidkot	C2	48.30	Choori
		UPF Bihroo	C1	35.55	Bihroo
		UPF Balh	C1	41.10	Chaplah
		UPF Khurwain	C2	18.00	Moh Maniar
		-do-	C3	19.65	-do-
		UPF Ambehra Ramkishna	C4	35.00	Amroh
		UPF Ambehra Dheeraj	Whole	64.72	-do-
		UPF Dumkhar	C1	17.00	Dhanet
		UPF Attia	C2	29.10	Amroh
	Bangana	UPF Chhatehr	C3	31.25	Dhar Chamukha
		UPF Nanawin	C2	7.40	Kotla
		UPF Alsan	C1	20.50	Dhar Chamukha
		UPF Karor Rajputan	C1	19.10	Arloo
		UPF Chabrani	Whole	3.90	Muchhali
		UPF Paproli	C1	5.11	Arloo
		UPF Karor Brahmna	C2	4.50	-do-
		UPF Ramnagar	C2	22.10	Beh
2021-22	Bangana	UPF Bharmar	C2	4.75	Beh
		DPF Chaplah Garlan	Whole	5.26	Dhanet
		UPF Padiola	C2	6.75	Dhungli
		DPF Akoi di Dhar	C1b(NB)	27.16	Beh
		DPF Paniala	C3a(NB)	5.65	Dhungli
		-do-	C3a(SB)	26.72	-do-
		UPF Dehan	C2	5.40	-do-
		UPF Damoor	Whole	12.90	Muchhali
		UPF Chaplah Garlan	C3	5.35	Dhanet
	Ramgarh	UPF Bhagnal	C1	69.60	Amroh
		-do-	C2	51.00	-do-

		UPF Kukhera Rajputan	Whole	63.82	-do-
		UPF Jol	C2	50.00	Chowki
		UPF Guler	Whole	7.40	-do-
		UPF Nughradi	Whole	3.90	Thana Kalan
		UPF Thana Khurd	Whole	18.55	-do-
		UPF Takoli	C1	5.18	Takoli
2022-23	Ramgarh	UPF Takoli	C2	2.21	Takoli
	-do-	-do-	C4	9.00	-do-
		-do-	C5	87.00	-do-
		UPF Kaint	C1	37.00	Chowki
		-do-	C2	60.00	-do-
		UPF Chowki	C1	31.35	-do-
		UPF Plata	C1	39.00	Amroh
		-do-	C2	10.25	-do-
		UPF Badoa	C1	32.55	Behi
	Bangana	UPF Chhatehar	C2	17.60	Dhar Chamukha
		UPF Tanda Uperla	C1	4.50	-do-
		UPF Bhiambi	C2	31.00	-do-
		DPF Solasingi Bhiambi	C3b(NB)	11.37	Kotla
		-do-	C3a	17.80	-do-
2023-24	Bangana	DPF Solasingi Bhiambi	C3c(NB)	15.39	-do-
		UPF Sar	C1	20.50	Arloo
		DPF Deehar	C4	45.00	Kharelta
		DPF Sarkaru Ghorplani	C3a	7.27	-do-
	Ramgarh	UPF Ludher	C1	64.10	Moh Maniar
		-do-	C2	49.30	-do-
		-do-	C3	64.20	-do-
		-do-	C4	42.20	-do-
		UPF Changredi	Whole	16.45	Mandli
		UPF Chukath	C1	19.10	Chukath
		UPF Gharwasra	C3	2.25	-do-
		UPF Jwalapur	Whole	10.00	Kolka
		UPF Tanda Anokha	C3	4.60	Tanda
2024-25	Ramgarh	DPF Ramgarh Parla	C1a	38.84	Tanda
		-do-	C2a(NB)	22.27	-do-
		-do-	C1c	37.23	-do-
		DPF Kariara	C2c	41.68	Dhanet
		-do-	C1c	40.46	-do-
		-do-	C1a SB	27.10	-do-
		DPF Ramgarh Awarla	C7c	50.80	Tanda
		-do-	C7b	49.94	-do-
		DPF Ramgarh	C1a	38.84	-do-
2025-26	Ramgarh	DPF Ramgarh Parla	C1c	37.23	Tanda
	Bangana	DPF Sarkaru Ghorplani	C2d	16.58	Kharelta
		-do-	C5d	11.32	Arloo
		UPF Sar	C2	12.50	-do-
		DPF Solasingi Bhambi	C3(SB)	5.25	Kotla
		-do-	C5b NB	3.62	Muchhali
		DPF Paniala	C3b	28.32	Dhungli
2026-27	Bangana	DPF Solasingi Bhiambi	C4c	19.82	Muchhali

		-do-	C5b	25.89	-do-
		UPF Sar	C3	18.60	Arloo
		DPF Sarkaru Ghorplani	C3b	14.97	Kharelta
		-do-	C5c	21.28	Arloo
	Ramgarh	DPF Chowki Maniar	C1a	36.05	Chowki
		-do-	C1b	41.66	-do-
		-do-	C1c	44.50	-do-
		DPF Charoli	C1b	6.80	Behi
		-do-	C1d	8.19	-do-
		DPF Busal	C1a	4.40	Chaplah
		-do-	C1b	4.85	-do-
		-do-	C1c	4.05	-do-
		DPF Dohak	C1	38.45	Kolka
		DPF Tihra Aghlour	C1a	12.15	Chaplah
		DPF Bihroo	C1a	26.57	Bihroo
		-do-	C1b	48.96	-do-
		-do-	C1c	19.83	-do-
		-do-	C2a	14.97	-do-
		-do-	C2b	52.61	-do-
		-do-	C2c	37.23	-do-
		DPF Thapal	C2a	27.54	Paroian
		-do-	C3b	45.72	-do-
2027-28	Ramgarh	-do-	C2b	23.06	-do-
		DPF Ramgarh Parla	C2a SB	17.81	Tanda
		-do-	C2b	19.47	-do-
		DPF Dhiunsar	C4c	29.55	Behi
		DPF Ramgarh Awarla	C6a NB	16.65	Tanda
	Ramgarh	-do-	C6a NB	25.43	-do-
	Ramgarh	DPF Ramgarh Awarla	C8b	17.41	Tanda
		-do-	C8a	23.47	-do-
		-do-	C6b SB	12.49	-do-
		-do-	C8c	19.49	-do-
		DPF Tanda Bagwan	C1b	21.45	-do-
		DPF Tanda	C1a	20.63	-do-
		-do-	C1c NB	22.99	-do-
	Bangana	UPFSar	C4	43.40	Arloo
		UPF Rajpura	C1	2.80	Kharelta
		-do-	C2	10.00	-do-
		DPF Sarkaru Ghorplani	C3c	10,=.21	-do-
		-do-	C3d	9.76	-do-
		-do-	C4d	20.63	Arloo

6.12 SUBSIDIARY SILVICULTURAL OPERATIONS

This working circle is for the exploitation of existing Khair. The coppice shoots will be protected so far as practicable and cleaned by retaining 2-3 vigorous healthy shoots. The main objectives of management of such areas are as given under Chil Working Circle. Khair (over lapping) working circle has been constituted only to harvest

mature khair trees. However, khair being economic species, the cleaning and singling of shoots coming out of the stumps of felled khair trees should be done effectively.

6.13 PLANTATION

The following areas of Scrub Working Circle will be planted with khair during the plan period:-

Year	Range	Name of Forest	Comptt. No.	Total area In ha.	Area proposed for planting (in ha.)
2014-15	Bangana	UPF Hathlaun	Whole	34.75	5.00
	Ramgarh	UPF Kathoh	C.2	72.30	5.00
2015-16	Bangana	UPF Tureta	C.2	40.00	5.00
	Ramgarh	UPF Lidkot	C.1	78.40	5.00
2016-17	Bangana	DPF Kanura	C2b	22.60	5.00
	Ramgarh	UPF Amroh	C2	73.30	5.00
2017-18	Bangana	UPF Basatar	C.1	26.00	5.00
	Ramgarh	UPF Tiar	C.3	100.00	5.00
2018-19	Bangana	UPF Bhiambi	Whole	24.20	5.00
	Ramgarh	UPF Balh	C.1	41.10	5.00
2019-20	Bangana	UPF Ramnagar	C.2	22.10	5.00
	Ramgarh	UPF Bhagnal	C.1	69.60	5.00
2020-21	Bangana	UPF Bharmout	C.2	4.75	4.00
	Ramgarh	UPF Takoli	C.5	87.00	5.00
2021-22	Bangana	UPF ThanaUperla	C.1	4.50	2.00
	Ramgarh	UPF Luder	C.2	49.30	5.00
2022-23	Bangana	DPF Solasingi	C3b	15.39	3.00
	Ramgarh	DPF Kariara	C2c	41.68	5.00
2023-24	Ramgarh	DPF Bohru	C2b	52.61	10.00
	Bangana	DPF Solalsingi	C5b	25.89	5.00
2024-25	Ramgarh	DPF Tanda	C1a	20.63	5.00
	Ramgarh	DPF Kariara	C2b	41.69	10.00
	Bangana	DPF Bharmout	C1a	6.88	5.00
2025-26	Ramgarh	DPF Dhiunsar	C2b	20.63	5.00
	Bangana	DPF Bharmout	C1b	10.12	3.00
2026-27	Ramgarh	DPF Ramgarh Awarla	C3a SB	39.30	5.00
	Bangana	DPF Bharmout	C1c	6.68	2.00
2027-28	Ramgarh	DPF Dhiunsar	C2d	21.08	5.00
	Bangana	UPF Takoli	C1	9.00	3.00

CHAPTER VII

PLANTATION (OVERLAPPING)WORKING CIRCLE

7.1 GENERAL CONSTITUTION:

Human population has increased manifold and is further increasing day by day. Their requirements for fuel-wood, fodder, timber, NWFP and water has also increased manifold thereby putting pressure on traditional forests which in turn are degrading day by day. Now, time has come when each and every corner of earth (land) is put to use economically as per land capabilities. The owner is using private lands optimally as per present available technology and its requirements. Farm technology is improving very fast with the opening of the area with the market and future seems very bright. Whereas, use of Forestland/Govt. land is not improving with the passage of time and is rather deteriorating miserably due to indifferent attitude of Government machinery. Scope of improving use of Govt. forests/ Govt. land is magnificent. Approximate 8 thousand hectare forestland in the form of mostly UPFs is in much depleted condition. These are situated either near habitations or are steep slopes and big blanks forming buffer zone in between DPFs/well vegetated lands. The Forest cover have been thinned drastically and reduced to minimum. Status of land is also a controversy between Forest Department and the Revenue Department on one side and between public on the other. Understandings are also different and concerns are also not matching. Fact remains that vast track remain unutilized.

General Constitution:

7.1.1 This Working Circle is overlapping and comprises the areas of Rehabilitation and Scrub Working Circles as these carry young crops, which need further protection, or are devoid of any tree growth, or carry open crops. Only specific areas have been included in this working circle, where site factors are favorable for raising successful plantations and closures are possible and also in view of the fact that not more than one

third area of a forest can be closed at a time and where the resultant plantation will be economically viable.

7.1.2 The details of the forests allotted to this Working Circle are given in Appendix. Total area of the working circle is **12660.98** ha.

7.2 General Character of vegetation:

Since the forests assigned to this working circle are situated in different altitudinal zone, therefore, the vegetation varies. The following types of these forests are included in this working circle: -

1. Northern Tropical Dry Mixed Deciduous Forests (Type SB/C-2)
2. Dry Deciduous Scrub Forests (Type SB/C2/DS1)
3. Himalayan sub tropical Pine Forests (Type 1c1a)

These forests have been described in details in Chapter II, Part-I. Detailed descriptions are given in the concerned compartment history files.

7.3 Blocks and Compartments:

The forests as per allotment in Rehabilitation Working Circle are taken as it is for this working Circle

7.4 Special objects of Management:

1. To manage the degraded, sparsely stocked and blank forests on scientific basis to increase the area under forest cover, thereby, reducing the pressure on traditional forests.
2. To augment the resources of timber, fodder and fire wood, to meet the increasing demand of local people in the vicinity of these forests.
3. To check denudation and soil erosion.
4. To raise compact plantation to make available raw material for wood based industries
5. To rehabilitate degraded areas by planting fodder trees and high yielding varieties of grasses.
6. To increase tree cover of valuable species so as to increase supply of fuel-wood and fodder to meet with demand of local community.
7. To increase employment opportunities (wage earning) to rural man folk.

8. To make people aware about better management of forest resources and to inculcate habit of tree planting among the masses.
9. To train staff and labour regarding planting techniques and also that of nursery techniques.

7.5 Plantation series:

There will be only one plantation series, the division being the unit for the purpose of control.

7.6 Area Statement:

The range wise distribution of areas as under:

Table 7.1: Range wise distribution of DPFs and UPFs

Name of Range	Area in ha.		
	DPF	UPF	Total
Bangana	1716.06	3920.28	5636.34
Ramgarh	2674.72	8485.47	11160.19
Total	**4390.78**	**12405.75**	**16796.53**

Complete enumerations were not considered necessary and hence were not carried out. However, estimation through various methods of samplings were made by deputing staff of Ramgarh and Bangana Forest Ranges except few forests where complete enumeration was carried out at random to know growing stock.

7.7 Silvicultural system:

As the main objective is to raise plantations, no silvicultural system is prescribed. The plantations will be raised by artificial means. However, as and when plantations are established, areas as per crop composition will be allotted to respective working circles in next working plans.

7.8 Rotation:

There is no need for prescribing rotation at this stage.

7.9 Choice of species:

The choice of species depends on the various factors, such as climatic, edaphic, topographic and biotic but the surviving indigenous species give a clear indication of the most suitable species. Since most of areas included in this working circle are situated at lower elevation, therefore, preference should be given to indigenous, fast growing, hardy,

species which can survive under the adverse conditions of the locality. Sincere and strenuous efforts should be made to bring the blank areas under forest cover as early as possible. A forester should follow the nature rather than compelling the nature to follow him. So, it is advisable to start with the hardy, species that occur in the earlier stages of succession.

7.9.1 The success of plantation works depends on the choice of species. The correct choice of species would give productive and praise worthy results where as wrong choice of species always brings adverse publicity for the forester. In short, adequate care must be taken while selecting the species to be planted keeping in view the land capability, terrain and the demands of the local people.

7.9.2 The species to be planted in different areas are suggested in **Para 7.12,** the suggestions are not exhaustive and may be changed by the Divisional Forest Officer if need arises with the experience of rising of plantations.

7.10 Plantation Programme:

In order to cover up the blank areas expeditiously, the maximum areas have been suggested to be taken up during the initial years of working plan period. Soil Conservation works has also been prescribed along with afforestation measures wherever necessary. The detailed plantation programme for the working plan period of **14** years is given as under in **Table7.2.**

7.11 Plantation Technique:

7.11.1 The technique of raising plantations of various conifers and broad leaved species are by now well established and need no elaborate discussion, however general principles are given below for the guidance for the field staff.

7.11.2 **Site Selection**: Specific sites have been suggested and location of plantations is also indicating in the other statement. However, if the deviation is absolute necessary, the Divisional Forest Officer can do some changes after spot inspections.

Table 7.2: Plantation programme during the Plan Period in Plantation (Overlapping) Circle

Name of Forest/ Compartment.	Area in ha	Spp.	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
Bangana Range																		
Paniala C-1a	41.32	BL	5	0	5	0	5	0	5	0	0	5	0	0	0	0	5	30
Paniala C 1b	36.01	BL	0	0	0	0	5	5	0	0	0	0	0	5	0	0	0	15
Paniala C1c	30.75	BL	0	5	0	0	5	0	0	0	5	0	0	0	0	0	5	20
Paniala C3 c	36.82	BL	5	0	0	0	0	0	5	0	5	0	0	0	0	0	0	15
SolaSingi Bhiambi C1	30.35	BL	0	5	0	0	0	0	5	0	0	0	0	0	0	5	0	15
UPF Kohdra C1	36.70	BL	0	5	0	0	0	0	5	0	0	0	0	0	0	5	0	15
UPF Kohdra C2	45.00	BL	0	5	0	4	0	5	0	5	0	0	0	5	0	0	0	24
Padiala C3	31.50	BL	0	5	0	0	0	0	5	0	0	0	0	0	0	5	0	15
Pansai Whole	88.70	BL	3	3	0	5	0	5	2	0	5	0	5	5	5	5	3	46
Naloot Whole	39.35	BL	0	0	5	0	0	0	0	0	5	0	0	0	0	5	0	15
Rachoh C2	35.50	BL	0	0	0	5	0	5	0	0	0	0	5	0	0	0	0	15
Badyar C1	30.20	BL	2	4	0	0	0	3	0	0	0	0	0	0	0	0	2	11
Sasan C2	34.13	BL	0	0	5	0	0	0	0	5	0	0	0	5	0	0	0	15
Turata C1	56.00	BL	0	3	0	0	5	0	0	0	5	0	0	5	5	0	0	23
Turata C2	40.00	BL	5	0	0	3	0	0	2	0	5	0	0	0	5	0	0	20
Sarsoli C1	52.30	BL	0	5	0	0	5	2	0	0	5	0	0	5	5	0	0	27
Nanawin C1	74.75	Bl	0	5	0	5	0	0	4	0	5	0	5	0	5	0	2	31
Dhundla Whole	38.30	BL	5	0	3	0	0	5	0	0	0	5	0	0	0	0	0	18
Beri Whole	62.50	BL	0	0	5	0	5	0	0	0	5	0	5	5	0	0	4	29
Bharmout Brahmana Whole	37.50	BL	5	0	0	3	0	0	2	0	5	0	0	0	5	0	0	20
Muchhali Khass Whole	43.50	BL	0	0	5	0	5	0	0	5	0	2	0	5	0	0	4	26
Lakhroon C1	59.20	BL	0	0	3	0	5	0	0	5	0	2	5	0	5	0	0	25
Samlara Whole	41.00	BL	2	5	0	6	5	0	0	5	0	2	0	5	0	0	3	33
Alsan C2	30.50	BL	0	0	5	0	0	5	0	5	0	0	2	0	0	0	0	17
Chhatehar C3	31.25	BL	5	0	3	0	0	0	0	0	4	0	0	0	0	8	2	22
Bhiambi C2	30.00	BL	2	0	0	5	0	5	0	5	0	0	0	0	5	0	3	25
Tamlet	60.95	BL	0	0	5	0	5	2	3	5	0	5	5	5	0	0	0	35
Chhaplah Kutlerian C1	47.20	BL	0	5	0	0	0	0	0	0	0	5	5	0	5	**0**	0	20
Bhaloun C1	38.25	BL	0	0	5	5	0	5	0	5	0	0	5	0	0	0	0	25
Takoli C3	86.00	BL	2	0	0	5	0	4	4	0	0	5	5	0	5	5	3	38

Takoli C5	87.00	BL	2	0	0	5	0	4	4	0	0	0	5	3	0	5	4	32
Total			**43**	**55**	**49**	**51**	**50**	**55**	**46**	**45**	**54**	**31**	**52**	**53**	**50**	**43**	**40**	**717**
RAMGARH RANGE																		
Dhiunsar C14d	43.46	BL	0	0	5	0	5	0	0	5	0	0	5	0	0	0	0	20
Chowki C1a	36.05	BL	4	0	0	5	0	0	0	0	2	0	2	0	5	0	0	18
Chowki C1c	41.65	BL	0	5	3	0	5	0	5	0	0	0	0	0	0	0	2	20
Attya Whole	39.25	BL	5	0	0	5	0	0	2	0	2	0	1	0	0	0	0	15
Kariara C1a NB	47.55	BL	0	0	0	0	0	5	0	2	4	0	0	4	0	5	0	20
Kariara 2c	41.68	BL	0	5	5	0	0	0	0	0	0	0	5	0	5	0	0	20
Mau Whole	53.41	BL	0	0	3	0	2	0	5	0	5	0	5	0	0	3	0	23
Tanda C2b	30.35	BL	0	0	0	4	0	0	3	0	0	0	0	3	0	0	0	10
Ramgarh uarla c7a	47.75	BL	3	0	3	0	0	5	0	5	0	0	0	0	5	0	0	21
Ramgarh uarla c7c	50.80	BL	0	5	4	3	5	0	0	5	0	0	5	0	0	0	0	27
Ramgarh Parla 1a	38.84	BL	3	0	0	5	0	5	0	0	2	0	0	0	0	0	0	15
Ramgarh Parla 2a	40.28	BL	0	5	0	5	0	5	0	0	2	0	0	0	0	0	0	17
Bohru cib	48.96	BL	0	5	5	0	0	5	0	0	0	5	0	0	0	5	0	25
Bohru c2b	52.61	BL	0	5	3	0	0	3	0	0	0	5	0	0	5	5	0	26
Bohru c2c	37.23	BL	2	0	4	0	5	0	0	0	0	0	5	0	0	3	0	19
Badoa C3	54.20	BL	5	5	0	0	0	0	2	0	0	3	0	0	0	3	0	18
Chhattehar C3	52.25	BL	5	5	0	0	0	0	0	4	0	0	0	0	5	0	0	19
Baslehar C1	78.00	BL	2	5	0	5	5	0	4	0	0	0	5	3	0	0	0	29
Panjora , C1	117.70	BL	4	0	0	0	4	0	0	0	0	0	5	4	3	5	0	25
Pallian C2	50.00	BL	0	5	5	0	0	0	3	0	0	2	3	0	0	0	0	18
Bhur C2	40.00	BL	0	5	0	5	0	5	0	0	2	0	0	0	0	0	0	17
Attya C1	69.60	BL	0	5	3	0	0	2	0	0	5	0	3	0	0	4	0	22
Attya C2	51.00	BL	0	0	2	0	0	0	3	0	0	0	5	0	5	5	0	20
Ambehra Dheeraj Whole	64.72	BL	2	0	0	0	3	0	4	0	0	0	0	3	0	0	5	17
Ambehra Ram Kishan C3	45.00	BL	0	0	3	0	0	5	0	0	2	0	0	0	0	0	0	10
Kukehra jattan Whole	83.10	BL	0	3	0	0	0	0	5	0	0	5	0	0	0	5	5	23
Kukehra Rajputan Whole	55.50	BL	5	0	0	0	5	0	5	0	0	5	0	0	0	0	0	20
Kartholi C1	50.00	BL	2	0	3	0	5	0	5	0	0	5	0	0	0	0	0	20
Kartholi C2	90.00	BL	3	0	0	5	0	0	0	5	0	0	0	0	5	0	5	23
Harot Whole	149.15	BL	4	0	0	4	0	0	5	0	0	5	0	4	0	0	0	22
Chamboa C1	40.35	BL	0	0	3	5	0	5	0	0	2	0	0	0	0	5	0	20
Bohana C2	35.80	BL	0	5	0	0	5	0	5	0	0	0	5	0	0	0	0	20
Sar Dhanet Whole	58.20	BL	5	0	0	0	0	5	0	5	0	0	5	0	0	5	0	25

Kuru C2	101.25	BL	3	0	0	5	0	0	5	5	0	0	0	5	0	0	5	28
Tiar C3	100.00	BL	4	0	2	3	0	5	0	0	4	5	0	0	0	0	5	28
Chakkroa C1	100.00	BL	0	0	2	3	0	0	0	5	0	0	5	0	0	0	5	20
Mou Khas C2	130.10	BL	0	0	4	0	0	4	0	0	5	0	0	4	3	0	0	20
Mou Khas C3	110.16	BL	4	0	2	3	0	5	0	0	0	5	0	0	2	3	0	24
Luder C5	89.20	BL	0	3	0	0	2	0	0	5	0	0	0	0	5	0	5	20
Kathoh C2	75.70	BL	2	0	0	0	3	0	0	5	5	0	0	3	0	0	0	18
Samoor Khurd C1	86.35	BL	0	3	0	0	5	0	0	5	0	3	0	5	0	0	0	21
Samoor Khurd C2	56.00	BL	0	5	0	0	0	5	5	0	0	0	5	0	5	5	0	30
Tanda C1	158.00	BL	4	0	0	0	5	0	4	0	5	0	0	0	5	0	6	29
Tanda C2	170.00	BL	0	0	0	5	0	0	5	0	0	5	0	0	5	0	4	24
Tanda C3	152.50	BL	5	0	0	0	6	0	0	4	0	6	0	0	0	0	5	26
Ghughan kakrana C2	120.00	BL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kothi C2	135.20	BL	4	0	0	0	5	0	5	0	5	0	0	5	0	5	0	29
Tanda Khas C2	78.10	BL	0	0	4	0	0	4	0	0	5	0	5	3	0	0	0	21
Bhusal C2	78.10	BL	0	0	3	5	0	0	4	5	0	0	0	3	0	0	5	25
Raipur C3	56.25	BL	0	5	0	0	0	5	0	5	0	0	0	0	0	0	0	15
Changer C1	112.90	BL	5	0	0	0	5	0	6	0	5	0	0	7	0	5	0	33
Changer C2	156.40	BL	0	5	0	0	6	0	0	4	0	7	0	0	6	0	6	34
Balh Khalsa C3	210.80	BL	3	0	0	0	5	0	0	0	0	0	5	6	0	5	0	24
Balh Khalsa C4	171.40	BL	0	5	0	0	0	0	0	6	0	0	0	4	0	7	5	27
Chulari C1	72.75	BL	2	0	6	0	0	4	0	0	5	0	0	3	5	0	5	30
Chulari C4	99.00	BL	3	0	0	5	0	0	5	0	0	5	5	0	5	0	5	33
Lidkot C1	78.40	BL	2	0	0	5	0	0	4	5	0	0	5	3	0	0	5	29
Jagat Khana C3	54.74	BL	0	0	5	0	0	5	0	0	5	5	0	5	0	5	0	30
Total			**95**	**94**	**82**	**85**	**91**	**87**	**99**	**85**	**72**	**76**	**89**	**77**	**79**	**88**	**83**	**1282**

7.11.3 **Closure Notification**: Each plantation area should be notified for closure and suspension of rights one year in advance of plantation work. According to provision made in forest settlement, one third of total area of forest can be closed for 30 years, but it is normally not practicable .The area should remain closed effectively till the regenerated crop reaches the stage beyond any damage due frost, drought, weeds and needs no longer protection from animals. Hence, the period of closure may be kept 10 to 20 years depending upon growth of species planted but fencing / closer be maintained properly and not on papers as is the practice now a days. One's efficiency be judged as per progress of plantation area's and their maintenance and should be objectively recorded.

7.11.4 **Fencing**: All plantation areas will be effectively closed with 3-4 strands barbed wire fencing. Fence post should be of durable species. These should be erected in the ground along the periphery of area to be closed at suitable spacing, deep enough to withstand weight and tension in barbed wire. It should be borne in mind that loose, zigzag and haphazardly aligned barbed wire fencing would provide least resistance to animals of vicinity/ stray and efforts so made in raising plantation will, surely, be unproductive and invite unnecessary criticism of local people. It would be better if some branches of fast growing species were reinforced in fencing to provide adequate tension in the strands of barbed wire, of course, depending on budget provisions. Bush fencing, hedge fencing should also be tried where ever such material is readily available.

7.11.5 **Site Clearance**: The site shall then be cleared of bushes and unwanted growth only to the extent absolutely necessary. On hot aspects, staggered bushes of Dodonaea; Desmodium should be left to afford side shade to young plants. Where possible the shrubs be allowed sufficient time. The slash should, then be collected in small heaps and burnt in depressions, nallas carefully so as to avoid any damage to existing patches of regeneration.

7.11.6 **Preparation of Site**: Pits on standard size 30 cm. deep, 30 cm diameter for Chil and 45 cm deep 45 cm is diameter for broad leaved should be dug well in advance so as to provide an interval of 2-3 months between pit digging and planting for weathering of soil.

7.11.7 **Spacing**: Planting of coniferous at spacing of 2.5 m x 2.5 m and that of broad leaved 3m x 3 m is general practice and it should be continued, however,

while treating eroded portions suitable broad leaved may be planted at the spacing of 1.5m x 1.5 m. Rocks / over shade should be avoided.

7.11.8 **Sowing and planting**: Planting should be preferred to sowing, though the latter operations may be cheaper. Success is more certain and initial growths more rapid, in case sturdy nursery raised plants are used. Sowing may be carried out on comparatively better site, where these are expected to be easily successful. Nursery technique of various species, and artificial reproduction, has been dealt in the detail in technical order Nos. 3 & 4 of Forest Manual Volume III. Every Range Officer and his subordinates should acquaint themselves with these instructions. However the broad principles of raising the important species in nurseries and in the field by artificial means are given for the guidance of field staff.

7.11.8.1.1 *Dalbergia sissoo* (Shisham)

Artificial propagation:

It can be raised by either (1) direct sowing (2) Planting out entire plants raised in the nursery (3) Stump planting, or (4) planting out root suckers. Stump planting gives better results than planting out entire plants, which are better than direct sowing.

Seed Collection and Storage

Ripe pods are collected in December – January, dried in the sun and broken by beating with sticks. The broken pods or seeds are stored in airtight containers in dry place.

Nursery Technique:

Sowing is done in the nursery beds, which are normally 40 cm wide at base and 30 cm at top and 25 cm high. Trenches of 25 cm width at the base alternate the beds. Sowing is done in February – March where irrigation facilities are available and July under rain fed conditions. Sowing in March should be preferred as low temperature during February delays germination. Broken pieces of pods, each containing one or two seeds, are sown in lines spaced 25 cm apart. In these lines, the broken pieces touch each other. When clean seed is used, the seeds are spaced 2

cm apart. The seeds of broken pieces of pods are soaked in water for 48 hours before sowing. The optimum depth of sowing is about 1.5 cm. The beds are irrigated soon after sowing. The germination of soaked seeds starts in about a week and is complete in about three weeks.

Regular irrigation is necessary for germination and good growth of the seedlings .Two irrigation are needed per week till the completion of germination, one irrigation per week thereafter till the seedlings attain a height of about 10 cm and from that stage onwards-fortnightly irrigation till the commencement of monsoon rains. During the monsoon seasons the nursery beds are irrigated as and when necessary.

The nursery bed should be kept clean of weeds. On an average 5-7 weeding are necessary in one year Hoeing is also done along with weeding to create mulch, which helps in moisture conservation.

Thinning of seedlings in the nursery is necessary to avoid overcrowding and competition. The seedlings are spaced 5 cm apart in lines when they attain a height of about 5 cm.

Application of organic matter and fertilizers is necessary for optimum seedling growth. Application of fertilizers, particularly super phosphate, increases height growth of seedlings significantly in the nurseries.

7.11.8.1.2 *Acacia catechu*:

Artificial propagation:

The seed should be collection in the month of January. The seeds should be soaked in cold water for 24 hours to soften the seed coat.

Nursery Technique:

Sowing is better than planting as the species cannot stand root and shoot pruning. Sowing in field should be done before monsoons.Sowing is required to be done in polypots in March-April. Germination starts in 8 days but completes in 30 days. Planting should be done in rains without root disturbance. Polythene bag raised plants gives good results.

7.11.8.1.3 *Melia azederach*:

Artificial Propagation

Melia azederach can be raised either by direct sowing or by planting out nursery raised seedling or stumps.

Seed Collection and Storage:

Fruits are collected during January February from the trees. They are rubbed and washed to remove the outer pulp. The stones are dried and stored.

Nursery Technique:

Sowing is done in nursery beds during February –March in drills 15 cm apart. Keeping the seed in liquid farmyard manure for about a week is reported to improve germination. The seeds are sown about 2 cm deep and about 5 cm. apart in the drills. About 1000 gm seed is needed to sow each square meter of nursery area. The nursery beds are irrigated after sowing and at regular intervals thereafter till germination is completed. Germination starts in about three weeks time and may take about two months to complete. Each fruit may give rise to as many as four seedlings and at places the seedlings will appear in clumps and will have to subsequently be thinned. Regular weeding of the nursery beds is also necessary as the seedling are susceptible to weed competition on completion of germination, the seedling should be thinned to spacing of about 10 cm so as to have a spacing 15x 10 cm. The seedlings are transplanted in the nursery beds in July when these are about 2-3 months old. They are retained in the nursery for one more year when they are uprooted for planting out. However, these can be planted during winter in favorable localities or where rains continue during March / April and moisture in the soil retained during summer.

Planting Technique:

The seedlings are planted out either in July or during winter months when these are leafless. For planting out entire plants in July, the seedlings are uprooted from the nursery with balls of earth. Planting is done in 30x30x30 cm pits dug in advance.

Stumps are prepared from 15 months old seedlings and are planted in 30x30x30 cm pits in the same manner as entire plants.

7.11.8.1.4 *Toona ciliata*

Artificial propagation:

The ripe fruits are collected from the trees before opening. The fruits should be collected when they start turning yellow and a few of them commence to open. These are dried, rubbed and winnowed to get the clean seed.

Sowing is done in June – July and August, viability of seed is only 7 days therefore, has to be sown within 7 days after ripening. The seed is sown in raised nursery beds in lines about 20 cm apart and should be only lightly covered by fine soil or sand and should in no case be sown deep. A thin layer of dry grass to prevent the washing away of the seed should cover the beds. Germination commences in about a week and continues for another week. The grass is removed after germination starts. The nursery beds are shaded to protect the young seedling from hot sun. Water logging has also to be avoided. About 5-8 cm tall seedling are transplanted in nursery beds at a spacing of about 15x15 cm. Regular weeding is necessary. Watering should also be regularly done after the monsoon rains cease .The seedlings are planted out either during winter when they are leafless or during the following July –August.

Planting out is done in monsoon season in pits of about 30x30x30 cms or 45x45x45 cms pits at a spacing of about 3x3 m or 4x4 m. Planting should preferably be completed before the middle of August.

7.11.8.1.5 **Poplar** (*Populus deltoides*):

Using nursery-raised plants from cuttings best raises poplar. The plants should have two-year root and one year shoot. However, one-year-old healthy plant can also be planted and gives good results.

Nursery should be located in planting zone. Southern aspect at low elevation and northern at higher elevation be avoided. Exposed wind ridges too are avoided. The nursery should be located at a sheltered place but not frost hole. It should have deep (minimum 30 cms) well pulverized soil. It should have adequate irrigation to ensure flood irrigation. But it should not have waterlogging condition and adequate drainage is desirable. The soil should be sandy loam. Sandy / clayey soil should be avoided. As for as possible, the nursery should be near planting site because the planting stock is very bulky and may weigh about half of tone for 1000 plants making manual carriage difficult and expensive. In case, plants are to be transported then nursery be located near road head to facilitate vehicular transportation. Width of nursery beds should be in multiple of 45 cm.

For making cuttings for preparation of planting stock, stool beds should be maintained in the nursery. Here cuttings from new branches of young / middle-aged trees be used but cuttings prepared from young nursery raised seedlings gives results and are to be preferred.

The time for making cuttings is during December or March when trees are leafless. In case these are prepared during March. These should be prepared before sprouting. The Trees and branches from which cuttings are prepared should be young and disease / pest free. The cuttings are cut to size of about 20-25 cm length. The thickness should be 10-25 cm in girth. Cuttings with thickness lesser than 10 cm at thinner end is avoided. These should be horizontally cut with a sharp instrument so as to make one clean cut in one stroke. Cuttings are then inserted in sunken beds having well pulverized sieved soil to depth of minimum 30 cm. for insertion, hole be made with dibbler. The width of hole should be slightly more than that of cutting. Cutting is inserted in it leaving about 2 cm above ground. Care be taken that upper side of cutting is not inserted down. Then soil is well packed firmly around it. The test for firm packing is that the cutting

should not be pulled out easily by using thumb and one finger. Spacing of cutting be kept 45x45 cm but in no case less than 30 cm x 30cm.

The beds be watered immediately after and regularly after-wards. Watering by flooding and once a week is sufficient. No watering is required during rains. Weeding too is necessary. With weeding, light hoeing so as not to disturb the roots of plant is also necessary. The shoots from these stool beds are used to make cuttings for planting stock year after year. Many shoots are developed from the cutting and therefore, singling of shoots is done. For it lower and inferior ones are cut with an sharp secateur carefully retaining only one best straight shoot. This is done when shoots are of about 15 cm. When shoots become one year old during winter within (December or March) these are cut back to a height of 15 cm. from ground and used to make cuttings for planting stock year after year.

Cuttings are made as earlier, cut with the sharp instrument in one fine cut in one stroke; length of cuttings should 20-25 cm. and dia 10-25 cm. Cuttings with thinner and lesser than 10cm be rejected.

These cuttings is inserted in other beds (planting beds) in the same manner as above at spacing of 45x45 cm and maintained as regards weeding / hoeing / watering / singling as above. The beds are manured also. For manuring sufficient quality of well decomposed FYM be added to beds every year. This is done in case of stool beds as well as planting beds. This is so because rising of Poplars in a nursery for 3-5 years reduces mineral deficiency of soil. So well decomposed FYM 50-70 tones /hectare be added to beds every year. If this is not possible then nursery is shifted after a few years say two years or at the most 4 years.

The Shoots in planting beds be cut back during December / March (before sprouting) when about one year old at 15 cm height from ground and used to make cuttings for planting as explained above. The root portion of the plants in planting beds is retained. It again sprouts during spring and the shoots when about 15 cm are singled with sharp secature as done in earlier case. By the end of the one-year i.e. by December the shoots are above 2 m high. These plants with two-

year root and one-years shoot are used for planting in field. Those with a height less than 2 m and basal dia less than 20 mm be rejected and not planted in field.

Planting is done during December – January when plants are leafless in low-lying areas and during March- April before sprouting in higher elevation areas. Plants are safely taken out from nursery. The roots should in no case be splinted. In this process the lateral roots and sinkers are cut with sharper edged tool to avoid splitting. Cut is made finally with one stroke. Roots should be cut in such manner that lateral roots about 15 cm long and sinkers about 40 cms retained. The planting is done in 45 cm x 45cm x45 cm sized pits or in case area is affected with raw humus, 60 cm x 60 cm x 60 cm pits. Branches should be pruned to have the lower half of stem free of branches. Excessive pruning should be avoided. There should be minimum time gap between lifting of plants from nursery and planting in the field. Distance of plant is kept 4x4 m.

7.11.8.1.6 **Ritha** (*Sapindus mukorossi*):

Nursery-raised transplants can grow Ritha. It is natural to the tract. It can be grown at elevation from 800-1500 m on hot aspects.

Fruit is de-pulped and seed, which is loose inside, is taken out. Seed is sown either during August – September or March –April in sunken nursery beds. Nursery should be located in planting zones. Seeds are sown at a spacing of 10x22 cm and depth of 2-2.5 cm. regular watering to beds is done but flooding is to be avoided. Germination starts in about two weeks and takes 5 weeks to complete. Plants out of sowings in August – September are pricked out in December in nursery beds at spacing of 15x 22 cm. Line to line being 22 cm. and plants to plant 15 cms. Plants of March – April sowing are pricked out in July – August. Regular watering / weeding to nursery beds is done. Pricking is done in holes made with dibblers. The hole should be of sufficient depth to accommodate roots of plants. Plants become fit for planting when about 15 months old. August – September sowing are planted in next winter while March-April in nest monsoons. Naked root planting is done. Plant lesser then 30 cms. height should be culled out in nursery and should not be planted.

Poly bags raised plants can also raise Ritha. For it the nursery should be located near planting site. The p/bag method is used for low elevation, planting (800-1200m) because the plants are kept in P/bag for a short duration (3-4 months) and may not attain plant-able size (about 20 cm) at higher elevation. For monsoon planting, sowing in P/bags should be done. Sown P. bags are watered and watering continued after germination. Weeding is done when required. Plants are planted during monsoon rains and planting be completed by end of July. Similarly, for winter planting, seed is sown in P. Bags during August / early September and plants are planted during winter rains. Germination of seeds in controlled condition on poly house constructed for the purpose, gives good results.

7.11.8.1.7 **Chil** (*Pinus roxburghii*)

Preparation of Nursery:

The nursery should be located near plantation area to avoid higher costs and damage to plants during transportation because plants are polythene bag raised. Availability of water is an important factor governing selection of nursery site. Nursery should not be located in shade, which affects growth of plants adversely. Nursery area about 15 sq m is sufficient to raise 1000 plants.

Seed Collection and Storage:

Seed is collected from healthy, well grown twist free, self pruned trees of Chil during February – March, however, during April / May in higher elevations. Cones are dried in sun and seed is separated and cleaned. Seed be stored in airtight container and kept in dry place. The good seed years are after 2-3 years so sufficient seed be collected in good seed years.

Sowing in Nursery

For monsoon planting sowing be done during September in polythene @ 2 Seeds/bag. For winter planting, however, sowing is done during February-March. The un-germinated polythene bags are re-sown immediately. Before sowing, the Chil seeds are soaked in water for 24 hours. Those, which float, are rejected as these are of poor quality and give low germination percentage. The seeds, which settle at bottom, are sown. In case more than one seed germinate in the bag, the weakling be cut safely with

blade. Polythene bags are filled up with loamy soil mixed with one-third-farm yard manure. Sandy/clayey soil is avoided for filling the polythene bags. Some soil collected from Chil forests is also mixed to act as inoculums for Chil mycorrhyza, in addition of about of 5 grams super phosphate and 5 grams Cane is also recommended for better growth of plants. Both these fertilizer are mixed thoroughly in the soil before polythene bags are filled. Seed will germinate after 12-15 days. Polythene bags are watered with rose-can. Light watering is required and over watering should always be avoided. Frequent watering before planting out in the field should not be done in order to harden the plants. Frequent weeding is necessary. Care should be taken that roots of seedlings are not injured and tiny Chil seedling is not pulled out during weeding. Shifting of polythene bags in nursery is done twice during the nursery period. First shifting is done in May-August for September –March sowing respectively. Second shifting cum grading is done in end of June –December for September-March sowing respectively i.e. just before planting.

Planting:

Planting is done during monsoon rains out of those sown in September. Planting be completed by end of July. In high elevation area about 1500 elevation the winter planting also gives good results. Winter planting is carried out, out of February –March sowing during December–January so as to coincide with winter rains. Planting is done in 30x30x30 cm. pits. Care should be taken to see that plants less than 20-cm height are not planted out.

7.11.8.1.8 **Bihul, Dhaman** (*Grewia oppositifolia*):

Planting out either nursery-raised seedlings or stumps does artificial propagation.

Seed Collection and Storage:

The fruits ripen from October to December depending upon the locality. The flesh of the fruit is sweet and as such birds devour these. A substantial quantity of the fruit crop may be eaten away by birds if seed collection is delayed. The fruits are not borne on current year shoots. Trees lopped completely do not, therefore, bear fruits. The trees reserved for seed production should either not be lopped at all or should be lopped only partially. The fruits are rubbed and washed

in water to remove the flesh. Each fruit contains 2-4 seeds. The seeds have hard testa and store well for at least a year without any appreciable drop in vitality.

Nursery Technique:

Sowing in the nursery is done in March. Pre-sowing seed treatment is necessary to hasten and improve germination, as the seed testa is hard. Out of various pre-sowing seed treatments soaking the seed in cooling boiling water for 12 hours gives the best results. Sowing should not be done on raised beds as moisture needed for germination is normally not available on such beds and germination is very much delayed and is poor. The seed is sown in 2 cm deep in lines 15 cm. apart. About 250 Gms. seed is required to sow each square meter of nursery area. The nursery beds are irrigated after sowing and regularly, thereafter, till germination is over. Germination starts in about 10 days and takes about a month to complete. Regular weeding is also necessary. At the time of weeding, the seedlings are spaced about 10 cm apart in lines. The seedlings grow fairly fast and attain plant-able size by July. For stump planting, seedlings of 15 months age are normally used.

Planting Technique:

Planting is done in July. Late planting usually results in poor survival. The seedlings are uprooted from the nursery with walls of earth and wrapped in moist gunny bags. Planting is done in pits of 30 x 30 x 30 cm dug during summers or with the beginning of the rainy seasons.

7.11.9 **Inspections:**

Intensive inspections of plantation works by superiors play an important role in achieving the best result. Pre-planting inspections are absolute necessary for improving the quality of works.

So, in order to make Plantation works result oriented, Range Officer should inspect all plantation areas frequently, especially while such works are in progress, in well-planned manner. Similarly D.F.O/A.C.F. should also inspect at least 60% of plantation works being carried out in each range. In the last 20 to 25 years quality of planting work has been deteriorated a lot resulting in failures of almost all with few exceptions, planting done during the plan period and after

ward has not been given good results mainly due to lack of proper planning and care at the time of planting. Staff has to be taken to task. Period of 2014-2015 can be rated well when proper accountability of staff was fixed in addition to proper training and guidance to field staff. DFO had to exert hard and care taken from nursery operations to planting.

7.11.10 **Control/ Review of Progress:**

The Divisional Forest Officer should review the progress achieved in raising plantation vis-à-vis the targets suggested above every year and if there is any backlog, the same should be adjusted during the next year. The deviation shall appear in control form 4. There is down ward trend of planting targets in last 2-3 years and it may be reduced drastically in coming years. This has to be compensated with outside funding and projects such as F.D.A. Centrally Sponsored Plans and that of other funding agency have to be resorted to.

7.12 After Care of Plantation Areas:

As emphasized above, tending operations in plantation areas are very important. These include weeding, cleanings, climber cuttings, early thinning etc. Beating up of previous years failure is an important operation and as such it should be attended to with proper care. Fencing has to be made effective. Visits / inspections are important for raising good plantations; ROs should visit each plantation at least once in a year for 5-6 years, BO 4-5 times a year, Forest Guard at least once in a week. Fencing should be repaired regularly.

7.13 Treatment of Existing Plantations:

The existing plantations are few in number and are very young. Weeding and cleaning shall be necessary in these plantations in due course. However, for quite some years, the previous failures will need to be replenished with due care.

7.14 Miscellaneous Regulations:

7.14.1 Grazing:

All plantations areas shall remain closed for grazing for 15 to 20 year's period depending upon the progress of the new crops. The closure should be effective and for the minimum possible time, so that least hardships is experienced by right holders. However, depending upon the progress of the young crop, particular area may be thrown open to kine grazing even before the period of closure expires. This will be so, especially in the case of Chil plantations when after 8-10 years of effective closure, the young crop will be nearly 2m in height and cattle grazing will also minimize damage by fire.

7.14.2 Grass Cuttings:

No grass cutting shall be allowed except under strict supervision of the forest guard. Removal of grass reduces competition and also mortality due to overhead shade.

7.14.3 Lopping:

Trees standing in the plantation areas shall remain prohibited for lopping during the closure period.

7.14.4 Fire Protection:

All the plantation area will be strictly fire protected. Young Chill plantation should receive special attention in this behalf. The methods of fire protection and control burning suggested in Chil Working Circle shall be followed.

7.14.5 Eradication of invasive alien species

As per Champion & Seth Classification, forests in these Ranges are classified into Group 5B and Group 9; in addition to that, adverse biotic influences viz. excessive grazing, lopping and felling etc. and fires have deteriorated the composition and condition of crop. The invasion by alien species has added to the problems already being faced by these forests. Besides all forests situated on precipitous slopes which are not fit for working under any silvicultural system have also been included in this working circle.These forests allotted to this working circle are required to be preserved only for protection of hills from denudation and erosion because of their

location on steep/precipitous slopes and at strategic points like source of various streams/nallahs and rivers.

Strategy For Control And Rehabilitation Of Affected Areas

Biological invasions – one of the anthropologically mediated ecological perturbations – are threatening native biodiversity, preventing natural ecological succession and changing the community structure and composition, besides impactin ecosystem services. *Lantana camara* is perhaps one of the most important invasive alien plant species (exotic weed) in forest ecosystems of India as also in the Kutlehar Forests of Una Forest Division. Other alien invasive plant species with significant impact on the Kutlehar Forests include *Ageratum conyzoides* and *Parthenium hysteriporus*. Whereas, the incidence of *Parthenium* popularly known as 'Congress Grass or *Gajjar Ghas*' and that of *Ageratum conyzoides* largely restricted to degraded and newly opened drier sites along roads and forest fringes, these three invasive alien species tend to occupy all possible vacant places even under tree canopy. *Parthenium* and *Ageratum* show a clear preference for moister locales and show gregarious occurrence, at many places these shasre the niche and grow in an intimate mix with *Lantana*.

A reconnaissance was made during July 2012 to map the distribution of exotic weeds in various compartments in these Forests. Whereas, it was possible to record the incidence of *Lantana* fairly accurately, the area infested with other two main invasive alien species could not be recorded comprehensively due to these species being limited to fringes of UPFs, adjoining agricultural fields.

It also comes out that once the lands become degraded and infested with invasive species, these attract apathy of all stakeholders, further strengthening the invasion process.

In the absence of any record of infestations of forest in the Kutlehar Forests of Una Division by exotic weeds prior to July 2012 the data presented here will be taken as baseline for the proposed management

purposes. Strategy for rehabilitation of forests infested with these three noxious exotic weeds is dealt in details under:

Contain Further Spread: A close watch over the spread of exotic weeds will be kept through biennial monitoring mechanism and necessary corrections in the programme will be made to remve the recent infestations on priority basis.

Complete Rehabilitation Of Infested Areas:It will involve shift from 'one time removal of weeds' to 'complete rehabilitation' of treated areas by competing/shading out exotic weeds. All noxious exotic weeds on any given area will be tackled simultaneously.

Reliance on Only Mechanical/Manual Methods: In view of their environmental/ecological concerns, the rehabilitation measure s will NOT employ any **chemical/biological** methods of exotic weed control.

Natural Resilience Of Native Flora To Be The Basis Of Rehabilitation Action:The natural regeneration of indigenous plant species on treated sites will be encouraged and facilitated to establish towards better environmental and ecological services, including fodder, fuel, water recharge etc.

No Exotic Species to Be Used To Rehabilitate Treated Sites: No potentially invasive exotic species viz. *Leucaena leucocephala, Prosopis juliflora, Jatropha curcus, Tecoma stans, Tectona grandis* etc., will be used for plantation in the areas under rehabilitation, because of their deleterious effect on the native flora.

Rehabilitation to Start From Low Intensity Infestation Areas And To Progress Towards Areas With Heavy Infestation: Rehabilitation activities will start from the fringes of infestation zone with lower intensity infestation and will progress towards the heavily infestation areas. This approach will –

- Allow tackling larger areas with the given financial resources and result in creating quick visible impact, and
- Help in containing further spread of exotic weeds.

Selective Priority Rehabilitation Of Heavily Infested Critical Habitats:

Rehabilitation of heavily infested areas as starting point will be taken up only in limited number of carefully selected critical habitats like grazing grounds near habitations. Such sites will then act as nucleus from where rehabilitation activity will radiate to adjoining areas of high infestation.

Withabove mentioned core principles of the strategy, the approach/plan to implement the strategy will be as under:

MANAGEMENT OF *LANTANA:* With the major focus of the management strategy on 'containing further spread', a two pronged approach, as described below, will be followed in tackling *Lantana* menace on forest lands. Table No. 11 & 12 gives spread of *Lantana* and the intensity of infestation.

APPROACH – I (FOR AREAS WITH LOW INFESTATION INTENSITY): More than 60% of the forest areas recorded to under *Lantana* have been infested with this exotic weed within the past 10years and have less than 25% intensity of infestation. Under this approach, these areas will be tackled on priority basis for the reasons that **(i)**with given financial resources, it would be possible to rehabilitate larger areas for creating significant impact, and **(ii)**further spread of this exotic weed would be contained.

The rehabilitation activities will be started form the fringes of infestation zone with low intensity infestation and will progress towards the high infestation areas. Major activities under this approach will be manual of *Lantana* bushes and encouraging establishment of local species, including grasses or augmenting populations of native species through plantation.

APPROACH – (FOR AREAS WITH HEAVY INFESTATION)

Under this approach, critical areas under heavy infestation, especially the grazing grounds near habitations, will be identified and treated.

The rehabilitation activities will start from the selected critical areas that will act as nucleus, and will radiate from this nucleus to cover adjoining areas of high infestation. Major activities under this approach will be manual cutting of *Lantana* bushes, encouraging establishment of local species, including grasses and planting areas with tall plants of fast growing species to quickly shade out *Lantana.*

This methodology to implement the above two approaches will be as follows:

Method of cutting *Lantana* will be Cut Root Stock (CRS) method i.e. cutting bushes below the soil to prevent coppicing.

Forest Beat will be the unit for rehabilitation *Lantana* infested sites. Financial resources available under various schemes will, therefore, be converged towards this end.

Local people, through existing community groups, will beencouraged to participate in rehabilitation of *Lantana* infested areas. Stake of local people will be hult into this initiative under the available JFM instruments.

The following will be, based on 'local practices, standardized for effective implementation of *Lantana* management initiative:

- Cutting tools/techniques
- Calendar of rehabilitation activities
- Cost models

A three year active maintenance of the treated areas and triennial follow up there after will form integral part of the rehabilitation programme till the areas gets fully rehabilitated. During this period, constant vigil will be maintained on any opportunistic springing back of sprouts/seedlings of the remove. At the same time, progress of establishment of the native species will actively monitored and encouraged.

An average of 150 hectares of *Lantana* infested areas will be taken up for rehabilitation per year.

REMOVAL OF *Lantana camara*from the DPFs and UPFs will be undertaken by the CRS method during the plan period, as per the programme given in below:

Table No. 7.3: Programme of *Lantana* removal in Kutlehar Forests

Year	Range	No & name of forest	Compartment	Area(Ha.)
I Legal Felling Series				
2014-15	Ramgarh	XVI Ban Dhanet	1.b(SB)	6.40
		–do–	1.c	5.26
		–do–	3.a	4.05
		–do–	3.b	4.45
		–do–	3.c	6.07
	Bangana	VI.Paniala	1.a	41.02
		–do–	1.B	36.01
		XLII Bharmout	1.c	6.38
		XLIII Chhatehar	Whole	22.66
2014-15	Ramgarh	XXXVI Khairian	1.a	11.73
		–do–	1.b	11.73
		–do–	1.c	10.93
	Bangana	XII Kanura	1.a (NB)	17.89
		–do–	1.c (NB)	10.55
		VI Paniala	1.c	30.74
2015-16	Ramgarh	XXXIV Chowki Maniar	1.a	36.05
		–do–	1.b	41.66
	Bangana	XII Kanura	2.b	22.6
2016-17	Ramgarh	XXXIV Chowkli Maniar	1.c	44.50
		XXXII Amroh	Whole	22.66
	Bangana	XII Kanura	3.a	24.95
		XII Kanura	3.b	14.58
2017-18	Ramgarh	XXXII Atia	Whole	39.25
		XV Kariara	2.a(NB)	25.33
	Bangana	XXXVIII Sohari Baduha.	Whole	12.94
		XIII Dhar Solasingi & Bhimabi	1.c	30.35
2018-19	Ramgarh	XV Kariara	2.b	41.69
		XV Kariara	1.a(NB)	24.50
	Bangana	XIII Dhar Solasingi & Bhimabi	5.b	25.39
		XII Kanura	3.c	11.75
2019-20	Ramgarh	XV Kariara	1.c	40.46
		XXVIII Ghugan Kakrana	Whole	9.30
	Bangana	XIII Dhar Solasingi & Bhimabi	2.c(NB)	5.26
		XIII Dhar Solasingi & Bhimabi	3.c(NB)	15.39
		XIII Dhar Solasingi & Bhimabi	3.c(SB)	5.26
2020-21	Ramgarh	XXIX Kawari	Whole	5.26
		XXXI Kathoh	Whole	5.26
		XXVI Tira Aghlour	1.a	12.15
		–do–	1.c	10.52

	Bangana	XIII Dhar Solasingi & Bhimabi	4.c	19.82
		XIII Dhar Solasingi & Bhimabi	5.c(NB)	3.62
		XIII Dhar Solasingi & Bhimabi	6.b	20.63
2021-22	Ramgarh	XXVII Busal	1.a	4.40
		XXVII Busal	1.b	4.85
		XXVII Busal	1.c	4.05
		XXV Tanda Bagwan	1.a	20.23
	Bangana	XIII Dhar Solasingi & Bhimabi	6.c	13.75
		XLSari	Whole	8.49
2022-23	Ramgarh	XXV Tanda Bagwan	1.b	21.45
		XXV Tanda Bagwan	1.c	15.78
		XXIV Thana Dulehri	1.a	4.45
		XXIV Thana Dulehri	1.b	3.64
		XXIV Thana Dulehri	1.c	4.45
		XI Tanda	1.a	20.63
		–do–	1.b	19.42
		–do–	1.c(NB)	12.99
	Bangana	XLII Bharmout	1.a	6.38
2023-24	Ramgarh	VII Thappal	2.b	23.06
		–do–	2.c	20.23
		–do–	2.a	22.66
		–do–	3.b	45.72
		VII Boru	1.a	26.56
	Bangana	XLII Bharmout	1.b	10.12
2024-25	Ramgarh	VII Boru	2.a	14.97
		VII Boru	2.b	52.61
		IX Ramgarh Awarla	6.a(NB)	16.85
		IX Ramgarh Awarla	6.b(NB)	8.15
		IX Ramgarh Awarla	7.a	47.75
2025-26	Ramgarh	IX Ramgarh Awarla	7.b	46.94
		IX Ramgarh Awarla	7.c	50.80
		IX Ramgarh Awarla	8.a	23.47
2026-27	Ramgarh	IX Ramgarh Awarla	8.b	17.41
		IX Ramgarh Awarla	8.c	19.49
		X Ramgarh Parla	1.a	38.84
		X Ramgarh Parla	1.c	37.23

7.14.6 Plantation Paths:

A Path should be aligned in each plantation area in March -April after slash clearance in the area is over. This will facilitate planting work as well as supervision and inspection.

7.14.7 Plantation Records:

i) Plantation journal will be maintained for each plantation area on the standard form prescribed for the purpose. A location map on 1: 50,000 scale should also be prepared and prefixed to the journal.

ii) Plantation boards should be put at prominent places, and written in Hindi, giving name of plantation, area, year of commencement, and other details of work. A simple small wooden / tin board; written in Hindi by staff will be sufficient instead of commercial type of high priced one.

iii) Notes on germination, establishment, casualties' etc.be given regularly by the Range Officer, and inspection notes of visiting Officers are incorporated in the journal.

iv) A detailed map showing various species and its extent should be prepared on 1:15,000 scale and placed in plantation journal.

v) At present no proper record of plantations is kept which gives apprehensions that planting is done on papers. It is, therefore, very much important that proper check is kept by DFO himself, otherwise, it may lead to scandalous proportions which may lower image of the department in addition to irreparable loss to the programme of planting. Plantation once done be made successful by all means, otherwise, should not be done. This should be the principle. In case of failures, defaulters are dealt with strictly and losses be made good from the defaulters. No one should be spared; otherwise, it will be too late.

CHAPTER VIII

FORESTPROTECTION (OVERLAPPING)WORKING CIRCLE

GENERAL CONSTITUTION OF WORKING CIRCLE

The Forest Protection (Overlapping) Working Circle includes areas of Chil Working Circle, Rehabilitation and Scrub Working Circles, comprised in the Bangana and Ramgarh Forest Ranges of the Kutlehar Forests of Una Forest Division. This is overlapping working circle and hence includes the whole area under different working circles and covers all the forests of the Kutlehar Forests of this Division. The main objective of this working circle is to curtail the forest fire incidences, illicit felling, smuggling of forest produce and increasing encroachments on forest land.

8.1 METHODS OF TREATMENT

The prescriptions in this chapter have been sub-divided into following parts –

i) Fire Management
ii) Encroachments
iii) Illicit Felling
iv) Smuggling of Timber

8.1.1 **FIRE MANAGEMENT:-** It is estimated that about one to three tonnesof chir-pine needles fall per hectare per season depending on the density of the forest. Thus taking an average of 1.5 tonnes per ha, the volume of pine needles that fall each season is approx. 3920 tonnes.Dry pine needles are fire hazard to the forest. Every year thousands of hectares of forest area gets fire

because of pine needle accumulation. The decomposition of pine needle is extremely slow. The strategy for fire management will include the following:

8.1.1.1 CLEARING OF ROADS Accidental fires in Chil Forests are caused by cigarettes/bidis 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 10 m 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/vermin-compost/briquettes.

8.1.1.2 NEEDLE COLLECTION 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 form the forest. To combat such fires various strategies under Para 7.2.1 may be adopted singly or in combination.

8.1.1.3 PARTICIPATION 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 programmes combined with monetary incentives could be tried here. Fires management committees may be constituted at Panchayat level or existing/new JFMCs may be involved. The incentive for protecting 100 ha forest may be fixed as follows:

8.1.1.3.1 No fire –Rs.10,000

8.1.1.3.2 Single fire - Rs.5,000

8.1.1.3.3 Two fires - Rs.2,000

8.1.1.3.4 More than two fires – No incentive

The area chosen for such schemes will thus save on deployment of fire-watchers and the amount so saved will be used towards paying the incentive.

8.1.1.4 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, fires-watchers may be deployed who will patrol forests and alert the **Rapid Response Team** specially constituted at Range level during fires seasons.

8.1.1.5 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 HP, handicrafts of chil needles are being made by Kangra Mahila Sabha, Dharamshala and they have imparted such training to SHGs form by MHWDP in Salooni, Chamba.After making a study of the economics of the enterprise, the same may be adopted in Kutlehar Forests of Una Forest Division. However, as the exercise would involve identification of marketing channel etc., it is better to get it done through an NGO or nay local Community based organisation that are already into marketing of handicrafts.

Pine briquetting has also been tried in several places. This activity will not only save forest but would 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 Kutlehar Forests.

Similarly pine needle check-dams, *pirule* have been made in Uttarakhnd 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 forsests which otherwise3 generally being a mono-crop of timber species (which means no immediate use/access to resource) are neglected 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 at least twice in the built into the agreement with Corporation at the time of handling over the forest to them. Failure to comply should attract a penal price to the Corporation.

8.1.1.6 WATCH-TOWERS:-TheKutlehar forests of Una Forest Division are in general vulnerable to wild fires during the drought from April to June. Establishment of another watch-tower at vantage points (probably near Dhiunsar Mahadev Temple, at Chaugath and the third one nearKakrana) would facilitate early detection and control of fire incidences in remaining forest areas.

8.1.1.7 CONTROL BURNING:-In the absence of tending operations, control burning of forest areas in the DPFs and UPFs during winters would de-escalate the vulnerability to the wild forest in summer season. Therefore, it would play an important role in the conservation of forests as well as it would prevent loss of Government Exchequer.

8.1.2 ENCROACHEMENTS:-Since no encroachments in the Protected Forests have been witnessed in the Kutlehar Forests of Una Forest Division, no strategy is planned. But the remedial measures to prevent such incidences would be taken up as discussed below:

8.1.2.1 PREVENTIVE REMEDIAL MEASURES

8.1.2.1.1 Boundary Pillars:-Forest Officials must be well conversant with boundaries of the Kutlehar Forests, under their jurisdiction. The Range Officers, Block Officers and Forest Guards must check 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. The repair/replacement work of Boundary Pillars in the DPFs of Bangana and Ramgarh Ranges would be taken up as per given schedule during the Working Plan period, detailed in **Appendix XII**:

DFO/ACF should also inspect the boundary pillars while inspecting forests, plantations and other forestry works.

8.1.2.1.2 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.

8.1.2.1.3 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.

8.1.2.1.4 All the encroachment cases on forest land are within the jurisdiction of DFO as Collector of the Division under HP Public Premises and Land (Eviction and Rent Recovery) Act, 1971. Range Officers should challan all such cases before Collector for speedy trial.

8.1.2.1.5 Powers of carrying out demarcation are vested with the Revenue Officers under HP Land Revenue Act, 1954 and as such, many times, the demarcation of forest is delayed due to their pre-occupation. It is therefore, suggested that the Tehsildar, Kanungo who are on deputation with the HP Forest Department be delegated powers of demarcation of forsts to process encroachment cases expeditiously.

8.1.2.2 STRATEGY

8.1.2.2.1 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.

8.1.2.2.2 Cement mortar/Concrete boundary pillars should be used in encroachment prone areas and BPs should be depicted in digitized maps of the area which will be maintained a permanent record.

8.1.2.2.3 As a deterrent, FIRs should be registered as soon as an encroachment is detected. Court proceedings will then follow.

8.1.2.2.4 Latitude, longitude and altitude readings of all Boundary pillars (old and new) to be recorded in the BP register and database in the Division Office be stored in the soft and hard copies.

8.1.3 ILLICIT FELLING:-With development of good network of roads, there has been an increase in incidences of illicit felling.

8.1.3.1 SMUGGLING TIMBER:- The high price of timber in the market has attracted/created tendency to become rich overnight and hence the

smuggling of timber takes plance more than often. The illicit felling and smuggling are both related, many times organized. The incidences of smuggling have, however, reduced after the amendment in Indian Forest Act (2nd Amendment 1991) vide which DFO has been designated as Authorized Officer to hear cases pertaining to illegal transportation of Government Property i.e. timber, resin, khair-wood and katha and may order confiscation of both forest produce and vehicle involved. The amendment notification is given as Annexure IX. The detail of cases admitted and decided in the Court of Authorized Officer, Una under section 52 A of IFA is given below:

TABLE No. 8.1 Detail of cases detected/decided under section 52 A of IFA, 1927 (2nd Amendment Act 2001) in the Una Forest Division including Kutlehar Forests.

YEAR	TOTAL CASES	TOTAL NO. OF VEHICLES	DECIDED IN FAVOUR OF GOVT.	DECIDED IN FAVOUR OF ACCUSED	PENDING
1996		6	0	3	3
1997	5	5	0	5	0
1998	9	9	0	4	5
1999	10	10	1	1	8
2000	15	15	6	3	6
2001	5	5	1	4	0
2002	5	5	2	3	0
2003	1	1	0	0	1
2004	5	5	1	2	2
2005	3	3	0	2	1
2006	2	2	0	1	1
2007	1	1	0	1	0
2008	4	4	0	0	4
2009	2	2	0	0	2
2010	3	3	0	0	3
2011	1	1	0	0	1
2012	3	1	1	1	1
2013	4	1	2	2	0
2014	2	0	1	1	1

8.1.3.2 STRATEGY

8.1.3.2.1 RAPID RESPONSE TEAM: Establishment of *van thana* is proposed in the vulnerable Beats, at Talai bordering Santoshgarh Block of Una Range, at Tutru bordering Dehra Forest Division and at Talmera bordering Amb Block of Amb Range, that shall be merged.

Officials will work in *van thanas* as Rapid Response Team (which means they will also be provided with good communication network, mobile allowances, vehicle etc.) and will have exclusive responsibilities only of protection works including illicit felling, encroachment, forest fires, wildlife poaching etc.

8.1.3.2.2 Stringent action against offender will act as deterrent.

8.1.3.2.3 Whenever any vehicle is apprehended or timber is seized, these should be disposed-off immediately (after seeking permission from Court) before there is any depreciation in their value. This will save space and time wasted in keeping them custody.

CHAPTER IX

THE JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE

9.1. GENERAL:

This working circle will be overlapping working circle and includes both degraded forests as well as good forests, which needs immediate treatment through protection, afforestation, pasture development, soil and water conservation etc. Treatment plan and memorandum of understanding will be different for degraded and good forests. As in other parts of Himachal Pradesh, most of the rural populace in Kutlehar Forest of Una Forest Division uses significant quantities of forest goods and benefits from the services provided by the forest areas. There is lot of pressure on the forests, apart from the usual demand for fuel, fodder and timber. The other rights enjoyed by the right holders as per the provisions of the Settlements, also are a major stake in the forests besides the livelihood issues.

9.2. THE NEED FOR JOINT FOREST MANAGEMENT:

To address the long standing problems of deforestation and land degradation, the approach of involving local communities in an effective and meaningful manner, is gaining acceptance significantly. Even the present National Forest Policy, 1988 emphasises on participatory management and common property management. It also specifically mentions that to achieve the objectives of the Policy, a massive people's movement should be created, especially involving women. Consistent with the NFP of 1988, the Government of India, on 1st June 1990, issued policy instruction to all state governments supporting greater participation of

village communities and NGOs in regeneration, management and protection of the forests. In keeping with the above notification, the Government of Himachal Pradesh has formulated a policy vide No. Forest (c) 3-4/80-V dated 12-05-1993, supporting Joint management arrangements. Ever since village communities are being involved by the Forest department to further the aim of protection and management of forests and continuation of forest cover. The recognition of the link between socio-economic incentives and forest development has been singularly responsible in eliciting community participation. A new resolution of the Ministry of Environment and Forests dated February 21, 2000 has further strengthened the JFM programme and this circular interalia contemplates:

(a.) Legal back up to the JFM committees;
(b.) 50% members of the General Body should be women;
(c.) Extension of JFM in good forests areas, with sharper focus on activities concentrating on NTFP/NWFP management.

This resolution is an attempt to evolve a proactive and people friendly framework for meaningful implementation of the programme, though the detailed operational modalities to translate these concerns have not been spelt out. There are various schemes and projects, initiated by the H.P. government and some financed through External agencies e.g. externally aided projects that lay emphasis on people's involvement in forestry. The Sanjhi Van Yojana is a H.P. government and Forest Development Agency Una including areas of Kutlehar Forests is a Goverenment of India backed initiatives. The Government of Himachal Pradesh has issued a notification no. Fts-II (B)15-10/87 dated 23rd August 2001, called the Himachal Pradesh Participatory Forest Management Regulations, 2001. These rules shall be applicable to such government forests and lands, including common lands, where participatory management is envisaged.

9.3. JOINT FOREST MANAGEMENT IN HIMACHAL PRADESH:

In 1985, social forestry was given impetus by the National Social Forestry (Umbrella) Project. The project achieved its objective of planting, but physical targets took precedence over participatory objectives, and social and equity issues could not be addressed.In the 1980s the World Bank-supported Social Forestry project (1984-92) and the Indo-German Integrated Dhauladhar Project (1982-92) were taken up in HP. Both were more participatory than previous Forest Department Projects.A new scheme "Van Lagao, Rozi Kamao" was launched in 1992 in which plantation over 2 ha land was awarded to a person belonging to Antodaya category and in

lieu of protection and care of this area, the beneficiary was to be given remuneration depending upon the survival percentage of the plantation. In the 1990s both switched their focus to the Shivalik hills with the Indo-German Changer Project that went on till 2005-06, as did the World Bank IWDP Kandi Project.

The framework for JFM in HP is provided by the Government of HP Order of 12 May 1993, which followed the June 1990 Government of India (JFM) Circular enabling the spread of JFM. The HP Order was compiled following study of JFM resolutions issued by other states.The JFM Order coincided with the development of a donor-led (DFID) project for Mandi and Kullu districts, in which JFM was a key element. This Himachal Pradesh Forestry Project (HPFP) may be seen to have facilitated the introduction of JFM statewide. Donor support to Mandi and Kullu districts continued until March 2001.

Until 1998, JFM in HP was confined to donor-supported pilot activities (DFID, GTZ, World Bank). The participation was the buzzword from Delhi, a group of three or four FD staff were tasked with developing plans for the new scheme. The Chief Minister was persuaded to launch *Sanjhi Van Yojna* (SVY). 'Entry point activities' – such as making pots, water taps, mending temples, small infrastructure developments; all designed to attract people to the project – were given a budget so that DFOs could be seen to be dispensing something worthwhile. To support the state JFM Order, Participatory Forest Management (PFM) Rules were developed for HP, and notified on 23 August 2001. These Rules make provision for increasing the institutional autonomy of Village Forest Development Committees (VFDCs) by registering them as Village Forest Development Societies (VFDSs) under the Societies Registration Act. Importantly, the PFM Rules encourage VFDS formation panchayat wardwise thereby attempting to link these bodies directly with the panchayat structure with each elected panch being on the executive committee of the VFDS, *ex officio*. However, the role of the VFDSs continues to be viewed narrowly, focusing mainly on helping the HPFD to police forests and on wage-based micro-plan activities.This resulted in the 'New SVY' rules and guidelines being announced by the GoHP in August 2001. They contain provisions for VFDSs to become, in legal terms 'the forest officer' (not notified as on July 2011) for levying fines etc, and for 100 per cent share in intermediate usufructs while on final harvest 75 per cent would go to the VFDS and 25 per cent to the panchayat. The GoHP agreed to completely forgo any share from JFM areas.

Under 'New SVY': entry point activities are abandoned but "income-generating activities" introduced; forest guards will not be the member secretary of the Executive Committee; but local organisers – usually led by a literate woman linked to a local community-based organisation, helps mobilise towards a properly representative VFDS based on a panchayat ward. Several meetings are held before a microplan is initiated – this shows VFDS maturity. The FD sends a cheque to a local bank account. The VFDS agrees with the FD to furnish a 'utilisation certificate' which can be monitored and checked.

At the policy level the PFM Rules and SVY Rules and Guidelines of August 2001 are seen as a major step forward, laying the basis for uniformity in approach to community based forest management. It also makes JFM poverty focussed and is targeted to the resource dependent.

In 2003, MoEF started the Forest Development Agencies (FDAs) at district level – with DFOs getting direct access to central funding – for forest and plantation work for employment generation objectives. This is an 100 per cent central sector scheme, created to reduce the multiplicity of schemes with similar objectives (it merges four existing central schemes), ensure uniformity in funding pattern and implementation mechanism, avoid delays in availability of funds to the field level and institutionalize peoples' participation in project formulation and implementation. FDAs will be constituted at the territorial/ wildlife forest division level, and JFM committees will be the implementing agencies at grassroots level. FDAs are to work through forest guards / deputy rangers- and thus appear to conflict with SVY rules which allow for the member secretary to be elected by the JFMC / VFDS. The growth of FDAs and therefore of JFMCs since 2003 appears to be fluctuating as figures culled out from various departmental reports indicate. In March, 2003, 678 JFMCs were reported covering a forest area of about 1640 km^2 distributed in RFs, DPFs & UPFs. In March, 2005, 1690 JFMCs are reported covering a forest area of over 4200 km^2. As of December, 2008, 1381 JFMCs stand listed. However, as per field reports only 986 of these are said to be active. In March, 2010, a total of 1109 JFMCs have been reported covering again an area of about 4200 km^2.

9.4. SPECIAL OBJECTS OF MANAGEMENT:

(i) To inculcate in the people or right-holders a direct interest in forests development, conservation, protection and to make them aware of the values of the forests to the mankind.

(ii) To involve people / communities in the treatment of degraded forests through protection planning, afforestation, pasture development, soil and water conservation so as to arrest their further degradation and for sharing of usufructs.

To achieve these objectives it is suggested that all activities, as far as possible, should be carried out after involving local people. However, the general prescriptions of the working plan be adhered to. It is also suggested that species of local importance be preferred in afforestation activities. Such species should have economic value and should be fast growing, high yielding and of multiple use. Species that provide raw material for local industry, craftsmanship should be encouraged. Quick growing and high yielding grasses and legumes e.g. Hybrid Napier, provide immediate alternatives to fodder demand and should be introduced along with tree species to sustain people's interest in the closed areas. Bamboos should be planted in gullies, nalas and moist pockets as these would serve the dual purpose of soil conservation and fuel and fodder replenishment as these are relatively quick growing. An all out effort should be made to evolve a"Community-State Partnership".

9.5. STEPS INVOLVED IN JOINT FOREST MANAGEMENT:

Community participation is an important aspect of any joint management plan. The process of community involvement starts from identification of the village to problem analysis and in monitoring and evaluation of the programme. The sustainability of any such practice or activity depends on the level of participation. Participation fosters ownership of the people over the resources being managed by such joint activity and ensures better results.

Participatory planning helps in

- building the "we" feeling;
- involve and ensure the community's participation
- transparency
- brings clarity; and
- sustainability

9.6. APPROACH TO BE ADOPTED IN IMPLEMENTING JFM SCHEMES:

- Educate people on the aim and objectives of the programme/scheme before launching the programme/ scheme;

- Make extensive and intensive use of PRA techniques to formulate the plan and share the derived information with the people;
- Draw up a working scheme/ Microplan with the active involvement of the local people, ensuring representation of the heterogeneity of the group;
- Execute works and use PRA techniques for monitoring as well;
- Exemplify spirit of participation by well defined, lucid usufruct sharing mechanisms and transparency in accounting the expenditure on the works.

9.7. PAST EXPERIENCES/LESSONS LEARNT IN PARTICIPATORY APPROACHES:

The last three decades of dabbling with JFM / PFM under various EAPs and the homegrown SVY and now the Centrally administered FDA do hold some valuable lessons and insights for the future of participatory natural resource management in the state.

1. PFM should focus in and around pockets of poverty i.e. remote, forested areas (better forests) and where livelihood dependence on forests is high. This would entail several genuine joint management activities (other than plantation) like collective protection against illicit felling, fires, poaching and so forth. Issues of Rights, equity and benefit sharing are better addressed and conflicts resolved.

2. In participatory approaches, the ***process*** is more important than achieving targets. Choosing and regularly training the right persons for the job is therefore critical.

3. Sharing of removals, including resin, intermediate and salvage felling with VFDSs are necessary to establish long term stake of local communities in PFM.

4. Continual Policy and Rules adjustment and calibration to promote better market returns for wood and non-wood based enterprises. Example, the recent decontrol of bamboo trade and transit. Next: efficient markets for value added products.

5. Local Leadership – this is a critical role. Successful examples of 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.

9.7.1. SANJHI VAN YOJANA:

Sanjhi Van Yojana, a community based afforestation scheme has been launched in Himachal Pradesh on 25th December 1998. Under this scheme the communities as well as the NGOs are to be involved in the protection of the existing forest wealth as also to participate in holistic rural development. The main objectives of this scheme are -

(a.) Involvement of grass-root level institutions e.g. gram panchayats, mahila mandals, yuvak mandals, schools, VFDCs, NGOs etc. in eco-restoration.

(b.) Regeneration of degraded forest areas through community involvement.

(c.) Creation of social assets for the benefit of the communities.

(d.) Increasing the productivity of the forest areas by improvement of nursery stock through adoption of modern nursery techniques.

(e.) Re-orientation of forest staff for facilitating community participation.

(f.) Generation of employment opportunities in rural areas. (g.) To bring more area under tree cover by encouraging rehabilitation/ plantations of private wastelands on cost/ benefit sharing basis.

No specific duration for the scheme has been proposed and depending upon its success in the initial years, the scheme would be adopted as a model for natural resource management by the State Forest Department.

In order to execute the scheme, a Village Forest Development Society (VFDS) is to be constituted in the villages situated on the periphery of the forests. The VFDS will be a registered, non-political body representing almost all families of the village, migratory graziers, Antodaya/ IRDP and other landless families who are dependent on forests for their livelihood. The society will be registered by the DFO(T) under the Societies Act and the process of formation of VFDS will be assisted by the DFO or his representative, not below the rank of Range Forest Officer. The executive committee will have 10-15 members and the local Forest guard will be the Member Secretary till such time the VFDS is enabled to handle its own affairs. For this the forest guard will pick up a co-secretary from amongst the literate persons in the village to acquaint him with the process and facilitate taking over soon.

9.7.1.1. RESPONSIBILITIES AND DUTIES OF THE VFDS:

(a.) Assist the Forest department in planning, protection, afforestation etc. as per the approved Microplan;
(b.) Judicious use of all existing rights and their equitable distribution;
(c.) Inform the department about forest offenders;
(d.) Help the Forest department in extinguishing forest fires;
(e.) Persuade villagers to give available area for plantations
(f.) Fair and just distribution of usufructs;
(g.) Settlement of disputes between VFDS members;
(h.) Protect the assets created by the VFDS;
(i.) Honour all the commitments made with the department and the members of the VFDS.

9.7.1.2. RESPONSIBILITIES AND DUTIES OF THE FOREST DEPARTMENT:

(a.) To recognise the VFDS and give full weightage to its recommendations;
(b.) To explain the contents of the Microplan to the VFDS members;
(c.) To provide technical know-how to the Executive body to carry out its responsibilities.
(d.) To honour the commitments made with the VFDS.

The areas taken up under the SVY scheme would primarily be degraded forests, government lands, existing poorly stocked plantation. These would be notified under Section 38 of the IFA. The area should not overlap with any other scheme and those with minimal conflicts would be given priority. The microplan would cover a period of 5-7 years and would contain 60% of the total activities for afforestation component and NTFPs. To ensure participation through creation of stakes of the communities to encourage their owning up the assets created by them, the VFDS will contribute 1% of the total cost of the microplan in cash and 4% as "shramdaan" (Voluntary labour) for the various works to be executed under the microplan.

9.7.1.3. PROGRESS OF WORKS UNDER JOINT FOREST MANAGEMENT SCHEMES: The area tackled in Kutlehar Forests of Una Forest Division as it stood on 31.3.2010 under Sanjhi Van Yojana amounts to approximately 300 hectares in various JFMCs as mentioned in table 9.1.

Table 9.1. showing the JFMCs tackled under Sanjhi Van Yojana.

RANGE	BLOCK	BEAT	JFMC
Bangana	Sohari Takoli	Akoi-ki-Dhar	Berrian
	-do-	Chouli	Behlan
	Bangana	Bangana	Muchhali
	-do-	Paniala	Dharet
	-do-	Paniala	Pansai
	Arlu	Bharmout	Sar
Ramgarh	Talmera	Amroh	Ambhera
	Thana-Kalan	Mo-Maniar	Ludher
	Thana-Kalan	Mo-Maniar	Mo-Khas
	Thana-Kalan	Makrer	Tanda
	Raipur	Proian	Proian
	Raipur	Raipur	Kolka

All the ranges i.e. Bangana and Ramgarh were involved in the scheme. It is observed that activities pertaining to afforestation, soil conservation, assisted Natural regeneration along with some entry point activities (EPAs) are being carried out after formulation of a microplan which is prepared using participatory methodologies. The entry point activities generally include construction or repair of village paths, construction of small rooms in Panchayat buildings and school buildings, augmentation of drinking water supply and irrigation channel etc. Under the soil conservation component checkdams and spurs are being constructed.

So far 300.00 ha area has been treated under the afforestation and Assisted Natural Regeneration components by the ten village forestdevelopment societies. In a modification of the scheme, now named as the "Parishkrit Sanjhi Van Yojana" scheme, notified vide No. FFE-C (9). 1/2001 dated 23rd August 2001, and the existing Sanjhi Van Yojana Scheme 1998, the Parishram Hamara, Van Hamara Scheme,2000 and the Apna Van, Apna Dhan Scheme, which was proposed to be launched during 2001 were clubbed together to constitute the Sanjhi Van Yojana Scheme, 2001. This scheme is goverened by the Participatory Forest Management Rules, 2001.

The following salient modifications have been made in the new scheme:

(a.) Each VFDS shall be required to make cash contribution of 15% of the annual outlay under the approved micro-plan.

(b.) In order to enhance the economic stake of the rural communities, forest related income generation activities shall be promoted under thisscheme, which shall commence only in the second or third year of the micro-plan.

(c.) Inputs sharing arrangement has been made especially to promote social fencing, wherein the funds normally spent on fencing will be made over to the VFDS, who would be at liberty to decide how to use these funds for the protection of the plantation. Table 9.2. tabulates the differences between the original and modified Sanjhi Van Yojana schemes.

Table 9.2. Differences between SVY I and SVY II

S. No		***SVY-I***	***SVY-II***
1.	MOU and rules	There was no such special provision	Forest department shall frame these rules in consonance with the PFM rules
2.	Choice of Member Secretary	Forest guard will be the member secretary	Any literate person chosen by the General House can become the member secretary. He will later on be trained by the forest department.
3.	Size of the VFDC	No limit prescribed	About 100 families to constitute one VFDC
4.	Membership of the VFDC	Only one male and one female member of the family are members	All adults in a family can be members, but atleast one male and one female member should be represented.
5.	Quorum	Only for approval of microplan, 50% of the members are required to be present.	For the General House presence of 60% members, half of which should be women, is essential. The Quorum for the executive committee is 70%, of which half should be women.
6.	Organisation of Meetings	The General House Meeting is to convened at least once every year.	The general House is to meet at least twice per year while the Executive has to meet once every three months.
7.	Term of the Executive Committee	One year	Two years, after which the General house shall again elect the executive. Each Executive member shall serve for a maximum of two terms only.
8.	Cost sharing mechanism in microplan	4% as labour 1% in cash	At least 15% in cash which will have to be deposited before release of Grant in aid. In afforestation works this contribution can also be in the form of labour.
9.	Activities at the Entry Point	25% funds of the microplan can be utilised for non-forestry activities	25% of the microplan's funds would be spent on Income generation activities and on forest and soil protection works, in consultation with the VFDC.
10.	Usufruct Sharing	a. VFDC members can collect fallen twigs, grass, fruits, flowers, seed and naturally growing NTFPs. b.50% of the income from	a. All products, including NTFPs from the Project area and all benefits from the plantation areas shall accrue to the VFDC. b. On maturity 75% of the harvest

		plantation areas raised by the VFDC will be deposited in the government treasury. c. On maturity of these plantations, 25% of the harvest value shall be given to the Executive of the VDC for distribution among members; 25% will be deposited in the VDC membership fund for development works in the area; 10% of the remaining half shall go to the concerned Panchayat and 40% to the government exchequer.	value shall go to the VFDC and 25% to the concerned Panchayat. It is mandatory to utilise 40% of this money for forest development and soil conservation.

9.8. FOREST DEVELOPMENT AGENCY: - The JFMC wise area tackled in Kutlehar Forest of Una Forest Division as it stood on 31.3.2015 under FDA is given in Table 9.3.

Table: 9.3. Areas Tackled under FDA (ha)

Sr.No.	**Name of JFMC**	**Area tackled (ha)**
1	Bharmot	15
2	Nanawin	18
3	Kodra	14
4	Barrian	10
5	Lukhroon	14
6	Sar	12
7	Dharet	8
8	Behlan	12
9	Gharwasra	8
10	Kusiala	18
11	Tanda Bagwan	12
12	Kolka	15
13	Ambhera	12
14	Mohkhas	18
	Total	**186**

Source: Kutlehar Forests of Una Forest Division.

Under FDA Project an area of 1000 ha area has been treated under Assisted Natural Regeneration and Management Intervention components through forty two Joint Forest Management Societies.

9.9. PAYMENT FOR ECOSERVICES: - According to Wunder (2005), PES can be defined as a voluntary transaction where a well-defined environmental service (ES) (or a land-use likely to secure that service) such as Water is being 'bought' by a (minimum one) ESbuyer from a (minimum one) ES provider if and only if the ES provider secures ES provision conditionally. All PES schemes share an objective: providing environmental services that are undersupplied due to the lack of compensatory mechanisms. They provide a mechanism through which services can be provided in a cost efficient manner. PES schemes seek to formulate a certain value to environmental services and establish appropriate pricing, institutional and redistribution systems that will lead to sustainable and socially optimal land use practices. These schemes tend to work best when the value of environmental services is high for beneficiaries and the cost of providing the services is low.

The GoHP has notified the state policy on payment for PES in HP vide notification No. FFE-B-C (15) -3/2005-II Dated 02/11/2013 emphasizing sustained flow of eco services system, to incentivize Es generators through adopting an eco system approach in decision making.

9.10. CONSTRAINTS TO PARTICIPATORY MANAGEMENT:

There is a general lack of enthusiasm in embracing the idea of shared management in the forestry sector by the people and though some inroads have been made with the communities, a lot more thrust needs to be given to popularise the concept among the masses. The main causes for this lack of encouraging response among people are:

(a) There is a general apathy of the youth to participatory programmes related to rural sector because with acquiring college education all youth strive for white collared jobs and anything that keeps them back in villages does not enthuse them.

(b) Lack of proper education of the government programmes and insufficient extension activities of the department.

(c) Long gestation period of forestry activities.

(d) Too much dependence of the public on government and subsidy, cost sharing in such activities is generally not accepted.

(e) Reluctance of government functionaries to hand over control of resources to people or even partially share their “power” with the people.

(f) Lack of proper legislation on participatory management and usufruct sharing.

(g) Need to promote income generating activities under JFM programmes.

(h) Frequent changes in schemes and discontinuation of old schemes which leads to mistrust of people in government.

9.11. MONITORING AND EVALUATION:

The monitoring of the progress and performance of the activities taken under this working circle under different schemes should be done at the Divisional level. Evaluation of the schemes should be planned at an interval of three years involving third party monitoring.

CHAPTER X

WILDLIFE MANAGEMENT (OVERLAPPING)WORKING CIRCLE

10.1GENERAL CONSTITUTION

As per the Wildlife Protection Act 1972, wildlife includes both flora and fauna. However in this working circle concentration will be on fauna only as flora is being focused in other working circles. This working circle has been constituted for protection and conservation of wildlife found in the forests as well as non-forest areas in the Kutlehar Forests of Una Forest Division.

10.2IMPORTANCE OF WILD LIFE

Faunal and Floral life (Biodiversity) play a significant role in maintaining the balance of nature. The value and importance of it from scientific, aesthetic, economic and recreational points of view is immense and is recognized the world over and therefore, adequate protection, and the scientific management of it is absolute necessity. In wider perspective, it is Biodiversity conservation and development and also its further research, which makes it more important.

Forests provide an excellent opportunity to man to study living beings in their natural environment. In addition to this, there are material considerations as well, especially ecological. These animals and plants through the intricate food web maintain the delicate balance of nature and any breach in this chain can cause over- population of any one species, which may prove detrimental to human interests. Wild life is a source of sport and enjoyment to people and fetches revenue to the State as well. If the people are led to know the importance and worth of wild life they will appreciate it as an asset and put in efforts to conserve them.

10.3 DISTRIBUTION OF WILD LIFE

The distribution of wild life has been described in details in the beginning of Part-I of the Plan.

10.4 OBJECTIVE OF WORKING CIRCLE:

This will be an overlapping working circle to ensure that all silvicultural prescriptions nurture local wildlife and its habitat.

10.5 SPECIAL OBJECTS OF MANAGEMENT

1. To identify, preserve and protect the wild life representative of the area.
2. To supplement the existing natural vegetation by planting fruit and fodder species with special emphasis on trees, shrubs and herbs that provide habitat and food to wildlife.
3. To mitigate man-animal conflict especially the ever increasing conflicts with semi-commensal rhesus monkeys and leopards.
4. To act as a source of education for the local population, and thereby create awareness about the value of wildlife and its habitat.
5. To ensure collection of scientific data for the maintenance and development of viable population of fauna for scientific, aesthetic, cultural, ecological and economic purposes.
6. To protect and improve upon existing population of endangered species of wild life both faunal and floral found in the tract.

10.6 MANAGEMENT OF WILDLIFE FOUND IN THE KUTLEHAR FORESTS OF THE UNA FOREST DIVISION

The responsibility of managing the Protected Areas lie with Wildlife Wing of the Department and that of managing the wild life falling outside areas lies with the concerned territorial DFO. As a result the territorial DFO's have been declared Wildlife Wardens within their territorial jurisdictions vide HP Govt. letter No. FFE-D-A (10) -1/2005 dated 15th Dec., 2011. This working plan is concerned with management of wildlife in Kutlehar Forests of Una Forest Division, which is totally outside any protected areas.

The forests have limited capacity to old wildlife and at best they provide temporary shelter to birds for roosting and nesting. It is worth mentioning here that the presence of wildlife is not abundant in the forests. The heavy biotic pressure like the vehicular traffic along roads, the habitation areas along such forest areas and the rapid urbanization in many areas also contributes to the negligible presence of wild animals.

Whatever little wildlife exists, it survives mainly in the bigger forests of miscellaneous broad leaved species. The common wild animals are Nilgai, *Canis*

aureus (jackal), *Herpestes edwerimi* (common mongoose), *Lepus negricollis*(common hare), *Felis* spp (jungle cat) and Rhesus macaque etc. There are reptiles like monitor lizard, garden lizard, *Naja naja* (cobra), rats and other reptiles in the area. A large number of bird species are also found all over this part of the Division.

Common birds found in the Kutlehar Forests are jungle-fowl, bulbul, baya, wood-pecker, common bee-eater, cattle-egret, kingfisher, Indian cukoo, common koel, grey hornbill, tree pie, common Indian kite, doves, pigeons, rose-ringed parakeet, crow pheasant, Indian myna etc.

10.7 WILD LIFE PROBLEMS OF THE TRACT

10.7.1 Leopard problem: There have been many cases of damage to cattle by leopards in the Kutlehar Forests, who target these cattle in the forests or grazing lands. Instances of cattle lifting from cattle sheds are also not uncommon. Though injury and casualty in cases of human beings has not been reported during the last few years, there have been a few instances when a leopard has created panic by venturing into the dwelling houses in villages and had to be captured by setting traps and cages.

10.7.2 Monkey Problem: Monkey population has increased manifold in the Kutlehar Forests and there lot complaints of crop depredation by them. All along the highways, monkeys can be seen in troops and pose threat to tourists and passersby. They have left the interiors of the forests and are seen residing near habitations/roads/*dhabas* waiting their time for offerings from tourists, many of whom feed them generously with bread, *chanas*, bananas, food etc. Some steps to curb and cull the monkey population are urgently required and wildlife management practices need to be enforced.

10.7.3 Wild Boars: These animals also pose a nuisance both in agricultural fields as well as forests areas, especially plantations. In the forest areas, they dig out the plants, while in the fields they destroy standing crop and vegetables. Sometimes, wild boars attack human beings. A lot of complaints are received for the elimination of this animal.

10.8 SUGGESTIVE MEASURES TO CONTAIN THE CONFLICT

10.8.1 Proactive measures:

10.8.1.1 As the current policy of compensating people for damage caused to life and domestic animals doesn't cover crops, farmers are not compensated for loss to their agricultural fields. There is need to develop some mechanism of crop insurance to cover this loss.

10.8.1.2 Farmers are already using various methods of scaring away the predators, by scare crow, lighting a fire etc.

10.8.1.3 A proper census to be done of all the species to determine the carrying capacity of the forest sand keep the population with normal limits.

10.8.1.4 Leave adequate undisturbed space for wildlife to grow and nurture.

10.8.2 Reactive measures:

10.8.2.1 It is imperative that once damage is done either to life, domestic animals or crops, compensation should be quick, easy and adequate to avoid elimination of the predator by the sufferers.

10.8.2.2 **Removal of problem animals either by shooting or capturing and release in suitable locations** In this regard a detailed Rescue and Release Policy has been formulated for the State. In Himachal Pradesh, all DFOs, Wildlife & Territorial Divisions are appointed Wildlife Wardens under Section 4 of Wildlife (Protection) Act, 1972. An amendment to Section 11 of the *ibid.* Act states "… Provided further that no such captured animal shall be kept in captivity unless the Chief Wildlife Warden is satisfied that such animal cannot be rehabilitated in the wild and reasons for the same are recorded in writing". Sole responsibility of rescue & release shall rest with Wildlife Wardens in their respective jurisdiction. The HP Forest Department shall make a rescue team comprising of staff i.e. 2-3 Forest Guards well trained and properly equipped in each Division in the State. The Department shall focus on capacity building of these rescue teams by way of imparting hands-on training for rescue teams to develop and enhance their skills. Rescue team

shall deal with calls or receive or gather any information related to the proper records of information received or so gathered. Team shall also render advice with regard to safety precautions as per the situations. They shall immediately transfer the received or gathered information to the repective Wildlife Warden. The team shall conduct rescue operation as and when needed under the guidance of respective Wildlife Warden or any other officer authorized by the Wildlife Warden in the Forest or Wildlife Division.

10.8.3 Controlling Monkey and Animal Menace Following strategies have been tried in the past -

10.8.3.1 **Translocation**:-Monkeys from problem areas near habitations were caught and released in isolated areas. However it has been noticed that monkeys return back to their original areas or create nuisance in the new area by migrating to closest habitation. Hence this practice has been stopped.

10.8.3.2 **Shooting of crop damging and other problem causing animals**: Vide letter No. 6-2/73 – SF – IV dated 21-6-1984 issued by GoHP, the department was permitted to hunt monkeys and eight other species for damaging crop in cultivated fields. However, in view of stay imposed by Hon'ble High Court of HP, presently hunting is not being allowed.

10.8.3.3 **Sterilization Program**:-The Monkey Sterilization Centre at Boul on Una-Bangana Highway has been established and the another Sterlization Centre is being established at an estimated cost of Rs. 1.05 crores at Ispur on the Una-Hoshiarpur Highway. The Boul Centre is equipped with modern laser technology for conducting sterilization surgery on both males and females. However, as monkeys are released at the same location from where they were caught, it would take some time before the impact of this program becomes visible.

10.8.4 Legal Position Wildlife (Protection) Act, 1972 is enforced in the HP State to save wildlife both flora and fauna. Under the above Act, Forest Officers have been duly empowered for implementation of the policies for protection & conservation of wildlife. Officers are vested with

powers of detection of illegal wildlife crime. Hunting, shooting and capturing of wild animals and birds are not allowed. However, Chief Wildlife Warden of the State is empowered under the Act to permit shooting of any animal which become dangerous for the human life or when they became menace to human habitation to avoid man animal conflict.

10.8.5 Injuries to which Wildlife are liable

10.8.5.1 Reduction in habitat: This is as a result of increasing urbanization. The reduction in habitat forces the wild animals to stay into inhabited areas in search of food and shelter.

10.8.5.2 Fire: Fire destroys the vegetation and the roosting sites of the wild animals. In the months of March-July, fire may sweep through the forests, as the forest floor is very dry. Besides, there is a tendency of adjoining farmer to use to burn the agricultural wastes in the field itself which pose danger to the forest and wildlife.

10.8.5.3 Grazing:- Grazing is rampant all over the District Una and reduces the forage available for wildlife besides physically trampling their niches.

10.8.5.4 Poaching:- Poaching is not ruled out. The Wildlife as well as the Forest Department does book the poacher but they have severe limitations of staff to check poaching.

10.8.6 Maintenance and Improvement of Wildlife Habitat:-The maintenance of the habitats of wildlife will be ensured through the provisions in the silvicultural system of all the Working Circles being implemented in the Division. In order to protect and herbivores this population of wildlife it should be ensured that:

10.8.6.1 Plantation for shelter: Plantations may be raised at some important places for shelter of the animals if such tree covers do not exist. Besides, scattered vegetation covers may be created by raising plantations throughout the forest areas for facility of the extension of the habitat of the wildlife**.**Some dead dry trees **w**hich form nesting places of birds are to be retained.

10.8.6.2 Raising of grass plantation for herbivores: Palatablegrass plantations for herbivores may be raised in a scattered manner for keeping such animals inside forest and saving agricultural crops of the adjoining field.

10.8.6.3 Raising of fruit trees for birds: Some trees like jamun (*Syzygium cuminii*), ber(*Zizyphus mauritiana*), *Ficus* spp whose fruits are eaten by birds are to b eraised in scattered manner throughout forests if such trees are found deficit. Fruit trees along strips are to be retained. Naturally growing ber trees must be given special attention and should be protected.

10.8.6.4 Water-holes: Water is a problem in summers so it is necessary to dig up some ponds or tanks at some important points for the facility of making the drinking water available to animals in summer months.

10.8.6.5 Salt-licks: Herbivores suffer from salt deficiency. So it will be better to have some salt-licks at some convenient places for herbivores. The regulated intake of salt will improve the health of herbivores and other animals.

10.8.6.6 Protectionfrom fire by removing the dry-grasses, weeds and other inflammable materials from the surrounding area. Legal actions are to be taken for lighting fire in forests, which will help in protection of wildlife.

10.8.6.7 Protection from illegal poaching and prosecuting the offenders strictly as per provisions of the Wildlife Protection Act, 1972 and other relevant Acts.

10.8.6.8 Spreading of awareness among the people, especially of the nearby areas regarding the importance of wildlife, the responsibility of people towards conservation as well as consequence in case of violations.

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CHAPTER XI

NTFP (OVERLAPPING) WORKING CIRCLE

11.1 GENERAL

Earlier, the management of forests was based on production of timber and earning of revenue. The non-timber forest products were considered to be much lesser importance. After 1980, the earning of revenue from forests and there management for commercial production of timber has been removed from the policy framework and objects of management. The 1988 National Forest Policy emphasizes on in situ conservation of natural eco-systems. Conservation and propagation of non-timber forest products and their contribution towards local/tribal economy has also been given importance in the policy.

The forests covered under this working plan have plenty of species giving minor forest products. Resin, Katha, material of medicinal importance, tannins, bamboos and grasses etc. are the important NTFPs.

11.2 OCCURRENCE AND UTILITY

The main species yielding NTFPs and their utility are listed below:-

Table No. 11.1: Various NTFPs occurring in the Una Forest Divsion

Name	Botanical name	Plant type	Part used	Uses
Chil Pine	*Pinus roxburghii*	Tree	Resin extract	Resin,Turpentine
Khair	*Acacia catechu*	Tree	Heartwood bark	Kattha.Tennin,
Kikar	*Acacia nilotica*	Tree	Bark	Tennin
Amaltas	*Cassia fistula*	Tree	Fruit	Ayurvedic Medicine
Amla	*Emblica officinalis*	Tree	Fruit	AyurvedicMedicine
Daru	*Punica granatum*	Tree	Seed	Spice
Arjun	*Terminalia arjuna*	Tree	Bark	AyurvedicMedicine
Basuti	*Adhatoda vasica*	Herb	Whole	Alkaloids Essential oils
Behera	*Terminalia belerica*	Tree	Fruit	AyurvedicMedicine
Brahmi	*Centella asiatica*	Herb	Whole	AyurvedicMedicine
Safeda	*Eucalyptus*spp	Tree	Leaves	Oil extracts
Dhara-phool; Dhawi	*Woodfordia fruiticosa*	Shrub	Flower	AyurvedicMedicine
Harad	*Terminalia chebula*	Tree	Fruit	AyurvedicMedicine
Aam	*Mangifera indica*	Tree	Fruit	Fruit,pickle
Ak	*Calotropis procera*	Shrub	Leaves	Veterinary Medicine
Jamun	*Syzygium cuminii*	Tree	Fruit	Fruit

Sal	*Shorea robusta*	Tree	Seed	Oil
Kachnar	*Bauhinia variegeta*	Tree	Fruit/flower	Vegetable/pickle
Neem	*Azedirachta indica*	Tree	Leaves/fruits	AyurvedicMedicine
Khajoor	*Phoenix sylvestris*	Tree	Fruit	Fruit
Ber	*Zizyphus mauritiana*	Shrub	Fruit	Fruit
Bel	*Aegle marmelos*	Tree	Fruit	AyurvedicMedicine
Gandhla	*Murraya koenigii*	Shrub	Leaves	Spices
Ritha	*Sapindus mukorossi*	Tree	Fruit	Detergent
Mahua	*Madhuca indica*	Tree	Flower/seed	Alcohlic extracts/oil
Bhang	*Cannabis sativa*	Shrub	Whole	Fibre,medicine, Marijuana

Apart from above species, following grasses and bamboos also occur throughout the tract.

Grasses:

Lambi	*Aristida depressa*
Dholu	*Chrysopogan montana*
Makora	*Cymbopogan martinii*
Bagar	*Eulaliopsis binata*
Lambh	*Hetropogon contortus*
Kahi	*Saccharum spontaneum*
Lunj	*Sorghum nitidum*

Bamboos:

Magar	*Bambusa arundinacea*
Bans	*Dendrocalamus strictus*
Mohar	*Dendrocalamus hamiltonii*

The above NTFP species occur throughout the tract, both in the forests and non-forest areas which included land ceiling area and *Shamlat* also.

11.3 CONSERVATION AND DEVELOPMENT PLAN

For the extraction, processing and marketing of resin and Katha, sufficient number of agencies already exists. Forest Department does not need to do much except to ensure enforcement of legal provisions of various acts. For all other NTFP species, forest department needs to intervene in following manner:-

i. Important NTFP species should be retained as reserves while marking.

ii. NTFP species should be given due importance in plantation programme. Exclusive NTFP plantation should be raised at suitable sites. Elsewhere 5 to 10% of the seedlings of NTFP species are planted at suitable locations

in plantation areas. Healthy nursery stock of such species should be made available to the private people desirous of planting them in their fields.

iii. Villagers should be encouraged to include NTFP species in JFPM micro plans.

iv. District Administration should be requested to provide all help to the local people in establishment of small scale processing and marketing units for NTFPs. This will help in making collection/ growing of NTFPs remunerative.

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CHAPTER-XII

Climate Change.

Human Effects on Climate

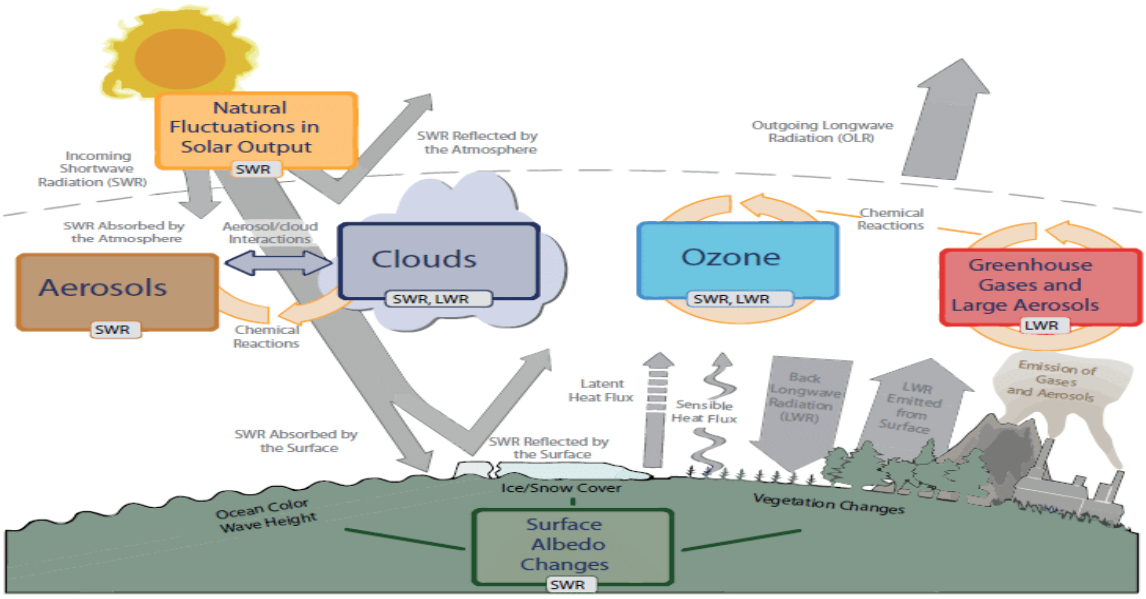
Human activities are continuing to affect the Earth's energy budget by changing the emissions and resulting atmospheric concentrations of radiatively important gases and aerosols and by changing land surface properties. Previous assessments have already shown through multiple lines of evidence that the climate is changing across our planet, largely as a result of human activities. The most compelling evidence of climate change derives from observations of the atmosphere, land, oceans and cryosphere. Unequivocal evidence from in situ observations and ice core records shows that the atmospheric concentrations of important greenhouse gases such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) have increased over the last few centuries.

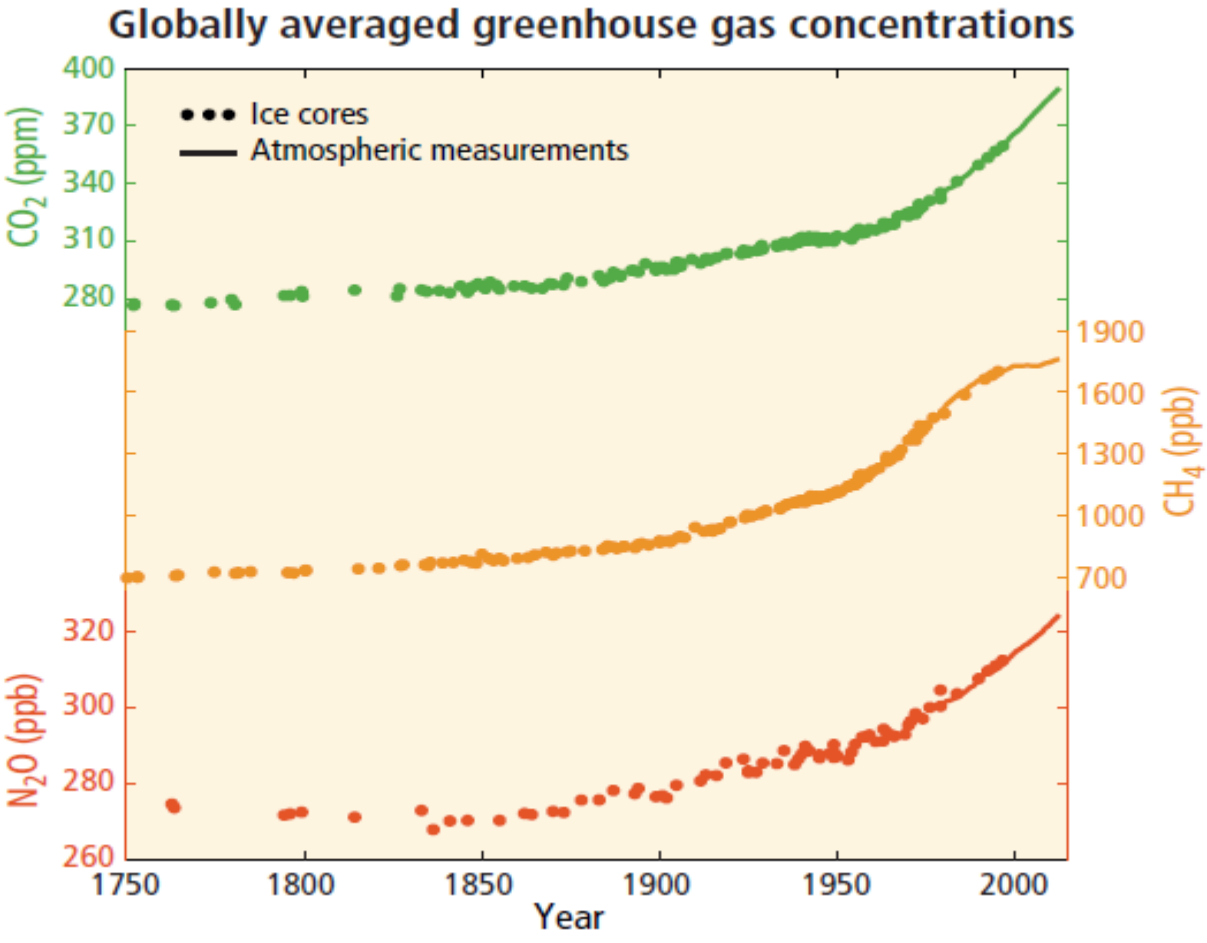
12.1 Definitions of climate change

Climate Change in IPCC usage refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity.

This usage differs from that in the United Nations Framework Convention on Climate Change (UNFCCC), where climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods.

Main Drivers of Climate change.





The physical science

Warming of the climate system is unequivocal and can now be firmly attributed to human activity. Numerous long-term changes in climate have been observed at continental, regional and ocean basin scales, including changes in arctic temperatures and ice, widespread changes in precipitation amounts, ocean salinity, wind patterns and aspects of extreme weather including droughts, heavy precipitation, heat waves and the intensity of tropical cyclones.

• The 100-year linear warming trend (1906-2005) was 0.74°C, with most of the warming occurring in the past 50 years. The warming for the next 20 years is projected to be about 0.2°C per decade.

• Continued greenhouse gas emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century.

• Projections of future changes in climate indicate for example the following:

1. Increasing atmospheric carbon dioxide concentrations lead to increasing acidification of the oceans;
2. Snow cover projected to contract, widespread increases in thaw depth over most permafrost regions; o Sea ice projected to shrink in both Arctic and Antarctic, and arctic late-summer sea ice may disappear almost entirely by the latter part of the 21st century;
3. Hot extremes, heat waves and heavy precipitation events very likely to continue to become more frequent;
4. Changes in precipitation patterns, with increase being very likely in high latitudes, while decreases are likely in most subtropical land regions;
5. Anthropogenic warming and sea level rise would continue for centuries due to the time scales associated with climate processes and feedbacks, even if greenhouse gas concentrations were to be stabilized.

12.2 Climate change impacts, adaptation and vulnerability

Observed Impacts

Many natural systems, on all continents and most oceans, are being affected by regional climate changes, particularly temperature increases. Observed impacts include: United Nations Framework Convention on Climate Change February 2011 3

1. Changes in snow, ice and frozen ground (including permafrost);
2. Effects on hydrological systems;
3. Changes on terrestrial biological systems;
4. Trend towards earlier "greening" of vegetation and longer thermal growing season;
5. Changes in marine and freshwater biological systems associated with rising water temperatures, as well as related changes in ice cover, salinity, oxygen levels and circulation;
6. Ocean acidification with an average decrease in pH of 0.1 units. The associated effects on the marine biosphere were not documented at the time of the assessment.

Projected future impacts

As regards the projected impacts, more specific information is now available on the nature of these impacts, across a wide range of systems and sectors. Examples of projected impacts include:

Fresh water resources and their management

1. Runoff and water availability are projected to increase at high latitudes and in some wet tropics, and decrease over much of the mid-latitudes and dry tropics, some of which are presently water-stressed areas.
2. Drought-affected areas will probably increase, and extreme precipitation events, which are likely to increase in frequency and intensity, will augment flood risk.
3. Hundreds of millions of people are projected to be exposed to increased water stress.

Ecosystems

1. The following ecosystems are identified to be most vulnerable, and are virtually certain to experience the most severe ecological impacts, including species extinctions and major biome changes:
    a) On continents: tundra, boreal forest, mountain and Mediterranean-type ecosystems;
    b) Along coasts: mangroves and salt marshes, due to multiple stresses.

c) In oceans: coral reefs and the sea-ice biomes.

2.The progressive acidification of the oceans is expected to have negative impacts on marine shell-forming organisms such as corals and their dependent species.

3. An intensification and expansion of wildfires is likely globally, as temperatures increase and dry spells become more frequent and more persistent.

4. Over the course of this century, net carbon uptake by terrestrial ecosystems is likely to peak before mid-century and then weaken or even reverse, thus amplifying climate change.

Food, fiber and forest products

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1. Moderate warming benefits cereal crops and pasture yields in mid- to high-latitude regions, but even slight warming decreases yields in seasonally dry and tropical regions. Further warming has increasingly negative impacts in all regions.
2. Increases in the frequency of droughts and floods are projected to affect local crop production negatively, especially in subsistence sectors at low latitudes.
3. Regional changes in the distribution and production of particular fish species are expected due to continued warming, with adverse effects projected for aquaculture and fisheries.

Coastal areas and low-lying areas

1. Coasts are very likely to be exposed to increasing risks, including coastal erosion, due to climate change and sea-level rise. The effect will be exacerbated by increasing human-induced pressures on coastal areas.
2. In addition to sea level rise, low-lying coastal systems are likely to be affected due to increased risk from extreme weather events.
3. Many millions more people are projected to experience severe flooding every year due to sea-level rise by the 2080s. Those densely-populated and low-lying areas where adaptive capacity is relatively low, and which already face other challenges such as tropical storms or local coastal subsidence, are especially at risk. The numbers affected will be largest in the mega-deltas of Asia and Africa, while small islands are especially vulnerable.

4. Ocean acidification is an emerging issue with potential for major impacts in coastal areas, but there is little understanding of the details. It is an urgent topic for further research.

Health

1. Projected climate change -related exposures are likely to affect the health status of millions of people worldwide, particularly those least able to adapt, such as the poor, the very young and the elderly.

Industry, settlement and society

1. Areas most likely to be affected are the poorer, often rapidly expanding communities near rivers and coasts, which use climate sensitive resources and are prone to extreme weather.
2. Where extreme weather events become more intense and or more frequent, their economic and social costs are predicted to increase.

Regions that will be especially affected

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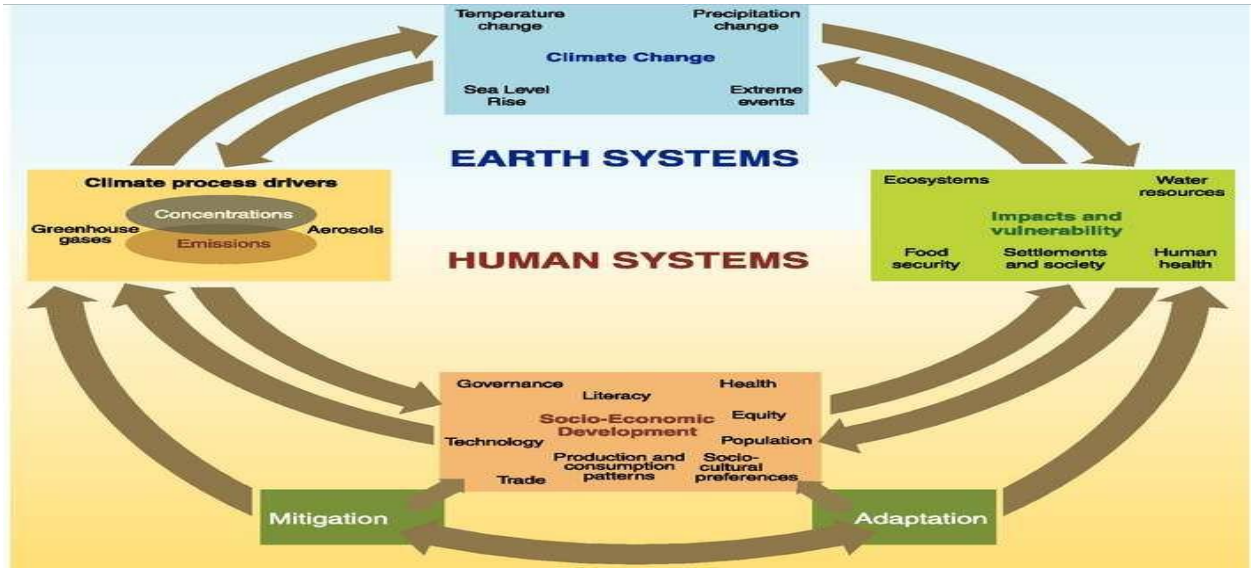
1. The Arctic, due to impacts of high rates of projected warming on natural systems and human communities.
2. Africa, because of low adaptive capacity and projected climate change impacts;
3. Small islands, where there is high exposure of population and infrastructure to projected climate change impacts.
4. Asian and African mega deltas, due to large populations and high exposure to sea level rise, storm surges and river flooding.



Mitigation of Climate Change

GHG emission trends

1. Global greenhouse gas emissions have grown since pre-industrial times, with an increase of 70 percent between 1970 and 2004 (24 percent between 1990 and 2004).
2. With current climate change mitigation policies and related sustainable development practices, global GHG emissions will continue to grow over the next few decades.

A. Mitigation in the short and medium term up to 2030

There is a substantial economic potential for the mitigation of global greenhouse gas emissions over the coming decades, sufficient to offset the projected growth of global emissions or reduce emissions below current levels.

B. Mitigation in the long term (after 2030)

C.

a. Global emissions must peak and decline thereafter to meet any long-term GHG ` concentration stabilization level.
b. The lower the stabilization level, the more quickly this peak and decline must occur.

c. The most stringent scenarios could limit global mean temperature increases to 2 - 2.4C above pre-industrial level .This would require emissions to peak by 2015 the latest and decline by 50-85 percent compared to year 2000 emissions by 2050.
d. Mitigation efforts over the next two to three decades will determine to a large extent the long-term global mean temperature increase and the corresponding climate change impacts that can be avoided.

Responding to climate change

Societies can respond to climate change both by reducing the rate and magnitude of change by reducing GHG emissions (mitigation), and by adapting to its impacts. Many impacts can be avoided, reduced or delayed by mitigation, but adaptation will be necessary to address impacts resulting from the warming which is already unavoidable due to past emissions.

The capacity to adapt and mitigate is dependent on socio-economic and environmental circumstances and the availability of information and technology. However, much less information is available on the costs and effectiveness of adaptation measures than about mitigation measures.

Adaptation options

1. Adaptation can reduce vulnerability, both in the short and the long term.
2. Vulnerability to climate change can be exacerbated by the presence of other stresses, arising for example from current climate hazards, poverty, unequal access to resources, food insecurity, trends in economic globalization, conflict and incidence of diseases such as HIV/AIDS.
3. Adaptation will be required at regional and local levels to reduce the adverse impacts of projected climate change and variability, regardless of the scale of mitigation undertaken.
4. A wide array of adaptation options is available, but more extensive adaptation than is currently occurring is required to reduce vulnerability to future climate change. There are barriers, limits and costs, but these are not fully understood.
5. Adaptive capacity is intimately connected to social and economic development, but it is not evenly distributed across and within societies.

Mitigation options

1. There is substantial economic potential for the mitigation of global GHG emissions over the coming decades that could offset the projected growth of global emissions or reduce emissions below current levels (high agreement and much evidence)
2. In all analyzed world regions, near-term health co-benefits from reduced air pollution, as a result of actions to reduce GHG emissions, can be substantial and may offset a substantial fraction of mitigation costs (high agreement and much evidence); United Nations Framework Convention on Climate Change February 2011
3. There may be effects from Annex I countries action on the global economy and global emissions, although the scale of carbon leakage remains uncertain (high agreement, medium evidence)
4. Changes in life style and behavior patterns can contribute to climate change mitigation across all sectors. Management practices can also have a positive role (high agreement, medium evidence)
5. Policies that provide a real or implicit price of carbon could create incentives for producers and consumers to significantly invest in low-GHG products, technologies and processes
6. A wide variety of national policies and instruments are available to governments to create the incentives for mitigation action (high agreement and much evidence). Their applicability depends on national circumstances and an understanding of their interactions, but experience form implementation in various countries and sectors shows there are advantages and disadvantages for any given instrument.

12.3 CLIMATE IN KUTLEHAR AREA OF UNA.

The climate of the area on the whole is subtropical type but appears to be little cooler at higher elevations. Summer months are rather warm and winters bit cold. The minimum and maximum temperatures range from 2^0C to 40^0C.

RAINFALL

Monsoons are the main carriers of rainfallfor this area and major part of rainfalloccurs in the months of July to September as may be revealed from the table below. Afew showers at longer intervals, however, occur in the remaining parts of the year also. The average annual rainfall at Bangana situated at a distance of 32 kms from Una is 150 cms. The extent of rainfall, however,decreases with movement towards Una. Rainfall occurs in torrential down-pours and causes landslides and severe erosion. Hailstones in the spring show common occurrence and cause considerable damage to the standing wheat crop.

The tract is subjected to heavy frost from December to the end of January and sometimes till the middle of February. It causes considerable damage to plantations, seedlings in the nurseries and also agricultural crops. The phenomenon of frost occurrence cannot be lost sight while selecting sites for nurseries in the tract and also making choice of species to be raised on a particular site.

Table No. 1.1: Month wise rainfall based on 2001-2013 rainfall data (Rainfall in mm)

Months	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Jan	0	26.7	77.2	121.0	97.0	55.0	21.0	53.0	7.0	13.0	87.0	139.0	27.0
Feb	0	25.0	101.0	15.0	209.0	2.0	0	9.0	7.0	37.0	55.0	28.0	90.0
Mar	0	41.4	93.2	0	73.0	167.0	133.0	12.0	14.0	0	28.0	23.0	51.0
Apr	0	52.2	13.0	47.0	11.0	20.0	209.0	57.0	17.0	0	52.0	32.0	8.0
May	0	34.3	0	12.0	176.0	112.0	48.0	26.0	0	38.0	184.0	1.0	8.0
Jun	0	38.7	84.0	167.0	80.0	214.0	17.0	230.0	0	110.0	135.0	29.0	261.0
Jul	0	223.0	55.2	365.0	469.0	398.0	88.0	251.0	232.0	207.0	374.0	278.0	400.0
Aug	0	568.0	235.0	199.0	429.0	410.0	388.0	216.0	303.0	339.0	121.0	534.5	385.0
Sep	0	116.5	366.0	139.0	153.0	137.0	428.0	45.0	197.0	295.0	31.0	330.5	142.0
Oct	0	0	0	155.0	2.0	0	150.0	35.0	2.0	61.0	0	6.0	40.0
Nov	22.1	0	16.0	5.0	0	0	0	0	14.0	8.3	19.0	0	8.0
Dec	16.3	0	0	27.0	0	55.0	0	0	0	0	0	0	30.0

Source: *Una Forest Division*

INTERVENTIONS IN KUTLEHAR FOREST AREA.

Forest ecosystems also play an important role and provide a wide range of provisioning, regulating, and cultural services broadly termed the 'ecosystem services'. But together with existing socio-economic processes such as population growth, Forest fragmentation,

deforestation, degradation and habitat loss, climate change could lead to significant changes in the delivery of such services. However, the forest sector is, unique as regards to the climate change issue in several respects as Forests contribute significantly to global CO_2 flux thus providing Significant opportunities to reduce the current or projected emissions. Forests also provide a means to remove CO_2 accumulated from past Emissions in the atmosphere, and sequester it in soil, vegetation and wood products. Forest sector is closely linked to socio-economic systems, particularly the livelihoods of forest dwellers and rural communities. Future climate change, due to increased Greenhouse Gas (GHG) Concentration in the atmosphere is likely to have adverse impacts on forest structure, composition, biodiversity, biomass and geographic distribution of plant species, all of which in turn would affect the environment and socio-economic systems. The forest and land use sector has received significant attention globally in addressing the climate change problem. However, the mitigation potential assessment in the land use change and forest sector has been limited by availability of information at the global-level, and by the lack of disaggregation of mitigation potential at the national and sub-national level. Further, these mitigation potential assessments provide technical potential estimates rather than economic or market potential. Forests in the state and also in the tract of this division are subjected to degradation, due to anthropogenic pressure. Degraded or open forests are subjected to unsustainable harvesting of timber and non-timber products and heavy infestation of weeds. This has led to thinning of forest cover, loss of biodiversity, reduced biomass productivity, changes in plant community structure and composition, disturbed nutrient cycle and reduced organic carbon in soil. As a consequence, these forests have limited capacity to regenerate by natural means under the prevailing land use. Forest plantations have been raised in Himachal Pradesh and in Una Forest Division under different schemes and projects such as the pasture and grazing improvement scheme, a forestation of blank areas, compensatory afforestation,Green India mission,Samudayik van samvardhan yojana,vidyarathi Van mitar yojana.

Approach and methods

The policy to increase forest tree cover to 2/3rd of the total geographic area, there is a need to look at the potential for increasing the forest Cover and thereby the biomass and carbon stocks. Following efforts are done in Una to increase the forest cover

1).Plantation programme.

Plantation in forest area is carried out in various departmental schemes annually and plantation programme is discuused in seprate CHAPTER VIIPLANTATION (OVERLAPPING) WORKING CIRCLE.

2).Green India Mission.

The Green India Mission aims to address key concerns related to climate change in the forest sector namely adaptation, mitigation, vulnerability and eco-system services. To this end the mission also aims to take a broader, landscape approach to address the drivers of forest degradation while support communities to meet their basic necessities of fodder, fuel wood and livelihood.

The mission is being implemented in the pilot phase in 40 JFMCs in four Forest Division in the state of H.P. out of these 8 JFMSCs are selected in kutlehar forest areaWith following aims,

- Respond to climate change by a combinatory of adaption and mitigation measure.
- Enhances Carbon sink in sustainably managed forests and other eco-system.
- Adaption of vulnerable species eco-system to the changing climate.
- Adaption of forest dependence of communities.

3). Samudayik Van Samvardhan Scheme.

The increasing population and the development needs has brought the forests under tremendous stress. There is an imminent need to maintain the integrity of the existing forest cover on one hand, and to bring more areas under forest cover on other to meet the growing environmental, ecological and social challenges. Under the Sustainable Development Goals (SDGs), the State government has set an ambitious target of bringing 30% of States geographical area under tree cover by 2030. Most of the culturable forest land now available for afforestation lies in the vicinity of villages and habitations facing tremendous biotic pressure. Bringing such land under forest cover without active involvement of local communities may not be successful. It, therefore becomes imperative to involve local communities and have long-term partnership with them for afforesting such land. This partnership with the local communities will go a long way in meeting the SDGs in improving the environment and in enhanced ecosystem services to the local people.

The Scheme - Goal and Objectives

The State of Himachal Pradesh has its very large population living in rural areas with traditional bond with nature. This bond needs to be rejuvenated and strengthened towards sustainable flow of ecosystem servicesfrom forests, so essential to fulfill day-to-day-household needs of the rural communities. The**"Samudayik Van SamvardhanYojna"(SVSY)** Scheme envisages rejuvenating this bond by strengthening participation of local communities in conservation and development of forests through plantation of useful plant species and communities is believed to result in achieving the twin objectives of improving the quality. Communities is believed to result in achieving the twin objective of improving the quality of forest and increasing the forest cover leading the enhancement of Eco System Services and also playing a pivotal role in rural economy.

The major objectives of the scheme are as follow:

Scheme shall aim to provide maximum economic benefit to the member of JFM/VFDSs in the form of valuable Forest Products and other usufruct yielding high economic returns in the market as well as productive usage water.

- To improve the flow of ecosystem service from the forest around villages through community based management of the designated forest.
- To enhance the forest cover in the state on forest land lying in the vicinity of villages through planting of tree species of local importance.
- To rejuvenate the traditional village level institutions related to conservation and sustainable use of natural resources through awareness, education and organization of village communities.

So,the new scheme is launched by state government and two JFMCs are presently functioning under this scheme detail is as under,

1). Joint forest Management Society Behlan.

Scheme is implemented in 81.74 ha forest area during the period from 2018-19 to 2022-23 and detailed of works is given below,

Five Year Works Target (2018-19 to 2022-23)

S. No	Detail of Works	2018-19		2019-20		2020-21		2021-22		2022-23		G Total
		Phy.	Fin	Phy.	Fin	Phy.	Fin	Phy	Fin	Phy	Fin	
1	Lantana Eradication @ 50 % I/C Maintenance	05	99804	5	109750	5	139750	5	159750	5	189696	698750
2	B/L Tall Planting I/C maint. @ 200 Plants per Hact	05	124000	5	166900	5	186900	5	218000	5	238700	934500

3	Cost of B/L Tall Plants	1000	47930	1000	47930	1000	47930	1000	47930	1000	47930	239650
4	Pasture & Grazing Land Dev. I/C Maint.		-	05	205950		200000	05	-		-	405950
5	C/o Water Pond	01	186000		14000		-		-		-	200000
6	Soil Moisture Conservation work in Upstream	L/S	250000		-		-		-		-	250000
7	C/o WHS	01	240000		300000		160000		-		-	700000
8	Misc. Expenditure on publicity, workshop & Micro Plan		20000		10000		-		-		-	30000
9	Cost of Machines/Equipment & training for value addition of local NTFPs		25266		20000	2	20000	2	20000		14734	100000
10	Honorarium of village Group Organizer for 04 month		2000		2000		2000		2000		-	8000
G Total			**995000**		**876530**		**756580**		**447680**		**491060**	**3566850**

2). JFMS Lakhroon.

Scheme is implemented in 50 ha forest area during the period from 2020-21 to 2024-25 and detailed of works is given below,

Five Years (2020-21 to 2024-25) Cost Model for Samudayak Van Samvardhan Yojana JFMS Lakhroon for a land bank of 50 hac for Lantana Infested areas in Piploo Beat, Arloo Block							
S. No.	**Name of Component**	**Name of Area**	**Qty**	**Unit**	**Rate**	**Phy.**	**Financial**
1.	Survey,demarcation and fencing	UPF Lakhroon C1	50	Hac	15156	50	757800
2.	Lantana Eradication @ 75% I/C Maintenance	UPF Lakhroon C1	25	Hac			904050
3.	Lantana Eradication @ 50 % I/C Maintenance	UPF Lakhroon C1	25	Hac			719725
4.	Raising of plants at Tiasar Nursery and maintainenace for 3 years		32000	No.			458080
5.	Plantation with b/L with 800 plants per hac	UPF Lakhroon C1	20	Hac	22001	20	440020
6.	Plantation with b/L with 400 plants per hac	UPF Lakhroon C1	20	Hac	37044	20	740880
7.	Maintenance of Plantation	UPF Lakhroon C1	40	Hac			284400
8.	Soil and Moisture Conservation works				L/S		700000
9.	Repair of Old water sources				L/S	2	200000
10.	Fire awareness and prevention measure						200000
11.	Misc. Expenditure on publicity, workshop &				L/S		30000

	Micro Plan						
12.	Honorarium of village Group Organizer for 04 month				2000		8000
Total							**5437955**

3). Vidyarathi Van Mitar Yojana.

Students can be the best ambassadors to put across and spread and useful message about the imperatives of Nature conservation to the society. The prime goal of this scheme is to take advantageofthisfact by inculcating awareness among school children about the importance of forest and environmental conservation by actively involving them in raising and protection of forest plantations and thereafter motivating them to act as agents of change. This scheme is presently implemented through 3 schools in Kutlehar forest area and target to increase number of schools to 10 during the plan period.

4). Agroforestry

Agroforestry is one of the best option to deal with problems related to land use and global warming. The amount of Carbon sequestered largely depends on the Agro forestry system, structure and functions, determined by environmental and socio-economic factors.

Implementation of these schemes have multiple benefits at the same time, it also fulfills both objectives of carbon mitigation and economic growth through proving livelihood options to local communities.

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CHAPTER XIII

GENERAL FINANCIAL FORECAST AND PLAN OF OPERATIONS

13.1 FUTUREREVENUE AND EXPENDITURE

Future revenue and expenditure depends mainly upon following four variables:-

i. ***Future yield*****:** Annual yield has been prescribed for two working circle viz. Bamboo and Scrub Working Circles only. Yield has been prescribed

by area in these two workingcircles. Quantitatively, their annual yields are only a guess work. Moreover,Govt. policy also matters a lot. As at present, there is almost blanket ban on commercial green fellings.This jeopardizes the prescribed flow of yields. In nutshell, annual yields are fixed buttheses are difficult to anticipate.

ii. ***Future Expenditure*****:** Although quantum of work to be executed is known in view of the working plan prescriptions, yet it is not certain that matching funds would always be availablefor their complete execution.So, future expenditure will be affected by availability of funds.

iii. ***Future Market Rates*****:** Market behaviour being very unpredictable, it is very difficult to anticipate future market rates for the forest produce with any amount of certainty and correctness.

iv. ***Future Labour Rates and Establishment Charges*****:** Gallopinginflation beats hollow all good guesses about future labour rates and establishment charges.

v. ***Fluctuation in number of resin blazes*****:** As is clear in the Table No. 4.2 of Chapter **IV**, there is generallyfluctuation in the number of blazes for various reasons like forest fires, storm damage,salvage fellings and putting to rest over-tapped and unfit to tap Chil trees. No doubttrees of younger age classes also keep in entering tappable limits but it is advisableto presume that their addition can off set the loss of trees mentioned above. Temperature during tapping season, quality of tapping labour and resin smuggling are some other relevant factors. So, the overall situation is indicative of fluctuation in numberof blazes and resin yield.

vi. ***Fluctuation in the yield of bhabbar grass:*** Yield of bhabbar grass is liable tofluctuation for reasons of forest fires and drought.

Notwithstanding what is contained in the foregoing paragraphs,financial forecast has been worked out on the basis of prescribed yields,quantum of working

plan prescription,current(2013-14) market prices for forest produce and current (2013-14) labour and establishment charges are as under:-

I	Bamboo Working Circle=300 Ha	93600=Bamboo bundles 36600=Qtls. (Approx.)
II	Scrub Working Circle =310.20Ha	B.L.Fuelwood including *Khair*and *chhal*
III	Rehabilitation Working Circle	Nil
IV	Misc.Produce	
	i) Resin blazes=15628 No.s	= 900.00 Qtls(Approx.)
	ii)Bhabbar grass=2355.52ha	=7195.00 Qtl(Approx.)

13.2 COST OF WORKING PLAN

S.N	Item	Amount (Rs.)
1	Cost of enumeration works & field work	443098.00
2	Moter vehicle expenses	50000.00
3	Office Expenses	25000.00
4		0
5		0
	Total	0
	Cost of working plan for brought under Management (D.P.Fs & U.P.Fs)	**518,098.00**

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CHAPTER XIV

MISCELLANEOUS REGULATIONS

14.1 PETTY FELLING

Felling of petty nature, as detailed below may be treated as prescriptions of this working plan:

1 Only dry trees for ordinary departmental use & will be counted towards yield.

2 Dry or green trees to meet the special free grant for construction of houses destroyed by natural calamities like fires, lightning etc as per settlement provisions & it will be counted towards yield.

All trees and poles marked for such purpose shall be recorded in the respective compartment History Files and such felling will appear in Control Forms. Silvicultural principles shall be strictly adhered to while carrying out such markings.

14.2 DEVIATIONS

Any large or unusual felling operation not prescribed in the Working Plan will be a deviation requiring prior sanction of the competent authority. The deviations may be due to:-

1. Large scale damage by fire and wind storms.
2. Special fellings to meet the sudden unexpected heavy demand of particular industries or for defense purposes.
3. Large scale felling of trees falling in the alignment of major roads and electric transmission lines.

14.3 DEMARCATION OF FOREST

Since the boundaries of UPFs are not properly defined and delimited on the ground. The boundary pillars are not properly serially numbered and maintained creating confusion at all stages.This is a specialized job. Special task force comprising of ACF, Rangers and Deputy Rangers be constituted which will carry out complete checking and repair of boundary pillars.

14.4 BOUNDARY REGISTERS

Boundary register for each forest shell be maintained separately. Also register containing tracing of forests shall be maintained separately range wise.

14.5 MAPS

The Survey sheets are available on 1:15000 Scales. Therefore, task of digitization of Forest Survey Sheet should be done by the GIS Unit of HP Forest Department for development of various layers.

14.6 RAIN GAUGES

Rain gauges have been installed in thispart of Una Forest Division at Bangana by the IMD, Govt. of India. It is recommended that rain gauges should be installed at Proian, Khurwain, Talmera, Kot&Sohari stations and maintained properly.

14.7 FIRE PROTECTIONS

Even the primitive methods of fire protection are not being taken care of. The budgets under fire lines and controlled burning have been almost finished. There is need to maintain fire lines, fire watchers in the fire prone areas. Publicity and Extension for education of local population regarding fire protection needs is done.

14.8 ENCROACHMENTS

Encroachments are not widespread in the Kutlehar Forests. The prospective encroachments in the near future cannot be ruled out due to absence of demarcation of UPF's and the hunger of land, always putting forest areas at the risk to be encroached. Special task force consisting of forests, police and revenue officials is required to be constituted forpreventive tackling of the menace of encroachments.

14.9 RESEARCH PLOTS

At present there is no research plot in this part of the Una Forest Division. It is necessary to emphasize the fact that experimental and sample plots and their demarcated surrounds are under the complete control of the Silviculturist and are thus excluded from all operations precribed in the Working Plan.

14.10 ROADS,PATHS AND BUILDINGS

14.10.1 Roads: -The construction of a large number of roads has already been undertaken by the HPPWD in the tract dealt within this Plan. These will suitably open forests and any further construction of roads will affect forests adversely. There are few motorable roads constructed by forest

department.So there is no need to construct any new motorable road on the forest area.

14.10.2 Paths: - Number of bridle and inspection paths covering all important forests has been constructed in the past. The existing roads and paths are detailed in **Table 3.3** of Chapter III of Part I. These should be kept well maintained. The inspection path should be constructed as far as possible along contours in such a way that whole of the forest is covered.

14.10.3 Buildings: Buildings have been constructed in the past. The existing buildings are detailed in **Para 6.2** of Part **I.**However, improvement of infrastructure in future would require construction of buildings depending upon the budget availability The following buildings would require construction based on the executive and protective charges from **Appendix V & VI,** respectively, detailed below:

Table 14.1: Buildings in the Kutlehar Forests of Una Forest Division

S.No	Range	Name of Building	Location	Number
1	Bangana	Block Office-cum-residence	Arloo	1
2		Block Office-cum-residence	Sohari	1
3		Forest Guard Hut, Kanura	Tanoh	1
4		Forest Guard Hut, Bharmout	Bharmout	1
5		Forest Guard Hut, Chouli	Chouli	1
6		Forest Guard Hut, Akoi ki Dhar	Bhaloun	1
		Forest Guard Hut, Sarkaru	Talmera	1
7	Ramgarh	Block Office-cum-residence	Khurwain	1
8		Block Office-cum-residence	Raipur	1
9		Forest Guard Hut, Mo Maniar	Khurwain	1
10		Forest Guard Hut, Kariara	Thana Kalan	1
11		Forest Guard Hut, Mandli	Mandli	1
12		Forest Guard Hut, Raipur	Raipur	1
		Forest Guard Hut, Bohru	Bohru	1
		Forest Guard Hut, Saili	Gharwasra	1
		Forest Guard Hut, Ban Dhanet	Dhanet	1
				16

14.11 BAN ON GREEN FELLINGS

The Govt. of HP had imposed a complete ban on green fellings from the year 1983-84 in high conifer forests.This resulted in complete stoppage of regeneration fellings and thinnings. The ban has since been lifted by a cabinet decisionduring 1997, yet due to an order

of the Hon'ble Apex in SLP No. 202 of 1995 titled as T.N. Godavarman v/s Union of India. There remains a complete ban on green fellings till date.

14.12 MID TERM REVIEW OF THE WORKING PLAN

Apart from the annual and concomitant monitoring by the State authorities,various provisions of this Working Plan shall be subject to a mid term review by the Government of India after every five year interval.

14.13 GO-SADANS

14.13.1:-ProblemofStaryCattle:- Ever increasing number of cattle in general and cow and its progeny in particular, roaming on the streets of towns, cities and in forests as stray cattle is a serious menace to the environment, transport system and general living of people. It is a serious threat and challenge to society, which needs no elaboration. It is a country-wide problem, spreading from rural areas to metropolitan cities. It is also the crucial issue, generally put forward whenever the question of total ban on cow slaughter arises. Time and again, it has been said that stray cattle are indication of the fact that these are unfit and their rearing is uneconomic. That is why the owners just push them out on the ultimate journey to the slaughter-house. Thus, first, it is desirable to examine whether these so called 'useless' cattle are really useless. It has is recognized that, in the general field of agriculture 70% of farmers are made up by small and marginal farmers, landless labourers and they have access to a total of 30% of the land in this country. By force of circumstances 67% of these people own livestock. The general pattern of this activity is that these livestock units are distributed in twos or threes, which are financially non-viable with their traditional ways. These are the persons who get rid of their cattle. The day these people come to understand the economic viability of their cattle - of even dry cows and old oxen -the problem of stray cattle will start vanishing.

14.13.2 Strategies for dealing with stray and 'so-called' useless or dry cattle:- In this background, the strategies to tackle the problem of Stray Cattle have is implemented at all levels and as a combined effort of various agencies. The following strategies are recommended forthepurpose.

Establishment of Village gosadans:-

Village Gosadans should be established in themannerproposedbelow:

1) Each village should have one Gosadan to take care of the stray cattle of the area. Also the seasonal left-outs can be accommodated therein.

2) The Gosadan is managed by the village community, with full involvement of the Village Panchayat. A 'Gosadan Committee' can be constituted in the meeting of Gram Sabhacomprising persons from all walks of life. Technical persons such as from agriculture and veterinary side should invariably be co-opted on this committee. The State Governments are required to make provisions regarding constitution of 'Gosadan Committees' in their respective Panchayati Raj,Acts.

3) 100 acres of land or as per availability be attached to the Gosadan. Gram Panchayat can do it as in most of the States, grazing lands (gocharbhumi) are within their jurisdiction. This land can serve not only as the grazing ground but also as the source of green and dry fodder to some extent.

4) The problem of unauthorised occupations on the 'Charagah' or Gochar lands canbe taken care of by 'fast track courts.'

5) In the villages where 'charagah' land is not sufficient, the wastelands can be converted for development of grass and fodder trees. Waste lands could be converted into fertile lands by various convergent natural nutrients prepared by 'gobar-gomutra-chhach,Amritpani'etc.

6) While arrangement of such land should be the responsibility of the revenue agencies, maintenance part may be entrusted to the Village Panchayat. Some sort of mechanism should be developed for linking the maintenance of Charagah land with the grants-in-aid given to a particular Gram Panchayat.

7) As the Gosadan will take care of the stray cattle, which otherwise could have caused damages to the standing crops of the village farmers, it should be mandatory for every farmer to donate one trolley of fodder and one bag of cereals to the Gosadan at the crop harvesting time. Of course, it can be in proportion to theagricultural land area possessed by the village farmers.

8) The Go-sadan, so established, can be developed into breeding centre of good local indigenous breeds. It can also develop good breed bulls, meant for service ofthewholevillage.

9) To augment its resources, the go-sadan can prepare bio-fertilizers and bio-pesticides, which can be sold to local farmers at very concessional rates. Thus, there would not be any problem of marketing for the products of Gosadan.

10) Go-sadan can have a bio-gas plant of a suitable size to take care of its energy requirements for fuel, light and water pumping. Agencies like K.V.I.C., DRDAS and Non-Conventional Energy Development agencies can assist these Go-sadans in establishing Bio-gas plants.

11) No cash subsidy should be given to these Go-sadans. Instead HRD training and provision of infrastructure should be there. In fact, it should be an independent enterprise. Let the village own it after having a considered view on the importance of the Gosadan in their village economy.

12) In the proposals prepared at Gram Panchayat and Block level, plans for organisation of Gosadans included in the District Plans, should be taken up on priority.

13) Public contributions and donations from individuals and organisations will be the main source of funding for organisations of Gosadans. As it would be an important institution for rural development, funds may be earmarked for establishment of gosadans in the MP and MLA quotas also.

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CHAPTERXV

ESTABLISHMENT AND LABOUR

15.1 ESTABLISHMENT

The list of existing Ranges, Blocks and Beats is given in Table **6.1** of Part I . The position of sanctioned staff and existing staff has been given in Table 6.1 of Chapter VI, isnot satisfactory.The Beats, Blocks and Ranges are on an average 25-30 sq Km large; problems arise in areas adjoining other Ranges of the Una Forest Division and other Forest Divisions of Hamirpur Circle viz. Dehra and Hamirpur. However, no further reorganization ofbeats Blocks and Ranges is suggested.The office work at Range level has increased considerably. Therefore all Range officers should be provided Range Clerks.Forest Workers/Class IV workersmay be provided to these two Ranges so that their services should be utilized in nurseries and for miscellaneous forest protection and regeneration operations.

15.2 LABOUR

The position of labour supply has been discussed in Para **6.3 of** Chapter-VI of Part – I. All theexploitation and harvesting works are being done by HPSFDC to carry out exploitation of Forests. For that reason it has to import labour from Mandi, Kangra and Chamba Districts. The present rate of unskilled daily wage labour is Rs. 150 per day which is revised from time to time.

Many developmental schemes such as MGNREGS, are in operation in the tract under various departments, thus there is some shortage of labour.

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CHAPTER XVI

CONTROL AND RECORDS

16.1 SYSTEM OF CONTROL

It has been unfortunate that some of the prescription of Working Plan under revision were not given a serious trial while others were completely ignored. Obviously, the objects of management could not be fully realized. Some of the forest journals do not contain complete information about various operations carried out in the past while some entries are not accurately recorded. Control should be considered as an integral part of plan and record of all operation must be maintained.

16.2 CONTROL FORMS

To exercise proper check and control on the prescription and suggestion made in this working plan, control forms will be prepared every year by DFO who will submit before 30th April every year the control forms 2(a), 2(b), 4 and C together with the deviation statement as laid down in chapter X of National Working Plan code, 2004.

16.3 COMPARTMENT HISTORY FILES

Compartment-wise compartment history files have been prepared in duplicate for allDPFs andUPFs on standard pattern laid down in Chapter-IX ofNational Working Plan Code, 2004. The summary of works carried out and theirresults during the preceding working plans have been recorded in the history files. Inspecting officers will invariably write inspection notes on the standard proformas prescribed in this chapter, copies of which will be placed in the concerned compartment history files.

It is prescribed that one set of history files shall remain in the office of DFO and second set in the office of concerned RO. It will be responsibility of the DFO and the RO to maintain and post each and every compartment history file in his own office.

16.4 DIVISIONAL NOTE BOOK

This is mainly a record for use of DFO which shows auction results, estimation of outturn of coupes, result of experiments carried out if any, records of annual seeding of important species, injuries to crop, divisional statistics, notes on the trial of exotics and their performance and any other important information regarding divisional works. This record can be very useful and handy at the time of working plan revision.

16.5 FIRE RECORDS

A complete record of fires will be maintained in the compartment history files both in the Range office and Divisional office. Maps of forests burnt showing extent of area burnt will be filled in the compartment history files concerned alongwith relevant date such as place from which fire originated, nature of fire, damage caused by fire, duration of fire and how it was fought and brought under control.

16.6 GUARD BOOK

Guard book and forest guard book Manual is an important and handy record of beat statistics and activities like details of forests, forest boundaries, included cultivation, encroachments, record of rights/concessions, sowing/ plantation, nurseries seed collection, beat maps showing forests, boundary, forest roads and paths etc. Rights and concessions allowed, ROs standing instruction and market rates etc. Every Forest Guard should maintain it for his beat and DFO will check these manuals during field tours and ensure that these are properly maintained.

16.7 REGISTER OF BOOKS AND MAPS

Register of books and maps will be maintained at Range and Divisional level and kept upto date. All roads, bridle paths, inspection paths and buildings constructed during the year should be shown in maps in April every year.

16.8 REGISTER OF D.P.Fs

Register of DemarcatedForests will be properly maintained and all changes in the area or boundaries recorded every year giving reference of Government orders and notifications.

16.9 REGISTER OF ROADS AND BUILDINGS

Register of roads and buildings will be maintained at Range and Divisional level and kept upto date. All roads and buildings constructed during the year should be entered in April every year alongwith cost of construction.

16.10 NURSERY JOURNALS

A nursery journal for each nursery shall be maintained wherein the details of all the nursery operations like sowing, germination, weeding, pricking etc. shall be incorporated along with cost.

16.11 PLANTATION JOURNALS

Plantation journals will be maintained for all plantation areas according standing instructions on the subject and contained the following informations:-

(i) Location, legal status, boundaries, configurations, aspect, slope, rock, geology and soil, drainage and deapth of soil.

(ii) Soil suitability and treatment map.

(iii) Map showing prominent natural features.

(iv) Astatement showing area planted and cost of planting item wise for each year.

(v) A critical note on success or failure of plantation and corrective steps if any required is taken for the success of plantation.

16.12 RESEARCH JOURNAL

The research journals should be maintained in the division and relevant research activities conducted/undertaken should be entered.

16.13 DIVISIONAL FCA CASES REGISTER

This will contain data regarding diversion of forest land allowed and compensatory afforestation details and trees permitted by GOI is felled in the area concerned and CAT Plan details, if there is any.

16.14 INSPECTIONS

Proforma for recording field inspections of important categories of works have been devised as under which only be used by officers to report field inspection.

I) Proforma for reporting field inspections

Plantations (outside working plan area)

(A) Basic information

i) Date of inspections
ii) Name of plantation
iii) Year of planting
iv) Exact location
v) Approach indicating on foot journey
vi) Nearest rest house and staff quarter
vii) Distance from nearest habitation
viii) Altitude: General Aspect
ix) Boundaries: N S E W
x) Scheme under which planted
xi) Closure notification No.
xii) Detailed description of original vegetation

(B) Works done

i) Plants planted
ii) Spacing followed
iii) Vegetative works done
iv) Engineering works done
v) Sowing done
vi) Fencing done & fencing material used
vii) Inspection path made
viii) Misc. works done

(C) Detailed observations:

i) Regarding choice of species
ii) Regarding growth of plants
iii) Regarding survival percentage
iv) Regarding Spacing
v) Regarding natural regeneration
vi) Regarding advance growth
vii) Regarding grasses and bushed
viii) Regarding inspection paths
ix) Regarding fencing
x) Regarding biotic interference
xi) Regarding climber cutting, weeding, cleaning pruning
xii) Regarding thinning
xiii) Regarding vegetative works
xiv) Regarding engineering works
xv) Regarding misc.works.

(D) Directions

II Proforma for reporting field inspections
Plantations (InsideWorking Plan area)

A. *Basic information*

i) Date of inspection
ii) Name of plantation
iii) Prescribed year of planting
iv) Year of planting
v) Exact location
vi) Approach indicating of foot journey
vii) Nearest rest house and staff quarter
viii) Distance from nearest habitation
ix) Altitude
x) General aspect
xi) Boundaries: N S E W
xii) Scheme under which planted treated:-
xiii) Closure notification No.:
xiv) Working CircleSeries:
xv) Series
xvi) PB:
xvii) Working plan para:
xviii) Prescribed treatment:
xix) Detailed description of original vegetation:

B. *Works done*

i) Plants planted:
ii) Spacing followed:
iii) Vegetative works done:
iv) Engineering work done:
v) Sowing done
vi) Fencing done and material used
vii) Inspection path made
viii) Misc.work done.

C. *Detailed observations*

i) Regarding Whether treatment carried-out as per prescription:
ii) Regardingchoice of species
iii) Regardinggrowth of plants
iv) RegardingSurvival
v) Regardingspacing
vi) RegardingNatural re-generation.
vii) Regardingadvance growth
viii) Regardinggrasses and bushes
ix) Regardinginspection path
x) Regardingfencing
xi) Regardingbiotic interference
xii) Regardingclimber cutting,weeding, cleaning and pruning
xiii) Reg.thinning
xiv) Regardingvegetative works.
xv) Regardingengineering works

xvi) Regardingmisc.works

D Directions:-

III Proforma for reporting field inspections

PBI AREA

A Basic information:-

i) Date of inspection
ii) Working Circle
iii) Series:
iv) Forest
v) Compartment
vi) Area (ha)
vii) Altitude
viii) General aspect:
ix) Boundaries:- N: S: E: W:
x) Exact location:
xi) Approach indicating on foot journey:
xii) Actual year of treatment:
xiii) Detailed description of Crop:

B. Prescribed treatment

i) Para under which treatment prescribed:
ii) Prescribed year of treatment:
iii) Details of prescribed treatment

C. Treatment carried–out

i) Marking done
ii) Felling done:
i) Debris disposal done:
ii) Closure done:
iii) Planting done:
iv) Spacing followed:
v) Fencing done and material uses:
vi) Vegetative works done:
vii) Engineering works done:
viii) Sowings done:
ix) Inspection path made:
x) Misc. works done:

D. Detailed observations:-

i) Whether treatment carried out as per prescription:
ii) Reg.markings:
iii) Reg.Fellings:
iv) Reg.debris disposal:
v) Reg.bush cuttings:
vi) Reg.plants growth:
vii) Reg.sowings:
viii) Reg.spacing of planning and sowing:

ix) Reg.survival percentage:
x) Reg.natural re-generation:
xi) Reg.inspection path:
xii) Reg.fencing and material used:
xiii) Reg.biotic interference:
xiv) Reg.vegetative works:
xv) Reg.engineering works:
xvi) Reg.misc.works:

E. Directions

IV PROFORMA FOR REPORTING FIELD INSPECTIONS

PB IV Areas

A. Basic information:-

i) Date of inspection
ii) Working Circle:
iii) Series:
iv) Forest:
v) Compartment:
vi) Area (ha.)
vii) General aspect:
viii) Boundaries: N S E W
ix) Exact Location:
x) Approach indication on foot journey:
xi) Scheme under which treated:
xii) Actual year of treatment:
xiii) Detailed description of crop:

B. Prescribed treatment

i) Para under which treatment prescribed:
ii) Prescribed year of treatment:
iii) Details of prescribed treatment:

C. Treatment carriedout:-

i) Felling done:
ii) Thinning done:

D. Detailed observations:

i) Reg.fellings done:
ii) Reg.thinning done:
iii) Reg.misc.observations

E. Directions

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CHAPTER XVII

SUMMARY OF PRESCRIPTIONS

17.1 Following is the summary of prescriptions and suggestions.

HEADINGS	PRESCRIPTIONS	PARAGRAPH OF THE PLAN
CHIL WORKING CIRCLE		
Silvicultural System	Indian Irregular shelterwood system	2.10
Rotation & Exploitable diameter	120 years rotation and exploitable diameter of 52 cm d.b.h has been fixed.	2.11
Regeneration Period	30 years	2.12
Division into Periodic blocks	Four periodic blocks have been formed	2.14
Calculation of yield	No yield can be prescribed due to less than average growing stock	2.15
Annual regeneration Plan	Sequence of regeneration plan is given for legal and voluntary series	2.17
Subsidiary cultural operations	Cleaning and thinning	2.18
BAMBOO WORKING CIRCLE		
Silvicultural System	Selection-cum-Improvement Felling system	3.9
Rotation & Exploitable diameter	Three years rotation has been fixed.	3.10
Calculation of yield	Yield has been calculated from PB-I and PB-IV	3.11
Method of executing felling	Overwood removal and D grade thinnings	3.13
Subsidary Silviculture operations	Works is carried out to general principles given	3.16
Special treatment to PB-IV	Plantation programme	3.16
SCRUB WORKING CIRCLE		
Silvicultural System	Improvement Felling system in which regeneration will be mainly with artificial regeneration	4.7
Rotation	No rotation has been fixed and only improvement fellings will carried out.	4.8
Calculation of yield	Yield has been calculated from Legal & Voluntary Felling Series	4.10
Prescribed annual yield	The prescribed annual yield in cum	4.12
Method of executing felling in Legal & Voluntary Series	Overwood removal and D grade thinnings	4.14

Sequence of felling	Felling programme has been laid down	4.13
Subsidary Silviculture Operations	Works is carried out to general principles given	4.15
Special treatment	Plantation programme	4.15
REHABILITATION WORKING CIRCLE		
Calculation of yield	There is a ban so no yield precribed	-
Precribed annual yield	Nil	5.6
Subsidary Silviculture Operations	General priniciples laid down for maintenance of areas treated under artificial regeneration	5.12
KHAIR (OVERLAPPING) WORKING CIRCLE		
Silvicultural System	Khair would be harvested under selection system	6.5
Rotation	Rotation has been fixed for 30 years	6.6
Calculation of yield	Yield has been fixed based on the Brandis Method	6.8
Sequence of fellings	All trees with dbh above 20 cm are proposed to be marked; and all dead, dry and fallen trees will be marked except for those whose removal may cause soil erosion	6.9
Subsidiary Silvicultural Operations	Works proposed to carried out as per given principles	6.12
Special Treatment	Plantation programme	6.13
THE PLANTATION (OVERLAPPING) WORKING CIRCLE		
Silvicultural System	No silviculture system prescribed. Plantation will be raised by artificial planting and sowing	7.7
Choice of species	Species best suited for the site conditions and climate be planted	7.9
Sequence of planting	Planting programme laid down	7.10
Miscellaneous regulations	Provides regulation regarding grazing, grass cutting, lopping , fire protection and eradication of invasive alien species	7.14
THE FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE		
Silvicultural System	No silviculture system prescribed as the forest is preserved and protected.	-
General Constitution	WC comprises of Chil WC, Scrub WC & Rehabilitation	8.1
Method of Treatment	Pertains to protection of forests from fire, , encroachment, illicit felling and smuggling of timber	8.2
JFM (OVERLAPPING) WORKING CIRCLE		

JFM in HP	Describes procedures & constitution of JFMCs	9.4
Formation of FDA	Provides objectives, salient features, project preparation, submission & approval of projects	9.12
Green India Mission	Mission under National Action Plan for amelioration of the environment	9.15
WILDLIFE MANAGEMENT(OVERLAPPING) WORKING CIRCLE		
Management of Kutlehar Forests	DFOs notified as the wild life wardens for protection and conservation of wildlife	10.6
Wildlife problems of the tract	Detail of problems related to leopards, monkeys & wild-boars	10.7
Containment measures	Provides both the proactive as well as reactive measures	10.8
NTFP (OVERLAPPING) WORKING CIRCLE		
General description		11.1
Conservation & Development Plan		11.3
GENERAL FINANCIAL FORECAST AND FINANCIAL PLAN OF OPERATION		
Future revenue and Expenditure		12.1
Cost of working plan		12.2
MISCELLANEOUS REGULATIONS		
Petty fellings		13.1
Deviations		13.2
Demarcation of Forests		13.3
Boundary register		13.4
Maps		13.5
Rain Gauges		13.6
Fire protection		13.7
Encroacments		13.8
Research plots		13.9
Roads, Paths Buildings		13.10
Ban on green fellings		12.11
Mid- term review of the W.P		12.12
Go-sadans		12.13
ESTABLISHMENT AND LABOUR		
Establishment		13.1
Labour		13.2
CONTROL AND RECORDS		
System of control		14.1
Control forms		14.2
Compartment		14.3

History files		
Divisional note book		14.4
Fire records		14.5
Guard book		14.6
Register of books and maps		14.7
Register of R.Fs and D.P.Fs		14.8
Register of roads and Buildings		14.9
Nursery Journals		14.10
Plantation Journals		14.11
Research Journals		14.12
Divisinoal FCA cases register		14.13
Inspections		14.14

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