

**HIMACHAL PRADESH GOVERNMENT
FOREST DEPARTMENT**



**WORKING PLAN FOR THE FORESTS OF
SUKET FOREST DIVISION
HIMACHAL PRADESH
FOR THE PERIOD
(2024-25 TO 2033-34)**

(VOLUME-I)

SUBMITTED BY

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PREFACE

The Suket Forest Division holds immense ecological and cultural importance, contributing significantly to the region's biodiversity, environmental balance, and community well-being. This Working Plan for the Suket Forest Division has been prepared following the guidelines of the *National Working Plan Code (2014)*, focusing on sustainable forest management, conservation of resources, and addressing emerging challenges like climate change.

This plan aims to ensure the protection and sustainable use of forest resources while balancing ecological needs with the socio-economic benefits for forest-dependent communities. Using modern tools like GIS and remote sensing, the document incorporates scientific analysis and participatory approaches to improve decision-making and forest management.

Special attention has been given to the conservation of wildlife and their habitats, recognizing the critical role of the forest in supporting diverse species. Strategies to mitigate and manage forest fires, which threaten both biodiversity and forest health, have been included as a key priority to ensure ecosystem resilience. This plan also integrates proactive measures to reduce human-wildlife conflicts and enhance coexistence.

Key areas addressed include biodiversity conservation, soil and water protection, carbon sequestration, and the sustainable harvesting of non-timber forest products. Special emphasis has been placed on community participation, recognizing the crucial role of local communities in forest conservation and management.

The preparation of this Working Plan involved extensive field studies, stakeholder consultations, and collaboration with experts. I am deeply grateful to all individuals and organizations who contributed their efforts and expertise to this process. Their input has been invaluable in creating a practical and forward-looking framework.

It is my hope that this Working Plan will serve as a vital tool for managing the forests of the Suket Forest Division sustainably, safeguarding its natural heritage for future generations.

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Acknowledgment

I wish to extend my sincere gratitude to all those whose contributions have been instrumental in developing the Working Plan for the Suket Forest Division. The successful preparation of the Draft Working Plan for the Suket Forest Division would not have been possible without the dedicated efforts and contributions of numerous individuals.

Firstly, I am profoundly thankful to **Sh. Sameer Rastogi, IFS, PCCF(HoFF)**, for providing us with this invaluable opportunity and for his insightful guidance throughout the process. I would also like to acknowledge the support extended by the then PCCF(HoFF), **Sh. Rajiv Kumar, IFS (Rtd.) & Dr. Pawnesh Kumar Sharma, IFS (Rtd.)**, during the initial phase of this work. My sincere appreciation goes to **Sh. Ajit Thakur, IFS (Rtd.) the then CCF Mandi**, for his valuable insights and support. I also acknowledge the invaluable guidance provided during the drafting of this working plan by the then **APCCF(WP&S) Sh. R. Lalnunsanga, IFS & Smt. Upasna Patial, IFS, APCCF (WP&S)** the present incumbent for their constant support.

I would like to extend a special thanks to **Sh. Subhash Parashar, IFS** for his valuable inputs during his tenure as DFO Suket. The initial field data collection for this plan commenced under his guidance, laying the groundwork for the analysis presented in this document.

The dedication and hard work of the team at Suket Forest Division have been invaluable. I especially acknowledge Sh. Munish Rangra, HPFS, ACF Suket for his unwavering support and contributions. I would also like to extend my heartfelt thanks to all the office members of the Suket Forest Division, including the Superintendent, Accountant, Senior Assistants, Junior Assistants, SMS JICA, staff deployed under the JICA-assisted “Project for Improvement of Himachal Pradesh Forest Ecosystems Management and Livelihoods” and other staff of the divisional office. Your dedication and outstanding work as part of the Working Plan Team are truly commendable.

I would like to extend my heartfelt thanks to the GIS lab for their invaluable support in providing the stock maps and other essential maps to compile this working plan. Special recognition goes to **the DFO GIS** and the other dedicated members of the

GIS lab for their prompt and meticulous work, which has been crucial to the successful completion of this document. Lastly, I express my sincere gratitude to all the Range Officers and field staff of the Suket Forest Division for their unwavering dedication and commitment. Their diligent efforts in conducting field exercises and providing various data in a timely manner have been instrumental in the swift and efficient completion of this plan. Their significant contributions and steadfast support have ensured that the plan was completed within the stipulated timeframe, reflecting their professionalism and excellence.

Rakesh Katoch, IFS
WPO cum DCF Suket

Abbreviations

Sr. No	Abbreviations	Full forms
1	ACF	Assistant Conservator of Forest
2	ANR	Assisted Natural Regeneration
3	BO	Block Officer
4	BEF	Biomass Expansion Factor
5	CAMPA	Compensatory Afforestation Fund Management and Planning Authority
6	CEC	Central Empowered Committee
7	CH	Compartment History
8	DFO	Divisional Forest Officer
9	Dia.	Diameter
10	DMFT	District Mineral Foundation Trust
11	FCA	Forest Conservation Act
12	FDA	Forest Development Agencies
13	FRA	Forest Rights Act
14	GIS	Group Insurance Scheme
15	HPSFDC	Himachal Pradesh State Forest Development Corporation
16	JFM	Joint Forest Management
17	MCR	Master Control Rooms
18	NCAP	National Clean Air Programme
19	NPV	Net Present Value
22	NTFP	Non-Timber Forest Produce
23	RF	Reserve Forest
24	RO	Range Officer
25	Spp.	Species
26	WC	Working Circle

MAP OF INDIA

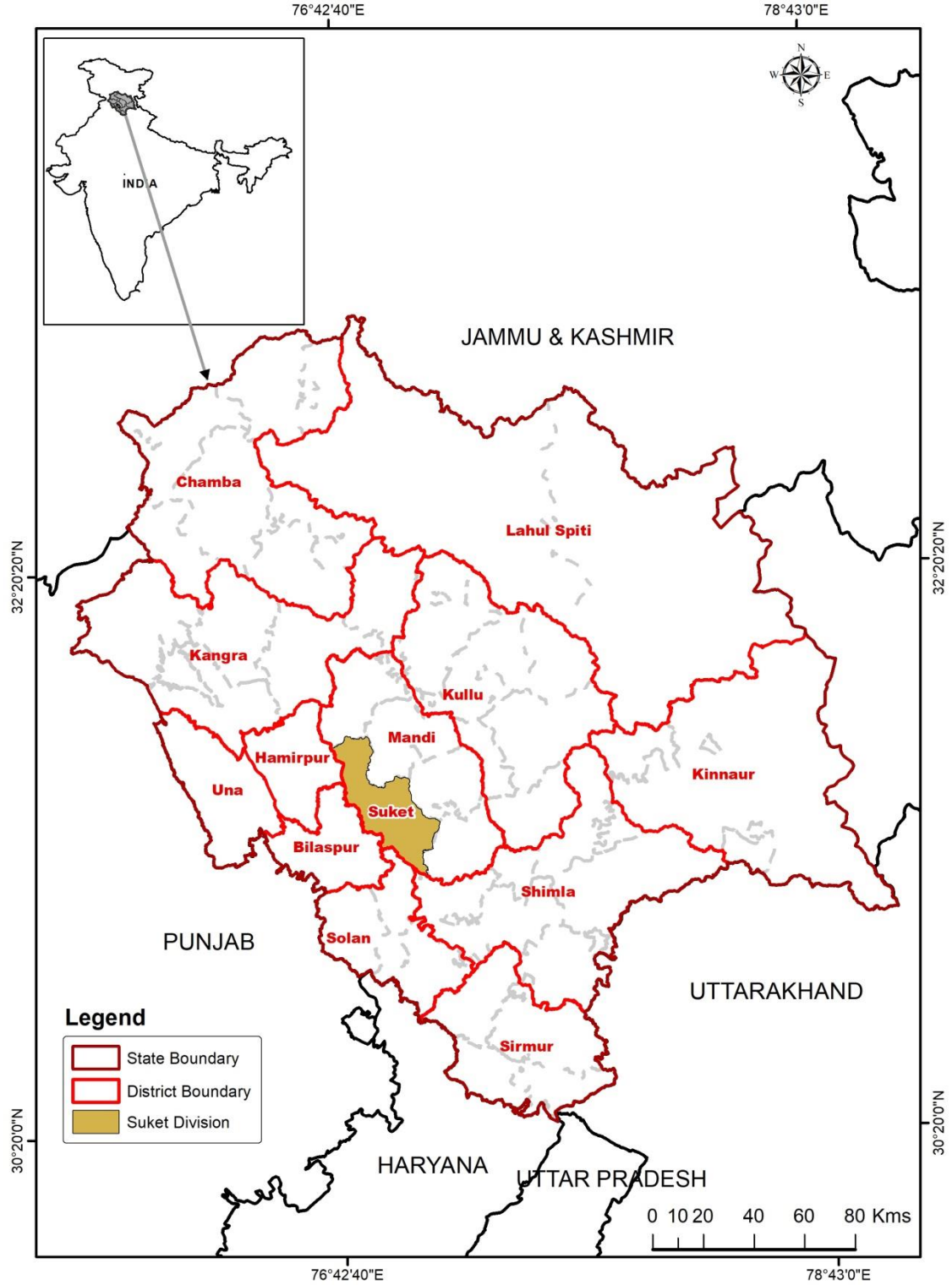
The map displays the following states and union territories:

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- Himachal Pradesh
- Punjab
- Chandigarh
- Uttaranchal
- Haryana
- Delhi
- Rajasthan
- Uttar Pradesh
- Bihar
- Madhya Pradesh
- Gujarat
- Daman and Diu
- Nagaland
- Assam
- West Bengal
- Jharkhand
- Chhattisgarh
- Orissa
- Maharashtra
- Andhra Pradesh
- Karnataka
- Tamil Nadu
- Kerala
- Puducherry
- Mizoram
- Manipur
- Nagaland
- Assam
- Arunachal Pradesh

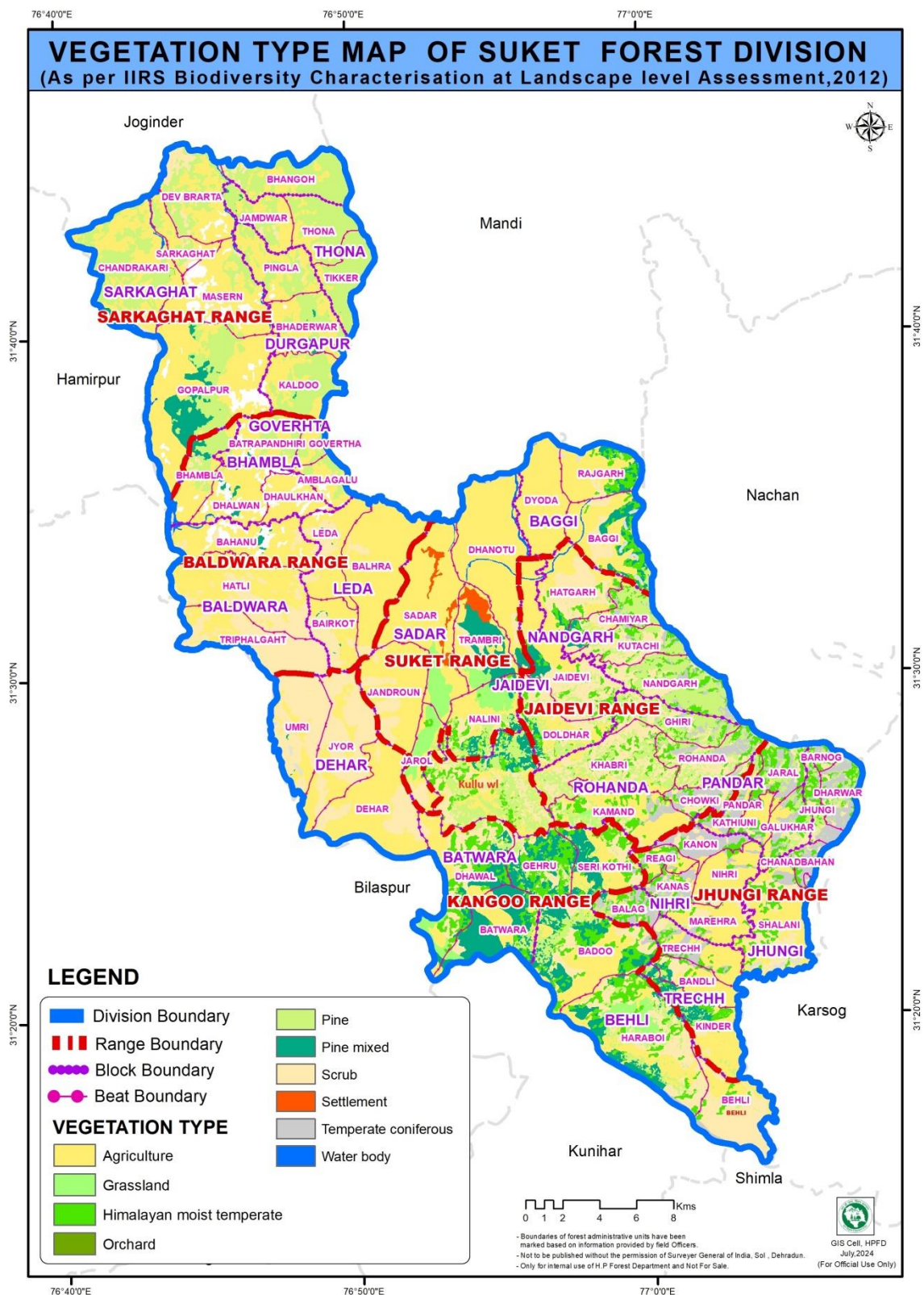
The map includes a coordinate grid with latitude and longitude markings, a north arrow, and an inset map of Himachal Pradesh.

(i)

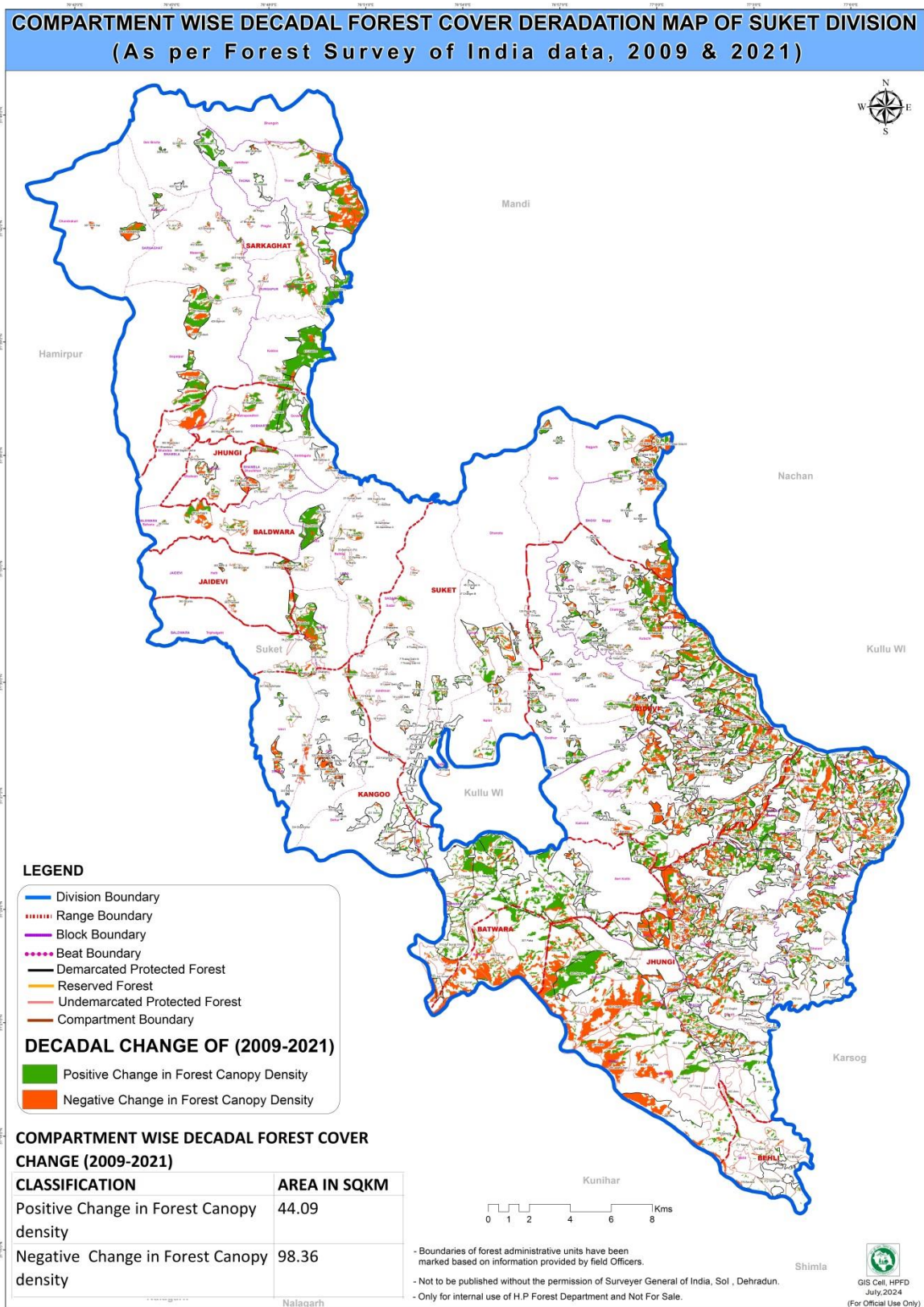
Study Area In Himachal Pradesh, India



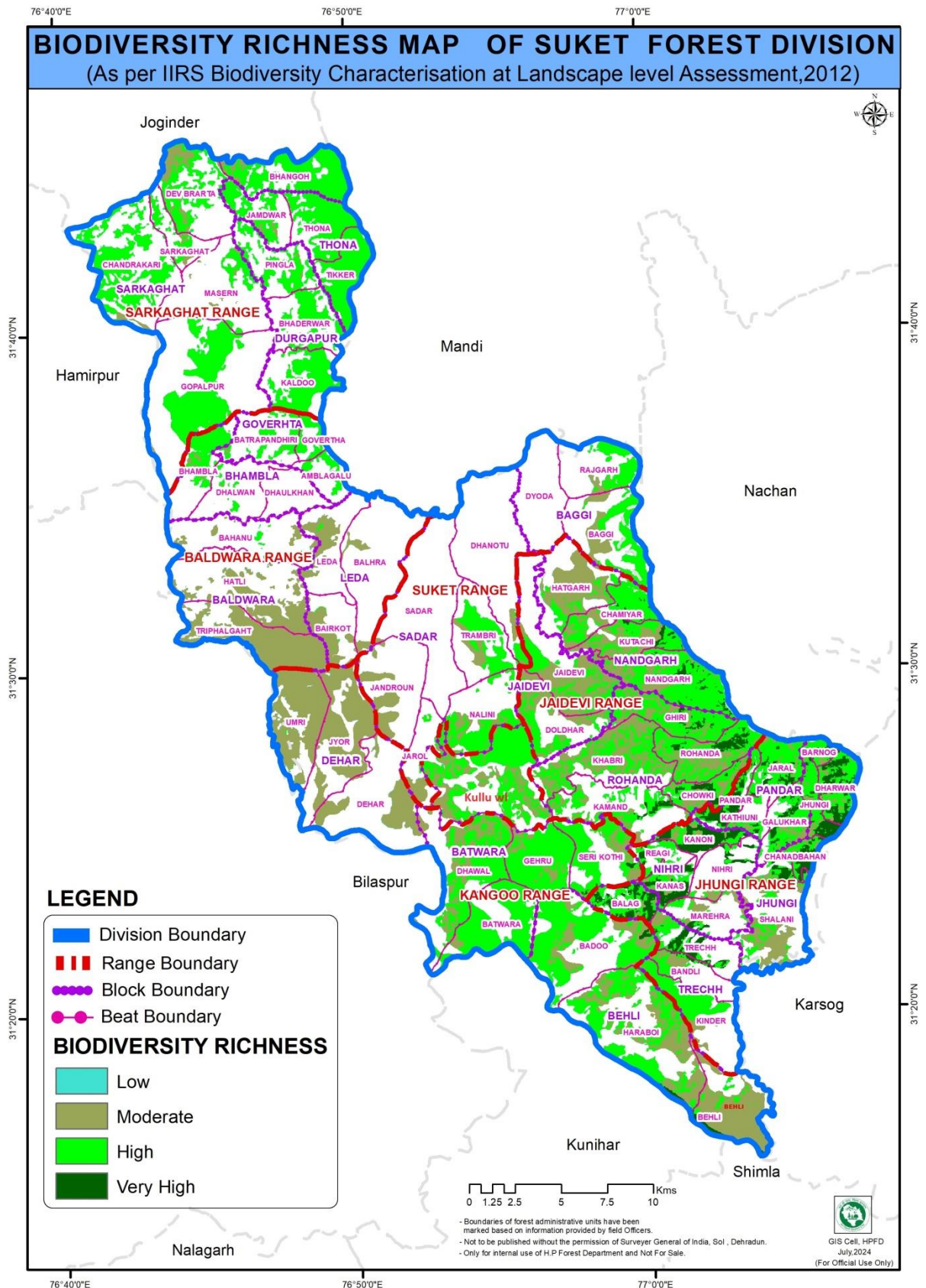
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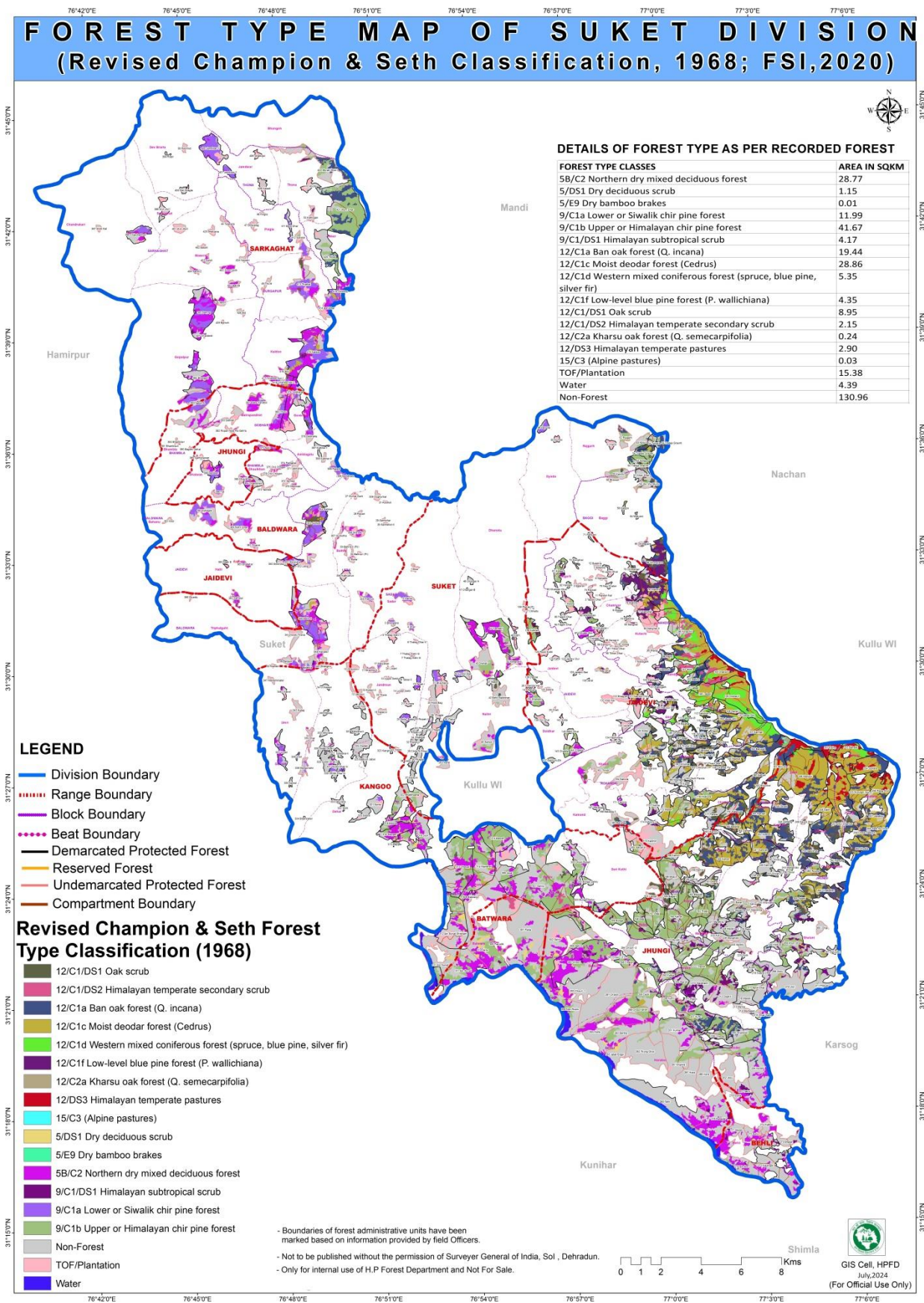
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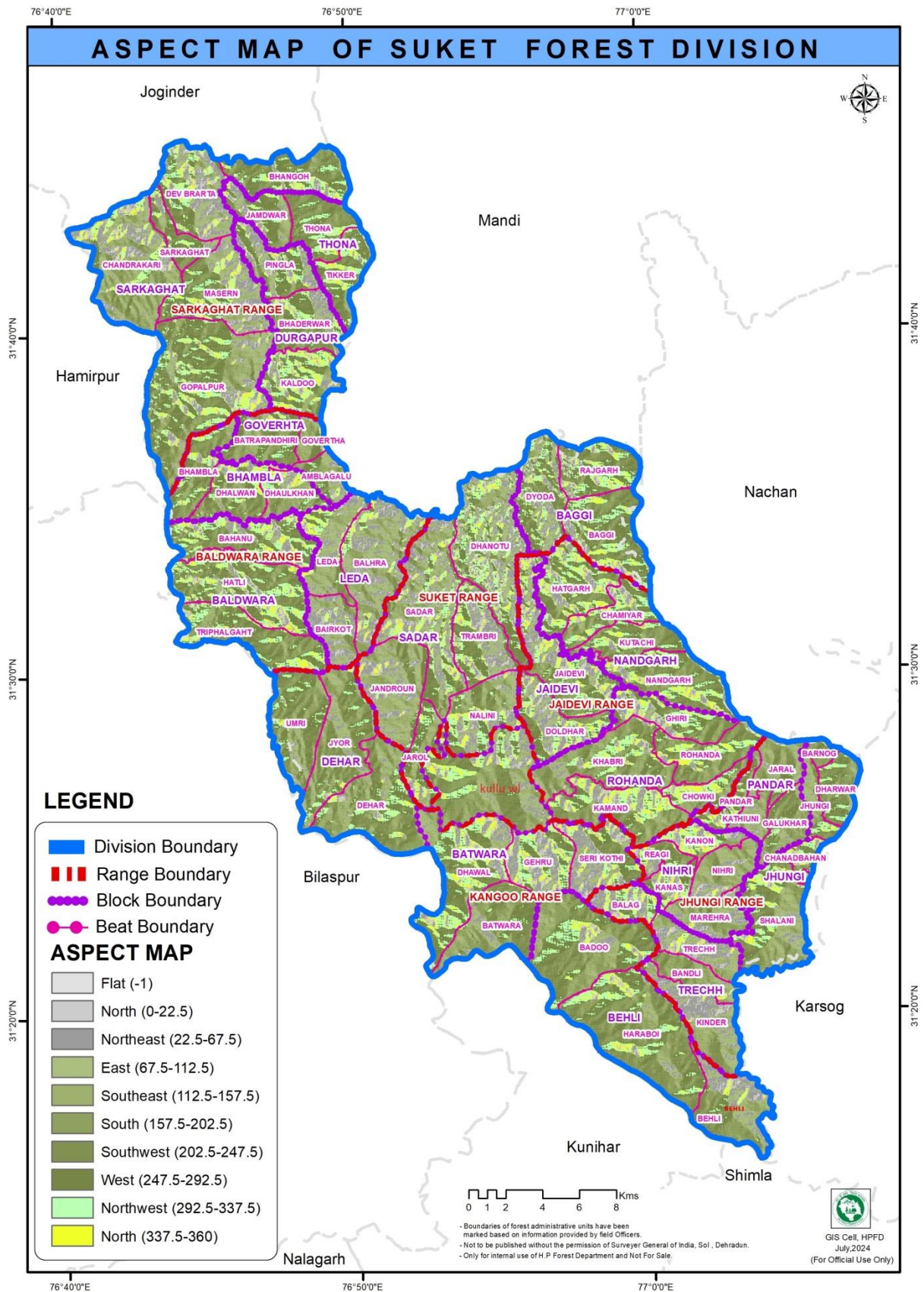


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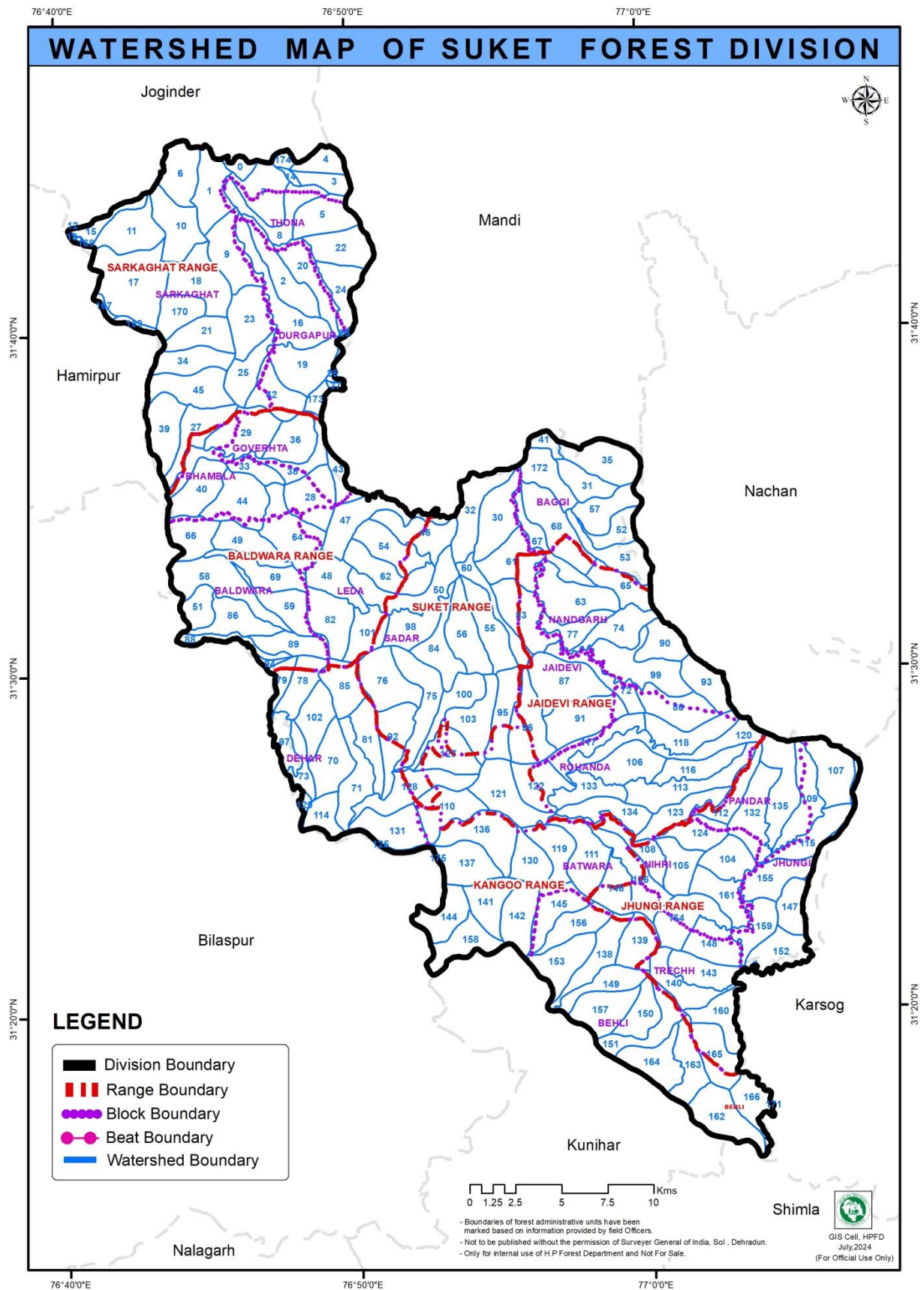


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EXECUTIVE SUMMARY

A. Vision Statement:

To ensure the sustainable management of the Suket Forest Division's diverse ecosystems, fostering ecological stability, biodiversity conservation, and socio-economic development, while responding to the challenges of climate change and enhancing community well-being in alignment with the National Working Plan Code 2014.

B. Goals:

1. **Sustainable Forest Management:** Maintain and enhance forest resources through scientific practices that balance conservation and resource utilization.
2. **Biodiversity Protection:** Safeguard endemic species and habitats unique to Himachal Pradesh's mid-altitudinal forests.
3. **Water and Soil Conservation:** Protect critical watersheds and improve soil health, ensuring environmental and agricultural stability.
4. **Climate Adaptation and Mitigation:** Enhance forest carbon stocks and promote resilience against climate change.
5. **Community Integration:** Empower local communities with participatory forest management and equitable benefit-sharing mechanisms.

C. Objectives of Management:

The working plan for the Suket Forest Division includes specific objectives tailored to the various working circles as a means to implement specialized management strategies across diverse forest types and uses:

1. **Conservation and Regeneration:** Prioritize afforestation in degraded areas and promote the natural regeneration of indigenous species.
2. **Non-Timber Forest Produce (NTFPs):** Develop sustainable NTFP extraction practices to support livelihoods without compromising ecological balance.
3. **Wildlife Habitat Improvement:** Implement habitat management strategies to protect flagship and endangered species.
4. **Technology Integration:** Leverage geospatial tools, including GIS and remote sensing, for forest monitoring and management.
5. **Climate Initiatives:** Incorporate REDD+ and afforestation schemes to mitigate emissions and foster resilience in forest-dependent communities.

SWOT Analysis:

- **Strengths:**
 - Rich biodiversity, including endemic and medicinal plants.
 - Scenic landscapes suitable for eco-tourism and sustainable tourism initiatives.
 - Community knowledge and traditional practices supportive of conservation goals.
 - Involvement of people through Joint Forest Management.
- **Weaknesses:**
 - Overdependence on forest resources for grazing, firewood, and fodder.
 - Vacancy in number of beats
 - Lack of awareness about legal aspects and procedures among the field staff
 - Lack of demarcation of proper forest boundaries.
 - Limited infrastructure for forest patrolling and biodiversity monitoring.
 - High susceptibility to forest fires and pest outbreaks.
- **Opportunities:**
 - Potential for funding and technical support from the PSUs, and corporates through CSR initiatives

- Promotion of sustainable eco-tourism as an alternative livelihood source.
- Modern technologies like GIS for real-time forest inventory and impact assessment.
- **Threats:**
 - Climate change impacts, including shifts in vegetation zones and forest productivity.
 - Increased human-wildlife conflicts due to habitat fragmentation.
 - Socio-economic pressures from growing populations around forest fringes.
 - High Biotic pressures including grazing and encroachments etc.
 - Illegal mining in the river beds and khads.

Expected Outcomes:

1. **Enhanced Forest Health:** Increased forest cover by taking various plantation activities and biodiversity conservation through focused silvicultural and restoration interventions.
2. **Improved Ecosystem Services:** Strengthened watershed management, soil stabilization, and climate regulation.
3. **Livelihood Security:** Diversified income sources for local communities through eco-tourism, sustainable NTFP harvesting, and skill development programs.
4. **Habitat Improvement:** Improvement in the wildlife habitat, better monitoring and documentation of species.
5. **Climate Change Mitigation:** Significant contributions to carbon sequestration and reduced emissions from deforestation.
6. **Resilient Ecosystems:** Restoration of critical habitats, reduced human-wildlife conflicts, and improved adaptability to environmental changes.
7. **Model Forest Management:** Establish Suket Forest Division as a benchmark for climate-adaptive and community-centric forest management practices in the Himalayan region.

SUMMARY OF PRESCRIPTIONS

Working Circle	Heading	Prescription	Para no. (of Part II)
Regular	Silvicultural system and Regeneration	Indian Irregular Shelterwood System/Punjab Shetre wood System with assisted natural regeneration	2.11
	Rotation and Regeneration Period	120 & 30 years respectively	2.11.2, 2.12
	Exploitable Dia	60 cm	2.12
	Felling Cycle	10 years	2.14
	Division into Periodic Blocks	Fixed; Three PBI, PB-II, PB III, PB IV	2.13
	Prescribed Annual Yield	By volume: 20810m ³ for PB I, 5500 m ³ for PB IV, 1400 M3 FOR PBIII Total 27710 m ³	2.15 – 2.18
Chil	Silvicultural system	Indian Irregular Shelterwood System	3.11
	Rotation Period	100 years	3.12
	Felling Cycle	10 years	3.17
	Periodic Blocks	Four PBs; PBI, PBII, PB III & PB	3.16

		IV	
	Prescribed Annual Yield	By volume: 800 m3 for PB I, 900 m3 for PB IV, 1360 M3 FOR PBIII Total 3060 m3	3.18-3.21
Protection-cum-Rehabilitation	Silvicultural System	None	5.9
	Salvage Removals	Only dry and fallen trees come within the meaning of salvage and can be removed.	5.10
	Yield, exploitable Dia, Rotation/Regeneration Period.	Not required as the forests are not to be managed silviculturally. However, salvage removals will appear in control forms.	5.18
	Methods of Treatment	Treatment of badly eroded areas, grassy blanks, riverine tracts and wooded areas given	5.11,5.11.1
	Other Regulations	Regulations of closure, grazing, lopping, planting, fire protection and right holder's requirements laid down.	5.13,5.17
Water Resource Management & Wildlife	Treatment proposed	Spring-shed identification and treatment	7.4-7.7
Management & Biodiversity Conservation (Overlapping)	Importance of wildlife	Different Aspects	10.3
	Wildlife Conservation Measures	Habitat management, improvement,	10.7-10.9
	Man animal conflict management	Mitigation measures	10.13.10.1 3.1,10.14
Ecotourism (Overlapping)	Ecotourism sites management	Perspective on ecotourism potential of the Division	12.3
	Future scope	Potential Eco-tourism sites in Suket Forest Division	12.6
	Monitoring Plan for Sustainable Ecotourism	sustainable and continue to benefit both the environment and local communities	12.7

INTRODUCTION

GLOSSARY OF LOCAL TERMS USED IN THE PLAN

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	A raised platform around a tree.
7.	Banjar Jadid.	New fallow, Not cultivated for more than four successive years.
8.	Banjar Kadim.	Old fallow. Not cultivated for the last eight successive years.
9.	Ban Kharetar.	Hay land in forest.
10.	Ban Maufi	Forest around 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 Forests 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.	Occasionally cultivated.
18	Burjee.	A boundary pillar
19	Chak.	Part of land.
20	Chak Ban.	An area maintained as a forest jointly by few tikas
21.	Chak dakhli	An area taken out from the tika and

		entered into other to facilitate revenue control.
22.	Chak kharji.	An area taken out from the tika.
23.	Chak Shamlat deh.	A piece of Ban Sarkar area surrounded by Demarcated Protected and Reserve Forest.
24.	Chalotu.	A Chil pole.
25.	Chand.	Boundary pillar of tika.
26.	Changer.	A rain fed inferior area.
27.	Charand.	Grazing ground.
28.	Chillaru.	Dry leaves of Chil.
29.	Chø.	A seasonal nallah not more than 50 feet in depth.
30.	Choharam.	Share of the forest Rakha from the sale proceeds of forest produce.
31.	Chowkidar.	A village watchman.
32.	Dandi.	A foot path.
33.	Darya.	A river.
34.	Dhauila.	White.
35.	Dhar.	A ridge.
36.	Devta.	Local Deity.
37.	Drat.	A sickle for cutting bushes and trees.
38.	Drati.	A sickle for cutting grass.
(ii)		
39.	Gaddies.	A community of migratory glaziers keeping sheep and goats.
40.	Gair Mumkin.	Barren land under buildings, roads, paths and streams.
41.	Gaula.	A pass.
42.	Ghanera.	Ruins of Village habitation.
43.	Gharal.	A shed for cattle and stirring grass.
44.	Gharat.	A water mill for grinding purpose.
45.	Gohar.	A path.
46.	Goharn.	A cattle shed.
47.	Goth.	A grazing run.
48.	Gujjars	A community of migratory graziers keeping buffaloes.

49.	Hadbast number.	A serial number given to a village, at the time of revenue settlement.
50.	Haldun.	Flat fertile ground with deep soil.
51.	Har.	Continue stretch of agriculture field.
52.	Haq.	Right.
53.	Haq Chuhram.	Zamadari share means one fourth share in sale proceeds of tree and grass etc. in Ban Sarkar areas.
54.	Hath.	A linear unit, approximately equal to (18 inches) 45 cm.
55.	Jagnu	Chil splinters used for lightning fire.
56.	Jagir	An Estate awarded to an individual by the British for an act of bravery etc.
57.	Jagirdar	Owner of the Jagir.
58.	Jamabandi	Three years record of land maintained by revenue department.
59.	Jungle Mehdooda.	Demarcated Protected Forest.
60.	Jungle Mehfooja.	Protected Forest.
61.	Jungle Mehdooda Gair and Mehfooja.	Un-demarcated Protected Forests.
62.	Karam	Linear Unit of equal to 57.7 inches= 146.05 cm
63.	Katha.	A tanning obtained from khair trees.
64.	Khad/Khalla.	A stream perennial or seasonal.
65.	Kharetar.	Hay field owned by individuals.
66.	Kharif.	Autumn harvest.
67.	Khasra.	A field number given on the village revenue records.
68.	Khola.	A small valley.
69.	Kohli.	A person looks after distribution of irrigation and running water mill.
70.	Kotwal	Manager of an area or Station House Officer.
71.	Kuhl.	A artificially constructed channel, for irrigation and running water mill.
72.	Kuhly.	Land irrigation through kuhls.
73.	Lahr.	Fields near 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 bush wood fence.
76.	Makbooja	Posses
77.	Mali	Gardener
78.	Mandir	Temple
79.	Manu	Current year's shoot of bamboo
80.	Marla	Revenue measuring unit 9sq Karam
(iii)		
81.	Mauja	Unit constituted by a member of tikka for purposes of Revenue Department
82.	Nadi	Stream
83.	Nallah	Small water channel or a torrent not more than 50 fit in width
84.	Naun	Spring use for bathing washing purpose.
85.	Nautor	Breaking of land for purpose of cultivation of habitation for the first time
86.	Palam	Irrigated paddy area
87.	Panch	Member of Panchayat
88.	Panchayat	Body of Panches forming a Village Management
89.	Patrah	Tree fodder
90.	Patwar	Group of villages forming a Patwar Circle
91.	Patwari	Revenue official Incharge of Circle
92.	Quila	Fort
93.	Ravi	Spring crop
94.	Rajaor Rajah	Ruler
95.	Rakha	A person appointed for the protection of Forests who collect grains from Right holder and gets Choram from sale of forest produce for his service
96.	Sarhada	Three junction pillars of three tikas
97.	Sarpanch	Person head of the Gram Panchayat
98.	Sawana	Gujjar's encamping and grazing ground.
99.	Sajra	Village field map
100.	Sawanadars	Right holder of Sawana
101.	Shamlat	Village common land.

102	Taluqa.	Management unit fixed by Revenue Department
103	Talab	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 a 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 for purpose of revenue administration (a village)
110	Un classed	Ban Sarkar area not declared as Protected forests under Indian Forest Act
111	Uperla	Upper
112	Zamindar.	A land lord
113	Zamindai share	A share granted to right holders and village servants paid out of revenue derived from sale of trees of grass etc. from Ban Sarkar area

A Glossary of Technical Terms

Term	Explanation
Above-ground biomass	The AGB carbon pool consists of all living vegetation above the soil, inclusive of stems, stumps, branches, bark, seeds and foliage.
Afforestation	Artificial establishment of forest on lands which previously did not carry forest within living memory
ANR	Assisted Natural Regeneration
Aquifer	An aquifer is an underground layer of water-bearing permeable rock, rock fractures or unconsolidated materials (gravel, silt and sand). Groundwater can be extracted using a water well.
Bank Erosion	Bank erosion is the wearing away of the banks of a stream or river. This is distinguished from erosion of the bed of the watercourse, which is referred to as scour. The roots of trees growing by a stream are undercut by such erosion.
Below-ground Biomass	The BGB carbon pool consists of the biomass contained within live roots
Biomass Expansion Factor (BEF)	The ratio of aboveground biomass and bole biomass (defined by a merchantable measure or a minimum DBH). It is used to quantify carbon stock in forests.
Biotic Factor	Any influence of living organisms. Usually restricted to the influence of animals including man.
Block Plantation	Tree plantations in compact blocks of more than 0.1 ha on lands outside recorded forest areas.
Borers	Any of various insects, insect larvae make holes in tree trunks, barks etc.
CAMPA	CAMPA Act or Compensatory Afforestation Fund Act is an Indian legislation that seeks to provide an appropriate institutional mechanism, both at the Centre and in each State and Union Territory, to ensure expeditious utilization in efficient and transparent manner of amounts released in lieu of forest land diverted for non-forest purpose which would mitigate impact of diversion of such forest land.
Canopy	The cover of branches and foliage formed by the crowns of trees in a wood.
Canopy Density	The relative completeness of canopy usually expressed as a decimal coefficient, taking closed canopy as unity. The following classification of canopy density is in vogue: Closed when the density is 1.0; dense when the density is between 0.75 and 1.0.; thin when the density is between 0.5 and 0.7; and open when the density is under 0.5

Capacity Building	It is the process by which individuals and organizations obtain, improve, and retain the skills, knowledge, tools, equipment, and other resources needed to do their jobs competently. It improves individual or organization capacity to do works in efficient way.
Carbon Sequestration	The uptake and storage of carbon. Trees and plants, for example, absorb carbon dioxide, release the oxygen and store the carbon.
CEC	Central Empowered Committee
Check Dam	A small low dam constructed in a gully or other water-course to decrease the velocity of stream flow and thereby to minimize channel scour and promote deposition of eroded material.
Clay Loam	A heavy soil intermediate in texture between clay and loam.
Clear Felling	Strictly the felling of the whole standing crop in one operation.
Climax Forest	The final stage of successional development on a forest site under specific climatic and other environmental conditions, leading to a more or less stable equilibrium underlying only minor changes in species composition.
Compartment	A territorial unit of a forest permanently defined for the purposes of administration, description and record. (Preferably designated by Arabic numerals, 1, 2, 3, etc.).
Compartment History	A record of all events effecting the forestry of an individual compartment.
Controlled Burning	Any deliberate use of fire whereby burning is restricted to a predetermined area and intensity.
Controlled Grazing	Conservative grazing through controlling the period and incidence by the movement of livestock in different parts of the area in prescribed sequence.
Coppice with Standards	Silviculture system where forest or stand consists of coppice among which a number of trees (standards), that are generally of seedling origin, are retained for a longer rotation to provide large material and seeds to regenerate the forests.
Coppice Shoot	A shoot arising from an adventitious bud at the base of a woody plant that has been cut near the ground or burnt back. Sometimes (incorrectly) used to include root suckers.
Coupe	Defined felling area in forest compartment
Defoliators	An adult or larval insect which strips all the leaves from a tree or shrub.
Deforestation	Change of land cover with depletion of tree crown cover to less than 10 percent. Changes within the forest class (e.g. from closed to open forest) which negatively affect the stand or site and, in particular, lower the production capacity, are termed forest degradation.

Dense Forest	All lands with a forest cover having a canopy density of 40 percent and above.
Diameter Class	One of the intervals into which the range of stem diameters, e.g., of trees or logs, is divided for classification and use; also, the trees, logs, etc., falling into such an interval.
DMFT	District Mineral Foundation Trust
Dominant species	The species that predominates in an ecological community, particularly when they are most numerous or form the bulk of the biomass.
Ecosystem	The sum of plants, animals, environmental influences, and their interactions within a particular habitat
Ecosystem Services	Ecosystem services, outputs, conditions, or processes of natural systems that directly or indirectly benefit humans or enhance social welfare For example, the pollination of crops provided by bees and other organisms contributes to food production and is thus considered an ecosystem service.
Ecotourism	It is tourism with an ecological conscience. It involves visiting fragile, pristine, and relatively untouched natural areas, with the intention to support conservation efforts.
Emissions factor	Emissions factor gives gains and losses in carbon stock as a standard rate of emissions per unit activity. It is used to scale emissions to activity data.
Enumeration	The counting, singly or together, of individuals of one or more species in a forest crop and their classification by species, size, condition, etc. Enumeration may be complete (total) or partial (sample); a partial enumeration may be carried out on separate sample plots or in strips or lines.
Evenness	A value for evenness approaching zero reflects large differences in abundance of species, whereas an evenness of one means all species are equally abundant
FDA	Forest Development Agencies are to be registered as Federation of all Joint Forest Management Committees (JFMCs) within a territorial/ wildlife forest division under the Societies' Registration Act
Felling Cycle	Felling cycle is defined as the time that elapses between successive – fellings
Felling Series	Annual felling of trees in Forest Campartment
Fire Lines	Containment lines or fire breaks in Forest Compartments to check forest fires. Width of Fire lines are kept as 10-15 m.
Fire Protection	All activities concerned with protection of a forest area from damage by fire; comprises prevention, detection, pre-suppression and suppression.

Flagship species	A flagship species is a species selected to act as an ambassador, icon or symbol for a defined habitat, issue, campaign or environmental cause.
Flood Plains	A flood plain is an area of flat land alongside a river. This area gets covered in water when the river floods. Flood plains are naturally very fertile due to the river sediment which is deposited there.
Forest	a) An area set aside for the production of timber and other forest produce, or maintained under woody vegetation for certain indirect benefits which it provides, e.g., climatic or protective. (b) A plant community predominantly of trees and other woody vegetation, usually with a closed canopy. (c) An area of land proclaimed to be a forest under a forest law.
Forest Area	The area recorded as a forest in the Government records. It is also referred to as “Recorded Forest Area”.
Forest Cover	All trees and other plants occupying the ground in a forest.
Forest Crop	The entire collection of trees (including bamboos) growing on a given area. Forest crops may be classified in terms of their stages of development as seedling crops, thickets or sapling crops, pole crops and tree crops.
Forest Diversion	Forest land is usually recommended for diversion by state governments for the development of various infrastructure projects or mining, and then given a final approval by the Union Ministry of Environment, Forest and Climate Change (MoEF &CC)
Forest Division	A forest division is a term used to signify an area containing one or more (usually) demarcated and (usually) protected or resource- managed forests, for administrative purposes.
Forest Fire Mitigation	Fire mitigation is a series of steps that you can take to reduce the risk of a wildfire consuming your property. It includes assessing the risks around your property, recognizing the wildfire dangers and your responsibility in mitigating them, thereby creating a defensible space.
Forest Fringe Villages	The villages located in the proximity of forest areas.
Forest inventory	A survey of a forest area to collect information on timber and a variety of other resource values.
Forest management plan	A general plan for the management of a forest area, usually for a full rotation cycle, including the objectives, prescribed management activities and standards to be employed to achieve specified goals. Commonly supported with more detailed development plans.
Forest Policy	The general principles determined according to social and economic objects adopted or the creation and/or maintenance of forests and their use.

Forest Produce	All material yielded by a forest estate. Generally defined in forest acts, regulations, etc., and may include earth, stone, gravel and minerals. Classified as (a) Major Forest Produce – timber, smallwood and fire wood and (b) Minor Forest Produce – all forest produce, other than major forest produce, including grass, fruit, leaves, animal products, soil and minerals.
Forest Range	An executive territorial unit, usually the charge of a forest ranger.
Forest Regulation	A branch of forestry concerned with the technical aspects of organizing and maintaining a forest for sustained yield. (b) A legal ordinance affecting forests.
Forest Right	A legally recognized claim, possessed by a person, community or property, to share in the enjoyment of some or all of the benefits of the forest property of another.
Forest Type	A category of forest defined generally with reference to its geographical location, climatic and edaphic features, composition and condition
Forest Utilization	The branch of forestry concerned with the harvesting, conversion, disposal and use of forest produce.
General Volume Table	Volume table designed to cover the whole natural range and dimensions of a species
Geographic information system (GIS)	A computer-based mapping system which combines different types of resource information. Often used to make forest management decisions.
Girth Class	One of the intervals into which the range of girth of trees or logs is divided for classification or use; also, the trees or logs falling into such an interval.
Grassland	A community in which grasses predominate; trees are either altogether absent or present in relatively small number.
Grazing Incidence	The amount of grazing in an area expressed as number of animals or equivalent cow units per acre.
Ground Water	The body of water in the ground, accumulated above impermeable layers that completely fills the pore space to a level whose depth below the surface varies from place to place and, generally from time to time.
Growing Stock	The sum (by number or volume) of all the trees growing in the forest or a specified part of it.
Habitat	The place where an organism lives and/or the conditions of that environment including the soil, vegetation, water, and food.
Hardwood	A conventional term, used irrespective of physical hardness or softness, for broadleaved trees and their timber, as distinguished from conifers and their timber which are known as softwoods. In countries where conifers are of little commercial importance, however, the terms are commonly used in their literal sense. In India the lighter hardwoods are often called 'light' or 'soft' hardwoods
Harvesting	The cutting and removal of trees from a forested area.

Hazard	A hazard is any source of potential damage, harm or adverse health effects on something or someone.
Heart Rot	In trees, heart rot is a fungal disease that causes the decay of wood at the center of the trunk and branches.
Hillocks	Narrow hills separated from larger hills
Humus	The organic component of soil, formed by the decomposition of leaves and other plant material by soil microorganisms.
Infiltration	It is the process by which water on the ground surface enters the <u>soil</u>
Irregular Shelterwood System	Silviculture system in which the advance growth (saplings and poles) are retained for compensating deficiency of natural regeneration, resulting in irregular crop
Invasive Species	The species not native to a specific location (an introduced species) and tends to spread to a degree believed to cause damage to the environment, human economy or human health.
JFM	Joint Forest Management
Land Use, Land-Use Change and Forestry (LULUCF)	It is a category within UNFCCC accounting framework for greenhouse gas (GHG) emissions. LULUCF includes carbon pools of living biomass (above and below ground), dead organic matter (dead wood and litter) and organic soil carbon.
Landslide	The sudden sliding of masses of rock soil or other superficial deposits on steep slopes.
Livelihood	A means of supporting one's existence, especially financially or vocationally.
Loamy	Includes all sandy loams, clay loams, loam, silt and silt-loam textures. Sometimes subdivided into moderately, coarse-textured, medium-textured, and moderately fine-textured groups
Location Map	Location map means a map depicting the location of the resource referenced in the application delineated in relation to the resource in its entirety and enough surrounding area to locate the resource on other map sources.
Log	The stem of a tree or a length of stem or branch after felling and trimming.
Logging (Synonym: Harvesting)	A method by which the growing stock (or part of it) of a stand is removed. Includes the procedure from felling to long-distance transport.
MAI (mean annual increment)	The average annual increase in volume of individual trees or stands up to the specified point in time. The MAI changes with different growth phases in a tree's life, being highest in the middle years and then slowly decreasing with age. The point at which the MAI peaks is commonly used to identify the biological maturity of the stand and its readiness for harvesting.

Management Information System	A management information system (MIS) is a computer system consisting of hardware and software that serves as the backbone of an organization's operations.
MCR	Master Control Rooms; established in forest division to release information bulletin on Forest Fire Danger Rating to all beats.
Micro-plans	Micro-plans are prepared for execution of various developmental activities of villages under JFM.
Mixed Forest	A forest composed of trees of two or more species intermingled in the same canopy; in practice and by convention, at least 20 per cent of the canopy must consist of species other than principal one.
Moderately Dense Forest	All lands with forest cover having a canopy density between 40 to 70 percent.
NAP	National Afforestation Plan of Govt of India to decentralised powers to JFMCs and FDA for protection of forests, plantation activities and capacity building.
NCAP	National Clean Air Programme, launched in 2019, and India's flagship program for better air quality in 122 cities.
Native species	A "native" plant is one that is living, growing, and reproducing naturally in a particular region.
Natural Regeneration	The renewal of a forest crop by self-sown seed, or by coppice or root suckers; also, the crop so obtained.
Net present value (NPV)	A stand's present worth before harvesting once costs associated with its establishment and tending have been subtracted.
Non-forest land	Land not primarily intended for growing or supporting a forest.
Non-Timber Forest Products (NTFPs)	It is defined as product or service other than timber that is produced in forests. NTFPs are useful materials or commodities obtained from forests without harvesting (logging) of trees.
Normal Forest	A forest which for a given site and given objects of management, is ideally constituted as regards growing stock, age class distribution and increment, and from which the annual or periodic removal of produce equal to the increment can be continued indefinitely without endangering future yields. A forest which by reason of its normalcy in these respects serves as a standard of comparison, for sustained yield management.
Open Forest	Lands with forest cover having a canopy density between 10 to 40 percent.
Overlapping Working Circle	Overlap across more than one Working Circle of a Forest Division

Panchayat Forest	Any forest whose management is vested in a village panchayat, i.e., a body of men elected by the villagers from among themselves for specific administrative or other purposes pertaining to the village.
Panwis	The forests other than RF, DPFS and UF having no tree growth and which contain grasses only
Perennial rivers	The rivers flow in all seasons.
Permanent pastures	Land used to grow grasses or other herbaceous forage naturally (self-seeded) or through cultivation (sown) and that is not included in the crop rotation of the holding for five years or longer
Physiographic Zone	A physiographic zone constitutes geographical areas that exhibit broad similarities in factors responsible for the growth of tree vegetation. Physiographic zones have been used as strata for assessing tree cover in the country.
Pole crop	5 to 9.9 cm DBH trees
Pollution	A change in the physical, chemical, or biological characteristics of the air, water, or soil that can affect the health, survival, or activities of humans in an unwanted way. Some expand the term to include harmful effects on all forms of life.
Preservation Plot	A sample area of natural forest or plantation set apart for preservation in perpetuity mainly for purposes of ecological observations and growth studies covering the full life of the trees and crops.
Reducing Emissions from Deforestation and Forest Degradation	A framework to reduce emissions from deforestation and degradation, conservation of existing carbon stocks and enhancement of carbon stocks.
Reforestation	Artificial (planting, seeding) or natural re-establishment of forest after harvesting/cutting on previously forest or other wooded land.
Regeneration	The renewal of a tree crop, either by natural or artificial means
Regeneration Survey	A survey for the assessment of established and unestablished regeneration generally by sample enumeration.
Remote sensing	Remote sensing is the acquisition of data, such as total forest area, forest type, canopy cover and height, from sensors on board aircraft or space-based platforms.
Reserved Forest	An area so constituted under the forest act or other law.
Root Rot	Any of various plant diseases characterized by decay of the roots and caused especially by fungi.
Root stock	Rootstock varieties may come from naturally growing trees, unique naturally occurring plant mutations, or be genetically bred for the purpose of being rootstock.

Rotation	The planned number of years between the formation or regeneration of a crop and its final felling. In the case of a selection forest, the average age at which a tree is considered mature for felling.
Sample Plot	A plot chosen as representative of a larger area. In forestry, sample plots are used mainly in enumeration surveys and for studies of growth.
Sampling	The selection of sample units from a population and the measurement and/or recording of information on these units to obtain estimates of population characteristics.
Sapling	A young tree from the time when it reaches 3 feet in height till the lower branches begin to fall. A sapling is characterized by the absence of dead bark and its vigorous height growth.
Scrub	Inferior growth consisting chiefly of small or stunted trees and shrubs
Seasonal rivers	Seasonal rivers are the rivers which flow only in rainy seasons and remain dry mostly.
Seedlings	A young plant, especially one raised from seed and not from a cutting usually less than 1 m of height
Selection System	The system in which regeneration and felling carried out in whole compartment but not in specific areas as in other systems. Dead, decaying, diseased and mature trees are selected for felling.
Shannon-Weiner Index	A measure of species richness and abundance. It is used for comparing diversity of species between various habitats.
Shelterwood System	Shelterwood systems are those high forests system in which the young crop is established under the shelter (overhead or lateral) of the old one, the latter at the same time affords protection to the soil. It includes the various systems of successive regeneration felling together with the selection system.
Silvicultural System	A method of silvicultural procedure worked out in accordance with accepted sets of silvicultural principles, by which crops constituting forests are tended, harvested and replaced by new crops of distinctive forms.
Silviculture	The art and science of cultivating forest crops.
Soil Organic Matter (SOM)	It is the organic component of soil containing small plants residues, small living soil organism and decomposed organic matter.
Species richness	Species richness is the number of different species represented in an ecological community, landscape or region
Stand density	A relative measure of the amount of stocking on a forest area. Often described in terms of stems per hectare.

Standard Volume Table	A volume table in which the contents are given as volume measured down to the limits for standard timber, and, if necessary, smallwood, with stump included. Mainly of use as a basis for reference and for deriving, by the application of suitable conversion factors, subordinate volume tables in units and modes of measurement for specific local purposes
Stratification	Stratification is the division of the area into more homogenous units of carbon density. The purpose of stratification is to increase the accuracy and precision of accounting by reducing field data variability.
Succession	The gradual replacement of one community by another in the development of vegetation towards a climax; succession is primary on sites which have previously not borne vegetation and secondary after destruction of whole or part of original vegetation.
Sustainable Development	Preservation and protection of diverse ecosystems—the soil, plants, animals, insects and fungi while maintaining the forest's productivity
Sustainable Use of Forests	Sustainable management is the prerequisite for the sustainable use of forests. Sustainable management means the stewardship and use of forests and forest lands in such a way and at such a rate that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions at local, national, and global levels and that does not cause damage to other ecosystems.
Thinning	A felling made in an immature stand for the purpose of improving the growth and form of the trees that remain, without permanently breaking the canopy.
Timber	Categories of wood other than fire wood.
Trenching	Trenching is a construction method that involves digging a narrow trench/ nali in the ground for protection of forest resources or water harvesting for plants.
Un-classed Forests	An area recorded as forest but not included in reserved or protected forest
Undergrowth	The lowest stratum of woody and other vegetation above the ground cover
Understorey	The lower storey of a forest crop, e.g., a young crop under seedbearers, coppice under standards, or the lower storeys in a multi-storeyed high forest.
Very Dense Forest	Lands with forest cover having a canopy density of 70 per cent and above.
Vitality	Making forest resources strong
Volume Table	A table showing for a given species the average contents of trees, logs or sawn timber for one or more given dimensions. The given dimensions may be (a) d.b.h. alone, (b) d.b.h. and height or (c) d.b.h. height and some measure of form or taper. Volume tables may be (a) general, (b) regional or (c) local, depending on the scope of their applicability.

Water logging	A condition in which the soil pores get filled with water to the exclusion of air. A consequence of inadequate soil drainage.
Watershed	Strictly a water parting, the dividing line between catchment areas. The use of this term as a synonym for catchment or drainage area is deprecated.
Watershed Management	The administration and regulation of the aggregate resources of a drainage basin for the conservation of water and the control of erosion, streamflow and floods.
Yield	The volume or number of stems that can be removed annually or periodically or the area over which fellings may pass annually or periodically, consistent with the attainment of the objects of management.
Yield Table	A tabular statement which summarizes on an acre or other unit area basis all the essential data relating to the development of a fully-stocked and regularly thinned even-aged crop at periodic intervals covering the greater part of its useful life.

List of common Animals and Birds.		
Sr.No	English Name	Zoological Name
1. Carnivore		
1.	Leopard	<i>Panthera pardus</i>
2.	Leopard cat	<i>Felis bengalensis</i>
3.	Wildcat	<i>Felis chaus</i>
4.	The Indian fox	<i>Vulpes bengalensis</i>
5.	Jackal	<i>Canis aureus</i>
6.	Redfox	<i>Vulpes vules</i>
7.	Yellow throated Martens	<i>Martes flavigula</i>
2. Herbivore		
8.	Ghoral	<i>Nemorhaedus goral</i>
9.	Sambar	<i>Cervus unicolor</i>
10.	Barking deer	<i>Muntiacus muntjak</i>
11.	Musk deer	<i>Moschus moschiferus</i>
12.	Himalayan Thar	<i>Hemitragus jemlachius.</i>
13.	The Ibex.	<i>Capra ibex</i>
3. Rodents.		
14.	Indian Crested Porcupine	<i>Hystrix indica</i>
15.	Indian Hare	<i>Lepus nigricollis</i>
16.	Himalayan Mouse Hare	<i>Ochotona roylei.</i>
17.	Three striped Palm Squirrel	<i>Funambulus palmarum</i>
18.	Fives triped Squirrel	<i>Funambulus pennanti.</i>
19.	Indian Mole rat	<i>Bandicota bengalensis</i>
20.	Indian bush rat	<i>Golunda ellioti</i>
21.	Indian Field Mouse	<i>Mus booduga</i>
22.	Brown Spiny Field Mouse	<i>Mus platythrix</i>
4. Primates and Others		
23.	The Rhesus Monkey	<i>Macaca mulatta</i>
24.	The Common Langur.	<i>Semnopithecus entellus</i>
25.	Himalayan Brown Bear	<i>Ursus arcotos</i>
26.	Himalayan Black Bear	<i>Ursus thibetanus.</i>
27.	Common Otter	<i>Lutra lutra</i>
28.	Mongoose.	<i>Herpestes edwardsii.</i>
29.	The Himalayan Wease	<i>Mustela sibirica</i>
30.	Indian Wild Boar	<i>Sus scrofa</i>
5. Lizards, Snakes and Fishes.		
31.	The Common Indian Monitor	<i>Varanus monitor</i>
32.	The Common House Lizards	<i>Gecko hemidactylus</i>
33.	The Common Indian Krait	<i>Bungarus caervleus</i>
34.	The Himalayan Pit Viper	<i>Ancistrodon himalayanus</i>

35.	The Indian Cobra	<i>Naja naja</i>
36.	The Red Snake	<i>Ptyas mucosus</i>
37.	Brown Trout	<i>Salmo trutta</i>
38.	Golden Mahaseer	<i>Tor putitora</i>
39.	Rohu	<i>Labeo rohita</i>
40.	Murrel	<i>Clauna straiata.</i>
41.	Eel	<i>Anguilliformed</i>
1. Birds		
42.	Himalayan Griffon-Vulture	<i>Gyps himalayensis</i>
43.	Indian Longbilled-vulture	<i>Gyps teruirastris</i>
44.	Indian Scavenger vulture	<i>Gyps</i>
45.	Himalayan Snowcock	<i>Tetraogallus himalayensis</i>
46.	Chukor Partridge	<i>Alectoris chukar</i>
47.	Snow Partridge	<i>Lerwa lerwa</i>
48.	Hill Partidge	<i>Arborophila torqueola</i>
49.	Grey francolin	<i>Francolinus francolinus</i>
50.	Black francolin	<i>Francolinus francolinus</i>
51.	Jungle Bush Quail.	<i>Perdica asiatica</i>
52.	Common Quail	<i>Coturnix coturnix</i>
53.	Himalayan Monal	<i>Lophophorus impejanus</i>
54.	Kalij Pheasant	<i>Lophura leucomelanos</i>
55.	Koklas Pheasant	<i>Pucrasia macrolopha</i>
56.	Cheer Pheasant	<i>Catreus wallichii</i>
57.	Indian Peafowl	<i>Pavo cristatus</i>
58.	Red Jungle fowl.	<i>Gallus gallus</i>
59.	Blue Rock Pigeon	<i>Columbia livia</i>
60.	Dove	<i>Columbidae</i>
61.	Little Brownor Senegal Dove	<i>Streptopelia senegalensis</i>
62.	Slaty headed Parakeet	<i>Psittacula himalayana</i>
63.	Plum headed Parakeet	<i>Psittacula cyanocephala</i>
64.	Blue Winged Parakeet	<i>Psittacula columboides</i>
65.	Rose Ringed Parakeet	<i>Psittacula krameri, columboides</i>
66.	Eurasian Cuckoo	<i>Cuculus canorus</i>
67.	Common Hawk Cuckoo	<i>Hierococcyx varius</i>
68.	Indian Cockoo	<i>Cuculus micropterus</i>
69.	Asian Koel	<i>Eudynamys scolopaceis</i>
70.	Tawny Owl	<i>Strix aluco</i>
71.	Brown Wood Owl	<i>Strix leptogrammica</i>
72.	Mountain Scopsowl	<i>Otus spilocephalus</i>
73.	Indian Roller	<i>Coracias benghalensis</i>
74.	Common Kingfisher	<i>Alcedo atthis</i>
75.	Common Hoopoe	<i>Upupa</i>

76.	Great Barbet	<i>Megalaima virens</i>
77.	Grey headed Woodpecker	<i>Picus canus</i>
78.	Scaly bellied Woodpecker	<i>Picus squamatus</i>
79.	Black-rumped Flameback	<i>Dinopium benghalense</i>
80.	Rifpis-bellied Woodpecker	<i>Dendrocopos hyperythrus</i>
81.	Black Drongo	<i>Dicrurus macrocercus</i>
82.	Ashy Drongo	<i>Dicrurus leucophaeus</i>
83.	Long- tailed Shrike	<i>Lanius schach</i>
84.	Common Woodshrike	<i>Tephrodornis pondicerianus</i>
85.	Common Myna	<i>Acridotheres tristis</i>
86.	Jungle Myna	<i>Acridotheres fuscus</i>
87.	Rufous Treepie	<i>Dendrocitta vaganimda</i>
88.	Yellow-billed Blue Magpie	<i>Urocissa flavirostris</i>
89.	Grey Tree pie	<i>Dendrocitta formosae</i>
90.	Eurasian Jay	<i>Garrulus glandarius</i>
91.	Black headed Jay	<i>Garrulus lanceolatus</i>
92.	Redbilled Chough	<i>Pyrrhocorax graculus</i>
93.	Yellowbellied Cough	<i>Pyrrhocorax graculus</i>
94.	Indian Jungle Crow	<i>Corvus culminates.</i>
95.	Black Bulbul	<i>Hypsipetes leucocephalus</i>
96.	Himalayan Bulbul	<i>Pycnonotus leucogeny</i>
97.	Red-vented Bulbul	<i>Pycnonotus cafer</i>
98.	Winter wren	<i>Troglodytes heimalis.</i>
99.	Scaly-breasted wren babbler	<i>Pnoepyga albiventer</i>
100.	Jungle Babbler	<i>Tutdoides striat</i>
101.	Common Babbler	<i>Tutdoides caudata</i>
102.	Chestnut-tailed Minla	<i>Minla Strigula</i>
103.	Rufous Sibia	<i>Heterophasia capistrata</i>
104.	White-throated Laughingthrush	<i>Garrulax albogularis</i>
105.	White-crested Laughingthrush	<i>Garrulax leucolphus</i>
106.	Striated Laughingthrush	<i>Garrulax striatus</i>
107.	Streaked Laughingthrush	<i>Trochalopteron lineatum</i>
108.	Variegated Laughingthrush	<i>Trocholoperon variegatum</i>
109.	Whiskered Yuhina	<i>Yuhina flaavicolis</i>
110.	Darksided Flycatcher	<i>Muscicapa sibirica</i>
111.	Staty Blue Flycatcher	<i>Ficedula tricolor</i>
112.	Grey Headed Flycatche	<i>Culicicapa ceylunensis</i>
113.	Asian Paradise Flycather	<i>Terpsiphone paradise</i>
114.	Ashy Prinia	<i>Prinia socialis</i>
115.	Striaated Prinia	<i>Prinia crinigera</i>
116.	White-tailed Rubythroat	<i>Lusciniapectoralis</i>

117.	Indian Blue Robin	<i>Luscinia brunnea</i>
118.	Golden Bush Robin	<i>Tarsiger chrysaeus</i>
119.	Blue-capped Redstart	<i>Phoenicurus coeruleocephala</i>
120.	Blue-fronted Redstart.	<i>Phoenicurus frontalis</i>
121.	Black Redstart	<i>Phoenicurus ochruros</i>
122.	Plumbeous Water Redstart	<i>Rhyacornis fuliginosa</i>
123.	Spotted Forktail	<i>Enicurus maculates</i>
124.	Little Forktail	<i>Enicurus maculatus</i>
125.	Brown Dipper	<i>Cinclus pallassi</i>
126.	Common stonechat	<i>Saxicola rubicola</i>
127.	Grey Bushchat	<i>Saxicola ferreus</i>
128.	Blue –capped Rock thrush	<i>Monticola cinclorhynchus</i>
129.	Chestnut-bellied Rock Thrush	<i>Monticola rufiventris</i>
130.	Blue Rock Thrush	<i>Monticola solitarius</i>
131.	Blue Whistling Thrush	<i>Myophonus caeruleus</i>
132.	Scaly Thrush	<i>Zoothera dauma</i>
133.	White-collard Blaackbird	<i>Turdus albocinctus</i>
134.	Grey Winged Blackbird	<i>Turdus boulboul</i>
135.	Great Tit.	<i>Parus major.</i>
136.	Green Blacked Tit.	<i>Parus monticolus.</i>
137.	Spot Winged Tit	<i>Parus melanolophus</i>
138.	Rufous naped Tit	<i>Parus rufonuchalis</i>
139.	Wall Creeper	<i>Tichodroma muraria</i>
140.	Grey wagtail	<i>Motacilla cinerea</i>
141.	White Wagtail	<i>Motacilla alba</i>
142.	House Sparrow	<i>Passer domesticus</i>
143.	Baya Weaver	<i>Ploceus philippinus</i>
144.	Red-headed Bullfinch	<i>Pyrrhula erythrocephala</i>
145.	Brown Bullfinch	<i>Pyrrhula nipalensis</i>
146.	Common Rosefinch	<i>Carpodacus erythrinus</i>
147.	Dark-breasted Rosefinch	<i>Carpodacus erythrinus</i>
148.	Himalayan Rock Bunting	<i>Emberiza cia</i>
149.	Crested Buntin	<i>Melophus lathamii</i>
150.	Pine Bunting	<i>Emberiza leucocephalos</i>

LIST OF COMMON TREES, SHRUBS, HERBS, AND CLIMBERS FOUND IN SUKET FOREST DIVISION			
TREES			
Sr.No.	Local/Hindi name	English Name	Botanical Name
1.	Aam.	Mango.	<i>Mangifera indica</i>
2.	Aerand	Castor tree	<i>Ricinus communis</i>
3.	Akhnor.	Horse chest-nut.	<i>Aesculus indica</i>
4.	Akhrot.	Walnut	<i>Juglans regia</i>
5.	Alsan		<i>Terminalia tomentosa</i>
6.	Ambara	Hog Plum	<i>Spondias mangifera</i>
7.	Ambla		<i>Antidesma diandrum</i>
8.	Amrud	Gauva	<i>Psidium guajava</i>
9.	Aru.	Peach.	<i>Prunus persica</i>
10.	Arjan	The Arjan	<i>Terminalia arjuna</i>
11.	Badah	Willow	<i>Salix alba</i>
12.	Badral		<i>Machilus duthiei</i>
13.	Badrol.		<i>Machilus gamblei</i>
14.	Badrol/kharamb		<i>Machilus odoratissima</i>
15.	Bakain/Drek	Persian Liliac	<i>Melia azedarach</i>
16.	Ban	While oak	<i>Quercus leucotrichophora</i>
17.	Badam	Almond	<i>Prunus amygdalus</i>
18.	Banni.	Holly Oak.	<i>Quercus glauca</i>
19.	Barh	Banyan tree	<i>Ficus benghalensis</i>
20.	Barthua		<i>Hymenodictyon excelsum</i>
21.	Bashal.	Willow	<i>Salix dephnoides</i>
22.	Bashal	Willow	<i>Salix denticulate</i>
23.	Bashal	Willow	<i>Salix wallichiana</i>
24.	Behera		<i>Terminalia bellirica</i>
25.	Bhurj		<i>Betula utilis, B.alnoides</i>
26.	Bil	Bael tree	<i>Aeglemarmelos</i>
27.	Bras/Brah		<i>Rhododendron arboretum</i>
28.	Bukain		<i>Maesa martiana</i>
29.	Chari/Khiri	Hornbeam	<i>Carpinus viminea</i>
30.	Chamar samn		<i>Glochidion velutinum</i>
31.	Chamror		<i>Ehretia laevis</i>
32.	Chil	Chir Pine	<i>Pinus roxburghi</i>
33.	Chilla	Aril Orange	<i>Casearia tomentosa</i>
34.	Chilla	Aril Orange	<i>Casearia graveolens</i>
35.	Chirindi		<i>Litseaumbrosa</i>

36.	Chirindi		<i>Xylosma longifolium</i>
37.	Dagur	The Fig.	<i>Ficus hispida</i>
38.	Dhak. Palah		<i>Butea monosperma</i>
39.	Dhama.		<i>Grewia mainesiana</i>
40.	Dhaman/Beul.		<i>Grewia oppositifolia</i>
41.	Dhamariana		<i>Grewia laevigata</i>
42.	Dhao		<i>Anogeissus latifolia</i>
43.	Dhoop		<i>Jurinea macrocephala</i>
44.	Dhura/Dudla	Wild Fig	<i>Ficus palmate</i>
45.	Diar	Deodar	<i>Cedrus deodara.</i>
46.	Dudla	The Fig	<i>Ficus nemoralis</i>
47.	Duri/Duari	Hil Toon	<i>Cedrelaserrata</i>
48.	Fhalsh	The Yew	<i>Taxus baccata</i>
49.	Gadi Kuri		<i>Brideliaretusa</i>
50.	Galeo		<i>Cornus macrophylla</i>
51.	Greru/Pariaru		<i>Erythrina suberosa</i>
52.	Ghian		<i>Litseapolyantha</i>
53.	Goon	Horse Chestnut	<i>Aesculus indica</i>
54.	Guj	Small Leaved Elm	<i>Ulmus laevigata</i>
55.	Harar	Myrobalans	<i>Terminalia chebula</i>
56.	Jacranda	Jacranda	<i>Jacaranda ovalifolia</i>
57.	Jaman		<i>Syzygium cumini</i>
58.	Jamun	Bird-cherry	<i>Prunus cornuta</i>
59.	Kachnar		<i>Bauhinia variegata</i>
60.	Kail	Blue pine	<i>Pinus wallichiana</i>
61.	Kainth	Wild Madlar	<i>Pyrus pashia</i>
62.	Kakrain		<i>Pistacia integerrima</i>
63.	Kalam		<i>Stephegyne parvifolia</i>
64.	Kamal		<i>Mallotus phillippensis</i>
65.	Kandrol		<i>Ficus cunia</i>
66.	Kanjar	The Indian Laburnum	<i>Cassia fistula</i>
67.	Kangu		<i>Flacourtia ramontchi</i>
68.	Kao/Kahu	The Indian Olive	<i>Oleacuspicate</i>
69.	Kaphal		<i>Myricanagi</i>
70.	Karal		<i>Bauhinia malabarica</i>
71.	Karal		<i>Bauhinia recemosa</i>
72.	Karandle		<i>Ficus clavata</i>
73.	Karmaru		<i>Albizia odoratissima</i>

74.	Karmaru		<i>Albizia lulibrissin</i>
75.	Krun	The Hil Mulberry	<i>Morus serrata</i>
76.	KasaKuri		<i>Tremapolitoria</i>
77.	Kathamam		<i>Eugenia jambolana</i>
78.	Kehmble		<i>Lannea coromandelica</i>
79.	Kelon		<i>Cedrus libani</i>
80.	Keor.	Conessi barh tree.	<i>Holarrhena antidysenterica</i>
81.	Khair	Khair	<i>Acacia catechu</i>
82.	Khajuy	DatePalm	<i>Phoenix sylvestris</i>
83.	Khirk	Nettle tree	<i>Celtis australis</i>
84.	Kharsu	Brown Oak	<i>Quercus semicarpifolia</i>
85.	Khor/Akhrot.	Walnut	<i>Juglans regia</i>
86.	Khurmani.	Apricot	<i>Prunus armeniaca</i>
87.	Kikkar	Babul	<i>AcaciaArabica</i>
88.	Kinu		<i>Diospyros tomentosa</i>
89.	Koi.		<i>Alnus nitida</i>
90.	Koi		<i>Alnus nepalensis</i>
91.	Kuri/Harsingar.		<i>Nyctanthes abror-tristis</i>
92.	Kuhman		<i>Cornia macleodii</i>
93.	Larandu		<i>Meliosmapungens</i>
94.	Larandu	Obliqua	<i>Cordia dichotoma</i>
95.	Lasura		<i>Cordia myxa</i>
96.	Lasuri		<i>Cordia vestita</i>
97.	Lichi		<i>Nephelium litchi</i>
98.	Makhan	TallowTree.	<i>Sapium sebiferum</i>
99.	Kaklain		<i>Pyrus foliolosa</i>
100.	Mandar	Maple	<i>Acer caesium</i>
101.	Maral	Elm	<i>Ulmus wallichiana</i>
102.	Morindu/Nirgu.		<i>Elaeodendron glaucum.</i>
103.	Neem	Margosa Tree	<i>Azadirachta indica</i>
104.	Nimbu	Lemontree	<i>Citrus medica</i>
105.	Ohi		<i>Albizia stipulata</i>
106.	Pajja		<i>Prunus padus</i>
107.	Pansara		<i>Wendlandia spp.</i>
108.	Phalsa/Pheruman		<i>Grewia elastic</i>
109.	Phalsh	Himalayan Poplar	<i>Populus ciliata</i>
110.	Phulai	Phulai	<i>Acaciamodesta</i>
111.	Pipal	Pipal	<i>Ficus religiosa</i>

112.	Pula		<i>Kydia calycina</i>
113.	Puna		<i>Ehretia acuminata</i>
114.	Putajan		<i>Putranjiva roxburghi</i>
115.	Rai	Himalayan spruce.	<i>Abies pindrow</i>
116.	Rajain/Pardesi		<i>Holoptelea integrifolia</i>
117.	Ramban		<i>Agave Americana</i>
118.	Ritha	Soap Nut	<i>Sapindus mukorossi</i>
119.	Robinia	Black locust	<i>Robinia pseudoacacia</i>
120.	Rumbal		<i>Ficus glomerata</i>
121.	Sal		<i>Shorea robusta</i>
122.	Samma		<i>Engelhardtia spicata</i>
123.	Santra	Orange	<i>Citrus aurantium</i>
124.	Sannan		<i>Ougeinia oojeinensis</i>
125.	Saru	Pyramidal cypress	<i>Cupressus torulosa</i>
126.	Safeda		<i>Eucalyptus citriodora.</i>
127.	Safeda		<i>Eucalyptus spp</i>
128.	Shehtut	Mulberry	<i>Morus laevigata</i>
129.	Shamshad.	Box wood	<i>Buxus sempervirens</i>
130.	Shaur-sharol.		<i>Betula alnoides</i>
131.	Shupa/Shur	Himalayanpencil cedar.	<i>Juniperus macropoda</i>
132.	Sia/Tut		<i>Morus indica</i>
133.	Silver oak		<i>Grevillea robusta</i>
134.	Simbal.	Silk cotton tree	<i>Bombax ceiba</i>
135.	Siris kala	Black siris	<i>Albizia lebbeck</i>
136.	Siris safe	White siris	<i>Abizia procera</i>
137.	Tali/Shisham	Sissoo.	<i>Dalbergia sissoo</i>
138.	Tat –palanga	The Indian Laburnum	<i>Osoxylum indicum</i>
139.	Tosh.	Himalayan spruce.	<i>Picea simithiana</i>
140.	Trembla.		<i>Ficus roxburghii</i>
141.	Tun.	Toon.	<i>Cedrela toona</i>
142.	Tung		<i>Pyrus lanata</i>
143.	Toot	Mulberry	<i>Morus alba</i>
SHRUBS			
144.	Aira		<i>Sarcoca saligna</i>
145.	Akha.	Raspberry yellow	<i>Rubus paniculatus;</i> <i>R.ellipticus</i>
146.	Akha	Raspberry red	<i>Rubus biflorus</i>
147.	Akha	Raspberry black	<i>Rubus lasiocarpus</i>

148.	Akha		<i>Rubus niveus</i> ; <i>R. macilentus</i>
149	Amrer		<i>Viburnum Coriaceum</i>
150	Badrakhan		<i>Rubus niveus</i>
151.	Ban Basuti.		<i>Caryopteris wallichiana</i>
152.	Ban Chola.		<i>Flemingia semialata</i>
153.	Ban Malti.	Jasmin	<i>Jasminumpubescens</i>
154.	Ban Seuol		<i>Pogostemon plectrandheiles.</i>
155.	Bana. Wana		<i>Vitex negundo</i>
156.	Bankhor		<i>Spirea lindleyana</i>
157.	Baobring	Burn	<i>Embelia robusta</i>
158.	Ber		<i>Zizyphus mauritiana</i>
159.	Barari		<i>Lanicara angustifolia</i>
160,	Barna		<i>Crataeva religiosa</i>
161.	Barhahi, Bilam		<i>Limonia crenulata</i>
162.	Basant		<i>Reinwardtia trigyna</i>
163.	Basant Jari		<i>Leea aspera</i>
164.	Basuti		<i>Adhatoda vasica</i>
165.	Batindu		<i>Stephania elegans</i>
166.	Batindu		<i>Cissampelos pareira</i>
167.	Bhadhrum.		<i>Gymnosporia royleana</i>
168.	Bharma/Buarina		<i>Astragalus jacquemontii</i>
169.	Bharmela		<i>Euonymus pendulus.</i>
170.	Bhakal		<i>Prinsepia utilis.</i>
171.	Ceclnar	The Fever Tree.	<i>Caesalpinia bonduceal</i>
172.	Cha	Tea Plant	<i>Camellia rineusio.</i>
173	Chikri.		<i>Euonymus lacerus.</i>
174.	Chata Mendru		<i>Myrsine africana</i>
175	Dadar		<i>Mimosa rubicaulis</i>
176.	Dendru		<i>Deutzia staminea</i>
177.	Dendru		<i>Itea nutans</i>
178.	Dendru		<i>Deutzia corymbosa</i>
179.	Dhakkari		<i>Clerodendron phlomidis</i>
180.	Dharu/Daru.	Wild Pomegranate	<i>Punica granatum</i>
181.	Dhawin		<i>Woodfordia fruticosa</i>
182.	Dhur bel.		<i>Aspidopterys wallichii</i>
183.	Dhur malti	Jasmine.	<i>Jasminumarborescens</i>
184.	Dhura, Dhurbana.		<i>Buddleja asiatica</i>

185.	Dudli		<i>Hypericumcernuum</i>
186.	Durghari.		<i>Mimosa himalayana</i>
187.	Durpa/Siaru		<i>Buddleja paniculata</i>
188.	Duesen		<i>Colebrookia oppositifolia</i>
189.	Falsh	Pencil dedar	<i>Juniperus recurva</i>
190.	Galodan		<i>Rhamnus triquetra.</i>
191.	Gandhla	Curry leaf	<i>Murraya koeninjii</i>
192.	Garna, Karonda.		<i>Carissa spinarum</i>
193.	Ghaniara/Kaner	Olender	<i>Nerium oleander</i>
194.	Ghin		<i>Elaeagnus umbellate</i>
195.	Girgithan		<i>Sageretia oppositifolia</i>
196.	Guilhain Padari		<i>Hamiltonia suaveolens</i>
197.	Hium Garna		<i>Capparu sepiaria</i>
198.	Lerni		<i>Tylophora hirsute</i>
199.	Jablota		<i>Jatropha curcas</i>
200.	Jagru		<i>Desmodium tiliaefolium</i>
201.	Jajra		<i>Desmodium pulchelum</i>
202.	Jamni	Red currant	<i>Ribes rubrum</i>
203.	Jungli badam. Thangi		<i>Corylus colurna</i>
204.	Jingru, Jindru		<i>Randia tetrasperma</i>
205.	Kahi		<i>Saccharum spontaneum</i>
206.	Kali Basuti.		<i>Pogostemon plactranthoides</i>
207.	Kala Akha		<i>Rubus lasiocarpus</i>
208.	Kala Akha		<i>Rosa macrophylla</i>
209.	Kala Dhao		<i>Diospyros Montana</i>
210.	Kali.		<i>Skimmia laureola</i>
211.	Kanderu/Charka	The Himalayan Holly	<i>Ilex dipyrena</i>
212.	Kaneli		<i>Lonicera quinquelocularis</i>
213.	Kao thalihana		<i>Rhamnus purpurea</i>
214.	Kapurminger		<i>Strobilanthes auriculatus</i>
215.	Kashmiri Patha		<i>Rhododendron campanulatum</i>
216.	Kasmal	Barberry	<i>Berberis edgeworthiana</i>
217.	Kasmal	Barberry	<i>Berberis lyceum</i>
218.	Kasmal	Barberry	<i>Berberis aristata</i>
219.	Kathi/Mattu		<i>Indigofera gerardiana</i>
220.	Kibal		<i>Rhamnus virgata</i>

221.	Kikar ber		<i>Ziziphus oenoplia</i>
222.	Kujh/kunj.		<i>Rosa moschata</i>
223.	Ligga		<i>Boehmeria rugulosa</i>
224.	Loder		<i>Symplocos crtaegoides</i>
225.	Mandhiara		<i>Andrachne cordifolia</i>
226.	Marak		<i>Bischofia javanica</i>
227.	Mehndru	Maple	<i>Dodonaea viscosa</i>
228.	Nacchar	Snakestick	<i>Staphylea staphylea</i>
229.	Nargan	China box	<i>Murraya exotica</i>
230.	Narr		<i>Arundo donax</i>
231.	Padara		<i>Leptodermis lanceolata</i>
232.	Padara		<i>Boehmeria platyphylla</i>
233.	Padara		<i>Ficus infectoria</i>
234.	Padaren		<i>Wickstroemia canescens</i>
235.	Palakh		<i>Ficus rumphii</i>
236.	Parand		<i>Loranthus ligustrinus</i>
237.	Parand		<i>Dendrophthoe falcate</i>
238.	Parad.		<i>Cocculus laurifolius</i>
239.	Paulnu/Phulnu		<i>Lantana camara</i>
240.	Phak		<i>Sageretia theezans</i>
241.	Rahan		<i>Litsea chinensis</i>
242.	Raina		<i>Ilex</i>
243.	Rara		<i>Randia dometorum</i>
244.	Rauns		<i>Cotoneaster acuminata</i>
245.	Raunsri		<i>Cotoneaster acuminata</i>
246.	Relan/Dhangar		<i>Acaciacaesia</i>
247.	Reru/Karer		<i>Acacia leucucephala</i>
248.	Rudder		<i>Ficus foveolata</i>
249.	Salorh		<i>Pueraria tuberosa</i>
250.	Shinn		<i>Lonicera purpurascens</i>
251.	Siaru		<i>Debregeasia hypoleuca</i>
252.	Sonan		<i>Osyris arborea</i>
253.	Sohazard		<i>Jasminum humile</i>
254.	Tagar		<i>Tabernaemontana coronaria</i>
255.	Taliani.		<i>Viburnum nervosum</i>
256.	Terni.		<i>Tylophora hirsuta</i>
257.	Teshu		<i>Rosa sericea</i>
258.	Thor		<i>Euphorbia royleana</i>

259.	Tirmira.		<i>Zanthoxylum alatum</i>
260.	Triuri.		<i>Spirgea bella</i>
261.	Tung	Wig Plant	<i>Rhus cotinus</i>
HERBS			
262.	Aelon		<i>Cassia tora</i>
263.	Akk, Dudla		<i>Calotropis procera</i>
264.	Bhang	Hemp	<i>Cannabis sativa</i>
265.	Balsam		<i>Impatiens scabrida</i>
266.	Balsam		<i>Impatiens roylei</i>
267.	Balsam		<i>Impatiens thomsonii</i>
268.	Ban Ajoin	Wild thyme	<i>Thymus serpyllum</i>
269.	Ban Kakri		<i>Podophyl um emodi</i>
270.	Banaksha		<i>Viola canescens</i>
271.	Barora, Dudli		<i>Irachelospermum fragrans</i>
272.	Bharoos.		<i>Echinops echinatus</i>
273.	Bichhu-buti		<i>Urtica dioica</i>
274.	Bichhu-buti		<i>Girardnia heterophylla</i>
275.	Dainther		<i>Solanum melongena</i>
276.	Datura		<i>Datura stramonium</i>
277.	Gangi-chhu		<i>Euphorbia neri folia</i>
278.	Isbgol		<i>Plantago tibetica</i>
279.	Karu		<i>Gentiana kurroo</i>
280.	Linger		<i>Asplenium polypodioides</i>
281.	Maiden hair fern		<i>Adiantum venustum</i>
282.	Pudeena	Mint	<i>Mentha viridis</i>
283.	Patis		<i>Aconitum heterophyllum</i>
284.	Pissubuti/Pissumar.		<i>Boenninghausenia albiflora</i>
285.	Puthkanda		<i>Achyranthes aspera</i>
286.	Res.		<i>Cotoneaster microphylla</i>
287.	Sarap/Chhali	Cobra Plant	<i>Arisaema wallichianum</i>
288.	Tulsi	TheTulsi	<i>Ocimum sanctum</i>
289.	Ulah		<i>Solanum verbascifolium</i>
CLIMBERS			
290.	Akash-bel	Dodder	<i>Cuscuta reflexa</i>
291.	Bakkar bel		<i>Ichnocarpus frutescens.</i>
292.	Bhur-bel.		<i>Aspidopteye wallichii</i>
293.	Calon/Giloe		<i>Tinospora malabarica</i>
294.	Chamar bel		<i>Vitis trifolia</i>

295.	Charki		<i>Clematis grata</i>
296.	Chibru/Meckrun.		<i>Clematis nutans</i>
297.	Dhanger		<i>Acaciacaesia</i>
298.	Dhullen		<i>Hydrangea altissima</i>
299.	Dudh Khal.		<i>Vallaris heynei</i>
300.	Geor bel.		<i>Clematis montana</i>
301.	Geori bel.		<i>Clematis puberula</i>
302.	Gida Dakh		<i>Vitis latifolia</i>
303.	Jhol		<i>Clematis gouriana</i>
304.	Katagri		<i>Euonymus echinatus</i>
305.	Margain		<i>Clematis buchananiana</i>
306.	Murd bel		<i>Dregea volubilis</i>
307.	Murina		<i>Helinus lanceolatus</i>
308.	Rambel		<i>Ficus glomerata</i>
309.	Rattak		<i>Abrus precatorius</i>
310.	Relan		<i>Caesalpinia sepiaria</i>
311.	Sandharan.		<i>Celastrus paniculatus</i>
312.	Sansaoni		<i>Jasminum officinale</i>
313.	Sarain		<i>Jasminum dispersum</i>
314.	Tour	Camel's climber	<i>Bauhinia vahlii</i>
315.	Want		<i>Hiptage madablota</i>
GRASSES			
316.	Babar grass	Bhabar grass	<i>Eulaliopsis binata</i>
317.	Bans Bauntla	Male bamboo	<i>Dendrocalamus strictus</i>
318.	Dholru		<i>Chrysopogon fulvus</i>
319.	Dub	The Dub	<i>Cynodon dactylon</i>
320.	Lambu		<i>Heteropogon contortus</i>
321.	Magar	Thorny Bamboo	<i>Bambusa arundinacea</i>
322.	Makora		<i>Cymbopogon martini</i>
323.	Mohr		<i>Denrocalamus hamiltonii</i>
324.	Munj		<i>Saccharum munja</i>
325.	Nal		<i>Bambusa nutans</i>
326.	Nirgal		<i>Arundinaria falcate</i>
327.	Nirgal		<i>Thamnocalamus spathiflorus</i>

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Rakesh Katoch, IFS

WPO cum DCF Suket

CHAPTER –I

TRACT DEALT WITH

1.1 Name and Situation

This working plan deals with all the Demarcated Protected Forests and those Un-demarcated Protected Forests which support established crop, which was not included in the working plan under revision falling in present Suket Forest Division contained within latitudes 31-16'-02" to 31-46'-08" and longitudes 76-40'-50" to 77-8'-00".

This is a revision of R K Singh Working Plan covering areas of Suket, Jaidevi, Jhungi, Kangoo, Baldwara and Sarkaghat ranges of present Suket Forest Division.

The tract lies in Mandi district, covering Sundernagar and part of Mandi Sadar, Sarkaghat, Chachiot and Sub Tehsil Baldwara and part of Tehsil Nihri. It is bounded on north by Mandi Forest Division, on the east by main ridge passing through Janetari Devi, Naina Devi and bordering Mandi Forest Division and another ridge passing through Sarea, Khunda, Kamrunag, Kanjira, Galtu Hej and dipping in Sarkaghat which joints Sutlej and forms boundary with Karsog Forest Division, on the south by Sutlej which delineates it from Kunihar and Bakar Khad which forms boundary with Hamirpur Forest Division and Bilaspur Forest Division from Trifalghat.

1.2 Configuration of ground

The tract is mountainous with limited gentle slopping areas in valleys near Sundernagar, Sarkaghat and Baldwara. Altitudes vary widely from 502 Mt at Dehar to 3086 Mt. at Kanjira. Series of parallel ridges start from the main ridge Saron-Kamrunag-Galtudhar and run in North-south directions down to river Sutlej where these drop sharply with steep to precipitous slopes.

The important ridges like sarea-Kamrunag-Galtudhar, Maidangardhar, Khoondhar, Murahdhar, Darludhar, Murahdhar, Darludhar, Mundlidhar, Trechhdhar, Dhanudhar, Bunga-Gehru-Bandlidhar, Marari Devi Dhar, Jumdhara, Janetridhar and their various spurs facing mostly East and West resulting intricate mass of steep and precipitous hills and saucer shape valley. The valleys are generally narrow except Balh and Baldwara which are about 5.5 and 4 Kms wide respectively. The bulk of the exposure is in North and South, only small areas is facing East and West.

The tract is drained by Khads like Lisad, Bharari, Bathal, Sir draining into river Sutlej and Kansakhad, Rissakhad, Sonkhad draining into river Beas

1.3 Geology, Rock and Soil

The tertiary represents the formation in the area and Pre-tertiary rocks, which are exposed on either side of the main boundary fault with North, North -East, South, South-West trend between Sundernagar and Mandi. The Pre-tertiary rocks are exposed around and east of Sundernagar.

Physio graphically, Mandi area lies in the lesser Himalayan region and as such presents rugged mountainous terrain with a tectonically carved valley of Sundernagar between the steeply rising hill ranges. The Beas and Sutlej rivers and their tributaries drain in the area.

The rocks exposed in the district range in age from Proterozoic to Pleistocene and have been classified into Rampur (Sunder nagar) Vaikrita, Kullu, Shali, Shimla Sirmour and Shivalik Group of rocks occurs in the western part of the district whereas the eastern part exposes Schist, Phyllite, Quartzite, Gneiss, Limestone, Marble conglomerate etc of Rampur, Vaikrita, Kullu, Shali and Shimla Group of Rocks. About 2000 million years, old lava flows are exposed near Mandi. These rocks are affected by number of Major tectonic planes. Unconsolidated fluvioglacial, fluvial and lacustrine deposits occupy the wide valley and supports cultivation.

Suketi (Sundernagar) an intermountain valley is often referred as the rice bowl of Himachal Pradesh. Hydro geological studies in the area indicate that groundwater occurs both under water table and low confined conditions. Perched water bodies are observed in the terraces adjacent to major streams. Artesian conditions have been encountered in many of the bore holes drilled in the outer periphery of the valley.

The schist and gneiss have rise to fairly deep and fertile loam to clay loam soil at higher reaches, the soil sustains the luxuriant growth of forest. The Shivalik give rise to sandy and gravelly loam which bears poor quality Chil and Scrub. The alluvial soil is deep, sand to clayey loam and very fertile.

1.4 The Stratigraphical Order

The Stratigraphical order of various rocks of the tract of this region is as tabulated below:

Formation	Member	Age
Shali Formation	Tatapani, Khatpul, Sorgharwari, Khaira, Ropri	Upper Proterozoic
Sundernagar, Mandi, Darla Volcanic		Upper proterozoic (1500 million years old
Salkhala		1500 million year old.

1.4.1 Salkhala Formation: It comprises quartz mica schist, gneiss and quartzite. The gneisses are light gray in colour, medium grained and well foliated. The quartzite is gray to pink in colour, fine grained and contains magnetite at places. Other rock types are light to dark gray gneiss occurring with inter bands of quartzite and limestone. The lower part of this formation is development along the Chail thrust.

Being highly foliated rocky, water may penetrate along foliation planes, leading to leaching and weathering.

1.4.2 Mandi-Darla Volcanic: Isolated patches/bands of these rocks are exposed south of Sundernagar. They comprise vesicular/non vesicular basic rock (Basalt). The basalt is filled with Secondary zeolite and calcite.

These rocks are rich in feldspar and contain ferromagnesian minerals. The decomposition of these rocks may produce the calcium, aluminum, silicate and potassium/sodium calcium silicate weathering by products. These rocks are less resistant to weathering during water action.

1.4.3 Sundernagar Formation: These rocks are exposed south to Sundernagar and along the main boundary fault. It comprises green, dirty earth shale, dark gray shale, slate, Phyllite and quartzite.

1.4.4 Shali Formation: The major part W&SW of Sundernagar is occupied by rock of Shali Formation. It includes Ropri, Khaira, Khatpul, Sorgharwari and Tatapani members.

(a) Ropri Member: Ropri member is exposed on the contact to territories and Pre-territories rocks. It comprises red shales, ailtstone and discontinuous bands of dolomite, salt and ‘Lakhan’.

(b) Khaira Member: It comprises pink and white quartzite with thin bands of red shale’s and dolomite in upper part. These rocks are more resistant to weathering. The weathering by product of these rocks may be hydrated iron oxide and hydrated aluminum silicates and calcium bearing residual soil.

(c) Khatapul Member: It contains massive dolomite with thin interlands of quartzite. These rocks are more resistant to weathering.

(d) Sorgharwari Member: It comprises pink and gray limestone with sporadic shale’s bands. The rocks of this member are less resistant to weathering as the limestone easily reacts with water and hydro-carbonic acid.

(e) Tattapani Member: This member comprises gray colored massive dolomite and phyllitiated slates.

1.4.5 Tertiaries

The tertiary rocks are exposed west of Mandi-Sundernagar and comprises rocks of Dharamsala and Shivalik Group. These rocks have tectonic/trusted contact with each other. The geological succession of these rocks is as under:

Group	Formation Alluvium	Age
Shivalik	Upper Shivalik, Middle Shivalik & Lower Shivalik	Middle Miocene to Pliocene (25 to 12 million years
Dharamsala	Upper Dharamsala (Kasauli), Lower Dharamsala (Dagshai formation & Subathu	Lower micocene to Oligocene (25 to 40 million years)

1.4.6 Subathu Formation: A thin cur crop of Subathu rock is exposed west of Sundernagar. It comprises Shale, Sandstone, Girt and Limestone.

1.4.7 Dharamsala Group: Dharamsala Group has been divided into two formations i.e. lower Dharamsala and Upper Dharamsala.

(a) Lower Dharamsala: The lower Dharamsala also known as Dagshai Formation is predominately an argillaceous sequence. It comprises maroon sandstone, siltstone, shale and mudstone. They may be less resistant to weathering.

(b) Upper Dharamsala: Upper Dharamsala is also described, as the Kasauli Formation is mainly an arenaceous sequence. It comprises khaki micaceous sandstone clay stone, shale's which at places show maroons, tinge.

1.4.8 Shivalik Group

The Shivalik Group is divisible into three formation i.e. Lower Shivalik, Middle Shivalik and Upper Shivalik formations

(a) Lower Shivalik: It comprises purple shales and purplish red shales, siltstone, clays and fine to medium sandstone. The argillaceous part of this formation is less resistant to weathering.

(b) Middle Shivalik: Formation comprises well bedded medium to coarse grained sandstone, inter bedded with shale siltstone, pebble beds and conglomerate and occasional clay bands.

(c) Upper Shivalik Formation comprises mainly boulders bed conglomerate with coarse sandstone parting and clays.

The rocks of middle and upper Shivalik formation are less resistant to weathering as they contain loose and friable sediments. They may produce residual soil on weathering.

1.4.9 Alluvium and other recent deposits

These sediments are exposed in northern part of Sundernagar. It comprises clay, silt and sand and other coarse material. These sediments are more suitable for plantation.

1.4.10 Structure

The rock exposed in the area is highly deformed, folded and faulted as a result the Shivalik rocks are overlain by Lower Tertiary, which in turn are succeeded along a thrust by the Salkhla rocks.

The Tertiary is Pre-rocks trend in NNE-SSW direction between Mandi and Sundernagar. A number of water springs seep through various tectonic planes.

1.4.11 SOIL The metamorphosed granite and rocks of outer Himalayan's weather into well drained deep loamy to sandy loam soils. These areas bear excellent crops of Deodar of quality (I/II) density varying from 0.6 to 0.9 However, schist, slates and shales weather into fine grained clays whereas quartzite's limestone and dolomites result in shallow texture soils, which on the whole are very well drained. This bears Chil of poor quality. Thus all types of soils met within the tract are generally suitable for tree growth. The soils in the lower areas covering approximately 8000 ha are generally sandy loams to loam and poor in organic matter. In open areas with heavy pressure of grazing, the soil is hallow and in may places especially closed to habitations and cattle paths, even rock out crops are not uncommon.

1.4.12 In areas with adequate forest covers especially of Deodar, Spruce, Fir and Kail (which on northern slopes) the soils are generally deep. In Deodar and Kail forests the soil has adequate organic matter whereas in Fir Forests humus layer is thick with a distinct AOO and AO horizon. However, soil in Chil Forests is poor in organic matter due to repeated burning which makes it friable and thus vulnerable to erosion. The soil under coniferous forests shows an acidic reaction but in lower reaches of subtropical zone it tends to be neutral. Ban forests are generally accompanied by mature soils of good depth and high water holding capacity and acidic in reaction.

1.4.13 The following tables give the physical characteristics of soil profile. These soil profiles are typical and area taken by the Department of Agriculture in Mandi District in high and low forests of Suket Forest Division.

Profile No. 1

The profile was studied at Thalag Dhar Forest near village Shillyt at the distance of 6 kms from Sundernagar on Sundernagar-Ghanganu roat at the elevation of 950 Meters from MSL, on upper pediment with slope percentage more than 20%. These soils have developed from sand stone and conglomerate, gravel's are found in all horizons

and boulder in lower horizon, with the increase in soil depth. No reaction was noticed with dil HCL.

Horizon	Depth	Description
Ap	0-12 cms	Radish brown (5 yrs 5/4) moist, gravelly loam, Medium weak granular, lightly hard, friable slightly sticky, abundant roots, abrupt and smooth boundary.
B	12-35 cms	Light radish brown (5Yr 6/3) moist, gravelly clay loam, medium hard granular, slightly hard, slightly sticky and slightly plastic abundant, roots gradually Wavy boundary
BC	35-59 Cms.	Redish brown (2.5 YR 5/4) moist, gravel clay loam medium moderate, sub angular blocky, very hard, firm, slightly sticky, fine few roots, clear wavy boundary
Cr	59-80 Cms	Radish brown (2.5 YR 5/4) moist other properties are the same as above except presence of stone and boulders of bigger size.

Ranges in characteristics: The texture of soil is loam to clay loam, the clay contents increases with the depth. Gravels are present in all horizons and C-horizon consists of weathered rock, stone and boulder Ph is 6.7 to 7.0

Drainage and Permeability: Well drained, moderately, slow permeability. With low water holding capacity and subjected to severe water erosion is due to steep topography.

Land use and vegetation: Terraced fields are under cultivation, rest under pasture and forest. Pinus Spp. Occurs along with sub tropical broad leave Spp.

Soil Classification: Soils of area are shallow to moderately deep, medium to fine, mixed hypothermic, typical ustorthents.

PROFILE NO. II

This was studied at Rohanda 35 Kms from Sundernagar at the height of 1800 metres from M.S.L. on sloping land with the slope 15-30%. These soils have developed from parent material consisting of granite and shales. Reaction with dilute Hydrochloric Acid is not noticed. Soils are medium to deep, fine textured with gravel present below 50 cms. Description of profile is as under:

Horizon	Depth	Description
Ap	0-13 Cms	Dark brown (10 Yr 4/3) Dry, silty loam, granular, moist fable, roots may moderately permeable, abrupt and smooth boundary pH 6.4
A	13-40 Cms	Light yellowish brown (10 YR 6/4) Dry, silty loan, granular, medium, slightly sticky, plenty roots, abrupt, smooth boundary.
B	40-70 cms	Brown (10YR 5/3) Dry, clay loam, medium, moderate granular, slightly hard, frible, slightly stocky, many fine roots, smooth boundary.
C	70-90 cms	Dark yellowish brown (10 YR 4/6) dry, gravelly clay massive structure, hard firm, sticky, few fine roots.

Soil are loam to clay loam in texture with slightly acidic in reaction. Soils are medium in Nitrogen, Phosphorus and Potash, clay contents increases with the depth.

Range in Characteristic: Soil are silty loam to clay loam.

Relief: Excessive

.

Drainage: Well drained

Natural vegetation: Evergreen temperate forest. Deodar, Kail Fir and Chil.

Present Land use: Only terraced fields are under cultivation. Sloppy land under forest and rock out crop being used as recreation of wild life.

Soil Classification: Medium deep to deep, well drained, thermic, fine loamy soils in very steep slopes surface associated with severe erosion. Medium to fine, mixed, slightly acidic to neutral, thermic, Eutrochrpts.

1.5 CLIMATE Due to altitudinal variations, there are two distinct climatic zone, which is below 1000 mt. covers approximately 2/3 rd of geographical area and remaining 1/3rd is in temperate zone. The duration of various seasons in two zones, is as under:

<u>Temperate</u>	<u>Sub-tropical</u>
Winter: Beginning of November to end of March	Middle of November to middle of March
Summer: Middle of April to middle of June	March to June
Rainy: Middle of July to middle of September	Middle of July to middle of September

The winter season is characterized by heavy frost in lower hills and fairly heavy snowfall in higher elevations. Temperature drops down considerably in valley also and Balh valley experiences morning fog. Rain and snow during winter season comes from Northwestern air currents. Even in valleys night are very cold though day temperature rises considerably.

Summers are very hot in lower belt and pleasant in higher ridges. The maximum temperature in Balh valley is as high as 44° C. This used to be the driest period with only sporadic showers. During past some year went so dry that no rain occurred from March to June with the result that fire destroyed forests of Chil and Scrub, even low lying Kail forests were also affected.

The distribution of rain fall is not regular. Sometimes it rains exceptionally heavy for a few days and rest of the rainy season may go dry. Sometimes heavy cloudbursts cause havoc and result in severe erosion, landslides and floods

1.5.1 Precipitation: Precipitation occurs both in the form of snow and rains. The major part of precipitation, however, is received from Southwest monsoon during July to September. The rainfall data is being recorded at Sundernagar, Kangoo, Jaidevi, Nihri, Jhungi, Bambla and Nagrota. But the record is not properly maintained. The average monthly rainfall data and number of rainy days is tabulated for these stations. The averages are taken of the years where data is satisfactorily available:

Table 1.1 Detail of month wise rain stations

Sl.No	Month	S/Nagar	Kangoo	Jhungi	Nihri	Jaidevi	Nagrota	Bhambla
1	Jan	68.57	40.67	13.54	10.73	55.07	10.03	24.68
2	Feb	90.43	78.39	14.26	8.03	30.58	13.65	57.15
3	Mar	41.90	57.52	17.596	11.47	69.89	12.92	68.58
4	Apr	51.00	59.18	11.40	9.28	108.12	8.29	35.56
5	May	108.00	128.15	15.99	116.56	115.96	54.23	42.56
6	Jun	208.00	143.29	401.89	256.99	180.82	32.92	66.62
7	Jul	498.17	279.96	301.96	186.36	205.41	59.47	282.10
8	Aug	470.33	322.43	401.96	133.85	204.46	54.42	269.24
9	Sep	267.50	147.650	225.26	201.06	143.52	43.14	130.78
10	Oct	100.25	43.79	145.16	66.96	47.96	17.09	33.02
11	Nov	73.50	48.26	71.96	37.30	104.92	9.25	12.70
12	Dec	39.00	42.30	53.97	28.66	60.05	4.84	-
Total		2016.65	1391.34	1313.91	1067.25	1326.78	320.15	1022.99

Similarly average number of rainy days in different months is tabulated below:

Names of stations

Table 1.2 Detail of number of rainy days

Sl.No	Month	S/Nagar	Kangoo	Jhungi	Nihri	Jaidevi	Nagrota	Bhambla
1	Jan	6.4	4.2	7.3	3.2	3.5	5.0	2.5
2	Feb	5.2	5.3	4.7	4.8	3.5	5.0	2.5
3	Mar	4.0	4.1	5.5	7.6	4.5	4.5	4.5
4	Apr	3.0	3.2	4.2	4.3	3.0	3.7	2.0
5	May	3.2	6.5	5.2	4.1	5.0	3.2	4.0
6	Jun	10.5	9.5	8.6	9.0	8.5	11.2	7.5
7	Jul	19.5	15.5	12.0	12.0	19.5	17.0	18.5
8	Aug	18.2	17.4	10.7	16.7	18.5	18.2	16.5
9	Sep	15.2	11.2	4.5	8.4	10.5	13.0	8.5
10	Oct	4.1	4.0	3.0	2.5	3.0	4.0	2.0
11	Nov	4.5	3.0	2.0	2.0	2.0	4.5	1.0
12	Dec	3.2	2.0	6.3	2.7	1.0	3.0	-
Total		97.0	85.9	68.8	77.3	82.5	92.3	69.5

1.5.2 Snowfall Data Average snowfall data for years where data is satisfactorily available is tabulated as under:

Table 1.3 Detail of average snowfall

Sl.No.	Name of Month	Name of Station	
		Jhungi	Nihri
1.	November	15.240	4.000
2.	December	10.500	12.000
3.	January	10.470	14.660
4.	February	5.500	9.934

1.5.3 Temperature: Atmospheric temperature is mainly conditioned by solar radiation and is, therefore, a function of latitude. But within some latitude the temperature varies due to

change in altitude and these results in change in climate. Maximum and Minimum temperature for the years 2021 & 2022 is given below:

Temperature

Table 1.4 Maximum and Minimum temperature for the years 2021 & 2022

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021												
Max	16.1	18.8	21.2	26.6	29.2	32.1	30.5	29.7	29.2	27.4	23.9	18.9
Min	0.7	3.5	7.0	8.9	12.0	17.0	20.3	20.7	16.7	8.8	2.7	1.8
2022												
Max	16.1	16.8	21.7	24.1	29.0	30.2	31.7	28.5	29.7	23.6	19.2	15.1
Min	0.4	1.0	6.6	10.4	10.9	16.5	21.5	19.8	17.5	9.3	4.6	2.2

1.6. WATER SUPPLY

The main streams and their tributaries originating from well stocked forests generally maintain perennial flow of water. However, streams originating in lower hills particularly in Sarkaghat Tehsil remain dry during summer. There is also an acute shortage of drinking water round the year in Sarkaghat Tehsil, where villagers have dug ponds (locally known as “ Khati”) to store rain water and to be used specially during summer in the past, whereas at present local people give little attention to this practice, though the Govt. is giving lot of amount for harvesting rainwater. However, now efforts are made by the Govt. to supply drinking water to scarcity area by undertaking Project for supply of drinking water and for irrigation purpose. On the other hand flash floods are common in almost all the streams and Nallahs and their severity depending upon the intensity and quantum of rains received.

1.7. DISTRIBUTION OF AREA:

The total geographical area of this Division is 86940 ha and the whole area has been measured at the time of last revenue settlement. This area has been classified as under:

Table 1.5 Statement showing category wise areas in hectare in various Teh/Sub Tehsil

Particular	S/Naga r	Chachoi t	Sadda r	S/Ghat	Baldwa ra	Nihri	Total
Cultivated	7600	339	3884	7327	4464	4078	27692
Banjar Kadim	589	10	74	490	171	157	1491
Banjar Jadid	692	0	0	0	0	0	692
Kharetar	2474	111	852	2363	1485	1158	8443
Bani	14	0	56	157	0	7	234
DPF	5498	1065	1773	2418	919	15773	27446
UPF	104	0	154	18	0	1220	1496
Ruta Sarkar	43	9	71	20	25	226	394
Chargah Darkhtan	409	0	220	1623	0	4741	6993
Chargah Billa drakhtan	1123	39	8258	1507	1323	1848	6665
Nurseries	0	0	0	11	0	0	11
Gair mumkan	1424	58	756	1188	897	1060	5383
Total	19970	1631	16098	17122	9284	30268	86940

1.7.1 This working plan deals with 27893.15 ha. This is the area after organization of Jogindernagar Forest Division from Suket Forest Division and areas transferred to Wild Life Wing of Himachal Pradesh vide letter No. Ft(1)(A)(I)II/86 dated 28.2.1987 and areas to Nachan Forest Division.

Table 1.6 Area of working plan

Sl.No.	Particulars of Forest	Area in Hactare.
1.	(a) D.P.Fs.	27361.15
2.	(b) U.P.Fs.	532
	Total	27893.15

- Area statement of previous (R.K, Singh) Working Plan classification under different categories in comparison with proposed classification

- Area as per the R. K. Singh working Plan

Name of Range	Chil	Regular	Plantation	Protection	Grand Total Area
Baldwara	1247.3	0	525.18	101.61	1874.09
Jaidevi	1534.95	1574.2	552.27	1243.17	4904.59
Jhungi	1129.44	4008.8	627.96	1900.87	7667.07
Kangoo	134.24	0	2490.41	6701.4	9326.05
Sarkaghat	850	0	410.04	1193.85	2453.89
Suket	530.75	0	723.89	412.78	1667.42
Grand Total	5426.68	5583	5329.75	11553.72	27893.15

- Area under proposed Working plan

Name of Range	Chil	Regular	Plantation	Protection	Grand Total Area
Baldwara	1256.2	0.00	241.63	376.25	1874.08
Jai Devi	1312.32	1907.08	513.35	1171.84	4904.54
Jhungi	1242.64	4021.29	470.64	1932.50	7666.07
Kangoo	237.78	0.00	2511.87	6576.40	9326.05
Sarkaghat	1254.54	0.00	0.00	1199.39	2453.93
Suket	454.46	0.00	712.86	500.10	1667.42
Grand Total	5757.94	5928.37	4450.35	11756.48	27893.15

Table 1.7 range-wise breakup of the areas of Division

Sl.No.	Name of Range	D.P.Fs.	U.P.F.	Total
1.	Suket	1667.42	-	1667.42
2.	Jaidevi	4634.59	270.00	4904.59
3.	Jhungi	7667.07	-	7667.07
4.	Kangoo	9326.05	-	9326.05
5.	Baldwara	1712.09	162	1874.09
6.	Sarkaghat	2353.93	100	2453.93
	Total	27361.15	532	27893.15

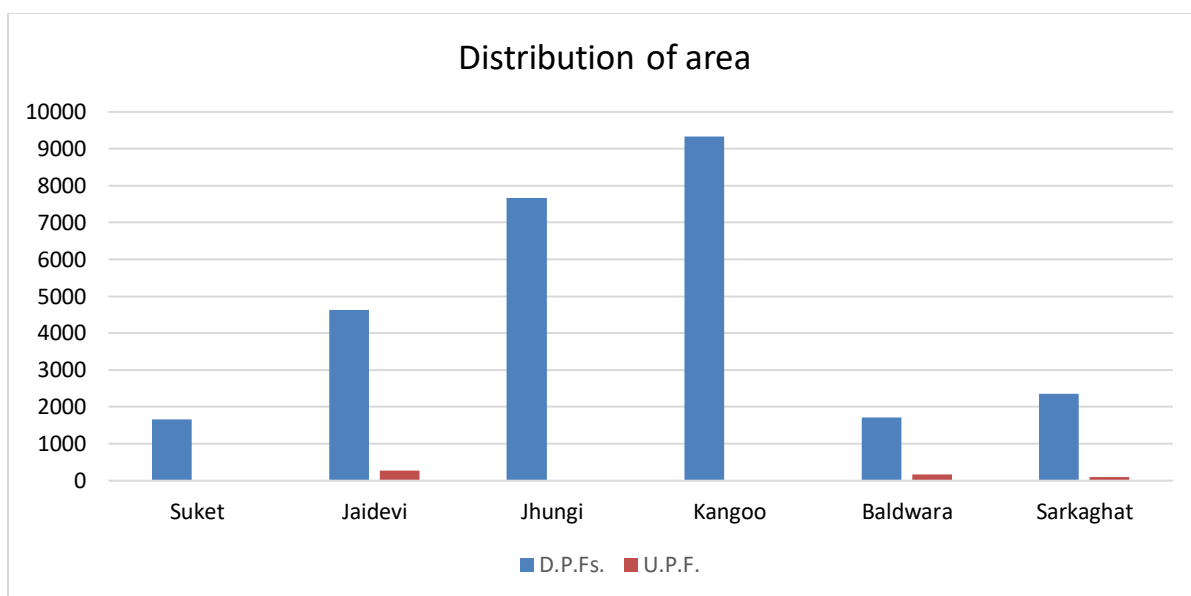


Fig 1.1 Represents distribution of Forest Area Cover of Suket Forest Division

1.8. STATE OF BOUNDARIES

Forest Settlement Operations were started in Suket Forest Division in 1979 and DPF were carved out from the following categories of Government lands in different Muhal.

- I) UPFs.
- II) Charagah Darkhtan
- III) Charagah Bila Darkhtan
- IV) Ruta Sarkar
- V) Gair Mumkin area

In many cases the DPFs were formed out of more than one Mohal. All areas shown in the revenue record as Charagah Darkhtan and Charagah Bila Darkhtan but bounded by boundary pillars have been notified as DPF in these operations. There are 17 Notifications vide which 299 forests were notified as DPFs. previously and 3 Notifications issued during the working plan under revision vide which 15 forests were notified as DPFs.

Sl No.	Notification No. and date	Nos. of DPFs notified
1.	Fts(F)5-1/80 dated 5.1.80	8
2.	Fts(F)5-38/79 dated 31.3.80	15
3.	Fts(F)3-46/79 dated 21.3.80	18

4.	Fts(F)3-1/81 dated 26.12.81	87
5.	Fts(F)(A)7-1/81dated 26.12.81	1
6.	Fts(F)5-8/85 dated 20.2.86	31
7.	Fts(A)7-15/85 dated 8.7.86	26
8.	Fts(A)7-1/86 dated 11.7.86	33
9.	Fts.(A)7-2/87 dated 9.2.88	12
10.	Fts(A) 7-22.86 dated 9.2.86	2
11.	Fts.(A)7-16/86 dated 9.2.86	11
12.	Fts(A) 7-3/87 dated 9.2.88	12
13.	Fts(A)5-8/82 dated 9.,2.88	32
14.	Fts(A)7-4/82 dated 9.2.88	5
15.	Fts(A) 7-2/82 dated 17.12.86	5
16.	Fts(F) 5-5/88 dated 2.6.88	1
17.	Fts(F)5-5/92 dated 20.3.93	5
18.	Fts(F) 5-4/92 dated 26.5.93	3
19	Fts(F)5-4/92dated 10.9.93	7
Total		314

1.8.1 15 forests notified at S.No. 17 to 19 were demarcated and notified as DPF's during the currency of Working Plan under revision and the same have been included in the R K Singh's Working Plan for the first time.

1.8.2 In addition to above there are lot of UPFs in Jaidevi, Sarkaghat, Baldwara, Kangoo, Suket and Jhungi, where successful plantation were raised in the past and now the crop is in poles stage.. The process to form this area to DPFs be taken in hand immediately as per Central Government direction vide letter No. 13-7(12)197-Roc dated 3.3.99.

1.8.3

Table 1.8 The balance UPF area left in Suket Forest Division

a) Jungle Mehfuza Gair Mehduda(UPF)	1496.00
b) Ruta Sarkar	394.00

c) Charagah Darkhtan	6993.00
d) Charagah Bila Darkhtan	6665.00
Total	15548.00

Note: (i) Out of which 540.0 ha are included in Chil Working Circle

(ii) Thus 15408 ha area still out of proper management and should be brought under working plan in next revision.

1.8.4 All these area are in small bits, honey combed surrounded by cultivation. Further more these categories of forests are heavily encroached upon and it will be futile attempt to bring them under systematic management in the working plan, except the area where successful plantation exists and these be included in the next revision of working plan as and when crop is in pole stage. The balance areas are taken for plantation with the help of VFDSs under various schemes going on in this Division under Joint Forest Management to increase the output of fodder and fuel wood.

1.8.5 The name and number of the forests remain the same as in the old working plan. The system adopted of numbering of forests in the old working plan under revision has been kept the same except O.D. and N.D. is termed as D(D.P.F.) Some forest has been transferred to Nachan Forest Division and Jogindernagar Forest Division and Wild Life Wing have been deleted in the list of forests.

1.8.6 In 1979, forest settlement operations were started in Suket Forest Division and (346-47=299) new DPFs were notified as DPFs from different categories viz Charagah Darkhtan, Charagah Bila Darkhtan, UPFs and Ruta Sarkar. New 15 more forest have been notified. These new DPFs consist of either wooded growth or new plantation raised in Sixties and Seventies. In order to remove the controversy about the area of old DPFs, Nanak Chand Working Plan area figures as given in the revenue record have been accepted for this working plan as for example take the case of a few forests. The corresponding areas in different cases are under:

Table 1.9 Corresponding areas in respect of Suket Forest Division

Name of forest	Jhuna Singh & Nanaks settlement	Sewal W.P. Area (Ha	1952-58 First demarcation area (Ha)	1962-68 Land settlement W.P. area	Pande/Sharma W.P.area (ha)	W.P. area (ha)

	area			(Ha)		
OD252	36.72	126.23	210.39	36.72	347.50	36.72
OD 222	362.52	251.25	44020	363.33	704.80	363.33
OD174	168.35	129.50	163.90	163.76	164.30	163.76

From the above figures it is very clear that there are large variations for one and the same forest. In this working plan, the area figures of land revenue settlement carried out from 1963-68 have been taken into account. This is due to the reason that 314 DPFs have been constituted. Previously DPFs has already been entered in the revenue record at the time of settlement.

STATE OF BOUNDARIES

Old Mandi State Forests:

First Forest Settlement took place in 1917 when the forests of Mandi State were demarcated with pillars of rough dressed stone during preparation of Gorrie's Working Plan. These were again measured at the time of demarcation by the Department (1952-58) and all the boundary pillars fixed earlier were located. No boundary register showing the number of boundary pillars, distance from pillar to pillar is available. However, the number of boundary pillars was computed from the maps and were 1993 at that time.

Detail record of boundary pillars of each New DPF's have been prepared and exists in the concerned file of each forest. One of these file are lying in the Divisional Office and one copy of the same be sent to Ranges. Boundary Register have been prepared and lying in the Division and the same also be sent to Ranges. A detail of boundary register further is supplied to Beat Guard and Block Officer for checking B.Ps. in the field to avoid any encroachment by local people.

Old Suket State Forests:

The Forest of Suket State was surveyed in 1919-20 and Survey of India carried out revision in 1937. The maps pertaining to 1937 survey were prepared on 1:31680 scale but complete set is not available. With the help of Jhuna Singh's working plan (1924-53) as corrected by Davis in 1932 Sewal made an effort to locate the forests to show their boundaries on 1:63360 survey sheets. DPFs were redemarcated during departmental

demarcation operation (1952-58) and boundary pillars were constructed. Chaks within forest area were also demarcated and chak pillars constructed.

Operations for demarcation and construction of boundary pillars in respect of un-demarcated forests of the entire Division were taken in hand during 1952-to 1958 and pillars were constructed around 32 UPFs. The remaining forests were left as such for demarcation. No boundary register is available.

Boundary register of 108 forests falling in Ex-Suket State showing number of boundary pillars bearing distance from pillar to pillar, situation of the pillar and direction of the line is available. Boundary register giving all details in respect of all UPFs(140)all DPFs (77) of Ex-Mandi State and 94 DPFs of Ex-Suket State is available in the old Ranges. Boundary register for newly created Jai Devi, Kangoo and Baldwara is prepared from the record of Jhungi, Suket and Sarkaghat

(i) In October,1978 there was re-organization of Divisions and Karsog Division was carved out from Suket Forest Division and the merger of Baggi and Nandgarh Forest Block, and whole of Sarkaghat Tehsil in Suket Division. With the re-organization of Division only 128 DPFs were left in Suket Forest Division for which boundary register Range wise exists in old ranges e.g. Jhungi, Jai Devi, and Suket.

(ii) Forest settlement Operations started in 1979 in Suket Forest Division and from 1979 to 1989, only 346 forests were notified and DPFs. During the currency of working plan 15 more forests were notified as per details in Annexure I-C. This is all 361 new DPFs have been formed. Out of which 47 new DPF have been transferred to other Divisions at the re-organisation of this division during 1978. Boundary pillars have been constructed around all the notified N.DPFs in Suket Forest Division. Boundary register has been prepared range wise for all these forests on the basis of revenue maps, wherein the number of boundary pillars, distance from pillar to pillar, location of pillars and direction of the line have been indicated.

MAPS

In 1968-69 survey of India prepared maps covering the entire Suket Forest Division on 1:15000 scale giving details of the boundary pillars. These survey sheets are compared with revenue maps prepared during revenue settlement (1962-68) and boundaries of only 55 forests could coincide with the revenue maps.

Survey of India again carried out a survey of the area during 1986-87, which now forms Baggi Block and Nandgarh Block of Suket Range and Jai Devi Range.

1.9 LEGAL STATUS

Forests now falling in Chachiot Tehsil were formerly in erstwhile Mandi State where all the land not assessed to land revenue but having tree or grass growth was classed as “State Forests” The ruler of Mandi state was the sole owner of such state forests subject to the right of users as determined in Forest Settlement by Wright conducted in 1917. The State Forests were classified by Wright into DPFs and UPFs and rights of villagers in these forests recorded. He also proposed that un-demarcated areas may be added to demarcated areas without prejudicing the interest of right holders. With the formation of Himachal Pradesh, the Govt. of H.P. became the owner of all the waste and forest land with effect from 15.4.1948 and the Indian Forest Act was made applicable to these forests vide H.P. Govt. (Forest Department) Notification No. 386-1B dated 25.12.1994.

1.9.1 In the erstwhile Suket State, comprising of Sundernagar and Karsog Tehsil, Jhuna Singh carried out the forest settlement during 1923 which was sanctioned on 14.8.1926. The legal position of these forests is more or less identical to that of erstwhile Mandi State forests with effect from 15.4.1948 vide notification referred to in Para 1.8.

1.9.2 All forest lands and wastelands have been declared, as Protected Forests vide Himachal Pradesh Govt. No. Ft. 19-241-BB-149 dated 13.11.1963 w.e.f. 1st January, 1964. Thus all the Govt. wasteland existing in this Division is protected forests.

1.9.3 Effect of Forest Conservation Act, 1980 on Nautors from forest Land

Under section 2 of Forest Conservation Act, 1980, prior approval of the Central Government is to be obtained before making a use of any forestland for non-forestry purposes. Therefore, as per provisions, of this Act, no Nautor can be sanctioned from any of the DPFs or UPF, without approval of the Govt. of India. Land transferred under Forest Conservation Act, 1980 in this Division is given in Appendix-XI

1.10 Right and concessions:

Ex-Mandi State Forests: In the forest settlement the “State Forests” have been divided into two categories:

i) **Demarcated Forests:** It includes all areas, which have been permanently demarcated.

ii) **Undemarcated Forests:** It includes all the areas containing tree grown which are not demarcated or are not contained in the malguzaries of any private person. It thus includes the greater part of the tree bearing grasslands, since grasslands have not ordinarily been entered in private malguzaries, the occupants having been recorded as tenants of Raja. It excludes the small areas of grassland in which malguzari rights have been recognized in the revenue settlement.

1.10.1 The essential difference between the demarcated and un-demarcated forests is that the former, a percentage of whole of area may at any time be closed to all rights of user bartan. The percentage ordinarily varies from 25 to 50 and majority of the cases has been fixed as 33.33%. In the Undemarcated forests there is no power to close all bartan. Bartans in demarcated forests were enjoyed as per record of right prepared for each forest. In Undemarcated forests bartan already admitted in DPF may be exercised by malguzaries of cultivated land assessed to revenue on which the revenue is assigned and their agricultural tenants, without permission provided the recognized customs of users of bartandar are respected.

1.10.2 Ex SUKET STATE FORESTS

Following types of forests were recognized in J. Singh's settlement report.

- (i) Reserved Forests
- (ii) Demarcated Protected Forests
- (iii) Un-demarcated Protected Forests.

The essential difference between these two forests is as follows:

1. In the Demarcated Protected Forests, a certain percentage of area varying from 25 to 50 percent may be closed at a time for a period of 30 years, the actual percentage being determined according to needs of the forest management and with consideration of the extent of such rights. Subject to these powers of closures bartan have been allowed in all such forest. In the undermarketed forests there is no such power.

2. The Demarcated Protected Forests have been demarcated. The Undemarcated forests are not at all demarcated.

3. The records of rights have been prepared only for Demarcated Forests according to which their exercise will be controlled.

4. In case of Undemarcated Forests the following prohibitions have been imposed:

a) The felling of green trees except for the purpose of burning of the dead.

b) The carrying of an axe into the forest except for the purpose of cutting fire wood for burning the dead.

c) Lopping of trees with a drat with more than one nail fastened to its handle.

1.10.2.1 The rights to be enjoyed in un-demarcated protected forests are those mentioned in case of Demarcated Protected Forests in addition to the right of breaking lands for cultivation purpose.

1.10.2.2 The rules to regulate the exercise of right and other matter in the Demarcated Protected Forests have been notified vide notification No. Ft. 43/241-D/49 dated 25.2.1952 and Ft. No. 43-242-E/49-2 dated 25.2.52 for Mandi and Suket Ex-State respectively copy of Notification is given in Appendix.

1.10.2.3 The right and concessions are appended to cultivate land and can only be exercised in regard to the village for which they are recorded. The rights are limited to only reasonable agricultural and domestic requirement of the people especially in regard to timber and grazing.

1.10.2.4 At the time of land settlement, rights have been given in the Naksha Bartan in respect of all the charand areas besides UPFs and there is no difference in the rights recorded for various categories except that in DPFs no provision of Nautor exists. These rights have been admitted “Muhal” wise and not as per the Forest Settlement in which they are village-wise.

1.10.2.5 A short resume of principal rights which have a direct bearing on forest management are discussed in the following paragraphs. The sale, transfer of bartan and forest produce obtained at bartandari rates is prohibited.

(a) TIMBER: Trees can be given to right holders for repairs and construction of their houses at bartandari rates. These are sanctioned to meet their legitimate domestic and agricultural requirements. In case buildings destroyed by fire and other natural calamities like flood,

earthquake etc., trees can be granted to the right holders. Due to very nominal rates charged, the bartandars are extremely wasteful in the use of timber. They are also in the habit of misusing such timber.

(b) GRAZING: The right holders are permitted to graze their cattle, buffaloes, sheep and goats for the whole year without any restrictions in the forests, not closed to grazing by any specific order. The forest settlement provides that the rights of villagers are limited to reasonable agricultural and domestic requirements of the people. The maintenance of the cattle, sheep and goats for purpose other than agricultural or domestic can be controller if it results in excessive grazing.

Grazing fees for the graziers coming from other areas like Chamba, Kullu or Bushehar is fixed as per the order of Govt. and present rates are as under:

1. Sheep per hundred Rs. 20/-
2. Goats per hundred Rs. 40/-

(c) LOPPING: Right of lopping the trees for fodder and litter has been admitted only in respect of Oak, Fir and Spruce. Heavy and continuous lopping of Spruce near the village is resulting in the death of trees. It is extremely necessary to prohibit the lopping of Spruce and Fir and to restrict the indiscriminate lopping of Ban Oak trees. DPF Chanda Pukhar, Majhoti Silh, Badagodown, Chota Gadown are notable examples.

(d) MINOR FOREST PRODUCE: There is right of cutting of grass, collection/sale of flowers, fruits, medicinal herbs honey and nirgals admitted for the right holders. Besides they can extract slates, stones for their buildings and earth for plastering. Removal of bark from Oak and suitable species is also permitted for tanning. Extraction of torchwood is permissible from stumps of all species provided hammer marks is kept intact.

Chapter- 2

Maintenance/ increase in the extent of forest and tree cover

2.1 Area of forests under different legal classes (RF, PF, UF and others)

The total geographical area of this Division is 86940 ha and the whole area has been measured at the time of the last revenue settlement. The area covered under present working is tabulated under.

Table 2.1 Area of Suket Forest Division under different Legal Classification

S No	Particulars of Forest	Area in Hectare.
1.	D.P.Fs.	27361.15
2.	U.P.Fs.	532.00
	Total	27893.15

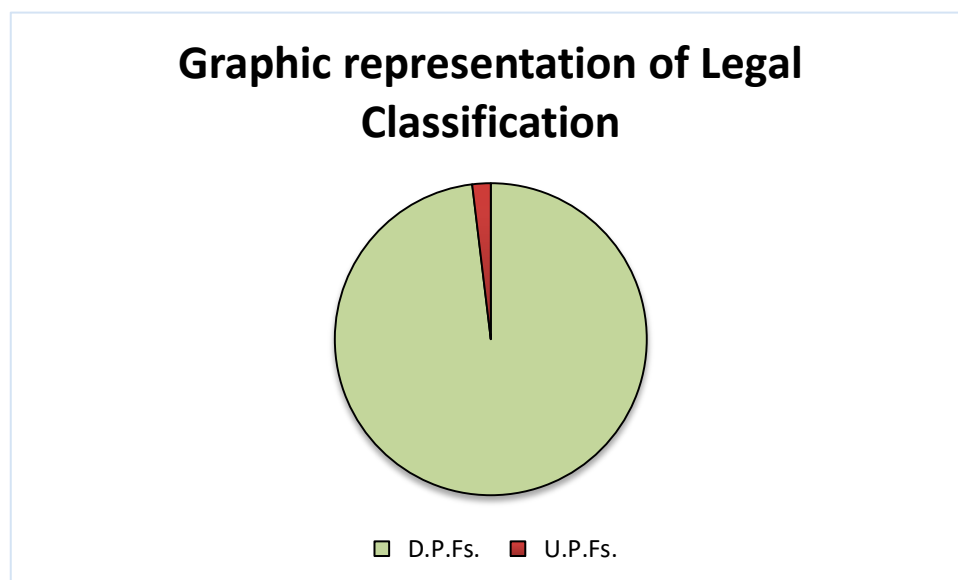


Fig. 2.1 Graphic representation of legal classification

The DPFs under the jurisdiction of Suket Forest Division has been notified and the detail is as under

Sl No.	Notification No. and date	Nos. of DPFs notified
1.	Fts(F)5-1/80 dated 5.1.80	8
2.	Fts(F)5-38/79 dated 31.3.80	15
3.	Fts(F)3-46/79 dated 21.3.80	18
4.	Fts(F)3-1/81 dated 26.12.81	87
5.	Fts(F)(A)7-1/81dated 26.12.81	1
6.	Fts(F)5-8/85 dated 20.2.86	31
7.	Fts(A)7-15/85 dated 8.7.86	26
8.	Fts(A)7-1/86 dated 11.7.86	33
9.	Fts.(A)7-2/87 dated 9.2.88	12
10.	Fts(A) 7-22.86 dated 9.2.86	2
11.	Fts.(A)7-16/86 dated 9.2.86	11
12.	Fts(A) 7-3/87 dated 9.2.88	12
13.	Fts(A)5-8/82 dated 9.,2.88	32
14.	Fts(A)7-4/82 dated 9.2.88	5
15.	Fts(A) 7-2/82 dated 17.12.86	5
16.	Fts(F) 5-5/88 dated 2.6.88	1
17.	Fts(F)5-5/92 dated 20.3.93	5
18.	Fts(F) 5-4/92 dated 26.5.93	3
19.	Fts(F)5-4/92dated 10.9.93	7
Total		314

The forest wise notification is given in Annexure

Table 2.2 Range wise distribution of area in Suket Forest division

Range Wise Distribution of Area			
Range	DPF	UPF	Grand Total
Baldwara	1712.09	162.00	1874.09
Jai Devi	4634.59	270.00	4904.59
Jhungi	7667.07	0.00	7667.07
Kangoo	9326.05	0.00	9326.05
Sarkaghat	2353.93	100.00	2453.93
Suket	1667.42	0.00	1667.42
Grand Total	27361.15	532.00	27893.15

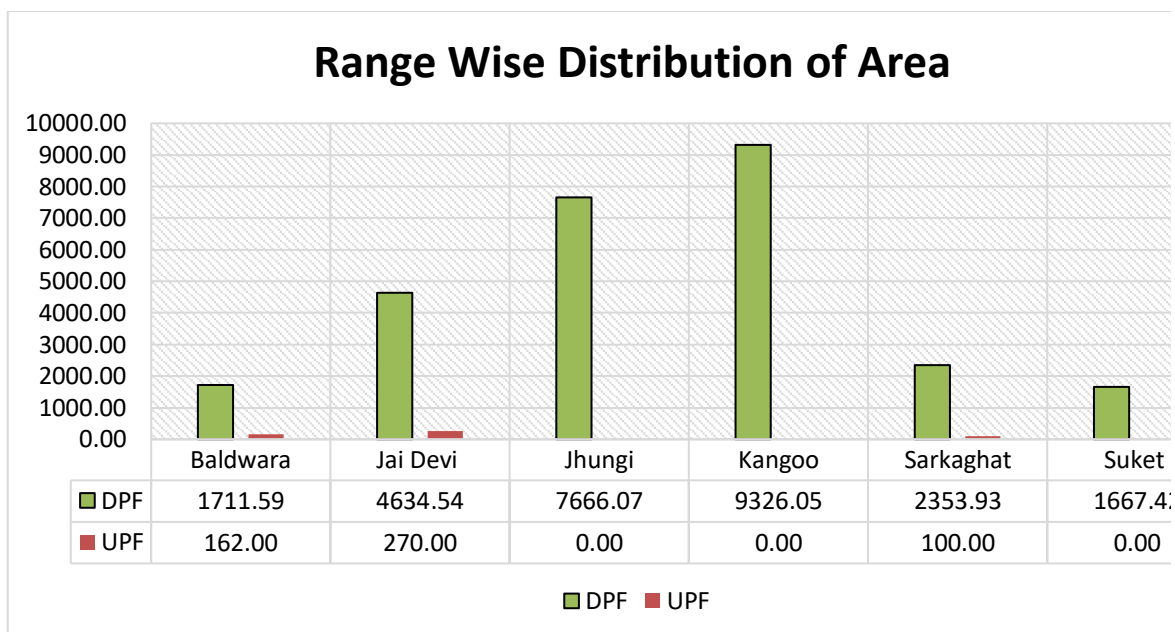


Fig. 2.2 Range wise distribution of the area

2.2 Forest area under different working circle/ management plan

The statement showing working circle and range wise distribution of forest area is tabulated below as Table 2.3.

Table 2.3 Working circle and range wise distribution of Forest area

Working Circle Distribution of Area(Hac.)					
	Working Circle				Grand Total Area
Range	Chil	Regular	Plantation	Protection	
Baldwara	1256.2	0.00	241.63	376.25	1874.08
Jai Devi	1312.32	1907.08	513.35	1171.84	4904.59
Jhungi	1242.64	4021.29	470.64	1932.50	7667.07
Kangoo	237.78	0.00	2511.87	6576.40	9326.05
Sarkaghat	1254.54	0.00	0.00	1199.39	2453.93
Suket	454.46	0.00	712.86	500.10	1667.42
Grand Total	5757.94	5928.37	4450.35	11756.48	27893.15

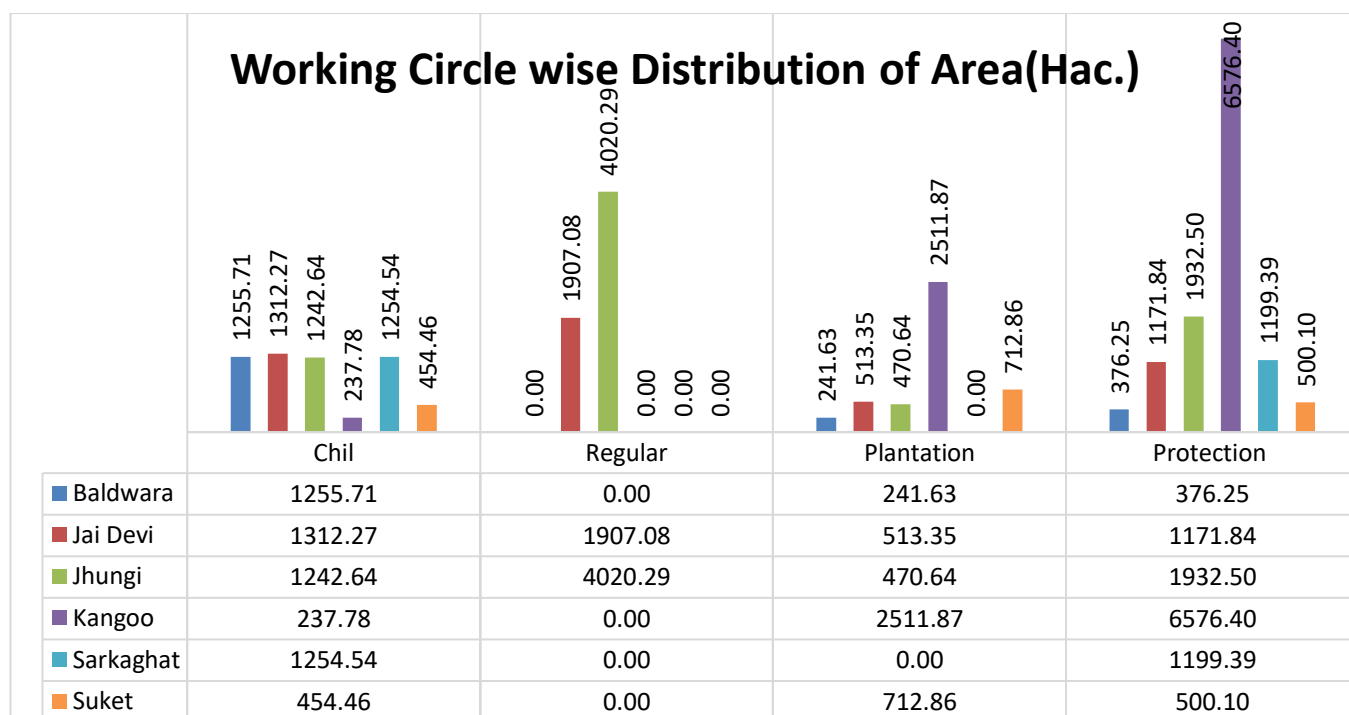


Fig.2.3 Working circle wise distribution of Area

2.3 Percentage of forest with secured boundaries

The Forests of Suket State were surveyed in 1919-20 and Survey of India carried out revision in 1937. DPFs were re-demarcated during departmental demarcation operation (1952-58) and boundary pillars were constructed. Chaks within forest area were also demarcated and chak pillars constructed.

Operations for demarcation and construction of boundary pillars in respect of un-demarcated forests of the entire Division were taken in hand during 1952 to 1958 and pillars were constructed around 32 UPFs. The remaining forests were left as such for demarcation. A large number of newly demarcated protected forests do not have boundary pillars. The position is still worse in respect of un-demarcated protected forests where the boundaries are simply indicated by the cultivation of particular village. The Working Plan Officer shall need to confirm from the available boundary registers. The beat wise detail of boundary pillars is as under

Table 2.4 Detail of Boundary pillars Suket Division

Kangoo				
Range	Block	Beat	Total number of BPs+CP	BPs constructed
Kangoo	Dehar	Umri	272	0
Kangoo	Dehar	Jyor	704	0
Kangoo	Dehar	dehar	544	0
Kangoo	Batwara	Serikothi	159	0
Kangoo	Batwara	Gehru	115	0
Kangoo	Batwara	Dhawal	193	0
Kangoo	Batwara	Batwara	307	0
Kangoo	Behli	Behli	517	0
Kangoo	Behli	Haraboi	450	0
Kangoo	Behli	Badhu	296	0
			3557	0
Suket				
Suket	Baggi	Deodha	66	0
Suket	Baggi	Rajgarh	137	0
Suket	Baggi	Baggi	256	0
Suket	Sadar	Dhanotu	46	0
Suket	sadar	Trambri	185	0
Suket	sadar	sadar	246	0
suket	sadar	Nalni	136	0
Suket	sadar	Jadroun	595	0
Suket	sadar	Jarol	273	0
Jhungi Range				
Range	Block	Beat	Total number of BPs+CP	BPs constructed
Jai Devi	Jhungi	Salani	515	0
Jai Devi	Jhungi	Chanaed bahan	180	0
Jai Devi	Jhungi	Jhungi	238	0
Jai Devi	Jhungi	Barnog	152	0
Jai Devi	Jhungi	Dharwar	213	0
Jai Devi	Pandar	Galukhar	145	0
Jai Devi	Pandar	Jaral	123	0
Jai Devi	Pandar	Pandar	147	0
Jai Devi	Pandar	Kathiuni	185	0
Jai Devi	Nihri	Reagi	193	0
Jai Devi	Nihri	Kanas	146	0
Jai Devi	Nihri	Marehra	441	0
Jai Devi	Nihri	Nihri	287	0
Jai Devi	Nihri	Kanoun	275	0
Jai Devi	Trechh	Trechh	427	0

Jai Devi	Trechh	Balag	88	0
Jai Devi	Trechh	Kinder	222	0
Jai Devi	Trechh	Bandli	270	0
		Total	4247	Nos.
Jai Devi				
Range	Block	Beat	Total Number of BPs	BPs constructed
Jai Devi	Rohanda	Rohanda	584	132
Jai Devi	Rohanda	Khabri	523	0
Jai Devi	Rohanda	Chowki	414	130
Jai Devi	Rohanda	Kamand	379	0
Jai Devi	Jai Devi	Ghiri	599	0
Jai Devi	Jai Devi	Doldhar	283	0
Jai Devi	Nandgarh	Chhamyar	249	0
Jai Devi	Nandgarh	Hatgarh	234	0
Jai Devi	Nandgarh	Nandgarh	275	0
Jai Devi	Nandgarh	Kuttachi	325	0
Jai Devi	Jai Devi	Jai Devi	187	130
			4052	392
Baldwara				
Range	Block	Beat	Total No. of B.P	B.P Constructed
Baldwara	Bhambla	Dhaulkhan	143	0
Baldwara	Bhambla	Dhalwan	125	0
Baldwara	Bhambla	Bhambla	129	0
Baldwara	Leda	Leda	170	0
Baldwara	Leda	Balhra	110	0
Baldwara	Leda	Bairkot	93	0
Baldwara	Baldwara	Hatli	110	0
Baldwara	Baldwara	Bahanu	180	0
Baldwara	Goverta	Goverta	107	0
Baldwara	Goverta	Amblagalu	105	0
Baldwara	Goverta	Batra pandhiri	155	0
Sarkaghat				
Sarkaghat	Sarkaghat	Sarkaghat	72	33
Sarkaghat	Sarkaghat	Chandrakari	33	19
Sarkaghat	Sarkaghat	Deo Bradta	37	37
Sarkaghat	Sarkaghat	Maseran	139	45

Sarkaghat	Sarkaghat	Gopalpur	92	0
Sarkaghat	Sarkaghat	Bhangoh	90	0
Sarkaghat	Thona	Jamdwar	180	180
Sarkaghat	Thona	Thona	138	38
Sarkaghat	Thona	Tikker	257	34
Sarkaghat	Durgapur	kaldoo	95	55
Sarkaghat	Durgapur	Bhaderwar	110	0
Sarkaghat	Durgapur	Pingla	84	0

2.4 Land use, land use change and forestry (LULUCF)

There is a land use change since the last working plan due to the reason that some of the forest land has been diverted for non- Forestry purpose and some encroachments on the forest land has been detected and recorded by divisional forest officer, however over the years there is a perceptible change in the forest density classes due to tremendous increase in biotic and abiotic pressure. A total of 580.914 hectares under Van (Sanrakshan Evam Samvardhan), Adhiniyam, 1980 (previously known as FCA, 1980) and 15.9584 (under FRA) ha of forest land has been diverted for non-Forestry purpose and encroachment over an area 19.5342 hac. was recorded. Out of which encroachment has been evicted over 18.0138 ha and this area has been reclaimed. Presently 10 No. of cases with an area 0.5174 ha are subjudice and one no. of case involving an area of 1.003 ha is pending for regularization under Tibetan Rehabilitation Policy.

Table 2.5 Information of Land Use Change under Van (Sanrakshan Evam Samvardhan), Adhiniyam, 1980 w.e.f. 1980 to 2022-23 (up to 31-07-2023)

Information of Land Use Change under Van (Sanrakshan Evam Samvardhan), Adhiniyam, 1980			
Year	Name of Proposal	Date of final approval	Area in ha.
1987	C/O 132 KV D/C Tr.Line Largi to Hamirpur	10-06-1987	1.857
1987	C/O Balh Valley Medium Irrigation Scheme	30-12-1987	1.92
1987	C/O 132 KV D/C Tr. Line Largi to Gaggal	10-06-1987	5.59

1993	C/O Post office building at Sarkaghat	16-07-1993	0.031
1995	C/O 400 KV Naptha- Jhakri Tr. Line	16-08-1995	54.91
1999	C/o Taleli to Ghangnu road	23-07-1999	0.26
2000	C/o Susan -Jawala road	15-05-2000	1.25
2000	Koldam HEPP.	23-11-2000	341.685
2002	C/o Inspection Hut at Nainadevi	06-05-2002	0.05
2002	C/o building for Him Shiksha Samiti	21-10-2002	0.075
2004	C/O Balh Valley Left Bank Irrigation Scheme	08-09-2004	2.37
2004	C/O Talyer, Pingla, Thona, Sarkaghat RD	2004	0.913
2004	C/O Kateru Slaper RD	09-11-2004	2.36
2005	C/o Ghangnu- Khnokhar road	14-11-2005	0.73
2006	C/o Alsu- Jamla road.	07-02-2006	1.65
2006	C/O 132 KV Tr. Line Largi to Kangoo	07-02-2006	3.2616
2006	C/o DAV School Nerchowk	14-08-2006	0.04
2006	C/o Engg. College, Sundernagar (Phase-I)	08-06-2006	0.8523
2007	C/o Rehan Basera, Sarkaghat	15-02-2007	0.054
2007	C/o residential building of Sub-Judge, Sundernagar	28-08-2007	0.08
2007	C/o Pandar- Tattapani road	06-11-2007	2.59
2007	C/o Nihri to Balag road	31-05-2007	5.556
2008	C/o Office and Canteen Building (Ex-serviceman) at S/Nagar.	11-08-2008	0.0197
2008	C/o Access to Clay Borrow Area in Vill. Harwani (NTPC)	19-11-2008	0.57
2009	C/o Solid Waste Management Project, S/Nagar.	01-04-2009	0.203
2009	C/o 220 KV Tr.Line from Prini to Nalagarh.	15-05-2009	17.4272
2009	C/o Uphaar Stone Crusher, Maloh	26-08-2009	0.4606
2009	Upgradation of Una to Nerchowk road (chainage Bhambla to Kalkhar)	24-12-2009	1.7293
2009	Diversion of forest land for clay borrow area at Kaned & Chowk Villages.	30-12-2009	0.18
2009	C/O Water Storage Tank, Sarkaghat	30-12-2009	0.06
2009	C/o 33/22 KV Sub- Station by HPSEB at Kalkhar	31-12-2009	0.29
2010	C/o Hafwana- Panyas road	20-04-2010	0.57
2010	C/O Janoul to Jaral RD	03-05-2010	3.08
2010	C/o Mahadev Stone Crusher, Nalini	18-05-2010	0.4542
2010	C/O Access & mining in clay borrow at Vill. Jugahan.	14-12-2010	0.054
2010	Setting up of VHF Station at Naina Devi ji (Rewalsar) by Police deptt.	31-12-2010	0.0162
2011	C/o Shilnoo road	24-01-2011	2.084
2011	C/o Slappaer to Tattapani road (KM 13/300 to 17/300) 1 st phase under NTPC deposit work.	02-02-2011	3.204
2011	C/o Ropa to Padhana road.	24-03-2011	0.621
2011	C/O LWSS Khudi, Khetari and Gurkotha	21-04-2011	0.1497
2012	C/O HRTC Driving school at Paplog	21-02-2012	2.603

2012	C/O Dharli to Serikothi road	06-06-2012	2.839
2012	C/O LWSS Rajwadi	09-07-2012	0.2261
2012	C/O Ambedkar Bhavan at Ambedkar Nagar, Sundernagar	06-08-2012	0.044
2012	C/O Tr. Line 400 KV from Banala To Amritsar	19-11-2012	5.8834
2012	400 KV Transmission Line Parvati to Koldam	30-11-2012	48.8634
2013	C/o Slapper to Tattapani road Ahen to Bari	09-07-2013	4.868
2013	Widening of J/Nagar Sarkaghat road (portion S/ghat to Ghumarwin	07-08-2013	2.3
2013	Widening & Strengthening of Nerchow to Kiratpur NH-21	19-12-2013	11.1486
2014	Providing of LWSS in Bhadrola Bera, Surangna & Hatli in Sarkaghat	18-06-2014	0.399
2015	Widening of Joginder Nagar -Sarkaghat-Ghumarwin road	12-02-2015	0.59
2015	C/o Sarouni to Tahli road	30-06-2015	3.53
2017	C/o Link road Balag road	23-03-2017	2.008
2017	For providing WSS/LWW to NC/PC Habitation in GP Slapper Kangoo Dehar Jambla, Baroti Chaonol Bobar, Salwana & /Samoun	22-09-2017	0.54
2017	C/o Sanihan to Batwara road	10-10-2017	4.66
2017	C/o Mautuary in Civil Hospital Sundernagar	10-10-2017	0.1685
2018	C/o ITI Dehar	22-01-2018	0.6885
2018	Diversion of AD Hydro power ltd. Transmission line for the rerouting shifting of AD Hydro 220 KV	14-03-2018	0.7941
2018	C/O Slapper to TataPani road (RD Km 25/490 to 30/690)	16-04-2018	2.717
2018	C/O Car Parking at Sarkaghat	03-05-2018	0.1031
2018	C/o Degree college Nihri	26-06-2018	1.3671
2018	C/o 33/11 KV D/C MVA sub station at Sarkaghat	20-08-2018	0.486
2018	C/o 132 KV D/C Transmissiom line to ESIC Hospital & Medical collage Ratti	07-09-2018	0.957
2018	C/o Sundernagar Bypass from (KMS 167/160 to172/950),	23-10-2018	3.34
2019	C/o Rashehar Hawani Tarangala Bhalyana road	19-02-2019	1.8722
2019	C/o ITI Bhadrola	28-02-2019	1.5283
2021	C/o Gadog Nalla to Barnog road	06-03-2021	4.06
2021	Upgradation of two lane from hamirpur to Mandi NH-7	19-07-2021	2.5697
2021	Establishment of Doppler Weather Radar System	24-08-2021	0.0396
2022	C/o road from Bhadrolu to Dharli via Kanda Hiun Nihari	22-03-2022	7.8329
2022	C/o Degree College Dehar	29-09-2022	2.6297
			580.914

Table 2.6 Information of Land Use Change under FRA w.e.f. 1980 to 2023-24 (up to 31-03-2024)

Information of Land Use Change under FRA w.e.f. 1980 to 2022-23 (up to 31-03-2024)				
Information of land use change under FRA from 2006 to March,2024				
Year	Sr. No.	Name of Proposal	Date of final approval	Area in ha.
2016	1	C/o GHS Kandar	25-10-2016	0.0485
2017	2	C/o road from Nal to Gehri	20-06-2017	0.219
2017	3	Link Road from main road rohanda to khanad	14-08-2017	0.39
2017	4	Talai to Balethi	26-09-2017	0.0395
2018	5	Link road to village Darvati Janagal, Kanna	20-01-2018	0.9667
2018	6	C/o Ayurvedic Health Centre Palahi Gram Panchayat Beri	17-02-2018	0.03
2018	7	Link road from Panyarta to Harijan Basti Dhaner	03-03-2018	0.7286
2018	8	C/o Link road khati ra gaheru to Nichili Jakher	21-03-2018	0.0927
2018	9	C/o Link road lucky filling station kalkhar to dhandaranal village	27-03-2018	0.1081
2018	10	C/o link road bataldi puli to dhaulkhan	03-05-2018	0.7176
2018	11	C/o link road from slapper tattapani road to village bari (Harizan Basti)	10-05-2018	0.315
2018	12	C/o link road talai to thala burhali via gujar basti	26-05-2018	0.5458
2018	13	C/o CHC Building Nihri	01-06-2018	0.242
2018	14	C/o GPS Punghru	15-06-2018	0.079
2018	15	C/o link road padhana to upper dhawal Sundernagar	25-07-2018	0.571
2018	16	C/o road from Rajgarh to Koyla Mata Mandir	15-09-2018	0.9983
2018	17	C/o Govt. ITI Building Nihri	20-09-2018	0.7619
2018	18	C/o Ambulance road from Jaral to Plakhagehri	20-09-2018	0.1313
2018	19	C/o Ambulance road from Smihi to Dora	08-10-2018	0.7581
2018	20	C/o Tahli to Barota Traltor Road	02-11-2018	0.8274
2018	21	C/o community hall at Kolni	29-11-2018	0.0117
2018	22	C/o link road to Murari Devi	21-12-2018	0.8224
2019	23	C/o Primary Health Centre at Balag	19-01-2019	0.172
2019	24	link road Jol to Simbal dhar	04-02-2019	0.2259
2019	25	C/o veterinary Hospital at Maloh	15-02-2019	0.047
2021	26	C/o link road Harizan Basti Triund to Pipli Kolni Hawani	02-09-2021	0.6406
2021	27	C/o Industrial Training Institute at Batail	17-09-2021	0.8088

2023-24	28	C/o Atal Adarsh Vidyalya in Muhal Chhamyanu	05-08-2023	0.694
2023-24	29	C/o ECHS Polyclinic building at Jamsai Tehsil Sarkaghat	10-05-2023	0.3541
2023-24	30	C/o Ambulance road Darkalag Galu to Ktula Harizan Basti	04-05-2023	0.1452
2023-24	31	Installation of BSNL mobile tower (4G) in Muhal Lalag(253)	12-06-2023	0.02
2023-24	32	Installation of BSNL Mobile tower (4G) in Muhal Dharli (230)	12-06-2023	0.02
2023-24	33	Installation of BSNL tower 4 G in Muhal Samsauh	19-06-2023	0.02
2023-24	34	C/o Link road from FRH to Murari Devi devi temple	23-06-2023	0.2016
2023-24	35	Installation of BSNL Tower 4G in Muhal Behli Jai Devi Range	30-06-2023	0.02
2023-24	36	Installation of BSNL tower 4G in Muhal Jamni Sarkaghat Range	04-07-2023	0.02
2023-24	37	Diversion of 0.5742 ha forest land for the remodelling Renovation of WSS Behli Mahadevi & WSS Neri Kangar Chambi Tehsil Sundernagar	04-08-2023	0.5742
2023-24	38	Diversion of 0.2671 ha forest land for C/o Link Road Galu di Hut to Bahi Mod via Kangru (portion Kangru to Bahi) Km	09-11-2023	0.2671
2023-24	39	Installation of BSNL 4G tower under FRA 2006 village Panyali Muhal Ropari	03-11-2024	0.02
2023-24	40	Installation of BSNL 4G tower in Muhal Tikkari Villa Chan	24-11-2023	0.02
2023-24	41	Diversion of 0.6531 ha forest land for multi Village water supply scheme for 9 nos Gram Panchayat of Chail Chowk area under Chachyot	19-12-2023	0.6531
2023-24	42	Installation of BSNL 4G mobile tower at village Jamsai	22-12-2023	0.02
2023-24	43	C/o Balhru Nalla to Samlehar road Km 0/00 to 0/845 Km	30-12-2023	0.4633
2023-24	44	C/o Ambulance road from Upper Bari to Chalila GP Dhawal/236	08-01-2024	0.2808
2023-24	45	Diversion of land for multi village water supply scheme for 15 nos gram panchayat of Kangoo area	17-01-2024	0.0767
2023-24	46	C/o ambulance road from Slapper Tatapani road to upper Ahen	12-02-2024	0.26
2023-24	47	Diversion of land for providing LWSS to GP serikothi of Batwara Tehsil Sundernagar	04-03-2024	0.0354
2023-24	48	C/o Ambulance road from main road to Su center Panchayat ghar serikothi Km 0/00 km to 01/300km	05-03-2024	0.4034
2023-24	49	C/o link road plan mod to Dodani Gehru	05-03-2024	0.0906

Total area Diverted under FRA in Suket Forest Division upto March 2024	15.9584

2.5 Threats to the forest

The crop of forests under this working plan is liable to threats from the following

A) Forest fires

The occurrence of forest fires is common feature in this tract, not only in Chil area but also in high level forests. During 1921 fire destroyed valuable forests e.g. Drahal, Rangjhol, Pandar, Shivshankar, Khobla, Manjhki Fir forests e.g. Retinal, Karah also caught fire. The intensity and extent was so high that the incalculable damage was done. It takes long time to restock these areas by natural/artificial method and some areas are still under regeneration block (PBI) e.g. Manjhki, Shivshankar.

Non maintenance of fire lines, contour fire path, non-creation of more fire lines as per requirement and prescribed in the working plan.

Defective resin tapping, mischief by people i.e. careless burning the Ghasinies throwing of Bididi/Cigarettes, careless handling of torches of wood. Some times, the fires are lit to drive out pigs, bears and leopards from the forests with dense undergrowth. But the main cause of fire in chil areas is dry pine needles.

Fires affect fertilization and seed production to considerable extent. Early summer fire interferes with fertilization of the cones and thus reduces the seed production, while a late summer fire burns the seed of the year and either kills or reduces the germinating power of seed in cones of the succeeding year. This can be seen in Bairkot C.1 & C.2 Khabri C.6 & C.8 Berumara near Rohanda.

Chil is relatively fire-hardy due to control burning right from found seedling. Kail is extremely sensitive to fire and gets charred beyond recovery. In general, pure deodar stand, spruce and fir are less prone to fires. As per the “Manual of Forest Fire Prevention and Control 2018” 42 beats of Suket Forest Division were identified as the Sensitive Beats towards Forest Fires.

AREAS AFFECTED BY FOREST FIRES IN LAST 10 YEARS

Fires:- With the onset of summers, fires are quite common in the region. They are accidental as well as deliberate, As the fires occur, burning of areas lead to a clean flush of grass. This fact motivates local inhabitants to put an area on fires. However, in most of the cases, results are extremely dangerous. There is a tremendous loss to both flora and fauna. The following table shows the areas burnt from 2013-14 onwards:

Table 2.7 Area affected by forest fires (last 10 years)

Sr. No.	Year	Total no. of case	Total area brunt	Percentage of total area brunt
1	2013-14	12	25.5	0.06
2	2014-15	53	124.6	0.29
3	2015-16	25	71.8	0.17
4	2016-17	80	400.5	0.93
5	2017-18	52	220	0.51
6	2018-19	154	975.95	2.27
7	2019-20	91	351.77	0.82
8	2020-21	107	390.76	0.91
9	2021-22	59	342.83	0.8
10	2022-23	117	537.55	1.25

B) Injuries to Forest by human beings

Human beings cause following types of injuries:-

(1) Lopping: Ban oak and other low level B/L species such as Bihul, Chimmu, Khirk, Jhingal, Series, Simal, Ficus are lopped heavily for fodder by the local inhabitants. People have unrestricted right of lopping, which resulted almost in extinction in some of the areas. Most of the undemarcated forests in the lower areas, which carried good crop of broad leaved species, have been reduced to scrub and opening blanks due to unrestricted and indiscriminate lopping and hacking for fodder and fuel. Though some of these areas have been planted with Chil, Moru Oak is also very heavily lopped and suffered very much on this account. Spruce growing near the habitations has suffered most because of excessive lopping. Lopping of Spruce is permissible only up to half the height, while trees of less than 3ft in girth cannot be

lopped. This rule is never followed and spruce trees of all sizes are lopped right up to top resulting in their death.

The damage done by heavy lopping is tremendous as some of the trees die of excessive lopping and those, which survive it, put on negative increment developed red heart also. Deodar trees are also lopped and drying as can be seen around Jhungi and Dharwar villages. Though lopping of Chil and Kail prohibited, but these species are lopped illicitly through out the division. Due to heavy lopping of Kail in the past, most of the Kail are suffering from taramites pinnie and show rotten in 60 to 70% of Kail stock in Jai Devi and Jhungi Ranges, Lopping of Chil reduces resin yield.

(2) Grass Cutting: There is recorded right of grass cutting in almost all the forests. The people divide amongst themselves, the existing forest in which their rights exist. In the process they cut recruits/young seedling of one to two years, as can be seen in 165 N.D. Khabri, C.6 & 8 Dhamkaon, 349 Bairkot.

(3) Debarking: Chil, Ban Oak and Spruce trees are debarked for charcoal tanning hides and roofing material and sheds respectively by local people. Some trees are debarked to girdling by Gujjar in high level for extending grazing ground as is seen along Kamrunag Dhar in Kamrah, Banwali, Manjhki Forest of Jaidevi and Jhungi Ranges. Similarly trees around orchards are also girdled which results in death of trees and the land later on is encroached. These damage is not very appreciable as these trees will be more vulnerable to increase fungal attack and prone to decay and rot.

(4) Illicit Felling: Improvement in communication due to construction of roads, increase in population growth, improvement of living pattern, and coming up various construction works in town resulted in an increase of illicit felling. Deodar and Kail are felled for timber while Spruce is felled for fuel wood and packing cases. People have the rights for cutting of Ban Oak and other broad leaved species for fuel has reduced some good forests and scrub or blanks particularly near to Sundernagar town and adjoining Balh Valley.

C) Injuries to Forest by Animals: Animals caused following injuries to crop:-

(1) Animal Grazing: The grazing damage doe not only confine to browsing and trampling down of the young seedling but also increased soil erosion. Excessive grazing

is disastrous as sheep and goats browse seedling. Soil gets hardened and infertile with the result that natural regeneration is hampered. In D. 349 Bairkot, Gobartha, Khabri forests, excessive grazing has caused irreparable damage and rock out crops have appeared. Grazing by buffaloes compacts soils, which cannot absorb rainwater and increases run off and soil erosion.

Over grazing in Deodar and Kail forests also damage natural regeneration. Most of the PBI area could not regenerate due to non-effective closure from grazing.

Spruce forests are also not free from this evil and accessible areas have become deteriorated due to heavy grazing by buffaloes of gujjar and local people and by other cattle during summer. The permanent gaps are expanding day by day. High lying pastures adjoining Kamrunag Dhar have almost lost the good soil for palatable grass and leguminous plants which are being replaced by inferior grass and thorny bushes.

In the lower scrub forest cattle of local and the migratory graziers, do a lot of damage during winter. Many forests are deteriorated due to grazing by migratory graziers as can be seen in D.395 Barnog, D.194 Bhangoh, D.420 Tikker, 421 Jumudhar-I and Jamudhar-II.

(2) Wild Animals: Debarking by bears, damages Deodar and Kail poles. Bears also break branches of Ban oak some times to get acorns. Porcupines also tear out the bark from the base of Deodar and Kail and dig out roots of chil sapling. Monkey does most of the damage by pulling out chil seedling in plantation and nurseries. Flying squirrels consume unripe cones of deodar, kail and chil. Birds grew away at young seedling and destroy lots of seed by eating fruit and just germinated seedling of chil, fir and deodar in forests and in nurseries. Wood packer bored holes in trees but at the same time eat harmful insects.

(3) Plants and weeds: In many forests, *strobilanthus* spp. *Arandinaria falcate*, *Spirea* spp. and *Indigofera* forms fairly this undergrowth inhibiting natural regeneration. In the lower zone *lantana camera* and *Ageratum* spp. are encroaching upon the scrub forests and have overpowered position of a serious menace to forest growth and grasses. Some

parasite e.g. *Loranthus* spp and *Viscum* spp. found in Ban oak forests do damage to some extent.

Climbers also damage forests. *Vitis semicardica*, *Hedera helix* and *Rosa moschata* occurs in deodar and kail forests, which devouring vital nutrients and moisture after coiling up. *Bauhinia Vahii* and *pucraria tuberaria* completely overpowered the existing crop in scrub forests and retards its growth.

(4) Fungi: There is fungus attack on kail, chil, shisham and khair and following are noticeable:

(i) *Trammetes pinii*: *Trammates pinii* infects kail mainly through trunk wounds caused during heavy lopping by local habitants. These can be seen in Jai Devi and Jhungi ranges in almost all kail forest near habitation. The fungus cause decay in heart wood and 70% kail shows rotten. This can be controlled by strictly prohibiting lopping.

(ii) *Formes annosus*: It attacks deodar poles through the roots in badly drained soil and is negligible in this division. This can be controlled by digging trenches around infested groups of poles, uprooting and burning infected material, will help to control this fungus.

(iii) *Peridermium companulatum* and *P. brenis*: These pathogens attack the needles of Chil and kail respectively and kill them. Slight attack of these has been noticed in chil and kail forests.

(iv) *Ganoderma lucidum*: Root disease in Shisham due to this fungus is common in Dehar block of Kangoo range. This disease is prevalent in both light and heavy texture soils and affected trees exhibit a stage headed and being killed after one year.

(v) *Fomes bodius*: It cause heart rot in khair and is common in all khair forest plantations. This fungus infects khair through injuries done by lopping and damage caused by wild animals.

(vi) *Fusarium Species*: It is noticed on young deodar seedling planted on bad drainage and poor aeration soil in Jhungi Valley. These types plantation is also damaged by *pythium*, *Rhizoetonia* and *Phytophthora* spp.

(5) INSECTS: Insects attack on living a tree is not very common and damage to standing trees noticed sporadic. Dead and fallen trees of chil are attacked by shoots and pin hole borer (*colytus minar*) which reduces the wood powder within few seasons. *Euzophera ceatrella* attack deodar cones and damage seeds. *Agrotis* spp cut seedling at ground level in the nurseries and seedling of natural regeneration. *Platypus biformis*, the short bole borer of chil, attack felled and sickly standing chil trees and riddles them with holes. It is quite common in chil areas of this division.

D) Injuries to Forest by natural calamities

1. Drought

The crop of forests under this working plan is liable to threats from the following agents

Absence of rains, scanty rainfall, less number of rainy days etc. result in drought conditions in these forests which some time persist for long periods. As the soil being well drained and having low capacity to retain moisture some spells of drought or late arrival of monsoon affects the growth of young plants badly. The regeneration as well as growth of flora are retarded due to inadequate moisture. Erratic rainfall also affects the growth of plants. Prolonged drought also results in heavy mortality of seedlings and due to heavy accumulation of ground floor litter risk of fire is considerable enhanced.

2. Frost

Adjective Frost and pool Frost are common in this area. The survival of Frost tender species in young plantations are affected by frost to a great extent. The effect of Frost during drought conditions become lethal resulting in large scale dying up of aged trees. The survival of young plantation are also affected severely by frost and many casualties are seen in some recent plantations. Frost tender o species covered with locally available grasses helps to protect them against frost

3. Soil erosion

Bank and slip erosion is very common in the Forest of Suket forest division due to its typical geological formation. This type of erosion is particularly common in Sarkaghat, Baldwara and Kangoo rangers where grazing is prohibited. Sheet erosion is common in many forest especially near habitations, where it is a result of over grazing. The beds of

nullahs has been raised due to deposition of stones and pebbles brought down from upper slope

E) Non- Working of forest

In the past non-working of forest has caused immense damage to the crop due to congestion and stagnation of new growth. Regular thinning and silviculture operations like seeding and final felling as per working plan is of utmost importance to keep forest healthy and growing

F) Area infested by invasive weed species in forests

The forests has been invaded by invasive weed species like Lantana , Parthenium ,Ageratum etc. which has caused negative impact on native biodiversity causing economical loss and harming human health. Lantana has done maximum invasion for which extensive survey for determining the extent of invasion like upto 25% invasion , 25 to 50% , 50 to 75% and more than 75% categories has been defined and survey reports has been posted in CH files.

2.6 Distribution of different forest types

The forests of Suket Forest Division lie in terrain, which in general is mountainous with moderately steep slopes. The gently sloping areas are limited and confined mainly to valleys near Sundernagar, Sarkaghat and Baldwara. The main forests lie between the elevations of 500 meters to 3086 meters above mean sea level. There are two distinct topographically features in this Division. Jai Devi and Jhungi Ranges are having high altitudes forests, whereas other ranges are of lower altitudes. Varied configuration of this resulted in varied climate and vegetation. The striking feature of Jai Devi and Jhungi Ranges is that the forests occur on slopes with northerly aspect, where the climate is moist and cool and human population on warmer aspect. In the lower altitude patches of forest occurs where the terrain is steep and permanent water sources are available. There is great change in vegetation with reverain species like Dalbergia Sissoo to Abies pindrow, Kharsu and pastureland on the main ridge. Thus this tract is having a flora varying from Semi-tropical to Scrub to high level Alpine type.

According to “Revised Survey of the Forest Types of India by Champion and Seth (1964) the following forest types are found in the tract:

Table 2.8 Forest types of Suket Forest Division

Group-5	Northern Tropical Dry Deciduous Forests	Area in Ha.
	5.B/C2. Northern Dry Mixed Deciduous forests	1422.57
	5.B/D.S.I. Dry Deciduous Scrub Forests.	6044.43
	BB.S.2 Khair & Sissoo Forests	728.44
	5.E.G Dry Bamboo Brakes	64.55
Group : 9	Sub Tropical Pine Forests	
	9/C.1(a) Lower or Shiwalik Chil Forests	2022.21
	9?C.1(b) Himalayan Chir Pine Forests	5079.71
	9/C.1/DSI Himalayan Scrub Forests	1941.79
	10/C.1(a) Olea cuspidate Scrub Forest	10.00
Group: 12	Himalayan Moist Temperate Forest	
	12/C.1 (a) Ban Oak Forests (Q. incana)	4101.93
	12/C.1(b) Moru Oak Forest (Q. Dilatata)	1.80
	12/C (c) Moist Deodar Forests (Cedrus)	3108.1
	12/C(d) Western Mixed Coniferous Forests	1254.80
	12/C(f) Low level Blue Pine Forest(P. Wallichana)	1591.16
	12/C.2(a) Kharsu Oak Forests (Q. Semicarpifolia)	65.44
	12/C2(b) West Himalayan Upper Oak/Fir Forests	389.94
	12/DS.2 Himalayan Temperates Park Land	66.28
	Total Forest Area	27893.15

Forests types from description point of view are described as under:

2.6.1 Northern Dry Mixed Deciduous Forests 5B/C2:

This type of forest occurs in the lower hills below and in between Chil forests. It covers most of the area of Kangoo and Suket Ranges. In Kangoo Range, these forests are mainly found in western, southwestern and partially on eastern parts of the tract on Dhauladhar, adjoining Tattapani and portions of Pargana western Deraghat, Batwara and on both sides of Alsed Khad in Suket Range. These forests are generally confined between 500 meters to 1300 Mt.

The important species in order of preponderance are *Lannea Coiromedelica*, *Emblica Officinlis*, *Acacia catchu*, *Cassia fistula*, *Dalbergia Sissoo*, *Terminalia belerica*, *Bombexceiba*, *Bauhinia racemosa*, *Grewia oppistifolia*, *Syzygium cumminii*, *Ficus glamerata*, *Anogeissus latifolia*, *Melia aardirachta*, *Albezzia stipulate*, *Albezzia procera* etc.

The under growth consist of *Carissa opaca*, *Woodfordia floribunda*, *Dodanea viscose*, *Adahatoda vasica*, *Murraya Koenigii*, *Indigofera pulchilla*, *Ziypus mauratiana* and *Zanthoxylum alatam* etc. *Euphorbia royuleana* and grows in some degraded and over grazed area. The ground cover is generally very thin and consists of mainly grasses with scattered *Flemingia Spp.* *Inula caspidata*, *Cassia tora*, and *Ageratum conyzoides*, *Bouthinia vahlii*, *Purria tuberosa*, *Acacia pinnato*, *Caesolpina sepiaria* and *Robus panicultus* are the climbers commonly met with.

2.6.2 Dry Deciduous Scrub Forests 5.B/D.S(6044.43 ha):

It is a degraded state of Northern tropical dry deciduous forest and was used grazing ground and hay land in the past and has become badly lopped and hacked by local habitants. It is characterized by abrupt brooked soil cover of shrubs which are either thorny like *Carissa*, *Randia*, *Dodanea viscose*, *Rhus parviflora*, *Woodfurdia floribunda*, *Berberies*, *Contoneaster*, *Preensekpiea utilis*, *Indigofera pulchalla* and *Adiatum*. A few trees also have been reduced to shrubby growth and generally many stemmed from the base. This type can be seen in D. 318 Slapper-Kangoo forest.

2.6.3 Khair Sisso 5B/DS.2 (728.44 ha)

This type represented along Sutlej in D. 312 Ainsinwal-shisam as a riverain fringe vegetation on alluvial deposits which get merged during monsoon and

usually retain moisture throughout the year. The growing stock of Khair and Sissoo is poor and having open canopy due to rocky portion and shallow soil. The main species are *Dalbergia Sissoo* and *Acacia catechu*. Xerophytic grasses like *Saccharum spontanium* are common occurrence.

This is a general serial type of dry deciduous in which *Dalbergia Sissoo* comes into leaf in spring and is in full leaf during summer. The other associates are *Acacia catechu*, *Mallotus philpensis*, *Moringa oleifera*, *Phanesix salvestris*. The under growth consists of *Adatoda vasica*, *Dodanea viscosa*, *Murraya koenigii*, *Zizyphus mauratiana* etc.

2.6.4 Dry Bamboo brakes 5/E.9 (64.55 ha)

This sub type of forest occurs on dry soil both on hills as well on the alluvium soil. The soil is dry during most of the year. The species is *Dendrocalomus strictus*. Where areas grazed, the bamboo grows in dense patches with grasses and deciduous often thorny shrub between. A scattered over wood of the hardier species of dry deciduous forest may indicate of dominance of bamboo to be only secondary. This type can be seen in D.393 (A) Jabot and D.391 Bambla forests of Baldwara Range.

2.6.5 Lower Shivalik Chil Forests 9/C.1.1 (2022.21 ha):

This type occurs on steep dry slopes below 1000 M in Sarkaghat Range. Typical example is D. 396 Chandrakri, D.399 Ropri, D.400 Dev Barodta and D.405 Doom Silh. Most of the areas are situated in the lower portion near habitation and in more accessible areas., Most of the areas are surrounded by habitations and have been heavily burdened with rights, malformed and stunted trees are standing. The over wood consists of pure *Pinus roxburghii* with *Mallotus philippinesis*, *Pyrus pashia*, *Syzygium cumini*, *Albezzia chinensis*, *Emblica officinalis*, and *Acacia catechu* forming under storey. The underwood consists of *Carissa opaca*, *Berberies* species, *Rubus* species, *Woodfordia floribunda*, *Inula capa*, *Myrsine Africana*, *Plectranthus urgusus*, *Murraya koenigii* and *Dodaneaviscosa* and *Adhotoda vasica*. The ground cover consists mainly of grasses with scattered *Anaphalis cinnamomea*, *Flemingia* species, *Cassia torra* and *inula cuspidate*, *Rosa moschata* occur as climber.

2.6.6 Himalayan Chil pine Forest 9/C.1(b)(5079.71 ha):

Chil forests occur generally in tract between 1200 to 1800 M with rainfall from 900 mm up to over 2500 mm and with temperatures running high during summer months. At lower limits, it occupies to cooler places on northern slopes, but above 1299 m it occurs in all aspects. The best chil forests are met with in the altitudinal zone of 1250 to 1780 m viz. D.415 Kudu, D.379 Gobarth, D.349 Bairkot, D.348 Sidhkot, D.61 Pathri, Above 1700m Chil always confines itself to southern, well drained slopes as in D.251 Shiv Shankar, D.265 Salani, D.205 Dhamkon. Deodar and Kail are invading along nalas and moist localities as in D. Galukhar, D.251 Shivshankar, D.197 Bag and D.196 Bhaun.

Chil occurs in variety of soil formations developed from tertiary sand stone, quartzite, genesis and Shales. On quartile it has attained large dimension and quality II crop are occurring on this soil formation. However it also occurs on bare rock and shallow soil, where it is stunted as in D.161 Khabri, D.162 Thikar, and D.379 Gobartha.

These forests have been subject to very heavy felling in the past and all well grown trees are removed in commercial and T.D. Markings. Only malformed and stunted trees, which were not much commercially important, were left and served as seed bearers. Thus the present crop is mostly from the seeds of these inferior trees. This type can be seen in D. 353 Sidhkot , D.351 Sikandra, D.379 Gobartha, where complete Silviculture neglect has added to misery of crop and resulted in pure chil crop of inferior quality. Artificial regeneration operations are needed in most of the areas.

Most of the chil forests are pure with little mixture of Ban, Oak, Deodar and Kail in the cooler patches. The canopy is generally open to light with dense in forest of plantation origin. There are no other trees in the top canopy. The chil are of plantation origin is having under story of Ban which is mainly from coppice shoots as most of Chil plantation areas were of Ban Forest in the past and Ban wal felled in favour of confers. In most of the old Chil forests understorey is absent and undergrowth is light. This is mainly due to heavy grazing and repeated fires. *Lannea caromandelica*, *Pistacia integrrima*, *Euphorbia Rolyana* form mix in its lower limits as associate, while *Quercus incana*, *Rhododendron arborium*, *Myrico Nagi*, *Lyonia ovalifolia*, *Cedrusdeodara*, *Pinus wallichiana* are associated in its upper limits. The common shrubs

intervening in blanks are Berberies, Rubus, Carissa, Myrsine, Rania, Zanthoo, Xylum, Inula, Plectranthus, woodfordia etc. Ground cover consists of Anaphalis spp and Flemingia species.

2.6.7 Himalayan Scrub Forest 9/C.1/D.S.1(1941.79 ha)

This type of forest occurs in the Shivalik Chil zone extending into the Himalayan Chil forest and down into mixed deciduous forests. The over wood has been destroyed or perhaps has been unable to develop owing to excessively dry and shallow soil. Open shrub formation occupies the ground. The dominant species vary a good deal and often one or two of them may so predominate as to give a characteristic appearance. Probably the residual scrub on degradation will show its origin but both edaphic and biotic factors are involved in determining what persists. Carissa, Dodonaea, Rhus and Plectranthus may be mentioned as examples.

2.6.8 Sub tropical Euphorbia Scrubs 9/D/1/D.S.2 (389.61 ha)

Eupharbia royleana form consociations sometimes of considerable extent. Their distribution is related to edaphic factors, notably dry rocky ridges, but under biotic pressure they extend and become denser and purer owing to the elimination of less resistant species. This type exists in Sarkaghat Range but is confined to southern and western slopes, which are dry and rocky. A few Bauhnia and Ficus are also found along with Euphorbia forest have shown their appearance in Hara C.3 of Kangoo Range also.

2.6.9 Olea cuspidate Scrub Forests 10/C.1 (a) (10.00ha)

This type of Forest is found in Kangoo Range in the shape of small patches/strips and scattered trees along Sutlej River near Tattapany in D.272 Karangal forest. Some patches are also on flatter alluvial ground of wide valley where it has been cleared for cultivation. Olea cuspidate, exists natural as the main species with Punica granatum, Pastacia intergrima, Ficus palmate. The shrubs are Beberies, Prinsepia, Robus etc.

2.6.10 Ban Oak Forest 12.D.1 (a)(4101.93 ha)

Ban oak forests are widely distributed in the tract between altitudes 1000m to 2300m. No other species in the tract shows such wide altitudinal distribution. It is confined to northern slopes in the lower elevation as in D.126 Kuthain, D.38 Sunderban, whereas above 1500m it occurs on all aspect as is seen in D.96 Kutachi, D.103 Shilh, D.199 Bunga, and D.301 Gehru. Some excellent forests are met with on south-western face of Srdhar and some are growing in depressions in Chil and on spurs in Deodar forests.

The canopy of Ban forests in this division is open to fairly dense with average 0.3 to 0.8. The growth in height is good in the areas away from habitations. Along and around agricultural fields/habitations, the naturally occurring trees are preserved by the villagers to meet fuel/fodder requirement in case of emergency/scarcity. In areas adjoining habitations, at places Ban has been subject to heavy lopping and hacking and reduced merely to scrub bushy growth as seen in D.120 Kaulpur Ban, D.103 Shilh, and D.68 Dhagwahan.

Some Oak Scrub also occurs in the lower elevation from 1000m to 1700m and having near to habitation and can be seen in Baldwara, Suket Ranges. These forests are subject to heavy lopping and hacking in the past. All such forests have been planted with Chil and can be seen in Kuthian, Kulkar, Deovarta, Hayeter.

There is scrub Oak also and subject to heavy lopping and hacking resulted to scrubs. The common associates of Ban Oak are *Rhododendron arborium*, *Lyonia ovalifolia*, *Machilus odoratissima*, *Litsea umbrosa*, *Mysia Nagi* and *Quercus glouca*. *Cederella serrata*, *Pyrus pashia*, *Aesculus indica*, *Acer Villosum* also associate with it and are mainly found along Nallahs and shady places.

Undergrowth is generally not thick and consists of *Berberis lyceum*, *Indigofera geradiana*, *Sarcococa saligna*, *Lonicera quinquelacularis*, *Liptodermis lanecolata*, *Desmodium tillifolium*, *Rotidia tetrasperma*, *Viburnum colinifolium* and *Daphne cannabiinna* etc. Harbacious flora is rich due to moist northern slopes of existing forests and consists of *Ainsliana aptra*, *Beenninghousenia albiflora*, *Voila serpens*, *Pilea umbrosa*, *arisaema wallichii*, *Salvia glutinera*, ferns and grasses. *Rubus ellipticus*, viis Himalayan, *Rosa moschata* are also found in the forest.

2.6.12 Moist Deodar Forest 12/D.1(c)-(3108.1 ha.)

These forests occur generally between 1600m to 2300m elevation with rainfall from 1000mm to 1400mm. These form the most valuable commercial forests in this region. On northern lopes, these go even lower, while on hotter southern slopes they reach higher along spurs. Soil formed on account of disintegration of granite is ideally suited to Deodar as can be seen in D.246 Manjhki and D.180 Kanas forests. Excellent forest of pure Deodar can be seen all over Jhungi Range as in D. 183 Pandar, D.192 Riagi, D.260 Khobla, D.180 Kanon, D.259 Chota Goddan. Kail is mixed on spurs and hotter aspects. Spruce come occasionally along Nallahs in the zone as in D. 252 Bara Goddan , C.3 and D.183 Pandar C.4..(b)

The overall quality of the crop is II and average density varies from 0.5 to 0.7 leaving aside artificial plantation the crop is uneven aged of all age classes with scarcity of mature to over mature trees due to defective working in the past. Biotic pressure and local demand of T.D. renders the forests under stocked and stunted due to heavy pressure of lopping as is evident in around Jhungi village and else where.

There is generally a paucity of Underwood in pure deodar forests, but present along nallah and in depressions. Ban oak in lower and middle altitude whereas Moru/Kharsu in upper reaches occurs in scattered form along nallas and in depression. The other species are found in scattered form e.g. Rhododendron, Lyonla ovalfolis, Cedrella serrata, Ulmus walichiana, Alnustida, Aesculus indica, Pyrus pashia etc.

In these forests the undergrown is of Indigofera, Desmodium, Viburnum, Lonicera, Robus, Berberies, Deutzia staminea, Sorcococa saligna etc. The ground flora is Gerarium spp, Galium Spp, Salvia glutinosa, Ainsliaea sptra, Tymus serphylum, Boenning housenia, Viola serkpens, Fragari indica, Anaphalis cinnamomea et. Vitis semicordata, Hedera nepalensis, Rosa moschata, Clematis Montana are the climbers generally found in these forests. D. 260 Khobla, D.180 Kanon, D.259 Chota goddan, Kail is mixed on spurs and hotter aspects. Spruce comes occasionally in the along Nallahs in this zone as in D. 252 Bara Godan C.3 and D. 183 Pandar D.4(b).

2.6.13 Western Mixed Coniferous Forests 12/C.1(d)-(1254.80 ha)

This type of forests is met with in Jhungi and Jai Devi Ranges only on cooler pockets and in steep to precipitous areas. This type of forest lies at an elevation of 2100 to 3000m above the Deodar zone. There is mixture of trees of Spruce, Silver Fir, Kail and Deodar with B/L species. In the lower portions Spruce predominates, associated with deodar on spurs and steep ground. Kail is confined to hot southern slopes and ridges with shallow soil. Overall density of forests is open to fair varying from 0.3 to 0.6 Canopy is broken along ridges due to cattle grazing. This type of forests has three sub types as under:

- a) Spruce-Deodar forests as stated above occupy limits of Deodar with deciduous, B/L trees as *Aesculus indica*, *Acer* species, *Cedrela serrata*, *Ulmus wallichiana* etc. Heavy lopping of spruce near habitations has resulted in knotty and malformed crop.
- b) Spruce-Kail forests occur in mixture and also in compact pure groups, Spruce found on upper reaches whereas Kail is confined to dry ridges. Spruce is regenerating under Kail shade as can be seen in D.178 Hobart, D.181 Blinker
- c) Spruce-silver Fir forests are confined to higher zone with Fir predominating in upper fringes and Spruce on the lower limits. Silver Fir is regenerating under the Spruce and encroaching upon Spruce zone on cooler places. Spruce occurs pure in the lower elevation. The understorey consists of Oaks with *Aesculus indica*, *Acer* species, *Prunus padus* etc. The under growth consists of *Viburnum contonifolium*, *Desmodium* spp., *Spiraea Lindleyana*, *Indigofera*, *Deutzia corymbosa*, *Berberies*, *Lonicera* etc. The ground flora consists of *Strobilanthes*, *Impaties*, *Pregaria vesca*, *Viola serpens*, *Valeriana* spp., *Ainsliana* spp., *Polygonum*, *Anaphalis* spp., *Ainsliana* spp., *Polygonum*, *Anaphalis* spp. Common ferns are *Adiantum*, *Pteridium* spp., *Asplenium polypodioides* and climbers are *Hedera nepalensis*, *Vitis semicordata*. These forests can be seen in D. 154 Banwali, D. 153 Kamrah, D.103 Jawar Shilh of Jhungi and Jai Devi Ranges.

2.6 .14 Low Level Blue Pine Forests 12/C.1(f)-(1591.16 ha)

This type is found in Jai Devi and Jhungi Ranges at an elevations ranging from 1450m to 2500m with *Pinus wallichiana* as the main species, has invaded those areas where fires had destroyed the pre existing species or where blanks are

created due to land slides and heavy markings under T.D. and salvages. The crop is comparatively even aged and ranges from pole to middle aged trees. Lower classes show physical maturity due to poor growth on shallow and steep soil. Most of the Kail is rotten due to fungus, fire grazing and heavy lopping in the past.

The quality of the crop is II and density 0.5 to 0.6. The crop shows good diameter and height growth. There is profuse regeneration of Deodar and Kail it has come up partly as result of artificial sowing/planting, in spite of repeated damaged by fire. Under storey is similar to that found under type 12/C.1(c) Moist deodar forests with plenty of Berberies and Indigofera are interspersed on warmer aspect.

2.6.15 Kharsu Oak forests 12/C.2(a)-(65.44 ha)

This type occurs above Spruce and Silver fir forests between 2500 to 3500m along Kamrunag dhar. On the northern slopes regeneration of Spruce, Silver Fir is coming and occasional trees of these species also occur. Kharsu forests are mostly of middle aged with malformed over mature trees have. These forests have protective nature rather commercial. In pure Kharsu stands, the understorey is generally absent. Undergrowth consists of viburnum cotinifolium, Desmodium tilifolium, Indigofera species and cotoneaster bacillaries.

2.6.16 Western Himalayan Upper Oak/Fir Forests 12/C.2(b)-(389.94 ha)

This is quite a unique, twostoreyed high forests which occurs above Fir Forests along Kamru Nag, Hejdhar. Silver fir occurs singly as well as in groups over oak other even green and deciduous trees are also associated. Rhododendron, Cotoneaster bacillaries, Pyruslanata, Khanor occurs pure in site not suitable for Fir and other species. Under growth are of Primula, Polygonum, Strablanthus, Anophalis, Senecio spp. Regeneration of Silver fir is quite good under Kharsu Oak, being protected from grazing due to steep and precipitous slopes.

2.6.17 Himalayan Temperate Parkland 12/D.S.2-(66.28 ha)

This type of forest occurs along Kamrunag dhar and is represented by open parkland like grazing ground at higher elevation, mostly in Kharsu

and Fir forests. The turf is full of flowers by spring. Due to heavy grazing by buffaloes, sheep and goats, erosion has set in such pastures along Kamrunag and Shikari Dhar.

2.7 Tree cover outside forest area

The field exercise to assess the species wise estimation of trees outside forest has been done and the field data so collected has been handed over to HFRI for extrapolation and result are still awaited and will be incorporated in the final working plan as addendum.

CHAPTER-3

MAINTENANCE, CONSERVATION AND ENHANCEMENT OF BIODIVERSITY

3.1 FOREST COMPOSITION AND DISTRIBUTION:-

The forests of Suket Forest Division lie in terrain, which in general is mountainous with moderately steep slopes. The gently sloping areas are limited and confined mainly to valleys near Sundernagar, Sarkaghat and Baldwara. The main forests lie between the elevations of 500 meters to 3086 meters above mean sea level. There are two distinct topographically features in this Division. Jai Devi and Jhungi Ranges are having high altitudes forests, whereas other ranges are of lower altitudes. Varied configuration of this resulted in varied climate and vegetation. The striking feature of Jai Devi and Jhungi Ranges is that the forests occur on slopes with northerly aspect, where the climate is moist and cool and human population on warmer aspect. In the lower altitude patches of forest occurs where the terrain is steep and permanent water sources are available. There is great change in vegetation with reverain species like Dalbergia Sissoo to Abies pindrow, Kharsu and pastureland on the main ridge. Thus this tract is having a flora varying from Semi-tropical to Scrub to high level Alpine type.

According to “Revised Survey of the Forest Types of India by Champion and Seth (1964) the following forest types are found in the tract:

Table 3.1 Revised Forest Types of Suket Forest Division

Group-5	Northern Tropical Dry Deciduous Forests	Area in Ha.
	5.B/C2. Northern Dry Mixed Deciduous forests	1421.02
	5.B/D.S.I. Dry Deciduous Scrub Forests.	6044.43
	BB.S.2 Khair & Sissoo Forests	728.44
	5.E.G Dry Bamboo Brakes	64.55
Group : 9	Sub-Tropical Pine Forests	
	9/C.1(a) Lower or Shiwalik Chil Forests	2022.21
	9?C.1(b) Himalayan Chir Pine Forests	5079.71
	9/C.1/DSI Himalayan Scrub Forests	1941.79
	10/C.1(a) Olea cuspidate Scrub Forest	10.00
Group: 12	Himalayan Moist Temperate Forest	

	12/C.1 (a) Ban Oak Forests (<i>Q. incana</i>)	4101.93
	12/C.1(b) Moru Oak Forest (<i>Q. Dilatata</i>)	1.80
	12/C (c) Moist Deodar Forests (<i>Cedrus</i>)	3108.1
	12/C(d) Western Mixed Coniferous Forests	1254.80
	12/C(f) Low level Blue Pine Forest(<i>P. Wallichana</i>)	1591.16
	12/C.2(a) Kharsu Oak Forests (<i>Q. Semicarpifolia</i>)	65.44
	12/C2(b) West Himalayan Upper Oak/Fir Forests	389.94
	12/DS.2 Himalayan Temperates Park Land	66.28
	Total Forest Area	27893.15

3.2 Plant species diversity: The data collected during enumeration such as the number of individuals of each species and the DBH of each tree was utilized to derive secondary attributes like basal area (BA, m²/ha), density (D, trees per ha) and frequency (F, number of quadrats where trees are present) in relation to total plots observed). Relative values of BA, D and F were then calculated. The important value index (IVI) was calculated by adding up relative dominance (R BAF), relative density (RD) and relative frequency (RF).

Species diversity is an expression of community structure. The number of species in a community is referred to as species richness. The relative abundance of all species is called evenness. A community demonstrates a high species diversity if many equally or nearby equally abundant species are present. Communities with a large number of species that are evenly distributed are the most diverse. Species diversity indices like Shannon–Wiener Index are calculated separately for trees, shrubs and herbs.

Table 3.2 The most common species in the forests under Suket Forest Division

S. No.	Scientific Name	Family	Local Name	English Name
1.	<i>Abies pindrow</i>	Coniferae	Tosh	Silver fir
2.	<i>Acacia nilotica</i>	Leguminosae (Mimosaceae)	Kikar	-
3.	<i>Acacia catechu</i>	-do-	Khair	-
4.	<i>Acer caesium</i>	Sapindaceae	Mandlu	Mandar Maple
5.	<i>Acer oblongum</i>	Sapindaceae	Parange	-
6.	<i>Acer villosum</i>	Sapindaceae	Chirandru	Maple
7.	<i>Adina cordifolia</i>	Rubiaceae	Haldu	-
8.	<i>Aegle marmelos</i>	Rutaceae	Bel	-
9.	<i>Aesculus indica</i>	Sapindaceae	Khanor	Horse chestnut

10.	<i>Ailanthus glandulosa</i>	Simaroubaceae	Ailanthus	Ailanthus
11.	<i>Albizzia procera</i>	Leguminosae (Mimosaceae)	Safed (White) Siris	-
12.	<i>Albizzia stipulata</i>	-do-	Oie	-
13.	<i>Albizzia lebbec</i>	-do-	Kala (Black) Siris	-
14.	<i>Albizzia odoratissima</i>	-do-	Siris	-
15.	<i>Alnus nitida</i>	Cupliferae	Kosh, Kunish	Alder
16.	<i>Alnus nepalensis</i>	-do-	Kosh	Alder
17.	<i>Anogeissus latifolia</i>	Combretaceae	Dhou, Chhal	-
18.	<i>Bauhinia perpurea</i>	Leguminosae	Karal	-
19.	<i>Bauhinia variegata</i>	-do-	Kachnar, Karale	-
20.	<i>Betula alnoides</i>	Betulaceae	Shagra	Birch
21.	<i>Bombax ceiba</i>	Bombaceae	Semal	Red Cotton tree
22.	<i>Buxus wallichiana</i>	Euphorbaceae	Shamshad	Box wood
23.	<i>Broussonetia papyrifera</i>	Moraceae	-	Paper mulberry
24.	<i>Careva arborea</i>	Myrtaceae	-	-
25.	<i>Carpinus viminea</i>	Betulaceae	Khirki	Himalayan Hornbean
26.	<i>Cassia fistula</i>	Caesalpiaceae	Amaltas	India Laburnum
27.	<i>Cassia siamea</i>	-do-	-	-
28.	<i>Cassia frondosa</i>	-do-	-	-
29.	<i>Callistemon viminalis</i>	Myrtaceae	-	Bottle Brush
30.	<i>Casearia tomentosa</i>	Samydaceae	Pimpla, goela, pula	-
31.	<i>Cedrela Serrata</i>	Meliaceae	Darke	Hill Toon
32.	<i>Cedrela toona</i>	-do-	Tooni, Tun	Toon
33.	<i>Cedrus deodara</i>	Coniferae	Kelo, Diar	Deodar
34.	<i>Celtis australis</i>	Urticaceae	Khirak	Nettle Tree
35.	<i>Citrus mediaca</i>	Rutaceae	Jhamirdi	-
36.	<i>Cordia myxa</i>	Boraginaceae	Lasura	-
37.	<i>Cordia vestita</i>	-do-	Lasura	
38.	<i>Cornus capitata</i>	Cornaceae	Kreeva	Dog wood
39.	<i>Cornus macrophylla</i>	-do-	-do-	-do-
40.	<i>Corylus colurna</i>	Cupuliferae	Sharol	Hazlenut
41.	<i>Cupressus sempervirens</i>	Coniferae	Saru	Himalayan cyprus
42.	<i>Cupressus torulosa</i>	-do-	Davidiar	Himalayan cyprus
43.	<i>Dalbergia sissoo</i>	Papilionaceae	Shisham, Tali	Sissoo
44.	<i>Ehretia acuminata</i>	Boraginaceae	Bakli	-
45.	<i>Ehretia laevis</i>	-do-	Chamror	-

46.	<i>Emblica officinalis</i>	Euphorbaceae	Ambla	-
47.	<i>Engelhardtia colebrookiana</i>	Euglandaceae	Samma	-
48.	<i>Erythrina subarosa</i>	Papilionaceae	Pariara	Coral tree
49.	<i>Eucalyptus camaldunensis</i>	Myrtaceae	Safeda	River Red gun
50.	<i>Eucalyptus citriodora</i>	-do-	-do-	Lemon scened gun
51.	<i>Eucalyptus globulus</i>	-do-	-do-	Blue gun
52.	<i>Eucalyptus grandis</i>	-do-	-do-	Rose gun
53.	<i>Eucalyptus hybrid</i>	-do-	-do-	-
54.	<i>Euonymus lacerus</i>	Celastraceae	Kala chindwara	Indian spindle tree
55.	<i>Euonymus tingens</i>	-do-	-do-	-
56.	<i>Ficus palmata</i>	Urticaceae	Fegura, Fegra	Wild Fig
57.	<i>Ficus hispida</i>	-do-	Debre	-
58.	<i>Ficus religiosa</i>	-do-	Pipal	-
59.	<i>Ficus roxburghii</i>	-do-	Tremal, Traimbal	-
60.	<i>Ficus bengalensis</i>	-do-	Bar	Banyan
61.	<i>Floccurtia ramentchii</i>	Bixaceae	Kaodei, Kangu	-
62.	<i>Fraxinus micranthus</i>	Oleaceae	Ash	Ash
63.	<i>Fraxinus floribunda</i>	-do-	Ash	Ash
64.	<i>Grevillea robusta</i>	Proteaceae	-	Silver Oak
65.	<i>Grewia oppositifolia</i>	Tiliaceae	Bihul, Beul	-
66.	<i>Gewia elastica</i>	-do-	-do-	-
67.	<i>Holarrhena antidysenterica</i>	Apocynaceae	-	-
68.	<i>Ilex dipyrena</i>	Illicineae	Jacranda	-
69.	<i>Jacaranda ovalifolia</i>	Bignoniceae	-	-
70.	<i>Juglan regia</i>	Juglandaceae	Khor, Akhrot	Walnut
71.	<i>Kydia calycina</i>	Malvaceae	Pula	-
72.	<i>Lagerstroemia indica.</i>	Lythraceae	Har Singar	-
73.	<i>Lannea grandis</i>	Anacardiaceae	Salambra	-
74.	<i>Litsea umbrisa</i>	Lauraceae	Paror	Laurel
75.	<i>Litsea Chinensis</i>	-do-	-do-	-do-
76.	<i>Litsea polyantha</i>	-do-	-do-	-do-
77.	<i>Leucaena leucocephala</i>	Leguminosae	Subabool	-
78.	<i>Lyonia ovalifolia</i>	Ericaceae	Airean, Ebran	-
79.	<i>Machilus odoratissima</i>	-do-	-do-	-
80.	<i>Mallotus</i>	Euphorbiaceae	Kambal	Kamila tree

	<i>philippinensis</i>			
81.	<i>Mangifera indica</i>	Anacardiaceae	Amb	Mango
82.	<i>Melia azedarach</i>	Meliaceae	Drek	Persian lialac
83.	<i>Moringa oleifera</i>	Moringaceae	Saunjana	-
84.	<i>Morus alba</i>	Urticaceae	Chimmu	Mulberry
85.	<i>Morus serrata</i>	-do-	Pahari tut	Hill mulberry
86.	<i>Myicra nagi</i>	Myrtaceae	Kaphal	-
87.	<i>Olea cuspidata</i>	Obaceae	Kahu	Olive tree
88.	<i>Oroxylum Indicum</i>	Bignoniaceae	Arlu	-
89.	<i>Ougeinia dalbergiodes</i>	Leguminosae	Sandan	-
90.	<i>Phoenix sylvestris</i>	Arecaceae	Khajur, Khajri.	Wild date palm
91.	<i>Phoenix humilis</i>	-do-	Khajri	Wild date palm
92.	<i>Picea smithiana</i>	Coniferae		Spruce
93.	<i>Pinus roxburghii</i>	-do-	Chil	Chir pine
94.	<i>Pinus wallichiana</i>	-do-	kail	Blue pine
95.	<i>Pistacia integerrima</i>	Anacardiaceae	Kakare	-
96.	<i>Populus deltoids G.3</i>	Salicaceae	Chiluna, Pahari	Poplar
97.	<i>Populus ciliata</i>	-do-	Pipal	Poplar
98.	<i>Populus deltoids G.48</i>	-do-	-	Poplar
99.	<i>Populus deltoids G.121</i>	-do-	-	Poplar
100.	<i>Populus nigra</i>	-do-	-	Poplar
101.	<i>Pongamia pinnata</i>	Papilionaceae	Karanj	Indian beech
102.	<i>Prunus armenica</i>	Rosaceae	Chuli	Wild apricot
103.	<i>Prunus cerasoides</i>	-do-	Paja	Bird Cherry
104.	<i>Prunus cemuta</i>	-do-	Jammu	Bird Cherry
105.	<i>Prunus granatum</i>	Lythraceae	Auar, Daru	Pomegranate
106.	<i>Pyrus lanata</i>	Rosaceae	Bumfal	-
107.	<i>Pyrus pashia</i>	-do-	Segal, Kainth	-
108.	<i>Quercus dilatata</i>	Cupliferae	Mohru	Green oak.
109.	<i>Quercus glauca</i>	-do-	Bani	-
110.	<i>Quercus incana</i>	-do-	Ban	White oak
111.	<i>Quercus semicarpifolia</i>	-do-	Kharsu	Brown Oak
112.	<i>Rhododendron arboreum</i>	Ericaceae	Burah	-
113.	<i>Rhus punjabensis</i>	Anacardiaceae	Titri	-
114.	<i>Robina pseudoacacia</i>	Legumes	Robina	-
115.	<i>Salix babylonica</i>	Salicaceae	Majnu	Weeping willow
116.	<i>Salix elegans</i>	-do-	Biuns	Willow
117.	<i>Salix tetrasperma</i>	-do-	Biuns	Willow
118.	<i>Sapindus mukurossi</i>	Sapindaceae	Ritha	Soap nut tree

119.	<i>Sapium sebiferum</i>	Euphorbiaceae	Dudhla	Chinesetallow Tree
120.	<i>Taxus baccata</i>	Coniferae	Barmi, Rakhale	Yew
121.	<i>Terminalia belerica</i>	Combretaceae	Bahera	-
122.	<i>Terminalia chebula</i>	-do-	Harad	-
123.	<i>Terminalia tomentosa</i>	-do-	Alasan	-
124.	<i>Ulmus wallichiana</i>	Ulmaceae	Marinu	-
125.	<i>Ulmus laevigata</i>	-do-	Marinu	Small leaf elm
126.	<i>Wrightia tinctoria</i>	Apocynaceae	Summa	-
127.	<i>Wrightia tomentosa</i>	-do-	Summa	-
128.	<i>Xylosma longifolium</i>	Bixaceae	Draindu	-
129.	<i>Zizyphus jujuba</i>	Rhamnaceas	Beri	-

The frequency, density, basal area and IVI of most important trees and shrubs found in forests are given in table.

Table 3.3 Ecological parameters of Trees of Chil Working Circle

Working Circle	Species	Relative Density	Relative Frequency	Relative basal Area	IVI=RD+RF+RBA
Chil Working Circle	<i>Ailanthus excelsa</i>	3.36	2.56	0.21	6.14
	<i>Albizzia Spp</i>	5.60	2.56	0.20	8.36
	<i>Bombex ceiba</i>	1.12	2.56	0.29	3.98
	<i>Cedrus Deodara</i>	15.40	10.26	8.63	34.29
	<i>Lannea grandis</i>	2.24	2.56	0.12	4.92
	<i>Myrica esculenta</i>	2.24	5.13	0.42	7.79
	<i>Pinus roxburghii</i>	49.13	53.85	87.34	190.32
	<i>Pinus wallichiana</i>	8.96	5.13	1.49	15.58
	<i>Prunus cerasoides</i>	1.12	2.56	0.02	3.70
	<i>Pyrus pashia</i>	2.24	2.56	0.13	4.94
	<i>Quercus leucotrichophora</i>	6.35	7.69	1.05	15.09
	<i>Toona ciliata</i>	2.24	2.56	0.08	4.89
Chil Working Circle Total		100.00	100.00	100.00	300.00

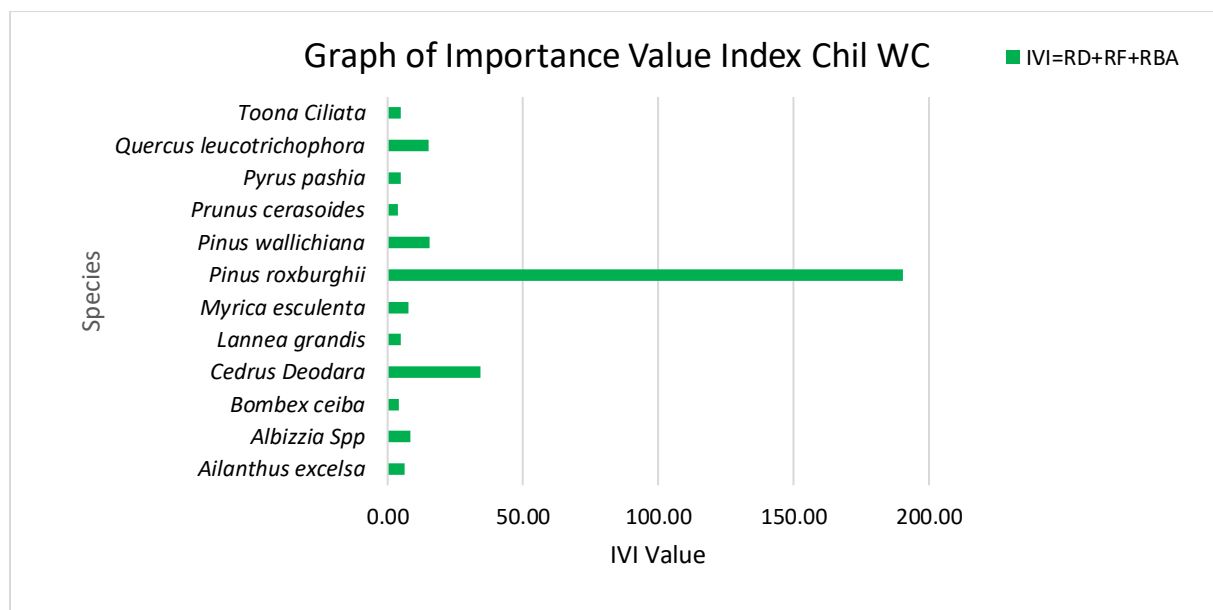


Fig 3.1 Graph representing Importance Value Index of Chil WC

Table 3.4 Ecological parameters of Trees of Plantation Working Circle

Plantation Working Circle	<i>Acacia catechu</i>	13.73	1.01	0.69	15.43
	<i>Ailanthus excelsa</i>	1.19	1.01	0.22	2.42
	<i>Albizzia Chinensis</i>	1.43	5.05	1.46	7.95
	<i>Albizzia lebbeck</i>	1.19	1.01	0.08	2.29
	<i>Albizzia Stipulata</i>	0.60	2.02	0.49	3.11
	<i>Albizzia Spp</i>	1.79	1.01	0.04	2.84
	<i>Bauhinia variegata</i>	0.60	1.01	0.03	1.64
	<i>BL</i>	2.69	2.02	0.31	5.01
	<i>Bombex ceiba</i>	1.19	5.05	0.95	7.19
	<i>Cassia fistula</i>	2.24	4.04	0.69	6.97
	<i>Cedrus Deodara</i>	2.09	2.02	0.16	4.27
	<i>Celtis australis</i>	1.79	2.02	1.29	5.10
	<i>Dalbergia sissoo</i>	2.39	3.03	0.87	6.29
	<i>Embllica Officinalis</i>	0.80	3.03	0.12	3.95
	<i>Ethretia Acumniata</i>	0.60	1.01	0.14	1.75
	<i>Eucalyptus hybrida</i>	0.60	1.01	0.13	1.74
	<i>Eucalyptus spp</i>	4.18	1.01	1.01	6.20
	<i>Ficus racemosa</i>	0.60	1.01	0.02	1.63
	<i>Ficus Spp.</i>	0.60	1.01	0.03	1.63
	<i>Flacourtia Sapida Roxb</i>	0.60	1.01	0.02	1.63
	<i>Grewia optiva</i>	0.60	1.01	0.03	1.63
	<i>Lannea grandis</i>	3.88	4.04	2.25	10.17
	<i>Litsaea umbrosa</i>	0.60	1.01	0.06	1.66
	<i>Mallotus philippensis</i>	1.39	3.03	0.14	4.56
	<i>Myrica esculanta</i>	3.58	2.02	1.45	7.05
	<i>pinus Phicia</i>	13.14	1.01	1.22	15.37
	<i>Pinus roxburghii</i>	11.94	31.31	79.68	122.9

					3
	<i>Pinus wallichiana</i>	7.76	2.02	0.80	10.59
	<i>Pistacia integerrima</i>	1.00	3.03	0.27	4.30
	<i>Populus Ciliata</i>	0.60	1.01	0.92	2.53
	<i>Prunus cerasoides</i>	1.19	1.01	0.05	2.25
	<i>Quercus leucotrichophora</i>	7.16	4.04	2.70	13.90
	<i>Rhododendron</i>	2.39	1.01	0.20	3.60
	<i>Syzygium cumini</i>	0.90	2.02	0.38	3.30
	<i>Terminalia bellirica</i>	1.79	2.02	0.76	4.57
	<i>tuna ciliata</i>	1.19	1.01	0.34	2.54
Plantation Working Circle Total		100.00	100.00	100.00	300.00

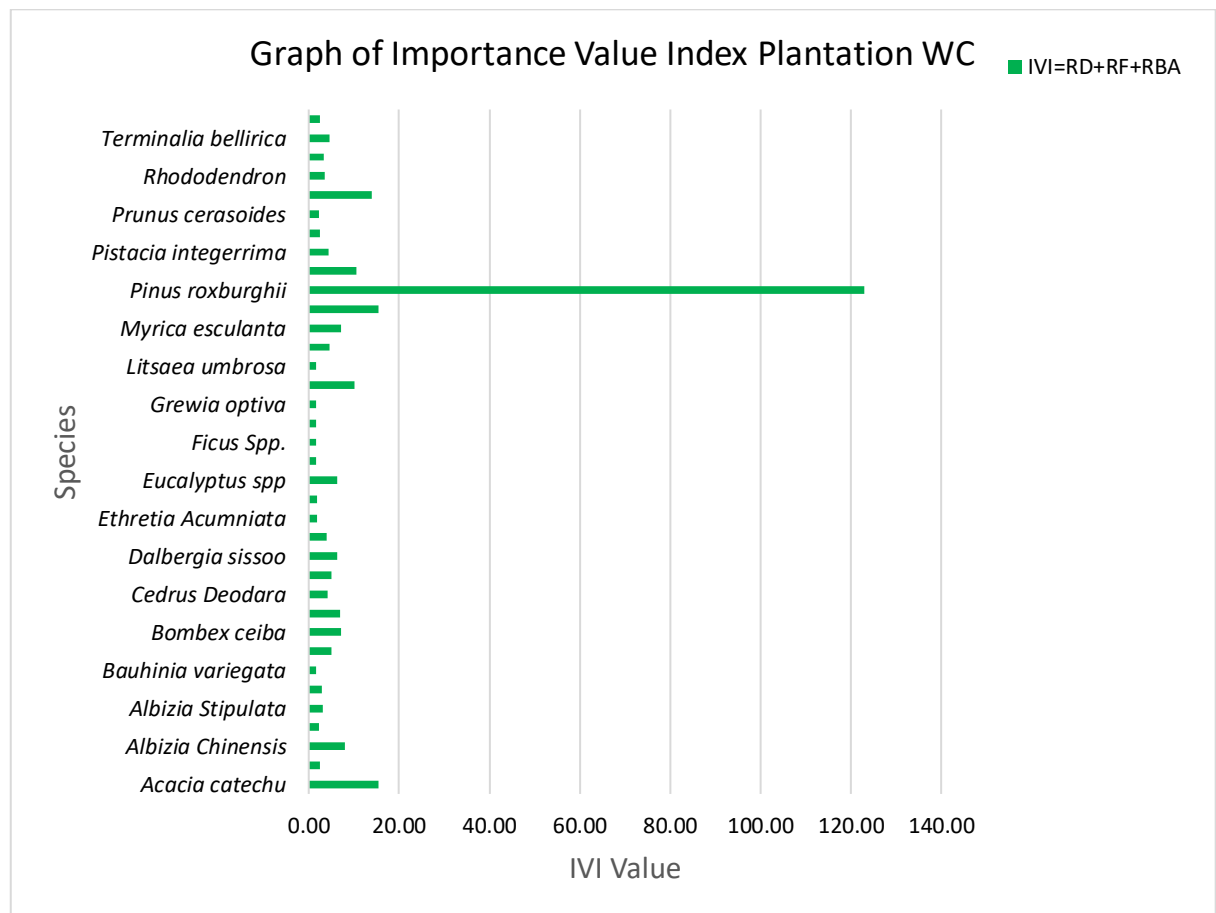


Fig 3.2 Graph representing Importance Value Index of Plantation WC

Table 3.5 Ecological parameters of Trees of Protection Working Circle

Protection Working Circle	<i>Abies pindrow</i>	5.41	0.92	7.51	13.84
	<i>Acacia catechu</i>	1.80	1.83	0.15	3.79
	<i>Acer oblongum</i>	5.41	0.92	0.30	6.62
	<i>Albizia Stipulata</i>	0.60	0.92	0.04	1.56
	<i>Anogeissus latifolia</i>	0.60	0.92	0.23	1.74
	<i>Areia indica</i>	0.60	0.92	0.04	1.56
	<i>Bahunia Vehlil</i>	3.01	1.83	1.75	6.59
	<i>Bauhinia variegata</i>	6.01	3.67	1.22	10.90
	<i>BL</i>	2.70	3.67	1.57	7.94
	<i>Bombex ceiba</i>	0.60	0.92	0.06	1.58
	<i>Cassia fistula</i>	1.80	1.83	0.73	4.37
	<i>Cedrus Deodara</i>	2.10	5.50	1.91	9.51
	<i>Celtis australis</i>	1.20	1.83	0.05	3.09
	<i>Dalbergia latifolia</i>	9.62	0.92	0.55	11.08
	<i>Emblica Officinalis</i>	5.41	1.83	0.71	7.95
	<i>Erythrina subarosa</i>	0.90	1.83	0.71	3.44
	<i>Ficus roxburgie</i>	0.60	0.92	0.04	1.56
	<i>Flacourtia Sapida Roxb</i>	0.60	0.92	0.09	1.61
	<i>Grewia optiva</i>	1.20	1.83	0.16	3.20
	<i>Lannea grandis</i>	2.40	2.75	1.20	6.35
	<i>Mallotus philippensis</i>	1.40	8.26	1.03	10.69
	<i>Myrica esculanta</i>	0.60	0.92	0.08	1.60
	<i>Phoenix sylvestris</i>	1.20	0.92	0.92	3.04
	<i>Picea smithiana</i>	1.20	1.83	0.22	3.26
	<i>Pinus roxburghii</i>	17.24	14.68	40.95	72.87
	<i>Pinus wallichiana</i>	3.91	3.67	2.62	10.20
	<i>Pistacia integerrima</i>	1.60	2.75	0.50	4.86
	<i>Prunus cerasoides</i>	1.50	1.83	0.23	3.57
	<i>Punica grantum</i>	1.80	0.92	0.02	2.74
	<i>Pyrus pashia</i>	0.72	4.59	0.34	5.65
	<i>Quercus leucotrichophora</i>	12.16	11.93	29.67	53.76
	<i>Rhododendron</i>	1.65	7.34	2.92	11.91
	<i>Taxus baccata</i>	0.60	0.92	1.10	2.61
	<i>Toona Ciliata</i>	0.60	0.92	0.20	1.72
	<i>tuna ciliata</i>	0.60	0.92	0.08	1.60
	<i>Xylosma longifolium</i>	0.60	0.92	0.10	1.62
Protection Working Circle Total		100.00	100.00	100.00	300.00

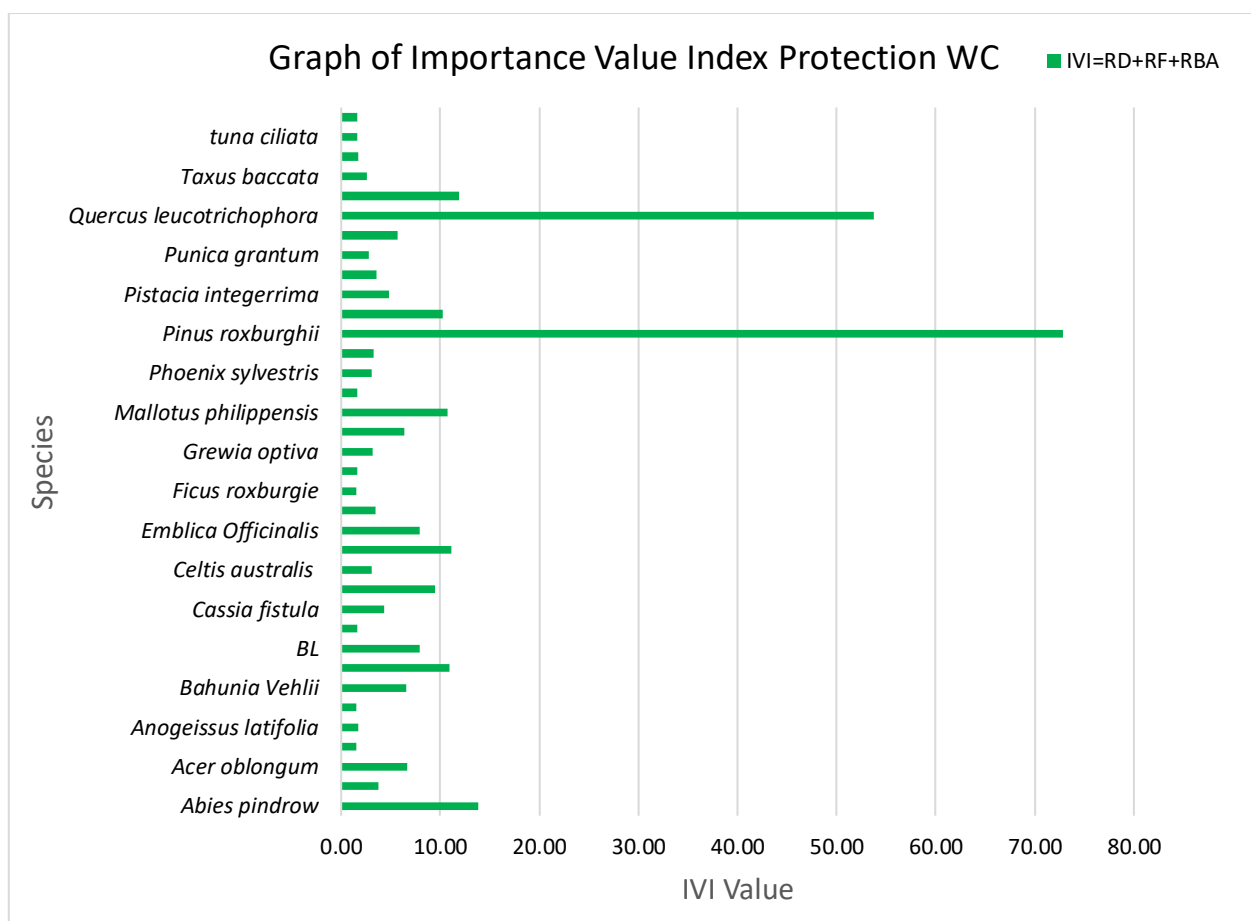


Fig 3.3 Graph representing Importance Value Index of Protection WC

Table 3.6 Ecological parameters of Trees of Regular Working Circle

Regular Working Circle	<i>Abies pindrow</i>	2.57	12.50	1.71	16.78
	<i>Acer oblongum</i>	31.75	3.13	0.27	35.15
	<i>Cedrus Deodara</i>	20.24	37.50	67.00	124.74
	<i>Myrica esculanta</i>	0.86	3.13	0.10	4.08
	<i>Pinus roxburghii</i>	28.61	9.38	5.02	43.00
	<i>Pinus wallichiana</i>	5.88	21.88	18.42	46.18
	<i>Quercus leucotrichophora</i>	10.08	12.50	7.49	30.08
Regular Working Circle Total		100.0	100.00	100.00	300.00

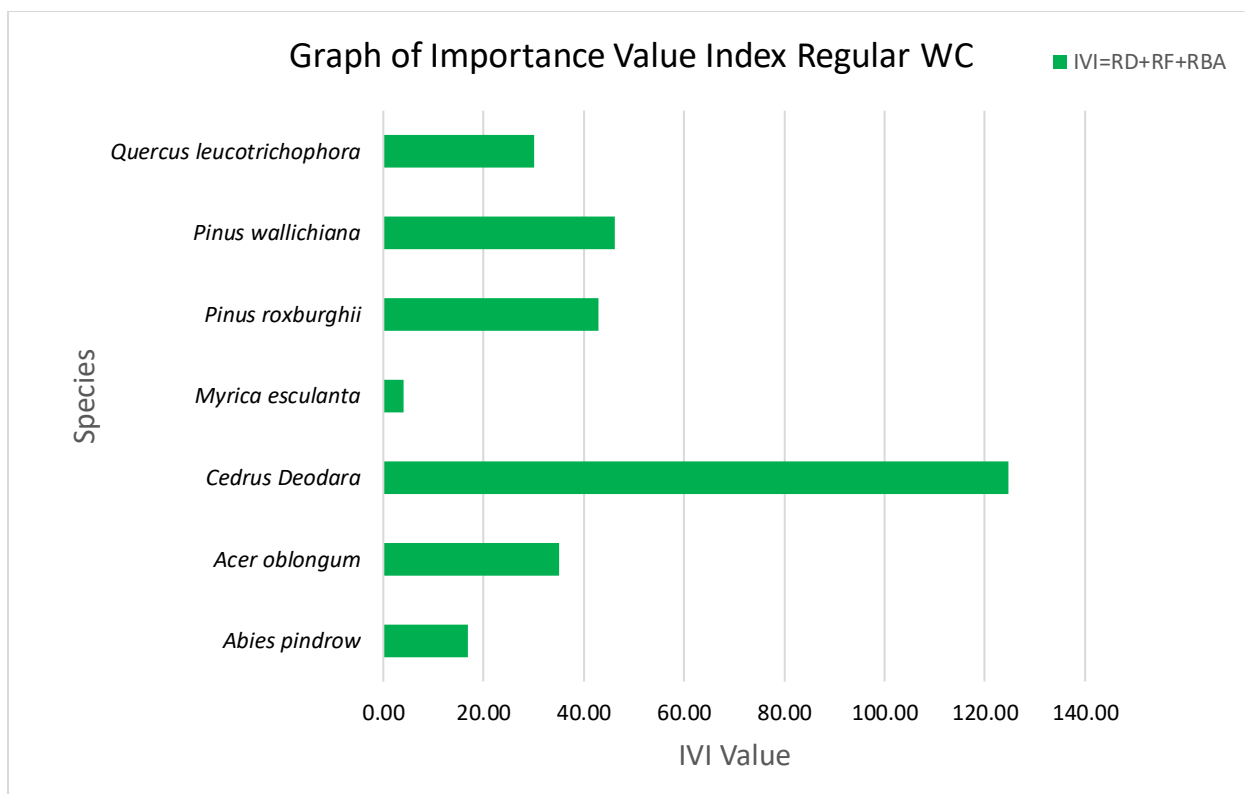


Fig 3.4 Graph representing Importance Value Index of Regular WC

The results show that in Chil WC the frequency of Chil species is 53.85 % which is maximum followed by Deodar species (10.26%) , Ban (7.69%) and Miscellaneous B/L (28.2%). Chil has maximum density of 49.13 stems/100m² followed by Deodar (15.40), Kail (8.96), Ban (6.35) BL species (20.16). The IVI of Chil is 190.32 followed by Deodar(34.29), Kail (15.58), Ban (15.09) and BL species (44.72)

In Plantation WC the frequency of chil species is 31.31% which is maximum followed by other B/L species (64.65%) and conifer spp (4.04). Khair has maximum density of 13.73stems/100m² followed by Kainth (13.14), Chil (11.94). The IVI of Chil is 122.93) followed by Khair (15.43), Kainth (15.37), Ban (13.50) BL species (117.91) and conifers (14.86).

In PCR WC the frequency of chil is 17.24 % which is maximum followed by Ban (12.14), B/L species (57.4) and Conifers species (13.22) each), Chil has maximum density of 17.24 stems/100m² followed by Ban (12.16). The IVI of Chil is 72.87 followed by Ban (53.76), BL species (133.95) and Conifers (39.42).

In Regular WC, Deodar Acer oblongum has maxium frequency of 37.50% followed by Kail (31.88), Ban (12.50) Abies pindrow (12.50). Acer oblongum has maxium density of

31.75/ stems /100 m², Chil (28.61), Deodar(20.24)/ Ban (10.08) and IVI value of Deodar is 124.74 followed by Kail 46.12 and Chil 43.0

Table 3.7 Ecological parameters of Shrub species

Importance Value Index Shrubs				
Species	Relative Density	Relative Frequency	Relative Cover	IVI=RD+RF+RCo
<i>Acer oblongum</i>	0.26	0.31	1.69	2.25
<i>Adathoda bellerica</i>	0.26	0.31	1.69	2.25
<i>Adhafacla justica</i>	0.26	0.31	1.69	2.25
<i>Adhatoda vasica</i>	1.29	1.55	1.69	4.52
<i>Agave americana</i>	0.26	0.31	1.69	2.25
<i>Apanarja aspeera</i>	0.51	0.62	1.69	2.82
<i>Artemisia absinthium</i>	1.29	1.55	1.69	4.52
<i>asparagus officinalis</i>	0.77	0.93	1.69	3.39
<i>Bauhinia vahlii</i>	0.51	0.31	3.37	4.20
<i>Berberis aristata</i>	19.79	17.34	2.32	39.45
<i>Boehmeria virgata</i>	0.26	0.31	1.69	2.25
<i>Boehmeria nivea</i>	0.26	0.31	1.69	2.25
<i>Boehmeria platyphylla</i>	0.51	0.31	3.37	4.20
<i>Carissa Opaca</i>	8.48	9.60	1.80	19.88
<i>Certrum nocturmum</i>	0.26	0.31	1.69	2.25
<i>Chroisopogon fulbus</i>	1.54	1.86	1.69	5.09
<i>Cocculus laurifolius</i>	0.51	0.62	1.69	2.82
<i>Colebrookea oppositifolia</i>	2.83	3.41	1.69	7.92
<i>Conoclinium coelestinum</i>	0.26	0.31	1.69	2.25
<i>Cotoneaster microphyllus</i>	2.06	2.48	1.69	6.22
<i>Cynodon dactylon</i>	0.26	0.31	1.69	2.25
<i>Dalbergia Saxatilis</i>	1.54	1.55	2.02	5.11
<i>Dendrocinide moroides</i>	0.26	0.31	1.69	2.25

<i>Dhapnae dhapnoid</i>	0.77	0.93	1.69	3.39
<i>Dodonaea viscosa</i>	1.03	0.93	2.25	4.21
<i>Elaeagnus umbellata</i>	0.26	0.31	1.69	2.25
<i>Epatorium adenophorum</i>	0.77	0.62	2.53	3.92
<i>Giradiana heterophylla</i>	0.26	0.31	1.69	2.25
<i>Hyptis suaveolens</i>	0.26	0.31	1.69	2.25
<i>Indigofera pulcella</i>	0.26	0.31	1.69	2.25
<i>Justicia adhatoda</i>	1.54	1.86	1.69	5.09
<i>Lantana camara</i>	5.14	5.57	1.87	12.59
<i>Lawsonia inermis</i>	0.51	0.62	1.69	2.82
<i>Mallotus philippensis</i>	3.08	3.72	1.69	8.49
<i>monosperma</i>	0.26	0.31	1.69	2.25
<i>Murraya Koenigii</i>	12.08	12.69	1.93	26.71
<i>Ocimum gratissimum</i>	0.26	0.31	1.69	2.25
<i>Phoenix spp</i>	0.51	0.62	1.69	2.82
<i>Piper longum</i>	0.51	0.62	1.69	2.82
<i>Polypodiopsida</i>	1.29	0.93	2.81	5.03
<i>Prinsepia utilis</i>	3.86	3.72	2.11	9.68
<i>Pyrus peshia</i>	0.51	0.62	1.69	2.82
<i>Rosa Acicularis</i>	1.29	1.55	1.69	4.52
<i>Rosa moschata</i>	0.77	0.93	1.69	3.39
<i>Rosa spp</i>	0.26	0.31	1.69	2.25
<i>Rubus elliptics</i>	9.77	7.43	2.67	19.87
<i>Rubus Rotundifolius</i>	0.51	0.62	1.69	2.82
<i>Rumex hastatur</i>	0.26	0.31	1.69	2.25
<i>Sarcococca Saligna</i>	5.14	3.72	2.81	11.67
<i>Solenum verginatum</i>	0.26	0.31	1.69	2.25
<i>urtica dioica</i>	0.51	0.62	1.69	2.82
<i>vitex Negundo</i>	1.03	1.24	1.69	3.95
<i>Zanthoxylum alatum</i>	2.83	2.48	2.32	7.62
Grand Total	100	100	100	300

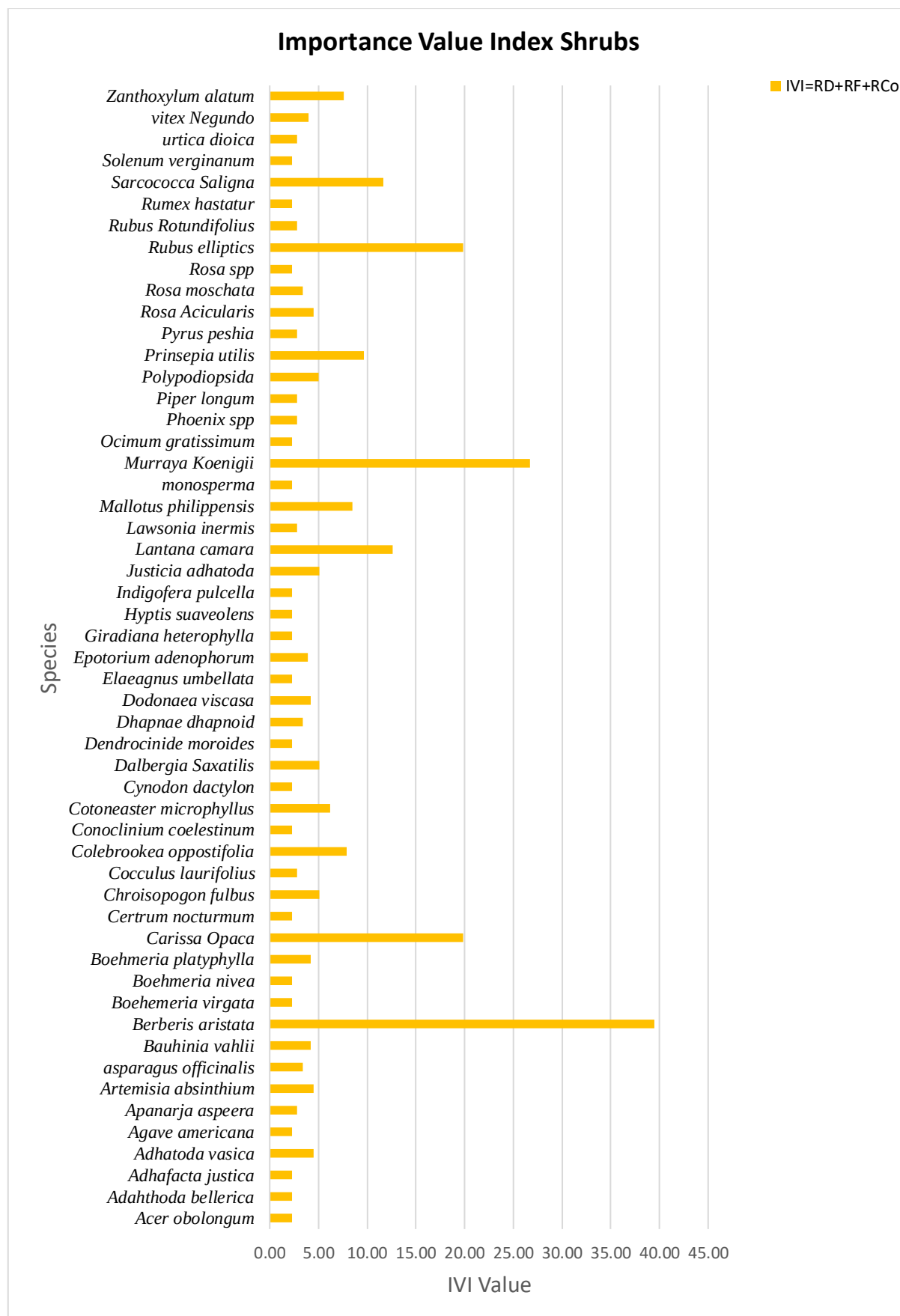


Fig 3.5 Graph representing Importance Value Index of Shrubs species

Table 3.8 Ecological parameters of Herb species

Importance Value Index Herbs				
Species	Relative Density	Relative Frequency	Relative Cover	IVI=RD+RF+RCo
<i>Achyranthes Japonica</i>	10.54	12.92	10.54	34.00
<i>Acorus calamus</i>	0.64	0.42	0.64	1.69
<i>Adiantum Spp</i>	4.79	4.17	4.79	13.75
<i>Adiantumlulatum</i>	0.32	0.42	0.32	1.06
<i>Ageratum conyzoides</i>	2.24	2.92	2.24	7.39
<i>Agrostis Curtissi</i>	20.77	9.17	20.77	50.70
<i>Ajuga Bracteosa</i>	2.56	3.33	2.56	8.45
<i>Asparagus racemosus</i>	0.96	1.25	0.96	3.17
<i>Avena aspera</i>	2.24	1.67	2.24	6.14
<i>Biden pilosa</i>	0.64	0.83	0.64	2.11
<i>Bidens bipinnata</i>	1.60	2.08	1.60	5.28
<i>Canarium strictum</i>	1.92	2.50	1.92	6.33
<i>Chrysopogon fulbus</i>	0.64	0.83	0.64	2.11
<i>Cocculushirsutus</i>	0.32	0.42	0.32	1.06
<i>Conoclinium coelestinum</i>	4.15	4.58	4.15	12.89
<i>Curcuma anpustifolia</i>	0.32	0.42	0.32	1.06
<i>Curcuma aromatica</i>	0.64	0.83	0.64	2.11
<i>Cymbopogen martini</i>	1.60	2.08	1.60	5.28
<i>Cynodon dactylon</i>	1.60	2.08	1.60	5.28
<i>Dhapnae dhapnoid</i>	0.96	0.83	0.96	2.75
<i>Eupatorium glandulosum</i>	0.32	0.42	0.32	1.06
<i>Euphorbia Hirta</i>	0.64	0.83	0.64	2.11
<i>Fragaria vesca</i>	0.32	0.42	0.32	1.06
<i>Grevia Optiva</i>	0.32	0.42	0.32	1.06
<i>Heteropogon conterlus</i>	0.96	1.25	0.96	3.17
<i>Hyptis Suaveolems</i>	0.32	0.42	0.32	1.06
<i>Jurnea macrocephala</i>	0.64	0.42	0.64	1.69
<i>justicia adhotoda</i>	0.64	0.83	0.64	2.11
<i>Lepidagathis Cuspidata</i>	1.60	2.08	1.60	5.28
<i>Lespedeza</i>	0.32	0.42	0.32	1.06

<i>procumbens</i>				
<i>Mallotus philippinensis</i>	1.28	1.67	1.28	4.22
<i>megathyrsus</i>	0.64	0.83	0.64	2.11
<i>murraya koenigii</i>	2.24	2.92	2.24	7.39
<i>Oplismenus hirtellus</i>	1.60	2.08	1.60	5.28
<i>Parthenium hysterophorus</i>	0.96	0.83	0.96	2.75
<i>pneumatopteris pennigera</i>	0.64	0.83	0.64	2.11
<i>Polypodiopsida</i>	6.39	4.58	6.39	17.36
<i>Reinwaradia indica</i>	0.32	0.42	0.32	1.06
<i>Rubus elliptics</i>	0.32	0.42	0.32	1.06
<i>Rubus paniculatum</i>	1.28	1.67	1.28	4.22
<i>Rumex dentatus</i>	0.64	0.83	0.64	2.11
<i>Saccharum spontaneum</i>	0.32	0.42	0.32	1.06
<i>Sarcococca saligna</i>	0.32	0.42	0.32	1.06
<i>Smilax aspera</i>	0.32	0.42	0.32	1.06
<i>Solanum Virginianum</i>	0.64	0.83	0.64	2.11
<i>Stenotaphrum secundatum</i>	1.28	1.67	1.28	4.22
<i>Synodon dactylon</i>	4.15	5.42	4.15	13.72
<i>Tagetes glendulifera</i>	0.32	0.42	0.32	1.06
<i>Tagetes minuta</i>	0.32	0.42	0.32	1.06
<i>Tagetes Glendulifera</i>	0.32	0.42	0.32	1.06
<i>Thalictrum foliolosum</i>	0.32	0.42	0.32	1.06
<i>Thymus vulgaris</i>	0.32	0.42	0.32	1.06
<i>Tridax procumbens</i>	0.32	0.42	0.32	1.06
<i>Urtica dioica</i>	0.32	0.42	0.32	1.06
<i>Velerina wallichii</i>	1.92	1.67	1.92	5.50
<i>Viola odoratum</i>	3.83	5.00	3.83	12.67
<i>Viola serpens</i>	3.19	2.92	3.19	9.31
Grand Total	100	100	100	300

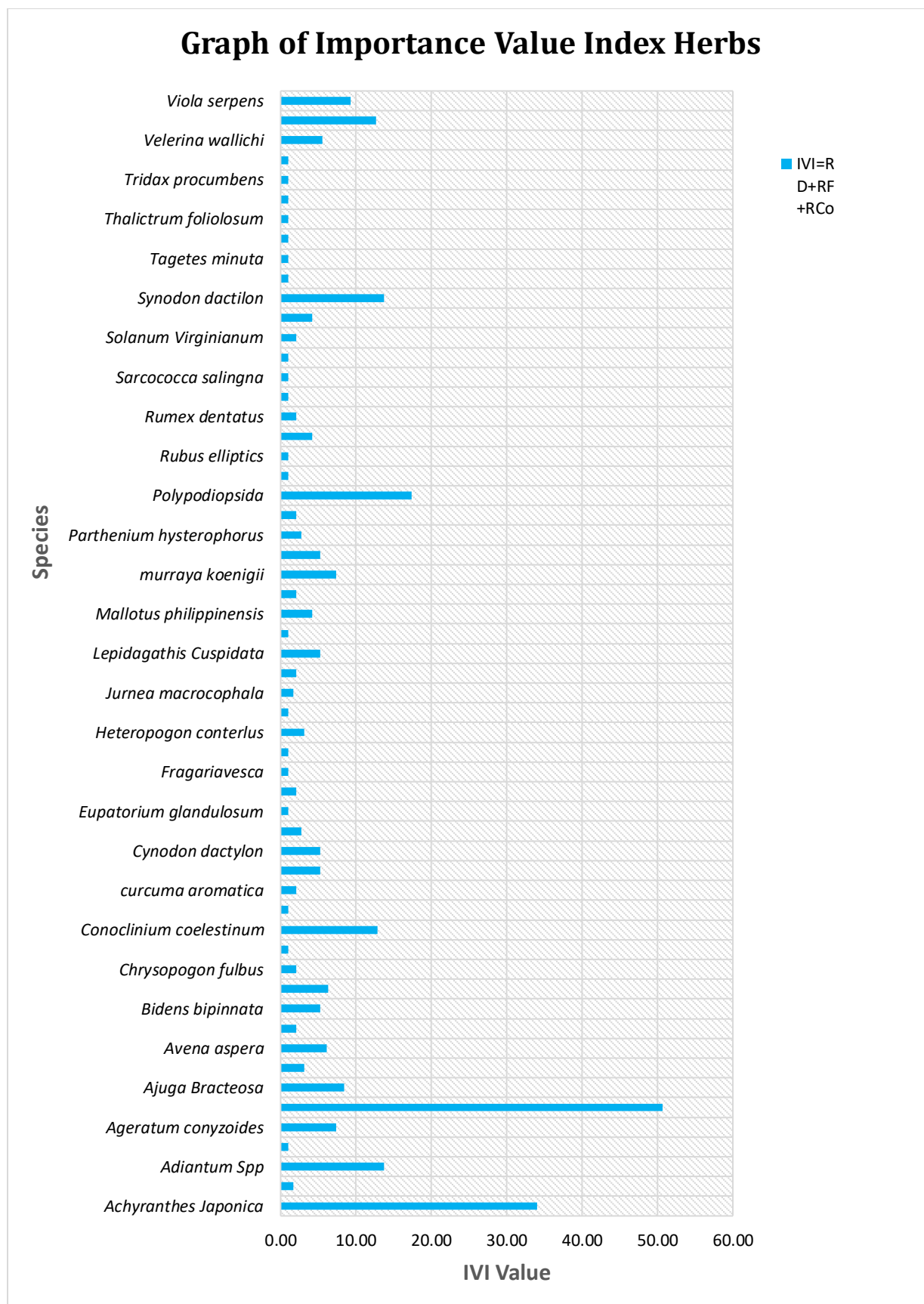


Fig 3.6 Graph representing Importance Value Index of Herbs species

The data collected during enumerations such as number of individuals of each species and dbh of each tree to derive secondary attributes like basal area (BA, m²/ha), density (D, trees per ha) and frequency (F, number of quadrants where trees are present in relation to total plots observed). Relative value of BA, D and F were then calculated. The important value index (IVI) was calculated by adding up relative dominance (RBAF), relative density (RD) and relative frequency

Species diversity is an expression of community structure. The number of species in a community is referred to as species richness. The relative abundance of all species is called evenness. A community demonstrates a high species diversity if many equally or nearly equally abundant species are present. Communities with a large number of species that are evenly distributed are the most diverse. Species diversity indices like Shannon-Wiener index are calculated separately for tree, shrubs and herbs.

Endemic, rare and threatened species: Species recorded were screened for their uniqueness with references in the literature. No species under Red Data Book was recorded. All the species recorded were abundant in nature. However species like *Delphinium danudatum* and *Peristylus constrictus* were found to occur rarely. In a study conducted by Indian Institute of Remote Sensing, the rare plants encountered were: *Cynoglossum wallichii*, *C. glochidiatum*, *Dicliptera roxburghiana*, *Galium asparine*, *Kydia calycina*, *Rubus ellipticus* and *Selaginella subdiaphana*.

Medicinal Plants: Some of the important medicinal plants, encountered are *Adhatoda vesica*, *Aegle marmelos*, *Azadirachta indica*, *Bacopa monnieri*, *Cordia dichotoma*, *Terminalia chebula*, *Terminalia bellirica*, *Moringa oleifera*, *Emblica officinalis*, *Acacia catechu* and *Tinospora cordifolia*.

Economically Important Species: There are many species that are considered important for food, fuel, fodder, fiber, timber, medicinal value, oil, gums and others. On these parameters many economically important species present in these forests are: *Acacia catechu*, *Dendrocalamus strictus*, *Moringa oleifera*, *Holoptelia integrifolia*, *Aegle marmelos*, *Emblica officinalis*, *Achryranthes aspera*, *Adhatoda vesica*, *Ageratum conyzoides*, *Azadirachta indica* and *Cannabis sativa*.

3.3 Status of biodiversity Conservation in Forests: The state has prepared the strategy and action plan for conservation of biodiversity. The strategies include augmentation of forest resources by making efforts to restore original ecosystem, promotion of indigenous

tree species, declaring climax communities as closed forest areas, improving canopy density in the existing forests, promotion of natural regeneration, growing of medicinal plants through inter departmental consultations and introduction of dwindling species. The strategic action plan also lays emphasis on involvement of local communities, especially women, in protection of forests making them important components of forest management, also linking forestry with livelihood issues and conducting economic evaluation of biological resources conserved by communities.

Injuries To Which The Crop Is Liable: The forest are subjected to injuries inflicted by several agencies. They include grazing, lopping, illicit, felling, soil erosion, fires, climbers, parasites, draughts, frost, storms, wild animals, insect pests and fungi etc. In the present day set up, the ill effects of grazing, lopping, illicit felling, fires. Soil erosion etc. has increased alarmingly. They are posing increasingly high danger to the very existence of the forests. Special watch and preventive methods are required to counter the occurrence of these injuries. The effects of these injuries are described below.

Grazing: - This is perhaps the most dangerous cause of depletion of forest wealth. The problem has increased many fold in the last couple of decades. Although there are rules and regulations stipulating freezing the numbers of animals that is to be allowed to graze in a particular area, but practically. It is very difficult to control the menace. All the forests dealt in this plan are either demarcated forests or undemarcated forests grazing restrictions are in vogue in them. But in reality, unabated, grazing is going on unchecked and uncontrolled. This has adversely affected the regeneration of forests, both natural and artificial. Young regeneration is often grazed, browsed and ultimately destroyed. The grazers include Gujjars, Gaddies and local inhabitants. The Gujjars and Gaddies are issued grazing permits in their respective permitted areas. This needs to be checked at any cost. The staff needs to remain vigilant. They should have a dialogue with the local people. Chronic offenders should be booked under the law. There is need to notify and strengthen the existing cattle ponds.

Lopping: - Lopping of miscellaneous trees is allowed with some restrictions. These restrictions are:

- I Top 1/3rd crown of a tree will be left intact.
- II No branch over 3cm in dia will be cut out in lopping

III Heavy cutting instruments, like axe will not be allowed used.

IV No trees below 20 cm d.b.h shall be lopped.

However these restrictions are not been followed in practice. Trees are badly lopped for fodder, sometimes leading shoot is also lopped. This leads to several ill effects. Fungus attacks and stuntedness are a few consequences of this. Restrictions number (I) listed above is seldom followed. This leads to a stunted, malformed and unhealthy crop. This practice must be checked by the field staff.

Illicit Felling: - Unauthorized felling by local people for private use as well for commercial use, have increased manifold. In the last decade with the increasing demand of timber and khair wood and availability of market thereof in adjoining areas, illicit felling and smuggling of timber/khair wood is not in prevent. They have become instance of organized illicit felling and smuggling; the field staff will have to be extremely cautious and vigilant to check this menace.

Soil Erosion: - The geological formation of the Shiwaliks is loose, unstable and prone to soil erosion. With the loss of vegetation cover, soil erosion has assumed dangerous proportions. The denuded Shiwalik hill sides, with sub soil exposed, is an example of destruction and loos of top soil. Significant soil erosion has been observed along the four-lane near Sundernagar town, posing a potential threat to the stability of the road and surrounding environment. The silt and boulders carried by the hill torrents not only scour the bed and deepen it, but also cut, and widen the banks. The debris often spread in the adjoining agriculture fields with the loss of top soil, nutrient availability of the plant decreases, which further results in degradation. Suitable Soil conservation and management plans are a must in the region. The catchments of satluj and Beas have already been surveyed to determine the intensity of soil erosion Using the already available data, works should be initiated to stabiles the already eroded areas.

Fires: - With the onset of summers, fires are quite common in the region. They are accidental as well as deliberate, As the fires occur, burning of areas lead to a clean flush of grass. This fact motivates local inhabitants to put an area on fires. However, in most of the cases, results are extremely dangerous. There is a tremendous loss to both flora and fauna. The following table shows the areas burnt.

Table 3.9 Area affected by forest fires (last 10 years)

Sr. No.	Year	Total no. of case	Total area brunt	Percentage of total area brunt
1	2022-23	117	537.55	1.25
2	2021-22	59	342.83	0.8
3	2020-21	107	390.76	0.91
4	2019-20	91	351.77	0.82
5	2018-19	154	975.95	2.27
6	2017-18	52	220	0.51
7	2016-17	80	400.5	0.93
8	2015-16	25	71.8	0.17
9	2014-15	53	124.6	0.29
10	2013-14	12	25.5	0.06

Climbers: - The common climbers found in this tract include Malijhan (*Bahinia vahlii*), Gauj (*Millettia auriculata*), vallaris heynei, Pueraria tuberosa, Paribel (*Vitis latifolia*) and Roel (*Combretum decandrum*). It is sad to note that no climber cutting is done in the forests, as a part of silvicultural operation. With the result, the climbers coil around the trunk or fasten the crowns of trees which lead to strangulation, bending, forking and stuntedness in the crop. Regular climber cutting should be done to keep the forest healthy.

Parasites: - Parasites feed on the sap of the host, weaken the tree prevents its growth and development and gradually cause its death.

Drought:- May and June are extremely hot in the region . These conditions however, do not seriously effect the standing crop, but they certainly cause damage to the regeneration (specially planted sapling/seedlings). If the drought period prolongs, further damage results. The effect is more pronounced on the ridges and spurs.

Frost: Severe frost is not common in this tract. However mild frost do occur every winter Young crop is damaged to great a extent by frost as it is frost tender.

Storms: - Mild storms occur in the tract during March, April and September and October, They cause severing of the crowns and branches of trees. However, sometimes chill and few other spp. are also uprooted by such storms, Generally storms of severe nature are very rare in the area.

Wild Animals: - The damage caused by the wild animals is very rare. Wild boars, porcupines and monkeys do cause some damage to the crop, specially the young crop and regeneration by nibbling and digging.

Insect Pests: - (I) The forests around Sundernagar are home to a diverse range of insect species, contributing significantly to the region's ecological balance. Notable among these are the Indian Swallowtail butterfly (*Papilio polytes*), the Rhinoceros beetle (*Oryctes rhinoceros*), and the Red Weaver ant (*Oecophylla smaragdina*). These insects play crucial roles in pollination, decomposition, and soil aeration. The presence of these species indicates a healthy ecosystem, but it also requires careful monitoring to ensure that any population imbalances do not disrupt the natural habitat.

(II) Occasionally swarms of locusts may reach these localities and attack the foliage of the trees and cause considerable damage.

(III) Ordinarily a sporadic attack of geometrid leaf defoliator- *Ascotis selenaris* takes place every year. This affects the growth of individual trees but there is never a large-scale damage.

(IV) Leaf hoppers and scale insects (*Monophlebus stebbingii*) also attack the young shoots of sal and other species during March and April and retard their growth. During the attacks of the scale insect, the foliage gets covered with a shining sticky substance exuded by the insect.

(V) Termites are the greatest enemies of the vegetation. These attack the young plants in the plantation during post-monsoon days in September and also during spring when the moisture regime is favorable for their spread. They also attack the dead bark of the trees and at times penetrate to the live bark and thus retard the growth of the trees. The termites damage the coppiced stumps also.

The Fungi: -

Khair is lopped heavily for fodder, throughout the tract, Heavy lopping makes the trees susceptible to attack by a heart rot fungi, it is very difficult to find a sound Khair tree. As almost all the khair trees are invariably affected by this heart rot.

Fauna

General:- The Siwaliks and the sub Himalyan hill zone with the streams and river forming this tract are ideally suitable for a variety of wild birds, wild animals and fishes, Wild life was in great abundance when the human populations was not such a multitude in the area, with the increase in population, their interference with the natural surroundings of wild birds, wild animal and fishers, wild life population receded to the more sheltered and protected woods and water. Even in such places the poachers have killed a substantial number of wild birds and wild animals.

The value and importance of wild life from scientific aesthetic, economic and recreational stand points is immense and is recognized all over the world. All forms of wild life including some vermin's play a very important role in keeping a balance of wild life populations. Ecological and biological research has proved the usefulness and importance of nature balance of mankind.

The beauty of wild animals and birds fascinates the bird watchers sport enthusiasts photographers animals and bird ecologists and biologists and tourists from with in and outside the country. Eco tourism earn substantial revenue for the state. Besides the revenue to the state exchequer, people of the area are benefitted in many ways by the tourists e.g. hoteliers transporters etc.

The animals and birds found in this area are described briefly as follows.

Animals

Though with the increased human activity in the forests more particularly the poaching, the populations of animals is very much reduced nevertheless, a few are seen in sheltered places, Main species of animals are briefly described in the following sub paras,

Sambar (Cervus unicolour):- This largest deer also occasionally met with in the sal forest of this division. It is possible to spot this animals in the Simbalbara sanctuary area though the stage are located outside also. This deer has more nocturnal habit and it retreats into heavy first cover at dawn. It feeds on grass. Leaves and wild fruits. Its coat is coarse and brown in colour with yellowish tings. Its height at shoulder may be upto 140 cms and may weigh upto 300 kg. It is capable of moving very silently in even the dense forest. Paring takes place in winter months.

Kakar Muntjac or Barking deer (*Muntiacus muntjak*):- This is a small deer mostly found in thickly wooded areas and coming out for grazing in open grassy blanks. It feeds on grass, leaves and wild fruits. When heard from a distance its call sounds like a bark of dog. The unbranched antlers are small and measure 5 to 8 cms. The coat is bright chestnut which darkens in the aged animals. Its height at shoulder is 50 to 75 cms and a full grown animals may weight about 29 kg. It is believed to breed all the year. In this area it is found in all the wooded and grassy areas.

Goral (*Nemorhaedus goral*):- This goat antelope is found on rugged grassy and rocky hill sides covered with tree growth, in all the range of this division. It has goat like build teeth short, cylindrical horns and a short tail. Usually it is blackish grey in color. On rocky mountainous area this animal may be seen in mornings and evenings. It is about 60 to 70 cms at the shoulders and weighs from 25 to 30 kgs. The ringed or ridged horns which curve slightly backwards are 10-12 cms long.

Jungli Suar or wild boar (*Sus scrofa*):- This notorious and omnivorous wild animal lives in grassy, bushey and also thickly wooded areas. It feeds on field crops, wild roots and tubers, and even insects and snakes. It usually feeds during mornings and evenings. It is black in colour, the skin is covered by a sparce growth of bristles which from a conspicuous man, wild boar is a prolific animal and gives at least two litters, one in the begings of rains and the second after the rains. A well grown male is about 80 to 90 cms at the shoulder and may weigh up to 200 kgs.

Indian Porcupine (*Hytrix indicia*): - 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 burros dug by itself. The burrows consists of a entrance gallery and a few bolt holes or emergency exists. The burrows or galleries some times 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 croops and gardens when adequate food is not available in the forests. The young ones are borne usually in springs.

The Indian Hare (*Lepus ruficaudams*):- This rufoustailed hare is found all over the area. It likes bushy forest growth and generally lives in the neighborhood of cultivations and villages. Early wheat and other crops in the field are badly nibbled wheat and other crops in the field are badly nibbled by this animals. 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 one to two number, in early winter months.

Leopard (*Panthera pardus*):- This animals lives in forest areas or even in open country among rocks. It can prey during the if it is unable to catch anything by night. It can prey on anything ranging from cattle, sheep, goat, pet, dogs, deer, monkeys and even rodents like porcupines. It is more dangerous to man and his cattle than tiger, It seizes its prey from a hiding or leaps on it from a tree on which it climbs easily. It has bright fulvous or buff coat with closely set resitters. Average total length varies from 215 cms to about 245 cms, the females are smaller than the males. While the full grown male may weigh from 50 to 68 kg the females weigh 40 to 50 kg. Panthers breed all the year round and probably one litter of 2 to 4 is given every year.

Kala Bhalu or Himalayan Black Bear (*Selenarctos thibetanus*):- Black bear is commonly found in upper areas of Jai devi range, Jhungi range and Behli block of Kangoo range. During the winters and even rains, black bear descends down resulting in it becoming a nuisance to the maize fields and fruits crop. This animal lives almost in solitary condition is nocturnal in habit and spends the day sleeping in a srock cave or hollow of a tree. It mostly feeds on wild fruits honey and been and honey insects etc. Fruits orchards and corn fields are frequently raided by it. It is a compact built, typical black in color with a “V” shaped white mark on its breast a typical character of this animals of less significance, squirrels and reptiles.

Birds

Jangle Murga—The Red Jungle Fowl (*Gallus gallus*):- Jangli Murga-The Red Jungle Fowl (*Gallus Gallius*) : This bird is believed to be the ancestor of all domestic breeds of fowl. It is found in pairs of parties in the sal forests and scrub jingles of this division. It is spotted on the fringes of cultivations and forests clearings in the morning and evening. It is a very shy and cunning bird. Scuttles into cover on slightest disturbance or suspicion. It roosts on thick crowned trees or bamboo clumps, feeds on grains, vegetable shoots, insects etc. Nesting season is generally from March to May. The hens are plain streaked brown with rufous brown under parts.

Teeter Black Partridge (*Francolinus Francolinus*):- A small bird, about half the size of a village hen, generally black and spotted with white. The hens are paler and

speckled black and speckled black and white. It is found on grassy blanks and cultivated land of sugarcane fields. On the mornings and evenings it feeds on grains, grass seeds, white ants and other insects. It is a swiftly running's bird relying upon its legs to ascape, lives singly or in pairs, Nesting season is April to July.

Bater-The common or Grey Quail (*Coturnix Coturnix*):- It is almost a tailless partridge like bird. It is burfish brown in color with pale reddish brown and black streaks. It is found in pairs or parties in grass lands and cultivations and hides very well in grass and bushes. It files straight for short distance. Their population swells during winter when they migrate from central and western Asia to this region. It feeds on grains grass seeds. Nesting season is from March to May. Rain quail (*Coturnix Coromandelica*) which migrate locally is also found in this region.

Lowe or Jungle bush quail (*perdicual asiatica*):- It is of the size of a rain with fulvous brown mottled black and buff feathers above and White below. In females the lower parts are pale-pinkish. It is found in open deciduous forests and dry scrub jungle area. It lives in cover of 5 to 20 which rest together and rise suddenly when almost trodden feeds on, grass seeds, tender shoots, and grains. Nesting season is well not defined, it ranges from August to April.

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 lives in a semi domesticated condition and favors old buildings and rock holes. It generally feeds on cereals, grass, pulses etc. Nesting season is not well defined.

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, Peacock (*Pavo Cristatus*) is also found in this area. Other birds or common occurance are house and jungle crows (*corvus spp.*) tree pies (*Dendrocitta spp.*) the jungle babbler (*Turdoides spp.*) the Bulbuls (*Chloropsis* and *Pycnonotus spp.*) the magpie-robin (*copsychus*) king crow (*Dicrurus spp.*) Golden oriole (*orialus spp.*), The common Myna (*Acridothers spp.*), the common Baya (*Ploceus spp.*), Red ruped swallow (*Hriundo spp.*) the wood pocker (*Dinopium*

spp), Parakeets (*Psittacula* spp.), common king fisher (*Althene* spp.), Vulchurs (*Gyps* spp.) Eagles (*Althene* spp.). etc. which are equally important from aesthetic, forest cleanliness and health, farming, bird watching and balance of nature points of views.

Fish

Fresh water fishes are found in and tributaries of Beas, Satluj. The species found in these waters are Mahasear (*Tor* spp.) Rohu (*Labeo* spp.) Lanchii (Fresh water shark *wallago* spp.) and rarely sometimes Goonch (*Bagarius* spp.) is also found.

CHAPTER 4

MAINTENANCE AND ENHANCEMENT OF FOREST HEALTH AND VITALITY

4.1 Status of Regeneration: Due to adverse effects of biotic interference, heavy grazing and non working of forests due to ban on felling, the natural regeneration in Protected forests of Suket Forest Division forests is absent and has not been relied upon. As a result, artificial plantations of Deodar, chil, Kail, Khair, Shisham, bamboos, and other Broad leaved species etc. have been tried with various degrees of success. In the scrub forests, the efforts to regenerate naturally by adopting closures, fencing areas, and adopting soil and water conservation measures have helped in securing scanty crop of trees of miscellaneous species, but due to poor site condition, the growth is not satisfactory. During reconnaissance natural regeneration of Chil. Deodar, Kail, shisham and Khair in the old plantations areas has been observed. The seedlings are one year old sheltered under the lantana growth. This regeneration of Chil has been observed to take place after the germination of seed due to scarification by forest fire which was widespread in the area. As the seedlings are frost-prone, careful opening after the winters and adoption will help to establish the seedlings. The conditions which favor regeneration of species can be enumerated as follows:

1. Removal of lantana weed which suppresses the young seedlings under its shade helps regeneration.
2. Control of grazing by strictly following closures in the areas.
3. Soil and water conservation measures in the area to control soil erosion and conserve moisture helps regeneration.

To supplement the natural regeneration abstract of plantations raised in the past in these forests is given in Table 4.1 below:

Table 4.1: Plantations done in the past working plan period

Year	Forest	No	Species	Beat	Area
2011-12	Jadron	ND12	Khair, Ambla	Jadron	3ha
	Baggi		Daru	Baggi	3ha
	Nalini		Deodar, Ban, Paza, Ritha	Nalini	5ha
	Sariun	ND40	Deodar, Thira, Ambla, kachnar, Bihul, ritha, daru, Tor	Sariun	5ha
	Jarol	ND28	Daru, chimu, kachnar, shisham	Jarol	5ha
	Govt .Land	-	Ambla, Khair	Ambi	2.5
	Govt .Land	-	Ambla	Thona	2
	Govt .Land		Ambla, Khair	Karnal	5
	Govt .Land		Ambla, Khair, Kachnar	Tikker	4
	Govt .Land	-	Ambla, Jamun, Drek, Khair, Ritha, Teak, Bel	Jhanjhail	2
	Govt .Land	-	Ambla, Jamun, Drek, Khair, Ritha, Teak, Harad, Bel	Dwardu	3
	DPF Shivshanakr	C-I	Deodar	Shivshanakar	3
	DPF Galukhar	C-II	Deodar, Paja	Galukhar	5
	DPF Khobla	C-I	Deodar	Khobla	3
	DPF Jodhnu	C-I	Daroo	Jodhnu	5
	DPF Kuftu	C-II	Daroo, Ban	Kuftu	5
	DPF Bunga	C-I	Ban	Bunga	3
	Nd-Bhater		Behra =160, Ambla =300, Jamun =90, Paza =50, Daru=500 Total =1100Nos.	Bhater	1Hac.
	UPF-Nawani		Amla=550, Khair =550,	Nawani	1Hac.
	ND- Suhagra	II	Amla=700, Khair =100, Daru =300total =1100nos	Suhagara	1Hac.
	ND- Bhambala		amla =240, khair =250, Bhera =130, Paja =250, daru =230 Total =1100nos.	Bhambla	1hac.
	Govt land Batail		amla=200, khair =50, Behra =50 jamun 47, daru =150, Ashok=30, willow=50 Total =550 nos.	Batail	0.50h ac.

	ND-Jakhar		amla=460, khair=400, chil=20, hard=20, behra=200, Jamun =100, Paja=600 Daroo 400 total =2200 nos.	Jakhar	2hac.
	govt land Jazzar		amla =1000, khair =600, behra =600, total =2200nos.	Jazzar	2hac.
	ND-Nala ra gehra		Khair =1100	Jawali	1hac.
	Nd-Dhaullkhan		amla=650, khair =600, Bhera =100, paja =100, Daroo=200 total =1650nos.	Dhaulkhan	1.50h ac.
	govt land Jazzar		amla=300, khair=700, behra =200 jamun=250, daroo=100, paja=100 total =1650nos.		1.50h ac.
	ND-141 Sangari	Whole	Paza= 5000 Nos Ambla= 500 Nos	Sangari	5
	ND-164 Sanaora	Whole	Paza= 1100 Nos Ambla= 900 Nos Chil= 1200 Nos Daru= 100 Nos	Naun	3
	Govt. land	-	Ban= 3000 Nos Ramban= 850 Nos	Panjrahan	3+0.5
	OD-161 Khabari	C-IV		Khabari	5.5
	Govt. land	-	Ambla= 4400 Nos	Chihund	4
	D.P.F Jartu	C1	Shisham, Dar lucenia, Dreka, Amla, a/tash	Jartu	25
	D.P.F Jartu	C2	Daru, Khair, Lucenia, Amla	Jartu	12
	D.P.F Thung Dhar	C1	Shisham Daru, Khair, Lucenia, Kachnar, Jatropa, Dreka, Amaltash	Thungdhar	10
	D.P.F Chouri-II	Whole	Deodar	Chouri	20
	D.P.f Mared	C-II	Shisham, Khair, Dreka	Mared	10
	D.P.f. Mared	C-I	Shisham Daroo, Khair, Lucenaia, Kachnar, Jatropa, Dreka Amaltashh	Mared	15
	D.P.F. Bindlu	C-I	Shisham, Daru, Khair.Kachnar, Jatropa, Dreka, Amaltash	Bindlu	12

	D.P.F Bindlu	C-II	Shisham, Daro, Lucenia, Drek Amaltash	Bindlu	9
	D.P.F Thung Dhar	C11	Shisham, Daru, Lucenia, Kachnar, Drek Amla, Amaltash	Thungdhar	15
	D.P.F Bragta	CII	Shisham, Daru, Khair, Drek, Amaltash	Bragta	4
	D.P.F Behli	Whole	Shisham	Behli	10
	D.P.F Chouri I	Whole	Daru, Khair, Lucenia, amaltash	Chouri	20
	ND297Challoun	Whole	Shisham, Daru, Drek Amaltash	Challoun	14
	D.P.F Shordu	Whole	Shisham Daru, lucenia, Amla	Shordu	10
	D.P.F Masog	Whole	Shisham, Daru, Amla	Masog	6
	D.P.F Jader	Whole	Daru, Kachnar	Jader	3
	D.P.F Guddidhar I	Whole	Shisham, Daru, Drek Amla	Guddidhar	5
	D.P.F. Batwara	Whole	Daru, Lucenia	Batwara	1
	D.P.F Koon	Whole	Derek Amla	Koon	5
	D.P.f Umri	CII	Shisham, Khair Lucenia	Umri	5
2012-13	Saruin	ND40	Ban, Paza, Daru	Saruin	5Ha
	Chila-Ra-Rida	ND29	Shisham, Jamun, Bheda	Chila-Ra-Rida	5Ha
	Baila-Balahr	ND29	Khair, Bheda, Paza, Kachnar, Jamun	Baila-Balahr	4Ha
	Patyoda	ND39	Daru, Ban, Theera	Patyoda	6Ha
	Bheacna	ND37	Harad, Shisham, Jamun, Ritha, Ban, Bel, Theera, Ambla	Baned	3Ha
	DPF Rajgarh	OD52	Ban, Bamboo, Jamun	Rajgarh (Gadjharh)	3Ha
	Talsai	ND15	Shisham, Shehtoot, Paza, Ritha, Kachnar, Ban, Theera	Talsai	3Ha
	Durgapur	C-II	Ban	Thathal	1
	Jamdwar	Whole	Ambla, Khair	Tor Gehru	4
	DPF Thathal	C-II	Ban	Thathal	2
	DPF Barnog	C-I	Ambla, Khair, Teak	Barnog	2

	DPF Bhangoh	C-II	Ambla, Khair, Teak	Bhangoh	3
	DPF Jhinjnoo	Whole	Ambla, Khair, Teak, Bamboo	Jhihjnoo	2
	DPF Tikker	Whole	Ambla, Khair, Bamboo	Kathogan	3
	Kaldoo	C-I	Deodar	Naina Devi, Sarkidhar	2.5
	DPF Chandrakari	C-I	Ambla, Khair, Teak	Bei Nala	4
	DPF Bhangoh	C-II	Willow	Bhangoh Nala	1
	DPF Chndrakari	C-III	Ambla	Mor Galu	1
	Govt. Land.	-	Arjun, Teak, Ambla	Gehri Bahadarpur	0.5
	Bhangoh	C-III	Kahir, Ambla, Teak	Panyali	3
	DPF Bhangoh	C-II	Bamboo	Ghandu Nala	2
	OD Chandrakari	C-III	Bamboo	Mor Galu	2
					27.5
	DPF Chiral		Broad Leave, Deodar	Chiral	5
	DPF Narsingh	C-II	Deodar	Narsingh	2
	DPF Bag		Daroo	DPF Bag	5
	OD 260 Khobla	C-II(a)	Deodar, Ban	OD 260 Khobla	5
	Narsingh	C-I	Deodar, Ban	Narsingh	3
	DPF Bhoon	C-II	Daroo	DPF Bhoon	5
	DPF Khoondhar	C-III	Daroo	DPF Khoondhar	5
	DPFKuftu	C-II	Ban	DPFKuftu	5
	DPFGalukhar	C-I	Deodar	Galukhar	2
	DPFShivshankar	C-II(a)	Rakhal	Shivshankar	5
	DPF Chhota Gadoun	C-II(a)	Deodar	DPF Chhota Gadoun	20
	DPF Galukhar	C-II	Deodar	DPF Galukhar	10
	DPF BadaGadown	C-II	Deodar	DPF BadaGadown	10
	DPF Rangjhol	C-I	Deodar	DPF Rangjhol	10
	DPF Kanas	C-III	Deodar	DPF Kanas	10
	DPF Reagi	C-I	Chulli, Deodar	DPF Reagi	10
	DPF Kamrah	C-II	Deodar, Ban	DPF Kamrah	10
	DPF Marehra	C-I	Deodar, Ban	DPF Marehra	10
	ND-Bairsain		amla=700, khair =600, Behra=200, Daroo=100 total 1600nos.	Bairsain	200ha c.
	OD-Dhualkhan		Amla=800, Khair=800, Daroo=600, Paja=200 total =2400nos.	Hadsar	3hac.

	Nd- jaboth		Bamboo=835nos.	Jaboth	2hac.
	UPF-Nawani		Amla=200, khair=100, Daroo=200, Jamun=200, Sagwan =500 total =1200nos.	Nawani	1.50h ac.
	ND-Bairkot	C-5	behra=110, Daroo=200, Paja=290, Chil=2200 total=2800nos.	Bairkot	3.50h ac.
	ND-Nala ra gehra		amla=1540, Khair=3960 Total =5500nos.	Jawali kothi	5hac.
	ND-Suhagara	C-II	Behra =610, Daroo=1650, Sagwan=140, Toal=3300nos.	Suhagara	3hac.
	UPF-Nawani		Amla=100, Khair=160, Daroo=40, jamun =150 Sagwan =100 toal =550nos.	Nawani	0.50H AC.
	ND-Patroun		Amla=100, Daroo=850, Paja=700, Toal=1650nos.	patroun	1.50h ac.
	OD-Goverta		Deodar=1450nos.	Goverta	5hac.
	OD 108 gadhyal	C-2	Ban= 5500 Nos	Gadyal	5
	Govt. Land	-	Ban= 2750 Nos	Suad	2.5
	OD-161 Khabari	C-V	Chil= 1900 Nos Ambla= 850 Nos	Siyasdhar	2.5
	ND-163 GarhParalla	Whole	Deodar= 4400 Nos Ambla= 1100 Nos	Garh	5
	Nd-169 Bakalag	Whole	Chil= 3300 Nos	Dobhu	3
	OD-134 Hafwana	Whole	Ban= 500 Nos Paza= 1200 Nos Ambla= 700 Nos	Hafwana	3
	OD-180 Kathyal	C-I	Deodar= 1600 Nos	Kathyal	2
	Nd-169 Bakalag	Whole	Chil= 2750 Nos	Dobhu	2.5
	OD-124 Kafla	Whole	Chil= 600 Nos Ambla= 500 Nos	Kafla	1
	ND-163 GarhParalla	Whole	Chil= 2500 Nos Ban= 3000 Nos	Garh	5
	D.P. F. Barota	Whole	Amla, Drek, Daru, Ball	Barota	2
	D.P.F Guddidhar III	Whole	Amia, Daru, Baheda, Khair,	Guddidhar	3
	D.P.F. Gehru OD301	C2a	Daru, Ban,	Galma	5

	D.P.F Deoli -390	Whole	Daru	Deoli-1	5
	D.P.F Deoli -291	C2	Deodar	Deoli-II	5
	D.P.F karangal	c1	Daru, Khair, Shisham	Karangal	5
	D.P.F Katohar	Whole	Shisham	Katohar	2
2013-14	DPF Saruin	ND40	Daru, Ambla, Lucinia, Paza, Kainth, Deodar	DPF Saruin	5Ha
	UF Swad		Deodar, Thira, Ambla, Ritha, Paza, Daru, Shisam, Kachnar	UF Swad	5Ha
	UF Chhajwargalu		Ambla, Kachnar, Paza, Ban, Jamun, Khair, Bani, Bamboo, Moringa, Siris	UF Chhajwargalu	5Ha
	DPF Rajgarh(Gadjharh)	OD52	Ban, Ritha, Daru, Bamboo	DPF Rajgarh(Gadjharh)	5Ha
	DPF Lotmakoda	ND69	Deodar	DPF Lotmakoda	3Ha
	DPF Khadidhar		Kachnar, Daru	DPF Khadidhar	5Ha
	DPF Ghangal	ND34	Khair, Jamun, Lucinia, Bamboo, kachnar, Tuni, Ritha, Thira	DPF ghangal	5Ha
	DPF Phagla	ND36	Siris, oie, Daru, Ambla, Paza, Kachnar, Shisam, Chir, Khair, Lucinia, Bamboo	DPF Phagla	10
	DPF Jarol	ND28	Thira, Shanan, Jamun, Chir, Kachnar, Lucinia, Ambla, Bel, Shisam, Ritha, Khair	DPF Jarol	10
	UF Teli		Deodar, Thira, Paza, Ambla, bamboo, Ban	UF Teli	5
	UPF Berry	Whole	Khair, Ambla	Beri	5
	Govt .Land	#REF!	Kachnar, Ban	Khudu ra pani	5
	Pingla	C-II	Khair Amla, Daru	Bairadhar	3
	DPF Jhumdhar	C-I	Kahir, Ambla .	Nahad	4
	Chandrakhari		Kahir, Ambla, Daru	Garh	6
	Bhangoh	C-I	Kahir, Ambla	Mera Bhangoh	3
	UPF Kathogan	Whole	Kahir, Ambla	Kathogan	2
	Govt .Land	-	Kahir, Ambla	Thona	3
	Govt .Land	-	Bamboo	Pingla	4

	Govt .Land	-	Bamboo	Garh	2
	Chandrakhari	C-I	Khair, Ambla, Daru	Bie nala	5
	DPF Gamdhoul	Whole	Khair, Ambla	Pauda mod	5
	DPF Thathal	C-I&CII	Khair	Mondle Thathal	5
	DPF Chhota Gadown	C-I	Ban	DPF Chhota Gadown	4
	DPF Chanad Bahan	C-II	Deodar	DPF Chanad Bahan	5
	DPF Marehra	C-III	Daroo	DPF Marehra	5
	DPF Kuftu	C-II	Deodar	DPF Kuftu	3
	DPF Kathla	C-I	Deodar	DPF Kathla	4
	DPF Bhoon	C-II	Deodar, Daroo	DPF Bhoon	4
	DPF khoondhar	C-III	Deodar	DPF khoondhar	4
	DPF Daint	C-I	Deodar	DPF Daint	20
	DPF Galukhar	C-II(b)	Deodar	DPF Galukhar	15
	DPF Narehli	C-I	Daroo, khair, Chulli	DPF Narehli	10
	DPF Jodhnu	C-I	Deodar, Ban	DPF Jodhnu	10
	DPF Bunga	C-I	Deodar, Daroo	DPF Bunga	20
	DPF Kuftu	C-II	Deodar	DPF Kuftu	15
	DPF Charog	C-I	Deodar	DPF Charog	10
	DPF Khobla	C-III	Deodar	DPF Khobla	20
	DPF Narsingh	C-I	Deodar	DPF Narsingh	10
	DPF Trechh	C-II(b)	Deodar	DPF Trechh	11
	DPF Jodnu	C-II	Deodar, Daroo, Paja	DPF Jodnu	15
	DPF Jodhnu	C-I	Deodar, Ban	DPF Jodhnu	5
	ND- Suhagra	C-II	amla=500, khair=1150, silveroak =50, katchnar =500, total=2200nos.	Suhagara	2hac.
	OD-Bairkot	C-III	Daroo=400, paja=600, Ban=100, Deodar=1100 toal=2200hac.	Bairkot	2hac.
	ND-Duganal		Behra=200, Daroo=390, Bhemeria=120, paja=500, Moringa=320, Ritha =100, Bamboo=500, Sayaru=70 total=2200nos.	Duganal	2hac.
	Nd-Bairsain		amla=600, Behra=527, Khair=300, Jamun=473, Paja=300 total=2200nos.	Bairsain	2hac.

	ND-Suhagara	C-1	Amla=450, Behra=200, Daroo=200, S/oak=50, Sagwan=1100, Katchnar=200 total=2200nos.	Suhagara	2hac.
	ND-Nala ra gehra		Amla=1000, Khair=1500, Paja=150, Katchnar=500, Sirs=150 total =3300 nos.	Thati	3hac.
	ND-Bairswan		Amla=250, Jamun=250, Bhemeria=100, Paja=200, Moringa=200, Bamboo=100 total =1100nos.	Bairswan	1hac.
	ND-Kalkhar		Amla=250, Jamun=100, Bhemeria=100, Paja=250, mornga =300, Bamboo=100 total=1100nos.	Kundhi	1hac.
	OD-Math		Behra=200, Daroo=100, Jamun=250, Aswagandha=112, Mango=15, Nimbu=15, Lithchi=8, S/oak=100 total =800nos.	Math	1hac.
	OD-Goverta	C-III	Amla=50, Behra=30, Khair=20, Daroo=50, Jamun=50, Paja=1450, Katchnar=500, Ban=250, total=2400nos.	Goverta	3hac.
	UPF-Bhtera		Amla=400, Behara=200, Daroo=100, Jamun=300, S/oak=100, Paja=1150, Katchnar=500 total =2750nos.	Bhatera	2.50h ac.
	ND-Sarsyalu		bhera=200, Daroo=800, Amltash =800, Paja=800, Ritha=150 total=2750nos.	Sarsyalu	2.50h ac.
	OD-Bairkot	C-7	Bhera=400, Daroo=400, Paja=300total =1100nos.	Bairkot	1hac.
	OD-Sikandra		Bhera=125, Daroo=1010, Amltash=1450, paja=1400, Ban=300, Deo=100, Ritha=50 total =4400nos.	Sikandra	4hac.

	OD-Dhualkhan		amla=1000, Behra=200, Khair=225, Daroo=250, Jamun =300, Paja=600, Sagwan =725 total =3300	thankari Gehri	3hac.
	Nd-Dhaullkhan		Amla=600, Behara=300, Khair=200, Daroo=200, Jamun=400, Sagwan = 500 total =2200nos.	Kuwal	2hac.
	OD-Bairkot	C-6	daroo=200, Paja=200, Ban=100, Dedar=600, Katchnar=200 total =1300nos.	Bairkot	1HA C.
	ND-phet		Bamboo=1200 nos.	Dhadwan	3hac.
	Nd-Chilchogan		Bamboo=835 nos.	Jadhrayani	2hac.
	private land jadhrayani		Bamboo=415nos.	Jadhrayani	1hac.
	ND-Jaboth		Amla=197, Hard= 750, Bhera=100, Khair=2140, bill= 490, Kathcnar=890, Sisham =1918, tuti=490, Bamboo=4275 total=11250nos.	jaboth	15hac .
	OD-Bairkot		Daroo=1100, Paja=1150, Ban=100, Deodar=200, Katchnar=800 total =3350nos.	Bairkot	5hac.
	ND-Bairsain		amla=1150, Bhera=1000, Khair=1100, Jamun=2250, total =5500nos.	Bairsain	5hac.
	Govt. land	-	Chil= 5500 Nos	Chiund 1 st	5
	ND 136 Khaneti	Whole	Paza= 3300 Nos	Khaneti	3
	Govt. land	-	Paza= 2000 Nos Daru= 2000 Nos	Darbehad	5
	Govt. land	-	Chil= 5500 Nos	Chiund 2 nd	5
	OD-100 Nandgarh	C-I	Deodar= 5350 Nos Ban= 150 Nos	Nandgarh	5
	OD-148 Thuhadhar	C-I	Deodar= 9900 Nos	Thuhadhar	9
	Govt. land	-	Chil= 11000 Nos	Chiund 3 rd	10
	ND-169 Bakalag	Whole	Chil= 5500 Nos	Shabhar	5

	O.D. 313 Dhawal	C-II, C-III	Kachnaar, Baheda, Shisham, Khair, Dreak, Chil, Bamboo, Daru, Amla, Lucinia, bell, klkar	P/A Dhawal	35
	N.D. 307 Patta	C-II	Khalr, Kikar, Darco, Amia	P/A Khaltu	8
	N.D 304 Lappar	Whole	Daroo, Deodar	P/A Lappar	5
	D.P.F Ahen Sunall	C-1	Daru, Pazza	Sanlhan	3
	D.P.F Slappar 318	C1	Daru, Amla, Khair, Shisham	Slappar	2
	D.P.F Sojha	Whole		Sojha	4
	D.P.F Tahli	Whole		Tahli	3
	D.P.F karangal	C3	Shisham, Khair Amla, Daroo, Lucinia	Karangal	5
2014-15	UF Nalani		Daru, Ambla, Lucinia, Paza, Deodar, Ritha, Oie, Hard, Ban	UF Nalani	10
	UF Chajwar galu22		Daru, Thira, Ambla, Deo, Lucinia, Siras, Hard, Khair, Mango, Bambo, Amrood, Oie, Tor, Shisham,	UF Chajwar galu22	5
	DPF Sariun	ND40	Deodar, Thira, , Paza, Daru, Kachnar .	DPF Sariun	5
	Khiuri	OD54	Bambo, Daroo, Ritha, Pangga	Khiuri	1
	UF Kandlu	ND55	Ambla, Ban	UF Kandlu	4
	UF Chhajwargalu		Daru, Thira, Ambla, Deo, Lucinia, Siras, Hard, Khair, Mango, Bambo, Amrood, Oie, Tor, Shisham,	UF Chhajwargalu	5
	DPF Rajgarh(Dodanal)	OD52	Bamboo	DPF Rajgarh(Dodanal)	5
	Bhachana (Panjrala)	ND37	Khair, Kachnar, Thira	Bhachana (Panjrala)	3
	DPF Sarauni	ND27	Daru, Ambla, Shisam , Khair , Lucinia , Mango, Tor	DPF Sarauni	10

	Bhangoh	C-I	Khair, Amla, jamun	Meira balh	4
	Chandrakhari	C-I& CIII	Kahir, Ambla, Jamun	Chandrakari	3
	DPF Deo-Brardta	C-I	Kahir, Ambla, Behra	Deo.Bradta	2
	DPF Thathal	C-I	Kahir, Ambla	Salyani	3
	DPF Jhumdhar	C-I	Kahir, Ambla	Nahad	3
	DPF Jamdwar	Whole	Kahir, Ambla	Chir	5
	DPF Tikker	Whole	Khair, Ambla, Daru	Tikker	10
	Bhangoh	C-I	Kahir, Ambla	Broi	9.237
	DPF Daint	C-II(a)	Deodar	DPF Daint	10
	DPF Bhoon	C-III	Deodar, Daroo	DPF Bhoon	20
	DPF Trechh	C-II	Deodar	DPF Trechh	10
	DPF Reagi	C-II	Deodar	DPF Reagi	5
	DPF Kanoun	C-III	Deodar	DPF Kanoun	5
	DPF Pandar	C-I	Deodar	DPF Pandar	5
	DPF Rangjhol	C-II	Deodar	DPF Rangjhol	1
	DPF Khoondhar	C-I	Daroo	DPF Khoondhar	1
	DPF Daint	C-II	Khanor	DPF Daint	2
	DPF Rangjhol	C-I	Deodar	DPF Rangjhol	1
	DPF Fegal	C-I	Daroo	DPF Fegal	2
	DPF Malohi	C-I	Daroo	DPF Malohi	4
	DPF Mahadev	C-II	Deodar	DPF Mahadev	1
	DPF Manjhgan	C-I	Daroo	DPF Manjhgan	1
	DPF Kumahru	C-I	Deodar	DPF Kumahru	1
	DPF Shivshanakar	C-I	Deodar	DPF Shivshanakar	1
	DPF Bunga	C-II	Deodar	DPF Bunga	1
	DPF Chehar	C-I	Deodar	DPF Chehar	1
	DPF Fegal	C-II	Daroo	DPF Fegal	1
	DPF Tandidhar	C-I	Daroo	DPF Tandidhar	1
	DPF Kuftu	C-I	Deodar	DPF Kuftu	15
	OD-Sikandra		Amla=1200, Amaltash=900, Ritha=230, Deodar=1500, Ban=600, Paja=5370, Katchnar=1200 Total=11000nos.	Sikandra	10hac .
	ND-Sarsyalu		Amla=990, Khair=600, Hard=50, Paja=600, Katchnar=300, Sisham =660, Total =3200 Nos.	Sarsyalu	4hac.

	ND-Bairsain		Amla=715, Bhera=600, Khair=1351, Daroo=2300, Jamun=300, Lasuniya=123, Paja =1262, Katchnar=26 Total =4400 Nos.	Tikari mod	4hac.
	Nd-Jaboth		Amla=1400, Khair = 1200, Hard=100, Kathcnar=1300, Shisahm =1500 Total = 5500 nos.	Jaboth	5hac.
	Od-Goverta		Deodar=5500nos.	Goverta	5hac.
	Od-Bairkot	C-II	Deodar=16500nos.	Bairkot	15hac.
	OD-Bairkot	C-8	Deodar=5500nos.	Murari Mta	5hac.
	OD-Bairkot	C-III	Bamboo=1275nos.	Bairkot	3hac.
	ND 122 Bhagyar	Whole	Deodar= 5500 Nos	Bhagyar	5
	OD-161 Khabari	C-VIII	Deodar= 4500 Nos Aadu= 500 Nos Sada= 500 Nos	Khabari	5
	ND-173 Kareru 1 st	Whole	Deodar= 5500 Nos	Kareru	5
	Govt. land	-	Deodar= 1300 Nos Ban= 2700 Nos	Nandgarh	5
	Govt. land	-	Daru= 2600 Nos Ban= 700 Nos	Thandapani	3
	OD-175 Kamand	C-IV	Deodar= 1100 Nos	Kamand	1
	ND-174 Kareru 2 nd	Whole	Ambla= 4400 Nos	Kareru	4
	Od-77 Sangrair	C-IV	Ban= 300 Nos Kachnar= 4100 Nos	Sangrair	4
	OD-148 Thuhadhar	C-II & 2014-15C-III	Deodar= 26000 Nos	Thuhadhar	23.3
	D.P.F Dhawal	c-lv	Shisham, Amla, Daru, Kachnar, Bamboo, Lucinia, Baboo	Dhwal	35
	D.P.f Nerl Ropru	C1	Shisham, Amla Daru, khair,	Neri Ropru	5
	D.P.F karangal	C6	Shisham, Amia Daru, khair,	Karangal	5
	ND290 Deoll	Whole	Amla, Khair, Darco	Deoli	7
	N.D. 307 Patta	C1	Shisham, Amia Daru, kachnar, Silver oak, Pazza, Kikar	Bater Dhar	5

2015-16	Drahal	ND43	Deodar, Ban	Drahal	4Ha
	Derdu	ND2	Ambla, Thira, Daru, Jamun, Mango, Kachnar,	Dodwan	1Ha
	sundervan	ND38	Ambla, Daru, Jamun, Mango,	Banaid	1 Ha.
	Patyoda	ND39	Ritha, Mango, Daru, Jamun, Kachnar, Khair.	Patyoda	1 Ha.
	Siharal		Daru, Mango, Ban, Thira	Siharal	1Ha.
	Kandlu	ND55	Ban, Daru, Ritha, Ambla, Pandge, Marinu . Khair,	Kandlu	2 ha.
	Tarlaza	OD54	Ban, Ambla, Ritha, Daru, Pandge, Marinu,	Tarlaza	5 Ha.
	Jhuju mujhu	ND59	Ban, Thira, Deodar,	Jhuju mujhu	5 ha.
	Chila ra dohara		Ban, Thira, Daru, Shisham, Oie	Chila ra dohara	3Ha
	DPF Barnog	C-I	Ambla, Khair, Ritha, Arjun, Daru, Sagwan, Kachnar, Ban,	Rattanpur	4
	DPF Barnog	C-I	Arjun, Sagwan, Kachnar, Paja,	Maira Kusri	5
	DPF Kalash	Whole	Ambla, Khair, Sagwan, Shisham,	UPF Palasara	5
	UPF Beiru	Whole	Ambla, Khair, , Ritha, Arjun, Sagwan Shisham	UPF Bairu	5
	DPF Barnog	C-I	Bamboo	Barnog	7
	DPF Bhangoh	C-II	Bamboo	Bhangoh C-II	10
	DPF Marehra	C-I	Deodar	DPF Marehra	5
	DPF Chhota Gadoun	C-II(b)	Paja, Ban	DPF Chhota Gadoun	0.5
	DPF Ghera	C-II	Deodar, Ban	DPF Ghera	1.5
	DPF Kuftu	C-I	Ban	DPF Kuftu	1
	DPF Chhhota Gadoun	C-II(b)	Deodar, saru, chulli, Akhnor	DPF Chhhota Gadoun	6
	DPF Neulidhar	C-I	Deodar	DPF Neulidhar	3
	DPF Tarehri	C-I	Daroo	DPF Tarehri	5
	DPF Ghera	C-I	Deodar	DPF Ghera	5
	DPF Khobla	C-III	Deodar	DPF Khobla	2
	DPF Chhota	C-I	Deodar	DPF Chhota	4

	Gadoun			Gadoun	
	DPF Bunga	C-II	Deodar	DPF Bunga	1
	DPF Bag	C-I	Deodar	DPF Bag	3
	DPF Charog	C-I	Deodar, Saru, Ban	DPF Charog	4
	ND-Sadwal		Hard=65, Bhera= 85, Khair=300, Paja=150, Sagwan =500, Bill=200, S/oak =200, Bamboo=100, Kathcnar=600 total =2200nos.	Sadwal	2hac.
	OD-Bairkot	C-III	Paja =1400, Ban =300, Deodar=500 total =2200 nos.	Bairkot	2hac.
	UPF-Takred		Amla=1064, Khair=2385, Daroo=830, Paja=2000, Bill=400, S/oak=170, Luciniya=201, Katchnar=2000, Jakranda =750, Ban=1200, total =11000nos.	Takred	10hac .
	ND-Jaboth		Amla=1366, Khair=2406, S/oak=400, Luciniya=935, Katchnar=1500, Jakranda =750, Jamun =700, Amaltash =963, Shisham =980 total =10000nos.	Jaboth	20hac .
	OD-Bairkot	C-IV	Paja=1200, Ban=36, Deodar=964, total =2200nos.	Bairkot	2hac.
	OD-Bairkot	C-IV	Paja=395.Ban=185, Deodar=536 total=1116nos.	Bairkot	1hac.
	ND-Sadwal		Khair=200, Sagwan =300, Katchnar=600, total =1100nos.	sadwal	1hac.
	Nd-Banala ri gehri		Amla=200, Hard=50, Khair =130, Bill=30, S/oak=150, Total =550nos.	Banala ri gehri	0.50h ac.

	Nd-Banala ri gehri		Amla=48, Hard=30, Khair=337, Sagwan =36, Bill=10, Aswagandha=11, S/oak=78 total=550nos.	Banala ri gehri	0.50h ac.
	ND-136 Khaneti	Whole	Deodar= 2000 Nos Daru= 2500 Nos Ban= 1000 Nos	Kawal Khaneti	5
	ND-142 Kotla	Whole	Daru= 3300 Nos	Kotla	3
	ND-172 Matoh	Whole	Deodar= 4400 Nos	Matoh	4
	OD-159 Chhichhar	C-I	Deodar= 3300 Nos	Chichar	3
	ND-146 Chuhani	Whole	Deodar= 4000 Nos	Chuhani	5
	ND-96 Kutahachi	C-II	Deodar= 1600 Nos	Kuttachi	2
	OD-161 Khabari	C-IV	Chil= 2400 Nos	Khabari	3
	ND-98 Rajot	Whole	Deodar= 4500 Nos Ban= 1000 Nos	Rajot	5
	ND-173 Kareru 1 st	Whole	Deodar= 3900 Nos Chil= 1600 Nos	Auli	5
	ND-86 Chhattarsilh	Whole	Deodar= 500 Nos Ban= 176 Nos Kachanar= 900 Nos Ambla= 2000 Nos Paza= 824 Nos	ChattarSilh	4
	ND-164 Sanora	Whole	Deodar= 2400 Nos Daru= 900 Nos	Sanora	3
	O.D 318 Slappar	CI, CII	Mango, Revenia, Khair, Amla, Bamboo, Bahera, Jamun, Ritha, BallA Tash	P/area Slappar	5
	D.P.F Fafna	Whole	Deodar	Fafna	3
	D.P.F Karangal	C3	Amla Shisham Khair Daru,	Karangal	3.5
	D.P.F Behli	Whole	Amla, Daru,	Behli	5
	D.P.F Deal 291	C1	Deodar Ban Kachnar	Deoli	3
	OD 301Gehru	c1b	Amia, Shisham, Bamboo, Khair, Rubinia, Jamun, Ritha Ball, Amaltash, Ban, Kachnar, Drek	Gehru	5
	D.P.F Umri	C1	Amla, Shisham, Khair, Jamun Ritha	Umri	5
	D.P.F Sojha	Whole	Amla, Shisham, Daru,	Sojha	10
	OD 296 Chaloun	Whole	Ban Daru	Chaloun	10

2016-17	Bholu		Ban, Kachnar, Paja, Daru	Bholu	5 Ha
	Nalout IInd	ND19	Ritha, Kheir, Kachnar, Mango, Jamun, Shisam	Nalout IInd	3H
	Tarlaza	OD54	Ban, Daru, Ambla, Marinu, Ritha	Piplu	5 ha.
	UPF Berry	whole	Ambla, Arjun, Ban Khair, Kachnar	Berry	5
	DPF Kaldoo	C-IV & C-V	Ban, Deodar	Druman (Kaldoo)	5
	DPF Deobradta	Whole	Ambla, Arjun, Bahera Deodar, Khair, Kachnar, Harad, Shisham, Toot, Popular	Dev Galu	2
	DPF Chandrakari	C-III	Khair, Ambla, Arjun, Bamboo, Sagwan, Silver Oak	Chandrakari C-III	3
	DPF Chandrakari	C-III	Deodar, Khair, Ambla, Arjun, Harad, Bahera, Kachnar Bamboo, Sagwan, Silver oak Shisham, Toot	Chandrakari C-III	5
	DPF Gadahach	C-I	Deodar	DPF Gadahach	2
	DPF Gadohach	C-II	Deodar	DPF Gadohach	5
	DPF Khoondhar	C-II	Daroo	DPF Khoondhar	3
	DPF Khobla	C-I	Deodar	DPF Khobla	5
	DPF Marehra	C-II	Deodar	DPF Marehra	5
	DPF khoondhar	C-I	Daroo	DPF khoondhar	2
	DPF Tarehri	C-II	Daroo	DPF Tarehri	3
	DPF Tarehri	C-I	Daroo	DPF Tarehri	10
	DPF Jodhnu	C-I	Daroo	DPF Jodhnu	5
	upf-Bhatera		Ambla=600, Khair=800, Daroo=500, Paja=500, S/oak=1000, Kachnar=600, Ban=500, Deo =1000, total =5500nos.	Bhatera	5hac.

	Govt Land Bhadarwani		Amla=800, Khair =450, Daroo=150, Sagwan =300, S/oak=670, Katchnar 300, Jakranda=450, Amaltash =150, Shisham=30 total=3300nos.	Bhadarwani	3hac.
	ND-Suhagara		Hard=285, Khair=350, S/oak=1000, Bamboo=92, Amaltash=400, Shisham=100 toatal=2200nos.	Barot	2hac.
	UPF-Nawani		Amla=1200, Khair=1000, Daroo=255, Sagwan =1800, S/oak=330, Lasuniya=300, Katchnar=200, Jakranda=125, Amaltash=150, Shisham=70 total =5500nos.	Nawani	5Hac.
	Nd-Dhaulkhan		amla=3179, Khair=600, Sagwan=953, Aswagandha=135, Katchnar=533, Amaltash=100, total =5500nos.	Dhaulkhan	5hac.
	OD-121 Kaulpur Chil	C-I	Deodar= 4000 Nos	Kaulpur Chil	5
	OD-77 Sangrair	C-I	Deodar= 4000 Nos	Sangrair	5
	Govt. land	-	Deodar= 2800 Nos Kachnar= 2700 Nos	Parua	5
	ND-96 Kutahachi	C-II	Deodar= 5500 Nos	Kuttachi 1 st	5
	OD-170 Cheora	C-II	Deodar= 5500 Nos	Cheora	5
	O.D. 305 Salyana	C-I	Kachnaar, Drak, Daroo, lausonia	P/A Salyana	7.06
	N.D. 310 Jartu	C-I	Ban, Daroo, Ambla, Silveroak, Paja, Jakranda, Kachnaar	P/A Jartu (Dhail)	10
	N.D 317 Slappar	Whole	Bamboo, Amla, Mango, Daroo	P/area Slappar	2

2017-18	Fagla	OD30	Sirus, Amblar, Daru, Shisam, Kachnar, Jamun, Kahu, Beil, Thira, Toot	Fagla	6 Ha
	Nalout Ist.	ND18	Shisam, Daru, Oie, Jamun, Beil, Kachnar, Mango, Sirs, Ambla, Shisam, Daru, Oie, Jamun, Beil, Kachnar, Mango, Sirs, Ambla=200, Toot=200,	Nalout Ist.	3
	Segali		Ban, Ritha, Daru, Ambla ., Marinu, Paja, Padnge, Shisam, Toot.	Segali	4
	DPF Gamdhoul	Whole	Khair, Kachnar	Gamdhoul	3
	DPF Jamdwar	Whole	Ambla, Khair, Lucinia	Rissa	3
	Bhangoh	C-I	Ambla, Ban, Drek, Toot, Khair, Bamboo, Kachnar	Maiara Bhangoh	3
	Kaldoo	C-II	Ban Deodar	Kaldoo	3
	DPF Sarelu	C-I	Deodar	DPF Sarelu	3
	DPF Baneshti	C-II	Tall Fascue grass	DPF Baneshti	3
	DPF Ukari	C-I	Daroo	DPF Ukari	5
	DPF Kumahru	C-II	Deodar	DPF Kumahru	3
	DPF Bandli	C-I	Deodar	DPF Bandli	5
	DPF Kot	C-II	Deodar	DPF Kot	3
	DPF Fegal	C-I	Daroo	DPF Fegal	3
	OD-Bairkot	C-8	Deodar=3300nos	Bairkot	3hac.
	OD-Goveta	c-III	Paja=200, Ban=700, Deodar=1500, total =2400nos.	Goverta	3hac.
	ND-167 Bakalag	Whole	Daru= 5500 Nos	Bakalag	5
	ND-173 Kareru 1 st	Whole	Daru= 4800 Nos	Kareru	6
	ND-136 Khaneti	Whole	Daru= 5500 Nos	KhanetiKawal	5
	N.D. 308 Panjolth	Whole	Amla, Daroo, Shisham,	P/A Panjolth	3
	N.D 316 Siun	CI	Shisham, Amla, Daru, Silveroak, Ritha, lucenia	P/area Siun	4
	D.P.F Tahli		Amla, Shisham, Daru,	Tahli	3
	N.D 322 Bhuwana	Whole	Shishm Daru, Jamun, Paza, Kachnar, Amla Mango, Silver Oak	P/area Bhuwana	5

2018-19	Harabag	ND35	Ambla, Jamun, Siris, kachnar, Amaltas	Harabag	5
	Sariun	ND40	Ban, Deodar, Daru, Theera	Sariun	5
	Baila Balahar	ND20	Shisham, Ambla, Jamun	Baila Balahar	1
	DPF Jamdwar	Whole	Daru, , Ambla, Bahera, Jamun,	Jamdwar	12
	Bhangoh	C-I	Daru, , Ambla, Chil, Marinu, Ban, Bamboo, Jamun, Shisham, Amaltash	Bhangoh	5
			Khair, Daru, Ambla, , Marinu, Ban, Jamun, Shisham Paja	Baira Dhar	5
	DPF Mundali	C-I	Deodar	DPF Mundali	3
	DPF Khoondhar	C-II	Deodar	DPF Khoondhar	3
	DPF Manjhki	C-II	Deodar	DPF Manjhki	3
	DPF Reagi	C-I	Deodar	DPF Reagi	3
	DPF Mundali	C-II	Deodar	DPF Mundali	2
	DPF Narehli	C-I	Deodar, Ban, Daroo, Paja	DPF Narehli	14
	DPF Chanadbahan	C-III	Deodar	DPF Chanadbahan	5
	DPF Tarehri	C-I	Daroo	DPF Tarehri	20
				DPF Khoondhar	
	OD-Bairkot	C-7	Paja=150, Ban=2350, Deaodar=1500, Total=4000nos.	Bairkot	5hac.
	OD-Dhualkhan	c-1	Paja=50, Shisham=150, Amla=250, Amaltash=100, jamun =250 total=800nos.	Dhualkhan	1hac.
	ND-173 Kareru 1 st	Whole	Deodar= 100 Nos	Kareru	4
			Daru= 4200 Nos		
			Ban= 100 Nos		
	ND-132 Khudi Nalla	Whole	Deodar= 1000 Nos	Khudinal	4
			Ban= 2200 Nos		
	OD-121 Kaulpur Chil	C-II	Deodar= 1600 Nos	Kaulpur Chil	4
			Ban= 1300 Nos		
			Paza= 300 Nos		
	ND-164 Sanora	Whole	Daru= 468 Nos	Naun	3
			Ban= 400 Nos		
			Ambla= 860 Nos		

			Thira= 172 Nos		
			Jamun= 500 Nos		
	O.D. 312 Ahen sunali Shisham	C-I	Daru, Kachnaar, Paja, Beil, Jamun	P/A Sanihan	5
	O.D. 312 Ahen sunali Shisham	C-I	Amitas, Ambla, Jamun, Shisham, Daru, Beil	P/A Sanihan	
	N.D. 307 Patta	C-I	Daroo, Ambla, Amalta, Jamun, Shisham	P/A Patta	5
	D.P.F Manjhkhatar				5
	N.D. 308 Panjolth	Whole	Jamun, Beil, Shisham, Daroo	P/A	
2019-20	jarol	ND28	Paja, Daru, Theera, Shisham, Ambla.jamun, kachnar.	Dolg	5
	Jarol	ND28	Beil, shisham, Ambla,	Harabag	2
	Jarol	ND28	Ambla, Jamun.	Jarol	1
	Kandlu	ND55	Drau, Ambla.jamun, piplal.	Gharwasra	0.15
	Kandlu	ND55	Daru, Ambla, jamun	Gharwasra	0.15
	Bhangoh	C-III	Khair, Daru, Kachnar, Bamboo	Bhangoh	2.68
	DPF Tikker	Whole	Khair, Daru Kachnar	Kathogan	0.5
	UPF Kathogan	-	Khair, Daru Kachnar Paja	Kathogan	5
	Kaldoo	C-I&CII	Deodar Ban, Paja	Kaldoo	5
	DPF Kathla	C-I	Deodar, Daroo, Ban, Kachnar	DPF Manjhki	3
	DPF Manjhki	C-III	Rakhal	DPF Reagi	6
	DPF Kuftu	C-I	Deodar, Daroo, Paja, Ban	DPF Mundali	5
	DPF Simu	C-I	Daroo	DPF Narehli	5
	DPF Salani	C-I	Deodar	DPF Chanadbahan	3
	DPF Jodhnu	C-II	Deodar, Daroo, Paja	DPF Tarehri	3
	DPF Dharli	C-I	Deodar		3
	DPF Narehli	C-II	Daroo, Paja, Kachnar, Biul	DPF Kathla	5.5
	DPF Reagi	C-I	Deodar	DPF Manjhki	1
				DPF Kuftu	
	ND-Bairsain	C-1	Amla=500, Khair=500, Bhera=200, Daroo=50, Jamun=50, Shimbali=300 total=1600nos.	Bairsain	2hac.

	Nd-Tharu		Jamun=100, DEO=2700, Ban=850, Katchnar=250, Paja=100, total=4000nos.	Tharu	5hac.
	Nd-Dhaboi		Amla =500, Khair=500, Daroo=100, Jamun=200, Katchnar=200, Shisham=100 total =1600nos.	Biuhmanotla	4hac.
	ND-Sarsyalu		Ban=140, Paja=660, total=800nos.	Sarsyalu	1hac.
	OD-152 Berumara	C-I	Deodar= 1500 Nos	Berumara 1 st	3
	ND-102 Badhu	C-II	Deodar= 1000 Nos	Badhu	2
	ND-164 Sanora	Whole	Daru= 2500 Nos	Naun	5
			Paza= 1000 Nos		
			Kachnar= 500 Nos		
	ND-146 Chuhani	Whole	Deodar= 2700 Nos	Chuhani	4
			Ban= 500 Nos		
	Govt. land	-	Daru= 1800 Nos	Parua	2
			Kachnar= 400 Nos		
	ND-102 Badhu	C-II	Deodar= 800 Nos	Gadahu	1
	OD-152 Berumara	C-I	Deodar= 800 Nos	Berumara	1
	N.D 303 Dharli Barad	C-III	Ban, Amla, Jamun, Daroo	Panjolth P/A Dharli	2
	O.D. 305 Salyana	C-II	Deodar, Daru	P/A	5
	N.D 304 Lappar	Whole	Deodar	P/A Salyana P/A	4
	N.D 316 Siun	CI	Amla, Shisham, Daru, Bail, Jamun, Chi	Lappar P/area Siun	5
	N.D 322 Bhuwana	Whole	Amla, Shisham, Drek Daru		2
	N.D 316 Siun	CI	Amla, , Shisham, drek, Daru	P/area Bhuwana P/area	5
	N.D 317 Slappar	Whole	Amla, Shisham,	P/area Siun	5
	ND290 Deoli	Whole	Deodar	P/areaSlappar Deoli	1
	D.P.F Khalind	c1	Amla, Shisham Daru, amaltash	Deoli	4
2020-21	sundervan	ND38	Sisham, Abmla, Daru	Sundervan	3
	Dagwahan	ND68	Ban, Deodar, Tejpata	Dagwahan	2
	Tarlaza	OD54	Ban,	Tarlaza	2

	DPF Barnog	C-I	Semal, Ritha, Darek, Bihul, Bahera, Kachnar, Ambla, Paja, Daru, Ban, Jamun	Khirka Ra Gehru	4
	DPF Jhinjnoo	Whole	Paja, Bihul, Mango, Silver oak, Semal, Jamun, Daru, Bel	Kuthehar Jhinjnoo	3
	DPF Bairadhar	C-I	Daru, Jamun, Ban, Paja	Bairadhar	3
	DPF Kholtu	Whole	Daru, Jamun, Ban, Paja, Kachnar Lacchman Patat	Dhalyat	5
	DPF Jhumdhar	C-II	Daru, Jamun, Ban, Kachnar, Lachman Pata	Nehad	4
	DPF Bhangoh	C-III	Daru, Jamun, Bihul, Semal, Kachnar, Ambla, Darek, Bahera	Bhangoh	2.32
	DPF Chandrakari	C-II	Daru Jamun, Ban	Chandrakari	4
	DPF Jamdwar	Whole	Kachnar	Dharyalag	4
	DPF Tikker	Whole	Daru, Kachnar, Shisham	Thankar	5
	DPF Ukari	C-I	Daroo	DPF Simu	5
	DPF Bhiunkar	Whole	Tall Fascue Grass	DPF Salani	5
	DPF Badagadoun	C-I	do	DPF Jodhnu	5
	DPF Pandar	C-I	Ban, Conifer	DPF Dharli	1
	DPF Rangjhol	C-II	Deodar	DPF Narehli	10
	DPF Daint	C-I	Ban, Deodar	DPF Reagi	5
	DPF Manjhki	C-III	Ban, Conifer	DPF Manjhki	5
	DPF Shivshanakar	C-II(a)	Ban	DPF Shivshanakar	4
	DPF Bag	C-I	Deodar	DPF Bag	3
	DPF Tandidhar	C-I	Daroo, Amla	DPF Tandidhar	3
	DPF Manjhki	C-I	Ban, Conifer	DPF Manjhki	1
	DPF Jabaltu	C-I	Deodar	DPF Jabaltu	3
	DPF Jodhnu	C-I	Ban, B/L	DPF Jodhnu	6
	DPF Pandar	C-II	Paja, Conifers	DPF Pandar	1
	DPF Shivshankar	C-II(a)	Daroo, Deodar	DPF Shivshankar	2
	DPF Khobla	C-II	Deodar	DPF Khobla	3
	DPF Shivshanakar	C-II(b)	Deodar	DPF Shivshanakar	3
	DPF Chanadbahan	C-II	Deodar, Paja	DPF Chanadbahan	3
	DPF Narehli	C-I	B/L	DPF Narehli	13.5
	DPF Galukhar	C-II	B/L	DPF Galukhar	5
	DPF Pandar	C-I	B/L	DPF Pandar	4
	DPF Doghari	C-I	B/L	DPF Doghari	5

	DPF ukari	C-I	B/L	DPF ukari	5
	DPF Malohi	C-II	B/L	DPF Malohi	5
	DPF Pandar	C-I	B/L	DPF Pandar	1
	OD-Bairkot	C-7	Ban=280, Deodar=1220, total=1500	Bairkot	5hac.
	UPF-Kakruhi		Amla=140, Chil=1120, S.oak=50,	Kakruhi	2hac.
			Daroo=130, Paja=160, total=1600nos.		
	Nd-Bhater		Amla=100, Jamun=30, Daroo=50, Mangoo=50, Bhera=70, Total =300nos.	Bhater	1Hac.
	ND-Suhagara	C-II	Amla =150, Jamun=350, Daroo=150, Mango=50, Simbal=50, Bhaera=50 total=800 nos.	Bairkot	2hac.
	UPF-Goverta		ban=1200, deodar=1000, total =2200nos.	Goverta	2hac.
	OD-152 Berumara	C-I	Deodar= 750 Nos	OD 152 Berumara 2 nd	1.5
	Od-153 Kamrah	C-I	Deodar= 2750 Nos	DPF Kamrah	5.5
	UPF Salosara	Whole	Daru= 150 Nos	UPF Salosara	2
			Paza= 700 Nos		
			Kachnar= 150 Nos		
	ND-102 Badhu	C-II	Deodar= 775 Nos	DPF Badhu	2
			Paza= 225 Nos		
	OD-77 Sangrair	C-II	Deodar= 2700 Nos	Sangrair	5
			Ban= 1300 Nos		
	OD-121 Kaulpur Chil	C-I	Deodar= 978 Nos	Kaulpur Chil	3
			Ban= 922 Nos		
			Paza= 300 Nos		
			Burans= 200 Nos		
	OD-146 Chuhani	Whole	Daru= 900 Nos	Chaluni	2
			Kachanar= 250 Nos		
			Ambla= 350 Nos		
			Sambal= 200 Nos		
			Akhrot= 500 Nos		
	OD-126 Kuthain	C-I	Deodar= 1000 Nos	Kuthain	5
			Daru= 1000 Nos		

			Ban= 2000 Nos		
			Kachanar= 1500 Nos		
	ND-122 Bhaghyar	Whole	Deodar= 2000 Nos	Baghyar	3
			Ban= 1200 Nos		
	ND-167Bakalag	Whole	Daru= 800 Nos	Bakalag(JICA Deptt. Mode)	5
			Paza= 500 Nos		
			Kachnar= 400 Nos		
			Ambla= 200 Nos		
			Amaltash= 100 Nos		
			Ritha= 500 Nos		
	ND-145 Garella	Whole	Daru= 800 Nos	Garella(JICA Deptt. Mode)	5
			Ban= 150 Nos		
			Paza= 500 Nos		
			Kachnar= 350 Nos		
			Ambla= 200 Nos		
			Amaltash= 200 Nos		
			Ritha= 300 Nos		
	N.D. 310 Jartu	C-I	Shisham, Daroo, Amla, Jamun, Ban, Thira, Lucinia	Khalind	5
	O.D. 305 Salyana	C-IV	Lucinia Daroo, Kachnaar, Ban, Amla	P/A Dhar	10
	D.P.F Karangal	C3	Daru,	P/A Grahan	10
	D.P.F Katohar	Whole	Amla, Daru	Karangal	10
2021-22	sundervan	ND38	Daru, Ambla, Daru	900	sundervan
	Dagwahan	ND68	Daru, shisham, Dreak	1000	Dagwahan
	Tarlaza	OD54	Daru, Biuhal, kanakchampa, Ban, Deodar	615	Tarlaza
	Sihnnal	Whole	Chil, Ban, Kachnar, Daru, Jamun, Shisham, Bahera	Sihnnal	3
	Govt. Land.	-	Daru, Bahera, Ambla, Khair	Kandyohal	4
	DPF Kholtu	Whole	Ban, Kachnar, Daru, Jamun, Shisham, Bahera, Ambla, Khair, Paja, Bihul Amaltash	Kholtu	5
	DPF Murahdhar	C-III	Daru, Jamun, Bahera,	Maigal	3

			Ambla		
	DPF Kaldoo	C-II	Ban, Daru Paja, Deodar	Kaldoo C-II	5
	DPF Thathal	C-II	Ban Kachnar, Daru Jamun, Shisham, Ambla, Paja	Thathal	4
	ND-102 Badhu	C-I	Deodar= 400 Nos	Badhu	2
	OD-143 Thuhadhar	C-III	Deodar= 300 Nos	Sohkli	4
			Ban= 1700 Nos		
	OD-153 Kamrah	C-I	Deodar= 1000 Nos	Surad	5
			Rai= 900 Nos		
			Mohru= 2100 Nos		
	OD-77 Sangrair	C-II	Deodar= 3500 Nos	Sangrair	5
			Ban= 500 Nos		
	OD-108 Gadyal	C-I	Deodar= 1000 Nos	Ghadyal	5
			Ban= 1000 Nos		
			Kachanar= 1500 Nos		
			Rubinia= 500 Nos		
	OD-120 Kaulpur Chil	C-II	Deodar= 200 Nos	Kaulpur Chil	5
			Khanor= 2300 Nos		
			Rubinia= 3000 Nos		
	OD-148 Thuhadhar	C-II	Chuli= 4000 Nos	Bulash(VSJS Scheme)	5
	OD-113 Sakohar B	Whole	Chuli= 4000 Nos	Sakohar(VSJS Scheme)	5
	OD-180 Kathyal	C-I	Discorea= 2600 Nos	Banwali(VSJS Scheme)	5
			Kala Kuth= 1900 Nos		
	OD-153 Kamrah	C-I	Chuli= 4000 Nos	Khanad(VSJS Scheme)	5
	ND-87 Chhattarsilh	Whole	Ban= 800 Nos	ChhatarSilh(VVM Y Scheme)	1
	O.D 301 Gehru	C-I-A	Daroo, Amla, Jamun, Amitas, Shisham,	Katohar	5
	O.D. 312 Ahen sunali		Shisham, Kachnaar	P/A Nagadi	5
	Shisham	C-II	Daru, Ban, Kachnaar, Shisham, Jamun		
	D.P.f. Bragta	c4	Amla, Shisham Daru DreK	P/A Ropa	5
	D.P.F Khalind	C2	Drek Khair Amla, Shisham, Daru DreK, Khair	Bragta	5

	D.P.F Hara	c2	Drek, Khair Daru,	Khalind	5
2022-23	Jhujumujhu	ND59	Reetha, Theera, Ban	2400	Jhujumujhu
	DPF Tarlaza	OD54	Reetha, Ban, Jamun, Deodar	2400	Tarlaza (segment)
	DPF Khiuri	OD53	Reetha, Jamun, Ambla, Lukath	1600	Khiuri
	DPF Jhumdhar	C-II	Chil, Ambla, Ban, Drek, Siris, Ritha Amrood, Sagwan, Paja	Gujar Gehra	5
	DPF Kholtu	Whole	Chil, Ban Sagwan, Mango	Thona	3
	UPF Bhalyara	Whole	Chil, Daru, Paja	Dhanghor	2
	DPF Murahdhar	C-III	Ban	Maigal	2
	DPF Jamdwar	Whole	Daru, Ambla, Kachnar, Jamun, paja	Rissa	5
	DPF Kaldoo	C-I	Deodar Ban, Paja	Sarkidhar	5
	DPF Jhinjnoo	Whole	Daru, Jamun, Bahera,	Jhihnjoo	3
	Chanadrakri	C-III	Deodar, Chil, Daru, Ban, Bahera, shisham	Chandrakari	8
	DPF Kholtu	Whole	Ambla, Daru, Jamun, Bahear, Darek	Beiru	2
	Govt .Land	-	Daru, Bahera, Ban, Jamun, Darek	Darkohli	1
	DPF Jhumdhar	C-I	Deodar, Chil, Ban, Harad, Paja,	Jhumdhar	8.04
	DPF Jhumdhar	C-II	chil, Khair, Daru, Ambla, Kachnar, Amaltash, Jamun, Bahera, Paja	Kathogan (Nehad)	10
	DPF Kholtu	Whole	Chil, Daru, Kachnar, Amaltash, Ban, Jamun, Bahera, Paja	Dhalyat Gehra	10
	DPF Jamdwar	Whole	Chil, Daru, Ambla, Kachnar Amaltash Jamun, Paja	Dolan Chirr	10
	DPF Kalash	Whole	Chil, Daru, Ambla, Amaltash Jamun, Paja, Tun,	Kalas Kharout	10
	Govt Land	-	Khair, Daru, Ambla, Kachnar, Jamun, Bahera, Paja, Tun	Druman	10

	DPF Kaldoo	C-IV, C-V	Chil, Daru, Ambla, Kachnar, Amaltash, Bahera, Paja	Kalar	10
	DPF Kholtu	Whole	Khair, Daru, Ambla, Kachnar, Jamun, Semal, Bahera, Darek, Siris, Paja, Shisham	Dhalyat Gehra	10
	DPF Jhumdhar	C-II	Khair, Daru, Ambla, Kachnar, Jamun, Bahera, Semal, Darek, Paja, shisham	Kathogan	10
	DPF Kalash	Whole	Khair, Daru, Ambla, Kachnar, Jamun, Semal, Bahera, Darek, Siris, Paja, Shisham	Kalas Kharout	10
	Jamdwar	Jamdwar	Khair, Daru, Ambla, Kachnar, Jamun, Semal, Bahera, Darek, Siris, Paja, Shisham	Jamdwar	10
	Govt land	-	Khair, Daru, Ambla, Kachnar, Jamun, Semal, Bahera, Darek, Siris, Paja, Shisham	Druman Banyorka	10
	UPF Khalanu	Whole	Khair, Daru, Ambla, Kachnar, Jamun, Semal, Bahera, Darek, Siris, Paja, Shisham	Khalanu	10
	OD-180 Kathyal	C-I	Deodar= 675 Nos Ban= 1925 Nos Mohru= 2643 Nos Rakhal= 357 Nos	Kathyal	7
	OD-154 Banwali	C-II	Deodar= 4000 Nos	Banwali	5
	Nd-169 Bakalag	Whole	Daru= 200 Nos Paza= 3800 Nos Thira= 1800 Nos Jamun= 600 Nos Willow= 200 Nos Ritha= 2200 Nos Shisham= 500 Nos Ambla= 2500 Nos	ND 169 Bakalag	15
	OD-150 Bhebhal A	C-II	Deodar= 2400 Nos	Bhebhal	3

	OD-120 Kaulpur Ban	C-I	Willow= 700 Nos	Kaulpur Ban	4
			Rubinia= 1000 Nos		
			Maple= 1500 Nos		
	OD-157 Thach Silh	Whole	Deodar= 2400 Nos	DPF Tahch	3
	Od-161 Khabari	C-V	Deodar= 2570 Nos	Khabri	6
			Daru=500 Nos		
			Ban= 1730 Nos		
	ND-103 Silh	C-I	Deodar= 800 Nos	Silh	4
	OD-126 Kuthain	C-I	Ddaru= 200 Nos	Kuthain	2
			Ban= 150 Nos		
			Jamun= 450 Nos		
			Bani= 200 Nos		
	OD-136 Khaneti	Whole	Daru= 300 Nos	Khaneti	2
			Ban= 250 Nos		
			Bani=250 Nos		
	OD-121 Kaulpur Chil	C-II	Deodar= 1200 Nos	Kaulpur Chil -II	4
			Daru= 300 Nos		
			Ban= 250 Nos		
			Bani= 250		
	UPF Salosara	Whole	Daru= 600 Nos	UPF Salosara	3
			Ban= 300 Nos		
			Paza= 800 Nos		
			Willow= 500 Nos		
			Ritha= 200 Nos		
	ND-173 Kareru	Whole	Deodar= 700 Nos	Kareru(JICA PFM)	10
			Daru= 2275 Nos		
			Kachnar= 500 Nos		
			Ritha= 600 Nos		
			Ambla= 800 Nos		
			Simbal= 125 Nos		
	ND-167 Bakalag	Whole	Daru= 2350 Nos	Bakalag(JICA PFM)	10
			Kachanar= 1500 Nos		
			Ritha= 350 Nos		
			Ambla= 600 Nos		
			Simbal= 100 Nos		
			Walnut= 100 Nos		
	ND-101 Nandgarh	Whole	Deodar= 500 Nos	Nandgarh(JICA PFM)	10
			Daru= 2500 Nos		
			Paza= 500 Nos		

			Ritha= 2000 Nos		
	ND-86 ChhattarSilh	Whole	Deodar= 500 Nos	Chhattarsilh(JICA PFM)	10
			Daru= 2000 Nos		
			Paza= 1000 Nos		
			Ritha= 1000 Nos		
			Ambla= 1000 Nos		
	ND-173 Kareru	Whole	Daru= 2350 Nos	Kareru(JICA Deptt. Mode)	10
			Kachnar= 1500 Nos		
			Ritha= 350 Nos		
			Ambla= 600 Nos		
			Simbal= 100 Nos		
			Walnut= 100 Nos		
	ND-169 Bakalag	Whole	Daru= 2350 Nos	Bakalag(JICA Deptt. Mode)	10
			Kachanar= 1500 Nos		
			Ritha= 350 Nos		
			Ambla= 600 Nos		
			Simbal= 100 Nos		
			Walnut= 100 Nos		
	OD-99 Dhamech	C-I & C-II	Daru= 2200 Nos	Dhamech(JICA Deptt. Mode)	10
			Kachnar= 650 Nos		
			Jamun= 2100 Nos		
			Walnut= 50 Nos		
	OD-77 Sangrair	C-II	Daru= 2450 Nos	Sangrair(JICA Deptt. Mode)	10
			Ambla= 2500 Nos		
			Walnut= 50 Nos		
2023-24	Piplidhar	Whole	Ambla, Sagwan, Jamun, Daru, Semal	Pipli Dhar	1
	Kaldoo	C-II	Daru, Deodar, Chil, Ban	Kaldoo II	3
	Tikker	Whole	Shisham, Ban, Paja, Daru, Ambla, Jamun, Darek, Amrood	Tikker I	5
	Jamdwar	Whole	Ambla, Harad, Jamun, Ritha, Daru	Jol	3
	Tikker	Whole	Deodar, Daru, Ambla, Jamun, Ritha, Ban, Shisham, Paja	Tikker	5
	Kaldoo	C-II	Deodar, Daru Ban Chil	Kaldoo	5

	UPF Mashdhwani	Whole	Daru, Jamun, Sagwan, Deodar, Bahera, Khair, Paja, Shisham, Kachnar Ambala	Masdhwan DPM	10
	UPF Mashdhwani	Whole	Chil, Ambla, Tun, Paja, Daru, Jamun, Sagwan, Shisham	Masdhwan PFM	10
	ND-132 Khudinal	Whole	Deodar= 140 Nos Daru= 800 Nos Ban= 10 Nos Paza= 150 Nos Jamun= 500 Nos	Khudinala	2
	Govt. land	-	Daru= 600 Nos Amaltas= 80 Nos Paza= 1000 Nos Kachnar= 170 Nos Poplar= 500 Nos Ritha= 650 Nos Bahera= 200 Nos	Kateru-I	4
	OD-177 Parala	C-I	Deodar= 3300 Nos Khanor= 1500 Nos	DPF Parala	6
	UPF Salosara	Whole	Daru= 500 Nos Paza= 950 Nos Harad= 1200 Nos Ambala= 900 Nos Ritha= 200 Nos Bahera= 250 Nos	UPF Salosara	5
	OD-80 Madhogan	Whole	Daru= 250 Nos Paza= 325 Nos Kachnar= 500 Nos Rubinia= 425 Nos	Madhogan	3
	ND-162 Thihkar	Whole	Deodar= 800 Nos Daru= 600 Nos Paza= 100 Nos Jamun= 100 Nos	Thihkar	2
	Nd-158 Thach Silh	Whole	Deodar= 600 Nos Chuli= 1000 Nos	Thach	2
	OD-155 MajhothiSilh	C-I	Rakhal= 1600 Nos	MajhothiSilh	2
	OD-125	Whole	Daru= 70 Nos	Roparkothi	2

	Roparikothi		Paza= 480 Nos		
			Kachnar= 50 Nos		
			Harad= 200 Nos		
			Ambla= 100 Nos		
			Bahera= 100 Nos		
	Govt. land	-	Daru= 200 Nos	Kateru	4
			Paza= 1000 Nos		
			Kachnar= 170 Nos		
			Harad= 130 Nos		
			Rubinia= 125 Nos		
			Bahera= 375 Nos		
	OD-108 Gadyal	C-I	Maple= 500 Nos	Gadhya	3
			Khanor= 400 Nos		
			B/Cherry= 300 Nos		
	OD-121 Kaulpur Chil	C-II	Deodar= 500 Nos	Kaulpur Chil (JICA PFM)	10
			Chil= 400 Nos		
			Daru= 700 Nos		
			Paza= 100 Nos		
			Rubinia= 500 Nos		
			Ritha= 700 Nos		
			Kachnar= 2100 Nos		
			Chuli= 500 Nos		
	Govt. land	-	Daru= 750 Nos	Nauda(JICA PFM)	5
			Jamun= 550 Nos		
			Ambla= 450 Nos		
			Ritha= 250 Nos		
			Bahera= 750 Nos		
	OD-124 Kafla	Whole	Deodar= 100 Nos	Kafla(JICA PFM)	5
			Daru= 1100 Nos		
			Ban= 20 Nos		
			Paza= 200 Nos		
			Kachnar= 230 Nos		
			Jamun= 400 Nos		
			Ambla= 300 Nos		
			Bahera= 400 Nos		
	ND-164 Sanora	Whole	Deodar= 50 Nos	DPF Sanora (JICA PFM)	10
			Daru= 1300 Nos		
			Amaltash= 100 Nos		
			Paza= 450 Nos		

			Kachnar= 700 Nos		
			Jamun= 1550 Nos		
			Ambla= 1250 Nos		
			Bahera= 100 Nos		
	OD-153 Kamrah	C-II	Deodar= 2000 Nos	DPF Kamrah(JICA PFM)	10
			Rakhal= 1200 Nos		
			Khanor= 1500 Nos		
			Chuli= 800 Nos		
	OD-121 Kaulpur Chil	C-II	Deodar= 1000 Nos	Kaulpur Chil (JICA Deptt. Mode)	10
			Chil= 600 Nos		
			Willow= 200 Nos		
			Rubinia= 300 Nos		
			Khanor= 2800 Nos		
			Bahera= 30 Nos		
			B Cherry= 100 Nos		
			Chuli= 470 Nos		
	ND-143 Challela	Whole	Deodar= 300 Nos	DPF Challela(JICA Deptt. Mode)	10
			Chil= 250 Nos		
			Daru= 1690 Nos		
			Ban= 10 Nos		
			Paza= 800 Nos		
			Kachnar= 500 Nos		
			Jamun= 1000 Nos		
			Harad= 50 Nos		
			Ritha= 400 Nos		
			Bahera= 500 Nos		
	ND-164 Sanora	Whole	Daru= 5000 Nos	DPF Sanora (JICA Deptt. Mode)	10
			Jamun= 500 Nos		
	OD-153 Kamrah	C-II	Deodar= 2000 Nos	DPF Kamrah(JICA Deptt. Mode)	10
			Rakhal= 1200 Nos		
			Khanor= 1500 Nos		
			Chuli= 800 Nos		

4.2 Area affected by forest fires:

Due to semi-arid conditions of the climate, dry-deciduous nature of forests, temperature rise and humidity fall, there is a fire hazard build up in the summers starting with April till June. This time coincides with the fire season of the area. The maximum temperature may rise to 43°C and the rainfall is scanty in these months. In the drought areas, due to more

accumulation of leaf litter, the fire hazard is multiplied. In the previous working plan period, 750 forest fires occurred affecting 3441.26 ha of forest area. The details are given in Table 4.2

Table 4.2 Fire incidents reported in Past WP

Fire incidents reported in Past WP										
Kangoo range 2010-11										
Sr No.	Name of Range	Name of Block	Name of Beat	Name of D.P.F	Total area affected	Natural/regeneration on area	Plantation area	Other area	Estimated loss	Total area
1	Kangoo	Batwara	Batwara	D.P.F. Jartu	80 Hac	lucenia, Khair, Slambda	-	80	-	80
2	Kangoo	Batwara	Dhawal	Ahen Sunali Shisham	25 Hac	shisham, Khair	-	25	-	25
3	Kangoo	Batwara	Dhawal	Ahen sunali	35 Hac	dhou, kambhal	-	35	63000	35
4	Kangoo	Dehar	Dehar	d.P.F. bhuwana	9hac	Shisham, khair	-	9	26000	9
	Kangoo	Dehar	dehar	D.P.F shordu	6Hac	Shisham Khair	-	6	-	6

2011-12

1	Kangoo	Behli	Haraboi	D.P.F Thungdhar	15	-	15	-	130000	15

2012-13

1	Kangoo	Batwara	Dhawal	Ahen sunali	32	-	26	6	200000	32

2013-14

	Kangoo	Batwara	Serikothi	D.P.F Salyana	4hac	-	-	4	-	4
					2014-15					
	Kangoo				Nil					
					2015-16					
1	Kangoo	Dehar	Umri	D.P.F Umri	9Hac	--	-	9	-	9
2	Kangoo	Batwara	Dhawal	Ahen sunali	2Hac	--	-	2	-	2
3	Kangoo	Kangoo	Behli	Behli	4hac	--	-	4	-	4
4	Kangoo	Dehar	Umri	D.P.F Umri	2Hac	--	-	2	-	2
					2016-17			2.75		2.75
1	Kangoo	Batwara	Dhawal	D.P.F Dhawal	2.75	-	-	-		

2	Kangoo	Batwara	Batwara	D.P.F. Jartu	2.5	-	-	2.5		2.5
3	Kangoo	Batwara	Dhawal	D.P.F Dhawal	2.5	-	-	2.5		2.5
4	Kangoo	Dehar	Jyor	D.P.f. Guddidhar	2		-	2	-	2
5	Kangoo	Dehar	Dehar	slappar	9	-	-	9	-	9
6	Kangoo	Dehar	Dehar	Siun	5	-	-	5	-	5
7	Kangoo	Batwara	Dhawal	mandehli	4	-	-	4		4
8	Kangoo	Batwara	Dhawal	D.P.F Dhawal	1.5	-	-	1.5	-	1.5
9	Kangoo	Batwara	Dhawal	Ahen sunali	3	-	-	3	-	3
10	Kangoo	Batwara	Dhawal	U.P.F Kyan	2.5	-	-	2.5	-	2.5
11	Kangoo	Dehar	Dehar	Shordu	8	-	-	8-	-	8
					2017-18					
1	Kangoo	Dehar	Umri	D.P.F Dhar	2	-	-	2	-	2
2	Kangoo	Batwara	Gehru	D.P.F. Gehroo	0.5	-	-	0.5	-	0.5
3	Kangoo	Batwara	Gehru	D.P.F. Gehroo	1	-	1	-	10000	1
4	Kangoo	Batwara	Dhawal	D.P.f. Mandehali	1.5	-	-	1.5	-	1.5
5	Kangoo	Dehar	Dehar	D.P.F Siun	2	-	-	2	-	2
6	Kangoo	Batwara	Batwara	D.P.F jaral	2	-	-	2	-	2
7	Kangoo	Batwara	batwara	D.P.f. Patta	0.12	-	-	0.12	-	0.12
8	Kangoo	Batwara	batwara	D.P.f. Patta C-III	6	-	-	6	-	6
9	Kangoo	Batwara	Dhawal	D.P.F. Dhawal	1			1		1
					2018-19					
1	Kangoo	Batwara	Dhawal	D.P.F Dhawal	16	-	16	-	80000	16
2	Kangoo	Behli	Behli	D.P.F behli	15	-	-	15	-	15
3	Kangoo	Dehar	Jyor	D.P.f Ghangnoo	3	-	-	3	-	3
4	Kangoo	Dehar	Dehar	D.P.F Barota	2	-	-	2	-	2
5	Kangoo	Behli	Behli	D.P.F kralang	2.5	-	-	2.5	-	2.5
6	Kangoo	Dehar	Dehar	D.P.F Siun	7	-	7	-	80000	7
7	Kangoo	Dehar	Jyor	U.P.F kotlu	2	-	-	2	-	2
8	Kangoo	Behli	Behli	D.P.F kralang	10	-	10	-	87000	10
9	Kangoo	Batwara	Gehru	D.P.F. gehru	19	-	19	-	289000	19
10	Kangoo	Dehar	Dehar	D.P.F. sarosh	17.7	-	-	17	-	17
11	Kangoo	Dehar	Dehar	D.P.F. bhuwana	15	-	-	15		15
12	Kangoo	Dehar	Umri	D.P.F. Umri	20			20		20
13	Kangoo	Batwara	Dhawal	D.P.F	3		30		550000	30

				Dhawal						
14	Kangoo	Dehar	Umri	n.d.339 Dhar	15	-	-	15		15
15	Kangoo	Batwara	Dhawal	Ahen Sunali Shisham	5			5		5
16	Kangoo	Behli	Haraboi	D.P.f Bartha, Karla	15	-	-	15		15
17	Kangoo	Behli	Behli	d.P.F. sojha	12	-	12		127000	12
18	Kangoo	Batwara	Dhawal	D.P.F Dhawal	30	-	30		400000	30
19	Kangoo	Dehar	Dehar	D.P.F. salpper	25	-	25		140000	25
20	Kangoo	Behli	Badhoo	D.P.F Deoli	4	-	4		60000	4
					2019-20	-				
1	Kangoo	Behli	Badhoo	O D Chouri	1.5	-	-	1.5		1.5
2	Kangoo	Dehar	Jyor	U.P.F malha	0.5	-	-	0.5		0.5
3	Kangoo	Dehar	Dehar	D.P.f Silh	2	-	-	2		2
4	Kangoo	Dehar	Umri	u.P.f nalag	2	-	-	2		2
5	Kangoo	Dehar	Dehar	D.P.f. sarosh	2	-	-	2		2
6	Kangoo	Behli	Haraboi	D.P.f Thungdhar	1.5	-	-	1.5		1.5
7	Kangoo	Dehar	Umri	D.P.F. manjhkhatar	4	-	-	4		4
8	Kangoo	Dehar	Dehar	D.P.f. sarosh	2	-	-	2		2
9	Kangoo	Dehar	Umri	D.P.f dhar	3	-	-	3		3
10	Kangoo	Dehar	Jyor	D.P.f koon	3	-	-	3		3
					2020-21					
1	Kangoo	Dehar	Jyor	U.P.F Kotlu	0.4	-		0.4		0.4
2	Kangoo	Dehar	Dehar	D.P.f. sarosh	1	-		1		1
3	Kangoo	Dehar	Dehar	Shordu	4	-		4		4
4	Kangoo	Dehar	Dehar	D.P.F. Siun	0.5	-		0.5		0.5
5	Kangoo	Dehar	Umri	D.P.F dhar	1	-		1		1
6	Kangoo	Behli	Behli	D.P.F Behli	1.5	-		1.5		1.5
7	Kangoo	Dehar	Umri	D.P.F dhar	4	-		4		4
8	Kangoo	Dehar	Umri	D.P.f chanol	2	-		2		2
9	Kangoo	Behli	Behli	D.P.f katohar	1	-		1		1
10	Kangoo	Behli	Haraboi	d.P.f Khalind	1	-	1		15000	1
11	Kangoo	Dehar	Jyor	D.P.f. ghangnoo	1	-		1		1
12	Kangoo	Behli	Haraboi	d.P.f Khalind	5	-	5		108400	5
13	Kangoo	Batwara	Gehru	D.P.F gehroo	0.5	-		0.5		0.5
14	Kangoo	Dehar	Umri	D.P.F Manjhkhatar	25	-	10	15	200000	25
15	Kangoo	Batwara	Serikoth	D.P.f	12	-		12		12

			i	salyana						
16	Kangoo	Batwara	Serikoth i	D.P.f salyana ca	7.06	-	7.06		350000	7.06
	kangoo	Behli	haraboi	d.P.f thungdhar	1	-		1		1
	kangoo	Batwara	Serikoth i	D.P.f salyana	5	-	4	1	125000	5
17	Kangoo	bEHLI	HARAB OI	d.P.f thungdhar	1	-		1		1
18	Kangoo	bEHLI	HARAB OI	d.P.F Khalind	2	-		2		2
19	Kangoo	Batwara	Serikoth i	D.P.F Grahan	10	-	10		386000	10
20	Kangoo	behli	HARAB OI	D.P.f jalah	1	-		1		1
21	Kangoo	Batwara	Batwara	D.P.f Jartu	4	-	4		40000	4
22	Kangoo	dehar	Dehar	D.P.F salappar	3	-		3		3
23	Kangoo	behli	haraboi	D.P.f Jalah	2	-		2		2
					2021-22					
1	Kangoo	behli	haraboi	D.P.F karla	5		5			5
2	Kangoo	Dehar	Jyor	D.P.f Dratak	1		1			1
3	Kangoo	Batwara	Dhawal	Ahen sunali	8		5	3	110000	8
4	Kangoo	Batwara	Dhawal	D.P.F. dhawal	15		15		450000	15

Jhungi Range										
Sr N o.	Name of Range	Name of Block	Name of Beat	Name of D.P.F	Total area affected	Natural/regenrati on on area	Plantati on area	Othe r area	Estimat ed loss	Total area
					Year2010- 11					
	Jhungi	Jhungi	Jhungi	Narsingh	8hac.	conifer seedlings, berberis, herbs	-	8hac.		8hac.
			Jhungi	Richhni	20hac.	do		20ha c.		20hac.
			Pandar	Manjhki	20hac.	do		20ha c.		20hac.
			Pandar	Galukhar	25hac.	Chill, berberis, herbs, shrubs	5hac.	20ha c.	60000	25hac.
			Jhungi	Shivshan kar	25hac.	do	10hac.	15ha c.	72000	25hac.
			Trechh	Narehli	18hac.	do	6hac.	12ha c.	52000	18hac.
			Trechh	Trehri	15hac.	do	6hac.	9hac.	48000	15hac.
					Year2012- 13					
			Kinder	Dhamkon		Chil, shrubs, herbs	5hac.	9hac.	46000	14hac.

			Marehra	Makrahad		do	3hac.	10hac.	32000	13hac.
					Year2013-14					
					Nil					
					Year2014-15					
					Nil					
					Year2015-16					
			Marehra	Marehra			5hac.	20hac.	50000	25hac.
					Year2016-17					
			Salani	Salani		chill needles, shrubs		1hac.		1hac.
			Kinder	Narehli		do, shrubs		16hac.		16hac.
			Kinder	Jodhnu				2hac.		2hac.
					Year2017-18			16hac.		16hac.
			Kinder	Narehli		do, shrubs		3.5hac.		3.5hac.
			Kinder	Tarehri		do, shrubs		16hac.		16hac.
					Year2018-19					
			Kinder	Jodhnu		Chill, needles, shrubs	20hac.	10hac.	320000	30hac.
			Kinder	Jodhnu		do	3hac.	4hac.	56000	7hac.
			Kinder	Narehli		do		6hac.		6hac.
			Balag	Bag		do		15hac.		15hac.
			Balag	Bag		do		18hac.		18hac.
			Kinder	Dhamkon				20hac.		20hac.
					Year2019-20					
			Kinder	Narehli		do	1hac.	27hac.	19000	28hac.
			Kinder	Salrelu		do		5hac.		5hac.
					Year2020-21					
			Kinder	Dhamkon				20hac.		20hac.
			Kinder	Khoondhar				5hac.		5hac.
			Jaral	Manjhki			5hac.	10hac.	200000	10hac.
					Year2021-22	Connifer seedling, shrubs, herbs		12hac.		12hac.
			Kathiuni	Kathiuni		do	5hac.	10hac.	100000	15hac.
			Galukha	Galukhar						

			r							
					Year2022-23					
			Bandli	Kuftu		Chiil, Ban seedlings, Shrubs, Herbs, pine needles		4hac.		4hac.
			Bandli	Bandli		do		1hac.		1hac.
			Balag	Kathla		do		16hac.		16hac.
			Kanoun	Kanoun		do		5hac.		5hac.
			Nihri	Chehar		do		0.3hac.		0.3hac.
			Reagi	Ghera		do		2hac.		2hac.
			Reagi	Bhoon		do		3hac.		3hac.
			Reagi	Ghera		do		4hac.		4hac.
			Kinder	Dhamkou n		do		8hac.		8hac.
			Bandli	Kuftu		do		10hac.		10hac.
			Kinder	Dhamkon		do		9hac.		9hac.
			Bandli	Kuftu		do	5hac.	7hac.	140000	12hac.
			Marehra	Kot		do	2hac.	0hac.	56000	2hac.
			salani	Sarelu		do		4hac.		4hac.
			Kinder	Khoondhar		do	3hac.	7hac.	81000	10hac.
			Kinder	Narehli		do	9hac.	5.5hac.	337450	14.5hac.
					Year 2023-24	do				
			Salani	Khoondhar		do	7hac.	-	280000	7hac.
			Jhungi	Shivshankar		do	5hac.	-	125000	5hac.
			Jaral	Manjhki		do	4hac.	15hac.	169268	19hac.
			Kinder	Jodhnu		do	3hac.	9hac.	90000	12hac.
			Kinder	Jodhnu		do	10hac.	-	250000	10hac.
			Kathiuni	Dharli		do	-	3hac.	-	3hac.
			Trechh	Tandidhar		do	5hac.	-	185000	5hac.
			Trechh	Trechh		do	3hac.		-	3hac.
			Kinder	Narehli		do	16hac.	94hac.	787000	110hac.
			Kinder	Tarehri		do	5hac.	45hac.	300000	50hac.
			Kinder	Jodhnu		do	1hac.	-	50000	1hac.
			Kinder	Tarehri		do	8hac.	7hac.	400000	15hac.
Jai Devi Range										

2010-11										
1	Jai Devi	Nandgarh	Hatgarh	UPF Salosara	7	7	0	0	0	7
2	Jai Devi	Nandgarh	Kuttachi	ND 96 Kuttachi - I	3	0	3	0	35000	3
	Jai Devi	Jai Devi	Doldhar	Saradhar	2.5	0	2.5	0	30000	2.5
	Jai Devi	Jai Devi	Doldhar	DPF Khaneti	2.5	2.5	0	0	2000	2.5
2011-12---Nil										
2012-13										
	Jai Devi	Rohanda	Rohanda	DPF Thachsilh	5	5	0	0	0	5
	Jai Devi	Rohanda	Khabri	DPF Khariyand	3	3	0	0	0	3
	Jai Devi	Rohanda	Chowki	DPF Khabora	4	4	0	0	0	4
	Jai Devi	Nandgarh	Chhamyar	DPF Chhattersil h	2.5	2.5	0	0	0	2.5
	Jai Devi	Nandgarh	Kuttachi	DPF Majhog	2	2	0	0	0	2
	Jai Devi	Nandgarh	Hatgarh	UPF Salosara	2	2	0	0	0	2
	Jai Devi	Nandgarh	Hatgarh	UPF Salosara	5	5	0	0	0	5
	Jai Devi	Nandgarh	Chhamyar	DPF Makora	2	2	0	0	0	2
2013-14										
	Jai Devi	Jai Devi	Jai Devi	DPF Nagdhar	2	2	0	0	0	2
	Jai Devi	Nandgarh	Hatgarh	DPF Madhogan	2	2	0	0	0	2
2014-15										
	Jai Devi	Nandgarh	Chhamyar	DPF Makora	1.75	1.75	0	0	0	1.75
	Jai Devi	Jai Devi	Jai Devi	DPF Kuthain	0.25	0.25	0	0	0	0.25
	Jai Devi	Jai Devi	Jai Devi	DPF Kuthain	1	1	0	0	0	1
	Jai Devi	Jai Devi	Ghiri	Kaulpur Chil	0.5	0.5	0	0	0	0.5
	Jai Devi	Jai Devi	Ghiri	Kaulpur Chil	0.5	0.5	0	0	0	0.5
	Jai Devi	Jai Devi	Doldhar	DPF Panyas	1.2	1.25	0	0	0	1.25
	Jai Devi	Jai Devi	Jai Devi	DPF Dharmi	0.25	0.25	0	0	0	0.25
	Jai Devi	Jai Devi	Kamand	DPF Bakalag	1.75	1.75	0	0	0	1.75
	Jai Devi	Jai Devi	Doldhar	DPF	1	1	0	0	0	1

				saradhar						
	Jai Devi	Jai Devi	Doldhar	DPF Doldhar	1.5	1.5	0	0	0	1.5
	Jai Devi	Jai Devi	Jai Devi	DPF Dagoh	1.25	1.25	0	0	0	1.25
2015-16										
	Jai Devi	Jai Devi	Hatgarh	Sethal	1.75	1.75	0	0	0	1.75
	Jai Devi	Jai Devi	Jai Devi	DPF Kuthain	1	1	0	0	0	1
	Jai Devi	Jai Devi	Jai Devi	DPF Baudhal	1	1	0	0	0	1
	Jai Devi			UPF Suad	1	1	0	0	0	1
	Jai Devi	Jai Devi	Doldhar	DPF Panyas	1.5	1.5	0	0	0	1.5
	Jai Devi	Jai Devi	Jai Devi	UPF Mahu	0.5	0.5	0	0	0	0.5
	Jai Devi	Nandgarh	Hatgarh	DPF hatgarh	1.9	1.9	0	0	0	1.9
	Jai Devi	Nandgarh	Hatgarh	UPF Barnog	1.5	1.5	0	0	0	1.5
	Jai Devi	Nandgarh	Hatgarh	UPF Salosara	1.75	1.75	0	0	0	1.75
	Jai Devi	Nandgarh	Chhamyar	DPF Sangrair	1	1	0	0	0	1
	Jai Devi	Jai Devi	Jai Devi	DPF Panyas	1.5	1.5	0	0	0	1.5
	Jai Devi	Jai Devi	Jai Devi	DPF Kuthain	0.75	0.75	0	0	0	0.75
	Jai Devi									
2016-17										
	Jai Devi	Jai Devi	Ghiri	DPF Kaulpur Ban	1.5	1.5	0	0	0	1.5
	Jai Devi	Rohanda	Khabri	DPF Khariyand	1	1	0	0	0	1
	Jai Devi	Jai Devi	Jai Devi	DPF Roparikot hi	0.5	0.5	0	0	0	0.5
	Jai Devi	Jai Devi	Jai Devi	DPF Roparikot hi	1	1	0	0	0	1
	Jai Devi	Jai Devi	Jai Devi	Kuthain	22	22	0	0	0	22
	Jai Devi	Nandgarh	Kuttachi	DPF Kuttachi	5	5	0	0	0	5
	Jai Devi	Nandgarh	Kuttachi	DPF Kuttachi	65	65	0	0	0	65
	Jai Devi	Nandgarh	Kuttachi	DPF Kuttachi	5	5	0	0	0	5
	Jai Devi	Jai Devi	Jai Devi	Kuthain	1	1	0	0	0	1
	Jai Devi	Rohanda	Rohanda	DPF Bhebal	1.5	1.5	0	0	0	1.5
	Jai Devi	Nandgarh	Nandgarh	DPF	5	5	0	0	0	5

				Badhu						
	Jai Devi	Nandgarh	Nandgarh	DPF Drahal	20	20	0	0	0	20
	Jai Devi	Nandgarh	Nandgarh	DPF Drahal	4	4	0	0	0	4
	Jai Devi	Jai Devi	Jai Devi	Kuthain	0.5	0.5	0	0	0	0.5
	Jai Devi	Rohanda	Kamand	DPF Matoh	0.75	0.75	0	0	0	0.75
2017-18										
	Jai Devi	Nandgarh	Chhamyar	DPF Makora	1	1	0	0	0	1
	Jai Devi	Nandgarh	Kuttachi	DPF Killing	1.5	1.5	0	0	0	1.5
	Jai Devi	Nandgarh	Hatgarh	UPF Salosara	2.5	2.5	0	0	0	2.5
	Jai Devi	Nandgarh	Hatgarh	UPF Salosara	2.5	2.5	0	0	0	2.5
	Jai Devi	Nandgarh	Hatgarh	UPF Salosara	10	10	0	0	0	10
	Jai Devi	Nandgarh	Hatgarh	UPF Nauda	1	1	0	0	0	1
	Jai Devi	Jai Devi	Jai Devi	DPF Dharmai	0.5	0.5	0	0	0	0.5
	Jai Devi	Jai Devi	Doldhar	DPF Doldhar	2	2	0	0	0	2
	Jai Devi	Jai Devi	Jai Devi	Kuthain	0.5	0.5	0	0	0	0.5
	Jai Devi	Rohanda	Kamand	DPF Bakalag	7	0	7	0	40000	7
	Jai Devi	Jai Devi	Ghiri	DPF Kaulpur Chil	0.5	0	0.5	0	2000	0.5
	Jai Devi	Nandgarh	Hatgarh	UPF Salosara	0.5	0.5	0	0	0	0.5
	Jai Devi	Nandgarh	Chhamyar	DPF Makora	2	2	0	0	0	2
	Jai Devi	Jai Devi	Doldhar	Kotla	0.5	0.5	0	0	0	0.5
	Jai Devi	Jai Devi	Doldhar	DPF Hafwana	0.5	0.5	0	0	0	0.5
	Jai Devi	Jai Devi	Ghiri	Tapli	2	2	0	0	0	2
	Jai Devi	Rohanda	Rohanda	DPF Berumara	1	1	0	0	0	1
	Jai Devi	Jai Devi	Ghiri	Kaulpur Ban	1.5	1.5	0	0	0	1.5
	Jai Devi	Rohanda	Rohanda	DPF Bhebal	4.5	4.5	0	0	0	4.5
	Jai Devi	Rohanda	Rohanda	DPF Berumara	4	4	0	0	0	4
2018-19										
	Jai Devi	Rohanda	Rohanda	OD 148 Thuhadhar	10	10	0	0	0	10
	Jai Devi	Jai Devi	Jai Devi	DPF Kuthain	0.5	0	0	0.5	0	0.5

	Jai Devi	Jai Devi	Jai Devi	DPF OD 126 Kuthain	0.75	0	0	0.75	0	0.75
	Jai Devi	Rohanda	Khabri	OD 161 Khabri	13	0	3	10	9975	13
	Jai Devi	Rohanda	Khabri	OD 166 Khariyand	5	0	0	5	0	5
	Jai Devi	Jai Devi	Doldhar	ND 136 Khaneti	3	0	0	3	0	3
	Jai Devi	Nandgarh	Chhamyar	DPF makora	1.5	0	0	1.5	0	1.5
	Jai Devi	Jai Devi	Doldhar	ND 136 Khaneti	12	0	0	12		12
	Jai Devi	Jai Devi	Doldhar	DPF Kateru	3	0	0	3		3
	Jai Devi	Nandgarh	Chhamyar	DPF Makora	15	0	0	15	0	15
	Jai Devi	Jai Devi	Jai Devi	DPF Khudinala	8	0	0	8	0	8
	Jai Devi	Jai Devi	Ghiri	DPF Baghair	9	0	5	4	47750	9
	Jai Devi	Jai Devi	Ghiri	Kaulpur Chil	5	0	5	0	55200	5
	Jai Devi	Jai Devi	Ghiri	OD 121 Kaulpur chil	25	0	0	25	0	25
	Jai Devi	Nandgarh	Hatgarh	UPF Gawalti	5	0	0	5	0	5
	Jai Devi	Jai Devi	Jai Devi	DPF Dharmi	3	0	0	3	0	3
	Jai Devi	Jai Devi	Jai Devi	DPF Dagoh	2	0	0	2	0	2
	Jai Devi	Nandgarh	Hatgarh	DPF makora	15	0	0	15	0	15
	Jai Devi	Rohanda	Khabri	DPF Sanora	20	0	0	20	0	20
	Jai Devi	Rohanda	Kamand	Karedu	9	0	4	5	20000	9
	Jai Devi	Rohanda	Kamand	Karedu	11	0	6	5	27500	11
	Jai Devi	Rohanda	Kamand	Cheora	10	0	5	5	15000	10
	Jai Devi	Nandgarh	Nandgarh	DPF Nandgarh	2	0	0	2	0	2
	Jai Devi	Rohanda	Khabri	Chiund 1st (DPF Thihkar)	5	0	5	0	5150	5
	Jai Devi	Rohanda	Khabri	Chiyund - 2nd (DPF Thihkar)	5	0	5	0	5000	5
	Jai Devi	Rohanda	Khabri	Chiyund -3rd (DPF Thihkar)	10	0	10	0	5125	10
	Jai Devi	Jai Devi	Jai Devi	DPF Kuthain	2	0	0	2	0	2
	Jai Devi	Rohanda	Chowki	ND 176 Kalaun	2	0	0	2	0	2

	Jai Devi	Jai Devi	Doldhar	DPF Khaneti	5	0	5	0	20375	5
	Jai Devi	Nandgarh	Nandgarh	DPF Nandgarh	5	0	0	5	0	5
	Jai Devi	Rohanda	Khabri	DPF Sanora	15	0	0	15	0	15
	Jai Devi	Nandgarh	Chhamyar	ND 86 Chattersil h	14	0	0	14	0	14
	Jai Devi	Nandgarh	Hatgarh	UPF Salosada	10	0	0	10	0	10
	Jai Devi	Jai Devi	Doldhar	DPF Doldhar	10	0	0	10	0	10
	Jai Devi	Nandgarh	Hatgarh	DPF Madhogan	15	0	0	15	0	15
2019-20										
	Jai DeviBB4: K19	Nandgarh	Kuttachi	ND 92 Kiling	5	0	0	5	0	5
	Jai Devi	Jai Devi	Jai Devi	DPF Dagoh	4	0	0	4	0	4
	Jai Devi	Nandgarh	Chhamyar	UPF Dhalechru	2	0	0	2	0	2
	Jai Devi	Jai Devi	Jai Devi	OD 124 Kafla	7	0	7	0	65000	7
	Jai Devi	Jai Devi	Jai Devi	OD 125 Roparikot hi	10	0	0	10	0	10
	Jai Devi	Nandgarh	Hatgarh	UPF Salosara	10	10	0	0	0	10
	Jai Devi	Jai Devi	Doldhar	ND 139 Doldhar	1	1	0	0	0	1
	Jai Devi	Jai Devi	Doldhar	ND 139 Doldhar	1	1	0	0	0	1
	Jai Devi	Jai Devi	Jai Devi	OD 126 Kuthain	57	57	0	0	0	57
	Jai Devi	Nandgarh	Chhamyar	OD 76 Makora	12	12	0	0	0	12
	Jai Devi	Nandgarh	Hatgarh	ND 83 Kaliphan Dhar	3	3	0	0	0	3
	Jai Devi	Rohanda	Khabri	ND 162 Thihkar	5	0	5	0	15000	5
	Jai Devi	Jai Devi	Jai Devi	OD 124 Kafla	7	7	0	0	0	7
	Jai Devi	Jai Devi	Doldhar	ND 139 Doldhar	2	2	0	0	0	2
	Jai Devi	Jai Devi	Doldhar	ND 137 Banani Badhrolu	0.75	0.75	0	0	0	0.75
	Jai Devi	Jai Devi	Doldhar	ND 139 Doldhar	2	2	0	0	0	2
	Jai Devi	Jai Devi	Doldhar	Panjyog	3.5	3.5	0	0	0	3.5
	Jai Devi	Jai Devi	Jai Devi	UPF	1	1	0	0	0	1

				Draman						
	2020-21									
	Jai Devi	Jai Devi	Doldhar	DPF Khaneti	1.5	1.5	0	0	0	1.5
	Jai Devi	Jai Devi	Jai Devi	DPF Palauta	2.5	2.5	0	0	0	2.5
	Jai Devi	Rohanda	Khabri	DPF Khabri	1.5	1.5	0	0	0	1.5
	Jai Devi	Jai Devi	Doldhar	UPF Cheli	0.3	0.3	0	0	0	0.3
	Jai Devi	Jai Devi	Doldhar	DPF Panjyog	0.3	0.3	0	0	0	0.3
	Jai Devi	Jai Devi	Doldhar	DPF Doldhar	0.1	0.1	0	0	0	0.1
	Jai Devi	Nandgarh	Chhamyar	OD 77 Sangrair	4.85	4.85	0	0	0	4.85
	Jai Devi	Jai Devi	Doldhar	DPF Kotla	0.3	0.2	0.1	0	6890	0.3
	Jai Devi	Jai Devi	Doldhar	DPF Doldhar	0.3	0.3	0	0	0	0.3
	Jai Devi	Rohanda	Khabri	DPF Garh Parala	4.5	4.5	0	0	0	4.5
	Jai Devi	Jai Devi	Ghiri	N.D. 145 Garella	10.5	5.5	5	0	100000	10.5
	Jai Devi	Nandgarh	Kuttachi	N.D. 96 Kuttachi	10	3	7	0	140000	10
	Jai Devi	Nandgarh	Kuttachi	OD 99 Damech	3	3	0	0	0	3
	Jai Devi	Nandgarh	Chhamyar	OD 77 sangrair	2.5	0	2.5	0	45000	2.5
	Jai Devi	Jai Devi	Doldhar	DPF Challela	11	4	7	0	50000	11
	Jai Devi	Rohanda	Khabri	DPF Khabri	35	35	0	0	0	35
	2021-22									
	Jai Devi	Rohanda	Khabri	DPF Sanora	3	3	0	0	0	3
	Jai Devi	Nandgarh	Chhamyar	OD 77 Sangrair	2	2	0	0	0	2
	Jai Devi	Rohanda	Kamand	DPF Pakyoda	4	4	0	0	0	4
	Jai Devi	Nandgarh	Hatgarh	DPF Madhogan	7	7	0	0	0	7
	Jai Devi	Jai Devi	Doldhar	Phangwas	3	3	0	0	0	3
	Jai Devi	Jai Devi	Doldhar	DPF Jandroh	0.5	0.5	0	0	0	0.5
	Jai Devi	Jai Devi	Jai Devi	UPF Khagrao	1	1	0	0	0	1
Sarkaghat										
Sr No.	Name of Range	Name of Block	Name of Beat	Name of D.P.F	Total area affected	Natural/rege nration on	Plantation area	Othe r area	Estimated loss	Total area

						area				
1	Sarkaghat	Sarkaghat	Chandrakar i	OD Chandrakari	11.5	9	2.5		0	11.5
2	Sarkaghat	Sarkaghat	Chandrakar i	OD Chandrakari	10	10	0		0	10
3	Sarkaghat	Sarkaghat	Gopalpur	ND Tapoun	11	7	4		0	11
4	Sarkaghat	Sarkaghat	Sarkaghat	DPF Jhinjnoo 1	4	2	2		0	4
5	Sarkaghat	Sarkaghat	Gopalpur	DPF Barnog	9	9	0		0	9
6	Sarkaghat	Durgapur	Pingla	DPF Bairadhar	1	1	0		0	1
7	Sarkaghat	Thona	Jamdwar	DPF Jamdwar	1.75	0	1.75		0	1.75
8	Sarkaghat	Thona	Jamdwar	DPF Jamdwar	1.75	0	1.75		0	1.75
9	Sarkaghat	Durgapur	Badharwar	DPF Thathal	18.25	15	3.25		0	18.25
10	Sarkaghat	Sarkaghat	Sarkaghat	DPF Jhinjnoo 1	1.75	0	1.75		8000	1.75
11	Sarkaghat	Sarkaghat	Chandrakar i	OD Chandrakari	1.5	1	0.50		0	1.5
12	Sarkaghat	Sarkaghat	Bhangoh	DPF Bhangoh	1.75	0	1.75		8000	1.75
13	Sarkaghat	Sarkaghat	Chandrakar i	OD Chandrakari	2	1	1		0	2
15	Sarkaghat	Sarkaghat	Chandrakar i	O.D Chandrakari	1	0	1		11000/0	1
16	Sarkaghat	Sarkaghat	Chandrakar i	O.D Chandrakari	0.5	0	0.5		5500	0.5
17	Sarkaghat	Sarkaghat	Chandrakar i	O.D Chandrakari	2.5	2.5	0		0	2.5
18	Sarkaghat	Durapur	Pinlgla	DPF Bairadhar	3	2	1		0	3
19	Sarkaghat	Sarkaghat	Sarkaghat	DPF Jhinjnoo	2.5	2.5	0		0	2.5
20	Sarkaghat	Sarkaghat	Maseran	UPF Bhyalag	5	5	0		0	5
21	Sarkaghat	Thona	Thona	DPF Murahdhar	4	4	0		0	4
22	Sarkaghat	Thona	Jamdwar	DPF Jamdwar	4	1	3		0	4
23	Sarkaghat	Durgapur	Kaldoo	DPF Kaldoo	6	2	4		0	6
24	Sarkaghat	Durgapur	Kaldoo	DPF Kaldoo	6	1	5		0	6

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26	Sarkaghat	Sarkaghat	Sarkaghat	DPF Jhnjnnoo	1.5	1.5	0		0	1.5
27	Sarkaghat	Sarkaghat	Maseran	DPF Doon silh	5	5	0		0	5
28	Sarkaghat	Sarkaghat	Sarkaghat	DPF Jhinjnnoo 1	2	2	0		0	2
30	Sarkaghat	Durgapur	Pingla	UPF Grodu	1	1	0		0	1
31	Sarkaghat	Sarkaghat	Bhangoh	DPF Bhangoh	5	5	0		0	5
32	Sarkaghat	Sarkaghat	Sarkaghat	DPF Jhinjnnoo	3	1	2		0	3
33	Sarkaghat	Sarkaghat	Gopalpur	DPF Bid	6	6	0		0	6
34	Sarkaghat	Thona	Jamdwar	DPF Gamdhoul	4	4	0		0	4
35	Sarkaghat	Thona	Jamdwar	UPF Berri	4	4	0		0	4
36	Sarkaghat	Thona	Thona	DPF Murahdharr	5	5	0		0	5
37	Sarkaghat	Thona	Bhadarwar	DPF Thathal	26	26	0		0	26
38	Sarkaghat	Thona	Thona	DPF Kholtu	3	1	2		0	3
39	Sarkaghat	Thona	Jamdwar	DPF Jamdwar	3	3	0		0	3
40	Sarkaghat	Sarkaghat	Sarkaghat	DPF Jhinjnnoo	3.5	2	1.5		0	3.5
41	Sarkaghat	Thona	Jamdwar	DPF Jamdwar	3	3	0		0	3
43	Sarkaghat	Sarkaghat	Deobrarta	DPF Deobradta	1	1	0		0	1
44	Sarkaghat	Sarkaghat	Gopalpur	D.P.F Barnog	5	5	0		0	5
45	Sarkaghat	Sarkaghat	Bhangoh	DPF Bhangoh	3	3	0		0	3
46	Sarkaghat	Sarkaghat	Maseran	U.P.F Bhiyalag	2	2	0		0	2
48	Sarkaghat	Sarkaghat	Chandrakhari	DPF Chandrakari	5	0	5		0	5
49	Sarkaghat	Sarkaghat	Deobrarta	DPF Deo Bradta	0.5	0.5	0		0	0.5
50	Sarkaghat	Sarkaghat	Chandrakhari	ND Piplidhar	0.5	0.5	0		0	0.5
51	Sarkaghat	Sarkaghat	Chandrakhari	DPF Sihnal	1.5	1.5	0		0	1.5
52	Sarkaghat	Sarkaghat	Sarkaghat	DPF Jhinjnnoo	2	0	2		0	2
53	Sarkaghat	Durgapur	Kaldoo	DPF Kaldoo	4.5	0.5	4		0	4.5
54	Sarkaghat	Sarkaghat	Bhangoh	DPF Bhangoh	1.5	0	1.5		0	1.5
55	Sarkaghat	Thona	Bhadarwar	DPF	10	10	0		0	10

				Thathal						
56	Sarkaghat	Thona	Tikkar	DPF Jhumdhar	5	5	0		0	5
57	Sarkaghat	Sarkaghat	Maseran	DPF Batalhri	2.5	2.5	0		0	2.5
58	Sarkaghat	Durgaur	Pingla	DPF Bairadhar	5	3	2		0	5
60	Sarkaghat	Thona	Bhadarwar	DPF Thathal	5	5	0		0	5
61	Sarkaghat	Thona	Jamdwar	DPF Kalas	2	2	0		0	2
62	Sarkaghat	Thona	Jamdwar	DPF Jamdwar 2nd	1	1	0		0	1
63	Sarkaghat	Durgapur	Kaldoo	DPF Silh	7	7	0		0	7
64	Sarkaghat	Thona	Tikkar	DPF Chobhra	1	1	0		0	1
65	Sarkaghat	Thona	Thona	DPF Behlidhar	2	2	0		0	2
67	Sarkaghat	Thona	Bhadarwar	DPF Thathal	3	3	0		0	3
68	Sarkaghat	Sarkaghat	Deobrarta	DPF Deo Bradta	1	1	0		0	1
69	Sarkaghat	Thona	Bhadarwar	DPF Thathal	3	3	0		0	3
70	Sarkaghat	Sarkaghat	Chandrakhari	DPF Sihnnal	1	1	0		0	1
71	Sarkaghat	Sarkaghat	Deobrarta	DPF Deo Bradta	1	1	0		0	1
72	Sarkaghat	Sarkaghat	Sarkaghat	DPF Jhinjoo	1	1	0		0	1
73	Sarkaghat	Thona	Tikkar	DPF Jhoomdhar	2	2	0		0	2
74	Sarkaghat	Thona	Bhadarwar	DPF Thathal	2	2	0		0	2
75	Sarkaghat	Durgapur	Pingla	DPF Sandoh	2	2	0		0	2
76	Sarkaghat	Sarkaghat	Chandrakhari	Govt land Kangu ka Galu near Ropar	0.5	0.5	0		0	0.5
77	Sarkaghat	Thona	Thona	DPF Murahdhar	3.5	3.5	0		0	3.5
78	Sarkaghat	Sarkaghat	Chandrakhari	DPF Chandrakari	2	2	0		0	2
79	Sarkaghat	Sarkaghat	Bhangoh	DPF Bhangoh	4	4	0		0	4
80	Sarkaghat	Sarkaghat	Sarkaghat	DPF Jhinjoo	1	1	0		0	1
81	Sarkaghat	Sarkaghat	Chandrakhari	DPF Chandrak	2	2	0		0	2

				ari						
82	Sarkaghat	Sarkaghat	Gopalpur	DPF Barnog	3	3	0		0	3
84	Jai Devi	Sarkaghat	Bhangoh	DPF Bhangoh	1	1	0		0	1
85	Jai Devi	Sarkaghat	Maseran	DPF Bhalyana	1.5	1.5	0		0	1.5
86	Jai Devi	Sarkaghat	Deobarta	DPF Deo Bradta	2	2	0		0	2
87	Jai Devi	Sarkaghat	Sarkaghat	DPF Jhinjnoo	4	4	0		0	4
88	Jai Devi	Durgapur	Kaldoo	DPF Kaldoo	1	1	0		0	1
89	Jai Devi	Durgapur	Kaldoo	DPF Chamba Nal	3	3	0		0	3
90	Jai Devi	Thona	Bhadarwar	DPF Thathal	2	2	0		0	2
91	Jai Devi	Thona	Bhadarwar	DPF Thathal	2.5	2.5	0		0	2.5
92	Jai Devi	Sarkaghat	Bhangoh	DPF Bhangoh	2.5	0	2.5		67600	2.5
93	Jai Devi	Thona	Jamdwar	UPF Baira	4	4	0		0	4
94	Jai Devi	Sarkaghat	Sarkaghat	Jhinjnoo 0I	3	3	0		0	3
95	Jai Devi	Sarkaghat	Sarkaghat	Jhinjnoo 0I	3	3	0		0	3
96	Jai Devi	Durgapur	Kaldoo	DPF Kaldoo	6	6	0		0	6
97	Jai Devi	Sarkaghat	Bhangoh	DPF Bhangoh	2	2	0		0	2
98	Jai Devi	Sarkaghat	Gopalpur	DPF Tapoun	3	3	0		0	3
99	Jai Devi	Thona	Jamdwar	DPF Kalash	4	0	4		22750	4
103	Jai Devi	Thona	Jamdwar	DPF Jamdwar	1	0	1		20000	1
104	Jai Devi	Durgapur	Kaldoo	DPF Kaldoo	3	2	1		0	3
105	Jai Devi	Thona	Jamdwar	DPF Jamdwar II	1.5	0	1.5		30000	1.5
106	Jai Devi	Thona	Jamdwar	Govt Land	1.5	0	1.5		30000	1.5
108	Jai Devi	Thona	Thona	DPF Murahdharr	23	20	3		90000	23
109	Jai Devi	Sarkaghat	Gopalpur	DPF Barnog	4	4				4
110	Jai Devi	Sarkaghat	Bhangoh	DPF Bhangoh	4	1.5	2.5		75000	4
111	Jai Devi	Sarkaghat	Maseran	DPF Doon Silh	15	15	0		0	15

Baldwara										
Sr. No.	Name of Range	Name of Block	Name of Beat	Name of RF/DPF	Total area Affected	Natural / Regeneration on Area	Plantation Area	Other Area	Estimated Loss	Total Area
1	Baldwara	Bhambla	Dhalwan	DPF Bairasen	12 Hac.	—	—	12 Hact.	6000	12 Hac.
2	Baldwara	Bhambla	Dhalwan	DPF Phet	0.5 Hac.	—	—	0.5 Hac.	1200	0.5 Hac.
3	Baldwara	Leda	Balhra	DPF Kathyaun	4 Hac.	—	—	4 Hac.	600	4 Hac.
4	Baldwara	Leda	Leda	DPF Sidhkot C5 & C6	12 Hac.	—	3 Hac.	9 Hac.	14000	12 Hac.
5	Baldwara	Baldwara	Bahanu	DPF Suhagra	0.40 Hac.	—	—	0.40 Hac.	—	0.40 Hac.
6	Baldwara	Baldwara	Bahanu	DPF Suhagra C1 & C2	5.15 Hac.	—	—	5.15 Hac.	—	5.15 Hac.
7	Baldwara	Leda	Bairkot	DPF Bairkot	10 Hac.	—	5 Hac.	5 Hac.	Approx. 35000	10 Hac.
8	Baldwara	Leda	Balhra	DPF Sarsyalu	15 Hac.	—	2 Hac.	13 Hac.	Approx. 20000	15 Hac.
9	Baldwara	Goverta	Batrapandhiri	DPF Sadwal	8 Hac.	—	—	8 Hac.	Approx. 25000	8 Hac.
10	Baldwara	Goverta	Amblagalu	DPF Mandaroo	7 Hac.	—	—	7 Hac.	—	7 Hac.
11	Baldwara	Baldwara	Hatli	DPF Panwari	8 Hac.	—	—	8 Hac.	Approx. 35000	8 Hac.
12	Baldwara	Baldwara	Bahanu	DPF Suhagra	3 Hac.	—	—	3 Hac.	—	3 Hac.
13	Baldwara	Baldwara	Bahanu	DPF Suhagra	4 Hac.	—	—	4 Hac.	—	4 Hac.
14	Baldwara	Baldwara	Bahanu	DPF Suhagra	6 Hac.	—	—	6 Hac.	—	6 Hac.
15	Baldwara	Baldwara	Bahanu	DPF Nijhrishan	1.50 Hac.	—	—	1.50 Hac.	—	1.50 Hac.
16	Baldwara	Baldwara	Bahanu	DPF Suhagra C1	3 Hac.	—	—	3 Hac.	—	3 Hac.
17	Baldwara	Baldwara	Bahanu	DPF Suhagra C1 & C2	7 Hac.	—	—	7 Hac.	—	7 Hac.
18	Baldwara	Baldwara	Bahanu	DPF Dhaboi	2 Hac.	—	—	2 Hac.	—	2 Hac.
19	Baldwara	Baldwara	Trifalghat	UPF Nawani	5 Hac.	—	—	5 Hac.	—	5 Hac.

20	Baldwara	Bhambla	Dhaulkhan	UPF Batahlari	5 Hac.	–	5 Hac.	–	Approx. 30000	5 Hac.
21	Baldwara	Bhambla	Dhaulkhan	DPF Dhaulkhan	14 Hac.	–	–	14 Hac.	Approx. 30000	14 Hac.
22	Baldwara	Leda	Balhra	DPF Sarsyalu	4 Hac.	–	–	4 Hac.	–	4 Hac.
23	Baldwara	Leda	Balhra	DPF Duganal	2 Hac.	–	–	2 Hac.	–	2 Hac.
24	Baldwara	Leda	Leda	DPF Gurkotha	3 Hac.	–	–	3 Hac.	–	3 Hac.
25	Baldwara	Goverta	Goverta	DPF Goverta	10 Hac.	–	–	10 Hac.	–	10 Hac.
26	Baldwara	Goverta	Goverta	DPF Goverta	6 Hac.	–	–	6 Hac.	–	6 Hac.
27	Baldwara	Goverta	Goverta	ND Goverta	4 Hac.	–	–	4 Hac.	–	4 Hac.
28	Baldwara	Goverta	Batrapandhiri	DPF Batrapandhiri	2.50 Hac.	–	–	2.50 Hac.	–	2.50 Hac.
29	Baldwara	Goverta	Batrapandhiri	DPF Batrapandhiri	7 Hac.	–	–	7 Hac.	–	7 Hac.
30	Baldwara	Goverta	Amblagalu	ND Mandaroo	3 Hac.	–	–	3 Hac.	Approx. 33000	3 Hac.
31	Baldwara	Goverta	Amblagalu	ND Raped	1 Hac.	–	–	1 Hac.	–	1 Hac.
32	Baldwara	Goverta	Batrapandhiri	DPF Sadwal	1 Hac.	–	–	1 Hac.	–	1 Hac.
33	Baldwara	Bhambla	Dhaulkhan	DPF Dhaulkhan	0.64 Hac.	–	–	0.64 Hac.	–	0.64 Hac.
34	Baldwara	Leda	Bairkot	DPF Halyatar	3 Hac.	–	3 Hac.	–	Approx. 30000	3 Hac.
35	Baldwara	Leda	Bairkot	DPF Bairkot C 7&8	25 Hac.	–	–	25 Hac.	–	25 Hac.
36	Baldwara	Leda	Leda	DPF Sidhkot	25 Hac.	–	–	25 Hac.	–	25 Hac.
37	Baldwara	Goverta	Batrapandhiri	DPF Sadwal	7 Hac.	–	–	7 Hac.	–	7 Hac.
38	Baldwara	Baldwara	Bahanu	DPF Dhaboi	2 Hac.	–	–	2 Hac.	–	2 Hac.
39	Baldwara	Leda	Balhra	DPF Patroun	4 Hac.	–	–	4 Hac.	–	4 Hac.
40	Baldwara	Baldwara	Hatli	DPF Bhater	3 Hac.	–	–	3 Hac.	–	3 Hac.
41	Baldwara	Bhambla	Dhaulkhan	DPF Jakhair	0.5 Hac.	–	0.5 Hac.	–	Approx. 10280	0.5 Hac.
42	Baldwara	Bhambla	Dhalwan	DPF Silh	1 Hac.	–	–	1 Hac.	–	1 Hac.

43	Baldwara	Bhambla	Dhalwan	DPF Bairasen	5 Hac.	–	–	5 Hac.	–	5 Hac.
44	Baldwara	Leda	Balhra	DPF Kathyaun	3 Hac.	–	–	3 Hac.	–	3 Hac.
45	Baldwara	Leda	Balhra	DPF Sarsyalu	20 Hac.	–	–	20 Hac.	–	20 Hac.
46	Baldwara	Leda	Balhra	DPF Patroun	10 Hac.	–	–	10 Hac.	–	10 Hac.
47	Baldwara	Leda	Leda	DPF Gurkotha	6 Hac.	–	–	6 Hac.	–	6 Hac.
48	Baldwara	Leda	Leda	DPF Leda	5 Hac.	–	–	5 Hac.	–	5 Hac.
49	Baldwara	Leda	Leda	DPF Sikandra	4 Hac.	–	–	4 Hac.	–	4 Hac.
50	Baldwara	Leda	Leda	DPF Sidhkot	35 Hac.	–	–	35 Hac.	–	35 Hac.
51	Baldwara	Goverta	Goverta	OD Goverta	60 Hac.	–	–	60 Hac.	–	60 Hac.
52	Baldwara	Goverta	Batrapandhiri	DPF Ropri Nala	3 Hac.	–	–	3 Hac.	–	3 Hac.
53	Baldwara	Goverta	Batrapandhiri	DPF Sadwal	15 Hac.	–	–	15 Hac.	–	15 Hac.
54	Baldwara	Baldwara	Hatli	DPF Panwari	1.5 Hac.	–	–	1.5 Hac.	–	1.5 Hac.
55	Baldwara	Leda	Balhra	UPF Balhra	1 Hac.	–	–	1 Hac.	–	1 Hac.
56	Baldwara	Goverta	Batrapandhiri	DPF Batrapand hiri	2 Hac.	–	–	2 Hac.	–	2 Hac.
57	Baldwara	Goverta	Amblagalu	Kalkhar I	1 Hac.	–	–	1 Hac.	–	1 Hac.
58	Baldwara	Leda	Leda	DPF Sidhkot	3 Hac.	–	–	3 Hac.	–	3 Hac.
59	Baldwara	Goverta	Batrapandhiri	DPF Batrapand hiri	4 Hac.	–	–	4 Hac.	–	4 Hac.
60	Baldwara	Goverta	Amblagalu	DPF Majhwan	3.60 Hac.	–	–	3.60 Hac.	–	3.60 Hac.
61	Baldwara	Goverta	Amblagalu	DPF Mandaroo	5 Hac.	–	–	5 Hac.	–	5 Hac.
62	Baldwara	Leda	Bairkot	ODPF Bairkot	4 Hac.	–	–	4 Hac.	–	4 Hac.
63	Baldwara	Leda	Bairkot	DPF Halyatar	5 Hac.	–	–	5 Hac.	–	5 Hac.
64	Baldwara	Leda	Bairkot	UPF Burali	1 Hac.	–	–	1 Hac.	–	1 Hac.
65	Baldwara	Leda	Bairkot	NDPF Bairkot	4 Hac.	–	–	4 Hac.	–	4 Hac.
66	Baldwara	Leda	Bairkot	ODPF Bairkot	10 Hac.	–	–	10 Hac.	300 No. Resin Blazes	10 Hac.
67	Baldwara	Leda	Leda	ODPF	4	–	–	4	–	4 Hac.

				Sikandra	Hac.			Hac.		
68	Baldwara	Leda	Leda	ODPF Sidhkot	3 Hac.	–	–	3 Hac.	–	3 Hac.
69	Baldwara	Goverta	Goverta	NDPF Tharu	2 Hac.	–	–	2 Hac.	–	2 Hac.
70	Baldwara	Goverta	Goverta	NDPF Goverta	3 Hac.	–	–	3 Hac.	–	3 Hac.
71	Baldwara	Goverta	Batrapandhiri	NDPF Sadwal	3 Hac.	–	–	3 Hac.	350 No. Resin Blazes	3 Hac.
72	Baldwara	Goverta	Batrapandhiri	NDPF Sadwal	10 Hac.	–	–	10 Hac.	2060 No. Resin Blazes	10 Hac.
73	Baldwara	Baldwara	Bahanu	DPF Nijhrishan	2 Hac.	–	–	2 Hac.	–	2 Hac.
74	Baldwara	Baldwara	Trifalghat	UPF Bhatera	5 Hac.	–	–	5 Hac.	–	5 Hac.
75	Baldwara	Leda	Balhra	UPF Gumalgar h	7 Hac.	–	–	7 Hac.	–	7 Hac.
76	Baldwara	Bhambla	Bhambla	DPF Jaboth C1	25 Hac.	–	5 Hac.	20 Hac.	Approx.11 4410	25 Hac.
77	Baldwara	Baldwara	Hatli	DPF Panwari	15 Hac.	–	–	15 Hac.	–	15 Hac.
78	Baldwara	Bhambla	Dhaulkhan	ODPF Dhaulkhan	42 Hac.	–	3 Hac.	39 Hac.	Approx.82 290	42 Hac.
79	Baldwara	Bhambla	Dhaulkhan	NDPF Dhaulkhan	14 Hac.	–	–	14 Hac.	–	14 Hac.
80	Baldwara	Bhambla	Dhalwan	DPF Phet	8 Hac.	–	–	8 Hac.	–	8 Hac.
81	Baldwara	Leda	Bairkot	DPF Halyatar	1 Hac.	–	–	1 Hac.	–	1 Hac.
82	Baldwara	Leda	Balhra	UPF Kwalkot	2.50 Hac.	–	–	2.50 Hac.	600 No. Resin Blazes	2.50 Hac.
83	Baldwara	Goverta	Goverta	NDPF Tharu	15 Hac.	–	–	15 Hac.	–	15 Hac.
84	Baldwara	Goverta	Goverta	NDPF Tharu	17 Hac.	–	–	17 Hac.	–	17 Hac.
85	Baldwara	Goverta	Goverta	NDPF Goverta	12 Hac.	–	–	12 Hac.	–	12 Hac.
86	Baldwara	Goverta	Goverta	ODPF Goverta C3	5 Hac.	–	–	5 Hac.	–	5 Hac.
87	Baldwara	Goverta	Batrapandhiri	DPF Batrapand hiri	8 Hac.	–	–	8 Hac.	–	8 Hac.
88	Baldwara	Baldwara	Trifalghat	UPF Basoun	12 Hac.	–	–	12 Hac.	–	12 Hac.

89	Baldwara	Bhambla	Dhaulkhan	NDPF Jakhair	2 Hac.	—	—	2 Hac.	Approx. 8050	2 Hac.
90	Baldwara	Bhambla	Dhaulkhan	NDPF Chilchogan	3 Hac.	—	—	3 Hac.	Approx. 5600	3 Hac.
91	Baldwara	Bhambla	Dhaulkhan	NDPF Dhaulkhan	5 Hac.	—	5 Hac.	—	Approx. 165523	5 Hac.
92	Baldwara	Bhambla	Dhalwan	DPF Bairasen	8 Hac.	—	—	8 Hac.	Approx. 28000	8 Hac.
93	Baldwara	Bhambla	Bhambla	UPF Haran	2 Hac.	—	—	2 Hac.	—	2 Hac.
94	Baldwara	Bhambla	Bhambla	UPF Sanehroo	1 Hac.	—	—	1 Hac.	—	1 Hac.
95	Baldwara	Leda	Bairkot	ODPF Bairkot C 7&8	18 Hac.	—	—	18 Hac.	—	18 Hac.
96	Baldwara	Leda	Bairkot	ODPF Bairkot C 7	15 Hac.	—	—	15 Hac.	—	15 Hac.
97	Baldwara	Leda	Balhra	UPF Balhra	3 Hac.	—	—	3 Hac.	—	3 Hac.
98	Baldwara	Leda	Balhra	NDPF Kathyaun	20 Hac.	—	—	20 Hac.	1713 No. Resin Blazes & 59955/-	20 Hac.
99	Baldwara	Leda	Balhra	NDPF Patroun	3 Hac.	—	—	3 Hac.	500 No. Resin Blazes & 7500/-	3 Hac.
100	Baldwara	Leda	Leda	ODPF Sidhkot	8.5 Hac.	—	—	8.5 Hac.	—	8.5 Hac.
101	Baldwara	Leda	Leda	ODPF Sidhkot	2 Hac.	—	—	2 Hac.	800 No. Resin Blazes & 28000/-	2 Hac.
102	Baldwara	Leda	Leda	ODPF Sikandra	8 Hac.	—	3 Hac.	5 Hac.	Approx. 68600/-	8 Hac.
103	Baldwara	Goverta	Goverta	ODPF Goverta C3	2 Hac.	—	—	2 Hac.	—	2 Hac.
104	Baldwara	Goverta	Goverta	NDPF Tharu	3 Hac.	—	—	3 Hac.	—	3 Hac.
105	Baldwara	Goverta	Goverta	ODPF Goverta	8 Hac.	—	—	8 Hac.	—	8 Hac.
106	Baldwara	Goverta	Goverta	ODPF Goverta C5	5 Hac.	—	—	5 Hac.	—	5 Hac.
107	Baldwara	Goverta	Goverta	NDPF Tharu	8 Hac.	—	—	8 Hac.	—	8 Hac.

108	Baldwara	Goverta	Amblagalu	NDPF Raped	4 Hac.	—	—	4 Hac.	400 No. Resin Blazes & 14000/-	4 Hac.
109	Baldwara	Goverta	Amblagalu	NDPF Kalther II	3Hac.	—	—	3Hac.	300 No. Resin Blazes & 10500/-	3Hac.
110	Baldwara	Goverta	Amblagalu	NDPF Kalther I	3 Hac.	—	—	3 Hac.	350 No. Resin Blazes & 12500/-	3 Hac.
111	Baldwara	Goverta	Amblagalu	NDPF Kalther I	0.5 Hac.	—	—	0.5 Hac.	—	0.5 Hac.
112	Baldwara	Baldwara	Bahanu	NDPF Dhaboi	7 Hac.	—	—	7 Hac.	—	7 Hac.
113	Baldwara	Leda	Bairkot	ODPF Bairkot C2	3 Hac.	—	—	3 Hac.	—	3 Hac.
114	Baldwara	Leda	Bairkot	ODPF Bairkot C2	2 Hac.	—	—	2 Hac.	—	2 Hac.
115	Baldwara	Leda	Bairkot	ODPF Bairkot C4	7 Hac.	—	—	7 Hac.	—	7 Hac.
116	Baldwara	Goverta	Batrapandhiri	NDPF Batrapand hiri	8 Hac.	—	—	8 Hac.	—	8 Hac.
117	Baldwara	Goverta	Batrapandhiri	NDPF Batrapand hiri	2 Hac.	—	—	2 Hac.	—	2 Hac.
118	Baldwara	Goverta	Goverta	NDPF Tharu	7 Hac.	—	—	7 Hac.	—	7 Hac.
119	Baldwara	Goverta	Goverta	NDPF Goverta	3 Hac.	—	—	3 Hac.	—	3 Hac.
120	Baldwara	Goverta	Goverta	ODPF Goverta	5 Hac.	—	—	5 Hac.	—	5 Hac.
121	Baldwara	Goverta	Goverta	NDPF Tharu	20 Hac.	—	—	20 Hac.	—	20 Hac.
122	Baldwara	Goverta	Goverta	ODPF Goverta	10 Hac.	—	—	10 Hac.	—	10 Hac.
123	Baldwara	Leda	Balhra	NDPF Duganal	4 Hac.	—	—	4 Hac.	500 No. Resin Blazes & 17500/-	4 Hac.
124	Baldwara	Baldwara	Trifalghat	UPF Bhatera	5 Hac.	—	—	5 Hac.	—	5 Hac.
125	Baldwara	Bhambla	Dhaul Khan	ODPF Dhaulkha n, NDPF Dhaulkha n, ND Chilchoga n, ND Tamled	42 Hac.	—	5 Hac.	37 Hac.	137148/-	42 Hac.

126	Baldwara	Leda	Bairkot	NDPF Halyatar	7 Hac.	–	2 Hac.	5 Hac.	52000/-	7 Hac.
127	Baldwara	Leda	Balhra	UPF Balhra	1 Hac.	–	–	1 Hac.	–	1 Hac.
128	Baldwara	Leda	Balhra	UPF Bralnu	3 Hac.	–	–	3 Hac.	–	3 Hac.
129	Baldwara	Goverta	Amblagalu	NDPF Mandaroo	2 Hac.	–	–	2 Hac.	–	2 Hac.
130	Baldwara	Baldwara	Bahanu	NDPF Suhagra	5 Hac.	–	–	5 Hac.	–	5 Hac.
131	Baldwara	Goverta	Batrapandhiri	NDPF Sadwal	4 Hac.	–	–	4 Hac.	–	4 Hac.
132	Baldwara	Goverta	Batrapandhiri	NDPF Sadwal	2 Hac.	–	–	2 Hac.	–	2 Hac.
133	Baldwara	Leda	Leda	NDPF Sikandra	0.25 Hac.	–	–	0.25 Hac.	–	0.25 Hac.
134	Baldwara	Leda	Leda	NDPF Sikandra C4	1.5 Hac.	–	–	1.5 Hac.	–	1.5 Hac.
135	Baldwara	Leda	Balhra	UPF Jol	0.8 Hac.	–	–	0.8 Hac.	–	0.8 Hac.
136	Baldwara	Baldwara	Trifalghat	UPF Bdoun	6 Hac.	–	–	6 Hac.	–	6 Hac.
137	Baldwara	Baldwara	Trifalghat	UPF Bhatera	4 Hac.	–	–	4 Hac.	–	4 Hac.
138	Baldwara	Baldwara	Trifalghat	UPF Basoun	3 Hac.	–	–	3 Hac.	–	3 Hac.
139	Baldwara	Goverta	Batrapandhiri	NDPF Batrapand hiri	30 Hac.	–	–	30 Hac.	–	30 Hac.
140	Baldwara	Goverta	Batrapandhiri	NDPF Sadwal	15 Hac.	–	–	15 Hac.	–	15 Hac.
141	Baldwara	Goverta	Goverta	NDPF Tharu	15 Hac.	–	–	15 Hac.	–	15 Hac.
142	Baldwara	Leda	Leda	NDPF Sidhkot	2.50 Hac.	–	–	2.50 Hac.	–	2.50 Hac.
143	Baldwara	Leda	Balhra	NDPF Duganal	5 Hac.	–	3 Hac.	2 Hac.	105360/-	5 Hac.
144	Baldwara	Baldwara	Trifalghat	UPF Nawani	2 Hac.	–	–	2 Hac.	2565/-	2 Hac.
145	Baldwara	Baldwara	Bahanu	NDPF Nijhrishan	2 Hac.	–	–	2 Hac.	–	2 Hac.
146	Baldwara	Baldwara	Bahanu	NDPF Nijhrishan	7 Hac.	–	5 Hac.	2 Hac.	70000/-	7 Hac.
147	Baldwara	Goverta	Batrapandhiri	Nala Ra Gehra	6.98 Hac.	–	–	6.98 Hac.	–	6.98 Hac.
148	Baldwara	Leda	Leda	ODPF Sidhkot	7 Hac.	–	–	7 Hac.	–	7 Hac.
149	Baldwara	Leda	Leda	NDPF Sidhkot	9 Hac.	–	–	9 Hac.	–	9 Hac.
150	Baldwara	Leda	Leda	ODPF Sidhkot	15 Hac.	–	–	15 Hac.	–	15 Hac.

151	Baldwara	Leda	Leda	NDPF Gurkotha	15 Hac.	–	–	15 Hac.	25650/-	15 Hac.
152	Baldwara	Leda	Leda	NDPF Leda	3 Hac.	–	–	3 Hac.	11354/-	3 Hac.
153	Baldwara	Goverta	Goverta	UPF Jawali	4 Hac.	–	–	4 Hac.	–	4 Hac.
154	Baldwara	Goverta	Goverta	NDPF Tharu	14 Hac.	–	–	14 Hac.	–	14 Hac.

Suket Range

Sr No.	Name of Range	Name of Block	Name of Beat	Name of D.P.F	Total area affected	Natural/regeneration on area	Plantation area	Other area	Estimated loss	Total area
				Nil						
				Nil						
	Suket	Sadar	Sadar	DPF Bechna	6.7	6.7	0		0	6.7
	Suket	Sadar	Jadraoun	DPF Thalagdhar	5.6	5.6	0		0	5.6
	Suket	Sadar	Jarol	DPF Jarol	8.9	8.9	0		0	8.9
	Suket	Sadar	Sadar	DPF Derdu	2.5	2.5	0		0	2.5
	Suket				23.7	23.7				23.7
	Suket			Nil	0					0
	Suket	Sadar	Jadraoun	DPF Thalagdhar I	5	5	0		0	5
	Suket	Sadar	Sadar	DPF Bechna	5	5	0		0	5
	Suket	Sadar	Trambri	DPF Drahal	1.5	1.5	0		0	1.5
	Suket	Baggi	Baggi	DPF chowkri	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Beena	1	1	0		0	1
	Suket	sadar	Jarol	DPF Fagla	3	3	0		0	3
	Suket	sadar	Sadar	DPF Harabag	2	2	0		0	2
	Suket	Baggi	Baggi	DPF Chowkri	10	10	0		0	10
	Suket	Sadar	Trambri	DPF Trambri	3	3	0		0	3
	Suket	sadar	Jarol	DPF jarol	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Derdu	2	2	0		0	2
	Suket	Sadar	Jadraoun	DPF Jadroun	3	3	0		0	3

	Suket				39.5	39.5				39.5
	Suket	Baggi	Baggi	DPF Kandlu	3	3	0		0	3
	Suket	Sadar	Jarol	DPF Ropari II	1	1	0		0	1
	Suket	Sadar	Sadar	DPF Bechna	3	3	0		0	3
	Suket	Sadar	Sadar	DPF Bechna	3	3	0		0	3
	Suket	Sadar	Sadar	DPF Draman	5	5	0		0	5
	Suket	Sadar	Sadar	DPF Sundervan	10	10	0		0	10
	Suket				25	25				25
	Suket	Sadar	Sadar	DPF Derdu	3.5	3.5	0		0	3.5
	Suket	Sadar	Sadar	DPF Sundervan	2.5	2.5	0		0	2.5
	Suket	Sadar	Trambri	DPF Trambari	2.5	2.5	0		0	2.5
	Suket	Sadar	Sadar	DPF Sundervan	1.5	1.5	0		0	1.5
	Suket	Sadar	Trambri	DPF Drahal	4.5	4.5	0		0	4.5
	Suket	Sadar	Sadar	DPF Bechna	3.5	3.5	0		0	3.5
	Suket	Sadar	Sadar	DPF Bechna	4.5	4.5	0		0	4.5
	Suket	Sadar	Jadraoun	DPF Nal	1	1	0		0	1
	Suket	Sadar	Jadraoun	DPF Sabyahan	0.5	0.5	0		0	0.5
	Suket	Sadar	Sadar	DPF Dhar	2.5	2.5	0		0	2.5
	Suket	Sadar	Sadar	DPF Dhar	1	1	0		0	1
	Suket	Sadar	Sadar	DPF Bhanglera	1	1	0		0	1
	Suket	Sadar	Trambri	DPF Trambari	3	3	0		0	3
	Suket	Sadar	Jadraoun	DPF Ghouru 1st	2.5	2.5	0		0	2.5
	Suket	Sadar	Jadraoun	DPF Thalagdhar I	3	3	0		0	3
	Suket	Sadar	Jarol	DPF Jarol	2.5	2.5	0		0	2.5
	Suket	Sadar	Sadar	DPF Sundervan	2.5	2.5	0		0	2.5
	Suket	Sadar	Jadraoun	DPF Nalout	3	3	0		0	3
	Suket	Sadar	Jarol	DPF Harabag	1	1	0		0	1
	Suket	Sadar	Jarol	DPF Ropari	2	2	0		0	2

	Suket	Sadar	Nalni	DPF Saryun	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Ropari II	2	2	0		0	2
	Suket	Baggi	Baggi	DPF Dhangyara	1	1	0		0	1
	Suket	Sadar	Jadraoun	DPF Ghouru -II	4	4	0		0	4
	Suket				57	57				57
	Suket	Sadar	Trambri	DPF Drahal	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Jarol	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Ropari	1.5	1.5	0		0	1.5
	Suket	Sadar	Nalni	DPF Sariun	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Bechna	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Beena	2	2	0		0	2
	Suket	sadar	Sadar	DPF Sundervan	1.5	1.5	0		0	1.5
	Suket	Sadar	Jarol	DPF Fagla	2	2	0		0	2
	Suket	sadar	Sadar	DPF Sundervan	1.5	1.5	0		0	1.5
	Suket	Baggi	Rajgarh	DPF Tarlaza Ghrounti	2	2	0		0	2
	Suket	Sadar	Jadraoun	DPF Ghouru	2	2	0		0	2
	Suket	sadar	Sadar	DPF Bechna	2	2	0		0	2
	Suket	Baggi	Rajgarh	DPF LOT Makoda	2	2	0		0	2
	Suket	Baggi	Baggi	DPF Tarlaza Ghrounti	1.5	1.5	0		0	1.5
	Suket	Sadar	Jarol	DPF Ghangal	1	1	0		0	1
	Suket				27	27				27
	Suket	Baggi	Baggi	DPF Kangru	1.5	1.5	0		0	1.5
	Suket	Sadar	Sadar	DPF Derdu	1.5	1.5	0		0	1.5
	Suket				3	3				3
	Suket	sadar	Sadar	DPF Bechna	2	2	0		0	2
	Suket	Sadar	Jarol	DPF jarol	1.5	1.5	0		0	1.5
	Suket	Sadar	Nalni	DPF Sariun	2	2	0		0	2
	Suket	Sadar	Jadraoun	DPF	2	2	0		0	2

				Talsai						
	Suket	Sadar	Jarol	DPF Chila -Ra-Rihdi	1	1	0		0	1
	Suket	sadar	Sadar	DPF Sundervan	2	2	0		0	2
	Suket	sadar	Sadar	DPF Dhar	2	2	0		0	2
	Suket	Sadar	Jadraoun	DPF Ghouru	2	2	0		0	2
	Suket	Sadar	Nalni	DPF Patyoda	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Jarol	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Bechna	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Sundervan	2.5	2.5	0		0	2.5
	Suket	Sadar	Jarol	DPF Fagla	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Ghangal	2	2	0		0	2
	Suket	Baggi	Baggi	UPF Kenchdi	1.5	1.5	0		0	1.5
	Suket	Sadar	Sadar	DPF Derdu	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Harabag	2	2	0		0	2
	Suket	Sadar	Jadraoun	DPF Kurada	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Sundervan	2	2	0		0	2
	Suket	Sadar	Nanli	DPF Sariun	2	2	0		0	2
	Suket	Sadar	Jadraoun	DPF Jadroun	2.5	2.5	0		0	2.5
	Suket	Sadar	Jarol	DPF Fagla	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Bhanglera	1	1	0		0	1
	Suket	Baggi	Baggi	DPF Tarlaza	2.5	2.5	0		0	2.5
	Suket	Baggi	Baggi	UPF Baggi	1.5	1.5	0		0	1.5
	Suket			UPF Karsanu	1	1	0		0	1
	Suket	Baggi	Baggi	DPF Jujhu -Mujhu	2	2	0		0	2
	Suket	Baggi	Baagi	DPF Dagwahan	2	2	0		0	2
	Suket			DPF Godwar	2.5	2.5	0		0	2.5
	Suket			DPF Gadchol	2.5	2.5	0		0	2.5
	Suket	Baggi	Rajgarh	DPF Rajgarh	1	1	0		0	1
	Suket	Baggi	Baggi	DPF Tarlaza	1.5	1.5	0		0	1.5

	Suket	Sadar	Jadraoun	DPF Baila Balahar	2.5	2.5	0		0	2.5
	Suket	Sadar	Jadraoun	DPF Thalagdhar	2	2	0		0	2
	Suket	Sadar	Jadraoun	DPF Ghouru	2.5	2.5	0		0	2.5
	Suket	Sadar	Jadraoun	DPF Jadroun	1	1	0		0	1
	Suket	Sadar	Jadraoun	DPF Ghouru	2.5	2.5	0		0	2.5
	Suket	Sadar	Rajgarh	DPF Khiuri	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Sundervan	2.5	2.5	0		0	2.5
	Suket	Sadar	Rajgarh	DPF Khiuri	2.5	2.5	0		0	2.5
	Suket	Sadar	Jadraoun	DPF Thalagdhar	2.5	2.5	0		0	2.5
	Suket	Sadar	Jadraoun	DPF Ghouru	2.5	2.5	0		0	2.5
	Suket	Sadar	Jadraoun	DPF Ghouru	2.5	2.5	0		0	2.5
	Suket	Sadar	Sadar	DPF Beena	5	5	0		0	5
	Suket			DPF Kandhar	2.5	2.5	0		0	2.5
	Suket	Baggi	Baggi	DPF Tarlaza	5	5	0		0	5
	Suket			UPF Sawad	2	2	0		0	2
	Suket	Sadar	Tarmbri	UPF Siharal	1	1	0		0	1
	Suket				101	101				101
	Suket	Sadar	Jadraoun	DPF Baila Balahar	1.5	1.5	0		0	1.5
	Suket	Sadar	Sadar	DPF Bechna	1.5	1.5	0		0	1.5
	Suket	Sadar	Jadraoun	DPF Sihli	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Bhanglera	2	2	0		0	2
	Suket	Sadar	Trambri	DPF Trambari	1.5	1.5	0		0	1.5
	Suket	Sadar	Sadar	DPF Bechna	1.5	1.5	0		0	1.5
	Suket				10	10				10
	Suket	Sadar	Jarol	DPF Fagla	4	4	0		0	4
	Suket	Sadar	Jadraoun	DPF Kurada	2	2	0		0	2
	Suket	Sadar	Jadraoun	DPF Kurada	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Jarol	2.5	2.5	0		0	2.5

	Suket	Sadar	Jarol	DPF Jarol	2.5	2.5	0		0	2.5
	Suket	Baggi	Baggi	DPF Tarlaza	1	1	0		0	1
	Suket	Sadar	Jarol	DPF Jarol	2	2	0		0	2
	Suket	Sadar	Jadraoun	DPF Upper Sihli	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Fagla	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Harabag	2	2	0		0	2
	Suket	Baggi	Baggi	DPF Jujhu-Mujhu	2.5	2.5	0		0	2.5
	Suket	Sadar	Jadraoun	DPF Talsai	2	2	0		0	2
	Suket	Sadar	Jadraoun	DPF Jadroun	2.5	2.5	0		0	2.5
	Suket	Sadar	Sadar	DPF Bechna	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Ropari	2	2	0		0	2
	Suket	Sadar	Jadraoun	DPF Trimhi	1.5	1.5	0		0	1.5
	Suket	Sadar	Jadraoun	DPF Baila Balahar	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Bechna	2	2	0		0	2
	Suket	Sadar	Jadraoun	DPF Talsai	1.5	1.5	0		0	1.5
	Suket	Sadar	Jadraoun	DPF Jadroun	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Jarol	2	2	0		0	2
	Suket	Sadar	Dhanotu	DPF Kafri	1.5	1.5	0		0	1.5
	Suket	Sadar	Jadraoun	DPF Baila Balahar	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Jarol	2	2	0		0	2
	Suket				49.5	49.5				49.5
	Suket	Sadar	Trambari	DPF Trambari	1	1	0		0	1
	Suket	Sadar	Nalni	DPF Sariun	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Fagla	8	8	0		0	8
	Suket	Sadar	Jarol	DPF Chila -R-Ridha	2	2	0		0	2
	Suket	Sadar	Nanli	DPF Saruin	2	2	0		0	2
	Suket	Sadar	Nalni	DPF Patyoda	2	2	0		0	2
	Suket	Sadar	Nalni	DPF Maloh	2	2	0		0	2
	Suket	Sadar	Nalni	DPF Patyoda	1	1	0		0	1

	Suket	Sadar	Jadraoun	DPF Baila Balahar	2	2	0		0	2
	Suket	Baggi	Baggi	DPF Kangru	1.5	1.5	0		0	1.5
	Suket	Sadar	Nalni	DPF Maloh	1	1	0		0	1
	Suket	Sadar	Jarol	DPF Harabag	1	1	0		0	1
	Suket	Sadar	Sadar	DPF Bechna	1.5	1.5	0		0	1.5
	Suket	Sadar	Jarol	DPF Jarol	1.5	1.5	0		0	1.5
	Suket	Sadar	Jadraoun	DPF Talsai 1st	1.5	1.5	0		0	1.5
	Suket	Sadar	Trambari	DPF Trambari	1	1	0		0	1
	Suket	Sadar	Trambari	DPF Trambari	1.5	1.5	0		0	1.5
	Suket	Baggi	Baggi	DPF Kangru	1.5	1.5	0		0	1.5
	Suket	Baggi	Rajgarh	DPF Kandhlu	1	1	0		0	1
	Suket	Baggi	Baggi	DPF LOT Makoda	1	1	0		0	1
	Suket				36	36				36
	Suket	Sadar	Jarol	DPF Jarol	1	1	0		0	1
	Suket	Sadar	Trambari	DPF Trambri C1(b)	1	1	0		0	1
	Suket	Sadar	Nalni	DPF Sariun	1	1	0		0	1
	Suket	Sadar	Jadraoun	DPF Upper Sihali	1	1	0		0	1
	Suket	Baggi	Rajgarh	DPF Khiuri	2	2	0		0	2
	Suket	Sadar	Jadraoun	DPF Trimhi	1.5	1.5	0		0	1.5
	Suket	Sadar	Trambari	Trambri (Nagbag)	1	1	0		0	1
	Suket	Sadar	Jarol	Chila- raphat	1	1	0		0	1
	Suket	Sadar	Sadar	Bina	2	2	0		0	2
	Suket	Sadar	Sadar	Derdu	2	2	0		0	2
	Suket	Sadar	Trambari	Trambri	1.5	1.5	0		0	1.5
	Suket	Sadar	Jarol	Ropari	2	2	0		0	2
	Suket	Sadar	Sadar	Derdu	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Dhar	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Bhechhna	2	2	0		0	2
	Suket	Baggi	Baggi	DPF Dhagwaha	1.5	1.5	0		0	1.5

				n						
	Suket	Sadar	Jarol	DPF Fagla	1	1	0		0	1
	Suket	Sadar	Sadar	DPF Bhanglera	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Saroni	1	1	0		0	1
	Suket	Sadar	Sadar	DPF Bhanglera	1	1	0		0	1
	Suket	Sadar	Jarol	DPF Fagla	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Bhechhna	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Bhechhna	1.5	1.5	0		0	1.5
	Suket	Sadar	Sadar	DPF Bhechhna	3	3	0		0	3
	Suket	Sadar	Sadar	DPF Bhanglera	1	1	0		0	1
	Suket	Sadar	Sadar	DPF Derdu	1.5	1.5	0		0	1.5
	Suket				40.5	40.5				40.5
	Suket	Sadar	Jarol	DPF Fagla	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Sunder van	1.5	1.5	0		0	1.5
	Suket	Sadar	Sadar	DPF Sundervan	0.5	0.5	0		0	0.5
	Suket	Sadar	Sadar	DPF Thaladhar	0.5	0.5	0		0	0.5
	Suket	Sadar	jarol	DPF Fagla	0.5	0.5	0		0	0.5
	Suket	Baggi	Baggii	DPF Jhujumujhu	3	3	0		0	3
	Suket	Sadar	jarol	DPF Fagla	5	0	5		0	5
	Suket	Sadar	Sadar	DPF Bhechhna	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Bhechhna	2	2	0		0	2
	Suket	Sadar	Sadar	Sunder Van`	1.5	1.5	0		0	1.5
	Suket	Sadar	Jadraoun	DPF Baila	1	1	0		0	1
	Suket	Baggi	Baggi	DPF Dagvahan	1.5	1.5	0		0	1.5
	Suket	Baggi	Baggi	DPF Dagwahan	1.5	1.5	0		0	1.5
	Suket	Sadar	Jadraoun	DPF Nalot IInd	1	1	0		0	1
	Suket	Sadar	Sadar	Dhar	0.5	0.5	0		0	0.5
	Suket	Sadar	Jarol	DPF Jarol	1	1	0		0	1
	Suket	Baggi	Baggi	DPF Jujhu Mujhu	3	3	0		0	3

	Suket	Baggi	Baggi	DPF Jujhu Mujhu	3	3	0		0	3
	Suket	Sadar	Trambari	DPF Drahal	1.5	1.5	0		0	1.5
	Suket	Sadar	Trambari	DPF Drahal	1.5	1.5	0		0	1.5
	Suket				34	29	5			34
	Suket	Sadar	Sadar	DPF Bhechana	1.5	1.5	0		0	1.5
	Suket	Sadar	Sadar	DPF Derdu	1.5	1.5	0		0	1.5
	Suket	Sadar	Sadar	DPF Derdu	1	1	0		0	1
	Suket	Sadar	Sadar	DPF Bhechana	3.5	3.5	0		0	3.5
	Suket	Sadar	Sadar	DPF Bhechana	1.5	1.5	0		0	1.5
	Suket	Sadar	Jadraoun	DPF Baila	1.5	1.5	0		0	1.5
	Suket	Sadar	Jadraoun	DPF Ghouru 1st	1.5	1.5	0		0	1.5
	Suket	Sadar	Jadraoun	DPF Kathalag Dhar 3rd	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Dhar	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Ghagal	2.5	2.5	0		0	2.5
	Suket	Sadar	Jadraoun	DPF Sihali	1.5	1.5	0		0	1.5
	Suket	Sadar	Sadar	DPF Bhechana C-I	1.5	1.5	0		0	1.5
	Suket	Baggi	Baggui	DPF Lot Makora C-I & C-II	1	1	0		0	1
	Suket	Sadar	Jarol	DPF Fagla C-II	4.5	4.5	0		0	4.5
	Suket	Sadar	Nalni	DPF Sruin	2	2	0		0	2
	Suket	Sadar	fTrambri	DPF Trambri - C3a	2	2	0		0	2
	Suket	Baggi	Rajgarh	DPF Kandlu	1	1	0		0	1
	Suket	Baggi	Rajgarh	DPFBhebl i	3.5	3.5	0		0	3.5
	Suket	Baggi	Rajgarh	DPF Khiuri	3	3	0		0	3
	Suket	Baggi	Rajgarh	DPF Tarlaza gharounti	0.3	0.3	0		0	0.3
	Suket	Sadar	Jarol	Chila ra Rida	2.5	2.5	0		0	2.5
	Suket	Sadar	Jarol	DPF Fagla	1.5	1.5	0		0	1.5

				C-II						
	Suket	sadar	Sadar	DPF Bhechna	3	3	0		0	3
	Suket	Sadar	Nalni	Bholu nala P/area 2016-17	1.5	1.5	0		0	1.5
	Suket	Sadar	Jarol	DPF Harabag	4	4	0		0	4
	Suket	Sadar	Sadar	DPF Bhechna	1	1	0		0	1
	Suket	Sadar	Sadar	DPF Bhechna	0.5	0.5	0		0	0.5
	Suket	Sadar	Jadraoun	DPF Thalgdhar	3.5	3.5	0		0	3.5
	Suket	Sadar	Nalni	DPF Chajwar	2	2	0		0	2
	Suket	Sadar	Nalni	DPF Saruin	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Dhar	3	3	0		0	3
	Suket	Baggi	Baggi	DPF Jhujhu Mujhu	1.5	1.5	0		0	1.5
	Suket	Sadar	Sadar	DPF Derdu	3	3	0		0	3
	Suket	Sadar	Sadar	DPF Derdu	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Bechana	3	3	0		0	3
	Suket	Sadar	Trambari	DPF Trambari	1	1	0		0	1
	Suket	Sadar	Jarol	DPF Fagla C-II	3	3	0		0	3
	Suket	Baggi	Rajgarh	DPF Kandlu	1	1	0		0	1
	Suket	Baggi	Baggi	DPF Kangru	4	4	0		0	4
	Suket	Baggi	Rajgarh	DPF Gadchoal	0.5	0.5	0		0	0.5
	Suket	Sadar	Jadraoun	DPF Bailablaha r	3	3	0		0	3
	Suket	Sadar	Jadraoun	DPF Nalot	1	1	0		0	1
	Suket	Sadar	Nalni	DPF Patyoda	1	1	0		0	1
	Suket	Sadar	Sadar	Sundervan	1	1	0		0	1
	Suket	Sadar	Sadar	DPF Derdu	1.5	1.5	0		0	1.5
	Suket	Baggi	Baggi	DPF Dagwan	4	4	0		0	4
	Suket	Sadar	Sadar	DPF Sunder Van	0.5	0.5	0		0	0.5

	Suket	Sadar	Sadar	DPF Bhanglera	1	1	0		0	1
	Suket	Sadar	Sadar	DPF Bhanglera	2.5	2.5	0		0	2.5
	Suket	Sadar	Jarol	DPF Jarol	3.5	3.5	0		0	3.5
	Suket				101.3	101.3				101.3
	Suket	Sadar	Jarol	DPF Fagla	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Derdu	1.5	1.5	0		0	1.5
	Suket	Sadar	Jadraun	DPF Talsai	0.5	0.5	0		0	0.5
	Suket	Sadar	Jarol	Ropari II	0.5	0.5	0		0	0.5
	Suket	Sadar	Sadar	DPF Sundervan	1	1	0		0	1
	Suket	Sadar	Sadar	DPF Dhara	0.5	0.5	0		0	0.5
	Suket	Sadar	Jarol	DPF Harabag	1	1	0		0	1
	Suket	Sadar	Jadraun	DPF Nalot II	1	1	0		0	1
	Suket	sadar	sadar	DPF Bechna	2.5	2.5	0		0	2.5
	Suket	Baggi	Baggi	DPF Dagwahan	0.5	0.5	0		0	0.5
	Suket	Sadar	Sadar	DPF Bechna C-II	1	1	0		0	1
	Suket	Sadar	Sadar	DPF Sundervan	1.5	1.5	0		0	1.5
	Suket	Sadar	Sadar	DPF Bechna C-I	1.5	1.5	0		0	1.5
	Suket	Sadar	Sadar	DPF Bechna C-I&II	2	2	0		0	2
	Suket	Sadar	Jadraun	DPF Jadroun	2	2	0		0	2
	Suket	Sadar	Jadraun	DPF Nalot-II	2	2	0		0	2
	Suket	Sadar	Trambri	DPF Trambri	0.2	0.2	0		0	0.2
	Suket	Baggi	Rajgarh	DPF Kandlu	1	1	0		0	1
	Suket	Baggi	Rajgarh	DPF Khuiiri	1	1	0		0	1
	Suket	Baggi	Rajgarh	DPF Khuiiri	2	2	0		0	2
	Suket	Sadar	Nalni	UPF Nalni	1	1	0		0	1
	Suket	Sadar	Jarol	Chila ra Ridhi	0.7	0.7	0		0	0.7
	Suket	Sadar	Sadar	DPF Bechna	2	2	0		0	2

	Suket			DPF Khurara	2.5	2.5	0		0	2.5
	Suket	Sadar	Trambri	DPF Trambri	0.02	0.02	0		0	0.02
	Suket	Sadar	Jarol	DPF Jarol (CA plantaion 2013-14 loss for Rs.1, 05, 000/-)	3	3	0		0	3
	Suket	Sadar	Jarol	DPF Fagla (CA plantaion 2013-14 loss for 87, 500/-)	2.5	2.5	0		0	2.5
	Suket	Baggi	Rajgarh	DPF Rajgrah	1	1	0		0	1
	Suket	Sadar	Jarol	DPF Jarol	1.5	1.5	0		0	1.5
	Suket	Sadar	sadar	DPF Bhanglera	0.1	0.1	0		0	0.1
	Suket				39.52	39.52				39.52
	Suket	sadar	Jarol	DPF Chila -Ra-Ridha	0.1	0.1	0		0	0.1
	Suket	sadar	Jarol	DPF jarol	0.5	0.5	0		0	0.5
	Suket	sadar	Trambri	UPF Siharal	0.1	0.1	0		0	0.1
	Suket	Sadar	Jadarun	DPF Kurada	0.5	0.5	0		0	0.5
	Suket	Baggi	Baggi	DPF Chowkri	0.5	0.5	0		0	0.5
	Suket	Sadar	Jadraoun	DPF Khiuri	0.5	0.5	0		0	0.5
	Suket	Sadar	Jadraoun	DPF Khiuri	1.5	1.5	0		0	1.5
	Suket	sadar	Sadar	DPF Dhar	1.5	1.5	0		0	1.5
	Suket	Sadar	Jadraoun	DPF Trihmi	2	2	0		0	2
	Suket	Sadar	Jarol	DPF Jarol	0.1	0.1	0		0	0.1
	Suket	Sadar	Sadar	DPF Sundervan	0.05	0.05	0		0	0.05
	Suket	Sadar	Jadraoun	DPF Naal	0.1	0.1	0		0	0.1
	Suket	Sadar	Jadraoun	DPF Kurada	0.05	0.05	0		0	0.05
	Suket	Sadar	Sadar	DPF Bechna	0.1	0.1	0		0	0.1
	Suket	Sadar	Sadar	DPF Bechna	1	1	0		0	1
	Suket	Sadar	Sadar	DPF Bechna	1	1	0		0	1
	Suket	Sadar	Sadar	DPF	1.5	1.5	0		0	1.5

				Bechna						
	Suket	Sadar	Nalni	DPF Maloh	0.5	0.5	0		0	0.5
	Suket	Sadar	Trambri	Chjwar Galu	1	1	0		0	1
	Suket	Sadar	Jadraun	DPF Kurada	2	2	0		0	2
	Suket	Sadar	Jadraun	DPF Kurada	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Bechna	2	2	0		0	2
	Suket	Sadar	Sadar	DPF Bechna	1	1	0		0	1
	Suket			Govt. Land Karsanu	1	1	0		0	1
	Suket	Sadar	Jadraun	DPF UpperSihli	2	2	0		0	2
	Suket	Sadar	Jadraun	DPF Upper Sihli	0.1	0.1	0		0	0.1
	Suket	Sadar	Jarol	DPF Fagla	0.5	0.5	0		0	0.5
	Suket	Sadar	Jarol	DPF Fagla	1	1	0		0	1
	Suket	Sadar	Jadraoun	DPF Kurada	0.1	0.1	0		0	0.1
	Suket	Sadar	Sadar	DPF Thara	1.1	1.1	0		0	1.1
	Suket	Sadar	Jadraun	DPF Sihli	0.1	0.1	0		0	0.1
	Suket	Sadar	Jadraun	DPF Thalagdhar	0.5	0.5	0		0	0.5
	Suket	Sadar	Jarol	DPF Fagla	0.5	0.5	0		0	0.5
	Suket	Sadar	Sadar	DPF Bechna	1	1				1
	Suket				27.5	27.5				27.5
	Suket			Shiharl	0.75	0.75	0		0	0.75
	Suket	Baggi	Baggi	Jujhumuju	1	1.00	0		0	1
	Suket	Sadar	Jarol	Jarol	1.5	1.50	0		0	1.5
	Suket	Sadar	Jarol	Fagla	4	4.00	0		0	4
	Suket	Sadar	Jadraun	DalagDhar	1	1.00	0		0	1
	Suket	Sadar	Jarol	Srouni	4	4.00	0		0	4
	Suket	Sadar	Jarol	Fagla	1.5	1.50	0		0	1.5
	Suket	Sadar	Jadraun	Trimhi	1	1.00	0		0	1
	Suket	Sadar	Sadar	Bhanglera	0.25	0.25	0		0	0.25
	Suket	Sadar	Sadar	Bechhana	0.25	0.25	0		0	0.25
	Suket	Sadar	Sadar	Bayla Balahar	1	1.00	0		0	1

	Suket	Sadar	Sadar	Bechhana	1.5	1.50	0		0	1.5
	Suket	Sadar	Jarol	Fagala	0.5	0.50	0		0	0.5
	Suket	Sadar	Nalni	Bholu	0.5	0.50	0		0	0.5
	Suket	Sadar	Nalni	Patyoda	0.5	0.50	0		0	0.5
	Suket	Sadadr	Jadraun	Talsai	1	1.00	0		0	1
	Suket	Sadadr	Jadraun	Kurara	1	1.00	0		0	1
	Suket	Sadar	Sadar	Sundervan	0.75	0.75	0		0	0.75
	Suket	Sadar	Sadar	F. Area Tryamblu	0.25	0.25	0		0	0.25
	Suket	Sadadr	Jadraun	Ghoroo	1.25	1.25	0		0	1.25
	Suket	Sadar	Jarol	Fagla	1.25	1.25	0		0	1.25
	Suket				24.75	24.75				24.75
	Suket	Sadar	Nalni	Saruin	0.5	0.5	0		0	0.5
	Suket	Sadar	Nalni	Patyoda	2	2.00	0		0	2
	Suket	Baggi	Baggi	Kandlu	4	4.00	0		0	4
	Suket	Baggi	Rajgarh	Khiuri	4	4.00	0		0	4
	Suket	Baggi	Baggi	Tarlaza	3	3.00	0		0	3
	Suket	Sadar	Sadar	Sundervan	4	1.00	3		0	4
	Suket	Sadar	Trambri	Trambri	1.5	1.50	0		0	1.5
	Suket	Sadar	Trambri	Trambri	1.5	1.50	0		0	1.5
	Suket	Baggi	Baggi	Lot makora	2	2.00	0		0	2
	Suket	Sadar	Trambri	Trambri	0.1	0.1	0		0	0.1
	Suket	Sadar	Sadar	Dhar	9	0.00	9		0	9
	Suket	Baggi	Baggi	Jhuju mujhu	0.5	0.50	0		0	0.5
	Suket	Sadadr	Jadraun	Kurada	0.6	0.6	0		0	0.6
	Suket	Sadar	Sadar	Beena	1.25	1.25	0		0	1.25
	Suket	Sadadr	Jadraun	kurada	0.45	0.45	0		0	0.45
	Suket	Sadadr	Jadraun	Thalgdhar -III	1.25	1.25	0		0	1.25
	Suket	Sadar	Sadar	Sundarvan	0.3	0.3	0		0	0.3
	Suket	Sadar	Sadar	Bhechanna	0.15	0.15	0		0	0.15
	Suket	Sadar	Sadar	Bhechanna	4	4.00	0		0	4
	Suket	Sadar	Sadar	Bhechanna	4	4.00	0		0	4
	Suket	Sadadr	Jadraun	Jadroun	1.5	1.50	0		0	1.5
	Suket	Sadar	Sadar	Bhechanna -C II	0.5	0.5	0		0	0.5
	Suket	Sadar	Sadar	Bhechanna	3	3.00	0		0	3

	Suket	Baggi	Baggi	D.P.F. Dhagwahan	4	3.00	1		0	4
	Suket	Sadadr	Jadraun	D.P.F. Jadroun	1.5	1.50	0		0	1.5
	Suket	Sadar	Rajgarh	Rajgrah	2	2	0		0	2
	Suket	Baggi	Baggi	Jhijumujhu	2	2.00	0		0	2
	Suket	Sadar	Sadadr	Sundervan	1.5	1.50	0		0	1.5
	Suket	Baggi	Baggi	Jhijumujhu	1	1.00	0		0	1
	Suket	Sadar	Jadraun	Jadroun	1.5	1.50	0		0	1.5
	Suket	Sadadr	Jadraun	Kurara	1.5	1.50	0		0	1.5
	Suket	Sadadr	Jadraun	Ghauroo (II)	2.5	2.50	0		0	2.5
					64.9	51.90	13			64.9
	Suket	Sadar	Jadraun	DPF Upper Sihli	0.5	0.5	0		0	0.5
	Suket	Sadar	Jadraun	DPF Ghoroo	2	2.00	0		0	2
					2.5	2.5	0			2.5

There is no denial of the fact that besides causing economic loss, loss to biodiversity, soil flora and fauna by forest fires is immense. To prevent forest fires, the following strategy should be followed.

1. Maintenance of fire lines. Fireline's over a length of 10 km have been constructed. The list of these firelines is provided in Table 4.3. These firelines must be maintained annually removing the lines clear of leaf litter and other obstacles.
2. Working of forests is essential on a regular basis without which dry and dead trees become fire hazard.
3. Watch towers be posted with fire watchers to keep an eye on the outbreak of smoke in the forests and report to the ground teams for quick response. A system needs to be developed for detection, reporting, dispatching and fighting fires within the shortest possible time lag.
4. The right holders and the JFM committees should be educated and trained to take necessary fire control measures in their areas.

4.3 Area damaged by natural calamities: Forests are affected by droughts, soil erosion and natural phenomena of frost. The area has experienced drought in the year 2016 and 2019

Aftermath of the drought of 1987, heavy mortality of trees even of big sizes was noticed in the forests resulting in gaps in the forest canopy.

Frost is common during the winter months of December and January. Though bamboo is not affected, seedling to pole crop of Rajain, amaltas and semal is affected.

The effects of soil erosion and its control shall be discussed in the next chapter.

The animals are mainly dependent on the forest areas for grazing. Over the years the grazing pressure has increased due to increase in the number of cattle.

Table 4.3 The cattle population under Suket Forest Division

Cattle population				
Status of cattle population Sarkaghat				
Type of animal	Number of animals	Unit	Total number of units	
Goats	6795	NO	6795	
Sheep's	865	NO	865	
Buffaloes	8653	NO	8653	
Cow/Ox	6255	NO	6255	
Total	22568	NO	22568	
Cattle population (Suket Forest Range)				
Status of cattle population				
Type of animal	Number of animals	Unit	Total number of units	
Goats	6650	nos	6650	
Sheep's	530	nos	530	
Buffaloes	7035	nos	7035	
Cow/Ox	8560	nos	8560	
Total	22775	nos	22775	
Cattle population (kangoo Forest Range)				
Status of cattle population				
Type of animal	Number of animals	Unit	Total number of units	
Goats	9889	nos	9889	
Sheep's	1251	nos	1251	
Buffaloes	989	nos	989	
Cow/Ox	4624	nos	4624	
Mule	141	nos	141	
Total	16894	nos	16894	

Cattle population (Jhungi Forest Range)				
Status of cattle population				
Type of animal	Number of animals	Unit	Total number of units	
Goats	3266	nos	3266	
Sheep's	1260	nos	1260	
Buffaloes	80	nos	80	
Cow/Ox	7080	nos	7080	
Mule	275	nos	275	
Total	11961	nos	11961	
Baldwara Range				
Goats	6183			
Sheep's	1696			
Buffaloes	6088			
Cow /Ox	1486			
Total	13967			
Status of cattle population Jai Devi				
Type of animal	Number of animals	Unit	Total number of unit	
Goats	2564	Nos.	2564	
Sheep's	619	Nos.	619	
Buffaloes	422	Nos.	422	
Cow/ Ox	3770	Nos.	3770	
Total	7375	Nos.	7375	

Due to incessant grazing and spread of lantana, the growth of palatable grasses has decreased and non-palatable species increased.

4.4 Lopping practices:

Bamboos, bahera, kachnar, *Quercus spp*, *khair* and various other species are lopped for fodder. The lopping is usually carried out in the winter season when grasses are weathering. The loppers do not have consideration for the age of the tree when found in Government land, though they have the plan to restrict lopping to the younger trees on the lower half portion of the tree. Usually, trees upto the top leaving a few small growing branches at the top are spared. This heavy lopping leads to drying of trees in the season of severe cold and frost.

4.5 Area infested by invasive weed species in forests

Lantana camara, *Parthenium histerophorus*, *Ageratum conyzoides* and *Cannabis sativa*

are the invasive weed species that have overgrown in the area affecting the biodiversity. *Lantana camara* is by far the most obnoxious weeds of the locally called phulbuti or panchphuli. The weed is considered to have been introduced from tropical Central America in 1810 AD. Because of its wide adaptability, prolific seed-bearing capacity and its ability to propagate vegetatively as well, fast growth and a strong light demanding habit, has invaded the forests in a big way. Being an alien species, it has invaded areas so thickly that it has affected the species diversity, and productivity of land thereby changing the ecology of the area. It has also deleterious effects on the health of animals, particularly cows, when browsed accidentally. Studies in Shiwalik hills showed that in the infested areas, it neither favoured palatable nor non-palatable species under its cover. Because of its fast growth, it overtakes the economically important species and negates the effort of afforestation as well. So far, to eradicate lantana and utilize it for economical conversion to tradeable products or biomass energy have failed. According to our estimate about 70 per cent of the total forest areas is infested with lantana. In areas on moderated slopes where moderately dense crop has come up, Lantana has decreased, whereas areas with gaps are thickly infested with this weed. There are no compartment where frequency of Lantana is 100 per cent and IVI is more than 100. (Table 4.5). There is a serious depletion of biodiversity in these areas.

4.6 Incidence of pests and diseases:

Termites though causing negligible damage in standing bamboos, but when feeding on dying and dead culms, they climb up bamboo culms and cause the new culm to originate high up causing congestion in culms. Bamboos are also attacked by culm and shoot borer of the species *Cyrtotrachelus longimanus*. The bamboo leaf roller *Pyrausta bambucivora* is reported to be a pest and particularly active in nallahs during July-October. The smooth naked pinked larvae feed inside the rolled leaves of the host and eventually they pupate in cocoons. Two to three leaves are sometimes rolled together. The species has four generations in a year.

Apart from bamboo pests, Khair and *Dalbergia sissoo* are attacked by *Ganoderma lucidum*, of which fruit bodies are found on the base of trees. In some situations mortality of trees is found in patches. Khair is attacked by witches broom in some localities.

4.7 Forest degradation and its drivers:

There are no two opinions that forests have degraded over the years. The degradation process has started long back with the permission to graze the animals in the forests even in the growing season. Later with the rise of the population of both humans and animals, the opening of forests for right holders for villages in the fringe of forests, and the increasing incidences of illicit removal, the crop degradation has obviously happened. Coupled with the non-working of forests, non-adherence to cleaning operations, the crop has deteriorated. This can be further evident due to the fact, that yield has decreased in the past working plans: Even the areas covered have slowly been taken over by the dry scrub forests and due to absence of natural regeneration, the areas had to be planted with fast-growing species. The identifiable drivers of change are:

1. Invasion of *Lantana camara*: Due to heavy invasion the regeneration has ceased to occur.
2. Biotic pressure of the fringe villages: Biotic pressure due to grazing and illicit removal has damaged the crop and its regeneration.

4.8 Pollution Control and protection of environment: The forests are away from the townships and industry and, therefore not prone to environmental pollution of the order which can affect their growth and quality

CHAPTER 5

CONSERVATION AND MAINTENANCE OF SOIL AND WATER RESOURCES

5.1 Area treated under soil and water conservation measures:

The tract being geologically younger, suffers from various forms of land degradation as a result of faulty land management practices in the past. The steep slopes and undulating terrain accelerate soil erosion during the monsoon season giving rise to ever-deepening gullies and formation of torrents which further degrade productive lands and cause wide spread damage to infrastructure. Due to this reason, attempts have been made in the past under various schemes like River valley project (RVP), Mid Himalayan watershed development project (MHWDP), Overseas development agency (ODA) and Japan International Cooperation Agency (JICA) to rehabilitate the degraded hills through afforestation and soil conservation measures. The measures included the construction of brushwood check dams, dry stone masonry check dams, continuous live hedges, crate wire structures in streams, silt retention dams, cement masonry structures and run-off drainage structures. Along with this, landslides and landslips are being rehabilitated with vegetative and concrete structures. To recharge the groundwater and to improve percolation, renovation of existing ponds is being done in the villages and new ponds are being constructed. Ponds are also maintained in the forest areas for the benefit of wild animals, to efficiently utilize the water for irrigation purposes in the area, Tanks are constructed to improve irrigation facilities for cultivation of off-season crops and cash-crops. The implementation of such a technical package requires proper survey, planning, design of cost-effective structures, judicious integration of vegetative and mechanical measures and people's participation. Many earthen dams, artificial barrages, and multipurpose dams with small and big reservoirs have also been constructed recently to augment irrigation facilities in this area, the detail of which is given in Table 5.2

In the past working plan period, areas vulnerable to soil erosion in forests have been treated with soil conservation works of the above description, the details of which are given in Table 5.1.

Table 5.1: Soil conservation works carried out in the past working plan period

Soil conservation works carried out in the past working plan period					
Sarkaghat Range					
Year	Forest	Compatt. No.	Brush wood chec dam (m)	Dry stone check dam cum)	Const. live hedge (m)
2017-18	DPF Barnog	C-II	Nil	Samsoh Nala	Nil
2017-18	ND Doon Silh	Whole	Nil	Doon Nala	Nil
2018-19	DPF Thathal	C-II	Nil	Salyani Nala	Nil
2018-19	DP		Nil	Nehad Nala	Nil
2019-20	DPF Barnog	C-II	Nil	Gopalpur Nala	Nil
2019-20	DPF Barnog	C-I	Nil	Gopalpur Nala	Nil
2019-20	DPF Barnog	C-II	Nil	Gopalpur Nala	Nil
2019-20	DPF Barnog	C-II	Nil	Barnog Nala	Nil
2019-20	DPF Bhangoh	C-II	Nil	DPF Bhangoh	Nil
2019-20	ND Doon Silh	Whole	Nil	Doon Silh Nala	Nil
2019-20	ND Chamba Nal-I	Whole	Nil	Chamba Nala	Nil
2019-20	DPF Thathal	C-II	Nil	Thathal C-1	Nil
2019-20	DPF Tikker	Chobhra C-I	Nil	Jhondi Nala	Nil
2019-20	DPF Gamdhoul	Whole	Nil	Gamdhaul Nala	Nil
2020-21	DPF Chandrakari	C-III	Nil	Chandrakari & Laka Nala	Nil

2020-21	Govt/ land	-	Nil	Naghlla Nala	Nil
2020-21	Govt Nala	-	Nil	Behlidhar Nala	Nil
2020-21	DPF Kalas	Whole	Nil	Kalas Nala	Nil
2020-21	DPF Kaldoo	C-I	Nil	Kaldoo Nala	Nil
2020-21	DPF Bhangoh	C-II	Nil	Ghandhu Nala	Nil
2020-21	DPF Barnog	C-II	Nil	Maira Kusri Nala	Nil
2020-21	DPF Chandrakari	C-II	Nil	Chandrakari Nala	Nil
2020-21	ND Balhra Chheck	wHOLE	Nil	Balhra Chheck Nala	Nil
2020-21	DPF Bhangoh	C-II	Nil	Ghandhu Nala	Nil
2021-22	DPF Kaldoo	C-II	Nil	Kahabu Nala	Nil
2021-22	DPF Bhangoh	C-II	Nil	Panyali Naghla	Nil
2021-22	ND Sarohli	Whole	Nil	Sarohli Nala	Nil
2021-22	DPF Murahdhar	C-I	Nil	Murahdhar Nala	Nil
2021-22	Govt Nala	-	Nil	Sarsai Grordu Nala	Nil
2021-22	ND Sarohli	Whole	Nil	Sarohli Nala	Nil
2021-22	DPF Bhangoh	C-I	Nil	Bhangoh Nala	Nil
2021-22	DPF Chandrakari	C-II	Nil	Chandrakari Nala	Nil
2021-22	Govt/ land	-	Nil	Nehad Nala	Nil

2021-22	UPF Khalanu		Nil	Khalanu Nala	Nil
2021-22	DPF Barnog	C-I	Nil	Gopalpur Nala	Nil
2021-22	Govt Nala		Nil	Kukkar Nala	Nil
2021-22	DPF Chamba Nal	Whole	Nil	Chamba Nala	Nil
2021-22	DPF Kalas	Whole	Nil	Kalas Nala	Nil
2021-22	Govt. Nala		Nil	Dhalyat Nala	Nil
2021-22	Govt. Nala		Nil	Kathogan Nala	Nil
2022-23	ND Sarohli -I	Whole	Nil	Sarohli Nala	Nil
2022-23	ND Bhangoh	C-III	Nil	Gahar Nala	Nil
2022-23	ND Jhijnnoo I	Whole	Nil	Jhijnnoo Nala	Nil
2022-23	ND Bid	Whole	Nil	Bid Nala	Nil
2022-23	Govt. Nala	-	Nil	Maigal Nala	Nil
2022-23	ND Sandoh	Whole	Nil	Sandoh Nala	Nil
2022-23	DPF Jamdwar II	Whole	Nil	Rissa Nala	Nil
2022-23	UPF Khalanu	Whole	Nil	Sarnota Nala	Nil
2022-23	ND Deo Bradta	Whole	Nil	Deo Nala	Nil
2022-23	DPF Thathal	C-II	Nil	Thathal Nala	Nil
2022-23	DPF Bhangoh	C-II	Nil	Ghandhu Nala	Nil

2022-23	DPF Chamba Nal	Whole		Chamba Nal	Nil
Kangoo Range					
Year	Forest	Compatt. No.	Brush wood chec dam	Dry stone check dam	Const. live hedge
2013-14	O.D Umri	C-I	Nil	Bansu Nala	Nil
2013-14	DPF Manjhkheta	Whole	Nil	Manjhkheta nala	Nil
2013-14	DPF Sarosh	Whole	Nil	Alsed Khad	Nil
2014-15	DPF Sarosh	Whole	Nil	Sarosh	Nil
2016-17	DPF Sarosh	Whole	Nil	Alsed Khad	Nil
2016-17	DPF Patta	C-I	Nil	Batehar Nala	Nil
2018-19	DPF Lappar	Whole	Nil	Galad Nala	Nil
2018-19	DPF Lappar	Whole	Nil	Viyalva Nala	Nil
2018-19	DPF Ahen sunali Sisham	C-III	Nil	Ahen sunali nala	Nil
2018-19	DPF Ahen sunali Sisham	C-II	Nil	Ropa Nala	Nil
2018-20	O.D Umri	C-I	Nil	Bansu Nala (WHS)	Nil
2019-20	DPF Salyana	C-IV	Nil	Grahan Nala	Nil
2019-20	DPF Salyana	C-III	Nil	Grahan Nala	Nil
2019-20	Jader Nala/ Govt. land	-	Nil	Jader Nala	Nil
2019-20	DPF Patta	C-II	Nil	Patta Nala	Nil

2019-20	DPF Jartu		Nil	Jartu Nala	Nil
2019-20	DPF GEHRU 299	Whole	Nil	Kathla nala	Nil
2019-20	DPF GEHRU 299	Whole	Nil	Saul Dharli Nala	Nil
2020-21	DPF Salwana-II	Whole	Nil	Salwana Nala	Nil
2020-21	DPF Siun	Whole	Nil	Siun Nala	Nil
2020-21	DPF kangri	Whole	Nil	Jajru Nala	Nil
2020-21	DPF Bhuwana	Whole	Nil	Sarauni Nala	Nil
2020-21	DPF Gehru 302	Whole	Nil	Manjhali Nala	Nil
2021-22	DPF Hara I	Whole	Nil	Devra Nala	Nil
2021-22	DPF ThungDhar	Whole	Nil	Bagri Nala	Nil
2021-22	DPF ThungDhar	Whole	Nil	Bagri Nala	Nil
2021-22	Kot Nala/ Govt. land	-	Nil	Kot Nala	Nil
2021-22	Lalag Nala / Govt. land	-	Nil	Lalag Nala	Nil
2021-22	DPF Patta	C-II	Nil	Batehar Nala	Nil
2022-23	DPF Hara II	C-I	Nil	Battari nala	Nil
2022-23	DPF Sojha	Whole	Nil	Damani Nal	Nil
2022-23	DPF Krangal	C-II	Nil	Krangal Nala	Nil
2022-23	DPF Salwana-II	Whole	Nil	Salwana Nala	Nil

2022-23	Karthouli Nala/ Govt land	-	Nil	Karthouli Nala	Nil
2022-23	Karthouli Nala/ Govt land	-	Nil	Karthouli Nala	Nil
2022-23	DPF Batwara		Nil	Naral nala	Nil
2022-23	DPF Batwara		Nil	Batwara Nala	Nil
2022-23	DPF Patta	C-II	Nil	Panol Nala	Nil
2022-23	DPF Patta	C-II	Nil	Panol Nala	Nil
2022-23	DPF Batwara		Nil	Naral Nala	Nil
2022-23	Banola Nala		Nil	Banola Nala	Nil

Suket Range					
Year	Forest	Compatt. No.	Brush wood chec dam	Dry stone check dam	Const. live hedge
2019-20	DPF sariun	-	-	sariun Nala	-
2019-20	DPF Ropari-I	whole	-	Ropari Nala	-
2019-20	DPF Kafri	-	-	Dugh & Chila Quali Nalla	-
2019-20	DPF Drahal	-	-	Drahal and Shusan Nalla	-
2019-20	DPF Sundervan	-	-	Kalapani and Bned Nalla	-
2020-21	DPF Dhar	-	-	Hawani Nalla	-
2020-21	DPF Dhar	-	-	Thalagdhar Nalla	-
2020-21	DPF BhanglerA	-	-	Bhour Nalla	-
2020-21	DPF Ropari	whole	-	Alsehd khad	-
2020-21	DPF Maloh	-	-	R/wall in gla ran Nal	-
2021-22	DPF Bayla Balahar	-	-	Bayla Nalla& Bazir Nalla	-
2021-22	DPF Ropari-I	-	-	Dike and superstructure in Alsed khad	-
2021-22	DPF Nalni	-	-	check dam in Nalni khad	-
2021-22	DPF Ropari-I	whole	-	R/wall near Ropari Nursery	-
2021-22	DPF ROpari-I	whole	-	R/wall near Ropari Nursery	-
2021-22	DPF Kafri	-	-	check dam in kathial Nala	-

2022-23	DPF Sihli	-	-	Checkdams in Sihli Nala	-
2022-23	DPF Nalni	-	-	Checkdams in Bholu Nala	-
2022-23	DPF Dhangyara	-	-	Check dams in Charkha and Dhangyara Nala	-
2022-23`	DPF Kheuri	-	-	Check dams in Dodanal and Goddwar	-
Jhungi range					
Year	Forest	Compatt. No.	Brush wood chec dam (m)	Dry stone check dam cum)	Const. live hedge (m)
2013-14	DPF Shivshankar	C-II-a	Nil	Jhungi Nalla	Nil
	DPF Salani	C-I	Nil	Salni Nalla	Nil
	DPF Badagadoun	C-I	Nil	Badagadoun Nalla	Nil
	DPF Pandar	C-I	Nil	Pandar Nalla	Nil
	DPF Kathiuni	C-I-a	Nil	Kathiuni Nalla	Nil
	DPF Chehar	C-II	Nil	Nihri Nalla	Nil
2014-15	DPF Chrog	C-II	Nil	Charog Nalla	Nil
	DPF Neulidhar	C-II-a	Nil	Nehndigali Nala	Nil
	DPF Kanas	C-II-C	Nil	Kanas Nala	Nil
	DPF Trechh	C-II-a	Nil	Trechh Nalla	Nil
	DPF Khobla	C-I	Nil	Jhungi Nala	Nil
	DPF Daint	C-I	Nil	Thaloug Nala	Nil
	DPF Manjhki	Whole	Nil	Kahli Nala	Nil
	DPF Baneshiti	C-I	Nil	Barnog Nala	Nil
2015-16	DPF Salni	C-II	Nil	Salani Nala	Nil
	DPF Narsingh	C-II	Nil	Kutahchi Nala	Nil
	DPF Charog	C-I	Nil	Charog Nala	Nil
	DPF Manjhki	Whole	Nil	Kahli Nala	Nil
	DPF Kathiuni	C-I	Nil	Kathiuni Nala	Nil

2016-17	DPF Manjhki	Whole	Nil	Kahli Nalla	Nil
	DPF Jogikufar	C-II-b	Nil	Jogikufar Nala	Nil
	DPF Shivshankar	C-II-a	Nil	Jhungi Nala	Nil
	DPF Neulidhar	C-I	Nil	Galukhr Nala	Nil
	DPF Pandar	C-I	Nil	Pandar Nalla	Nil
	DPF Kathiuni	C-I	Nil	Kanoun Nala	Nil
	DPF Badagadoun	C-I	Nil	Barnog Nala	Nil
	DPF Salani	C-II-a	Nil	Salani Nala	Nil
	DPF Ukari	C-I	Nil	Ukari Nala	Nil
	DPF Reagi	C-I	Nil	Reagi Nala	Nil
	DPF Marehra	C-II-a	Nil	Marehra Nala	Nil
	DPF Baag	C-I	Nil	Baag Nala	Nil
	DPF Bandli	C-I-b	Nil	BAndli Nala	Nil
	DPF Trechh	C-I	Nil	Janoul Nala	Nil
2017-18	DPF Khobla	C-II-a	Nil	Majhas Nala	Nil
	DPF DAint	C-I	Nil	Daint Nala	Nil
	DPF Manjhki	Whole	Nil	Chohlra Nala	Nil
	DPF Kathiuni	C-I	Nil	Kathiuni Nalla	Nil
	DPF Pandar	C-I	Nil	Pandar Nalla	Nil
	DPF Chanadbahan	C-II	Nil	Sanog Nala	Nil
	DPF Ukari	C-II	Nil	Ukari Nala	Nil
	DPF Kanas	C-I	Nil	Kanas Nala	Nil
	DPF Kanoun	C-III-A	Nil	Kanoun Nala	Nil
	DPF Trechh	C-I-A	Nil	Trechh Nalla	Nil
2018-19	DPF Chanadbahan	C-II	Nil	Chanad bahan Nala	Nil
	DPF Narsingh	C-II	Nil	Khaneri Nala	Nil
	DPF Shivshankar	C-II-b	Nil	shkara Nala	Nil
	DPF BAneshti	C-I	Nil	Barnog Nala	Nil
	DPF Rangjhol	C-I	Nil	Rangjhol Nala	Nil

	DPF Kathiuni	C-I	Nil	Kathiuni Nalla	Nil
	DPF Pandar	C-II	Nil	Pandar Nalla	Nil
	DPF Bandli	C-II	Nil	BAndli Nala	Nil
	DPF Charog	C-I	Nil	Charog Nala	Nil
2019-20	DPF Shivshnakar	C-II	Nil	Badiuli Nala	Nil
	DPFRichhni	C-II-b	Nil	Richhni nalla	Nil
	DPF Salani	C-I	Nil	Salani Nala	Nil
	DPF Baag	C-II-B	Nil	Baag Nala	Nil
	DPF Trechh	C-I	Nil	Trechh Nalla	Nil
	DPF Marehra	C-II-a	Nil	Marehra Nala	Nil
	DPF Manjhki	whole	Nil	Kahli Nala	Nil
	DPF Kathiuni	C-I	Nil	Kathiuni Nalla	Nil
	DPF Chehar	C-II-a	Nil	Chehar Nala	Nil
2020-21	DPF Galukhar	C-III	Nil	Galukhar Nalla	Nil
	DPF Narsingh	C-II-b	Nil	Badiuli Nala	Nil
	DPF Ukari	C-I	Nil	Ukari Nala	Nil
	DPF Rounce	C-II-B	Nil	Raouce Nala	Nil
	DPF Kathiuni	C-I	Nil	Kathiuni Nalla	Nil
	DPF Manjhki	C-II-a	Nil	Chohlra Nala	Nil
	DPF Kanoun	whole	Nil	Kanoun Nala	Nil
2021-22	DPF Salni	C-I	Nil	Salni Nalla	Nil
	DPF BAag	C-II-a	Nil	Baag Nala	Nil
	DPF BAndli	C-I	Nil	BAndli Nala	Nil
	DPF Charog	C-II-a	Nil	Charog Nala	Nil
	DPF Shivshanakar	whole	Nil	Jhungi Nalla	Nil
	DPF Manjhki	C-I	Nil	Manjhki Nalla	Nil
	DPF Galukhar	C-II-a	Nil	Galukhar Nalla	Nil
	DPF Baneshti	C-II-a	Nil	Baneshti Nala	Nil
2022-23	DPF Bunga	C-I	Nil	Bunga Nalla	Nil
	DPF Kanas	C-II	Nil	Kanas Nala	Nil
	DPF Daint	C-I	Nil	Daint Nala	Nil

	DPF Kathiuni	C-II-b	Nil	Kathiuni Nalla	Nil
	DPF Salani	C-I	Nil	Salni Nalla	Nil
2023-24	DPF Shivshankar	C-II-B	Nil	Jhungi nala	Nil
	DPF Richhni	C-I	Nil	Richhni nalla	Nil
	DPF Salani	C-II-a	Nil	Salani Nalla	Nil
	DPF MAnjhki	whole	Nil	Kahli nala	Nil
	DPF Baag	C-I	Nil	Baag Nala	Nil
	DPF Trechh	C-II-a	Nil	Trechh Nalla	Nil

Jai Devi Range					
2020-21	Bhebal A	C-II	0	0	Bhebal Nalla =1 No
2021-22	Bhebal A	C-I	0	Tapali Nalla = 4 No	
	Thuadhar	C-II	0	Thuadhar Nalla = 4 No	
	Berumara	C-II	0	Khanad = 3 No	
	Dogri	Whole	0	Dogri Nalla = 4 No	
	Majothi Ra Silh	C-I	0	Mahu Nalla = 4 No	
	Majothi Ra Silh	C-I	0	Majothi Nalla = 4No	
	Chandakufar	C-I	0	Aukal Nalla = 2 No	
	Thach Silh	Whole	0	Darli Nalla = 4 No	
2022-23	Thuadhar	C-II	0	Sohkali Nalla = 2 No	
	Chandakufar	C-I	0	Aukal Nalla = 4 No	
	Majothi Ra Silh	C-I	0	Mahu Nalla = 4 No	
	Chandakufar	C-II	0	Manjhar Nalla =	
				4 No	

	Banwali	C-I	0	Ghasanu Nalla = 4 No	
	Banwali	C-II	Khanad Nalla = 2No		
	Banwali	C-II	Nehra Nalla = 2 No		
	Banwali	C-II	0		Surad Nalla = 1 No
2021-22	Parala	C-II	0	Parala Nalla = 4 No	
	Parala	C-II	0	Dhrupad Nalla = 4 No	
	Jhalangahr	C-I	0	Jhalanghar nalla = 2 No	
	Khabora	C-II-c	0	Kalaun Nalla = 4 NO	
	Kathyal	C-I	0	Jol Nalla = 3 No	
	Kathyal	C-I	0	Chowki Nalla = 3 No	
	Kathyal	C-I	0	Kathyal Nalla = 4 No	
2022-23	Kathyal	C-I	0	Chowki Nalla = 4 No	
	Jhalangahr	C-I	0	Jhalanghar nalla = 2 No	
	Jhalangahr	C-I	0	Thuagada Nala = 2 No	
	Parala	C-II		Parala Nalla = 3 No	
2020-21			Mandhu Nalla = 1 No		
				Kuttachi Nalla = 3No	
				Kuttachi Nalla = 2 No	
2021-22	Kamand	C-I		Kharti Nalla =	
				3 no	

	Kamand	C-VI		Kamand Nalla = 2 no	
	Kamand	C-VI		Thrimbal Nalla =2 no	
	Cheora	C- II		Thirs Nalla = 1 no	
	Cheora	C-I		Choo Nalla = 2no	
	Kamand	C-V		Dhangu Nalla = 4no	
	kareru I	Whole		Auli Nalla =4 No	
	Cheora	C-I		Chehar Nalla = 4no	
	kareru I	Whole		kareru Nalla =3 no	
	Kamand	C-VI		Bayae Nalla = 4no	
	Pakyoda	Whole		Paniul Nalla = 4No	
	Bakalag	Whole		Segal Nalla = 4no	
	Kamand	C-VI		Adyas Nalla = 4no	
2022- 23	Cheora	C-I		Salosh Nalla = 3no	
	kareru I	Whole		Paraala Nalla = 3no	
	Kamand	C-I		Dumat Nalla = 3no	
	Matoh	Whole		Dumat Nalla = 3no	
	Kamand	IV		Dhar Nala = 2No	
	Kareru II	Whole		Auli Nala = 2No	
	Kareru I	Whole		Nachala Nala = 4No	
	Kareru I	Whole		Khadaol Nala =	
				4No	

	Kareru II	Whole		Banda Nala = 2No	
	Bakalag II	Whole		Shabhar Nalla = 2 No	
	Pakyoda	Whole		Pakoyada = 2 No	
	Pakyoda	Whole		Anushi = 4 No	
	Kareru I	Whole		Puratan Nala= 4 No	
	Pakyoda	Whole		Paniul Nalla = 1 No	
2021-22	Khabri	C-VI		Khabri Nalla = 4 No	
	Khabri	C-VIII		Theran Nalla = 3 No	
	Thikar	Whole		Chhater Nala =4 No	
	Thikar	Whole		Kutal Nala= 3 No	
2022-23	Sanora	Whole		Sanora Nala = 4 No	
	Chichar	C-I		Dungari Nala= 2 No	
	Khabri	C-I		Ladhamu Nala = 4 No	
	Sanora	Whole		Nagaru Nala = 4No	
	Sanora	Whole		Maseran Nala= 2 No	
	Sanora	Whole		Kodas Nala =2 No	
	Sanora	Whole			Manora Nalla = 1 No
2017-18	ND 140 Behlidar	Whole		Dehar Nalla	
2018-19	ND 123 Duman			Jaidevi Nalla	

2020-21	ND 142 Kotla	Whole		Kotla Nalla(W.H.S)	
2020-21	ND 136 Khaneti	Whole		Khaneti Nalla	
2021-22	ND 137 Banani Bhadrolu	Whole		Badhorlu Nalla	
2021-22	ND 137 Banani Bhadrolu	Whole		Chebla	
2021-22	ND 140 Behlidar	Whole		Dehar Nalla	
2021-22	ND 140 Behlidar	Whole		Ropa Nalla	
2021-22	ND 137 Banani Bhadrolu	Whole		Ghuraan Nalla	
2021-22	ND 140 Doldhar	Whole		Bodal Nalla	
2021-22	OD 126 Kutain	Whole		Kutahain Nalla	
2021-22	ND 132 Khudinal	Whole		Khudi Nalla	
2021-22	OD 124 Kafala	Whole		Traybari Nalla	
2021-22	ND 132 Khudinal	Whole		Khudi Nalla	
2021-22	OD 124 Kafala	Whole		Fatrayli Nalla	
2022-23	ND 140 Behlidar	Whole		Dehar Nalla	
2022-23	ND 136 Khaneti	Whole		Khaneti Nalla	
2022-23	ND 132 Khudinal	Whole		Khudi Nalla	
2022-23	OD 125 Ropar kothi	Whole		Roparikothi Nalla	

2022-23	ND 123 Duman	Whole		Jaidevi Nalla	
2022-23	OD 124 Kafla	Whole		Aala Ra nalla	
2022-23	OD 124 Kafla	Whole		Hawana Nalla	
2022-23	OD 124 Kafla	Whole		Nagain Nalla	
2022-23	DPF Kaulpur Chil	CII		Chalaun Nalla =2 Nos	
2022-23	DPF Sakohar	CII		Sakohar Nalla	
2020-23	DPF Kaulpur Chil	CII		Nehara Nalla	
Baldwara Range					
2017-18	UPF Thana Chowki	—	Nil	UPF Thana Chowki =1 No.	Nil
2017-18	UPF Kashmaila	—	Nil	UPF Kashmaila = 4 Nos.	Nil
2018-19	ND Nijrishan	C-II	Nil	Tarandol Nala =3 Nos.	Nil
2018-19	ND Panwari	Whole	Nil	3 Nos.	Nil
2018-19	DPF Bairkot	—	Nil	1 No.	Nil
2019-20	DPF Dhaulkhan	C-I	Nil	4 Nos.	Nil
2019-20	ND Nijrishan	—	Nil	3 Nos.	Nil
2019-20	DPF Shil	Whole	Nil	6 Nos.	Nil
2019-20	DPF Bairasen	C-I	Nil	5 Nos.	Nil
2019-20	DPF Dhaulkhan	C-I	Nil	5 Nos.	Nil
2019-20	DPF Jaboth	C-II	Nil	6 Nos.	Nil

2019-20	DPF Sikandra	—	Nil	Sikandra Nala=5 Nos.	Nil
2019-20	DPF Sikandra	—	Nil	Sikandra Nala=4 Nos.	Nil
2019-20	DPF Bairkot	—	Nil	2 Nos.	Nil
2019-20	DPF Sikandra	—	Nil	Sikandra Nala=4 Nos.	Nil
2019-20	DPF Sidhkot	—	Nil	Sidhkot Nala=4 Nos.	Nil
2019-20	DPF Goverta	—	Nil	10 Nos.	
2019-20	DPF Raped			Raped Nala=9 Nos.	
2020-21	ND Panwari	Whole	Nil	4 Nos.	Nil
2020-21	DPF Bairasen	C-I	Nil	5 Nos.	Nil
2020-21	DPF Duganal	—	Nil	2 Nos.	Nil
2020-21	DPF Leda	—	Nil	2 Nos.	Nil
2021-22	DPF Bhambla IInd	Whole	Nil	4 Nos.	Nil
2021-22	DPF Sarsyalu	—	Nil	Sarsyalu Nala=4 Nos.	Nil
2021-22	DPF Gurkotha	—	Nil	Gurkotha Nala=8 Nos.	Nil
2021-22	DPF Bairkot	—	Nil	Bairkot Nala=7 Nos.	Nil
2021-22	DPF Goverta	—	Nil	Goverta Nala=4 Nos.	Nil
2021-22	DPF Kalkhar I	—	Nil	4 Nos.	Nil
2022-23	UPF Bhatera	—	Nil	4 Nos.	Nil
2022-23	UPF Nawani	—	Nil	4 Nos.	Nil

2022-23	UPF Thana Chowki	—	Nil	4 Nos.	Nil
2022-23	UPF Thana Chowki	—	Nil	2 Nos.	Nil
2022-23	ND Suhagra	—	Nil	6 Nos.	Nil
2022-23	ND Panwari	Whole	Nil	5 Nos.	Nil
2022-23	DPF Jaboth	C -II	Nil	5 Nos.	Nil
2022-23	DPF Kathyaun	—	Nil	2 Nos.	Nil
2022-23	DPF Sidhkot	—	Nil	Bana Ra Nala=3 Nos.	Nil
2022-23	DPF Sidhkot	—	Nil	Khuddi Nala=3 Nos.	Nil
2022-23	DPF Sidhkot	—	Nil	Slapar Nala=1 No.	Nil
2022-23	DPF Sikandra	—	Nil	Sikandra Nala=1 No.	Nil
2022-23	DPF Bairkot	—	Nil	4 Nos.	Nil
2022-23	DPF Bairkot	—	Nil	3Nos.	Nil
2022-23	DPF Goverta	—	Nil	2 Nos.	Nil
2022-23	DPF Mandaru	—	Nil	4 Nos.	Nil

Apart from above, there is about 600 ha area that needs to be treated for soil conservation.

Table 5.2 Farm ponds constructed in the area

Farm Ponds constructed				
Year	Detail of works	Volume/work/No/	Area	Range
2019-20	Farm pound	1 nos.	-	Suket

2019-20	Farm pound	1 nos.	-	Suket
2020-21	Farm pound	2 nos.	-	Suket
2020-21	Farm pound	2 nos.	-	Suket

5.2 Duration of water flow in the selected seasonal streams:

There are records to show that a number of perennial streams were flowing into the forests of Suket Forest Division, not in the distant past, however due to biotic interference and grazing in the forests, the intensity of erosion had increased to such an extent that these streams turned into seasonal streams and instead the loads of silt blocked the paths of streams and turned them into flash flood channels. There are a number of *small nallahs* now in the forests wherein the flow of water is resumed only during the rains. Even the soil and water conservation measures along with afforestation have so far not been able to resume flow in the streams and nullahs. .

Table 5.3 List of spring shed identified in Suket Forest Division

List of spring Shed						
Range/Block	Beat/ Compartment	Name of Source	GPS Coordinate s	Perm anent /	Seasonal Discharge	Purpose
Kangoo/ Dehar	Dehar/ Bhuwana Whole	D.P.F Bhuwana	N- 31.441450E- 76.855022	Perma nent	1ltr / sec	Drinkingwater
Kangoo/ Dehar	Jyor	Nil				
Kangoo/ Dehar	Umri	Nil				
Kangoo /batwara	Batwara	Nil				
Kangoo /batwara	Dhawal	Nil				
Kangoo /batwara	Gehru / C-I-d	O.D.301 Gehru	N- 31.395698E- 76.960142	Perma nent	1ltr / sec	Drinkingwater

Kangoo /batwara	Serikothi	Nil				
Kangoo/ Behli	Behli	Nil				
Kangoo/ Behli	Haraboi	NIL				
Kangoo/ Behli	Badhoo	Nil				
Baldwara /Leda	Bairkot/C8	Kheta	N31°52'75. 14" E76°80'67.3 1"	Perma nent	1ltr / sec	Drinking water for villagers and Nry. Use
Baldwara /Leda	Bairkot/C2	Chari	N31°53'09. 4" E76°81'22.5 3"	Perma nent	.5 ltr/ Sec	Drinking water for villagers and Wildlife
Baldwara /Leda	Bairkot/C7	Malou na RaPani	N31°52'36. 05" E76°81'26.7 7"	Perma nent	.5 ltr/ Sec	Drinking water for villagers and Wildlife
Baldwara /Leda	Bairkot/C4	LiyunaRa Pani	N31°52'14. 18" E76°82'14.4 8"	Perma nent	1ltr / sec	Drinking water for villagers and Wildlife
Baldwara /Leda	Bairkot/C1	Pandit Noun	N31°53'84. 03" E76°80'61.8 7"	Perma nent	.5 ltr/ Sec	Drinking water for villagers and Wildlife
Baldwara /Leda	Leda	FRH Leda (Bauri)	N31°53'33. 19" E76°81'79.7 9"	Perma nent	1ltr / sec	Drinking water for villagers and Wildlife
Baldwara /Goverta	Goverta	Fgd Hut Goverta (Bauri)	N31°61'93. 67" E76°81'27.7 1"	Perma nent	.5 ltr/ Sec	Drinking water for villagers and Wildlife

Suket /Sadar	Nalni	UPF Nalni	N 31 28 51.000 E 7655 23.4	Perma nent	1ltr / sec	Drinking water for villagers and wildlife
Jaidevi/ Rohanda	Rohanda Kamrah C-III	Kamru nag Lake	31.473108 77.049753	Perma nent	1ltr / sec	Drinkingand Irrigation
Jaidevi/ Rohanda	Rohanda Banwali C-V	Seri Nalla	31.469540 77.058117	Perma nent	1ltr / sec	Drinkingand Irrigation
Jaidevi/ Rohanda	Rohanda Kamrah C-I	Khanad Nalla	31.466858 77.033224	Perma nent	1ltr / sec	Drinking
Jaidevi/ Rohanda	Rohanda Berumara C-I	Rohanda Nalla	31.467093 77.032657	Seasonal	1ltr / sec	Drinking
Jaidevi/ Rohanda	Rohanda Berumara C-II	Tapli Nalla	31.465871 77.028143	Perma nent	1ltr / sec	Drinkingand Irrigation
Jaidevi/ Rohanda	Rohanda Berumara C-I	Hanuman Nalla	31.463067 77.032202	Perma nent	1ltr / sec	Drinkingand Irrigation
Jaidevi/ Rohanda	Rohanda Majothi Ra Silh C-I	Mahu Nalla	31.457288 77.035171	Seasonal	1ltr / sec	Drinking
Jaidevi/ Rohanda	Chowki Kathyal C-I	Galukhru Nalla	31.455252 77.043441	Seasonal	1ltr / sec	Drinking
Jaidevi/ Rohanda	Chowki Kathyal C-I	Chowki Nalla	31.446333 77.050573	Perma nent	1ltr / sec	Drinkingand Irrigation
Jaidevi/ Rohanda	Khabri Khabri C-I	Ladhmu Nalla	31°26'59.71 2 76°59'48.86 4	Perma nent	.5 ltr/ Sec	Drinking
Jaidevi/ Rohanda	Khabri Thikar	KutalStep well	31°27.847 76°59.089	Perma nent	.45 ltr/ Sec	Drinking
Jaidevi/ Rohanda	Khabri Thikar	Chhater Nalla	31°27'43.42 2	Perma	.5 ltr/ Sec	Drinking

Rohanda			76°58'43.95 6	nent		
Jaidevi/ Rohanda	Khabri Khabri IV	Khabri Nalla	31.457699 76.986990	Perma nent	.5 ltr/ Sec	Drinking
Jaidevi/ Rohanda	Kamand ND 169 Bakalag	Dobhu Nalla	31.431852 76.98384	Perma nent	.25 ltr/ Sec	Irrigation
Jaidevi/ Rohanda	Kamand DPF Kamand C -III	Dhangu Nalla	31.435764 77.005717	Perma nent	.5 ltr/ Sec	Drinking
Jaidevi/ Rohanda	Kamand ND 169 Bakalag	Dobhu Step well	31.431999 76.982076	Perma nent	.25 ltr/ Sec	Drinking
Jaidevi/ Rohanda	Kamand DPF Kamand C -IV	Dhangu Step well	31.430627 77.012855	Perma nent	.25 ltr/ Sec	Drinking
Jaidevi/ Nandgarh	Chammyar O D 77 Sangrair	Sangriar Step well	31.526993 76.985276	Perma nent	0.25 ltr/sec	Drinking
Jaidevi/ Nandgarh	Chammyar N D 86 ChhaterSilh	Chhater step well	31.515101 76.965983	Perma nent	0.25 ltr/sec	Drinking
Jaidevi/ Nandgarh	Chammyar ND 78 Makora	Riyul Step well	31.530581 76.986356	Perma nent	0.20 ltr/sec	Drinking
Jaidevi/ Nandgarh	Chammyar DPF Chammyar	Chammyar Step well	31.519818 76.967714	Perma nent	0.20 ltr/sec	Drinking
Jaidevi/ Nandgarh	Kuttachi Kutt achi C-V	Gama haru Nalla	31.518518 77.012261	Perma nent	.5 ltr/ Sec	Drinking and Irrigation
Jaidevi/ Nandgarh	Kuttachi Kutt achi C-IV	Damahau Nalla	31.512680 77.014176	Perma nent	.5 ltr/ Sec	Drinkingand Irrigation
Jaidevi/ Nandgarh	Kuttachi Kuttachi C-III	Changhar Nalla	31.508155 77.017081	Perma nent	.25 ltr/ Sec	Drinkingand Irrigation

Jaidevi/ Nandgarh	Kuttachi Kuttachi C-I	Bada Nalla	31.522887 77.005824	Perma nent	.5 ltr/ Sec	Drinkingand Irrigation
Jaidevi/ Nandgarh	Nandgarh ND 103Shilh,C-II	Chhia a nala	N31°29'52" E 77°00'34"	Parma nent	0.05	Drinking
Jaidevi/ Nandgarh	Nandgarh ND103Shilh,C- IV	Devi dhar Stepw ell	N 31°29'38" E77°00'28"	Parma nent	0.2 ltr	Drinking
Jaidevi/ Nandgarh	Nandgarh OD 106 Latogali C-IV	Dehra Nalla	31.4826152 77.0197056	Parma nent	0.05 ltr	Drinking
Jaidevi/ Nandgarh	Nandgarh OD 106 Latogali C-I	Natural sourceat Dogari	31.4887841 77.0195658	Parma nent	0.05 ltr	Drinking
Jaidevi/ Nandgarh	Nandgarh ND 105 Drahal 2 C - IV	Natural sourceat Handkro Nalla	31.4850804 77.0267173	Parma nent	0.6ltr	Drinking
Jaidevi/ Nandgarh	NandgarhND 105 Drahal 2 C -II	Natural sourceat Budha kedar	31.4858083 77.0338311	Parma nent	0.10 ltr	Drinking and Irrigation
Jaidevi/ Nandgarh	Nandgarh ND 105 Drahal Ist C - IV	Natural sourceat Thata dhar	31.4961123 77.0234054	Parma nent	0.05 ltr	Drinking
Jaidevi/ Nandgarh	Nandgarh ND 102 Badhu C _II	Natural sourceat Keos Nalla	31.4942189 77.0149896	Parma nent	0.150 ltr	Drinking
Jaidevi/ Nandgarh	Nandgarh ND103 Silh C -II	Natural sourceat Silh Nalla	31.4987847 77.0151489	Parma nent	0.10 ltr	Drinking
Jaidevi/ Nandgarh	Nandgarh ND	Natural sourceat kansh a	31.4808333 3	Parma		Drinking and

Nandgarh	105 Drahal 2 C -II	Khad	77.04194444	nent	0.014 ltr	Irrigation
Jaidevi/ Nandgarh	Nandgarh ND101 Nandgarh	Salohd har Nala	31.49094 076.99646	Perma nemt	0.050 ltr /sc	Irrigation
Jaidevi/ Jaidevi	Jaidevi ND 135 Chhatru (Whole)	Bavdi	31.527655, 76.980008	Perma nemt	0.035 ltr/sec	Drinking
Jaidevi/ Jaidevi	Jaidevi ND 128 Kutain (c-iv)	Bavdi	31.519212, 76.928306	Perma nemt	0.040 ltr/sec	Drinking
Jaidevi/ Jaidevi	Jaidevi ND 128 Kutain(c-1)	Nalu	31.514365, 76.930467	Perma nemt	0.20 ltr/sec	Drinking
Jaidevi/ Jaidevi	Jaidevi OD 124 Kafla (Whole)	Bavdi	31.505693, 76.944091	Perma nemt	0.040 ltr/sec	Drinking
Jaidevi/ Jaidevi	Jaidevi ND132 Khudinala (Whole)	Bavdi	31.485565, 76.96801	Perma nemt	0.050 ltr/sec	Drinking
Jaidevi/ Jaidevi	Jaidevi OD125 Roparkothi (Whole)	Bavdi	31.506870, 76.933240	Perma nemt	0.030 ltr/sec	Drinking
Jaidevi/ Jaidevi	Jaidevi ND132 Khudinala (Whole)	Nalu	31.486059, 76.971969	Perma nemt	0.10 ltr/sec	Drinking and Irrigation
Jaidevi/ Jaidevi	Jaidevi UPF Bodal	Bavdi	31.507156, 76.931909	Perma nemt	0.040 ltr/sec	Drinking
Jaidevi/ Jaidevi	Doldhar OD 144 Chhellela (C-I)	Bavdi	31.462227, 76.952269	Perma nemt	0.040 ltr/sec	Drinking
Jaidevi/ Jaidevi	Doldhar ND 139 Doldhar (Whole)	Bavdi	31.478781, 76.933279	Perma nemt	0.040 ltr/sec	Drinking
Jaidevi/ Jaidevi	Doldhar ND 137 Banoni Bhadrolu (Whole)	Bavdi	31.458517, 76.941902	Perma nemt	0.035 ltr/sec	Drinking

Jai Devi/Jai Devi	DPF KaulpurBan	Bavdi	31.476860 E76.997162	Perma nent	0.5	Drinking
Jai Devi/Jai Devi	DPF Kaulpur Chil	Bavdi	N31.478667 E 76.985623	Perma nent	0.2	Drinking
Jai Devi/Jai Devi	DPF Sakohar	Nalla	N31.474560 E77022382	Perma nent	0.5	Irrigation/ Drinking

5.3 Wetlands in forest areas: There are no wetlands in the forests. .

5.4 Water level in the wells in the vicinity (upto 5 km) of forests area

Due to overexploitation of water through tubewells, the depth of water in most parts of the state ranges between 100 to 200metres below groundwaterlevel

except in the southwestern parts where due to water logging it is less than 100 m. The decadal fluctuation in water level is between 2m to 4m. On an average the water table is declining at the rate of 20 cm per year.

Table 5.4 Seasonal Nalla in the forests

Seasonal nullah in the Forest					
Forest	Chose Name	Compart No.	Max. width	Lengt h	Water flow
Bhuvana	Bag Nala I	Whole	4	500	
	Bag Nala II	Whole	3.5	400	
DPF Siun	Khurka Nala	C-I	2	1000	
d.P.F. Bhuwana	Tahli Nala	Whole	3	700	
D.P.F Slappar	Subal nala	C-II	2.5	800	
D.P.F Dratak	Jabbal Nala	C-II	1.5	600	
	Jajar chali Nala	C-I	2	800	
D.P.F Koon	Koon Nala	Whole	2.5	750	
D.P.F. Ghangnoo	Ghangnoo nala	Whole	1.5	500	
D.P.F. Masog	Masog Nala	Whole	2	650	
D.P.f. Ghangnoo	Ghangnoo Nala	Whole	3	1000	
	-I				

	Ghangnoo Nala -II	Whole	4	1100	
DPF Umri	Bagayater Nalla	C-II	1	500	
	Gehrri nalla	C-II	1.5	900	
	Khada Nalla	C-II	1	1000	
	Amb ka Nalla	C-II	2	1000	
	luhri nalla	C-II	1	800	
	Thara nalla	C-II	2	500	
	Bainsi nalla-1	C-II	1.5	400	
	Bainsi nalla-2	C-I	3.5	2000	
	Khai Ghat Nalla	C-I	2	600	
DPF Manjkheter	Manjkheter Nala	Whole	5	1500	
	Changar Nalla	Whole	1.5	500	
DPF Chanol	Chanol Nala	Whole	3.5	2000	
DPF Nalag	Balhda Nalla	Whole	2.5	1000	
	Nalag Nalla	Whole	1.5	500	
DPF Mugalwani	Muglwana Nalla	Whole	1.5	500	
	Patta Nalla	whole	1	1000	
DPF Dhar	Jyor Nalla	Whole	2	500	
	Bajiuri Nalla	Whole	3	950	
DPF Namol	Namol Nalla	Whole	2	1500	
	Dugli nalla	whole	1.5	500	
D.P.F Batwara	Naral nal	Whole	8	2000	
D.P.F Panjolath	Panol Nala	Whole	6	1500	
	Panjolth Nala	Whole	5	1000	
D.P.F Patta	Banol nala	C-III	5	500	
	Kandhi nala	C-I	5	700	

D.P.F Jartu	Jartu Nala	C-I & C-II	8	500	
D.P.F Jaral	Raba nala	C-I&C-II	6	500	
D.P.F Dhawal	Ropari Nala	C-IV	5	2000	
	Khanod nala	C-Iv& C-V	4	1200	
	dhawal nala	C-III	6	3000	
D.P.F Ahen					
Sunali Shisham	Ropa Nala -1	C-IV	4	2000	
	Ropa Nala -2	C-III,&C-II	4	2500	
D.P.F Ahen					
Sunali	ahen Nala	C-II,	5	1000	
D.P.F Sojha	Chandikar nala	C-I	3	1100	
	sagroun nala	C-I	4	1200	
D.P.F. Bhalan	Surtha Nalla	C-II	3	900	
D.P.F. Krangal	Karangal nalla	C-I	3	1100	
D.P.f tahli	Hiun nalla	Whole	4	900	
D.P.F. Khalind	gaun nalla	C-I	5	850	
d.P.f hara	Bathad nalla	c-III	4	750	
D.P.F. Karla	Karla nalla	C-II	3.5	600	
D.P.F. Neri					
Ropru	samol nalla	C-III	4	800	
N.d 296 chaloun	samli Nalla	whole	5	700	
n.d. 297 Chaloun	kandhi nalla	Whole	4.5	900	
DPF Manjhki	Cholhra Nalla	C-I(c)	5	1200	modrate flow
DPF Manjhki	Kahli	C-IV	9	1400	modarate flow
DPF ChhotaGadoun	Gadoug	C-I	7	900	Modarte flow
OD-126					
Kuthahin	Kuthahin Nalla	C-II	1	900	

ND-132 Khudinal	Khudinal	Whole	1.5	600
OD-125				
Roparikothi	Ropari Nalla	Whole	2	800
OD-124 Kafla	Kafal Nalla	Whole	1.5	900
ND-143 Challela	Bhadetar Nalla	Whole	1.5	900
ND-142 Kotala	Kotala Nalla	Whole	1	600
ND-140	Behalidhar			
Behalidhar	Nalla	Whole	2	300
ND-135 Saikra	Chamba Naal	Whole	1.5	750
OD-175 Kamand	Kalao Nala	C-VI	0.7	900
OD-175 Kamand	Adash Nalla	C-V	0.6	1000
OD-175 Kamand	Kharthi Nalla	C-I	0.8	1500
OD-175 Kamand	Shalosh Nalla	C-I	0.6	1000
OD-175 Kamand	Auli Nalla	C-IV	1	1000
UPF Baru Nalla	Bhanard	Whole	0.5	500
OD-80				
Madhogan	Rakani	Whole	0.8	1000
ND-74 Rajwari	Rajwari	Whole	0.5	1500
UPF	Mundhkhar			
Mundhakhar	Nalla	Whole	0.7	600
UPF Batehra	Batehra	Whole	0.8	1800
UPF Dugrain	Dugrain	Whole	0.5	1500
ND-73 Darvehar	Kangar Nalla	Whole	0.6	400
UPF Gour	Palli Nalla	Whole	0.8	1500
PF Tapanidhar	Baleran Nalla	Whole	0.5	900

In the sub-mountainous area of the state, there is a tremendous scope for watershed management. The role of forests in conserving water and recharging the water table is well known. Retaining of forest cover in this area can save the waters of Himachal Pradesh.

CHAPTER 6

MAINTENANCE AND ENHANCEMENT OF FOREST RESOURCE PRODUCTIVITY

6.1 Growing stock of Wood:

Analysis of growing stock is necessary to know the capacity and potential of the forest to have tree growth and also to calculate harvestable yield in the working plan as also for future management to maintain the forest in the similar condition as a selection forest. As the objective of forest management is gradually shifting towards a regular flow of income and ecosystem services to the local community keeping conservation and ecological security as the larger objective, the harvestable yield and the increment of the forest have to be considered to arrive at the crucial decision of sustainable management. In Suket forest Division the main crop is Chil, Deodar, Kail, Khair, and miscellaneous BL species Chil forests are also being managed under shelter woodworking system and the rest of the forests are being managed under the selection system.

6.2 Estimation of Total Growing Stock: Forest Resource Assessment methodology as prescribed in the “National Working Plan Code-2014” was used to assess the total growing stock of trees and biomass. In each working circle number of sample plots were laid out using systematic sampling tools after reconnaissance of the forest area so that representation of all site qualities, type and structures of forests was ensured. Detail of sample plots, their geographical coordinates and compartments are given in Annexures. While approaching the sample plot observational assessment of site quality, tree species, composition, its health, density and crop age etc. were recorded in the Plot Approach Form I. Presence of special features such as blanks, scattered trees, plantations raised etc. were noted. Information on NTFP yielding species, intensity of invasive species, faunal sights and their traces, special wildlife habitats and drivers of deforestation were recorded.

After reaching the sample plot, a square plot of 0.1 ha was laid out measuring 22.36m horizontal distance i.e. half of the diagonal in all the four directions. After checking the dimensions of the plot, latitude, longitude and altitude coordinates were recorded. The main plot was used for recording the trees and bamboo stocking. The enumeration of trees was done by measuring the diameter/girth of each tree found in the sample plot. In case of bamboos, each clump was enumerated by taking its height,

number of first, second and three year old culms, dried, congested culms and overall condition of the culms. Information on regeneration and status of crop, injury to crop, grazing incidence, fire incidence, soil type, gradient of slope etc. were gathered and recorded.

The data of shrubs, climbers and regeneration status from all quadrats of 3m×3m laid out at a distance of 30 meters from the center of the main plot of 0.1ha was collected and recorded in the plot enumeration form. The data of herbs from all nested quadrats of 1m×1m laid within each quadrat of 3m×3m was collected and recorded in the plot enumeration form.

The recorded data was analyzed compartment wise to find the stocking of trees and other ecological parameters.

The results show that growing stock is represented by about 36 tree species in various proportions. The most predominant species include *Pinus roxburghii*, *Cedrus deodara*, *Pinus wallichiana*, *Quercus incana*, Fir, Spruce *Acacia catechu*, *Cassia fistula*, *Terminalia tomentosa*, *Syzygium cumini*, *Lannea grandis*, *Butea monosperma* and *Bauhinia variegata*. Going by the number of trees, it is apparent that *Pinus roxburghii* contributed 42.23 per cent to the total growing stock, . However, going by the volume *Cedrus deodara*, emerged as the most important species contributing as much as 22.67per cent of the total growing stock. All other species contributed more than 77.37 per cent. This is because the young age class of trees predominates and the mature age class is deficient. This was further evident when diameter classes were plotted against the number of trees. The forest is fairly balanced. This graph however does not give the picture that how many more trees can be accommodated in the higher diameter classes. From the structure and composition of forest, it will be advisable to develop the forest as a selection forest with fair distribution of trees of all classes and species.

Table 6.1: Number of Trees in diameter classes

Class	Trees
V	2458598
IV	1346798
III	808539
IIA	346402
IIB	264826
IA	119381
IB	111220
IC	94250
ID	24348

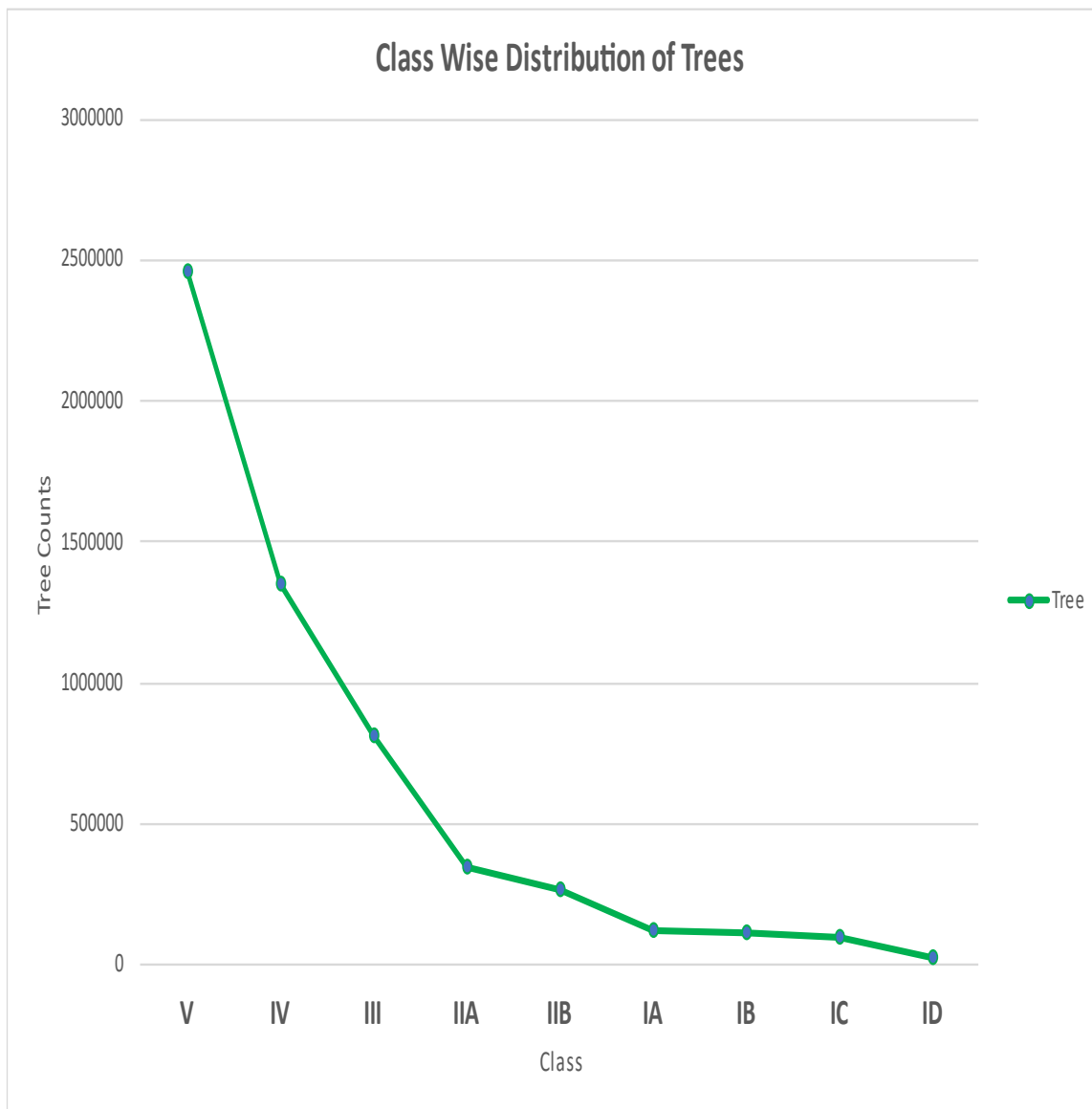


Fig. 6.1 Class wise distribution of trees

Table 6.2: Total Growing Stock (No. of Trees and total volume)

Class	Species (No. of trees)							Grand Total
	Chil	Deodar	Kail	Khair	Ban	Fir Spruce	BL	
V	1337916	274101.5	15912	32241	377809.5	35990	384628	2458598
IV	600583	266244	3182	47227.5	220733.5	11293	197535.5	1346798
III	263715	143638	5	53032	282762	4939	60448.5	808539
IIA	77430.5	81861	0	45195	95293	13055	33567.5	346402
IIB	38645.5	163002	0	29636	14471	0	19071.5	264826
IA	17043.5	34576	0	19757	27180	8116	12709	119381
IB	11362.5	54334	0	19757	12709	3177	9880.5	111220
IC	7447	74092	0	0	0	12709	2.5	94250
ID	0	4939	0	9878	0	6354	3177	24348
Tree	2354143	1096787	19099	256723	1030958	95633	721020	5574363
Volume	451659.545	1737592.808	1496.53	429315.235	769017.15	231880.701	318579.0734	3939541.042

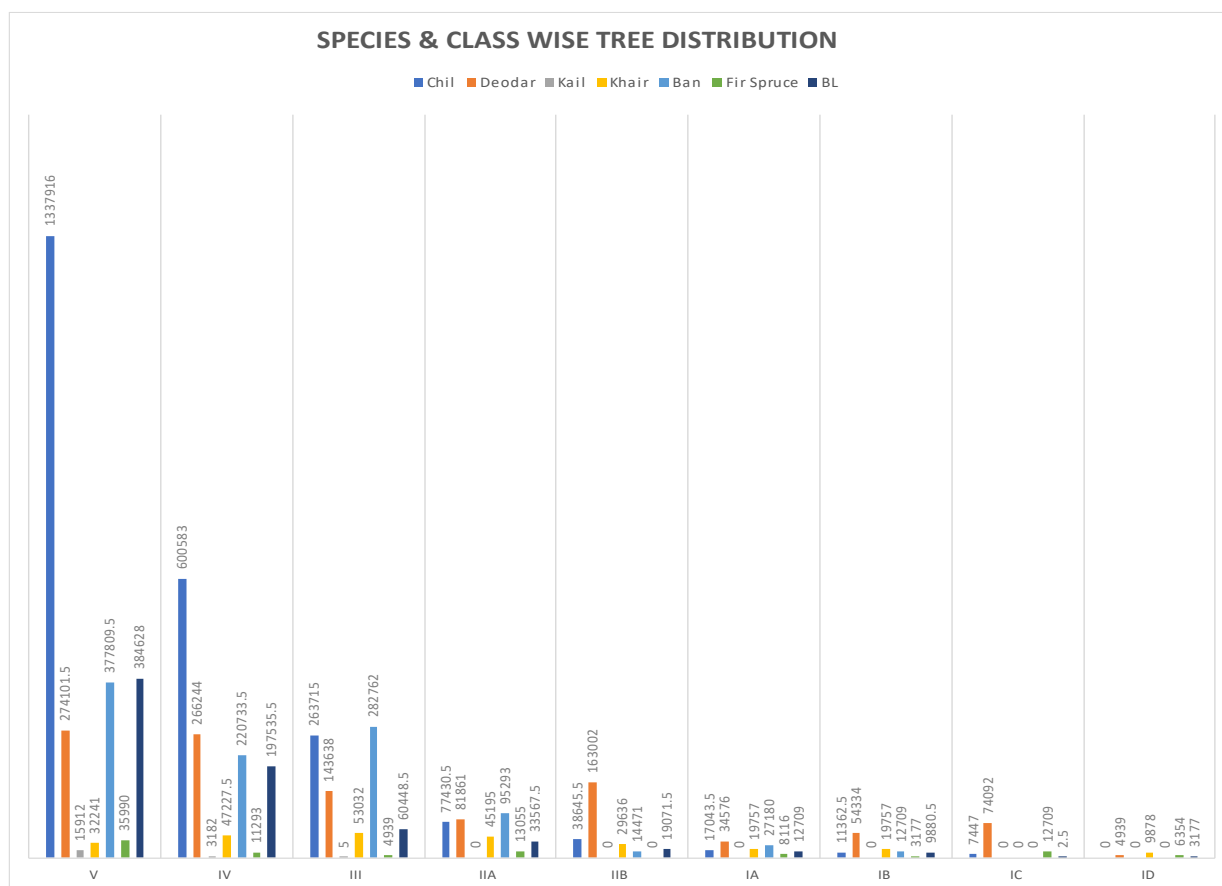


Fig 6.2 Species and class wise distribution of trees

6.3 Increment in volume of identified timber species:

Increment percentage: Volume increment in case of Deodar, Kail Chil, Spruce and Silver/fir adopted in Nanak Chand working plan are also adopted in this working plan which are as under:

VOLUME INCREMENT PERCENTAGE

Dia. (cm)	class	Deodar	Kail	Chil	Spruce	Silver/Fir
20-30		3.52	3.81	4.35	3.08	2.34
30-40		2.82	2.92	3.28	2.56	2.06
40-50		2.27	2.47	2.49	1.97	1.69
50-60		1.82	1.80	2.08	1.54	1.30
60-70		1.56	1.67	1.41	1.21	1.13

70-80	1.27	1.24	1.01	0.95	0.91
80-90	1.14	1.20	0.97	0.83	0.73
90 & above	0.86	0.88	0.78	0.65	0.49

6.3.1 Conversion Factors: The conversion factors of Ban Oak volume to weight of Fuel/wood and weight of Charcoal as adopted in Nanak Chand W.P. is quite reasonable and the same is also adopted in this Working Plan as tabulated below:

<u>Dia. Class</u>	<u>Volume (m3)</u>	<u>Weight of F/wood extracted</u>	<u>Wt. of charcoal extracted (qtls.</u>
20-30	0.26	2.99	0.49
30-40	0.73	8.39	1.38
40-50	1.36	15.64	2.58
50-60	1.52	17.48	2.88
60-70	2.09	24.03	3.96

(i) One cubic meter of fuel wood of Ban Oak weighs 11.50 qtls.

(ii) 6.0 Qtls of Fire wood is used for preparing one quintal of charcoal from Ban Oak.

The following table taken from Nanak Chand's working plan of Nurpur Forest Division (1976-91) and adopted in the working under revision. It indicates the volume of Heartwood and weight of Katha extracted from Khair trees of different classes.

<u>Diameter (Cms.)</u>	<u>Standing Vol. (m3)</u>	<u>Heartwood (m3)</u>	<u>Vol. Weight of Katha in Kgs</u>
15-20	0.07	0.03	2.50
20-25	0.12	0.06	5.00
25-30	0.17	0.11	8.00
30-35	0.25	0.18	14.00
35-40	0.33	0.24	18.00
40-45	0.43	0.30	23.00
45-50	0.55	0.39	29.00

In the higher classes the trees are rotten. Therefore, Katha content is less. As per Himachal Pradesh Manual Volume I, the following factors have been adopted:

0. 28 m3 stacked is taken as equal 0,014 meters solid.

2.80 m³ stacked firewood weighs 9.300 quintals.

The out turn of charcoal is to be taken as 0.37 quintals for 0.28 cubic meter (solid) of volume felled.

As above factors are sufficiently conservation no allowance need be made for the small amount admixture of miscellaneous species that may happen to be felled along with the Oaks.

6.4 Efforts towards enhancement of forest productivity through quality plantation activities:

To enhance the productivity of forests, it is imperative to stock the blank areas by planting with improved planting material. Further well drained soils can be planted with Khair, Bamboo, miscellaneous BL species and Deodar. However, the success of the plantation will depend on the eradication of lantana till the establishment age after which the species will take care to suppress lantana with their shade. In the identified areas, teak and *Diospyros tomentosa* should be planted for better productivity. There is a considerable scope to enhance the productivity of these forests with silvicultural measures and providing protection.

6.5 Carbon stock:

Biomass studies for carbon stock assessment are carried out separately for each working circle of the Suket forest division. The enumeration of stock is done as per the methodology adopted by the Forest Survey of India for conducting National Forest Inventory. From these observations, the above-ground biomass is calculated. For below-ground biomass, biomass of litter, rhizomes and the soil is taken separately and added to the above-ground biomass to arrive at the total biomass. The carbon stock is finally calculated using the biomass-carbon relationship applied by the FSI. Thus total carbon stock of these forests is arrived at. This will be useful as a baseline to find out the carbon sequestration capacity of these forests and their management keeping in view this object in mind.

6.5.1 Carbon Estimation of Forests:

6.5.1.1 Soil Carbon: Soil organic carbon is next to above-ground biomass in terms of its contribution to the incremental total carbon stock in forests and plantations. There is also a relationship between soil organic C and the site characteristics such as the deciduous or evergreen vegetation, climate and rainfall conditions. During Resource Assessment Survey, soil samples were collected from each compartment as per the standard

procedures. These samples were tested for C content in the soil laboratory. The results are produced below:

Table 6.3: Soil Carbon estimation in the forests

Working Circle	Total area	Soil wt. (MT)	Soil C %	Total Soil C
	(ha)			(MT)
Regular	5927.37	14907336	1.26	187832
Chil	5757.4	14479861	1.06	153486
Plantation	4450.35	11192630	0.915	102412
Protection	11756.48	29567547	1.32	390291
Total	27891.6	70147374		834021

The carbon storage in the soil thus comes to 29.90 tonnes/ha. The results are quite comparable to the recent studies made on the carbon content of soils of Uttarakhand. In teak plantation of Uttarakhand, the carbon storage in soil was reported to be 41.12 tonnes/ha.

6.5.1.2 Biomass estimation of forests: After the assessment of the growing stock of volume of trees, their biomass was estimated by application of standard equations and methodology developed by the FSI. Working circlewise estimation of biomass for forests is given in Table 6.5.

Table 6.4 Biomass estimation of Trees

Sr No	Working Circle	Total Growing Stock	Biomass of Tree Bole	Biomass of Roots	Biomass of Branches	Total Biomass
		Volume (Cum)	(qtl.)	(qtl.)	(qtl.)	
1	Regular	2435147.67	1363682.69	272736.53	4870.30	1641289.52
2	Chil	145226.79	81181.77	16264.72	290.45	97736.94
3	Plantation	3101360.81	1671633.47	341149.68	6202.72	2018985.87
4	Protection	1358472.02	745801.13	152148.86	2716.94	900666.93
	Total	7040207.29	3862299.06	782299.79	14080.41	4658679.26

6.5.1.3 Total Carbon Content: On the basis of estimates given in the above pages, the total carbon content in the forest (except shrubs and herbs) of the tract has been arrived as under (Table 6.6).

Table 6.5 Total Carbon Content (tonnes)

TOTAL AREA	SOIL CARBON (MT)	TREE CARBON (MT)	TOTAL CARBON (MT)
27891.60	834021	121125	955146

The estimates show that total carbon contained in the forests is 34.24 tones/ha. It must be mentioned that the carbon content of shrubs and herbs which make a major part of carbon pool in these forests has not been calculated. Of the total carbon, the contribution by soil carbon is the maximum and the contribution by tree is significantly low. This shows that there is a large potential for enhancing the carbon sequestration of these forests.

6.6 Carbon sequestration and mitigation: Efforts will be taken to enhance the carbon sequestration of these forests taking the calculated carbon stock as the baseline. It must be recognized that a balanced crop having a representation of all diameter and height classes is ideal for maximum carbon sequestration. A growing forest, with healthy and vigorous crop is the signature for the maximum sequestration crop. Forest soil must be kept as healthy and fertile as possible and the forest crops must be kept as vigorous as possible to produce as rapidly as they can till the biomass production attains its maximum desirable level.

CHAPTER 7

OPTIMISATION OF FOREST PRODUCE UTILISATION

7.1 Recorded removal of timber:

The removal of timber is only by way of salvage and by right holders as there is a complete ban on green felling and no silvicultural fellings has been carried during the last working period. The year-wise removal of trees from Suket forest division is tabulated as below

Table 7.1 Removal of Trees in salvage by Forest corporation

Detail of timber lots handed over to HPSFDC (last 10 years)

Sr No.	year	Species	No	Volume	Royalty value	Remark
1	2022-23	Final payments has not been made from HPSFDC				
1	2021-22	Deodar	122	229.448		
		Kail	107	250.56		
		Fir/Rai/Tosh	351	481.721		
		Chil	2348	473.8		
		Tun	32	7.42		
		Safeda	80	90.13		
		Shisham	16	2.52		
		Khair	3	1.26		
		OBL	182	104.68		
		Total	3241	1641.539	2345395	
2	2020-21	Chil	2548	724.58		
		Safeda	6	14.44		
		Shisham	1	0.28		
		Khair	20	2.206		
		B/L	416	187.5		
		Total	2991	929.006	561056	
3	2019-20	Deodar	215	244.244		
		Kail	482	878.08		
		Rai/Fir	1023	1828.612		

		Chil	3107	846.65		
		Total	4827	3797.586	8475792	
4	2018-19	Deodar	301	414.62		
		Kail	592	700.72		
		Chil	1170	347.44		
		Fir	236	281.91		
		Other BL	73	11.89		
		Total	2372	1756.58	4807974	
5	2017-18	Deodar	570	768.796		
		Kail	453	652.21		
		Rai/Fir	485	737.511		
		Tosh/Fir	4	5.116		
		Chil	1340	269.38		
		Ban	432	86.556		
		Rhododendron	13	2.66		
		Oie	3	0.56		
		Khair	3	0.42		
		B/L	12	5.32		
		Total	3315	2528.529	7038984	
6	2016-17	Nil	Nil	Nil	Nil	
7	2015-16	Chil	3110	536.65		
		B/L	229	56.78		
		Total	3339	593.43	357176	
8	2014-15	Khair	78	16.24		
		B/L	1421	254.98		
		Total	1499	271.22	75774	
9	2013-14	Deodar	356	743.706		
		Kail	411	641.712		
		FIR	232	397.221		
		Chil	1993	903.59		
		Tun	58	13.44		
		Safeda	6	6.2		
		B/L	461	172.824		

		Total	3517	2878.693	7359806	
10	2012-13	BL	796	150.6		
		Chil	259	120.13		
		Tuni	3	1.26		
		Kail	63	8.96		
		Toatl	1121	280.95	137662	

Table 7.2 Removal of Trees by Right Holders

Detail of Free grant Suket			
Year	Species	No. of trees	Volume
2011-12	Deodar	8	12.544
	Kail	22	25.22
	Rai	9	4.726
	Chil	15	3.81
Total		54	46.3
2012-13	Deodar	18	10.668
	Kail	8	4.09
	Chil	53	12.69
	Rai	4	3.624
	Kambal	2	0.28
	Panage	1	1.7
Total		86	33.052
2013-14	Deodar	53	13.688
	Kail	41	27.96
	Rai	7	4.079
	Chuli	2	3.4
	Kambal	8	1.26
	Panage	2	3.4
	Chil	126	48.922
	Ban	7	7.732
	Safeda	1	0.11
Total		247	110.551
2014-15	Deodar	885	2736.328
	Kail	72	157.6
	Rai	19	9.957

	Ban	10	7.292
	Chil	455	628.26
	Safeda	85	15.34
	OBL	15	32.81
Total		1541	3587.587
2015-16	Deodar	150	428.4
	Chil	340	322.888
	Kail	5	7.47
	Rai	3	4.232
	Safeda	1	0.28
	Poplar	1	0.84
	Khirak	4	1.68
	Kainth	1	0.28
Total		505	766.07
2016-17	Deodar	258	615.358
	Kail	62	85.08
	Tosh	2	2.56
	Maharu	1	1.76
	Ban	20	24.54
	Rai	9	12.628
	Chil	343	311.71
	Safeda	2	3.39
	Poplar	6	11.02
	Marinu	2	1.68
	OBL	8	7.6
Total		713	1077.326
2017-18	Deodar	213	514.06
	Kail	90	100.92
	Rai	9	9.642
	Panage	10	13.56
	Ban	42	46.8
	Chil	481	223.24
	Buransh	4	7.62
	OBL	56	39.93
Total		905	955.772
2018-19	Deodar	191	466.984
	Kail	81	105.79
	Rai	11	16.805
	Safeda	4	4.66

	Simble	1	2.54
	Ban	26	24.786
	Chil	451	315.2
	Mohru	1	0.84
	OBL	59	42.08
Total		825	979.685
2019-20	Deodar	172	510.85
	Kail	33	59.61
	Chil	710	501.966
	Ban	9	7.04
	OBL	41	37.72
G Total		965	1117.186
2020-21	Deodar	190	556.32
	Kail	17	26.27
	Chil	785	607.48
	Safeda	6	14.13
	OBL	10	4.9
Total		1008	1209.1
2021-22	Deodar	189	512.974
	Kail	18	24.81
	Chil	617	293.43
	Ban	39	27.41
	OBL	26	15.46
	Rai	2	4.424
	Safeda	2	1.68
	Oie	4	1.68
Total		897	881.868
2022-23	Deodar	199	439.16
	Kail	32	43.95
	Chil	555	357.97
	Ban	726	27.12
	OBL	12	5.18
Total		1524	873.38
2023-24	Chil OBL	349	342.14
	Deodar	164	575.372
	Kail	8	23.99
	Rai	0	0
Total		521	941.502

Table 7.3 Details of Trees of FCA cases approved in Suket Forest Division

Case :- 1 (First List) Widening of Nerchowk to Kiratpur (11.1486)													
Sr · N o.	Spp	sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Marinu	0	7	7	3	4	0	2	0	0	0	0	23
2	Khirk	0	12	12	6	6	1	2	1	0	0	0	40
3	Paplar	2	10	33	54	92	76	55	16	5	2	2	347
4	Bihul	0	0	1	0	0	0	0	0	0	0	0	1
5	Buins	0	3	0	1	1	0	0	0	0	0	0	5
6	Darek	0	2	7	6	1	0	0	0	0	0	0	16
7	Lassunia	0	1	2	2	3	0	0	0	0	0	0	8
8	Safeda	2	6	5	9	16	8	0	4	1	0	0	51
9	Mango	0	0	2	0	0	1	0	0	0	0	0	3
10	Pipal	0	1	1	1	0	0	0	0	0	0	4	7
11	Puna	0	5	1	0	0	0	0	0	0	0	0	6
12	Ritha	0	1	0	0	0	0	0	0	0	0	0	1
13	Shisham	0	0	4	7	1	0	0	0	0	0	0	12
14	Shehtoot	0	6	10	3	1	1	1	0	0	0	0	22
15	Semal	0	1	0	0	0	0	0	0	0	0	0	1
16	Tun	0	10	11	6	2	0	0	0	0	0	0	29
17	Fagura	0	2	2	0		0	0	0	0	0	0	4
18	Kakre	0	0	0	0	1	0	0	0	0	0	0	1
G. Total Tress		4	67	98	98	128	87	60	21	6	2	6	577
Case :- :-1 (Second List) Widening of Nerchowk to Kiratpur (11.1486)													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Amla	0	1	0	0	0	0	0	0	0	0	0	1
2	Bargad	0	1	1	0	1	0	1	0	0	0	1	5
3	Beul	0	5	4	1	0	0	0	0	0	0	0	10
4	Biuns	0	9	0	2	0	0	0	0	0	0	0	11
5	Drek	0	4	0	2	0	0	0	0	0	0	0	6
6	Fegra	0	0	4	0	0	0	0	0	0	0	0	4
7	Jamun	0	2	2	1	0	1	0	2	0	0	0	8
8	Kachnar	0	0	0	1	0	0	0	0	0	0	0	1
9	Kakre	0	0	1	0	0	1	0	0	0	0	0	2
10	Khidak	0	1	0	0	0	0	0	0	0	0	0	1
11	Lucinia	0	7	2	0	0	0	0	0	0	0	0	9
12	Mango	0	143	179	80	50	30	19	4	1	2	1	509

13	Naspati	0	0	1	0	0	0	0	0	0	0	0	1
14	Oie	0	1	1	1	0	0	0	0	0	0	0	3
15	Pipal	0	1	2	3	7	3	3	2	0	0	2	23
16	Paplar	0	9	12	18	12	9	1	0	0	0	0	61
17	Ritha	0	2	0	2	1	0	0	0	0	0	0	5
18	Safeda	0	17	31	22	17	3	0	0	2	2	0	94
19	Shisham	0	91	36	4	1	0	0	0	0	0	0	132
20	Simbal	0	4	8	3	9	2	0	0	0	0	0	26
21	Siris	0	1	0	0	0	0	0	0	0	0	0	1
22	Toot	0	21	15	3	0	1	0	0	0	0	0	40
23	Tuni	0	9	9	8	4	0	0	1	0	0	0	31
G.Total trees		0	329	308	151	102	50	24	9	3	4	4	984
Case :- :-1 (Thirst List) widening of nerchowk to Kirtpur													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Mango	0	1	0	0	0	0	0	0	0	0	0	1
2	Bhiul	0	28	8	2	0	0	0	0	0	0	0	38
3	Lassunia	0	15	3	0	0	0	0	0	0	0	0	18
4	Tat Palanga	0	0	1	0	0	0	0	0	0	0	0	1
5	Toot	0	2	1	0	0	0	0	0	0	0	0	3
6	Shisham	0	26	3	0	0	0	0	0	0	0	0	29
7	Siras	0	1	0	1	0	0	0	0	0	0	0	2
8	Simbal	0	1	1	2	0	0	0	0	0	0	0	4
9	Tunni	0	0	1	0	0	0	0	0	0	0	0	1
10	Fegara	0	1	0	0	0	0	0	0	0	0	0	1
11	Triambal	0	1	0	0	0	0	0	0	0	0	0	1
12	Bargad	0	0	0	0	0	0	1	0	0	0	0	1
13	Khair	0	43	0	0	0	0	0	0	0	0	0	43
14	Fatker	0	1	0	0	0	0	0	0	0	0	0	1
15	Amlatas	0	1	0	0	0	0	0	0	0	0	0	1
16	Slambra	0	8	0	0	0	0	0	0	0	0	0	8
G. Total trees		0	129	18	5	0	0	1	0	0	0	0	153
Case :- 2 C/o access and mining in clay borrowing at village jugahan													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Khirak	0	10	1	0	0	0	0	0	0	0	0	11
2	Toon	0	17	6	0	0	0	0	0	0	0	0	23
3	Kainth	0	5	0	0	0	0	0	0	0	0	0	5

4	Marinu	0	2	1	1	0	0	0	0	0	0	0	4
5	Pnia	0	1	0	0	0	0	0	0	0	0	0	1
6	Fegra	0	2	0	0	0	0	0	0	0	0	0	2
7	Chimu	0	3	1	0	0	0	0	0	0	0	0	4
G. Total trees		0	40	9	1	0	0	0	0	0	0	0	50

Case :- 3 C/o road from nihri to Balag

Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Deodar	0	10	15	54	63	67	19	8	4	0	0	240
2	Kail	0	0	0	3	7	4	2	0	0	0	0	16
G. Total Trees		0	10	15	57	70	71	21	8	4	0	0	256

Case :- 4 C/o Kateru to Slapper road

Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	134	125	1	0	0	0	0	0	0	0	260

Case :- 5 C/o road to vilage Balag

Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Simbal	0	0	5	0	0	0	0	0	0	0	0	5
2	Mango	0	0	1	0	0	0	0	0	0	0	0	1
3	Chil	0	3	0	0	0	0	0	0	0	0	0	3
4	Amaltas	0	2	0	0	0	0	0	0	0	0	0	2
5	Safeda	0	0	0	4	0	0	0	0	0	0	0	4
6	Khair	0	3	0	0	0	0	0	0	0	0	0	3
G. Total trees		0	8	6	4	0	0	0	0	0	0	0	18

Case :- 6 Sarouni to Tahli

Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total

1	Chil	0	35	4	0	0	0	0	0	0	0	0	39
2	Shisham	0	24	0	0	0	0	0	0	0	0	0	24
3	Bihul	0	1	0	0	0	0	0	0	0	0	0	1
4	Lucinia	0	1	0	0	0	0	0	0	0	0	0	1
5	Amaltas	0	3	0	0	0	0	0	0	0	0	0	3
6	Bhera	0	1	0	0	0	0	0	0	0	0	0	1
7	Kambhal	0	12	0	0	0	0	0	0	0	0	0	12
8	Slambda	0	3	6	4	0	0	0	0	0	0	0	13
9	Taur	0	1	0	0	0	0	0	0	0	0	0	1
10	Amla	0	2	0	0	0	0	0	0	0	0	0	2
G.Total trees			83	10	4	0	0	0	0	0	0	0	97
Case :- 7 C/o 132 kv DC transmission line from tapping tower 54 of kangoo largi line to sub station ratti for SOP													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Marinu	0	0	6	8	3	0	0	0	0	0	0	17
2	Poplar	0	18	8	1	0	0	0	0	0	0	0	27
G.Total trees		0	18	14	9	3	0	0	0	0	0	0	44
Case :- 8 C/o 132 Kv Tr Line Largi to Kangoo													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	19	86	25	1	0	0	0	0	0	0	131
2	Safeda	0	3	18	16	0	0	0	0	0	0	0	37
3	Oie	0	0	1	0	0	0	0	0	0	0	0	1
G.Total trees		0	22	105	41	1	0	0	0	0	0	0	169
Case :- 9 Diversion of forest land for clay borrow area at Kaned & Chowk													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Biunsh	0	10	3	0	0	0	0	0	0	0	0	13
2	khidak	0	4	1	1	0	0	0	0	0	0	0	6
3	Marinu	1	3	0	0	0	0	0	0	0	0	0	4
4	Kainth	0	1	0	0	0	0	0	0	0	0	0	1
5	Poplar	17	20	8	3	0	0	0	0	0	0	0	48
6	Tooni	0	0	1	1	0	0	0	0	0	0	0	2

G.Total trees	18	38	13	5	0	0	0	0	0	0	0	74

Case :- 10 C/o 33/22 KV sub station by HPSEB at Kalkhar

Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Bihul	2	2	0	0	0	0	0	0	0	0	0	4
2	Kainth	1	0	0	0	0	0	0	0	0	0	0	1
3	Oie	1	0	0	0	0	0	0	0	0	0	0	1
4	Paza	3	0	1	0	0	0	0	0	0	0	0	4
5	Fegda	1	1	1	0	0	0	0	0	0	0	0	3
6	Simbal	0	1	0	0	0	0	0	0	0	0	0	1
7	Kambhal	0	1	0	0	0	0	0	0	0	0	0	1
8	Trimbal	0	0	2	0	0	0	0	0	0	0	0	2
9	Tuni	1	0	0	0	0	0	0	0	0	0	0	1
G. Total trees		9	5	4	0	0	0	0	0	0	0	0	18

Case :- 11 Dharli to Serikothi

Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Slambra	0	7	7	2	0	0	0	0	0	0	0	16
2	Kachnar	0	8	2	1	0	0	0	0	0	0	0	11
3	Tyambali	0	0	8	3	0	0	0	0	0	0	0	11
4	Sahama	0	3	5	1	1	0	0	0	0	0	0	10
5	Galma	0	12	0	0	0	0	0	0	0	0	0	12
6	Paryara	0	4	7	0	0	0	0	0	0	0	0	11
7	Kambal	0	62	26	1	0	0	0	0	0	0	0	89
8	Tuni	0	1	1	1	0	0	0	0	0	0	0	3
9	Pulla	0	12	7	1	0	0	0	0	0	0	0	20
10	Kaulia	0	0	1	0	0	0	0	0	0	0	0	1
11	Fegda	0	0	0	1	0	0	0	0	0	0	0	1
12	Daru	0	2	0	0	0	0	0	0	0	0	0	2
13	Tirmira	0	1	0	0	0	0	0	0	0	0	0	1
14	Khidak	0	9	1	1	0	0	0	0	0	0	0	11
15	Simbal	0	1	0	0	0	0	0	0	0	0	0	1
16	Oie	0	1	0	0	0	0	0	0	0	0	0	1
17	Thira	0	1	3	1	0	0	0	0	0	0	0	5
18	Kakre	0	3	4	1	1	3	0	0	0	0	0	12
19	Sanan	0	4	2	1	0	0	0	0	0	0	0	7
20	Balodhar	0	9	0	1	0	0	0	0	0	0	0	10

21	Ghaldra	0	3	0	0	0	0	0	0	0	0	0	3
22	Palakhe	0	3	0	0	0	0	0	0	0	0	0	3
G. Total trees		0	146	74	16	2	3	0	0	0	0	0	241
Case :- 12 Setting up of VHF station at Naina Devi Ji by police department													
Sr · No.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Oak	5	0	0	0	0	0	0	0	0	0	0	5
Case :- 13 C/o road Pandar To Tatapani													
Sr · No.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Ban	0	0	83	51	10	5	1	1	0	0	0	151
Case :- 14 : C/o road Janaul to Jaral													
Sr · No.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Deodar	0	13	0	0	0	0	0	0	0	0	0	13
2	Kail	0	28	18	20	20	23	4	1	0	0	0	114
3	Chil	0	1	0		0	1	0	0	0	0	0	2
4	B/l	0	11	9	2	0	0	0	0	0	0	0	22
G. Total trees		0	53	27	22	20	24	4	1	0	0	0	151
Case :- 15 C/o Degree college nihiri													
Sr · No.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Deodar	0	1	2	1	0	0	0	0	0	0	0	4
2	Kail	18	36	5	23	15	7	1	0	0	0	0	105
													109

Case :- 16 C/o ITI Bhadrota													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Drek	0	7	2	0	0	0	0	0	0	0	0	9
2	Mango	0	1	0	1	0	0	0	4	0	0	0	6
3	Siras	0	3	1	0	0	0	0	0	0	0	0	4
4	Kakarsingi	0	1	0	0	0	0	0	0	0	0	0	1
5	Ambla	0	2	0	0	0	0	0	0	0	0	0	2
6	Simbal	0	0	1	1	0	0	0	0	0	0	0	2
7	Chil	0	1	1	0	0	0	0	0	0	0	0	2
8	Jamun	0	1	0	0	1	0	0	0	0	0	0	2
9	Kainth	0	2	1	1	0	0	0	0	0	0	0	4
10	Blodhar	0	0	0	1	0	0	0	0	0	0	0	1
11	Slambda	0	0	1	0	0	0	0	0	0	0	0	1
12	Nashpati	0	1	0	0	0	0	0	0	0	0	0	1
13	Shisham	0	1	1	1	0	0	0	0	0	0	0	3
G. Total trees		0	20	8	5	1	0	0	4	0	0	0	38
Case :- 17 : C/o Tanda Kohla Tikari Road													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Ban	0	0	2	11	3	0	0	0	0	0	0	16
2	Chil	0	8	21	0	0	0	0	0	0	0	0	29
3	Shama	0	1	0	0	0	0	0	0	0	0	0	1
G. Total trees		0	9	23	11	3	0	0	0	0	0	0	46
Case :- 18 Lakhwan Dhanu road 2.3698 ha													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Tuni	0	2	1	1	0	0	0	0	0	0	0	4
2	Kainth	0	3	0	0	0	0	0	0	0	0	0	3
3	Shehtoot	0	3	0	0	0	0	0	0	0	0	0	3
4	Bihul	0	1	1	0	0	0	0	0	0	0	0	2
5	Darehndu	0	5	0	0	0	0	0	0	0	0	0	5
6	Khidak	0	2	1	0	0	0	0	0	0	0	0	3
7	Jamun	0	1	0	0	0	0	0	0	0	0	0	1

8	Kambhal	0	2	0	0	0	0	0	0	0	0	0	2
9	Kakde	0	0	1	0	0	0	0	0	0	0	0	1
10	Drek	0	1	0	0	0	0	0	0	0	0	0	1
G.Total trees		0	20	4	1	0	0	0	0	0	0	0	25
Case :- 19 : Bhadrolu to Dharli													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Ban	0	13	10	10	5	1	0	0	0	0	0	39
2	Kachnar	0	25	10	1	0	0	0	0	0	0	0	36
3	Dharle	0	1	0	1	0	0	0	0	0	0	0	2
4	Shegal	0	0	0	0	1	0	0	0	0	0	0	1
5	Khidak	0	17	0	0	0	0	0	0	0	0	0	17
6	Dudru	0	5	0	0	0	0	0	0	0	0	0	5
7	Slambda	0	42	7	8	2	0	0	0	0	0	0	59
8	Kambhal	0	80	5	0	0	0	0	0	0	0	0	85
9	Taryambal	0	1	0	0	0	0	0	0	0	0	0	1
10	Sama	0	2	0	0	0	0	0	0	0	0	0	2
11	Kakarsingi	0	10	0	0	0	0	0	0	0	0	0	10
12	Gledru	0	1	0	0	0	0	0	0	0	0	0	1
13	Siris	0	6	0	0	0	0	0	0	0	0	0	6
14	Daru	0	2	0	0	0	0	0	0	0	0	0	2
15	Koid	0	1	0	0	0	0	0	0	0	0	0	1
16	Kangu	0	1	0	0	0	0	0	0	0	0	0	1
17	Kummi	0	1	0	0	0	0	0	0	0	0	0	1
18	Amaltas	0	3	0	0	0	0	0	0	0	0	0	3
19	Biul	0	11	0	0	0	0	0	0	0	0	0	11
20	Paryara	0	9	0	0	0	0	0	0	0	0	0	9
21	Buraash	0	3	7	4	0	0	0	0	0	0	0	14
22	Jamun	0	0	0	1	0	0	0	0	0	0	0	1
23	Badhrol	0	5	0	0	0	0	0	0	0	0	0	5
24	Landhad	0	1	1	0	0	0	0	0	0	0	0	2
25	Tarebal	0	4	0	0	0	0	0	0	0	0	0	4
26	Pula	0	11	1	0	0	0	0	0	0	0	0	12
27	Chuli	0	0	1	0	0	0	0	0	0	0	0	1
28	Kafal	0	1	0	0	0	0	0	0	0	0	0	1
29	Other BL	0	4	5	4	1	0	0	0	0	0	0	14
30	Amla	0	0	2	3	0	0	0	0	0	0	0	5
31	Sanan	0	8	0	0	0	0	0	0	0	0	0	8
32	Bambu Clumps	0	1	0	0	0	0	0	0	0	0	0	1

G. Total trees		0	269	49	32	9	1	0	0	0	0	0	360
Case :- 20 Slapper to Tatapani list 1													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Farse	0	3	0	0	0	0	0	0	0	0	0	3
2	Dhow	0	318	41	6	0	0	0	0	0	0	0	365
3	Khair	0	56	18	4	0	0	0	0	0	0	0	78
4	Simbal	0	1	0	0	0	0	0	0	0	0	0	1
5	Goyla	0	1	0	0	0	0	0	0	0	0	0	1
6	Rataila	0	1	0	0	0	0	0	0	0	0	0	1
7	Kararu	0	5	0	0	0	0	0	0	0	0	0	5
8	Amaltast	0	154	19	5	0	0	0	0	0	0	0	178
9	Kuri	0	105	5	0	0	0	0	0	0	0	0	110
10	Slambra	0	148	62	13	0	1	0	0	0	0	0	224
11	Soman	0	45	8	0	0	0	0	0	0	0	0	53
12	Kongoo	0	22	0	0	0	0	0	0	0	0	0	22
13	Chhuhre	0	10	7	0	0	0	0	0	0	0	0	17
14	Beil	0	32	1	1	0	0	0	0	0	0	0	34
15	Ambla	0	9	4	0	0	0	0	0	0	0	0	13
16	Taur	0	57	0	0	0	0	0	0	0	0	0	57
17	Kumi	0	8	3	0	0	0	0	0	0	0	0	11
18	Balodher	0	7	5	0	0	0	0	0	0	0	0	12
19	Kamal	0	114	8	1	0	0	0	0	0	0	0	123
20	Charomade	0	27	3	0	0	0	0	0	0	0	0	30
21	Khirak	0	8	2	1	0	0	0	0	0	0	0	11
22	Singar	0	0	2	1	0	0	0	0	0	0	0	3
23	Badthu	0	4	0	0	0	0	0	0	0	0	0	4
24	Behul	0	2	0	0	0	0	0	0	0	0	0	2
25	Paryara	0	3	2	1	0	0	0	0	0	0	0	6
26	Bakar	0	2	0	0	0	0	0	0	0	0	0	2
27	Katchnar	0	6	0	0	0	0	0	0	0	0	0	6
28	Paplakhe	0	2	0	0	0	0	0	0	0	0	0	2
29	Khame	0	2	0	0	0	0	0	0	0	0	0	2
30	Punne	0	2	0	0	0	0	0	0	0	0	0	2
31	Pulle	0	5	1	0	0	0	0	0	0	0	0	6
32	Behuli	0	10	0	1	0	0	0	0	0	0	0	11
33	Dhave	0	3	0	0	0	0	0	0	0	0	0	3
34	Behra	0	6	2	2	0	0	0	0	0	0	0	10
35	Paruni	0	5	3	0	0	0	0	0	0	0	0	8
36	Ghaledru	0	4	0	0	0	0	0	0	0	0	0	4
37	Kakre	0	5	1	2	0	1	0	0	0	0	0	9

38	Ainthan	0	1	0	0	0	0	0	0	0	0	0	1
39	Siras	0	0	0	1	0	0	0	0	0	0	0	1
40	Kharara	0	4	0	0	0	0	0	0	0	0	0	4
41	Kaldhou	0	26	0	0	0	0	0	0	0	0	0	26
42	Khaloe	0	10	3	0	0	0	0	0	0	0	0	13
43	Bodha	0	5	1	1	0	0	0	0	0	0	0	7
44	Karmaru	0	7	1	0	0	0	0	0	0	0	0	8
45	Airaila	0	2	0	0	0	0	0	0	0	0	0	2
46	Sayahru	0	2	0	0	0	0	0	0	0	0	0	2
47	Bamboo clumps	0	0	0	0	0	0	0	0	0	0	0	0
G. Total trees		0	124 9	202	40	0	2	0	0	0	0	0	1493
Case :- 21 C/o slapper tatapani 2.717 ha 397 trees													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Amla	0	5	2	0	0	0	0	0	0	0	0	7
2	Amltas	0	40	27	0	0	0	0	0	0	0	0	67
3	Amboara	0	10	2	1	1	0	0	0	0	0	0	14
4	Bakar	0	3	0	0	0	0	0	0	0	0	0	3
5	Bihul	0	12	7	0	0	0	0	0	0	0	0	19
6	Bhera	0	0	1	0	0	0	0	0	0	0	0	1
7	Bel	0	4	0	0	0	0	0	0	0	0	0	4
8	Debari	0	2	0	0	0	0	0	0	0	0	0	2
9	Dhou	0	26	9	5	2	0	0	0	0	0	0	42
10	Goyla	0	7	1	0	0	0	0	0	0	0	0	8
11	Kachnar	0	3	1	0	0	0	0	0	0	0	0	4
12	Kambal	0	34	6	0	0	0	0	0	0	0	0	40
13	Khair	0	10	8	2	0	0	0	0	0	0	0	20
14	Khalave	0	2	0	0	0	0	0	0	0	0	0	2
15	Kumi	0	1	2	0	0	0	0	0	0	0	0	3
16	Kura	0	7	0	0	0	0	0	0	0	0	0	7
17	Paplakhi	0	0	0	1	0	0	0	0	0	0	0	1
18	Paryara	0	3	2	1	1	0	0	0	0	0	0	7
19	Pule	0	11	4	1	1	0	0	0	0	0	0	17
20	Rataila	0	2	1	7	0	0	0	0	0	0	0	10
21	Salamara	0	31	33	2	1	0	0	0	0	0	0	67
22	Sanan	0	27	2	1	0	0	0	0	0	0	0	30
23	Singar	0	4	3	0	1	1	0	0	0	0	0	9
24	Siras	0	2	1	0	0	0	0	0	0	0	0	3
25	Taryamal	0	0	1	0	0	0	0	0	0	0	0	1
26	Drek	0	0	1	0	0	0	0	0	0	0	0	1

27	Shisham	0	0	1	0	0	0	0	0	0	0	0	1
28	Aledhar	0	0	1	0	0	0	0	0	0	0	0	1
29	Khidak	0	2	2	0	0	0	0	0	0	0	0	4
30	Dhave	0	1	1	0	0	0	0	0	0	0	0	2
G. Total trees		0	249	119	21	7	1	0	0	0	0	0	397

Case :- 22 Slapper tatapani 13/300 to 17/300 3.204

Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Dhow	0	166	9	0	0	0	0	0	0	0	0	175
2	Slambara	0	84	29	2	0	0	0	0	0	0	0	115
3	Sanan	0	93	8	2	0	0	0	0	0	0	0	103
4	Khair	0	62	1	0	0	0	0	0	0	0	0	63
5	Taur	0	20	0	0	0	0	0	0	0	0	0	20
6	Kuri	0	47	0	0	0	0	0	0	0	0	0	47
7	Kumi	0	6	3	1	0	0	0	0	0	0	0	10
8	Amalstas	0	18	2	0	0	0	0	0	0	0	0	20
9	Kambhal	0	20	1	0	0	0	0	0	0	0	0	21
10	Siris	0	1	0	0	0	0	0	0	0	0	0	1
11	Shinger	0	2	0	0	0	0	0	0	0	0	0	2
12	Bihuli	0	1	0	0	0	0	0	0	0	0	0	1
13	Goyaks	0	10	0	0	0	0	0	0	0	0	0	10
14	Tyambli	0	1	1	0	0	0	0	0	0	0	0	2
15	Blodhar	0	0	1	0	0	0	0	0	0	0	0	1
16	Pipal	0	1	0	0	0	0	0	0	0	0	0	1
17	Shyama	0	1	0	0	0	0	0	0	0	0	0	1
18	Beel	0	3	0	0	0	0	0	0	0	0	0	3
19	Sykaru	0	5	1	0	0	0	0	0	0	0	0	6
20	Kachnar	0	7	0	0	0	0	0	0	0	0	0	7
21	Khidak	0	1	0	0	0	0	0	0	0	0	0	1
22	Amla	0	1	0	0	0	0	0	0	0	0	0	1
23	Barthu	0	0	1	0	0	0	0	0	0	0	0	1
24	Charmary	0	2	1	0	0	0	0	0	0	0	0	3
25	Churray	0	2	0	0	0	0	0	0	0	0	0	2
26	Bhera	0	1	0	0	0	0	0	0	0	0	0	1
G. Total trees		0	555	58	5	0	0	0	0	0	0	0	618

Case :- 23 : C/o road Rashar hawani Trangla Bhalyana 1.8722 ha

Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	0	7	6	7	0	0	0	0	0	0	20
2	Shisham	0	1	0	0	0	0	0	0	0	0	0	1
G. Total trees		0	1	7	6	7	0	0	0	0	0	0	21
Case :- 24 : Road Arthi 0.924 ha													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	35	22	3	0	0	0	0	0	0	0	60
2	Oie	0	2	1	0	0	0	0	0	0	0	0	3
G. Total trees		0	37	23	3	0	0	0	0	0	0	0	63
Case :- 25 : Hafwana panyas													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	5	0	7	5	2	2	0	0	0	0	21
2	B/L	0	11	4	4	0	0	0	0	0	0	0	19
G. total		0	16	4	11	5	2	2	0	0	0	0	40
Case :- 26 : Ropa to Padhna													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Shisham	0	2	1	0	0	0	0	0	0	0	0	3
2	Beel	0	6	1	0	0	0	0	0	0	0	0	7
3	Kambhal	0	5	1	0	0	0	0	0	0	0	0	6
4	Siras	0	0	1	0	0	0	0	0	0	0	0	1
5	Taur	0	4	0	0	0	0	0	0	0	0	0	4
6	Samlbra	0	5	6	2	0	0	0	0	0	0	0	13
7	Dhau	0	5	1	0	0	0	0	0	0	0	0	6
8	Simbal	0	1	2	0	0	0	0	0	0	0	0	3
9	Sanan	0	2	1	0	0	0	0	0	0	0	0	3
10	Amaltas	0	3	1	0	0	0	0	0	0	0	0	4
11	Pariyara	0	0	1	0	1	0	0	0	0	0	0	2

12	Bihul	0	0	1	0	0	0	0	0	0	0	0	1
13	Kangu	0	1	0	0	0	0	0	0	0	0	0	1
G. Total trees		0	34	17	2	1	0	0	0	0	0	0	54

Case :- 27 : Road Shilhanu

Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Deodar	30	16	6	1	1	1	3	0	0	0	0	58
2	Kail	0	1	0	0	0	0	0	0	0	0	0	1
3	Chil	41	34	17	6	1	2	0	0	0	0	0	101
G. Total trees		71	51	23	7	2	3	3	0	0	0	0	160

Case :- 28 : C/o road Taleli to Ghangnu road

Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	21	23	4	0	0	0	0	0	0	0	48

Case :- 29 : C/o Sushan Jawala Road

Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	3	6	3	1	0	0	0	0	0	0	13
2	Simbal	0	2	1	4	0	0	0	0	0	0	0	7
3	Dudhla	0	0	0	0	0	1	0	0	0	0	0	1
4	Popular	0	0	0	1	2	0	0	0	0	0	0	3
G. Total trees		0	5	7	8	3	1	0	0	0	0	0	24

Case :- 30 : LWSS in Bhadrota bera Surangran hatli Sarkaghat

Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	15	25	13	0	0	0	0	0	0	0	53
2	Ban	0	38	0	0	0	0	0	0	0	0	0	38
G. Total trees		0	53	25	13	0	0	0	0	0	0	0	91

Case :- 31 : Diversion of 0.7941 forest land in favour of AD Hydro power ltd. Transmission line													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Khair	0	22	4	1	0	0	0	0	0	0	0	27
2	Shisham	0	7	0	0	0	0	0	0	0	0	0	7
3	Lucinia	0	1	0	0	0	0	0	0	0	0	0	1
4	Kaldhan	0	1	0	0	0	0	0	0	0	0	0	1
5	Simbal	0	0	0	2	0	0	0	0	0	0	0	2
G. total trees		0	31	4	3	0	0	0	0	0	0	0	38
Case :- 32 : Diversion of 3.34 ha of forest land in favour of NHAI for the c/o Sundernagar by pass													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Willow	0	0	1	0	0	0	0	0	0	0	0	1
2	Oie	0	0	0	0	1	0	0	0	0	0	0	1
3	Brodall	0	0	1	0	0	0	0	0	0	0	0	1
4	Debran	0	0	0	1	0	0	0	0	0	0	0	1
5	Draindu	0	3	0	0	0	0	0	0	0	0	0	3
6	Dugda	0	0	1	0	0	0	0	0	0	0	0	1
7	Jamun	0	0	1	0	0	0	0	0	0	0	0	1
8	Kakde	0	3	2	0	0	0	0	0	0	0	0	5
9	Kanbal	0	1	0	0	0	0	0	0	0	0	0	1
10	Kachnar	0	2	0	0	0	0	0	0	0	0	0	2
11	Khidak	0	9	2	0	0	0	0	0	0	0	0	11
12	Pipal	0	0	0	0	0	0	0	0	0	0	1	1
13	Shehtut	0	2	0	2	0	0	0	0	0	0	0	4
14	Shegal	0	2	0	0	0	0	0	0	0	0	0	2
15	Shisham	0	1	0	0	0	0	0	0	0	0	0	1
16	Trambal	0	1	1	0	0	0	0	0	0	0	0	2
17	Tuni	0	0	2	0	0	0	0	0	0	0	0	2
18	OBL	10	0	0	0	0	0	0	0	0	0	0	10
G. Total of trees		10	24	11	3	1	0	0	0	0	0	1	50
Case :- 33 : C/o motorable road Sanihan to Batwara													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Slambra	0	18	5	2	0	0	0	0	0	0	0	25

2	Kachnar	0	15	2	2	0	0	0	0	0	0	0	19
3	Paryara	0	24	11	4	0	0	0	0	0	0	0	39
4	Sanan	0	13	2	0	0	0	0	0	0	0	0	15
5	Bihuli	0	13	7	0	1	0	0	0	0	0	0	21
6	Gadal	0	0	0	1	0	0	0	0	0	0	0	1
7	Singar	0	4	1	0	0	0	0	0	0	0	0	5
8	Tayambali	0	4	1	0	0	0	0	0	0	0	0	5
9	Palakhe	0	2	0	0	1	0	0	0	0	0	0	3
10	Blodhar	0	4	3	0	0	0	0	0	0	0	0	7
11	Khidak	0	3	0	0	0	0	0	0	0	0	0	3
12	Kambhal	0	6	1	0	0	0	0	0	0	0	0	7
13	Umbarne	0	0	1	0	0	0	0	0	0	0	0	1
14	Bhadrol	0	1	1	2	0	0	0	1	0	0	0	5
15	Sashama	0	3	1	0	0	0	0	0	0	0	0	4
16	Kakde	0	1	4	2	0	0	0	0	0	0	0	7
17	Kangoo	0	3	0	0	0	0	0	0	0	0	0	3
18	Pula	0	1	0	0	0	0	0	0	0	0	0	1
G. Total trees		0	115	40	13	2	0	0	1	0	0	0	171

Case :- 34 : C/o 0.4860 ha of forest land in favour of HPSEBL ltd for c/o 33/1 Sub station Talow Sarkaghat

Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Tuni	0	0	2	1	0	0	0	0	0	0	0	3
2	Bihul	0	8	0	0	0	0	0	0	0	0	0	8
3	Tut	0	2	2	0	0	0	0	0	0	0	0	4
4	Simbal	0	1	0	1	0	0	0	0	0	0	0	2
5	Gawaun	0	1	0	0	0	0	0	0	0	0	0	1
6	Kachnar	0	0	1	0	0	0	0	0	0	0	0	1
G. Total trees		0	12	5	2	0	0	0	0	0	0	0	19

Case :- 35 : Car parking at Sarkaghat

Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Khirak	0	1	0	0	0	0	0	0	0	0	0	1
2	Jamun	0	0	1	0	0	0	0	0	0	0	0	1
3	Bayul	0	2	0	0	0	0	0	0	0	0	0	2
4	Fegra	0	1	0	0	0	0	0	0	0	0	0	1
5	Ban	0	1	1	0	0	0	0	0	0	0	0	2
6	Balodhar	0	0	2	1	0	0	0	0	0	0	0	3

7	Shehtoot	0	2	1	1	2	0	0	0	0	0	0	6
G. Total trees		0	7	5	2	2	0	0	0	0	0	0	16
Case :- 36 : ITI Dehar													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Shisham	0	16	0	0	0	0	0	0	0	0	0	16
2	Khair	0	5	0	0	0	0	0	0	0	0	0	5
3	Bargad	0	0	0	0	0	0	2	0	0	0	0	2
G. Total trees		0	21	0	0	0	0	2	0	0	0	0	23
Case :- 37: Gadog Nalla to Barnog													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Deodar	0	12	27	41	43	31	17	6	3	2	0	182
2	Kail	0	1	3	2	6	0	2	0	0	0	0	14
3	Chil	0	0	1	1	1	0	0	0	0	0	0	3
G. Total trees		0	13	31	44	50	31	19	6	3	2	0	199
Case :- 38: Bhambla to Kalkhar													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	12	18	9	7	1	0	0	0	0	0	47
Case :- 39 : Bhambla to Kalkhar													
Sr · N o.	Spp	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	127	195	95	14	0	0	0	0	0	0	431
2	Paza	0	0	1	0	0	0	0	0	0	0	0	1
3	Khair	0	25	2	0	0	0	0	0	0	0	0	27
4	Shisham	0	3	2	0	0	0	0	0	0	0	0	5
5	Safeda	0	5	3	2	0	0	1	0	0	0	0	11
6	Oie	0	3	0	1	0	0	0	0	0	0	0	4

7	Mango	0	0	2	0	0	0	0	0	0	0	0	2
8	Misc	31	0	0	0	0	0	0	0	0	0	0	31
G. Total trees		31	163	205	98	14	0	1	0	0	0	0	512

Table 7.4 Abstract of trees felled in FCA cases under Suket Forest Division

Detail of trees felled in FCA cases in Suket Forest Division														
Sr. No .	Spp	Sa p	V	IV	III	II A	II B	I A	I B	I C	I D	I E	Tota l	Volume (m ³)
1	Ainthan	0	1	0	0	0	0	0	0	0	0	0	1	0.14
2	Airaila	0	2	0	0	0	0	0	0	0	0	0	2	0.28
3	Aledhar	0	0	1	0	0	0	0	0	0	0	0	1	0.28
4	Amalstas	0	224	49	5	0	0	0	0	0	0	0	278	49.28
5	Ambla	0	30	10	4	1	0	0	0	0	0	0	45	12.06
6	Badhrol	0	5	0	0	0	0	0	0	0	0	0	5	0.7
7	Badthu	0	4	1	0	0	0	0	0	0	0	0	5	0.84
8	Bakar	0	5	0	0	0	0	0	0	0	0	0	5	0.7
9	Balodhar	0	16	7	2	0	0	0	0	0	0	0	25	5.88
10	Bamboo clumps	0	1	0	0	0	0	0	0	0	0	0	1	0
11	Ban	0	52	96	72	18	6	1	1	0	0	0	246	147.188
12	Bargad	0	1	1	0	1	0	4	0	0	0	1	8	17.96
13	Beel	0	45	2	1	0	0	0	0	0	0	0	48	7.7
14	Bhadrol	0	1	1	2	0	0	0	1	0	0	0	5	5.5
15	Bhera	0	8	3	2	0	0	0	0	0	0	0	13	3.64
16	Bihul	2	96	29	4	1	0	0	0	0	0	0	132	26.9
17	Biyunsh	0	22	3	3	1	0	0	0	0	0	0	29	8.14
18	Blodhar	0	9	6	2	0	0	0	0	0	0	0	17	4.62
19	Buraash	0	3	7	4	0	0	0	0	0	0	0	14	5.74
20	Charmary	0	29	4	0	0	0	0	0	0	0	0	33	5.18
21	Chhuhre	0	10	7	0	0	0	0	0	0	0	0	17	3.36
22	Chuli	0	0	1	0	0	0	0	0	0	0	0	1	0.28
23	Chil	41	453	551	173	37	6	2	0	0	0	0	1263	175.02
24	Churray	0	2	0	0	0	0	0	0	0	0	0	2	0.28
25	Darehndu	0	8	0	0	0	0	0	0	0	0	0	8	1.12
26	Darek	0	14	10	8	1	0	0	0	0	0	0	33	13.18
27	Daru	0	4	0	0	0	0	0	0	0	0	0	4	0.56
28	Debari	0	2	0	1	0	0	0	0	0	0	0	3	1.12
29	Deodar	30	52	50	97	107	99	39	14	7	2	0	497	811.608
30	Dharle	0	1	0	1	0	0	0	0	0	0	0	2	0.98
31	Dhave	0	519	61	11	2	0	0	0	0	0	0	593	102.38

32	Dudhla	0	0	1	0	0	1	0	0	0	0	0	2	2.82
33	Dudru	0	5	0	0	0	0	0	0	0	0	0	5	0.7
34	Farse	0	3	0	0	0	0	0	0	0	0	0	3	0.42
35	Fatkera	0	1	0	0	0	0	0	0	0	0	0	1	0.14
36	Fegra	1	7	7	1	0	0	0	0	0	0	0	16	3.92
37	Gadal	0	0	0	1	0	0	0	0	0	0	0	1	0.84
38	Galma	0	12	0	0	0	0	0	0	0	0	0	12	1.68
39	Gawaun	0	1	0	0	0	0	0	0	0	0	0	1	0.14
40	Gledru	0	8	0	0	0	0	0	0	0	0	0	8	1.12
41	Goyaks	0	10	0	0	0	0	0	0	0	0	0	10	1.4
42	Goyla	0	8	1	0	0	0	0	0	0	0	0	9	1.4
43	Jamun	0	4	4	2	1	1	0	2	0	0	0	14	14.4
44	Kachnar	0	66	16	5	0	0	0	0	0	0	0	87	17.92
45	Kafal	0	1	0	0	0	0	0	0	0	0	0	1	0.14
46	Kail	18	66	26	48	48	34	9	1	0	0	0	250	228.49
47	Kainth	1	11	1	1	0	0	0	0	0	0	0	14	2.8
48	Kakre	0	29	13	5	2	5	0	0	0	0	0	54	28
49	Kaldhan	0	27	0	0	0	0	0	0	0	0	0	27	3.78
50	Kambhal	0	33 7	48	2	0	0	0	0	0	0	0	387	62.3
51	Kangu	0	27	0	0	0	0	0	0	0	0	0	27	3.78
52	Kararu	0	12	1	0	0	0	0	0	0	0	0	13	1.96
53	Kaulia	0	0	1	0	0	0	0	0	0	0	0	1	0.28
54	Khair	0	22 6	33	7	0	0	0	0	0	0	0	266	17.4366
55	Khalave	0	12	3	0	0	0	0	0	0	0	0	15	2.52
56	Khirak	0	79	22	9	6	1	2	1	0	0	0	120	47.14
57	Koid	0	1	0	0	0	0	0	0	0	0	0	1	0.14
58	Kuri	0	15 9	5	0	0	0	0	0	0	0	0	164	23.66
59	Kummi	0	16	8	1	0	0	0	0	0	0	0	25	5.32
60	Landhad	0	1	1	0	0	0	0	0	0	0	0	2	0.42
61	Lucinia	0	25	7	2	3	0	0	0	0	0	0	37	12.24
62	Mango	0	14 5	18 4	81	50	31	1 9	8	1	2	1	522	403.49
63	Marinu	1	12	14	12	7	0	2	0	0	0	0	48	33.94
64	Nashpati	0	1	1	0	0	0	0	0	0	0	0	2	0.42
65	Oak	5	0	0	0	0	0	0	0	0	0	0	5	0.5
66	Oie	1	7	3	2	1	0	0	0	0	0	0	14	5.34
67	Other BL	41	26	18	10	1	0	0	0	0	0	0	96	24.52
68	Paplakhe	0	7	0	1	1	0	0	0	0	0	0	9	3.52
69	Paruni	0	5	3	0	0	0	0	0	0	0	0	8	1.54
70	Paryara	0	43	23	6	2	0	0	0	0	0	0	74	20.9
71	Paza	3	0	2	0	0	0	0	0	0	0	0	5	0.98
72	Pipal	0	3	3	4	7	3	3	2	0	0	7	32	64.07
73	Poplar	19	57	61	77	10	85	5	1	5	2	2	486	747.66

						6		6	6					
74	Pulle	0	40	13	2	1	0	0	0	0	0	0	56	12.62
75	Punne	0	8	1	0	0	0	0	0	0	0	0	9	1.4
76	Rataila	0	3	1	7	0	0	0	0	0	0	0	11	6.58
77	Ritha	0	3	0	2	1	0	0	0	0	0	0	6	3.8
78	Safeda	2	31	57	53	33	11	1	4	3	2	0	197	182.85
79	Sanan	0	14 7	15	4	0	0	0	0	0	0	0	166	28.14
80	Sayahru	0	2	0	0	0	0	0	0	0	0	0	2	0.28
81	Sehtut	0	41	30	9	3	2	1	0	0	0	0	86	34.99
82	Shama	0	10	6	1	1	0	0	0	0	0	0	18	5.62
83	Shegal	0	2	0	0	1	0	0	0	0	0	0	3	1.98
84	Shisham	0	17 2	48	12	2	0	0	0	0	0	0	234	51
85	Simbal	0	13	18	13	9	2	0	0	0	0	0	55	38.16
86	Singar	0	10	6	1	1	1	0	0	0	0	0	19	8.16
87	Siris	0	14	3	2	0	0	0	0	0	0	0	19	4.48
88	Slambara	0	34 6	15 6	35	3	1	0	0	0	0	0	541	129.16
89	Soman	0	45	8	0	0	0	0	0	0	0	0	53	8.54
90	Sykaru	0	5	1	0	0	0	0	0	0	0	0	6	0.98
91	Tat Palanga	0	0	1	0	0	0	0	0	0	0	0	1	0.28
92	Taur	0	82	0	0	0	0	0	0	0	0	0	82	11.48
93	Thira	0	1	3	1	0	0	0	0	0	0	0	5	1.82
94	Tirmira	0	1	0	0	0	0	0	0	0	0	0	1	0.14
95	Tuni	1	39	34	18	6	0	0	1	0	0	0	99	43.84
96	Tyambli	0	12	14	3	0	0	0	0	0	0	0	29	8.12
97	Umbame	0	0	1	0	0	0	0	0	0	0	0	1	0.28
98	Willow	0	0	1	0	0	0	0	0	0	0	0	1	0.28
G.Total trees felled in FCA cases													7910	3791.78 26

Table 7.5 Detail of tree felled under FRA in respect of Suket Forest Division

Case -1 C/o link road Galu di Hut to Bahi mod via Kangru													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Kainth	0	0	1	0	0	0	0	0	0	0	0	1
2	Sris	0	0	3	0	0	0	0	0	0	0	0	3
3	Kachnar	0	2	7	0	5	0	0	0	0	0	0	14
4	Kambal	0	1	0	0	0	0	0	0	0	0	0	1
5	Slambra	0	0	1	0	0	0	0	0	0	0	0	1
6	Biunsh	0	0	0	0	1	0	0	0	0	0	0	1
G.total trees in Galu di hut to Bahi mod via Kangru road													21

Case - 2 C/o ambulance road from Slapper Tatapani road to upper Ahen													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Other B/C		13	1	1	0	0	0	0	0	0	0	15
G. Total trees in Slapper tatapani road to upper Ahen													15
Case - 3 C/o Balhru Nalla to Samlehar road Km 0/00 to 0/845 Km													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	0	8	3	5	1	0	0	0	0	0	17
2	Tuni	0	0	1	0	0	0	0	0	0	0	0	1
3	Kakre	0	0	1	0	0	0	0	0	0	0	0	1
G. Total trees in Balhru Nalla to Samlehar road													19
Case - 4 C/o link road plan mod to Dodani Gehru													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	0	0	5	0	0	0	0	0	0	0	5
G. Total Trees in C/o link road plan mod to Dodani Gehru													5
Case - 5 CONSTRUCTION OF COMMUNITY HALL AT KOLNI													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Safeda	0	0	0	0	0	0	1	0	0	0	0	1
G.Total trees in C/o community hall at Kolni													1
Case - 6 CONSTRUCTION OF C.H.C BUILDING NIHRI,													
Sr. No.		Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Dedar	0	11	1	0	0	0	0	0	0	0	0	12
2	Kail	0	4	0	1	0	0	0	0	0	0	0	5
G. Total trees in C/o CHC Nihri													17
Case - 7 CONSTRUCTION OF ROAD FORM BATALDIPULI TO DHAULKHAN													
Sr. No.		Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Shisham	0	11	0	0	0	0	0	0	0	0	0	11
2	Trambla	0	1	0	0	0	0	0	0	0	0	0	1
3	Oie	0	0	1	0	0	0	0	0	0	0	0	1

4	Mango	0	0	1	0	0	0	0	0	0	0	0	1
5	Ambla	0	4	0	0	0	0	0	0	0	0	0	4
6	Simbal	0	0	1	0	0	0	0	0	0	0	0	1
7	Bihul	0	1	0	0	0	0	0	0	0	0	0	1
G.Total trees in C/o road from Bataldipuli to Dhaulkhan													20
Case - 8 CONSTRUCTION OF ROAD FROM NAL TO GEHRI													
Sr. No.		Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	0	0	2	0	0	0	0	0	0	0	2
2	Simbal	0	0	1	0	0	0	0	0	0	0	0	1
G. Total tree c/o road from Nal to Gehri													3
Case - 9 C/o ECHS polyclinic building in Jamsai Tehsil Sarkaghat													
Sr. No.		Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Kakre	0	0	2	0	0	0	0	0	0	0	0	2
2	Chil	0	0	1	0	2	0	0	0	0	0	0	3
3	Jamun	0	2	0	0	0	0	0	0	0	0	0	2
4	Safeda	0	3	1	0	1	0	0	0	0	0	0	5
5	Mango	0	1	1	0	0	0	0	0	0	0	0	2
6	Gawaun	0	1	0	0	0	0	0	0	0	0	0	1
7	Shisham	0	1	0	0	0	0	0	0	0	0	0	1
8	Kalama	0	1	0	0	0	0	0	0	0	0	0	1
9	Tun	0	1	0	0	0	0	0	0	0	0	0	1
G.Total of trees in ECHS polytechnic Jamsai Tehsil Sarkaghat													18
Case - 10 Installation of BSNL 4G mobile tower at village Jhamrani Muhal Bairi													
Sr. No.		Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	0	1	1	0	0	0	0	0	0	0	2
G.Total of tree in installation of BSNL 4 G mobile tower at Village Jhamrani Muhal Bairi													2
Case - 11 C/o Industrial Training Institue at Batail													
Sr. No.		Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Shisham	0	4	7	0	0	0	0	0	0	0	0	11
2	Oie	0	0	2	4	0	0	0	0	0	0	0	6
3	Mango	0	0	7	6	1	0	0	0	0	0	0	14
4	Safeda	0	0	1	1	6	3	0	0	0	0	0	11

5	Kachnar	0	0	1	0	0	0	0	0	0	0	0	1
6	Umbray	0	1	2	2	0	1	0	0	0	0	0	6
7	Salambra	0	0	1	0	0	0	0	0	0	0	0	1
8	Jamun	0	0	1	4	0	0	0	0	0	0	0	5
G. Total of tree in ITI Batai													55
Case - 12 CONSTRUCTION OF GOVT. I.T.I BUILDING NIHARI													
Sr. No.		Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Dedar	17	0	0	0	0	0	0	0	0	0	0	17
2	Kail	3	0	3	0	0	0	0	0	0	0	0	6
3	Rai	1	0	0	0	0	0	0	0	0	0	0	1
G.Total of trees c/o ITI Nihri													24
Case - 13 Talai to thala Burahali													
Sr. No.		Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil		3	3	0	0	0	0	0	0	0	0	6
G. Total of Talai to thala Burahali													6
Case - 14 PHC Balag													
Sr. No.		Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Buransh	0	0	2	2	4	0	0	0	0	0	0	8
2	Ban	0	0	1	1	0	0	0	0	0	0	0	2
G.Total of trees in PHC Balag													10
Case - 15 GHS Kandhar													
Sr. No.		Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Pipal	0	0	1	0	0	0	0	0	0	0	0	1
2	Mango	0	0	0	0	0	0	1	0	0	0	0	1
G.total of trees iin GHS Kandhar													2
Case - 16 Slapper tatapni to village Beri Harizan basti													
Sr. No.		Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total

1	Lucinia	0	1	1	0	0	0	0	0	0	0	0	2
2	Shisham	0		1	0	0	0	0	0	0	0	0	1
3	Simbal	0	2	1	0	0	0	0	0	0	0	0	3
4	Kambhal	0	7	0	0	0	0	0	0	0	0	0	7
5	Bihul	0	3	0	0	0	0	0	0	0	0	0	3
6	Khair	0	2	0	0	0	0	0	0	0	0	0	2
7	Slambda	0	1	0	0	0	0	0	0	0	0	0	1
G.Total of trees in Slapper tatapani to village beri Harizan basti													19
Case - 17 Samihi to Dora													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Ban	0	12	8	1	0	0	0	0	0	0	0	21
2	Kafal	0	5	3	0	0	0	0	0	0	0	0	8
3	Segal	0	1	0	0	0	0	0	0	0	0	0	1
G.Total of Samihi to Dora													30
Case - 18 Talai to Bhaleti													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	0	1	1	0	0	0	0	0	0	0	2
G.Total of Talai to Bhaleti													2
Case -19 C/o Jaral to Plakhagehri													
		Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Ban	0	3	3	1	0	0	0	0	0	0	0	7
2	Chil	0	1	0	0	0	0	0	0	0	0	0	1
G.Total of trees of Jaral to Plakhagehri													8
Case -20 C/o link road Harizan basti Tiwend to Pipli Kolni Hawani													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Oie	0	3	3	3	0	0	0	0	0	0	0	9
2	Simbal	0	0	2	0	0	0	0	0	0	0	0	2
G. Total of trees in Harizen basti Tiwend to Pipli Kolni Hawani													11
Case -21 C/oroad from Rajgarh to Koyla mata mandir													

Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	0	0	3	3	1	0	0	0	0	0	7
2	Safed	0	0	0	2	2	0	0	0	0	0	0	4
G. Total of trees from Rajgarh to Koyla mata mandir													11
Case -22 C/o 0.5742 ha renovation of WSS bheli Mahadev WSS Neri Kangar													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Siras	0	2	0	0	0	0	0	0	0	0	0	2
2	Tuni	0	14	0	0	0	0	0	0	0	0	0	14
3	Marinu	0	1	0	0	0	0	0	0	0	0	0	1
G. Total of trees in Renovation of WSS Behli Mahadev WSS neri Kangar													17
Case -23 Lucky filling station to Dhandhar nal													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	2	1	1	1	0	0	0	0	0	0	5
G.Total of trees in Lucky filling station to Dhandhar nal													5
Case -24 Atal Aadarsh Vidhyalya at Sarkaghat													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Amla	0	5	1	1	0	0	0	0	0	0	0	7
2	Oie	0	1	0	0	1	0	0	0	0	0	0	2
3	Kamal	0	12	3	1	0	0	0	0	0	0	0	16
4	Kainth	0	1	0	0	0	0	0	0	0	0	0	1
5	Shisham	0	6	2	1	0	0	0	0	0	0	0	9
6	Salambra	0	2	0	1	0	0	0	0	0	0	0	3
7	Pulya	0	0	1	0	0	0	0	0	0	0	0	1
8	Amaltash	0	1	0	0	0	0	0	0	0	0	0	1
G. Total of trees in Atal Aadarsh vidhyalaya at Sarkaghat													40
Case -25 Rohanda to khanad													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Deodar	0	12	1	0	0	0	0	0	0	0	0	13
2	Kail	0	3	0	0	0	0	0	0	0	0	0	3
3	Rai	0	3	1	0	0	0	0	0	0	0	0	4

G. Total of trees in Rohanda to Khand													20
Case -26 Tahli to Barota													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Kambhal	2	4	0	0	0	0	0	0	0	0	0	6
2	Amlastas	4	1	0	0	0	0	0	0	0	0	0	5
3	Slambda	4	2	0	0	0	0	0	0	0	0	0	6
G. Total of trees in Tahli to Barota													17
Case -27 Murah devi gram panchyat Thona													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Ban	0	1	0	2	2	1	3	1		1	0	11
2	Buransh	0	0	0	0	1	0	0	0	0	0	0	1
G. Total of tree in Murah Devi Gram Panchayat Thona													12
Case -28 C./o Jamsai Jhinjroo Bahi Ropari Ropari , Banerdhi Rachhot													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	1	5	6	3	0	0	0	0	0	0	15
G. Total of tree in Jamsai Jhinjroo Bahi Ropari Banerdhi Rachhot													15
Case -29 Ambulance road Darkalag Galu to Kutla Harizan Basti upper Sarohli Jangle													
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total
1	Chil	0	0	2	5	0	0	0	0	0	0	0	7
G. Total of tree in Darkalag Galu to Kutla Harizen Basti													7

Table 7.6 Abstract of trees felled under FRA in respect of Suket Forest Division

General abstract of tree felled under FRA in Suket Forest Division														
Sr. No.	Species	Sap	V	IV	III	IIA	IIB	IA	IB	IC	ID	IE	Total	Volume (m3)
1	Amaltash	4	2	0	0	0	0	0	0	0	0	0	6	0.84
2	Ambla	0	9	1	1	0	0	0	0	0	0	0	11	2.38
3	Ban	0	16	12	5	2	1	3	1	0	1	0	41	34.132
4	Bihul	0	4	0	0	0	0	0	0	0	0	0	4	0.56
5	Biunsh	0	0	0	0	1	0	0	0	0	0	0	1	1.7
6	Buransh	0	0	2	2	5	0	0	0	0	0	0	9	10.74

7	Chil	0	7	22	27	14	2	0	0	0	0	0	72	23.55
8	Deodar	17	23	2	0	0	0	0	0	0	0	0	42	2.632
9	Gawaun	0	1	0	0	0	0	0	0	0	0	0	1	0.14
10	Jamun	0	2	1	4	0	0	0	0	0	0	0	7	3.92
11	Kachnar	0	2	8	0	5	0	0	0	0	0	0	15	11.02
12	Kafal	0	5	3	0	0	0	0	0	0	0	0	8	1.54
13	Kail	3	7	3	1	0	0	0	0	0	0	0	14	2.35
14	Kainth	0	1	1	0	0	0	0	0	0	0	0	2	0.42
15	Kakre	0	0	3	0	0	0	0	0	0	0	0	3	0.84
16	Kalama	0	1	0	0	0	0	0	0	0	0	0	1	0.14
17	Kambal	2	24	3	1	0	0	0	0	0	0	0	30	5.32
18	Khair	0	2	0	0	0	0	0	0	0	0	0	2	0.0942
19	Lucinia	0	1	1	0	0	0	0	0	0	0	0	2	0.42
20	Mango	0	1	9	6	1	0	1	0	0	0	0	18	12.51
21	Marinu	0	1	0	0	0	0	0	0	0	0	0	1	0.14
22	Oie	0	4	6	7	1	0	0	0	0	0	0	18	9.82
23	Other B/L	0	13	1	1	0	0	0	0	0	0	0	15	2.94
24	Pipal	0	0	1	0	0	0	0	0	0	0	0	1	0.28
25	Pulya	0	0	1	0	0	0	0	0	0	0	0	1	0.28
26	Rai	1	3	1	0	0	0	0	0	0	0	0	5	3.723
27	Safeda	0	3	2	3	9	3	1	0	0	0	0	21	29.53
28	Segal	0	1	0	0	0	0	0	0	0	0	0	1	0.14
29	Shisham	0	22	10	1	0	0	0	0	0	0	0	33	6.72
30	Simbal	0	2	5	0	0	0	0	0	0	0	0	7	1.68
31	Siras	0	2	3	0	0	0	0	0	0	0	0	5	1.12
32	Slambra	4	5	2	1	0	0	0	0	0	0	0	12	2.66
33	Trambla	0	1	0	0	0	0	0	0	0	0	0	1	0.14
34	Tuni	0	15	1	0	0	0	0	0	0	0	0	16	2.38
35	Umbray	0	1	2	2	0	1	0	0	0	0	0	6	4.92
G. Total of trees felled under FRA cases in Suket Forest Division													432	181.7212

7.2 Recorded removal of fuelwood: Forest fringe community uses different types of fuels like fuelwood, crop residues, cow dung cakes, electricity and LPG for cooking. On the basis of socio-economic survey done by the FRI, per capita consumption of fuelwood is 5.50 kg/day/household. The number of households in 413 fringe villages was estimated to be 30400. According to this scale the total consumption in the 413 fringe villages comes to 61028 tons per annum. The socio-economic survey showed that fuelwood was the major source of energy for forest fringe households for cooking and heating. Fuelwood provided 69.75 per cent of total energy requirement which clearly reflects very high dependency. The fuelwood use also depended on state of affluence of household. While the poor people were solely dependent on fuelwood, the affluent class

used both fuelwood and LPG for cooking. The major source of fuelwood was forests as 42.3 per cent was extracted from the forest, while 39.8 per cent was obtained from their own land. However, 16.5 per cent of fuelwood consumption was obtained from the market.

Out of this consumption, about 50 percent is extracted from the forests and the rest is met from the agricultural fields or areas. Even this rate of removal by rightsholders is substantially responsible for the degradation of forest areas in the fringes. However, it must be recognized that headload removal of fuelwood by villagers has decreased substantially over the past working plan period due to increasing prosperity and availability of LPG in the villages.

7.3 Recorded removal of locally important NTFPs including MAPs:

There is a wide scope of planting, augmentation, harvest and marketing of NTFPs in these forests. Based on these products, various income generating activities can be promoted in the area. Following are the important produces having potential for value addition and marketing:

1. Amla (*Emblica officinalis*)
2. Desi mango (*Mangifera indica*)
3. Giloe (*Tinospora cordifolia*)
4. Gandla (*Murraya koengii*)
5. Basuti (*Adhaoda vesica*)

Grass is however the only NTFP that is given free of cost to the right holders for fodder and other uses. There is no other NTFP worth the name that is sold or auctioned. However, there is a large potential of NTFPs such as amla fruits, bael fruits, medicinal plants that can sustain livelihoods of the neighboring people.

Demand and supply of timber and important non-timber forest products:

Local timber market is very well established. Khair is traded for its heartwood, katha factories have a demand for Khair wood. It also imports timber from other states. Road network is extensive, timber and non-timber products are traded far and wide. The rates of timber have increased manifold in the past decade due to increased demand and inadequate availability of timber.

CHAPTER 8

MAINTENANCE AND ENHANCEMENT OF SOCIAL, ECONOMIC, CULTURAL AND SPIRITUAL BENEFITS

8.1 NUMBER OF JFM COMMITTEES AND AREAS PROTECTED BY THEM:

As envisaged in the National Forest Policy, 1988 the participation of people in the protection, management and development of forests has assumed more and more significance. In order to make the local communities as protectors and managers of forests rather than destroyers, there is an urgent need to establish a continuous dialogue with them. It is felt that foresters and local communities should work together in the formulation of plans for the management of forest resources. It is also envisaged that local communities would participate in the decision-making process on choice of species to be planted, areas to be afforested, protection of forests and benefit-sharing of usufructs. The concept of Joint Forest Management has been developed after a series of experiments and resolutions.

To address the long-standing problems of deforestation and land degradation, the approach of involving local communities in an effective and meaningful manner is gaining acceptance significantly. Even the present National Forest Policy 1988, emphasizes on participatory management and common property management. It also specifically mentions that to achieve the objectives of the policy, a massive people's movement should be created, especially involving women. Consistent with the NFP of 1988, the Government of India, on 1st June 1990, issued policy instructions 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 12.5.1993, 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 program, 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, Mandi, Govt. of India backed initiatives. Recently the Government of Himachal Pradesh has issued a notification No. Fts-II(B)15-10/87 dated 23rd August 2001, called the Himachal Pradesh Participatory Forest Management Regulations, 2001. These rules shall be applicable to such government forests and lands, including common lands, where participatory management is envisaged.

8.2 JOINT FOREST MANAGEMENT IN HIMACHAL PRADESH:

In 1985, social forestry was given impetus by 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. 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 nonor-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 of 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 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 supported the state JFM Order, Participatory Forest Management (PFM) Rules were developed for HP, and notified on 23rd 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 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. The resulted in the 'New SVY,' rules and guidelines being announced by the GoHP in August 2001. They contains provisions for VFDSs to become, in legal terms 'the forest officer'(not notified as on July 2011) for levying fines etc, and for 100 percent share in intermediate usufructs while on final harvest 75 percent would go to the VFDS and 25 percent to the Panchayat. The GoHP agreed to completely forgo any share from JFM areas. Under 'New SVY' entry point activities are abandoned but "Income-generating activities" introduced; forest guard will not be the member secretary of the Executive Committee; but local organizers-usually led by a literate woman linked to a local community-based organization, helps mobilize 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 for furnish a 'utilization certificate' which can be monitored and checked.

At the policy level the PFM Rules and SVY Rules and SVY Rules and Guidelines of August 2001 are seen as a major step forward, laying the basis of

uniformity in approach to community-based forest management. It also makes JFM poverty focused and is targeted to the resource dependent. In 2003, MoEF started the Forest Development Agencies (FDAs) at district level-with DFOs getting direct access to central funding- for forest and plantation work for employment generation objectives. This is an 100 percent central sachem, 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 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 Km² distributed in RFS, DPFs & UPFs. In March, 2005, 1690 JFMCs are reported covering a forest area of over 4200 Kms. 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 Kms.

Table 8.1 List of JFMCs in Suket forest Division

V.F.C. UNDER F.D.A. SUKET

S.No.	Name of Range	Name of V.F.C.
1	Suket	Thera Ghauroo Kura Harabag Bechhna Dhar Bagla Jarol
2.	Jhungi	Gharoi Tathachhi Manah Manghel Kayar Kandhi Dhanoo Jandrehar

		Charog Bandli Kufatoo Basoth Kathala Gadachh Janoul Neda Ropa Kinder
3.	Kangoo	Majhas Chhardog Salag Darsajhi Gharyali Dhar Naundi Dhagora Kandhloo Bhalan Kathla Brad Dharali Bah Basahoo Batwara Jarol Barpat Ropri Khanelo Saniham Ahen Ropa Khawal Kayan Padhana Sunali Lower Bari Upper Bari

Table 8.2 Village Forest Development Committees constituted under DFID

Sr. No.	Range	DFID
1	Jai Devi	Kuthain
2	Baldwara	Goverta
3	Sarkaghat	Bhangoh
4	Sarkaghat	Merakusari

5	Sarkaghat	Upper Barot
6	Jai Devi	Hatgarh
7	Jai Devi	Khaneti
8	Kangoo	Umari
9	Kangoo	Guddidhar
10	Kangoo	Bragat
11	Sarkaghat	Padhru
12	Kangoo	Sariun
13	Baldwara	Jaboth
14	Baldwara	Sersain
15	Jhungi	Salani
16	Jhungi	Charog
17	Jhungi	Shivshankar
18	Jhungi	Kinder
19	Jhungi	Chotta Gadaun

Table 8.3 Village Forest Development Societies under SANJHI VAN YOJANA

S.No.	Range	Name of V.F.D.C.
1	Jhungi	Manjhagen
2	Jhungi	Kumaharu
3	Jhungi	Marahara
4	Jai Devi	Kutachi
5	Jhungi	Barnog
6	Kangoo	Sariun
7	Jai Devi	Kheneti
8	Kangoo	Bhengla
9	Jai Devi	Challela
10	Kangoo	Boi
11	Sarkaghat	Kallar Kaldoo
12	Jhungi	Ukri
13	Jhungi	Shivshankar
14	Jhungi	Chota Gadoun
15	Jhungi	Salani
16	Jhungi	Kinder
17	Jhungi	Charog.

Table 8.4 List of VFDS registered under JICA Project

Sr. No.	Year Registration	of	Sche me	Name Range	of	Name of JFMCs
1	2020		JICA	Sarkaghat		VFDS Dolan Chirr

2	2020	JICA	Sarkaghat	VFDS Kals Kharaut
3	2021	JICA	Sarkaghat	VFDS Dhalyat Gehra
4	2020	JICA	Sarkaghat	VFDS Kathogan
5	2020	JICA	Sarkaghat	VFDS Druman Banyorka
6	2020	JICA	Sarkaghat	VFDS Masdhan
7	2020	JICA	Sarkaghat	VFDS Khalanu Sarnota
8	2021	JICA	kangoo	V.F.D.S Veh
9	2020	JICA	kangoo	V.F.D.S Gamohu & Jabbal
10	2021	JICA	kangoo	V.F.D.S. Upper Bari & Dhawal
11	2021	JICA	kangoo	V.F.D.S Sanihan
12	2021	JICA	kangoo	V.F.D.S Ropa Bandla
13	2021	JICA	kangoo	V.F.D.S Chiral
14	2022	JICA	kangoo	V.F.D.S Anu Balh
15	2020	JICA	Baldwara	VFDS Bhatera
16	2020	JICA	Baldwara	VFDS Thana chowki
17	2021	JICA	Baldwara	VFDS Mandoli
18	2021	JICA	Baldwara	VFDS Bahanu
19	2021	JICA	Baldwara	VFDS Gobharta
20	2021	JICA	Baldwara	VFDS Sarua Dhar I
21	2021	JICA	Baldwara	VFDS Ghanera
22	2019-20	JICA	SUKET	VFDS ROPARI
23	2019-20	JICA	SUKET	VFDS CHAMUKHA
24	2019-20	JICA	SUKET	VFDS Bhanglera
25	2019-20	JICA	SUKET	VFDS Thalla
26	2020-21	JICA	SUKET	VFDS Rigger
27	03.12.2021	JICA	Jhungi	VFDS Gharot/Dhamasan(Dev Bala Tika)
28	03.12.2021	JICA	Jhungi	VFDS Pandar(Mahamaya)
29	15.11.2021	JICA	Jhungi	VFDS Ukari
30	28.02.2022	JICA	Jhungi	VFDS Manjhagan
31	20.01.2022	JICA	Jhungi	VFDS Kumahru-I
32	13.12.2021	JICA	Jhungi	VFDS Bandli-II
33	20.01.2022	JICA	Jhungi	VFDS Charog
34	2022	JICA	Jaidevi	Manjhar VFDS
35	2022	JICA	Jaidevi	Singhwa VFDS
36	2021	JICA	Jaidevi	Behli I and II VFDS
37	2021	JICA	Jaidevi	Anushi VFDS
38	2022	JICA	Jaidevi	Kharloh VFDS
39	2021	JICA	Jaidevi	Jaidevi VFDS
40	2021	JICA	Jaidevi	Dayola VFDS
41	2021	JICA	Jaidevi	Salyandi VFDS

Table 8.5 Status of empowerment of JFMCs

Sr. No.	Name of JFMSc	Range	Block	Beat	Committee Members	Remarks

1	VFDS Dolan Chirr	Sarkaghat	Thona	Jamdwar	19 Members	
2	VFDS Kals Kharaut	Sarkaghat	Thona	Jamdwar	16 Members	
3	VFDS Dhalyat Gehra	Sarkaghat	Thona	Thona	14 Members	
4	VFDS Kathogan	Sarkaghat	Thona	Tikker	14 Members	
5	VFDS Druman Banyorka	Sarkaghat	Sarkaghat	Deo- Brarta	16 Members	
6	VFDS Masdhwan	Sarkaghat	Sarkaghat	Deo- Brarta	16 Members	
7	VFDS Khalanu Sarnota	Sarkaghat	Durgapur	Kaldoo	18 Members	
8	V.F.D.S Veh	Kangoo	Dehar	Jyor	16 Members	
9	V.F.D.S Gamohu & Jabbal	Kangoo	Dehar	Dehar	16 Members	
10	V.F.D.S. Upper Bari & Dhawal	Kangoo	Batwara	Dhawal	16 Members	
11	V.F.D.S Sanihan	Kangoo	Batwara	Dhawal	16 Members	
12	V.F.D.S Ropa Bandla	Kangoo	Batwara	serikothi	13 Members	
13	V.F.D.S Chiral	Kangoo	Batwara	serikothi	16 members	
14	V.F.D.S Anu Balh	Kangoo	Behli	Behli	15 Members	
15	VFDS Bhatera	Baldwara	Baldwara	Trifalgha t	16 members	
16	VFDS Thana chowki	Baldwara	Baldwara	Trifalgha t	16 members	
17	VFDS Mandoli	Baldwara	Baldwara	Bahanu	16 members	
18	VFDS Bahanu	Baldwara	Baldwara	Bahanu	15 members	
19	VFDS Gobharta	Baldwara	Goverta	Goverta	17 members	
20	VFDS Sarua Dhar I	Baldwara	Leda	Bairkot	16 members	
21	VFDS Ghanera	Baldwara	Leda	Bairkot	16 members	
22	VFDS ROPARI	Suket	Sadar	Jarol	16 members	
23	VFDS CHAMUKHA	Suket	sadar	Jarol	16 members	
24	VFDS Bhanglera	Suket	Sadar	Sadar	16 members	
25	VFDS Thalla	Suket	Sadar	Sadar	16 members	
26	VFDS Rigger	Suket	Baggi	Rajarh	16 members	
27	VFDS Gharot/Dhamasan(Dev Bala Tika)	Jhungi	Pandar	Galukhar	16	
28	VFDS Pandar(Mahamaya)	Jhungi	Pandar	Pandar	16	
29	VFDS Ukari	Jhungi	Jhungi	Salani	14	
30	VFDS Manjhagan	Jhungi	Trechh	Bandli	12	
31	VFDS Kumahru-I	Jhungi	Trechh	Bandli	11	
32	VFDS Bandli-II	Jhungi	Trechh	Bandli	10	
33	VFDS Charog	Jhungi	Trechh	Kinder	12	
34	Manjhar VFDS	Jaidevi	Rohanda	Rohanda	13 members	
35	Singhwa VFDS	Jaidevi	Rohanda	Khabri	15 members	
36	Behli I and II VFDS	Jaidevi	Rohanda	Kamand	14 members	

37	Anushi VFDS	Jaidevi	Rohanda	Kamand	12 members	
38	Kharloh VFDS	Jaidevi	Jaidevi	Ghiri	13 members	
39	Jaidevi VFDS	Jaidevi	Jaidevi	Jaidevi	16 members	
40	Dayola VFDS	Jaidevi	Nandgarh	Chamyar	16 members	
41	Salyandi VFDS	Jaidevi	Nandgarh	Nandgarh	16 members	

Extent of cultural/sacred groves: The following sacred groves are reported from the tract dealt with:

Table 8.6 Extent of cultural / sacred groves: following sacred groves are report from the tract dealt with

Forest	Temple grove	Sacred trees
D.P.F Dharli Barar	Shiv Gufa dharli	Chil
DPF Salani	Dev Temple Badhu Bara	Chil ,Deodar
DPF Khoondhar	Dev Temple khoon	Chil,Deodar
DPF Jogikufar	Temple chhatri Mata	Deodar
DPF Jogikufar	Dev Narsingh Temple	Deodar
DPF Shivshanakar	Shivshankar Temple	Deodar
FDPF ChhotaGadoun	Temple Chhota Gadoun	Deodar
DPF Khobla	Shiva Temple Bakhari	Deodar
DPF Badagadoun	Bada Gadoun Temple	Deodar
DPF Daint	Dev Daint Temple	Deodar
DPF Pandar	Jai Mahamaya Temple Pandar	Deodar
DPF Dawarlu	Dev Bala Tika Temple Dawarlu	Deodar
DPF Mahadev	Mahadev Temple Matyog	Deodar
DPF Kathiuni	Dev Ghatotkach Temple Tharu	Deodar
DPF Kanoun	Dev Bala tika Temple Nihri	Deodar
DPF Kanoun	Jai Vaishno Mata Temple jood	Deodar
DPF Kanoun	Dev Shivshankar Jabrash	Deodar
DPF Reagi	Dev Mashishar Temple Reagi	Deodar
DPF Kanas	Sheetla Mata temple Mundali	Deodar,kail
DPF Ghera	Mahunaag Temple Naga Dhar	Deodar,kail
DPF trechh	Dev Trechh Temple	Deodar,kail
DPF Trechh	KamrunaagTemple	Deodar,kail
DPF Trechh	Gann Devta Temple Trechh	Deodar,Kail
DPF Bandli	Baradev Temple	Ban
DPF Kuftu	Nagni Mata Temple	Ban,Kail
DPF ttrechh	Gann Dev Temple	Chil
DPF charog	Dev Tihu	Chil
DPF Dhamkon	Dev Lankra Dhamkon	Chil
Rohanda	Kamrunag Temple	Deodar
Rohanda	Banwali Devi Temple	Deodar
Kamand	Dev Bala Tika Temple	Deodar
Kamand	Mata Narda Sharda Temple	Deodar

Kuttachi	Dev Bala Tika	Deodar
Kuttachi	Dev Bala Tika	Deodar
Nandgarh	Dev Bala Kameshar	Deodar
Nandgarh	Mata Dhumari	Deodar
Nandgarh	Mata Tungra	Deodar
DPF Deo Bradta	Bala Kameshwar Deo	Chil
DPF Murahdhar	Murah Devi Mata & Saraein	Ban
DPF Jhumdhar	Mata Jogni Mandir	Ban
DPF Kaldoo	Naina Devi Temple & Saraein	Ban
D.P.F Dharli Barar	Shiv Gufa dharli	0
DPF Sundervan	Shri lingri mahadev mandir	NA
DPF Trambri	Shri Kulara mahadev Mandir	NA
Nalni	Shri Sat Bada Devi Mandir	NA
DPF Behli Baderan	Shri Sat Bala Kameshwer Mandir	NA

Local fairs on religious dieties are held frequently where moderate gatherings emerge.

8.3 Other Rights and Concessions:

Right of way and to take away dead, dry wood from open areas is common to these forests. Other rights for Reserved Forests and Protected Forests are given under:

8.4 Dependency of local people on NTFPs:

Table 8.7 Common NTFPs of the area and their uses

S.NO.	NTFT	Particulars	Uses
1.	Amla (<i>Emblica officinalis</i>)	Fruit	Pickles, candies, medicinal uses as hair tonic, vitamin C fruit, medicinal
2.	Desi Mango (<i>Mangifera indica</i>)	Fruit	Fruit medicinal
3.	Neem (<i>Azadirachta indica</i>)	Leaves fruits	Local medicinal uses
4.	Amaltas (<i>Cassia fistula</i>)	Fruits	Medicinal
5.	Giloe (<i>Tinospora cordifolia</i>)	Leaves	Food additive, medicinal
6.	Gandla (<i>Murraya koengii</i>)	Leaves	Food additive
7.	Basuti (<i>Adhatoda vesica</i>)	Flower	Medicinal
8.	Bhabhar (<i>Eulaliopsis binata</i>)	Grass	Rope-making, mat making

Economic dependency though small is significant for the poor people as NTFPs, attribute additional income to their already meager resources. The JFM committees have the right to collect NTFPs from the forests free of cost. Local traders even purchase the NTFPs at the doorsteps of collectors.

During the survey at household level, it was found that forest fringe communities extract NTFPs and fuelwood. The surveyed people were unable to give the exact amount of NTFP extracted from the forest. The extracted products were used basically for self-consumption by the forest fringe community.

The exploitation of forest by local communities depends on the distance between their houses and the forest to a certain context. The socio-economic survey revealed that 23.38% households were almost touching the forest boundary as they were less than 100m away from the forest. Another 28.57 percent were located at a distance of less than 500m from the forest. Only 14.29 per cent of households were at a distance of 2.5km or more from the forest. There are 32 fringe villages located within 3km periphery of the forests. The findings of this survey will provide valuable insights that can guide future development initiatives and help address the specific needs of the community in a targeted manner.

CHAPTER 9

ADEQUACY OF POLICY, LEGAL AND INSTITUTION FRAMEWORK

9.1 Existing policy and legal framework and their compliance: The management of forests is guided by the National Forest Policy, 1988. The main principles of this policy are forest conservation and management of forests through the participation of people, for the welfare of the people leaving behind the revenue generation in the colonial past. The policy recognizes that due to relentless pressure arising from the ever-increasing demand for fuelwood, fodder and timber, the inadequacy of protection measures, diversion of forest lands to non-forest uses, and the tendency to look upon forests as revenue earning resource was leading to depletion of forests. The policy reiterates that the national goal should be to have a minimum of one-third of the total land area of the country under forests or tree cover. On the hills and mountainous region, it aimed to maintain two-third of the area under forests. The policy also exhorted a massive need-based and time-bound program of afforestation and tree-planting on all degraded and denuded lands in the country. The policy also admitted that natural forests which serve as a gene pool resource and help to maintain ecological balance should be safeguarded for providing sustained benefits to the entire community. To further strengthen the policy, the Convention on Biological Diversity adopted in 1992 has affirmed that the states have sovereign rights over their biological diversity resources and that they are responsible for conserving their biological diversity and for using them in a sustainable manner.

To achieve the goal of sustainable management of forests, the State Government has prepared the Himachal Pradesh Forest sector Policy and Strategy 2005. To augment the forest resources, the state is implementing a Japan Bank for International Cooperation aided Project (JICA) and World Bank funded IDP projects for afforestation, soil and water conservation works, and joint forest management initiatives. Besides this state government is also investing through State Plan, centrally sponsored scheme and CAMPA.

Legal protection is provided to the forests through various acts and regulations. The Forest (Conservation) Act, 1980 is being implemented in the State w.e.f. 25th October, 1980. Similarly, Wildlife (Protection) Act, 1972 is being implemented in the

state w.e.f. 1976. The Indian Forest Act, 1927 was adopted in the state before independence. The Act provides the procedure for declaration of protected and reserved forests and also control over forests, timber and other forest produce. It also lays down the penalties and procedure for contravention of the Act and gives certain powers to the forest officers to deal with the situations while implementing the Act. The Indian Forest Act, 1927, underwent a significant revision with the 2nd Amendment specific to Himachal Pradesh, aimed at strengthening forest conservation and management within the state. This amendment introduced enhanced provisions to address issues such as illegal encroachments, unauthorized felling of trees, and better regulation of forest produce. It also empowered forest officials with more authority to enforce laws, thereby ensuring the sustainable use and protection of forest resources in Himachal Pradesh. The introduction of section 52A grants forest officers the authority to seize and confiscate vehicles, tools, or other equipment used in the commission of forest-related offenses, such as illegal logging or unauthorized transportation of forest produce. The introduction of Section 52A is a significant step toward curbing illegal activities in forest areas by allowing for the immediate confiscation of items involved in such offenses, thereby enhancing the enforcement capabilities of the Forest Department.

9.2 Status of approved working plan and compliance:

The working plan by Sh. R.K.Singh HPFS was implemented w.e.f. 2003-04 to 2017-18. The prescriptions and their compliance is given in Table 9.1.

Table 9.1: Status of prescriptions and their compliance

S. No.	Prescription	Working Circle	Status
1.	Closure for grazing	All circles	Not strictly implemented
2.	Felling / removals	Regular, Chil	Not implemented due to ban on green felling
3.	Soil and water conservation	All Circles	Carried out under state plan and under various project
	measures		CAMPA and other schemes. Many areas were left.
4.	Plantations	All working circles	Plantations done in some areas,

			but blank area still existing
5.	Active participation of Forest Protection Committees	All circles	No visible impact noticed
6.	Development of Water holes	Wildlife Protection Circle	Not done
7.	Construction of new buildings	Misc-regulation	New buildings were constructed
8.	Checking and maintenance of forest boundaries	Misc. regulation	Not done as per programme provided

9.3 Number of forest offences: The forest offences commonly committed in these forests include illicit felling of Deodar, Kail, Chil, Khair trees, lopping of miscellaneous broad leaved trees for fodder, stealing green bamboos without grant of permission, grazing of animals in the closed areas etc. Other than petty offences, no major incidences are reported from the area. The number of cases booked and taken to the court of law are provided in the Table 9.2

Table 9.2 Number of offences and their settlement

Sr. No.	Year	No. of damage reports issued	No of trees involved	No of damage report compounded	Compensation	Court cases
1	2011-12	259	153	402	332152	0
2	2012-13	325	193	304	281169	0
3	2013-14	366	157	369	579022	0
4	2014-15	457	150	455	286892	0
5	2015-16	300	152	297	502412	0
6	2016-17	447	128	441	442232	0
7	2017-18	132	56	169	178927	0
8	2018-19	130	38	153	89348	0
9	2019-20	301	83	299	479473	0
10	2020-21	549	163	549	1206627	0
11	2021-22	324	79	302	986627	0
12	2022-23	310	116	338	1385903	5
13	2023-24	200	176	143	783842	3
	Total	4100	1644	4221	7534626	8

9.4 Status of research and development: The following research studies pertaining to these forests have been made:

Experiments in Shiwaliks have shown that *Lantana camara* suppresses the growth of both palatable grasses and non-palatable herbs under its canopy. Further it reduces biodiversity of the area.

Experiments by the University of Horticulture and Forestry, Solan have shown that bamboos can reduce the growth of Lantana under its shade.

9.5 Human reserve capacity building efforts: For human resource development on a sustainable basis, importance of regular training of staff at all levels cannot be overemphasized. The forest training school at Sundernagar and Chail is equipped with modern training tools and teaching aids to impart training to staff members. In the past years, special trainings have been imparted to the field staff on diverse subjects such as uses of GPS, forest fire protection, root trainers technology, disease and pest control management,

9.6 Forest Resource Accounting: A number of tangible benefits are derived by the stakeholders. Forests caters to their livelihoods, food articles, medicinal plants, fuel wood source, source for making handicrafts, cots, sticks, wood for agricultural and household uses and many other reported and unreported uses. The farmers in the area are still using the bushes for fencing agricultural fields and home yards. Forests are still being used as grazing lands and unlimited source for collection of fuel wood. However, the public by and large are not mindful of the intangible benefits of these forests, the reason for antipathy and hostility.

9.7 Budgetary allocations to the forestry sector: The budgetary allocations to the forestry sector have traditionally been at the low level varying from 0.09 to 0.65 in the 12th Five Year Plan. Himachal being a predominantly a forest dominated state having approximately 66% of land classified as forests, , the allocation is low as compared to agriculture, irrigation and rural development departments. Nevertheless, the budget allocation has been sufficient to meet the plan and non-plan expenditure. But the budget allocation is neither projected on the basis of working plan prescription by the Department, nor allocated accordingly, therefore most of the prescriptions given in the working plan remain unfulfilled. Plan and non-plan expenditure details are given in Table No. 9.3

Table 9.3 Plan and non-plan expenditure in Suket Forest Division (Rs)

Plan and Non-plan Expenditure in Suket Forest Division (Last 10 Years)					
S.No.	Years	Non-Plan		Plan	
		Allotment	Expenditure	Allotment	Expenditure
1	2013-14	86598584	4479782	12565900	12565886
		82118776	82118776	760000	760000
		168717360	86598558	3322600	3322600
				2539739	2539739
				19188239	19188225
2	2014-15	1782400	1782400	11847200	11847190
		94513011	94513011	3025300	3025300
		96295411	96295411	2547934	2547934
				1960000	1960000
				19380434	19380424
3	2015-16	994600	1055902	7564700	7564700
		116254000	84469491	9308700	9308700
		117248600	85525393	304200	304200
				1378999	1378999
				930000	930000
				1159438	1159438
				20646037	20646037
4	2016-17	1739100	1739100	12546900	12426896
		135233600	95708934	1305300	1305300
		136972700	97448034	1191989	1191989
				136174600	96551564
				770000	770000
				13000	12994
				152001789	112258743
5	2017-18	2539500	2539500	10045390	10045390
		106830343	106830343	1206300	1206300
		109369843	109369843	1551300	1551300
				904951	904937
				800000	800000
				14507941	14507927

6	2018-19	122342316	122342316	12811160	12811160
				1248100	1248100
				4287750	4287750
				1330300	1330300
				19677310	19677310
7	2019-20	108263724	116302026	27477111	22161567
				922675	921620
				11900	11865
				146600	141200
				873000	713099
				73770	73770
				1570865	1263306
				31075921	25286427
8	2020-21	198013770	198013770	26869286	26869286
				793500	793500
				3861822	3861822
				1499975	1499975
				33024583	33024583
9	2021-22	235206932	235206932	196508534	196508534
10	2022-23	218360056	218360056	218359285	218359285

9.8 Existence of monitoring, assessment and reporting mechanism: For monitoring of works under different schemes, the department has a cell under the control of Chief Conservator of Forests, Monitoring and Evaluation, who has support of the Conservator of Forests and Divisional Forest Officer and their officials to perform the field work. The external monitoring of works is being carried out by different funding agencies like JICA ETC

For evaluation of prescriptions of the Working Plan, Control forms devised by the Department. They pertain to evaluation of fellings, subsidiary fellings, progress of regeneration, statement showing the deviations and works of maintenance, reproduction, improvement and protection. It is the responsibility of the Conservator of Forests to review the control forms annually during the Annual Office inspection of his subordinate offices. The Conservator and his superior officers are supposed to inspect the coupes and see themselves the adequacy of the operations in the different working circles.

9.9 Public awareness and education: Publicity and extension education is an important part of the Forest Department. At present, one divisions at Shimla is providing extension services to the people. Forest education and awareness is provided through arranging forest exhibitions, nature camps and user-seller meets in different parts of the state. Literature in the form of posters, pamphlets, manuals and handouts on forest laws, need for conservation and the citizen's charter are distributed free of cost to the public. Information is also given during public gatherings at local fairs, and Van mahotasava and wildlife week celebrations throughout the state.

9.10 Adequate manpower in Forest Division: The details of sanctioned permanent and temporary posts are given in the Table 9.4. In general, adequate manpower is available to manage the forests. Against all the sanctioned posts, there are a few deficiencies.

Table 9.4 Sanctioned strength as on 30/06/2024 of Suket Forest Division

Sr. No.	Name of Post	Working No.	Sanctioned cadre	Vacant post
1.	DFO/DCF	1	1	0
2.	ACF	1	1	0
3.	Superintendent	1	1	0
4.	Forest Ranger	7	7	
5.	Senior Assistant	3	3	0
6.	Deputy Ranger	16	22	-6
7.	Forester	-	-	-
8.	Surveyor	-	-	-
9.	Forest Guard	64	81	-17
10.	Steno typist	-	-	-
11.	Driver	1	1	0
12.	Tractor Operator	-	-	-
13.	Clerk/ Jr. Asstt.	3	7	-4
14.	Peon	26	27	-1
15.	Multipurpose worker	2	2	-
16.	Beldar	-	-	-
17.	Chowkidar	25	25	0
18.	Mali	13	13	0
19.	Mali-cum-Plantation work	5	0	+5
20.	Kanungo	-	-	-
21.	Forest Worker	63	110	Dying Cadre
22.	Dak Runner	1	-	1
23.	Sweeper	1	3	-2
Total		234	304	

Most of the field staff is deployed for the management of Government forest, Labour is locally available for carrying out all types of operations in the forest and nurseries. However, shortage of labour is felt in the sowing and harvesting season of *Rabi* and *Kharif* crops.

Table 9.5 Wages rates per day in Himachal Pradesh

S. No.	Category of labour	w.e.f. 1-04-23	w.e.f. 1-04-22	w.e.f. 1.04.2021	w.e.f. 1.04.2019	w.e.f. 1.04.2018
1.	Unskilled labour		350.00	300.00	275.00	250.00
2.	Semi-skilled labour		371.77	318.52	292.00	267.00
3.	Skilled labour		406.36	348.21	319.17	294.17
4.	Highly skilled labour		483.17	414.03	379.50	354.50

CHAPTER 10

FIVE YEAR PLANS

10.1 Five year Plans

After independence, India has chosen centralized process of planning for equitable development of Indian states and its people. From original formulation through successive modification to parliamentary presentation, plan making in India has evolved as a responsive democratic political process and the culmination of the same in final document is an impressive manifestation. The planned economic development in India began in 1951 with the inception of First Five Year Plan. Five Year Plans (FYPs) are centralized and integrated national economic programmes. The process began with setting up of Planning Commission in March 1950 in pursuance of declared objectives of the Government to promote a rapid rise in the standard of living of the people by efficient exploitation of the resources of the country, increasing production and offering opportunities to all for employment in the service of the community. The Planning Commission was charged with the responsibility of making assessment of all resources of the country, augmenting deficient resources, formulating plan for the most effective and balanced utilization of resources and determining priorities.

The first FYP was launched in 1951 and two subsequent plans were formulated till 1965, when there was a break because of the Indo Pakistan conflict. Two successive years of drought, devaluation of the currency, a general rise in prices and erosion of resources disrupted the planning process and after three Annual Plans between 1966 and 1969, the fourth five year plan was started in 1969.

The first plan focused on agriculture as there was a severe food shortage in the country. The power and transport were also priority areas. Forests got a new direction during the Plan period as the New Forest Policy in 1952 was enunciated. The policy emphasized the resurrection of forests but in the same breath stated that agriculture had the first charge on forests. Large forest areas were diverted for agriculture in the first three plans. As the second Five year plan focused on rapid industrialization, heavy and basic industries, the forests were felled for industrial uses and timber. Bamboo forests especially were given on lease to paper and pulp industries in the subsequent plans. In the third plan, based on the experience of the first two plans, as agricultural production was seen as limiting factor in India's development, agriculture was given top priority to support the exports and

industry. In the fourth plan also, main emphasis was on growth rate of agriculture to enable other sectors to move forward.

Table 10.1 Investment and afforestation across different plans in Himachal Pradesh

S No.	Plan Period	Amount invested (Rs in Lakhs)	Area Afforested (Hac)
1	First Five Year Plan (1952-56)	18	5294
2	Second Five Year Plan (1956-61)	78	17926
3	Third Five Year Plan (1961-66)	438	40187
4	Annual Plan (1966-69)	310	27321
5	Forth Five Year Plan (1969-74)	929	73349
6	Fifth Five Year Plan (1974-78)	1308	73599
7	Annual Plan (1978-80)	1095	44897
8	Sixth Five Year Plan (1980-85)	4698	120399
9	Seventh Five Year Plan (1985-90)	10883	163826
10	Annual Plan (1990-92)	6475	58945
11	Eighth Five Year plan (1992-97)	23420	142732
12	Ninth Five Year Plan (1997-2002)	39659	131850
13	Tenth Five Year Plan (2002-2007)	38456	86341
14	Eleventh Five Year Plan (2007-2012)	67349	83968
15	Twelfth Five Year Plan (2013-2017)	69406	75212

After two years of Rolling Plan (1978-80), the Sixth Plan (1980-85) focused on increase in national income, modernization of technology, decrease in poverty and unemployment and controlling population. The period saw the beginning of foreign aided social forestry projects for easing the pressure on forests. The national conservation strategy was launched and also the Project Tiger was implemented. The forestry saw the birth of Forest (Conservation) Act, 1980. During this period, Indian Council for Forestry Research and Education was borne. It was the golden period for the development of forestry.

The Seventh Plan (1985-90) and Eighth Plan (1992-97) aimed at grain production, increasing employment opportunities and raising productivity. The Sixth Plan laid more emphasis on social sector viz. education, health and infrastructure development with share of public participation. The tenth plan further emphasized the social indicators as the targets such as reduction in gender bias, reduction in infant and maternal mortality and access to potable water, and cleaning of major rivers.

The Eleventh Plan (2007-12) emphasized on the inclusive growth reducing poverty, creating employment opportunities and access to essential services of health and education. It also laid emphasis on environmental sustainability. There were calls on conservation of biodiversity and wildlife both at the national and international fora.

The Twelfth Five Year Plan (2012-17) seeks to have broad vision of faster, sustainable and more inclusive growth. Whereas inclusiveness is to be achieved through poverty reduction, reducing inequality, empowering people, the sustainability includes ensuring environmental sustainability, development of human capital through improved health, education, nutrition, and development of institutional capabilities. The plan envisages to increase green cover by 1 million hectare every year during the Twelfth FYP. It also has the target to reduce emission intensity of GDP in line with the target of 20 per cent to 25 per cent reduction over 2005 levels by 2020. Obviously the Twelfth Plan has high aspirations for sustainable management of forests. The outlay for Himachal state during the 12th Plan is given below: Total outlay (Himachal Pradesh) = 2280000 lakhs

Project outlay (Forest & Wild Life) = 69406.00

Percentage to total projected outlay = 3.0 Lakhs

it can be seen that the outlay for Forests and Wildlife Preservation is only 3.04% whereas it covers 66% of total geographical area has increased from 0.09 percent to 0.51 percent of the total outlay of the state, which is a good sign.

CHAPTER 11

PAST SYSTEM OF MANAGEMENT

11.1 General:

The Suket Forest Division remained under frequent re-organization during the past. The area presently falling under it was covered by different working plans. The Working Plans, of course, covered these areas partly i.e. their total coverage extended to other areas also. These Working Plans were:

Table 11.1 List of Working Plans

Sl.No.	Name of Working Plan	Period	Remarks
1.	J. Singh's W.P.	1924-53	Ex-Suket State Forest
2.	Sewal's W.P.	1941-70	-do-
3.	Writ's W.P.	1918-36	Ex-Mandi State Forest
4.	Gorie's W.P.	1937-56	-do-
5.	R.V. Singh's W.P.	1957-77	-do-
6.	Pande and Sharms's W.P.	1971-86	Suket Forest Division
7.	Nanak Chand's W.P.	1986-2001	-do-
8	R.K.Singh	2003-04 to 2017-18	do

11.1.1. Apart from it different portions of the tract of the present Suket Forest Division were also governed by to different Ex-States viz.Suket and Mandi.

11.1.2 The management under different ex-State and Working Plans is briefly described here under

11.2. Period of Early Management (SUKET EX-STATE FORESTS)

In Suket forests departmental work was started in 1885 when felling on fairly large scale were carried out, especially in deodar forests along Suket-Mandi border. No attempt was made to introduce any scientific management in State forests. The marking operations were carried out by the state Darogas and other state Kardars to mark the trees up to the limit already agreed upon. The sole criterion for determining yield was the net revenue desired by the Durbar from time to time. Subsequently, fellings were carried out at intervals. Up to 1912 fellings were probably done on a reasonable scale. Excessively heavy fellings were carried out between 1912 to 1919 when many of the forests were suspected in 1919 by

Commissioner of Jullunder Punjab Govt. and Mr. H.M.Glover, the then Divisional Forest Officer Bushehar Division was deputed to report on the condition of forests. He undertook a short tour of some of the important forests and reported that most of the marketable trees has been already felled or marked for fellings and even trees of small girth sufficient turn out one or two sleepers were marked and royalty paid on cubic feet out-turn basis. He further observed that despite reckless exploitation, forest had not yet been completely ruined and in some cases further fellings might even be followed. He recommended that most of the markings should be cancelled as soon as the suggested felling had been completed and the entire forests given complete rest from 1921 onwards until a simple working plan could be drawn up. Mr. J. Singh, I.F.S in his preliminary working plan report (1923) observed that “ It can be said without any doubt that as timber producing reserves, the productive capacity of such forest has been greatly spoiled by indiscriminate marking and felling; and the present Raja is to be congratulated for taking serious view of the jungles, otherwise after a few more years the entire sources of the forest would have been irretrievably ruined”.

11.3 J. Singh's Working Plan (1924 TO 1953)

Following Working Circles were constituted in this Plan:-

(i)	Deodar Working Circle	7314.80 ha
(ii)	Chil Working Circle	16510.00 ha
(iii)	Selection Working Circle	6475.60 ha
(iv)	Fuel Working Circle	5978.00 ha

11.3.1 Deodar Working Circle (7314.80 HA)

It comprised all the areas either under pure deodar or mixtures with deodar predominating. The system adopted was thinning-cum- improvement felling with well defined marking rules. A felling cycle of 15 years was adopted. The yield was calculated on area basis and annual coupe of 487.60 ha was prescribed. Cleaning was suggested in young patches of regenerations. Artificial regeneration by contour line sowing/patch sowing and planting, where sowing were not successful, were also proposed. An annual coupe of 10 to 12 ha for this purpose was prescribed. Presumably the prescriptions were not followed.

11.3.2. Chil Working Circle (16510 HA)

It contains all well stocked chil areas. It was to be treated under Shelter wood system with rotation of 120 years corresponding to exploitable girth of 1.8 m and regeneration period of 30 years. An area of 2549.60 ha was allotted to P.B.1 and was to be regenerated within the regeneration period. Yield was prescribed at 2400 m³. For this, volume of trees below exploitable girth was not to be counted.

Regular regeneration felling was prescribed in a few forests, in the remaining forest, it was found that the crop is already too open and no felling was prescribed. The number of secondary felling was left at the discretion of the Forest Officer. Final felling was prescribed where the regeneration was established. In case regeneration did not appear within 10 years artificial regeneration was to be resorted to. Thinning cycle was kept at 10 years. Cleaning was to be done where the young crop was 15 years old. Strict fire protection measures were suggested.

11.3.3 Selection Working Circle (6475.60 ha)

This included all spruce and fir forests containing a little Kail and high lying oaks also. The working circle was divided into conifer felling series and Oak felling series.

11.3.3.1 Conifer Felling Series (1571.60 ha)

Selection felling along with thinning and improvement felling were prescribed. Felling cycle was fixed at 15 years. Yield was fixed at 180 and 56 and 67 trees for spruce, Kail and fir respectively. Much demand for fir and spruce was not expected everywhere, therefore, it was suggested that whenever there was demand, the yield would be made available in 3 installments within a period of 15 years. Clear marking rules were laid down which enjoined the removal of all I class and over trees provided they were not required to serve as seed bearers. II and lower diameter class trees were to be removed strictly on Silvicultural grounds.

11.3.3.2 Oak Felling Series (4904.00 ha)

Only the requirement of right holders was to be met with. Some suitable areas were suggested for Deodar planting.

11.3.4 Fuel Working Circle (5978.00 ha)

It comprised of scrub and low-lying Oak and was divided into Firewood and Charcoal Felling Series. There was no major difference in the two felling series.

11.3.4.1 Fire Wood Felling Series (4465.60 ha)

Coppice with Standard System was prescribed with a rotation of 30 years and 60 evenly spaced standards of valuable species per ha was prescribed. Cleaning of shoots was prescribed in 6th year. Areas prescribed yield areas prescribed yield. Annual coupe of 16 ha was considered sufficient to meet the firewood requirement in each 'estate depot'. The coupe size could be increased depending upon demand. Workings of bamboo clumps occurring scattered were also prescribed.

11.3.4.2 Charcoal Felling Series (1512.40 ha)

This series was carved to meet charcoal requirement of Sundernagar town. Coppice with standard system with 30 years rotation was prescribed with identical felling rules of Firewood felling Series. Yield was to be increased by area with annual coupe of 20 ha. The size of the coupe could be increased depending upon the local requirements. Annual Coupes were to be closed for 5 years after the felling.

The then C.C.F. of Punjab did not accept the working plan and in his letter of June, 1926 directed the State that "Pending the introduction of Working Plan the demarcation of the forest should be proceeded, but felling for export should not be permitted". A.D. Blaschek C.C.F. informed the Agent to the Governor General at Lahore that the plan was unsuitable for the needs of the forests and might follow from the adoption by the state of the present working plan. After protracted correspondence the working plan was received by the Durbar during 1927 unsanctioned. However, the felling continued in utter disregard to the advise of the C.C.F. which was seriously viewed by the Punjab Government. At the instance of Punjab Govt, Govt of India sent Mr. Davis Instructor, F.R.I. Dehradun in 1931 to inspect and report on conditions of Suket Forests much against the wishes of Durbar. In his report to Inspector General of Forests, Mr. Davis wrote, "the majority of working plan prescriptions were not brought into force and further heavy felling took place between 1925 and 1931. These felling were partly of dead trees killed in the 1921 fires, but a large part of them was marked

down to 35 cm or even to 30 cm. in diameter and kail was marked down to 35 cm or even lower. the trees were removed quite regardless of Silvicultural requirements and future regenerations of the forests, the object of felling being to obtain as much of revenue as possible. “Selective felling were again carried out in 1933 on an extensive scale over all important deodar and chil forest with the result that these were completely depleted of large size trees. During the period 1920-21 to 1937-38, 67217 trees having a volume of 53,056.70 m³ of Deodar, Kail Chil and Fir and 67217 Bamboos were removed.

11.4 SEWAL’S PLAN 1941 TO 1970

On the recommendations of Mr. Davis, Mr. Sewal was appointed to prepare working plan for the period 1941 to 1970. The prescriptions of Sewal’s Working plan were suspended during 1953 because it was decided to amalgamate it with Gorrie’s plan. Sewal made the following working circles:

1.	Deodar Working circle	=	8069.22 ha
2.	Chil Working Circle	=	14616.07 ha
3.	Protection Working Circle	=	4606.07 ha
4.	Fuel and Fodder W.C.	=	6898.37 ha
<u>Total</u>			<u>34189.73 ha</u>

11.4.1 Deodar Working Circle (8062.22 ha)

It includes deodar and kail areas either pure or mixed having some spruce and oak also. Chil and Ban areas which could not be separated from the former and some transitional areas between chil and deodar where kail and deodar regeneration had come up under chil. Small patches of deodar and kail forests in the neighborhood of villages were excluded. Thinning and improvement felling were prescribed, because there was no middle-aged and mature stock, purely as a tending operation on a felling cycle of 15 years for eventually obtaining series of even aged crops in which introduction of uniform system could be possible. No yield was prescribed as no commercial felling was envisaged. Plantation of fire burnt blanks was prescribed over 1858 ha out of which 25 hawas to be attempted during its 3 years of the plan and later on the target was enhanced to 60 to cut in Dhamoon, Begli,

Kamrah, Kanen, Kanas, and Treach forests and fire watchers were to be appointed during fire season.

Against prescription of 3317.36 ha during the period of working plan, thinning and improvement felling were done over 1442.61 ha. The heavy arrears felling can be attributed to the fact that there was practically no demand for smaller sized trees.

After the merger of the states, Divisional Forest Officer, Suket recommended in 1949 the forests which were worked during the State time were densely stocked with young crop and observed that while carrying out marking the cardinal principles of thinning were entirely ignored that only selected large sized trees were removed by the contractors. He recommended that the following forest should be re-marked/marked afresh:

Table 11.2 List of forest to be re-marked/marked afresh

Name of Forest	Area in ha	Prescribed year of working	Remarks
Kanon	251	1944-45 1945-46	Worked in 1946-47
Kamrah	320	1946-47 1947-48	Worked in 1947-48
Marera	312	1942-43 1946-47	Marked but could not be worked
Riagi	736	-do-	Worked in 1947-48
Kamand	416	1946-47 1947-48	Marked but could not be worked
Batehar	251	1953-54 1954-55	50 acres worked in 1947-48 nearly 100 acres blanks
Dwarloo	90	--do--	Only 20 acres stock Ed/worked
Total	2376		

However, these forests remained unsold in 1949-50 but were auctioned in April, 1951.

It was felt that the main reason for heavy areas was that the felling were scattered and the thinning cum-improvement felling yield was too low to form an economically floatable ghall. To attract purchasers the felling schedule was revised in 1953 and sanctioned vide CCF letter No. Ft. 43-88/56 dated 14th March 1953 which prescribed the felling as under:-

Table 11.3 List of forest where felling schedule was revised

Name of Forest	Year in which now to be marked	Nallah
Bhund-Shgaoh, Lotla, Maganal	1953-54	Cheora Khad
Sundroo, Richhni, Jachh, Charog, Sarandha, Dhamoon, Khadra, Dhurmu, Shiladhar.	1954-55	Kotlu Khad
Kandhi, Dopha, Kelodhar-Sarandha, Tikri	1955-56	Cheora Khad

Total area = 6188.00 ha

Note: (Certain forests allotted to Chil Working Circle have also been included viz. Lotla Naganal, Jachh, Richhni, Kelodhar-Sarandha & Dhurmu)

Against a total area of 6188.00 ha were gone over under thinning cum-improvement felling. Thus 1/3rd of the area was deprived of practically any Silviculture operation. Crop continued to grow in congestion.

In spite of the efforts for raising plantations, it remained in heavy arrears. Success was not good on account of ineffective closure and haphazard manner in which plantations were raised. Dopha, Pathrive, Khadra and Shagach Forests.

11.4.2 Chil Working Circle (14616.07 ha)

This working circle comprised of all chil forest, occasionally mixed with ban and deodar. No commercial felling was envisaged and only felling allowed was to meet the demands of right holders. The working circle area was divided into three blocks:

Block I (3848.87 ha): Areas deficient in regeneration were included in this block. No felling was prescribed except to meet the demand of right holders. Grazing only by cows and bullocks was permitted.

Block II (2667.70 ha) This included areas where regeneration had come up and established. Felling to meet the demand of right holders was permitted.

Block III (82--.50 ha) The remaining areas were kept in this block and only thinning in congested crops were permitted.

The entire working circle was to be protected from fire. In block II and III one half of each of the compartment was to be control burnt, during alternate years, so that right holders could have some burnt areas every year for grazing their cattle.

In the absence of any protection, the area suffered from repeated incendiary fires, continuous light grazing and silvicultural neglect leading to deterioration in the crop. Felling was carried out over an area of 2952 ha. Trees were marked liberally to the right holders. No areas were closed and natural regeneration failed to establish itself. As prescribed, resin tapping was started in 1948. Defective resin tapping increased the susceptibility of the trees to wind and snow damage. Fire watchers were regularly appointed during fire season. Regular control burning reduced fire hazard. Artificial regeneration as suggested in the plan was not carried out and heavily grazed areas were not fenced.

11.4.3 Protection Working Circle (4606.07 ha)

This working circle included Spruce/Fir forests with little proportion of kail, deodar, ban and mohroo forests. A provision was made for working of these forests in case of market for fir/spruce was developed in the later stage. Marking for meeting the demand of right holders was prescribed strictly on silvicultural grounds. The entire area was to remain open for grazing but number of Jammuwal and other professional graziers was to be reduced to 50%. The area was to be protected against fire. In oak and spruce forests where natural deodar occurred blanks were to be filled up with deodar after closing the areas to grazing with barbed wire fencing.

Lopping continued to be done mercilessly. Small patches for Deodar planting were taken up on Bunga, Churasni and Gehru forests but were completely neglected. In Spruce Kail zone, regeneration of spruce (2.5 to 3m) has established in small patches in Makra, Banwali and Gharech forests.

11.4.4 Fuel and Fodder Working Circle (6998.37 ha)

The forests carrying miscellaneous species, low lying scrubs and oak

forests adjoining Sundernagar, Dehar and Tattapani were included in this working circle and firewood and charcoal felling series were constituted.

11.4.4.1 Fire Wood Felling Series (5529.28 ha)

Coppice with standard system with rotation of 30 years was prescribed 60 to 70 seeds bearers per ha of valuable species with good and healthy crown were to be retained and remaining crop coppiced. Annual coupe was fixed at 30 ha. Cleaning was to be done in 5th years followed by cleaning and thinning in 10th year. These could not be regenerated due to uncontrolled grazing and non closure of felled coppice coupe.

11.4.4.2 Charcoal Felling Series (1367.26 ha)

The Silvicultural system adopted was “Selection Group”. Existing Groups of saplings and poles were to be freed and properly thinned. Cleaning and C grade thinning were to be carried out wherever necessary. Size of annual coupe was fixed at 20 ha which could be increased on demand. Exploitable diameter was fixed at 30 Cms.

Only two forests viz. Trambri and Kothain were exploited for manufacturing charcoal and supply of firewood for Sundernagar. Till 1956.57 there was an arrear of 378.68 ha and 230 ha. in firewood and charcoal felling series respectively. The coupes were not closed for grazing. The forests suffered maximum destruction as a result of increase in human and cattle population. Supply of grass in Sundernagar town was met with from forests allotted to Fuel wood felling series. Export of grass was strictly controlled. Bandli forest continued to be principal source of grass and yield was estimated to be 77300 tons air dry per annum.

11.5 PERIOD OF EARLY MANAGEMENT (MANDI EX-STATE FOREST)

No information is available about the management of these forests prior to 1880 A.D. The past history of this forest can be divided into three periods i.e. 1880-1890, 1890-1917 and 1918-1957.

11.5.1 Period (1880-1890) Forest exploitation was started in 1880. Prior to 1880, a company of Sikh traders worked the forests more accessible. In 1880's a 10 year lease of all the Deodar

forests was granted to Mandi Forest Company. The lease allowed 1500 trees of Deodar per annum at Rs. 5.00 per tree for trees of 6 to 8 ft. girth, but for trees over 8 ft. girth the rate provided was Rs. 2/- per foot girth. It was provided in the lease that the lessee will retain 10% of seed bearing trees in each forest and that for every tree felled 10 plants of deodar should be planted. Against the conditions of lease more number of trees than the prescribed were as removed. 10,000 trees were removed, alone during the last 2 year. The state had been great sufferer due to these over felling. Practically all the Engineering works done by the company and many areas of the forests were opened which otherwise were lying unworked. This also enabled the local labour to acquire a masterly skill in sawing and floating working.

In 1889, Mr. Maynor, Counselor to the Raja of Mandi, prepared a Forest Jama-bandi for the whole state giving the rights, which the residents of a village could enjoy in a particular forest. The first regular demarcation of the forests was also done simultaneously and two classes of forests were viz SIYAN or Demarcated Forests and BARTAN or Undemarcated forests were created. The first category included all the forests, which were of substantial value to the State. As Deodar was the only species of any market value in undemarcated forests comprised areas intended mainly for the exercise of recorded rights of the villagers. In the absence of proper staff, the demarcation works was done by KARDARS. In some illaqs, even Jamabandi of Mr. Maynard was also prepared by KARDARS. The Jamabandi in many illaqs was prepared properly but in others it was found to be inaccurate, forests having been entered which did not exist at all.

Mr. Maynard framed definite forest rules regarding the exercise of the rights of user and the grant of timber was systematized. No rights to timber were admitted in the demarcated forests, but with occasional local exceptions other rights of user were allowed to continue. The lopping of Deodar was prohibited and that of other conifers restricted. Debarking of trees of charcoal marking and the extraction of torchwood from green trees were stopped. The burning of wasteland containing valuable trees was prohibited. A small forest establishment was created. It consisted of Jamadar and four Naib Jamadars under whom rakhas were appointed from among the local people. Rakhas were held responsible for the protection of forests and were exempted from Begar. Though Maynard's rules made a start towards systematic management of this forest, yet these could not be called as forest settlement. In subsequent years, Mr. Fendall extended the

demarcation gradually to include most of the forests exploited by State Agency. A list of demarcated forests as prepared and pillars were erected but these were not regularly repaired and consequently disappeared in due course of time.

11.5.2 Period (1890-1917) After the expiry of Mandi Forest Company's lease in 1890 the State had little Deodar trees to fell for many years only half dead and rotten or malformed Deodar, Pieces left unconverted by Mandi Forest Company along with the felling of some Kail trees. Between 1895 and 1910 felling were largely confined spruce and Fir. Heavy felling were made in may spruce forests and nearly every thing fit for timber was removed from chil forests, which were of poor quality.

In 1910 Sulej basis Deodar forests were again leased to a contractor under conditions similar to those of Mandi Forest Company. The contractor was bound to remove a minimum of 25000 sleepers annually till all the forest has been worked. The lease was later on cancelled on the advice of British Government when the work had been in progress for less than a year and only 500 trees have been removed from Pandar Forest.

In all the contracts the trees were sold before they were actually marked. The method of sale was "Hasab pasand" i.e. the contractor used to select trees according to their choice and the forest officials merely put hammer marks on them. The contractor could obtain as many more trees as he pleased from the same forest at the same price. The result was that all the best forests were felled and only inferior trees were left in the forests.

11.5.3 Period (1917-1957) First regular Forest Settlement was done in 1917 by Mr. Wright and two categories of forests viz. demarcated and undemarcated forests were created. Following types of areas were taken in demarcated forests:

- (a) All coniferous areas capable of yielding appreciable revenue. Areas containing young crops at that time but which would have eventually become valuable were also demarcated.
- (b) Forests required to be prescribed for supply of timber for state buildings and Mandi Depot and for the supply of firewood and Charcoal to Mandi Town.

(c) SIYAN forests which have been reserved for generation as shooting preserves

(d) Forests which though not of much value from revenue point of view but was required to be conserved for amenities and other purpose.

Large area of Ban oak and other broad leaved species in the lower hill and of Spruce and Silver Fir in higher hills, were left as undemarcated forests Small patches of Deodar, Kail and Chil very heavily burdened with rights were also left as undemarcated forests.

Detailed record defining the rights, which the villagers could enjoy in a particular forest, was prepared. The rights were admitted very liberally. At the same time, Mandi Forest Regulation No. I of Sambat 1975 was promulgated and made applicable to the whole of Mandi State from 1st day Chait Sambat 1975 (Corresponding to April, 1918) The Regulation prohibited breaking up of land for cultivation, except with the permission of the Durbar. Setting fire to trees, brush wood and shrubs cutting out slabs or torchwood from the boles of standing trees, felling or lopping of trees, removing, dead leaves or surface soil, grazing cattle or cutting grass from demarcated forests during the closed season, removal or damaging of any forest boundary pillar and removal, burning or defacing any mark placed by forest official on any tree, It embodied detailed rules along with definite provisions laid down in the forest settlement report afforded ample protection to these forests.

First regular working plan for the management of these forests was written by Mr. Wright in 1918 for a period of 20 years. It was revised one year earlier than scheduled in 1937 by Dr. Gorrie's as large scale damage had occurred due to wide spread incendiarism of 1921 fires and cover felling of 22% in Sutlej felling series of Deodar Working Circle which was largely due to the removal of an accumulation of dead and damaged trees in the following years.

11.6 WRUGHT'S PLAN (1918-36)

Mr. H.L. Wright, IFS, who was on deputation from Punjab during 1915 to 1918, compiled the first Working Plan for these forests. This was a simple working plan as the staff at that time was not adequate and lacked proper training required to execute the prescriptions of an elaborate working plan.

Though Mr. Wright felt that a system of concentrated regeneration was the most suitable

system of management for the coniferous forests of Mandi State, but such a system was considered unsuitable with existing staff. Mr. Wright gave definite prescriptions and lay down that the proposal made in his plan should not be applied to this forest but rather an attempt method, which should be applied to these forests but rather an attempt to reconcile scientific forestry with Mandi conditions. It was stressed that the proposal made in his plan should only be carried out till technical staff was available when the plan should be completely revised.

He constituted following six working circles:

Table 11.4 List of working circle and their areas

Sl. No.	Working Circles	Area in ha
1.	The Deodar Working Circle	7978,50
2,	Thinning Working Circle	1212,90
3.	The Spruce Working Circle	421.80
4.	The Chil Working Circle	221.50
5.	The Fuel Working Circle	---
6.	The un regulated Working Circle	52.20

11.6.1 The Deodar Working Circle (7978.5 ha) The working circle was sub divided into 2 felling series viz Sutlej felling series and Beas felling series, the area of Suket Forest Division were however covered by Sutlej felling series (7978.5 ha).

Total enumerations of Deodar and Kail down to 45 cm. Girth were carried out and spruce was enumerated down to 135 cms girth. Enumerations result is as under:

Species	I	II	III	IV	V
Deodar	11470	21442	63040	154315	243601
Kail	1689	6232	24921	73469	191196
Spruce	17642	15870	30457	N/a	N/a

These girth classes were as follows:

- (i) Over 7.5 ft.
- (ii) Over 6 ft but less than 5 ft

- (iii) Over 4.5 ft but less than 6 ft.
- (iv) Over 3 ft but less than 4.5 ft
- (v) Over 1.5 ft but less than 3 ft.

Felling of 90% of Ist Class trees (over 2.25 m) girth and 50% of II class (1.80 to 2.25 m girth) was prescribed. All Kail trees i.e. 1st and 2nd class and those mature spruce and fir trees occurring as associates of Deodar were prescribed for felling. The yield of Deodar was fixed at 19,000 trees for 1st and 2nd class, which worked out to 950 trees per annum. The annual yield of kail and spruce was fixed at 250 and 1000 trees respectively. The felling cycle was fixed at 20 years. Fairly heavy selection felling was prescribed in this working circle for Deodar, Kail and Spruce. Since the grazing was light it was expected that the deodar would regenerate under selection system. Barbed wire fencing was prescribed for fencing the areas where effective closures was desirable.

Comparative statement of prescribed and actual felling is as follows:

Felling Series	Actual felling		Total	Prescription
	1st Class	2nd Class		
Sutlej	13466	9762	23228	19000

The net result was removal of 1.26 % per annum of the growing stock over 19 years against prescribed 1 % per annum over 20 years. On the whole the working was beneficial to the growing stock, which had generally increased in all age classes. The forests have not been over felled is clear from the following table which gives enumerations figures of 1917 and 1935 in Sutlej felling series which falls in Suket Working Plan :

Size	Deodar		Kail	
	1917	1935	1917	1935
Iv	257428	266820	158097	188995
III	110016	196395	55384	126056
II-A	66443	119393	27512	53445
II-B	33189	74733	12975	27536
I-A	14465	29808	4264	7144

IB- ID	11513	18767	1738	3333

The above figures pertain to areas previously included in Wright's Deodar and thinning Working Circles and Gorrie's Concentrated Regenerations and Section Working Circle and these two sets of figures are strictly comparable and there is an increase in all age classes.

11.6.2. Thinning Working Circle (1212.9 ha)

This included Deodar and Kail forests in which a number of mature trees were not appreciable. It also included large areas of poor Chil, Deodar and Spruce-Deodar mixture, which could not be expected to produce better quality deodar. It also included large areas of young kail majority of which were so badly diseased as to be hardly of any use. Thinning was prescribed over 10 year felling cycle. Felling was to be regulated by area. However, thinning were done only on these areas which could yield timber to justify extractions, which in some cases resulted in fairly heavy thinning but many other areas which could not yield commercial return, although in need of silvicultural thinning, were left unfelled. On the whole, thinning improved the crop by way of removal of inferior and useless stems.

11.6.3 Spruce Working Circle (421.8 ha)

This comprised of all spruce and silver fir forests, which naturally included large areas of, sub alpine Kharsu and broad-leaved mixtures. No enumeration was done in these forests. Only selection felling was to be carried out. Annual yield of 1000 trees of over 1.80 m firths was arbitrarily fixed (not separately fixed for Sutlej basin areas). It was also stipulated that if the prescribed yield of spruce and silver fir trees in Deodar Working Circle was not available, the balance could be felled from this working circle. Removal of over mature stock and such trees as owing to damage were unlikely to survive until the next felling was prescribed. Closure of some areas to grazing was also suggested.

The prescribed yield remained in arrears as there was not much demand of fir and spruce timber at that time.

11.6.4. Chil Working Circle (221.5 ha)

All pure Chil forests were allotted to this Working Circle. Owing to past

heavy exploitation, no felling was prescribed except those for meeting bartan demands. The primary object of management was to afford protection to these forests until the conditions became favorable for introducing a system of concentrated regeneration felling. No. work was prescribed for areas now falling in Suket Division.

11.6.5 Fuel Working Circle.

No area allotted to this working circle falling in Sutlej basin now covered by this plan.

11.6.6 Un-regulated Working Circle (52.2. ha)

It included heterogeneous composition of grass reserved, Deltas groves, areas reserved for local bartan demands and areas unfit for regular working. These forests were to be worked to meet the requirements of the local people and the felling was to be made viz. 7 N Galukahr (52.2 ha) was allotted to this working circle in Sutlej basin. Overall, adequate protection had been afforded to the forest allotted to this working circle.

(a) Special Works of Improvement:

(i) Sowing and Planting: No extensive programmed of sowing and planting was prescribed. Regeneration made very good progress in fire burnt area of Drahal (148.2 ha) and Lambidhar (103.3 ha) forests, which have now been complete regenerated.

11.7 PERIOD OF REVISED WORKING PLAN

Gorrie's Working Plan for erstwhile Mandi State Forests 1937-56:

Five Working Circles as given below were constituted. Areas of various working circles in Sutlej felling series, which form part of Suket Forest Division, are given against each:

(i)	Concentrated Regeneration Working circle	= 4983.37 ha
(ii)	The Selection Working Circle	= 4837.80 ha
(iii)	The Chil working Circle	= 631.80 ha
(iv)	The Protection Working Circle	= 407.83 ha
(v)	The Fuel Working Circle	= -
Total:		= 10860.77 ha

11.7.1 Concentrated Regeneration Working Circle (4873.37 ha)

This working circle included all well stocked deodar forests suitable for introduction of system of concentrated regeneration as evolved in Punjab. 1/7 of the area was allotted to PB I and further 1/7 has been allotted tentatively to PB II. The area allotted to PB I consisted of the area destroyed by 1921 fires in several of which cultural work has already been done and over wood was to seriously damaged that it required removal, and areas in which natural regeneration had established requiring removal of scattered over wood. Very little seedling or secondary regeneration feelings were required and the main point to be attended to was the completion of restocking during the plan period. These were as follows:

<u>Name of Forest</u>	<u>Area in acres</u>
4 S.Bagdeyar	259
5.S Dharwaran	128
17 S Drahal	366
18 S Lambidhar	255
32 S I Kalainj V	128
33S 3 Ruhmani	166
45 S.1 Phaidhar	120
9 N 2 Bara Dadaon	114
13 N 2 Rangjjhol	105

Rotation was fixed at 140 years.

PB II areas consisted of well stocked area of Deodar with a maximum number of maturing trees and the object was to give them the best possible chance of good individual girth increment. Heavy crown thinning was prescribed. Thus very little seeding or secondary regeneration felling was prescribed. Thus very little seeding or secondary regeneration felling was required. The main aim was of restocking the areas allotted to PB I

PB I areas: In fire burnt areas over wood was to be removed where standing over young crop and not required for shelter. In other regeneration crops, the markings were to be done according to the needs of the young crop. In irregular mixture of old and young crops, old single trees were to be removed. Where old trees occurred in groups they were to be retained, unless their average diameter exceeded

60 cms as part of the future crop. The felling cycle was fixed at 20 years and intermediate thinning at 10 years interval. In other areas where regeneration was sparse and mature trees existed, 20 trees per acre of any size between II A and II B-I B with good health crown were to be retained as seed trees. Kail areas were to be opened sufficiently for deodar planting. In patches unsuitable for Deodar such as damp Nallahs-beds and rock outcrops no felling was to be done. All areas of pure Spruce were to be worked according to prescriptions of Protection Working Circle.

In P B II area tree of IB and over sizes were to be felled if dead or dying or where the removal would not create large gap in the canopy. Trees of IIB and IA would be felled only in the course of ordinary thinning.

All temple groves and Devtas trees wherever claims were reasonable were to be preserved.

The remaining 5/7 of this working circle was to be worked through Light selection cum improvement felling. A varying proportion of the number of trees in size of IA and up words was prescribed for each compartment as guide to the marking officer for the removal of large trees. It was suggested that trees be selected at early age, the best individual stem in the crop should be marked with rings of white paint and this would be the tree of future elite. Stems interfering with development of elites were to be moved under thinning. Underwood of oak in coniferous forests was not to be removed.

Well stocked deodar forests were to be thinned under E grade and inferior quality Deodar Crop associated with excessive grazing were to be thinned under C grade thinning. In case of pure young crop of Kail higher intensity than E grade thinning was suggested. If possible rotational lopping of oak was to be introduced to save it from destruction. Enumeration result is as under:

Species	IV	III	IIA	IIB	IA	IB-D
Deodar	193317	141543	85829	52146	20006	11144
Kail	122494	90616	36892	18732	4420	2211

11.7.1.4 No separate yield was worked for Sutlej and Beas Felling series

.Marking of trees over 60 cm diameter has been allocated to each compartment totally 18300 IB to ID and 9000IA over 20 years period giving an average of 5040 cum per annum.

Considerable work has been made in Drahal (148.2 ha) and Lambidhar (103.3 ha) forests, which were completely gutted by fires during 1921, by the time these forests were marked for felling in 1937-38. The planting work was done till 1948 and areas fully regenerated. In remaining forests the

fire damage varied within wide limits. Regular markings were carried out in all the forests except probably Rangjhol C.II for which no such record is available. Natural/artificial regeneration was present to varying degrees in all the forest.

With the heterogeneous age distribution in the crops of forests, it was not possible to open any forests to the required degree of 20 trees per acre where natural regenerations was absent. The result was that trees up to IA and IB diameter classes were retained as part of future crop as could be seen in Baragadon CII(43.7 ha) which resulted in a vary irregular opening in the crop. Regeneration was present to varying degrees in all the forests and on the basis of density none of the forests allotted to PNI other than Drahal and Lambidhar are fully regenerated. The un-regenerated areas were worked under seeding felling during the period of annual plan and continued to be allotted to PBI in the current plan. Young regeneration present at the time of marking has developed into compact of groups of poles as seen in Ruhmni and Kaleju forest. No. check was provided to link progress of regeneration with felling.

Further, as suggested in the working plan, no elites were ever selected and the drain of removal of mature and over mature trees continued, with the result that the crop new is mostly middle aged. Rotten Kail crop areas continued to be neglected and no area was taken up for conversion during the plan period.

11.7.2 Selection Working Circle (4736.80 ha)

It contained open and rather slow growing Deodar, crops on hot southern slopes generally with shallow hot soils, small forest of good quality Deodar and Kail, heavily burdened with rights marking seeding felling undesirable, rotten Kail areas worthless for commercial felling, but where some young Deodar had already established, or could be brought in by cultural work i.e. D.86 Daint and D87 Galukhar, Ban areas having high percentage of young Kail and part of upper Chil forest having good percentage of Deodar. Rotation was fixed at 180 years corresponding to 70 Cm Dbh Felling cycle was fixed at 20 years. In Sutlej basin forests worth 4736.80 ha were allotted to this working circle. The yield prescribed for both the felling series was 2240 m³ per annum for trees above 50 cm dbh. Out of this 1600 m³ was to be obtained from IA and over trees and 560 m³ from IIB trees. To obtain this yield 4545 trees of IB and 975 of IA were to be felled in Sutlej basin and 2440 IB and over and 670 IA trees in Beas basin. The remaining yield of 560 m³ was to be made available from thinning cum

improvement felling of IIB class trees. In Kail an arbitrary figures of 80% removal of 60 cm and

over diameter was suggested.

A deviation of 15 % of volume felled was permitted for each 10year period and up to 25% in number of trees marked.

The Forest Officer could alter the suggested felling sequence. Markings were to be done strictly on selection basis modified as per notes in the compartment history files. Removal of smaller sized trees was to be done strictly on Silviculture requirement. Debris burning was prescribed immediately after the felling.

In case of Deodar, there had been over felling to the extent of 4235.14 M³ for forests of both the basins. As Deodar yield was not prescribed separately. The actual yield removed from two felling series cannot be compared with the prescribed yield. No. area of Sutlej basin was prescribed for intensive cultural work.

11.7.3 Chil Working Circle

This working circle covered only 631.81 ha in the Sutlej basin out of which 480.74 ha was allotted to the Sales Felling series and 151.01 ha to the Bartan fellings series for meeting the legitimate demands of the right holders.

The forests were prescribed to be worked under shelterwood system with “much more rapid removal of over wood than is admissible of Deodar” No rotation was prescribed but the felling cycle of 20 years was suggested. Felling were permitted over all the areas of Sales Felling Series and as much as could be dealt with of the Bartan Felling Series.

In the absence of definite allotment, felling as prescribed was not done. The total Chil trees removed in Sales Felling Series has been 101 trees of IIA and above against the prescribed yield pf 3200 trees pf IIA and over trees. In Bartan Felling Series 239 trees of IIA & over diameter has been removed. On account of heavy grazing the natural regeneration was absent. The forest not opened by marking as required under Shelter wood system after allotting different blocks.

11.7.4 Protection Working Circle

An area of 407.83 ha of Fir and Spruce forests of Sutlej basin was included in this working circle. The felling was to be governed by progress of regeneration and market for Fir. Marking were to be carried out only of over wood, standing over young regeneration. Thinning was prescribed in dense pole crop. Exploitable size was fixed at 60 cm diameter but smaller sized trees could be felled where regeneration was established.

As against prescribed yield of 500 trees were removed. Felling was not prescribed to aim at obtaining regeneration and only the regeneration, which had already established was to be freed. This coupled with U.N restricted grazing has resulted in deficiency of younger classes.

11.7.5 Fuel Working Circle

There was no area in this working circle in Suket Forest Division.

11.8 PERIOD OF ANNUAL PLAN OPERATION

The revision of Gorrie's Working Plan was started in 1956 but no serious effort was made to complete the revision works in time bound, due to posting of un-willing Plan Officers. The enumeration works were carried out from 1957 to 1966 H.P. Govt. was in need of funds for development works and main source was forests. Tentative felling programme was prepared and felling carried out as per prescriptions of the expiring working plan with modification by the competent authority from time to time. Felling carried out from 1957 to 1970 under regeneration felling as per rules of seeding felling.

Table 11.5 List of Felling carried out 1957 to 1970 under regeneration felling

Year	Name of Forest	Area in ha
1957	D.193 Bagdeyar C.I	104.90
	D.194,Dharwan Shih C.I	51.80
1960	D Khund C.5	84.30
1963	D.56 Pander C.I	52.20
	D.87 Gulukhar C.I	18.60
1964	D.88 Shiv Shankar C.I	14.20
1965	D.Manjki C.4	110.00
	D. Phaidhar C.I	48.60
	D.Seri Narain C.I	48.60
1966	D.89 Bargadon C.2	43.70
	D. 89 Baradadon C.4	32.60
1967	D.107 Chandani Daint C.I	62.00
1968	D. 36 Bhabal C.1	29.60
	D.52 Khabora C.1	72.90
	d.114 Begli	67.70

1969	D.40 Majhoti Shilh	34.40
	D.56 Pandar C.2	59.50
	D.84 Dharli C.2	42.90
	D.126 Charkufri C.1	31.60
1970	D.250 Lotla C.3	122.20
	D.252 Kathundhar C.3	125.90
Total Area	Seeding Felling	1258.20

In addition to above the following areas were gone over for thinning improvement from 1957 to 1970 as details below:

Year	Area in ha	Year	Area in ha
1957	333.1.	1964	140.700
1958	469.00	1965	265.40
1959	220.30	1966	475.50
1960	28.60	1967	504.80
1961	--	1968	409.40
1962	--	1969	381.90
1963	578.60	1970	1103.60

Total Area gone over = 4910.90 ha

B- CHIL FORESTS

Seeding felling in D.125 Bhakra C.1, D.230 Jachh C3, D.235 Sundroo C.I, D. 163 Mehran C.1, D. Kandha C.2. D. 151 Devikot C.2. D.128 Katach, D.133 Kot Bahal C.1 Kandhi C.6, Dhurmoo C.2, D.243 Makara C.2. 245 Jakhol C.2 were done from 1957 to 1970 over an area of 1039.9 ha.

Thinning-improvement felling is also done over an area of 6034.6 ha during this period to make viable lots for extraction to timber for marketing and supply to railways.

RESULT:

11.8.1 DEODAR FORESTS: There is nothing on record to show system which was adopted while carrying out markings for regeneration purposes. Field inspections reveal that single tree advance growth was retained in addition to advance growth occurring in patches. From 1957 to 1970, such markings were carried over 1241.2 ha. Regeneration operations were started and till 1970 809.3 ha were brought under regeneration. Advance growth was retained over 130.24 ha. Natural regeneration has come up over 234.89 ha leaving all stages of regeneration viz. poles, saplings, seedlings and recruits. Out of these 234.89 ha only 29.28 ha are fully stocked, 171.85 ha are moderately stocked and 33.76 ha are poorly stocked. Artificial regeneration operations in concentrated and consistent manner started only from 1963 and artificially regenerated areas have mainly recruits to seeding stage of regeneration. No area is fully regenerated

23.87 ha moderately stocked and 154.77 ha poorly stocked. Out of 809.3 ha where regeneration felling has been completed besides advance growth retained over 130.24 ha only 29.28 ha has been regenerated.

The failure has been on account of uncertain weather condition and uncertainty of technique to begin with. Even single tree advance growth had been retained and trees growing along depression and Nallahs have not been properly spaced at all. There is further scope for removal of over wood in almost all the forests.

11.8.2. CHIL FORESTS: Sewal and Gorrie did not provide any regeneration felling in Chil forests. Seeding marking started from 1965 onwards. There is nothing in record to indicate the marking rules. Inspection of the forests reveal that besides retention of advance growth accruing in patches single tree advance growth was also retained.

Till 1970 seedling fellings have been done over in an area of 1110.4 ha. Out of 905.9 ha where seeding felling have been carried out, advance growth has been retained over 127.59 ha. Natural regeneration has come up over 148.32 ha and varies from recruit stage to pole stage. Out of this 19.63 ha are fully stocked, 112.14 ha moderately stocked and 16.59 ha poorly stocked.

Artificial regeneration in the form of patches sowing and planting has

carried over 397.71 ha out of which 198.60 ha are moderately stocked. The low pace of regeneration is primarily due to fire uncontrolled grazing and poor protection. Thus besides 127.59 ha over which advance growth has been retained only 19.63 ha fully stocked areas exists.

11.9 YIELD

The following table gives the yield of Deodar, Kail Fir/spruce and Chil removed:

Year	Deodar	Kail	Chil	Fir/Spruce	Total
1960-61	153507 Ft ²	890008 Ft ²	11796 Ft ²	53248 Ft ²	307559 Ft ²
1961-62	198294 Ft ²	150420 Ft ²	3331306 Ft ²	51120 Ft ²	3331144 Ft ²
1962-63	89884 Ft ²	45299 Ft ²	5245 Ft ²	15782 Ft ²	474128 Ft ²
1963-64	166530 Ft ²	86565 Ft ²	76010 Ft ²	145023 Ft ²	474128 Ft ²
1964-65	251676 Ft ²	14471 Ft ²	10790 Ft ²	48348 Ft ²	455529 Ft ²
1965-66	424573 Ft ²	137669 Ft ²	14065 Ft ²	144191 Ft ²	7204498 Ft ²
1966-67	682900 Ft ²	250611 Ft ²	681213 Ft ²	270641 Ft ²	1885365 Ft ²
1967-68	94.81 M ³	11052.34 M ³	4934.94 M ³	12167.86 M ³	37556.14 M ³
1968-69	7579.57 M ³	14615.93 M ³	22014.03 M ³	6616.44 M ³	50525.07 M ³
1969-70	12825.24 M ³	17139.85 M ³	38463.54 M ³	15177.87 M ³	83607.04 M ³
1970-71	4193.24 M ³	30456.80 M ³	11424.99 M ³	9668.68 M ³	55745.39 M ³

The total growing stock of coniferous species in the forests allotted to Regular and Chil Working Circles during 1966-67 when enumerations were completed comes to 26.81 lakh m³. The following table gives total growing stock of all the species, total removal and its percentage of the growing stock removed:

Year	Total Growing stock m ³	Yield removed m ³	%age of the growing stock

1966-67	26,81,000	53867	2.0%
1967-68		37556	1%
1968-69		50825	1%
1969-70		83607	3.0%
1970-71		55745	2.0%
Total		281600	

Average for the period 1966-67 to 1970-71 comes to 2.1% of the growing stock which too much and is on the higher side.

11.10 PANDEY AND SHARMA'S WORKING PLAN (1971-86)

After the expiry of Gorrie's Working Plan, the work of revision was started in 1956 and forests were enumerated from 1957 to 1966. But the working plan prepared by Sh. S.K.Pandey and H.C.Sharma was for a period of 15 years. 1971-86 was sanctioned vide H.P.Govt. Letter No. 1(5_-17/77 dated 4.7.80 and the printed working plan was received from C.F.W.P. Circle vide letter No. CIII(a)-II/Vol. III/1542-92 dated 24.8.1982. The prescriptions of the draft working plan were incorporated from 1971 onward with modifications till the draft was approved. The following working Circles were constituted.

Table 11.6 List of constituted working Circles

S.No.	Name of working circle	In Suket F. Div.	In Karsog F.Div.	Total (ha)
1.	Regular Working Circle	5605.10	11056.20	16661.3
2.	Chil Working Circle	1309.20	14897.30	16206.5
3.	Fuel Working Circle	1311.08	872.10	2183.18
4.	Protection Working Circle	4818.60	2470.03	7288.63
5.	Plantation Working Circle	2929.70	1930.01	4859.71
6.	Grazing Working Circle	--	---	---
	Total	15973.68	31225.64	47199.32

11.10.1 REGULAR WORKING CIRCLE

(A) **GENERAL:-** This working circle includes DPFs is mainly Deodar, Kail, Spruce, and Fir. Thus it included a concentrated Working Circle, Regular Working Circle of Gorrie's Working Plan, Deodar Working Circles of Sewal's plan. Forests with rotten Kail under the Selection Working Circle of Gorrie's Plan predominantly spruce forests under the protection working circles of Sewal's Plan. Total enumerations of all important species were carried out in 10 cm dia classes down to 10 cm in all DPFs' and listed UPFs. The rotation period of 120 years and four periodic blocks with 30 years regeneration period was envisaged. Definite allotments were made to PBI and PBII and rest of the forests area was kept in PBU 15 years felling cycle was prescribed.

(B) **Area allotment:** The area under different P.Bs' was as under:

Area under present Suket Forest Division	P.B.I	P.B.II	P.B.U	Total
	1756.4	1078.1	2770.6	5605.1

Felling program for 1277.4 ha in P.B.I were prescribed out of total allotment of 1756.4 ha in this periodic block, out of which only 914 ha was filled till March,1984. Felling in P.B.U. were also given, however, felling were not prescribed in P.B.II. The yield were calculated on the basis of pf (i) Von mantals' Formula,(ii) Increment Method and (iii) Hufnagel's formulas. Entire growing stock inclusive of U.Fs has been taken into account while calculating the yield. The yield was to be regulated for a period of 5 years and total deviation in a particular year was allowed only 20% of annual prescribed yield. The yield prescribed in different periodic blocks of different species was as under:

Species	P.B.I	P.B.U	Total
Deodar	14000	2100	16100
Kail	8680	1320	10000
Fir/Spruce	8000	1200	9200
Chil	100	---	100

(C) Result of Working: As there was unusual time lag between the preparation and final approval of the Working Plan, there were many constraints in the operation of the working Plan and these are summarized below:

(i) In the approved Plan, retention of advance growth is prescribed only if there is compact patch of more than 0.2 ha. However, the marking done at the time when Working Plan was under preparation the old practice of retention of single tree advance growth was followed. P.B.I markings carried out in early seventies were conservative and have not resulted in sufficient opening of canopy which has retarded the progress of regeneration. This has, in turn, necessitated corrective markings in some of the forest.

The forests worked under corrective marking over and above, the prescribed forests in the Working Plan are as under:

Sl. No.	Name of Forest	Area in ha.
1.	D.56 Pandar C.II	59.30
2.	D.56 Pandar C.I	52.20
3.	D.89 Bara Godown C.II	43.70
4.	D.85 Manjki C IV	111.00
5.	D. Gulukahar C.I	18.60
	Total	284.8

To compensate these un-prescribed fellings, the following forest, though prescribed, have not been felled:

(i) D.56 Pander C.III	= 51.90
(ii) D.Rangjhol C.I	=74.70
Total	126.60

In addition to the above, keeping in view the facts that (i) certain forests can wait seeding feeling for some more time, (ii) future requirement of packing cases can be met from Fir/Spruce forests only and (iii) bigger compartment needs sub division depending upon the vegetation, the seeding feelings in the following forests have also not been done:

Name of Forest	Area in ha.
(i) D.38 Kamrah	356.40
(ii) D.39 Banwali	164.30
Total	520.70

In this way the area prescribed for felling in P.B.I and the felling actually done during the currency of plan are as follows:

1.	Area prescribed for felling in W.P.	3323.70 ha
2.	Area to be felled in Suket Division	1277.40 ha
3.	Area to be worked by 31.3.86	630.10 ha
4.	Area felled but not prescribed	284.00 ha
5.	Total area felled Col 3 & 4	914.10 ha
6.	Area not felled for compensating the packing cases felling as per Col. 4	126.60 ha
7.	Total area, which can wait for more time	647.30 ha

- i. From the description of compartment history files, it is evident that at some stage there were proposals of keeping selection Working Circle also. But approved Working Plan there is no Selection Working Circle and the forests which were to be kept in Selection Working Circle, have either been kept in Regular Working Circle or in Protection Working Circle. Obviously this has resulted in faulty allotment of different P.Bs e.g. D. 38 Kamrah and D.39 Banwali.
- ii. While calculating the yield, entire growing stock inclusive of U.Fs was taken into account, but in area allotment only DPFs. have been considered and allotment to periodic block/prescription for working in case of U.Fs has not been done.
- iii. Though the forests to be felled in P.B.I during the currency of the plan were listed but their year wise sequence of felling was not given which resulted in felling of unequal area during different years.
- iv. Considering the area falling both in Suket and Karsog Forest Division, an area of 2333.7 ha was prescribed for felling in 15 years only. This meant that 20% of the total working circle was prescribed for felling in 15 years while it should have been only 12.5% keeping in view 120 years rotation.
- v. The volume of C.I and C.2 taken for calculation of yield was rather higher as compared to similar forests elsewhere.
- vi. The yield in P.B. U was arbitrarily fixed, reduced as 15 % of P.B.I yield.
- vii. Improvement felling cum thinning were prescribed for each year. However, subsequently certain conditions were imposed by CCF before the forest was allowed to be thinned. Some of the Forests prescribed for improvement felling did not fulfill the conditions laid down and as such thinning was done. Only salvage markings and removals to meet the demand of electricity poles and demand of right holders were done.

The net accumulated result of various factors after 15 years of working has been given in following yield position as on 31.3.1986

(Deviation in Cubic Metres)

P.Bs.	Deodar	Kail	Chil	Fir/Spruce	Total
P.B.I	(-)115432.62	(-)67416.32	(-)730.36	(-)8130.50	(-)268541.80
P.B.II	(+)18935.80	(+)20100.98	(+)410.37	(+)3621.47	(+)43068.62

P.B.U	(+)22776.84	(+)31663.21	(+)4854.74	(_)1258.97	(+)58035.62
Total	(-)77052.98	(-)1565213	(+)4534.75	(-)5768.00	(-)167438.36

11.10.2 CHIL WORKING CIRCLE:

(A) General: This working circle coincides almost with Chil

Working Circle of Gorrie's and Sewal's Working plans and includes large areas of Chil which were kept in Deodar Working Circle of Sewal's plan. An area of 1309.2 ha was allotted to this working circle. Rotation was kept at 90 years with regeneration period of 30 years and three periodic blocks. Definite allotment of areas of all the three P.Bs. was done. Total enumeration in 10 cm diameter classes was done to 10 cm down. Area in PB I and PB II was about 25% in each of total Working Circle and remaining about 50% was allotted to P.B.U. forests.

Yield in this Circle was also calculated on the basis of Von Mantel's formula, Increment method and by Hufnagel's formula. Thinning cum improvement felling was prescribed in P.B.U. The yield in P.B.I and P.B.U was prescribed as follows (M3):

Species	P.B.I	P.B.U	Total
Chil	5600	840	6440
Kail	740	110	850
Deodar	240	35	275

(b) Results of Working (Chil Working Circle)

After the creation of Karsog Forest Division in 1978, majority of the forests of this working circle have been transferred to Karsog Forest Division. It will be seen that out of the 29 forests two are now in Suket Forest Division with another one, out of nine two forests for packing industry. All the three forests have been gone over and regeneration is satisfactory. The yield position of this Working Circle is as under:

P.B.s	Deodar	Kail	Chil	Fir/Spruce	Total
P.B. I	(-)2312.25	(-)3445.76	(-)33907.75	(+)82.92	(-)39582.84

P.B. II	(+)1244.12	(+)2141.00	(+)8145.81	(+)3.30	(+)11534.23
P.B.U	(+)3683.46	(+)2485.02	(+)19917.17	(+)50.07	(+)26135.72
Total	(+)2615.33	(+)1180.26	(-)5844.77	(+)136.29	(+)77251.79

11.10.3 Fuel Working Circle:

(A) General: This Working Circle was corresponding to firewood felling series of Fuel and Fodder Working Circle of Sewal's Working Plan. An area of 1311.8 ha was allotted to this working circle with two felling series namely Sundernagar (903.4 ha) and Karsog felling series (1279.5 ha) Felling programmed for 10 years, from 1971 to 1980 was also suggested. All these forests have been worked except D.76 Gehru, which could not be worked due to its being away from the motor road end and exploitation became very uneconomical. These forests were worked under coppice with standard system and a rotation of 30 year for coppice and 90 years for standards was prescribed. Felling cycle of 30 years was adopted.

(B) Results of Working (F.W.C.) Most of these areas, which were allotted to this working circle were situated very near to the habitation and therefore, had lot of biotic interference. As a result of the forests felled during the currency of plan and also before that have not been able to coppice in the desired manner and plantation of other conifers as well as broad leaved species have been carried out. This resulted that little area was left for this working circle during Nanak Chand's Working Plan period

11.10.4 Protection Working Circle:

(a) General: This working circle included Demarcated Protected Forests having precipitous terrain, ban area requiring rest for recuperation and un-demarcated protected forests bearing open crop of broad-leaved species. An area of 7288.9 ha was allotted to this working circle and complete rest was prescribed. Out of this an area of 4818.6 ha falls in Suket Forest Division. In addition to this forests were earmarked for carrying out artificial regeneration.

(b) Results of Working (Protection Working Circle) As a result of the prescription of working plan, some very good plantations have been established in some of these forests. With the creation of Karsog Forest Division, there is very little area left in this Division

11.10.5. PLANTATION WORKING CIRCLE:

(A) General: This working circle comprised of the areas fit for raising plantation of valuable and economically more important species. The area allotted to this Working Circle was 4859.8 ha out of which 2929.7 ha falls in Suket Division. In addition to this UPF's and plantation areas were also allotted to this Working Circle. Year wise plantation programme for 15 years was given and plantation series formed. Indication of choice of species was also made. The plantation raised before the commencement of the Working Plan was also given. Brief mention of plantation as well as nursery technique was also made.

(B) Result Of Working (PWC): As a result of prescription of this Working Circle, plantations have been raised over large tracts, as prescribed in the Working Plan. Umri, Slapper, Kangoo, Ahen-Shisham, Phagia, Trambri and Dhawal etc. are some of the examples of plantations raised during the currency of the Plan.

11.10.6. Grazing Overlapping Working Circle:

(a) General: As the name suggests this is an overlapping Working Circle and no separate area was earmarked for this Working Circle. Grazing incidence, grazing rights and prescriptions were given.

(b) Results of Working (Grazing Overlapping Working Circle) In view of the legal status, increasing cattle population and the democratic functioning, the prescription could not be enforced in reality.

11.11. Yield: The yield prescribed and removal with excess and deficit for the period from 1971 to 1986 of the Working Plan (S.K.Pandey & H.C.Sharma) of the different Working Circles, is given below in a tabular statement:

Working Circles	Species	Previous Year balance	Prescripti onfor the year	Felling done during the year	Deviation as on 1.4.1986
Regular	Deodar	(-)68389.85	14490	5826.87	(-)77052.98
working	Kail	(-)9180.37	9000	2528.25	(-)15652.12

circle	Chil	(+)4354.93	90	269.82	(+)4534.75
	Rai	(-)71347.31	5280	359.30	(-)79268.01
	Total	(-	31860	8984.24	(-
		)144562.60			)167438.36
Chil	Deodar	(+)2757.56	247.50	305.26	(-)2615.33
Working	Kail	(+)150.88	765.00	1794.38	(+)1180.26
Circle	Chil	(-)5772.93	5795.00	5724.16	(+)5844.77
	Rai	(+)136.29	---	--	(+)136.29
	Total	(-)2929.20	6808.50	7823.80	(-)1912.89
Fuel	Deodar	(+)395.26	-	3.13	(+)398.40
Working	Kail	(+)339.15	-	21.18	(+)660.30
Circle	Chil	(+)520.25	-	14.81	(+)535.06
	Rai	(+)185.65	-	-	(+)185.67
	Total	(+)1740.33	--	39.12	(+)1779.45
Protection	Deodar	(+)157.91	-	-	(+)157.91
Working	Kail	(+)213.54	-	26.76	(+)240.30
Circle	Chil	(+)68.19	-	9.84	(+)78.03
	Rai	(+)12.09	-	2.19	(+)14.26
	Total	(+)451.73	---	38.79	(+)490.52
Plantation	Deodar	(+)768.48	-	32.31	(+)800.79
Working	Kail	(+)3708.59	-	10.11	(+)3718.70
Circle	Chil	(+)453.30	-	15.69	(+)468.99
	Rai	(+)282.04	-	--	(+)282.04
	Total	(+)5212.41	---	58.11	(+)5270.52

11.12 Area From Nachan Working Plan

Old Kamlah Range and Baggi, Nadgarh Blocks of Nachan Division were transferred to Suket Division in Oct. 1978. The history of management of forests transferred from Nachan Working Plan to Suket Forest Division in 1978 can be divided broadly into the

following period.

1. Period of early management
2. Wright Working Plan 1918-36
3. Gorrie's Working Plan 1937-38 to 1956-57
4. Singh's Working Plan 1957-58 to 1976-77
5. Annual Plan of Operation 1977-78 to 85-86

11.13 Period Of Early Management This stands discussed in detail in Para 5.4

11.14 Wright's Plan (1918-36) As ready discussed in Para 5.5 Wright formed six working circles for the management of forests, which are as under:

1. Deodar Working Circle
2. The Thinning Working Circle
3. The Chil Working Circle.
4. The Fuel Working Circle.
5. The unregulated Working Circle.

11.14.1 Deodar Working Circle (167.0)

- (a) **General:** This working circle included all the forest having an appreciable number of Deodar trees. The felling series namely Sutlej and Beas were formed. The transferred area covered O.D. Lotogale of Beas felling series. The forests allotted to this working circle were to be managed under a system of selection fellings. The detail account of this working circle stand already discussed in para 5.5.1.
- (b) **Result of Working:** Wright's prescriptions were quite conservative, even slight over felling in Beas felling series did not harm the forest much.

11.14.2. Thinning Working Circle (134.0 Ac)

- (a) **General:** This working circle included all the forest containing immature crop in which Deodar or Kail was the predominant species. Only O.D. Nadgarh of transferred area was allotted to this working circle. Total enumeration down to 18" girth was done. The entire

area of working circle was prescribed to be gone over for thinning in 10 years. Single forest was prescribed to be worked in particular year.

(b) Result of working: The thinning carried out brought a marked improvement in the crop by getting rid of inferior and useless stems.

11.14.2. Spruce Working Circle: No area allotted to this working circle falling in the transferred area now covered by this plan.

11.14.3. Chil Working Circle (4207 acre)

(a) General: This working circle included all pure Chil forest. The forests were prescribed to be protected till the conditions were favorable for a system of concentrated regeneration felling. Felling was carried out only to meet the demand of local people and the states requirement for closures of few forests were also prescribed.

(b) Result of working: The protection afforded greatly benefits to the forests. Though barbed wire fencing was not done, yet closure of least frequented periods following the wide spread fires of 1921 had brought in excellent Chil regeneration.

11.14.4. Fuel Working Circle (61 ac)

(a) General: It comprised the Oak and hardwood forests, prescribed to be worked to supply fir wood and charcoal to Mandi Town. Two felling series viz the fire wood felling series and charcoal felling series were formed. O.D. Dyoda and Kummi of transferred area were allotted to this working circle. These areas were prescribed to be worked under Coppice with standards. Twenty well grown trees per acre were to be retained as standards as regularly as possible.

(b) Result of working: No fire weed felling were carried out as per the prescription of working plan, because the demand for fire wood was met from the unregulated felling done by villagers in un demarcated forests around Mandi town.

11.14.5. Unregulated Working Circle (1435 Acres)

This working circle included all the demarcated protected forest, not allotted to any of the above working circles. These forests were to be worked to meet the local requirements only and felling was

prescribed to be made according to the silvicultural requirement of the crop. These forests were benefited greatly from the protection afforded to them.

11.15. Gorrie's Working Plan (1937-56):

Dr. R.M.Gorrie of the Punjab Forest Department also prepared a working plan for a period of 20 years from 1937 to 1957. He constituted the following working circles. Areas of various working circle, which form now part of Suket Forest Division, are given against each.

S. No.	Working Circles	Area in Acres.
1.	The Concentrated Regeneration Working Circle	350.00
2.	The selection Working Circle now in Suket Forest Div.	-
3.	The Chil Working Circle	4524.00
4.	The Fuel Working Circle	91.00
5.	The Protection Working Circle	1780.00
	Total	6745.00

11.15.1. Concentrated Regeneration Working Circle(350 Ac)

This working circle included all the better stocked Deodar forests, suitable for being managed under shelter wood working. Two felling series viz. Sutlej felling series and Beas felling series were formed. O.D.Latogali and Nandgarh C.I with total area of 350 acres of transferred area fell in this working circle. The exploitable diameter was fixed as 24" diameter at breast height. A rotation of 140 years was adopted to fit in the 20 years felling cycle. Allotment to different periodic blocks and prescription there in has already been discussed in Para 5.7.1

It was advocated to allot to PB I either areas destroyed by 1921 fires or areas in which natural regeneration was already established sufficiently to justify removal of scattered and branch over wood. No seeding or secondary felling was proposed in such areas because of established regeneration. Against these proposals the third category of forests allotted to PB I areas were such type of forests, viz OD Latogali. The forests of previous two categories deal not fell in transferred area in Suket Division. In OD Latogali, there had no established regeneration, hence seeding felling was therefore, very necessary to bring the regeneration in it.

5.15.2. Selection Working Circle: No forests allotted to this working circle fell in transferred area now covered in this plan.

11.15.3. Chil Working Circle (4524 Ac)

This working circle included all the Chil forests. Keeping in view the great demands of bartandars for timber and grazing, bartan felling series was constituted. Out of total 39804 acre area in its working circle only 4524 acres fell in the transferred portion now covered in this plan. The forests were prescribed to be worked under shelter wood system with much more rapid removal of over wood that is admissible for Deodar. No. rotation was suggested. Felling was permitted over all the areas of sales felling series and as much as could be dealt with the Bartan felling Series.

No periodic blocks were formed and in all the areas thinning and improvement felling were prescribed. The existing crop in all the forests is consequently heterogeneous in age class, distribution and stock with middle age classes. In the absence of definite allotment of PB I no regeneration felling area done and no area was regenerated. Among the forests prescribed for working now fall in Suket Division were Tarlaza ghronti and Pathi, while forests not prescribed but worked were Bairkot, Sidhkot, Kaldu and Gobartha.

11.15.4. Fuel Working Circle(36.4 Ac)

The working circle included mostly miscellaneous scrub with large variety of species and some Ban Oak of demarcated as well as undemarcated forests lying well in 13 Kms radius of Mandi town. Ordinary light selection markings, removing the majority of the mature trees of all the species and thinning the younger growth were prescribed in ordinary scrub forests. OD Doheda forest was prescribed to be coppiced taking a strip of 8-10 acres annually. All felling coupes were prescribed to be closed against grazing.

The over mature trees removed in selection felling did not coppice. The coupes worked for fir wood were not closed to grazing as prescribed in working plan and the young coppice was not protected and properly tended and the result was the degrading of forest.

11.15.5. The Protection Working Circle (1780 Ac)

This working circle included demarcated forests having Fir, Ban Oak and miscellaneous scrub forests lying out side 13 Kms radius of Mandi Town. In addition to it undemarcated Ban oak and miscellaneous scrub forests were also included. The exploitable diameter was fixed at 24" but this was not to be strictly adhered to when over wood was being removed from established regeneration. Reduction in grazing incidence was prescribed. To control unrestricted lopping of Oak, it was prescribed the villagers should be persuaded to adopt 3 year lopping rotation instead of annual

lopping. Sowing and planting of suitable species was prescribed to be done in closed areas of suitable scrub forests, which are deficient in timber species.

The annual yield was arbitrarily fixed and was not based on stock. Many forests of transferred area were omitted from the felling programme, these were Math, Dhanlkan, Jander, Kamlah while few forests namely Chandrakr, Kher were worked though not included in felling programme. No sowing and planting as prescribed in working plan were done in scrub forests deficient in timber species. Scrub areas have degraded further and some of them are hardly worth the name of a forest.

11.16 Singh's Working Plan(1957-77)

After the expiry of Gorie's working plan the work of revision was started in 1955, with the posting of Sh. D.C. Sehgal, as Asstt Working Plan Officer. Sh. Sehgal worked as such for about 5 months and submitted the preliminary working plan report to C.F. Chamba, which was however not approved. Shri R.V. Singh was posted as Working Plan Officer in April, 1958. The field work was completed in May, 1964. The compilation work completed in December, 1964. This working plan was approved by Government during 1967 and following Working Circles were constituted:

Name of Working Circle	Total area in Ha	Area now falls in Suket Forest Division
The Regular Working Circle	11092.85	169.97
The Chil Working Circle	17979.38	3186.34
The Selection Working circle	18369.49	104.41
The Spruce Working Circle	5286.00	1870.05
The Protection Working Circle	48278.17	3512.93
The Plantation(Overlapping) Working circle.	60048.27	1343.50

11.16.1. The Regular Working Circle (196.97 ha)

(a) General: This working circle included all the pure or mixed Deodar and Kail demarcated and un-demarcated forests, situated on comparatively easy ground. Successful deodar plantation raised in Oak areas has also been included in this working circle. Total enumerations were carried out in all the demarcated protected forests in 10 cms diameter classes down to 20 cm diameter. All the coniferous species and important broad-leaved species, other than Oaks were enumerated. The forests were managed under Indian Irregular Shelter wood system. The

rotation period of 120 years and 4 periodic blocks with 30 years regeneration period was envisaged. Definite allotments were made to PBI and PB II and rest of the forests were kept in PBU. Only three forests namely OD Nandgarh CI and ND Rajot of Suket Division fell in this working circle.

- (b) Result of working:** In the approved plan for PB I type “A” areas, all healthy and vigorously growing poles up to 30 cm diameter whether occurring singly or in groups were retained as a part of the future crop. Thus PBI marking carried out have not resulted in sufficient opening of canopy, which has retarded the progress of regeneration.

11.16.2 The Chil Working Circle (3186.34 ha)

This working circle included all the demarcated and un demarcated protected forests of Chil. These forests were managed under uniform system with floating periodic blocks. This working circle mostly coincides with Chil Working Circle of Gorrie’s working Plan. Two felling series viz Nachan felling series and Mandi felling series were constituted. This Division covered only the forest of Nachan felling series. Total enumeration of all the coniferous species and important broad leaved species other than oak were carried out in all the demarcated protected forests. Enumerations were done in 10 cm diameter classes down to 20 cm diameter. Rotation was kept at 90 years with regeneration period of 30 years and three periodic blocks.

Only four forests of this Division namely, Masot, Pathri, Khimbi and Chil-ka-Chogan were allotted to Quarter Blue. Expect Khumbal, Seeding felling were carried out as per prescription of working plan and the regeneration is satisfactory.

11.16.3. Selection Working Circle (104.41 ha)

This working circle included all the commercially exploitable demarcated and un-demarcated Protected Forests of Silver Fir and Spruce. Besides a few deodar or kail forests situated on steep and difficult terrain were also included in it. Two felling series viz Nachan felling series and Mandi felling series has been constituted. However, only Nachan felling series covers this division. Total enumerations were carried out in 10 cm diameter classes down to 20 cm. diameter. The forests were managed under selection system and exploitable size was kept as 60 cm. The felling cycle of 15 years was adopted; yield for demarcated protected forests

was calculated by Smythie's safeguarding formula, while for un-demarcated protected forests, no volume yield was prescribed. These forests were not enumerated.

In this working circle only new DPF Drahal of this division was kept. The forests were not worked according to prescriptions with the result that over mature trees are standing over most of the area.

11.16.4 Spruce Working Circle No areas allotted to this working circle fell in the Suket Division.

11.16.5 Fuel Wood Working Circle (1870.05 ha)

(a) General: This working circle included the un-demarcated protected forests of Ban Oak, which are accessible and are in the close vicinity of consumer centers. Four felling series were constituted. However, this division is covered by only Mandi felling series. No enumerations were carried out. These forests were worked under coppice with standard system and a rotation of 30 years for coppice and 90 years for standard was prescribed. Felling cycle of 30 years was adopted.

(b) Result of working: The over mature trees removed in selection felling did not coppice and the growing stock was thus impoverished as no young regeneration came in these areas for charcoal supplies were not closed to grazing and sown with ban oak as prescribed in the working plan and the young coppice was not protected and properly tended. This resulted, in browsing, lopping and hacking of young coppice and reduction of ban oak forests. Area carrying miscellaneous broad-leaved species allotted to this working circle were similarly worked heavily with closing the areas and taking steps for replenishing the growing stock. These forests have in large portions been reduced to mere scrubs, and tree growth is very thin and has been heavily lopped.

11.16.6. The Protection Working Circle (3512.93)

(a) General: This working circle included all the demarcated protected forests not carrying coniferous species, forests that lie on precipitous and difficult terrain, forest of Ban Oak that have been over exploited and indiscriminately hacked in the past and the undemarcated protected forests bearing miscellaneous broad-leaved species of scrub. An area of 3512.93 ha of this division was allotted to this working circle and complete rest was prescribed. In addition to this forests were earmarked for carrying out artificial regeneration.

(b) Result of working: As a result of prescription of this working circle, various soil conservation works were carried out in some forest, which have stabilized the seriously eroded areas. A few

very good plantations have also established in some of these forests.

11.16.7 The Plantation (over lapping) working Circle (1343.50 HA)

(A) General: As the name suggests, this working circle overlapped all the above working circles and included some Ban Oak area suitable for planting Deodar and some scrub or ban areas suitable for sowing Chil or for raising miscellaneous important broad leaved species. 1343.50 ha of Suket Division were allotted to this working circle. Year-wise plantation programme for 10 years was given and plantation series framed. Indication of choice of species was also suggested. Brief mention of plantation as well as nursery technique was also made.

(b) Result of working: As a result of prescription of this working circle, plantations have been raised over large tracts as prescribed in the working plan Hatgarh, Killing, Janitari, Bahi, Baradhar, Leda Sikandra and Patroun are some examples of plantations raised during the currency of plan.

11.17. Period of Annual Plan of Operations

From 1977-78 to 1985-86 works has been carried out under annual plan of operations. No major felling was carried out except to meet with the demands of right holders. The details of volume removed in T.D. marking are given as under:

(A) For Regular Working Circle

Year	Species	Volume felled in M³
1977-78	-	-
1978-79	-	-
1979-80	Deodar	4.93
1980-81	Deodar	83.30
1981-82	Deodar	420.97
1982-83	Deodar	37.98
1983-84	Deodar	198.09
1984-85	Deodar	15.05
1985-86	-	-
Total		161.32
(b) For Chil Working Circle.		
1977-78	-	-

1978-79	Chil	43.20
1979-80	Chil	22.90
1980-81	Chil	4.64
1981-82	Chil	9.34
1982-83	Chil	14.29
1983-84	Chil	1.74
1984-85	Chil	7.34
1985-86	Chil	268.14
Total		371.59

Apart from this, plantations of Chil and borad-leaved species were carried out over 803 ha Pathri, Jason, Slosra, Choukari, Chhattersilh Baron, Badhu, Chandrakarie are some plantations.

11.18. Past Revenue & Expenditure:

The revenue and expenditure since 1971-72 of Suket Forest Division is under

Year	Revenue (Rs.)	Expenditure (Rs.)	Difference (Rs.)
1971-72	4301856	1688911	2612945
1972-73	4359330	2382874	1976456
1973-74	5942128	3643459	2298669
1974-75	6923889	28702061	-21778172
1975-76	4484937	2675863	1809074
1976-77	4545686	2657150	1888536
1977-78	7445686	2748712	4696974
1978-79	9428110	8781606	646504
1979-80	3080299	3511325	-431026
1980-81	6565181	4097820	2467361
1981-82	3070172	3509480	-439308
1982-83	7579179	5061451	2517728
1983-84	1744269	9840173	-8095904
1984-85	2124821	7396808	-5271987
1984-86	743864	7859320	-7115456

1986-87	736615	9838910	-9102295
1987-88	1060055	13615026	-12554971
1988-89	1453633	16031949	-14578316

11.19 Nanak Chand's Working Plan (1986-2001)

After the expiry of Pandey and Sharma working plan, the working plan, the work of revision started by Sh. Nanak Chand. The revision of working plan of Suket Forest Division was started during 7/86 and compilation work completed during 1988. The working plan was prepared for 15 years, (1986- 2001) and the same approved vide H.P. Govt. letter No. Van (F) 12-3/92 dated

22.5.93 and approved from Central Govt. vide letter No. 13-7(12) 197-ROC dated

3.3.99. This working plan was for the areas of Suket Forest Division only. The following circles were constituted.

Name of Working Circle	Area in Ha
1. Regular Working Circle	5416.55
2. Chil Working Circle	3317.55
3. Protection Working Circle	17052.73
4. Plantation Working Circle	8794.80
5. Social Forestry Working Circle	--
6. Grazing Working Circle	---
7. Soil Conservation Working Circle	--
Total Area	34581.63

11.19.1. Regular Working Circle :

(a) General: This working circle comprises of DPFs' and new DPFs' where Deodar, Kail either pure or intimately mixed are predominant species and are situated on easy grounds, fit for being worked under Shelter Wood principles. Some of the predominant spruce forest on easier slopes such as D.Pandar C.IV a, D.185 Majethi Shil C.I & 2, D 156 Chanda Pukhar, C.2 & 3 D.157 Thach Shil C 1 & 2 D 180 Kathail C 1&2 and 154 Banwali C.1 2,3,4, have been allotted to this working circle. Thus it included all the forests of Regular Working Circle in Pandey and Sharma's working plan and

area transferred from Nachan Forest Division during 1978 which were under Regular Working Circle in R.V.Singh's plan, in addition to N.D.P.Fs.

The forests on the whole have all age classes but there is an overall preponderance of middle age class trees. The forests are fairly stocked except on Southern slopes or forests adjoining habitations.

The whole area of this working circle was stocked mapped on 4"-1" mile scale. Generally site quality was II. The density was estimated by ocular method. Average density varies from 0.2 to 0.8. Total enumerations of all important species were carried out in 10 cm dia classes down to 10 cm in all the forest of this working circle.

11.19.1.1 Method of Treatment: The forests were managed under Shelter wood system, but actually marking done as per past practice and retained a single trees as advance growth. Whereas there is provision of selection marking on broken ground and also retention of compact groups of advance growth up to 30 cm dbh and not less than 0.2 has as part of future crop. Natural regeneration supplemented by artificial regeneration where ever necessary was relied upon. The rotation of 120 years in conformity with the scheme of rotational closure was adopted. The regeneration period of 30 years was fixed. Four periodic blocks were constituted with specific allotment. The area could not be distributed equally due to non allotment of definite areas for PB III & PB IV in Pandey and Sharma's Plan. 15 year felling cycle was prescribed corresponding to the period of the plan.

(b) The area under each periodic block is given below:-

Range	P.B.I	P.B.II	P.B.III	P.B.IV	Total
Jai Devi	326.18	328.68	837.80	80.67	1573.33
Jhungi	1040.63	1310.42	1412.76	79.41	3843.22
Total	1366.81	1639.10	2250.56	160.08	5016.55

Though there was prescription for marking in 781.00 ha in PB I area out of 1366.81 ha of PB I area. No marking done in this periodic block due to blanket ban on green felling by the Govt. of Himachal Pradesh vide Notification No. Ft.26-5/5/75(S)(S) 11 dated 14.4.86. Similarly felling in PB III over an area of 2258.36 ha was prescribed and same also not done as stated above. Final removal over an area of 160.08 ha in PB IV area was also done resulting suppression of established crop.

Calculation of Yield: Yield was of two type:

- (i) Main yield: All felling from PB I and felling of trees IIA and above from PBIV constituted main yield.
- (ii) Intermediate yield: It was from the cleaning/thinning from PB III.

The yield was calculated on the basis of (i) Van Mantel's Formula (ii) By Bland ford and Simson's Formula for the whole working circle and by Hufnagel's formula for PBI. The yield was regulated for a period of 5 years and total deviation was kept with in +/- 10% of the annual yield.

The yield prescribed in different periodic blocks of different species was as under:

Species	PB I	PB II	PB III	PBIV	Total
Deodar	4700	-	1800	400	6900
Kail	1050	-	800	180	2030
Fir/spruce	2250	-	800	25	3075
Chil	-	-	100	-	100

- (c) **Result of working:** As already discussed under S.K.Pandey and H.C.Sharma's working plan vide Para 5.10.2 that forests were worked under old practice till the approval of that plan during 1982. This resulted uneven aged crop due to defective marking. The working plan officer prescribed corrective seeding felling in 408.45 ha Out of 781.09 ha of PB I areas prescribed for felling under regeneration felling.

No marking done during the currency of working plan due to ban on green felling. The result that the old PB I areas are full regeneration in the form of sapling to pole stage and over wood standing over established crop and suppressing due to shade and close canopy.

- (i) No definite periodic blocks were formed resulting non-achieving the objects of sustained supply of timber and other produce.
- (ii) No yield for PB.II was calculated and prescribed, only dead, dying and snow damaged trees to be marked as per prescription, whereas at the time of inspection of forest T.D. marking have

been done in these areas and yield obtained is very much on the higher side. Almost all the PB II area is open due to unauthorized marking in these areas and regeneration is coming up in sheltered pockets.

- (iii) During the working plan of Pandey and Sharma 7.5 % area already felled in excess, but no effort was made to adjust this over felling. Thanks God's felling not occurs due to ban for green felling otherwise most of the forests might be ruined.
- (iv) Planting of deodar prescribed after marking and disposal of slash, but during inspection it was noticed that planting is going on, even where canopy is close.
- (v) Systematic cleaning not prescribed and the result is that established crop is congested. The growth of sapling and poles are very slow.
- (vi) Though the forests of PB III were listed up for planting, but no year wise sequence was framed resulting in haphazard planting in wooded areas. The result of planting not visible on spot except natural regeneration in protected pockets.
- (vii) No notification issued for the closed area to suspend the rights of grazing, lopping. The result is that grazing is going on unrestricted and heavy lopping noticed and these resulted in failure of plantation/PB I areas
- (viii) Proper fire protection measures not adopted resulting in burning of kail forest every year and destroying natural and artificial regeneration.
- (ix) Though no green felling was done during the currency of plan, however heavy marking under T.D. and salvage was done. The accumulated yield was as under:

Position of felling on 31.3.2001 as per deviation statement.

P.B .s	Deodar	Kail	Chil	Fir/Rai	Total
PB I	(-)59171.186	(-)5225.422	(+)79.040	(-)29657.067	(-)93974.635
PB II	(+)11103.862	(+)6957.320	(+)215.400	(+)2828.639	(+)21105.221
PB.U	(-)12745.428	(-)4080.146	(-)468.510	(-)7660.617	(-)24954.701
PB IV	(-)5328.880	(-)2333.930	(+)26.030	(-)303.411	(-)7940.191
Total	(-)66141.632	(-)4682.178	(-)148.040	(-)34792.456	(-)105764.306

- i) The yield position as it stood on 31.3.2001 is deficit in all the PBs except in PB II, which is mainly due to Salvage and TD marking under political pressure. The over all deficient position is due to the ban on green felling.
- ii) Some of the forest allotted to PB II has higher growing stock the normal forests as the improvement cum thinning felling prescribed for such forests were not executed due to ban imposed on green felling.
- iii) The yield prescribed from PB III is 3500 m³ whereas TD marked to right holders during the last 3 years was more than 4800 m³ annually.
- iv) As no felling was carried out, proper opening that would have been created as a consequence of seeding felling for regeneration, are lacking. Therefore, no regeneration operations were undertaken.
- v) There are large number of regenerated deodar areas in PB I and PB IV in the working circle, which require immediate removal of the over wood and corrective marking. However, this silvicultural requirement remained wanting for allowing regeneration to set in over the entire areas in such forests.

11.19.2 CHIL WORKING CIRCLE:

This working circle comprises of all Chil bearing DPFs. forests of Pandey and Sharma's working plan and Chil area transferred from Nachan Division during 1978 of R.V.Singh's working plan. All the newly constituted DPFs have Chil also included for

the first time. The total area under this working circle is as under:

Sl. No.	Name of Range	Area
1.	Suket	281.34
2.	Jai Devi	855.61
3.	Jhungi	1091.87
4.	Kangoo	33.84
5.	Baldwara	777.84
6.	Sarkaghar	189.73
Total of Suket Forest Division		3230.23
7.	Dharampur	5.64
8.	Kamlah	81.63
Transferred to J/Nagar Forest Division		87.27

11.19.2.1 Forests on the whole are under stocked, vastly variable in density and normal distribution of age class is lacking except PB IV and PB III areas. Young to middle aged trees predominate and mature trees are rather scattered in them. The whole area of this Working Circle was stock mapped on 4"-1" mile scale. General site quality was II. The density varies from 0.2 to 0.7 Total enumeration of important species was carried out in 10 cm dia classes down to 10cms. in all forests allotted to this working circle.

11.19.2.2. Area under each periodic block's is given below:

Name of Range	PB I	PB II	PBU	PB IV	Total
Suket	19.82	-	111.11	150.31	281.24
Jai Devi	120.80	72.10	571.17	91.54	855.61
Jhungi	221.03	61.21	607.94	201.69	1091.87
Kangoo	-	-	33.89	-	33.89
Baldwara	69.66	80.23	328.81	299.14	777.84
Total	431.31	213.54	1652.92	742.68	3040.45

Dharampur	-	-	-	5.64	5.64
Kamlah	-	-	57.94	23.69	81.63
Total	-	-	57.94	29.33	87.27

The forests were managed under Punjab Shelter wood system with the retention of compact groups of well grown poles up to 30 cm DBH not less than 0.2 ha in extent as advance growth. Natural regeneration supplemented by artificial regeneration where ever necessary was to be relied upon. The rotation of 100 years was adopted. Four periodic blocks were constituted with a specific allotment. Proportionate area could not be allotted due to irregular nature of crop. PB U area is more than 50% of the total area of this circle. The regeneration period of 25 years was therefore, adopted. Felling cycle of 15 years was kept corresponding to the period of plan.

The yield was calculated on the basis for the working circle by

(i) Von Mantel's formula (ii) Simon's formula for the whole working and by Hufnagel's formula for PB I area. The yield was regulated for 5 year and total deviation was kept with in 10% at the end of 5 years and at the plan period should also not exceed 10% of the annual yield.

The yield prescribed in different periodic blocks of different species was tabulated as below:

Species	PB I	PB II	PBU	PB IV	Total
Deodar	-	-	-	-	-
Kail	-	-	-	-	-
Chil	500	-	400	300	1200
Total	500	-	400	300	1200

(b) Result of working: Out of total area of 431.41 ha only 8 PB I area prescribed for seeding fellings, to be done over to avail prescribed yield where as D.251 Shiv Shankar Cila , D.161 Khabri C.8 and D.171 Khabri C.6 were kept reserve for match industry, Felling were done in D. 251 Shivshankar D.21-

20.20 ha. During 1986-87 and D. 161 Khabri C.2=31.40 ha during 1989-90 for this purpose. No marking prescribed in other remaining forests, as the crop is already open with mother trees and with good regeneration. No felling prescribed in PB I where seeding felling done during S.K.Pandey and H.C.Sharma Working e.g. in

D.205 Dhamkaon D.2(a) & 2(b) , 265 Salani C.2a,b,c and Tandidhar C.2 in this forest regeneration occurs in the form of sapling to pole stage except in Dhamkaon C.2a&B where regeneration destroyed by fire during 1998-99. Regeneration is deficit in Bairkot and Khabri which are also burnt repeatedly. Artificial regeneration operation carried out in all the PB I areas and there is good crop in Shiv Shankar C.II a 265 Salani C2a, C2b, C2c and 217 Tandidhar C.2 and crop is in sapling to pole stage.

No felling prescribed in PB II but due to heavy demand of TD staff was forced to mark trees. This resulted opening of PB II area and having natural regeneration in spite of uncontrolled grazing and fire.

Thinning and improvement felling prescribed over 1779.93 ha in PB U. Similarly felling over 207.88 ha of PB IV were prescribed for removal of over wood standing over established crop but no felling done due to ban on greenfelling.

Planting in PB III area were prescribed over 145 ha. The success is 40 to 50% due to uncontrolled grazing and repeated fire.

Name of Range	Area in Ha
Suket	1418.91
Jai Devi	804.28
Jhungi	909.98
Kangoo	2723.49
Baldwara	720.07
Total of Suket Forest Division	6576.73
Dharampur	543.74
Kamlah	868.64
Transferred from Jogindernagar	1412.38

All the areas were stocked mapped on 1:15000 scales but no enumeration have been done in these areas. Planting/sowing prescribed with important species

e.g. Papular, Eucalyptus, Shisham, Robinia, Khair Ritha, Semal, Series, Tun Mulberry, Kachnar, Behul Willow, Drek, Jaman, Dhaman etc. Plantation programme year wise framed but could not be followed and total plantation done in Suket Forest Division is given in Appendix VII. Separate record of planting in this working circle is not available and control forms not prepared as per instructions. The result of plantation is not encouraging and only 10-20% success visible mainly due to uncontrolled grazing and fire.

Method of Treatment Culturable blanks were to be planted with suitable species. The year wise plantation programmed not followed and also could not be followed due to providing funds not every year.

Similarly protection and maintenance of plantation not done properly, and eradication of Lantana & Eupatorium adhenopharum infested in plantation not done due to financial crunch and resulted poor survival of plantation.

No budget has been provided for the cultural operations e.g. pruning cleaning, thinning in plantation areas.

Planting of various species was done as per stock available and not as per requirement of site. Whenever budget allotted more the staff used to plant undersize plants. No accountability is done for the survival of plantation and staff is free to allow planting the same area twice and thrice.

Some good plantation Chil planted in the past over large area are having established crop has been transferred to PB IV of Chil W.C.

Deviation statement for the year 2000-2001 show that total excess removal from this Working Circle is 4287.913 m3 although no yield was prescribed from the Working Circle. This removal is only on account of salvage removals and to meet legitimate requirements of right holders.

Yield position of plantation working circles as stood on 31.3.01.

Deodar	Kail	Chil	Fir	Total
(+)1521.841	(+)1682.710	(+)1060.278	(+)23.084	(+)4287.913

Detail of plantation carried out under various Schemes and under all the Working Circles is tabulated in Appendix VIII

11.19.4 Protection Working Circle:

(A) **General:** This working circle include DPFs having precipitous and broken terrain comprising of Ban, Oak and open crop of B.L and indiscriminately hacked in the past and required rest for recuperation. The area allotted to this working circle is given below:

<u>Sl. No.</u>	<u>Name of Range</u>	<u>Area in ha.</u>
1.	Suket	430.71
2.	Jai Devi	1181.74
3.	Jhungi	1962.50
4.	Kangoo	6671.38
5.	Baldwara	101.61
6.	Sarkaghat	1193.89
<u>Total</u>		<u>11541.83</u>

The entire area has been stock mapped on 4"-1" mile scale and crop analysis has also been done.

No definite silvicultural system was prescribed. These forests are just to be protected and preserved. Felling of trees to meet needs of local right holders was allowed. Local people were allowed to graze their cattle's and Migratory Grazers also grazed in these areas after getting Grazing Permits. This resulted deterioration of soil and some places soil erosion started due to this uncontrolled/over grazing.

The Culturable blanks and poorly stocked areas were prescribed for planting over an area of 1077.88 ha. The results are not encouraging due to uncontrolled grazing and repeatedly fire. Some very good plantation done in the past has been transferred to Chil Working Circle for proper management.

No tending operations were carried out in the existing plantation during the plan period. Assessment of survival percentage of the plantation areas was not done. The area planted not depicted on the Stock map and no entry made in C.H. files on form C. This resulted that some plantation are taken twice or thrice in the working plan period.

Deviation statement for the year 2000-01 as detailed below show that total excess removals from this Working Circle is 2966.439 m³ although no yield prescribed from the Working Circle. This removal is only on account of salvage removals and to meet legitimate requirements of local right holders.

Deodar	Kail	Chil	Fir	Total
(+)352.772	(+)967.720	(+)1070.530	(+)1575.417	(+)3966.439

(b) Result of working: Out of this 1077.88 ha were earmarked for carrying out artificial regeneration. Some very good plantation done in the part has been transferred to Chil Working Circle. But most of the plantation failed mainly due to uncontrolled grazing and frequent fire. Planting programme laid down in the Plan was not strictly followed. Ban forest not protected and tended properly.

Felling of trees to meet needs of local right holder was allowed. Salvage marking done in Ban forest for departmental charcoal. The removal from the Working Circle as it stood on 31.3.01 is given above.

11.19.5. Social Forestry Working Circle

(A) General: This circle constitutes Govt. lands like UPFs Charagah, Darkhatan and Charagah Billa Darakhtan, roads, Nallahs, Kuhals and Private lands, irrigated and un irrigated and Khartar (Ghasnis) To achieve the goal of raising income and employments among the rural poor people and increasing production of small timber, fuel and fodder. The National Social Forestry Project (Called Umbrella Project) was launched in H.P. during 1985-86 for a period of five years and work was done in this division up to 1990 and thereafter this scheme was abandoned.

This scheme was new and work not carried out with actual micro planning, without the consent of people and not preparing people to accept technical plan with the resources and it resulted almost failure.

11.19.6 Grazing Over Lapping Working Circle:

(A) General: This working circle overlaps all other working circle. Apart from this, it also includes all the UPFs Chargah Darkhtan, Charagah, Billa Drakhtan occurring in this division.

Grazing incidence, grazing rights and prescription were given.

(b) Result of working (Grazing overlapping Working Circle: In view of the legal status, increasing cattle population and domestic functioning, the prescriptions could not be enforced in reality. Some area protected from grazing with the help of V.D.C. and some area planted under pasture improvement with little success.

11.19.7 Yield: The yield prescribed and remained with excess and deficit for the period of the plan of different Working circle under revision is given in tabular statement.

Working Circles	Species	Previous year balance	Prescription for the year	Removal during the year	Deviations as on 1.4.2001
Regular Working Circle	Deodar	(-)59737.316	6900.000	495.684	(-)66141.632
	Kail	(-)39986.048	2030.000	333.870	(-)4682.178
	Chil	(-)120.870	100.00	72.830	(-)148.040
	Fir	(-)31730.678	3075.000	13.216	(-)34798.456
	Total	(-)131574.906	12105.000	915.600	(-)105764.306
Chil Working Circle	Deodar	(+)5005.943	-	167.888	(-)5173.831
	Kail	(+)1885.278	-	80.930	(+)1972.208
	Chil	(+)8717.072	1200.000	558.130	(-)9358.942
	Fir	(+)596.767	-	-	(-)816.786
	Total	(-)1009.065	1200.000	812.948	(-)1396.117
Protection Regular Working Circle	Deodar	(+)347.004	-	5.768	(+)352.772
	Kail	(+)958.130	-	9.590	(+)352.772
	Chil	(+)971.790	-	96.740	(+)1070.530
	Fir	(+)596.767	-	979.650	(+)1575.417
	Total	(+)2872.691	-	1093.748	(+)3966.439
Plantation Working	Deodar	(+)1039.121	-	482.720	(+)1521.841
	Kail	(+)1558.810	-	123.900	(+)1682.710

Circle	Chil	(+)988.888	-	71.390	(+)1060.278
	Fir	(+)23.084	-	-	(+)23.084
	Total	(+)3609.903	-	676.010	(+)4287.913

11.19.8 PAST REVENUE AND EXPENDITURE

The revenue and expenditure from 1989-90 to 1999-2K of Suket Forest Division is tabulated as under:

Sl. No.	Year	Revenue	Expenditure	Difference
1	1989-90	17549392	15667293	(+)1682099
2	1990-91	16900590	17690099	(-)16089508
3	1991-92	720918	23302974	(-)22582056
4	1992-93	8123875	16214283	(-)8090408
5	1993-94	2220360	19263048	(-)17042688
6	1994-95	17297019	23150339	(-)5853320
7	1995-96	8226137	23676506	(-)15450369
8	1996-97	7405422	28585485	(-)21180063
9	1997-98	1183238	27157325	(-)25974087
10	1998-99	4393522	50709146	(-)46325624
11	1999-2K	5594100	55483491	(-)49889391
Total		74314573	301099989	(-)230159614

11.20 R. K. Singh Plan (2003-04 to 2017-18)

11.20.1. General objects of Management:

The general objects of management are as under:

To preserve and improve the forest flora, fauna, soil and thereby to prevent denudation and erosion so as to ensure an equable flow of water in the streams and rivers, and enhancing the life of river valley projects by reverting rapid siltation and also to ameliorate the climate and well being of people and place.

To provide for the bonafide domestic and agricultural requirement of local people of timber, firewood, grass, grazing and other major and minor forest produce.

To ensure, protect and improve the quality and density of existing forests and to bring the

growing stock and regeneration as near to normal as possible so as to increase the productivity to its maximum, for meeting the growing needs of industrial woods.

To increase the area under more valuable species in all localities suited to their growth by replacing the inferior stock and fulfill the social needs by bringing more areas under social forestry.

Consistent with the above, to obtain a progressively maximum possible sustained annual yield of timber and other forest produce best suited to industries, defense, market, and other state and National needs.

11.20.2. Constitution of Working Circles and Method of Treatment:

In conformity with the above objects of management following working circles have been constituted:

- I. **Deodar & Kail Working Circle:** It includes all DPFs allotted under Regular Working Circle in Nanak Chand's Working Plan. These forests are situated on easy to moderate slopes, bearing mixed or pure Deodar, Kail, Spruce and Fir Forests, at places there is admixture of Chil on warmer aspect at lower elevation and Broad leaved species in depression, along Nallahs and are fit being worked under Punjab Shelter wood system, with fixed periodic blocks and definite allotment to each period block. Artificial regeneration will be carried out to supplement the natural regeneration for speedy restocking the area. In artificial regeneration Deodar be favoured, otherwise other species i.e. Kail, Rai Fir, may also be allowed to grow. Though green felling have been banned by the Govt. the strain on the forests continued on account of more timber distribution pressure and creating opening in other P.Bs. and fill up with natural regeneration.
- II. **Chil Working Circle:** All the DPFs of Nanak Chand's Working Plan in Chil Working Circle has been included in this working circle. In addition to these areas where Chil plantation has been raised and new fully established are also included in it. Similarly UPFs, where Chil plantation has established are also included in it. Some forests as per Annexure IC transfer to Nachan Forest Division have been excluded from the area of previous working plan. The forest under this circle will be managed under Punjab Shelter wood system with fixed periodic blocks. The natural regeneration of Chil will come up with the closure, but will be supplemented artificially as well where necessity and frequent fire

destroyed regeneration.

- III. **Plantation Working Circle:** This working circle has been created in the working plan under revision with main objective to increase the area under forest cover and thereby reducing the pressure on existing forests. This working circle included all plantation raised under various development schemes in DPFs with species like Deodar, Chil, Khair, Shisham, Poplar, Lucernia and other misc. B.L. suitable species. The existing plantation will be tended, while definite areas have been earmarked for planting every year in the plan period. Failed plantation has been kept in the circle for restocking, whereas fully established Chil plantation has been transferred to PB- IV of Chil Working Circle.
- IV. **Protection and Rehabilitation Working Circle:** This working circle comprised of all the DPFs, which are situated on steep to precipitous slopes and in difficult terrain and therefore, cannot be commercially exploited. All the degraded, sparsely stocked forests subject to heavy erosion requiring adequate effective protective cover have been assigned to this working circle. All Ban oak forests have been allotted to it, keeping in view their significant role in moisture conservation and blanket ban of oak felling.
- I. **J.F.M (Over Lapping) Working Circle:** This working circle will include DPFs near to habitation, which has become degraded due to excessive marking of T.D., overgrazing and frequently burnt due to non cooperation of local inhabitants. In addition to above it will also includes the UPFs and waste lands which are in small bits after demarcation and settlement. These categories of areas are heavily encroached upon and will be a very good attempt to manage through people participation approaches. The area already taken under DFID and Sanji Van Yojana will be included where some works left uncompleted.
- II. **Grazing Policy and Guidance:** This working circle will overlap the Protection Working Circle and other areas where the habitants have recorded right for grazing. Similarly areas where migratory graziers got permit in such areas efforts will be made to regulate cattle grazing of migratory graziers as well as of local graziers. The main thrust to be given to areas where migratory graziers graze their cattle. The fodder production capacity of the forests is to be increased. It will include all DPFs and UPFs and other Govt. lands and also all categories of forests. The main objective of this working circle is to be preserving the forest wealth from further deterioration if the interest of soil and water conservation.

III. Soil Conservation (Overlapping) Working circle: It will include all DPFs and UPFs and other Govt. lands and also all categories of forests. The main objective of this Working Circle is to be preserving the forest wealth from further deterioration in the interest of soil and water conservation.

A. Deodar and Kail Working Circle:General Constitution:

This working circle covers all the DPFs situated on comparatively moderate slopes and where Deodar and Kail either pure or intimately mixed, are the predominate species. Some of the forest having predominately Fir/Spruce forest on easier slopes allotted in the working plan under revision, mainly for packing cases at that time, is also retained in this working circle. The complete details regarding the forest/compartment/sub compartment allotted to this working circle shall be given in the Appendix by WPO.

General character of Vegetation:

The crop is mainly deodar, Kail, Spruce/Fir with a varying inter mixture of evergreen and deciduous broad leaved trees. The Deodar,Kail, Spruce and Fir forests occurs either pure or in mixture. Fir and Spruce also met with in the upper reaches and depression. Some pure forests of Fir and Spruce also occurs e.g. D. 195 Kamru, D.197 Banwali. Chil also occupied in few forests of lower zone on warmer aspects as in D.175 Kamand, C.2, 4 & , D.196 Bhun, D.251 Shivshankar, D.179 Jhalangar. All age classes are met with, but there is an overall preponderance of middle aged trees, due to heavy marking in T.D. in the past and at present and removal of mature and over mature trees in the past. The forests are fairly well stocked except on southern slopes, steep portion and adjoining habitations. All the fire blanks created by fire in the past are also stocked up; with Deodar, Kail, Spruce or Chil. Deodar, Kail and Fir trees have been heavily lopped in the forests adjoining habitation especially in Jhungi and Jai Devi Ranges.

Block and Compartment:

The existing division of forests into compartment and sub compartment has been retained as such. There is no change of crop pattern due to non working of forests during the currency of Working Plan due to blanket ban on green felling imposed by the H.P. Govt. The existing division shall be revised as per field surveys.

Special objects of Management:

- i) To continue the conversion of generally irregular Deodar, Kail, Spruce forests into more or less uniform crop.
- ii) To bring these forests gradually to normal conditions as near as possible by obtaining a more distribution of age classes with normal increment and normal regeneration by natural and artificial means.
- iii) To fully restock PB I areas, as early as possible by supplementary regeneration through artificially regeneration and to tend the already obtained.
- v) To provide the requirements of right holders for the constructional timber, fire wood and grazing etc.
- v) To seek involvement of local people by adopting Joint Participatory Forestry Management, wherever possible.
- vi) To obtain maximum possible progressively increasing sustained yield of timber suited to the market demands.
- vii) To thin and tend the forests already so covered.
- viii) To raise broad leaved species in depression which are best suited to them in order to meet regeneration of fodder and fuel and reduce fire hazards.

Area Statement:

The total area of this Working Circle is 5624.33 ha.

Silvicultural System:

The forests of this working circle will be worked under **Punjab Shelter Wood System** with fixed periodic Blocks. Felling shall be done according to the nature of the terrain. Selection marking shall be followed but there should be no marking on precipitous slopes and retention of compact groups of healthy and vigorous poles up to 30 cms dbh but not less than 0.2 ha in extent with 0.7 density will be retained as future crop in PB I marking. In the past scattered poles occurring singly or in groups of lesser extent than one indicated above has been retained and resulted un even aged crop in uniform PB I and PB IV areas. Now removal of these trees will not be possible except thinning as and when transfer to PB III Regeneration in PB I will be supplemented by artificial means without waiting for natural regeneration, immediately after fellings and debris clearance. Young established regeneration PB IV shall be thinned and unwanted over wood standing over established crop shall be removed. Thinning cum

improvement fellings shall be carried out in PB III areas and where advance growth retained at the time of PB I marking. No fellings be done in PB II except for the removal of dead, dry, uprooted and fallen trees as per norms of salvage marking.

Choice of species:

The forests allotted to this working circle are, by and large pure Deodar and Kail forests with mixture of these species, Fir and Chil also occurs on suitable aspects. The species eminently suited to the locality will be favoured and get preference over all other species. Deodar timber fetches the highest price among the coniferous as per present market trends. Kail is more susceptible to fire danger and is often have burnt. It is also lopped heavily and therefore, attacked by fungus tremetias Pinni. Deodar will, therefore, be preferred to Kail and Fir will be introduced wherever it can be conveniently introduced. The proportion of Deodar can be increased by encouraging its natural spread through cleaning, thinning and improvement fellings favoring and discarding Kail where possible in preference to Kail as Spruce. Retaining Deodar as seed bearers in preference to Kail or Spruce can increase this proportion. On hot southern slopes on exposed ridges Kail allow to come up. Similarly Spruce and Silver fir belt and pockets shall not be converted into Deodar and Kail. Therefore, Fir and Spruce will be encouraged, wherever they are growing naturally and efforts will be made to introduce them in suitable areas. Cool and moist locations should be invariably be planted with valuable broad leaved species like Walnut, Mohru, Poplar, Birdcherry, Acer, Aesculus indica, Ash, Carpinus, Poplars in their natural habitats, Robinia will be raised along boundary line. Detail treatment map should be prepared for areas where sowing/planting to be done with species to be planted.

Rotation:

As per available statistical data, Deodar takes 111 years, Kail 91 years to attain 60 cms diameters, which has been fixed as exploitable diameter. Accordingly the rotation/conversion period 120 years has been adopted. The forests are under the process of conversion to uniform. The irregular and generally under stocked nature of forests is coupled with the facts that most of the Kail is generally rotten, culled for short conversion period. But in the interest of sustained yield and to avoid the sacrifice of young crop, conversion period is fixed equal to the rotation. For quality class II, Deodar crops with proposed "D" grade thinning the mean annual increment for stem timber culminates at 120 years. As per available statistical data, Deodar takes 111 years, Kail 91 years to attain the exploitable diameter of 60 cms dbh. Accordingly the

rotation/conversion period is fixed 120 years corresponding to 60 cms dbh a size suitable for economical conversion into sleepers/scantlings.

Regeneration Period:

This is the period which is considered necessary for complete regeneration by natural or artificial supplemented and will reach the pole crop and will not be liable to damage due to grazing. On inspection of forests in the field show that period of 30 years is more than enough to regenerate a PB I areas. Therefore, the regeneration is kept at 30 years .The crop for quality II areas attains an average height of 5 metres during the period, which can be considered as established, as is visible in old areas PB I areas and plantations done in blanks created by natural calamity and planting in Ban Oak forests in Treach Block of Jhungi range and in Gehru forest of Kangoo Range.

Division into Periodic Blocks:

With a rotation/conversion period of 120 years and regeneration period of 30 years; the area of this circle, is divided into four Periodic Blocks with definite allotment. Efforts have been made

to allot areas to the most appropriate periodic blocks. Due to irregular nature of the existing crop and non fellings of forests due to ban on green fellings, it is not possible to differentiate the age classes by PBs.

- PB I It includes the Forests/compartments, which had been allotted to P.B.I area in Nanak Chand Working plan, but have not so far been fully regenerated. Forest/compartments, which had been allotted by Nanak Chand in P.B.I area, but not felled during the working plan, e.g. D.254 Gouhta. C1, D.258 Garh ka Chhol C.2a & 2b, D.183 Pandar C.3a&3b, D.159 Chicher C.1, D- Rangjhol C.2. Some of the PB II area having middle aged to mature and PB III area having middle aged to mature open crop due to TD markings and regeneration coming up allotted to PB I. Mature or over mature trees and predominately diseased Kail areas are proposed to be replaced with healthy crop of Deodar and Kail.
- PB II It comprises of more mature becoming stands. The crop is thus ready to go.
- PB III The forests allotted to this block are those bearing generally middle aged trees.
- P.B.IV It comprises of fully regenerated areas carrying pole crop and required immediate

removal of over wood.

Felling Cycle:

A felling cycle of 15 years corresponding to the period of the plan has been adopted. The seeding felling will be done during this period, as no felling done during the last 15 years due to ban on green felling.

Calculation of yield:

The total growing stock has been calculated from the enumeration carried out/computed from partial enumeration and results of different Periodic Blocks are tabulated giving number of trees and volume. From the enumeration results, it is clear that bulk of the crop is IIA and IIB classes and then there is abrupt fall in higher classes, the highest number of trees are in Vth class followed by IV class and so on.

Method for the calculation of yield: The expected yield for the whole working circle had been calculated as under:

1. Von Mantel's Formula method:

$$Y = 2.G/R$$

Where Y = Annual yield in m³

G = Total growing stock of the working circle in m³ R = Rotation age in years.

2. By Blanford and Simmon Formula:

$$Y = 2V/ R(1-X^2/R^2)$$

Where Y = Annual yield in m³

V = Total growing stock measured down to 10 cm. diameter

R = Rotation in years (i.e. 120 years)

X = Age in years required to attain the diameter to which the stock has been measured. Yield from PB I areas where seeding felling are to be done.

Main Yield (by Hufnagel's Formula) In view of the fact that only seeding felling will be carried out in P.B.I areas during the period of the plan, the yield has been calculated taking into view the silvicultural availability assessed on the basis of actual marking in some of the P.B. I areas during the period of Working Plan by Sharma and Pandey.

$$Y = (C_1V_1 + C_2V_2) /P$$

Where Y = Annual yield m³

V1 = Volume of trees above 40CM dbh in PB I

V2 = Volume of trees up to 40CM dbh in PB I

C1 = Constant to represent the proportion of 40CM and above dbh trees required to be felled.

C2 = Constant represents the proportion of 40CM dbh to be felled.

P = Period of regeneration in the plan.

Yield from PB II

Only dead and wind broken or otherwise seriously damaged trees will be marked under salvage marking as per prescribed norms for salvage markings.

Yield from PB III

The yield from this P.B. will be in the form of thinning and removal of dead, dry, uprooted and fallen trees. The demand of the right holders is in variably met with from the forests of this periodic block. The demand of right holders has been increased manifold due to improvement in the economic condition of the people and it is likely to show further increase year after year. But the per house hold consumption timber has reduced due to the construction of modern houses and increasing trend of single family system. The average annual removal of T.D. for the last 15 years is 3643 m³ varying from 2000 m³ to 10519 m³. Grant of T.D. therefore, needs to be controlled from this P.B. since the yield from thinning and improvement felling in this P.B. shall be mainly taken away by the right holders, the forest needs not to be included in the felling programme of thinning. It is estimated that not more than 5% of total growing stock will be available for felling under thinning-cum-improvement felling during the plan period.

Yield from PB IV

Complete enumerations down to 10 dbh have been carried out in all the areas of this periodic block. The abstract of the growing stock is given. Calculation of yield has been based on the total volume of trees in P.B.IVs 75% trees above IIB were prescribed for the removal in the previous working plan, but the same was not removed due to ban on green felling and trees become wolf and Kail having rotten and putting negative increment and total removed required. Increment has not been taken into account. All the trees above IIB and above do not warrant their retention in this block and as such can be removed during the plan period. Though silviculturally it is not possible to remove all such trees yet trees standing on precipitous and broken ground will have to keep as fire insurance and national emergency

reserves. This being the position so it has been estimated that only 70% of volume of the trees of IIB and over can be removed during the Working Plan period.

Prescribed Yield:

The following yield was prescribed for this Working Circle:

S.No.	P.B.I	P.B.II	P.B.III	P.B.I	Tot
Species				V	al
1. Deodar	4300	--	1900	5000	11200
2. Kail	1050	---	400	1800	3250
3. Rai/Fir	1150	---	900	300	2350
4. Chil	50	---	---	100	150
Total	6550	---	3200	7200	16950

The yield is, therefore, controlled by periodical blocks, In case concentrated felling have to be carried out in some of the forests allotted to this Working Circle, for any reason what so ever reason, then the same will count towards the yield prescribed in P.B.I. In that case the territorial staff will be required to carry out compensatory plantation in suitable selected areas/patches. Definite prescription if laid down those removals must be compensated by replacement.

B. CHIL WORKING CIRCLE: General Constitution:

This working circle comprises of all Chil bearing D.P.Fs of Nanak Chand's Working Plan. It also covers areas transferred from established Chil plantations fit for working under Shelter wood System. Besides, all the newly constituted D.P.F. during the expiring work plan and U.P.F. having established chil Crop and not covered in the expiring working plan have also been allotted to it for the first time.

General Character of vegetation:

The vegetation of this circle corresponds to 9/c 1(b) sub tropical Himalayan Chil pine forests. Chil is dominant species of all the forest allotted to this Working Circle. Chil forest generally occurs between 1200 - 1800 meters elevation. At lower limits it occupied northern aspect and restrict it self to cooler locations. It density and quality on southern and southwestern slopes along ridges is rather poor. The vegetation corresponds to age is rather poor even of middle class trees appear mature. Above 1780 meters chil always occur on

southern, well drained slopes as in D.251 Shiv Shankar and D-250 Galukhar part. Deodar and Kail encroach in Chil areas along Nallahs and other moist pockets as in D.250 Galukhar and D.251 Shivshankar. In depression and Nallahs on northern aspect Ban Oak grow as common associate along with Rhododendron, Pistacia intergerrima, Lyonia ovalifolia, Grewia oppositifolia, Myrica nagi. In the lower limits tropical deciduous broad leaved species replace it.

Young to middle aged trees predominate and mature to over mature trees are malformed and stunted mainly due to heavy demand of right holders for timber, fuel wood, litter and grazing as is visible in D-349 Bairkot, D.353 Sidhkot, D-379 Govartha. Natural regeneration coming up but not established, mostly destroyed due to fire as seen in D-349 Bairkot. D-161 Khabri, D-251 Shiv Shankar. Ground cover is thin due to repeated fires. The trees are straight boles without twist, but badly lopped in all the ranges.

Block and Compartment:

The compartment and sub compartment have already been split up into smaller in the expiring workings plan. There is no need to further bifurcate as no green felling took place during the period of expiring working plan and there is hardly change of crop.

Special Object of Management:

The special objects of management are as under:

- i) To continue the conversion of generally irregular crop into more or less uniform crop.
- ii) To tend the existing stands properly so as to progress in the direction of a normal forest by obtaining more normal distribution of age classes, normal growing stock, with normal increment and normal regeneration by natural or artificial means.
- iii) To fully stock forest in such a way as to bring about rapid growth and increment so that large size timber is obtained for industries.
- iv) To bring fully established plantation under regular management for further working the existing areas.
- v) To protect these forests from fires.
- vi) To meet legitimate demand of right holders for timber, fuel wood, grass and grazing.
- vii) Consonance with above to obtain maximum possible yield of timber and resin as per units.

Area Statement:

The area allotted to this working circle is 5426.68Ha.

Silviculture System:

Chil being a light demander and grow in uniform system. The forest will be worked under Punjab Shelter Wood System the system ensures the retention of compact groups of pole crop up to 30 cm dbh with density not less than 0.7 and area not less than 0.2 ha. In extent as part of future crop to avoid unnecessary sacrifice of immature crop. Isolated trees are not to be retained as part of future crop. Precipitous and rocky pockets of forest will be worked under Selection principles. P.B.I area will be regenerated naturally subject to protection from fire, grazing. However, natural regeneration is supplemented by artificial means immediately without waiting natural regeneration, particularly in refractory area. Thinning and improvement felling shall be carried out in P.B.III, though there is very little scope due to heavy marking of trees in T.D. in the past. Over wood standing over established crop in P.B. IV area be removed and cleaning, thinning shall be carried out in young crop. No felling shall be done in P.B.II except for salvage removal as per norms of salvage marking.

Chil is the only species suited and will be planted. But in some Chil forests as visible in D.349 Bairkot C.5, D.419 Chobra D-262 Salani, D-250 Gulakhar, D-268 Khondhar, Deodar has been introduced in the past, without encouraging results, so this should be avoided. However in higher elevation and in depression suitable for deodar be planted. B.L species along Nallahs be planted, this will also check fire hazard. Area recently transferred from plantation to Chil Working Circle were thick forests of Ban Oaks and B.L. species but degraded due to defective management in the past and now they have stocked up with Chil. There are scattered blanks in these forest and the same be planted with Ban oak and B.L. Coppice shoots of Ban Oak also noticed in these forests that should be managed and encouraged.

Rotation:

According to the available growth data, it takes 90 years to obtain diameter of 60 cms dbh, which is considered suitable for conversion into sizes most in demand. But to be on the conservative sides, a rotation of 100 years has been adopted. This period also facilitates in dividing this period into 4 periodic blocks.

Regeneration Period:

There is no problem of natural regeneration in this tract and period which is considered necessary for complete regeneration of natural crop supplemented by artificial has been kept as 25 years. Under favorable condition i.e. absence of grazing, excessive fires and with good soil the regeneration will established it self with in 15 years as is visible in D.265 Salani C.2a, 2b & c. In adverse conditions it may extend beyond 25 years. Thus on conservative side the period of 25 years has been taken as regeneration period. In this period much of the crop will attain the size of poles, which will be able to with stand the accidental fires if they rum through the area.

Exploitable size:

The extraction is still done through conventional method and mechanization is not tried in this strict in spite of most of the forests are served with roads. It has been checked that trees of 60 cm dbh and above, give maximum out turn in shape of sleepers. The exploitation size is therefore, fixed at 60 cms corresponding in age of 100 years.

Regeneration assessment:

Regeneration assessment has been carried out in area where regeneration felling done in the past, and results are tabulated as under.

Division into periodic block:

With the rotation of 100 years and regeneration period of 25 years, the whole working circles has been divided into 4 periodic blocks of 25 years. The crop on the whole is irregular, younger to middle classes and predominating 2403.68 ha have been brought under Chil Working Circle from plantation working circle and crop is younger age class. It is not possible to divide periodic blocks of equal area due to this. The condition of crop, status of regeneration, soil and other factors have been kept in view, while making allotment of areas to periodic blocks.

P.B. I : Area allotted to this periodic block is as under:

- (a) All the area of the plan under revision which has not fully regenerated due to various factors e.g. uncontrolled grazing and fire.
- (b) Some of the P.B II areas carrying middle aged to mature Chil crop.
- (c) Some of the P.B. II areas carrying middle aged to mature open crop due to T.D. marking and are fit for harvesting and regeneration.

P.B.II: This block consists of following areas in it:

- (a) P.B. II areas of the working plan under revision minus transfer to P.B. I.
- (b) Some of the P.B.III areas of the working plan under revision, which the crop is mostly of middle aged trees.

P.B. III: This constitutes irregular crop of Chil predominately young to middle aged. Following areas have been put in it:

- (a) P.B.III area of the plan under revision minus area transferred to P.B.II.
- (b) Some of the P.B. IV area carrying young to middle aged crop.
- (c) Area carrying young to middle aged crop of Chil in the newly constituted DPFs.

P.B.IV: This consists of following areas in it:

Forests mostly with young crop have been allotted to this P.B. which requires removal of over wood over established crop. Plantation areas having well established crop in the form of young age of plantation origin transferred to Chil Working Circle.

Felling Cycle:

Felling cycle will be of 15 years corresponding to the 15 year period of working plan.

Calculation of Yield:

The yield from this working circle will consist of yields from P.B. I, from mature trees standing over regeneration of P.B. IV and some removal from thinning to be carried out in P.B.III. There will be no yield from P.B.II areas and only dead, dying, uprooted trees may be removed from this P.B. wherever necessary. The total growing stock has been calculated from the enumeration carried out and calculated from partial enumeration is tabulated in the sub joined statement.

Yield for whole Working Circle:

The yield have been calculated by the following methods:

1. Von Mantel's Formula method:

$$Y = 2.G/R$$

Where Y = Annual yield in m³

G = Total growing stock of the working circle in m³

R = Rotation age in years.

2. By Blanford and Simmon Formula:

$$Y = 2V / R(1 - X^2/R^2)$$

Where Y = Annual yield in m³

V = Total growing stock measured down to 10 cm. diameter

R = Rotation in years (i.e. 120 years)

X = Age in years required to attain the diameter to which the stock has been measured.

Yield from PB I (by Hufnagel's Formula)

$$Y = (C_1V_1 + C_2V_2) / P$$

Where Y = Annual yield m³

V₁ = Volume of trees above 40CM dbh in PB I

V₂ = Volume of trees up to 40CM dbh in PB I

C₁ = Constant to represent the proportion of 40CM and above dbh trees required to be felled.

C₂ = Constant represents the proportion of 40CM dbh to be felled.

P = Period of regeneration in the plan

Yield from P.B.II:

No felling is prescribed in P.B. II Only dead, dying, wind fallen trees are to be removed. Hence no yield has been prescribed.

Yield from P.B.III:

The yield from P.B. III will be in the form of thinning. It is estimated that 5% of the growing stock will be available for removal.

Yield from P.B.IV:

The yield from P.B.IV will be in the form of final removal only and this will be the removal of trees of IIB and over from this P.B. Some trees will have to be retained on rocky strata and some trees will have to keep in blank portions. Therefore, 75% of the volume of IIB and above will be removed.

In addition to above 5% of volume of V, IV and III class trees shall be available under cleaning/thinning as majority of areas are from plantation origin.

Prescribed yield: The following yield was prescribed for P.B. wise:

<u>Species</u>	<u>P.B.I</u>	<u>P.B.II</u>	<u>P.B.III</u>	<u>P.B IV</u>	<u>Total</u>
Chil	2100.00	---	450.00	450.00	3000.00
Deodar	200.00	---	---	---	200.00
Kail	200.00	---	50.00	50.00	300.00
Total	2500.00	---	500.00	500.00	3500.00

In case fellings not prescribed are to be carried out in some of the forests allotted to this working circle for any reasons whatsoever, the same will count towards yield prescribed for P.B.I In such an event compensatory plantation is to be done in suitably areas. It should be done simultaneously. Felling in P.B.I to the extent felled for aforesaid reason is different from felling programme for the year.

Resin Tapping:

All chil trees above 35 cm dbh are being tapped for resin extraction as per rill method.

C. PLANTATION WORKING CIRCLE

General Constitution:

This Working Circle comprises of all the areas of Plantation Working Circle in the expiring working plan of Nanak Chand, except area transfer to regular management for the first time being fully established pole crop. The depleted scrub forests have also been included in this Working Circle. The areas planted in the expiring working plan, being un- established areas, having marginal success, carrying young crop which needs protection, devoid of any tree growth, or carry open crop have been retained in this working plan.

Area Statement:

Total area of working circle is 5329.75Ha.

Special Object of Management:

The special objects of management will be as under:

- a) To raise compact plantation of suitable species to meet the requirement of local people for small timber, fuel, fodder and fruits.
- b) To raise plantation to make available raw material for wood based industries e.g. plywood, furniture and for building body of trucks and buses.

- c) To restock the blanks, failed plantation areas and the areas which are under stocked or stocked with useless scrubs growth, with species of higher utility and economic value.
- d) To nurse the existing young plantation and natural young growth under Systematic regime of cleaning and thinning
- e) To plant the blanks alongside roads with species of aesthetic importance
- f) To seek involvement of local people by adopting JFM wherever possible.
- g) To provide employment to local village community particular in the interior locality.
- h) To encourage sericulture.
- i) To seek involvement of local people by adopting JPFM.

General Character of vegetation:

Since the forests assigned to this Working Circle are situated in different altitudinal zone, therefore, the character of vegetation varies. Almost all forests types are found in this Working Circle.

Plantation Series:

Plantation programme was framed Range-wise so no plantation series required/suggested.

Block and Compartment:

The forest have been divided into compartment or sub compartment, wherever felt necessary to separate the area suitable for plantation in the expiring working plan and no further bifurcation is required at present in this working plan period.

Choice of Species:

The choice of species depends on the various factors such as climatic, edifice, topographic, and biotic, but the surviving of indigenous species give a clear indication to the most suitable species to be planted. Since most of the degraded forests of Deodar, Kail, Ban, Chil has been allotted to this Working Circle, so the existing species is planted in the area of rather than other species. In the depressions and along Nallahs, in such forests be planted with B.L species suitable to locality. Similarly blank having no vegetation and scrub growth is planted with indigenous, fast growing, hardy, species that can survive under adverse

conditions of the locality. Sincere and strenuous efforts should be made to bring the blank area under vegetative cover as early as possible. The forester should follow the nature rather than compelling nature to follow him.

The forest areas in lower belts are heavily infested with Lantana and Ageratum. The methodology developed by University of Horticulture & Forestry, Nauni for the eradication of these obnoxious weeds is adopted. After the eradication of these obnoxious weeds these areas will be planted with tall plants of two years root system and one shoot. Shisham, Kachnar, Siris, Ohi, Mango, and Robinia (in higher area) are planted.

Monoculture should be avoided and plants of mix B/L species of indigenous origin be planted, keeping in view the need of local people for fodder, fuel and small timber species.

Plantation Programme:

In order to avoid hardship to local people from closure against grazing the plantation and area having survival less than 30% have been suggested to be taken up during the initial years of the Working Plan period. Barbed wire already used may be reaffixed.

Treatment of Existing Plantation:

List of successful plantation raised in the last two decades has been prescribed under different working circle. The treatment in the remaining area also suggested and recorded in respective history files be studied and acted accordingly subject to availability of funds.

D. PROTECTION AND REHABILITATION WORKING CIRCLE

General constitution:

This Working Circle includes all the forest having precipitous and broken terrain comprising of conifers, Ban or open crop of broad leaved species which was subject to indiscriminate lopping and hacking in the past. The degraded, sparsely stocked subject to heavy erosion requiring adequate effective protection cover, and found unfit for allotment to other working circle have been allotted. Ban Oak forests, for their significant role in moisture conservation have been banned for felling by the Govt. and all Ban Oak forests have been allotted to this working circle. Forest situated at the head of streams and Nallahs for the preservation of water and moisture also allotted to this circle.

General Character of Vegetation:

The forest allotted to this Working Circle have their scattered distribution throughout

the tract, hence they represent almost all types of forests starting from scrub in lower elevation and extending to Alpine pasture. So generally (a) scrub forest (b) Ban Mohroo and Kharsu forest (c) Northern dry mixed deciduous forest (d) Western Oak Fir forests are predominately found.

Block and Compartment:

The existing compartment/sub compartment remained unchanged as bifurcation has already done in the working plan under revision. There is no change of vegetation's and crop so further division not considered necessary.

Special Object of Management:

The special objects of management are as under:

- i) To protect the hilly tract from further denudation and erosion by preserving and enhancing the forest cover.
- ii) To prevent indiscriminate and ruthless lopping/hacking of trees for fuel wood and fodder for local people and graziers who come to these forests for grazing.
- iii) To initiate measures to increase the forage and fodder value of these forests to meet increasing grazing and fodder demands.
- iv) To conserve moisture and streamline the flow of water in streams and Nallahs by protecting and increasing vegetation cover at the head of their source and along banks.
- v) Consistent with the principles of soil conservation, to provide for grazing of sheep, goats and buffaloes of local and migratory grazers who come to these areas and also meet the genuine demands of right holders for timber and other forest products.
- vi) To protect non timber forest produce growing naturally in high lying area from indiscriminate exploitation.
- vii) To provide a suitable habitat to wild animals in forests and around the boundary of wild life sanctuary.
- viii) To protect the Ban Oak and other valuable broad leaved species from indiscriminate destruction and simultaneously improving their growing stock by artificial means, wherever possible.
- ix) Constant with the principles of sound Silviculture to meet the bonfire demands of right holders for timber, fuel and fodder etc.

Area Statement:

The total area allotted to this working circle is 11553.72Ha.

Analysis and Valuation of the Crop:

All the forests in this working circle have been stock mapped on 1:15000 scales. The tracing of each compartment or sub compartment has been placed in each compartment history files.

Method of Treatment:

To achieve the main object of management of these forests constant strenuous efforts should be made to maintain, or increase the protective vegetation cover in these forests. These forests shall, therefore, be simply protected to save the valleys, of plains from the revenges of floods and soil erosion. No felling should be carried out except salvages removals or to meet the demand of right holders. If in case on natural calamity, salvage removal involved concentrated fellings the area shall be closed immediately, after the fellings are over, and regenerated with species coming up naturally in the particular locality. If it occurs in Ban oak forest only Ban be planted and no other species be tried as has been in the past. Most of the Ban Oak forest felled under Fuel wood and Charcoal felling in the past were degraded due to non effective closure and the same is reclaimed/restocked with Chil which spoil ecosystem and scarcity of fuel and fodder requirement of local people.

The heavy grazing pressure is required to be brought down and grazing must be regulated. The rotational closure supplement with some soil conservation work in badly eroded forests would improve protective vegetation cover. Most of the forests in lower elevation and adjoining Sutlej bank in Behli, Batwara block of Kangoo Range are poorly stocked, carry scattered trees growth or devoid of adequate vegetation cover. Some inedible shrubs like *Adhotada vasica*, *Carissa opaca*, *Cassia tora*, *Lantana* also exist. Therefore, it is prescribed that area having such growth be planted with grasses of high forage value if required uprooting of such species may also be done subject that soil erosion not occur.

Most of the waste land pockets are in small bits honey combed surrounded by cultivations and most of the areas are heavily encroached upon and it will be difficult to preserve and stocked up. These areas should be reclaimed under J.F.M programme and planted with grasses of forage, fodder, fuel wood trees and Bamboo in lower belt. These will increase

the fodder yield, which is essential for livestock and fuel wood yield for local requirement.

There is 8443 ha area under private Ghasinies (Kharetar) the owners of the Ghasinies are maintaining them nicely and these are well preserved. It was advocated in Nanak Chand Working Plan that grasses of high nutritive value should be introduced and suggested that owners of the Ghasinies can be motivated easily as it will pay them in long run. This was suggested keeping in view of Social Forestry Scheme at that time now this could be done under J.P.F.M.

All the plantation area will be put under effective closure against grazing for a period of 15 years. The area should be opened only when the plantation gets established. Timely action will have to be taken for notifying the area for closure. Grazing permits are being issued adjoining these plantations to migratory graziers and they destroyed most of the plantation in the night. A condition is recorded that if any damage is done to adjoining plantation they will be responsible and their permit be canceled in the next year.

A. JOINT FOREST PLANNING AND MANAGEMENT (OVER LAPPING – WORKING CIRCLE)

General Constitution:

This Working Circle will overlap with other Working Circle and includes Demarcated Forests near to habitations, which become degraded due to heavy pressure of grazing, lopping and T.D. marking and mismanagement in the past particularly the Ban forests. Besides these DPFs it also included the UPFs and waste lands, which are in small bits, honey combed surrounded by cultivations and left out after demarcation and settlement. These categories of areas are heavily encroached upon and will be very good attempts to manage through people participation approach.

The need for J.F.P.M.:

The concept of Joint Forest Management is an intervention to evolve organized and collective thinking on the issues of management where maximum benefits for the society keeping the sustenance of the resources in mind.

The people living in and around forests were given the rights to utilize the produce of the forests for their livelihood. These rights were modified, reduced and some cases eliminated as the state took over control of forest resources during 19th and early part of 20th century. Through out most of this century forestry in India has developed within the frame work

characterized by state control. Since the extent of forests and consequently the growing stock was large as compared to demand and system functioned satisfactory. Some states started managing forest as a source of income, resulting over felling. Similarly liberal Nautor granted to landless and uncontrolled clearing forest for non forestry purpose resulted degradation of forest wealth. The pressure of forest increased manifold, due to this and increase in population. The behavior of the people changed due to political set up and pleasing every one for catching vote. The people started considering forests as “No mans land”.

During 1970 in West Bengal, Haryana, Gujarat, Forest Protection Committee's were formed and given the responsibility of protecting degraded forest, departments land from illegal cutting, fires, overgrazing and encroachment. In return they were granted more concessions and share of the returns from plantation raised and protected.

In 1990 Government orders were issued directing all the States to undertake participatory forest management on degraded forests land, based on the experience of States as West Bengal, Gujarat and Haryana. This gave official sanction to the implementation of J.F.M

Special Objects of Management:

The basic objects of Joint Management are given below:

1. To evolve consensus on the basic issues to conservation of soil, water and forest resources.
2. To provide an effective and immediate treatment for barren, wasteland, or degraded protected forests situated near villages through protection afforestation, pasture development, soil conservation by active participation of local people.
3. To maintain the environmental stability through preservation and wherever necessary and restoration of the ecological balance that has been adversely destroyed by depletion of the forests through involvement of local people in resource management.
4. To augment fuel wood, fodder and small timber production for use by local people.
5. To convert a hostile population living on fringes of forest areas into friends ultimately into resource managers and resource users.

F. Grazing Policy and Guidance General Constitution:

This Working circle overlaps all other working circles. Apart from this,

it also includes all UPFs, Charagah Darkhtan, and Charagah-billa drakhtan occurring in this Division. However, the main thrust would be given for the improvement of area allotted to

Protection Working Circle and hence this working circle will overlap Protection Working Circle.

Block and Compartment:

This is being an overlapping working circle, no further sub division is required.

Special Objects of Management:

These are as under:

- i) To maintain and improve the existing grazing area.
- ii) To improve fodder production so as to ensure continuous supply of different types of fodder to local right holders, in consistence with productive capacity of different area (Private land as well as Govt. forests).
- iii) To inculcate and encourage the habit of stall feeding.
- iv) To make integrated efforts for replacing large number of inferior cattle breed with lesser number of better cattle bred.
- v) To give rotational closure giving due consideration to the carrying capacity.

Method of Treatment:

The rural population depends on the forest for their daily requirement of timber, fuel wood, fodder and grazing etc. At the same time function of forest are manifold. They conserve soil and water, prevent erosion and control floods, reduce siltation of reservoirs and lengthen the life of hydroelectric project etc. The rearing of live stock by rural population have been continued as indispensable chief source of livelihood next to the agriculture in this hilly region since time immemorial. Grazing is one of the principles recognized in the settlement. We can ill afford to ignore it, as it would antagonize the local population. This will not brood well for the forestry activities envisaged, wisdom and skill, thus in adjusting the requirement of the people with out forestry programme.

Suggestions:

Suggestion made in the last working plan, to control and regulate grazing and for improvement of pasture still hold good. The following suggestions are made to control and regulate grazing and for improvement of grazing grounds:

- i) List up all the existing and other suitable grazing areas, grazing capacity be assessed at the rate of 0.5 hectares per unit. Strict control and check must be exercised and it must be ensured, that no further increase in the number of migratory cattle i.e. sheep, Goats and buffaloes, who enter during summer and winter is allowed.
- ii) Educate and persuade the migratory graziers to reduce their herds. Further educate the local people requesting them to only keep a few cattle of superior breed. Local graziers should not be allowed to increase their flocks and should be dissuaded from keeping non working cattle for manure purposes only. Adoption of stall feeding should be encouraged. Loans and subsidies should be provided to the needy persons under pasture improvement scheme for purchase of feed and for purchase of superior breed of animals.
- iii) Provision to supply fertilizers at subsidized rates and use of chemical manures is encouraged, so that dependence on cattle manure is reduced.
- iv) Suitable areas should be taken up, as demonstration plots and beneficial effects of rotational grazing and other improved application are made known to the people.
- v) Rotational closures should be enforced to give rest to the pasture and increase productive capacity. Permanent or periodic closure should be encouraged, in areas under erosion, gully formation or slips.
- vi) Afforestation in hilly slopes through silva-pastoral System should be encouraged amongst local people. Planting of fodder trees, shrub, and legumes along with soil conservation measures be adopted to stabilize slopes.
- vii) Obnoxious weeds and unpalatable grasses should be eradicated and more nutritive fodder grasses suitable to locality should be introduced in the pastures. Pastures, which have deteriorated through over use, will be closed to grazing for 3 years. Sowing of grasses like prairie grass i.e. *Bromus unioloides*, Perennial rye grass- *Lolium perenne*, orchard grass or cockfoot dactylic, *glomerata*, *Limothy Phleum*, and other grasses.
- viii) The lower areas of Baldwara, Kangoo and Sarkaghat is infested with Lantana. Special programme be made to control of lantana and *Ageratum*.

Control of Movement of Migratory and Nomadic herds and Flocks Registration and Enumeration: The most important prerequisite for the control of migratory and nomadic herds and flocks and management of pastures grazed by them is the correct enumeration of these flocks and

registration of their owners. Registration implies the preparation of list of grazers together with the grazing grounds and pastures showing also the recorded rights. So far as the migratory and nomadic graziers are concerned no where has their grazing in summer or winter pastures have been recorded as a right. No doubt, in a majority of cases, a particular individual and his dependents by simple usage and not by any recorded right to do have made a particular pasture or grazing run. Divisional Forest Officer will carry out the registration of these graziers in the following performas:

S. No.	Name of Graziers, parentage & address.	Name of the grazing ground Compt./sub Compt.	Whether summer/winter grazing ground	Area	Kind & No. of animals	Remarks
1	2	3	4	5	6	7

It is stated that great vigilance is required for correct registrations and enumeration to be prepared in the above manner. Once this has been done, it will be particular to enforce the methods for the control of grazing, for reducing their present number and for applying a check to the increase in the number of their cattle.

At present grazing permits do not show any particular area/boundary of the grazing areas. It contains only name of forest and area in hectare in particular forest without giving compartment or subcompartment. It has resulted that they are grazing in whole of the forest, even in plantation areas they graze. This is wrongly done to give benefit to the graziers. This practice should be abandoned and particular compartment or sub compartment is to be mentioned on the permit giving details of boundary.

Fixation of Routes and Check Post:

Another prerequisite for the control of the migratory and nomadic graziers is the fixation of routes and establishment of seasonal checking posts on these routes at suitable places, preferably at bridges or at which places on the border of a Division through which the herds and flocks have to pass. A mention of the main routes used by nomadic and

migratory grazers has been made in the forest settlement, but it has not been made clear whether it is obligatory for the flock and herds to stick to this or not.

Keeping in view the convenience of graziers with respect to the movement of flocks and their grazing grounds and compatible with the proper supervision, the following routes are suggested to be fixed for future:

- I. Nihri-Langara bridge over Beas to different forests of Sarkaghat and Baldwara ranges.
- II. Dadaur to Slapper and vice versa.
- III. Chail Chauk to Sarour Bridge and via Nihri vice versa.
- IV. Sarour Bridge to Slapper along river Sutlej and vice versa.

The movement of herds and flocks must stick to these routes, in case of deviation, they should suitably be dealt with.

The seasonable checking post proposed to be set up on these routes fixed above are Neri-Langna Bridge, Dadour Bridge, Chail Chauk and Sarour Bridge. For this purpose suitable subordinates will be posted at these checking posts during the movements of the herds and flocks. They will count the number of cattle, sheep, goats etc and issue either permits or verify the permits already issued.

Records of Grazing Grounds and Pastures:

The grazing done by these graziers spread over summer pastures to winter runs and vice versa. It means that these migratory and nomadic flocks graze in all classes of forests. In order to find the correct grazing incidence and to make its satisfactory distribution, it is essential to have a record of all the pastures, both summer and winter with respect to their situation, areas, and grazing capacities. This record should be maintained in the Divisional Office as well in the Range Office.

Imposition of Restriction on the movement of Migratory and Nomadic Graziers:

After recording of the grazing runs, fixation of routes and the establishment of check posts, what remains to be done is to exercise control over the movements of herds and flocks during transit from summer pasture to winter runs and vice versa. It is during these movements that maximum damage is done to the forest and these graziers try to prolong their stay in forest en-route. The graziers pass through the territory of a Forest Division for two

objects.

Either they pass through the grazing grounds situated in some other Division or they pass through the Division to reach the pastures situated in the same Division. In the former case they pay only *rahdari* fee and in the later full grazing fees. To control the movement of the animals in both the cases, the following restrictions should be imposed:

- i) Date of entry should be fixed.
- ii) The owner of all flocks and herds entering the territory of the Division must get a permit at the check post. Those who simply pass through will get *rahdari* permits and those who enter for grazing will get grazing permits.
- iii) Each permit will bear the period of transit both through the Division and to the grazing ground inside the Division. Any over stay should be treated as trespass under the Forest Act.
- iv) Minimum period of transit through the Division should be fixed. The graziers should not be allowed to halt their herd and flocks for longer than one night at any single halting place in any forest in which they have not a right of grazing. Halting places shall be at least 8 kms apart. Halt may be granted for two nights at one place if there has been heavy rain or if salt has been given to the animals.
- v) All herds and flocks must stick to the fixed routes and must not be allowed a deviation of more than 400 meters on each side of the fixed route.

G. Soil Conservation (Overlapping) Working Circle

General:

This circle will include the total geographical area of the Division which forms the major part of catchments area of Sutlej River and some part of Beas River. Thus this circle includes all DPFs UPFs and other Govt. lands and also all categories of private lands.

General Character of the Vegetation:

It has already been discussed in detail under respective working circle. The Deodar, Kail, Chil, Ban oak, Moru Oak, Behul, Kachnar, Morus, Prunus etc., occurs in scattered in private lands.

Block and Compartment:

This being an overlapping Working Circle, no sub division is required.

Special Objective of Management:

The chief objects of Soil Conservation and water management are:

1. To reduce the flow of silt in the catchments by adoption of multidisciplinary integrated approach in the catchments.
2. To promote the land use to match land capability.
3. To improve the land capability and moisture regime in the water shed and thereby reduce run of and providing engineering structure wherever necessary so as to ensure stabilization and perennial supply of irrigation and drinking water.
4. To improve the ecology of the area.
5. To improve the grazing and fodder resources and reduce the grazing intensity in the area.
6. To increase the fodder and forest resources of the tract by improving the water supply, creating better growth conditions and adopting effective protected measures.
7. To involve the people in the management of catchments and also upgrade the skills in planning and execution of land development.

H. Wild Life (Over Lapping) Working Circle

General:

On account of varied climatic conditions due to variation in altitude, topographical, and vegetation, has a bearing upon wild life distribution in the tract of this Division which supports a variety of wild animals and birds. The wild life in this tract is however, decreasing fast due to changing condition in the areas, the gradual advancement of civilization, deforestation, improvement of communication resulted intrusion by man, poaching and other biotic pressure. The increase in human population and consequent increase in land under cultivations has also reduced the domain available to wild life. In the past indiscriminate, hunting, poaching by human beings had brought quite a few animals like *Moschus moschiferus* (Kastura) and birds like *Lophophorus impejanus* (Monal) are on the verge of extinction. Kastura is found around Kamrunag Kajira-Hajdhar in the forests. Besides it, at one time herds of *Nemorhaedus goral* (Ghoral) were found in steep grassy blanks of Kangoo Range. Now one may be lucky enough to see these animals in wild life sanctuary Bandli. The Central Wild Life (Protection) Act, 1972 was adopted in the state of Himachal Pradesh on 24.4.1973 and rules made there under were brought operative from 24.2.75.

Importance of Wild Life:

- i) Preservation of all forms of life is a part of our religious and culture. Vedas are full of hymns in veneration of wild life. Kautilya's Arth- Shastra provides severe punishment for entrapping, killing or molesting deer, lion, bird or fish in protected area. Ashoka's fifth pillar edict of the third century B.C. depicts his commandments for giving protection to wild animals, birds, fish and forests. These all and many other to reflect that our all great Lords, Rishis, Munis and Prophets have close ties with wild animals and birds and they always lived and breathed together.
- ii) The value and importance of wild life from scientific, aesthetic, economic and recreational point is immense and is recognized all over the world. Ecological and biological research has proved the usefulness and importance of nature's balance to the mankind.
- iii) God has created every being with definite purpose and function to maintain the ecological balance in nature Wild Life, like wise, maintains the natural balance, the bird destroy the insects and eats which are harmful to man, animals, trees and orchards. Atit, which is only a tiny bird, with its progeny is esteemed to destroy annually at least 12 millions insects eggs or 1,50,000 caterpillars and pupae. Similarly partridges, pheasant Myna king crown and several other birds also devour about 200 to 300 insects daily. Besides these birds also help in dissemination of seed and pollination. Snakes, wild animals such as Jungle cats and birds of prey like Owl, hawks do a great service to the humanity by killing and keeping in check rodents like rats and mice which are most inimical to our agricultural crops. Some wild animals are used for the preparation of necessary Ayurvedic and Allopathic medicines, monkeys are used for preparing Polio vaccine, muskdeer provides us scented musk which is widely used in the preparation of Ayurvedic medicines. Similarly the venom of cobra and liver of black bear got high medicinal value.
- iv) The beauty of wild animals and birds fascinates the bird watchers, sport enthusiasts, photographers, amateurs and professionals, animal and bird ecologists and country. The country side is blessed with natural beauty, bearing beautiful weeds, health resorts, with animals and bird attraction and multitude of tourists for sight seeing, sport and rest in such surrounding. Tourism earns substantial revenue in some of the States. Besides the revenue to state exchequer, people of the area are benefited in many ways by the tourists.

- v) A habitat improvement programme for Wildlife to be properly planned and be implemented.

Special Objects of Wild Life Management:

- i) To ensure collection of scientific data for the maintenance and development of viable population of fauna for scientific, aesthetic, cultural ecological and economic purpose.
- ii) To identify the problems of wild life in the tract, this in turn will help in formulating the guidelines for the development and to address the issue of human-animal conflict.
- iii) To increase the population of fauna by providing special food and ideal habitat especially for the goral, barking deer and Sambar etc.
- iv) To create important spots for the exhibition of wild life in natural state for general public.

H. N.T.F.P (OVERLAPPING) WORKING CIRCLE

General Constitution:

This working circle overlaps all the working circles and is constituted to ensure systematic development and exploitation of non-timber forest products that occur or can be introduced in this Division.

General Character of N.T.F.P:

In the earlier years the policy and practice focused on production of quality timber and these smaller and significant forest products were termed as Minor Forest Projects (MFPs) but with the change in National Forest Policy and recognition of their role, these important products are now rightly termed as N.T.F.Ps. With the people friendly and conservation oriented policy the practice should now change to focus attention on the development, conservation and their management and these should not be allowed to be continued as by products of tree focus forestry, apart from biological resources, slates, sand and Bajri.

Special objects of Management:

- i) To ensure scientific harvesting of non timber wood forest produce by enforcing control of methodology of harvesting of N.T.F.P. species found in the tract.
- ii) To develop the resources by natural or artificial means wherever and to the extent possible.
- iii) To identify economical and useful species of herbs, shrubs and fungi and other important floras for harvesting.

- iv) To collect data about occurrence, distribution, method and cost of harvesting and also output and statistics of important N.T.F.P. species.
- v) To promote ex-situ and in situ cultivation and conservation of important N.T.F.P. species.

Rotational Extraction:

No information or data is available for laying down method of extraction or fixing rotation for obtaining maximum yield of the plant without damage to its multiplication. To put a stop of excessive extraction year after year it is necessary to give rest to the area at least once in three years. It is therefore, prescribed that after the extraction is picked up, plants would be extracted on rotational basis. If it was not followed it is likely to reduce the yield and quality of the plant and may eventually lead to disappearance of the species. So the unit of closure should be territorial Block of the Range.

Extraction cycles:

Four year extraction cycle should be devised by the D.F.O. and once approved, should be put to practice for *Taxus baccata*, Pine cones, Deodar stumps, and other important species having in large quantity. Extraction of old stump of Deodar is being done in this area.

Artificial Propagation:

Keeping in view the economic importance and frequent demand of medicinal herbs, it is desirable to cultivate the naturally occurring medicinal plants in suitable localities which, in the course of time may develop into establish farms. There is large scope of raising medicinal plants due to setting up of drugs manufacturing industries in the State.

Mining Activities:

The mining in the tract dealt with is carried out to extract the following products for local development (roads and buildings) and commercial use: Stones, Bajri, Limestone and Soil. The above mentioned produces are utilized mostly locally by the villagers for construction of houses as most of the inaccessible villages use slates for roofing purpose and stones and soil for rest of construction work.

I. Miscellaneous Regulations By Felling:

Felling of petty nature, as detailed below may be treated as prescription of the working plan

- (a) Dry or green trees required to meet bonafide requirement of right holders as per record of rights

in the settlement.

- (b) Dry or green trees to meet special free grant for the construction of houses destroyed by natural calamities like fires, lightening etc., as per settlement provision or as per Govt. orders.
- (c) Trees required for ordinary departmental works.
- (d) Felling of trees in the forest transferred for non forestry purpose under Forest Conservation Act, 1980 e.g. trees falling along prospective road alignment, electric, and telephone lines, water channels etc. Special care must be taken while carrying out such alignments to minimize trees to be felled.
- (e) Felling of trees in sub merged areas under Hydro electric projects.
- (f) Special felling to meet unforeseen defence requirement and natural calamity.

Deviations:

Large or unusual felling operations other forestry activities not prescribed in the working plan will be a deviation and requiring prior sanction of the competent authority. The following class of removal constitutes deviations:

- i) Large scale damage by fire, snow and windstorms.
- ii) Special felling to meet the demand of particulars local small scale industry or for defence purpose.
- iii) Un usually large scale fellings for departmental works.
- iv) Large scale felling of trees falling in the alignment of major roads and electric transmission lines.
- v) Deferment of preparation and maintenance of B. Pillars and fire lines from this approved programme.
- vi) Transfer of forest land for non forest activities.

Demarcation and Survey

All the notified DPFs have been mapped on scale 4"=1 mile but on ground numbering of boundary pillars do not exist and condition of boundary pillars is not satisfactory especially adjoining cultivation lands. Demarcation of UPFs shall be carried out and separate files for each UPF incorporating all the relevant shall be prepared.

11.21 Special Works of Improvement Undertaken

Summary and results of works such as fire-protection, improvement in communication, interface activities, amenities to staff, etc. shall be discussed in this section.

11.22 Past Revenue and Expenditure

The revenue and expenditure from 2013-14 to 2022-23 of Suket Forest Division is tabulated as under:

Sl. No.	Year	Revenue	Expenditure	Difference
1	2013-14	27207681	105786783	78579102
2	2014-15	5723192	115675835	109952643
3	2015-16	3013455	106171430	103157975
4	2016-17	4520643	209706777	205186134
5	2017-18	4464510	123877770	119413260
6	2018-19	4237370	142019626	137782256
7	2019-20	5374885	141588453	136213568
8	2020-21	6648540	231038353	224389813
9	2021-22	12328633	196508534	184179901
10	2022-23	4768708	218359285	218359285
Total		78287617	1590732846	1512445229

CHAPTER 12

STATISTICS OF GROWTH AND YIELD

GENERAL: A comprehensive analysis of comparison of local statistical data collected during earlier plan with the one appearing in following record of F.R.I publications shows remarkable proximity. However, growth and statistics data in respect of conifers species of the working plan of Suket by Nanak Chand, which was adopted from R.V.Singh's working plan and working plan of Pandey and Sharma's hold good. The volume table applied in this Division from the beginning of Working Plan shows no variation of volume except in very few forests have extraordinary growth on good soil and aspect, altitude and in some area where growth is poor due to shallow soil and biotic factors. But average for the Division is justified the volume adopted. Out turn obtained are also as per admissible in H.P. Forest Manual and Compiled by H.G.Champion. In view of this, it was not necessary to collect this data afresh. However, the following records were consulted in connection with statistics growth and yield.

- (i) Yield and volume table for deodar by Howard.
- (ii) Volume and out turn tables for Blue pine by H.G.Champion, I.D.Mahendru and P.N.Puri.
- (iii) Yield and Volume tables for Chil by Howard.
- (iv) Yield table and diameter growth curve for Spruce by Seth and Louhani
- (v) General Volume tables for Silver Fir by Sethi and Louhani.

12.1. VOLUME TABLE: Preparation of local volume table will require felling of large number of standing green trees of different quality and diameters classes. It is likely that the Govt. of India will not accord permission for this felling. More over there is no justification for doing stem analysis afresh.

Volume table for the coniferous as adopted in the expiring working plan from the working plan of Pandey and Sharma's hold good and it is now not necessary to do further exercise for preparing a fresh one. The existing volume factor is suitable to the crop in this division as no dispute occurs at the time of allowing export permit regarding out turn percentage. The volume table of the expiring working plan is reproduced below and it will be adopted in this working plan.

Table 12.1 Local Volume Table**Volume of standing timber (m³)**

Deodar				Kail		Chil		Silver/Fir	
Diameter	Classes	Volume	Age in yr	Volume	Age in yrs	Volume	Age in yrs	Volume	Age in yrs.
10-20	V	0.056	31	0.080	24	0.500	23	0.086	43
20-30	IV	0.196	51	0.210	37	0.110	39	2.283	66
30-40	III	0.756	65	0.590	49	0.280	53	0.906	87
40-50	IIA	10568	87	1.230	62	0.730	67	1.652	109
50-60	IIB	2.632	101	2.550	75	1.500	82	2.772	132
60-70	IA	3.920	120	3.780	92	2.630	97	4.046	155
70-80	IB	5.600	140	5.370	111	3.950	113	5.544	179
80-90	IC	7.140	156	7.450	130	5.460	127	7.168	201
90-100	ID	7.140	174	7.450	155	5.460	143	9.128	223
100&Ab		7.140	-	7.450	-	5.460	-	9.128	-

12.2 DIAMETER GROWTH

During the course of field work, exercise were conducted for carrying out stump analysis by selecting trees marked for TD and also chil trees in Seed Stand by High Conifer Research Centre, Dehradun in Bairkot C.3 and figures in each case were compared as was done in Nanak Chand working plan with stump analysis figures given in Pandey and Sharma's working plan. It has been concluded and established that the expiring working plan for stump analysis is sufficiently accurate. Therefore, the same has been adopted for this working plan.

Table 12.2 Stump analyses Table of Pandey and H.C.Sharma's working plan

Species	No. of stump analysed	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
Deodar	252	10	19	27	29	33	51	53	67	75	83	92	102	106	111	115	117
Kail	72	8	14	19	24	31	34	39	46	52	57	64	71	73	79	83	-

Chil	200	9	15	22	28	36	44	58	61	69	73	75	78	84	87	-	-
Spruce	23	10	19	27	35	46	51	59	68	77	87	95	99	104	113	123	132
Silver/Fir	49	13	25	36	46	56	66	77	89	101	115	130	142	150	-	-	-

12.2.1. The rates of growth of the 5 different coniferous species as tabulated in Pandey and H.C.Sharma are also reproduced below. This table will be made applicable to this working plan.

No. of years to reach D.B.H.(OB)

D.B.H.(OB)	Deodar	Kail	Chil	Spruce	Silver/fir
10	23	18	15	26	32
15	31	24	23	36	43
20	40	31	30	45	55
25	51	37	39	55	66
30	58	43	45	64	77
35	65	49	53	73	87
40	75	55	60	82	100
45	83	62	67	92	109
50	93	68	75	101	123
55	101	75	82	111	132
60	111	81	89	109	145
65	120	92	97	130	155
70	129	101	105	138	167
75	140	111	113	150	179
80	147	122	120	157	190
85	156	130	127	167	201
90	165	145	135	177	213
95	174	155	143	186	223

12.2.2 The crops of Suket Forest Division are, open, the rate of diameter growth is much higher than corresponding figures of even aged regular crop dealt in Multiple Yield Table. Similarly the rate of height growth of Deodar in Pandar Forests and Chil in Bairkot forest is much higher than other forests.

12.3 RECRUITMENT PERIOD: From the rate of growth in table under 6.2.1 therecruitment period from the lower class to higher diameter class for different species work out by H.C.Sharma and Pandey is tabulated below:

Species	V to IV (cms)	IV to III (cms)	III to IIA (cms)	IIA to IIB (cms)	IIB to IA (cms)	IA to IB (cms)
Deodar	20	14	18	18	19	20
Kail	13	12	13	13	17	19
Chil	16	14	14	15	15	16
Spruce	19	18	19	19	19	20
Silver/fir	23	21	22	23	23	24

12.4. MORTALITY RATE (VALUE OF Z): The value of Z for Kail and Deodar have been derived from the Multiple Yield Table of Deodar and adopted as givenbelow:

Diameter Class	% Mortality for different grade thinning			Average value of Z
	D	D/E	E	
40-50 cm to 50-60 cm	27	25	24	25
50-60 cm to 60-70 cm	27	26	25	26

As stated in working plan under revision is not possible to workthe value of ‘Z’ for approaching class in term of Kail with the help of yield table of Kail, as the number of trees for area for quality II crop with average diameter of (65 cms) is not available in the yield table of Kail.

In Suket Forest Division the crop of Deodar are irregular and under stocked, the mortality rate will therefore, be lower than that worked out above from the yield table. Therefore, it will be quite safe to adopt the above figures in the working plan. For adoption in this working plan, the value of ‘Z; from IIA to IIB and IIB to IA diameter class is taken to be 25 whereas the crop of Kail is also irregular and under stocked due to frequent fire in Kail area. Kail is badly lopped and rotten. The chil percentage is very higher than other place.

12.5. QUALITY CLASS ASSESSMENT: The quality class for the coniferous species was assessed after height and diameter measurement of the trees in each compartment/sub compartment in the past and by comparing the same with these of standard quality classes as given in Multiple Yield Table for the respective species. The quality class already assessed has been recorded in C.H. Files.

12.6. Density: Density of the entire compartment/sub compartments which have been enumerated has been calculated by basal area method. As regards other un-enumerated compartment, it has been assessed by ocular estimate and is recorded in C.H.Files.

12.7. Enumerations:

- (i) Total enumeration of all coniferous and broad leaved trees down to 10 cm dbh are carried out in 10 cm diameter- classes for entire quadrant of 0.1 hac obtained from systematic sampling using center of grid of 25"x25" (1sq km)
- (ii) For shrubs 2 quadrants of 3x3 meter laid 3 meter away from corner of tree enumeration plot of each quadrant was counted for each species above 2mm dia
- (iii) For herbs 2 quadrants of 1x1 meter laid on corner of tree enumeration plot of each quadrant was counted for each species below 2mm dia

12.8. Stock Map: All the forests have been stocked, mapped on GIS Platform with all layers on appropriate scale so that the small compartment is visible (Approximately 1:15000 scale) as per guidelines of working plan code and stock maps have been filed in the compartment history files.

12.9. Increment percentage: Volume increment in case of Deodar, Kail Chil, Spruce and Silver/fir adopted in Nanak Chand working plan are also adopted in this working plan which are as under:

VOLUME INCREMENT PERCENTAGE					
Dia. class (cm)	Deodar	Kail	Chil	Spruce	Silver/Fir
20-30	3.52	3.81	4.35	3.08	2.34
30-40	2.82	2.92	3.28	2.56	2.06
40-50	2.27	2.47	2.49	1.97	1.69
50-60	1.82	1.80	2.08	1.54	1.30
60-70	1.56	1.67	1.41	1.21	1.13

70-80	1.27	1.24	1.01M	0.95	0.91
80-90	1.14	1.20	0.97	0.83	0.73
90 & above	0.86	0.88	0.78	0.65	0.49

12.10. Conversion Factors: The conversion factors of Ban Oak volume to weight of Fuel/wood and weight of Charcoal as adopted in Nanak Chand W.P. is quite reasonable and the same also adopted in this Working Plan as tabulated below:

<u>Dia. Class</u>	<u>Volume (m3)</u>	<u>Weight of</u> <u>F/wood extracted</u>	<u>Wt. of charcoal</u> <u>extracted (qtls.</u>
20-30	0.26	2.99	0.49
30-40	0.73	8.39	1.38
40-50	1.36	15.64	2.58
50-60	1.52	17.48	2.88
60-70	2.09	24.03	3.96

12.10.1

(i) One cubic meter of fuel wood of Ban Oak weighs 11.50 qtls

(ii) 6.0 Qtls of Fire wood is used for preparing one quintal of Charcoal from Ban Oak.

12.10.2

The following table taken from Nanak Chand's working plan of Nurpur Forest Division (1976-91) and adopted in the working under revision. It indicates the volume of Heartwood and weight of Katha extracted from Khair trees of different classes.

<u>Diameter (Cms.)</u>	<u>Standing</u> <u>m3)</u>	<u>Vol. (Heartwood</u> <u>(m3)</u>	<u>Vol. Weight of Katha</u> <u>in Kgs</u>
15-20	0.07	0.03	2.50
20-25	0.12	0.06	5.00
25-30	0.17	0.11	8.00
30-35	0.25	0.18	14.00
35-40	0.33	0.24	18.00
40-45	0.43	0.30	23.00
45-50	0.55	0.39	29.00

In the higher classes the trees are rotten. Therefore, Katha content is less. As per Himachal Pradesh

Manual Volume I, the following factors have been adopted:

0.28 m³ stacked is taken as equal 0.014 meters solid.

2.80 m³ stacked firewood weighs 9.300 quintals.

The out turn of charcoal is to be taken as 0.37 quintals for 0.28 cubic meter (solid) of volume felled.

As above factors are sufficiently conservative no allowance need be made for the small amount admixture of miscellaneous species that may happen to be felled along with the Oaks.

12.11 Regeneration Assessment Survey: Regeneration assessment survey of all PBI areas, which are under regeneration operation in Regular and Chil Working Circle have been done on 16' = 1 mile scale (1:3750) and given as annexure.

12.12. Broad leaved species: Local volume tables (commercial timber) in respect of broad leaved species were prepared during the compilation of working plan of Kullu Division by D.P.Kapoor. These are reproduced below for use as taken from Kullu Working plan (1993-94 to 2008-09) by J.S.Walia. Volume has been taken down to 30 cm dbh including branches and given below:

Name of Species	IV	III	IIA	IIB	IA	IB	IC	ID	Over
	20-	30-	40-	50-	60-	70-	80-	90-	100
	30	40	50	60	70	80	90	100	& Ab
<i>Quercus semicarpifolia</i>	0.30	1.00	1.80	3.00	4.60	6.30	8.00	9.60	12.20
<i>Aesculus indica</i>	0.30	0.80	1.70	2.70	3.90	5.60	7.10	9.00	12.00
<i>Juglans regia</i>	0.20	0.80	1.50	2.50	3.50	5.10	7.20	8.90	11.30
<i>Acer speies</i>	0.20	0.70	1.30	2.10	3.30	5.10	6.90	8.50	11.20
<i>Prunus Padus</i>	0.10	0.70	1.40	2.20	3.20	4.30	5.60	6.90	6.90
<i>Betula alnoides</i>	0.30	0.90	1.60	2.30	3.30	4.40	5.40	6.60	8.00
<i>Carpinus spp</i>	0.30	0.90	1.50	2.40	4.00	6.00	7.80	9.70	12.60
<i>Populous ciliate</i>	0.30	0.70	1.40	2.80	4.90	6.80	9.00	11.10	14.50
<i>Cedra serrata</i>	0.50	1.00	1.80	2.80	4.40	6.00	8.00	9.00	13.30
<i>Rhus spp</i>	0.30	0.70	1.40	2.00	2.90	4.00	5.10	7.00	10.10
<i>Celtis australis</i>	0.30	0.70	1.30	2.20	3.30	4.60	6.30	8.30	11.10

<i>Alnus nitida</i>	0.30	0.80	1.50	2.20	3.20	4.30	5.70	7.80	11.00
<i>Salix spp</i>	0.40	0.80	1.50	2.40	3.10	3.90	...	...	...
<i>Robinia</i>	0.30	0.60	1.00	1.40	1.70	2.00	...	...	...
<i>psudocasia</i>									
<i>Buxus</i>	0.10	0.20	...	...	...	...	...	...	...
<i>Semperirens</i>									

Part-II

FUTURE MANAGEMENT

CHAPTER- 1

BASIS OF PROPOSALS

1.1 National Forest Policy:

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

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

1. Two third of the area under forest cover in hilly States.
2. Environmental stability and maintenance of ecological balance.
3. Creation massive people's movement and involvement of women.
4. Modification of land laws.
5. Alternative avenues of income, suitably harmonized with the right land laws.
6. Strengthening of scientific forestry research and education.
7. Relation of rights and concessions to the carrying capacity of forests.
8. Protection, improvement and enhanced production of minor forest produce.
9. Forest management through approved working plans.
10. Wildlife and biological diversity conservation.

11. Establishing a strong forest data base.
12. Use of modern method to control forest fires.
13. Substitution of wood needs.
14. Public awareness.
15. Strict control of diversion of forest lands for country.
16. Increasing substantially forest tree cover in the country.
17. Covering the natural heritage of the country by preserve in remaining natural forests.

1.2 Himachal Forest Policy

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

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

9. Transfer of areas under reserved, demarcated protected forest and plantations for non-forestry purposes to be totally banned.
10. Management of watersheds to be given due importance.
11. Game development and preservation to be accorded high priority.
12. People's participation in afforestation programmes.
13. Planting of fast-growing fuel and fodder species to be preferred near habitations to meet the requirements of the local people.
14. Steps to be taken to reduce cattle population rationally.
15. To promote tourism along with improvement of forest vegetation.
16. No lease for the extraction of minerals to be granted without the prior consent of Forest Department.
17. Research facilities to be created to solve problems of applied nature.

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 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.

- iv)** 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.
- v)** To bring the growing stock to a condition nearer the normal forest, as far as possible.
- vi)** 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.
- vii)** 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.

1.3 Supreme Court on Green Felling and Regeneration:

The T.N. Godavarman case attracted significant attention when on 12-12-1996, the Apex Court with order 'Suspended' the felling of trees in all forest except in accordance with the Working Plans of the State Governments which were approved by the Central Government. The land mark orders passed by the Apex Court in an effort to save the fast diminishing forest cover of the country against the greedy and wanton plundering of its natural resources, on 15-01-1998, the Hon'ble Supreme Court held that Working Plan for all forest divisions shall be prepared by the State Government and get approval from the Govt. of India. Forest working shall be carried out strictly in accordance with the approved prescriptions of the Working Plans. On 12-5-2001, the Apex Court laid down detailed guidelines for the felling of trees from forest areas as well as non-forest areas including plantation. As per the order, the felling of trees from forest areas could be allowed only as per the approved Working Plan/scheme, whereas the felling of trees from non-forest area could be allowed only as per detailed guidelines which are prepared by the State Govt. with the concurrence of the Central Government. This order, together with the order of the Apex Court on 15-1-1998 forms the guidelines for felling of trees. The highlights of the order in T.N. Godavarman case dated 12-5-2001 were: i) Felling of trees from forest shall be only in accordance with Working

Plans/schemes or felling schemes approved by the Ministry of Environment and Forests. ii) Such Working Plans/schemes shall also be needed for felling of trees from any non-Govt. forest areas including land which is required to be treated as “forest” as the decision of the Apex Court on 12-12-1996. iii) While implementing the Working Plans/schemes approved by the Central Govt., the State Govt. or the concerned authority shall ensure that no felling is done unless and until sufficient budgetary provisions exist for the regeneration of such areas. iv) For felling of trees from non-forest areas, including plantations on concerned State Govt. which will come in force only after concurrence from the MoEF, Govt. of India. v) The Guidelines/Rules shall also include provisions for penalties and mode of disposal in respect of any felling done in violation of such rules/guidelines. vi) Till such guidelines/Rules become effective, no felling from any area other than that under approved Working Plans/schemes or felling schemes shall be permitted. vii) The schemes are to be prepared within a period of three months and the MoEF has to take a decision on the same within a period of one month of the date of receipt. For the State of Himachal Pradesh, the Hon’ble Supreme Court’s order dated 12-12-1996 held that there will be no felling of trees permitted in any forest, public or private. This ban will not 175 “Save Forests - Save Environment” affect felling in any private plantation comprising of trees planted in any area which is not a “forest”, and which has not been converted from an earlier “forest”. This ban will not apply to permits granted to the right holders for their bonafide domestic use. Further, in a forest, the state Government may either departmentally or through the state Forest Corporation remove fallen tree or fell and remove diseased or dry standing timber from areas other than those notified under section 18 or section 35 of the Wild Life Protection Act, 1972 or any other act banning such felling or removal of trees. For this purpose, the state Government is to constitute an Expert Committee comprising a representative from MoEF, a representative of the state government, two private experts of eminence and the MD of the State Forest Corporation (as Member Secretary), who will fix the qualitative and quantitative norms for the felling of fallen trees and diseased and standing timber. The state shall ensure that the trees of felled and removed are in accordance with these norms. Felling of trees in any forest of any clearance of forest land in execution of projects shall be strict conformity with the Forest Conservation Act, 1980 and any other laws applying thereto. Moreover, any trees so felled, and the disposal of such trees shall be done exclusively by the state Forest Corporation and no private agency is to be involved in any aspect thereof. There is also a complete ban on

felling of Oak trees. Again, immediately two questions arise for consideration in the Hon'ble Supreme Court in T.N. Godavarman Thirumulpad V. Union of India, IA 424 in WP (c) No. 202/95 dated 8-1-2001. One is with regard to the implementation of the Working Plans in so far as felling is concerned and the Second is with regard to the regeneration of forests. It is quite obvious that the two activities must co-exist. There cannot be regeneration without felling because that will over a period of time only result in the forests vanishing. There has been shortfall with regard to the regeneration and as a result thereof forest cover is depleting. That shortfall has to be made up and for the future such felling has to be done which will ensure that there is at least no further depletion of the forest cover, and the targets for increase in forest cover, as contemplated in the Working Plans, are met. In other words, regeneration should be commensurate with the felling, and to the extent stipulated in the Working Plan. Keeping in view of the aforesaid reason and the National Working Plan Code, MoEF, Govt. of India, March, 2014, the present Working Plan has been revised thoroughly notwithstanding the present moratorium on green felling, the revised Working Plan includes all regular Working Circles prescribing yield and felling cycles, depending on the condition of the forests in each Working Circles. This green felling in any forest or in public forest will be allowed/carried out strictly in accordance with the approved prescription of the Working Plan subject to the decision of the Hon'ble Supreme Court

1.4 Broad Objectives of Management

With the passage of time, much reliance has been laid upon sustainable management of natural resources. The principles of sustainable forest management wherein thrust is laid upon conservation of the forest resources vis-à-vis utilization of forest usufructs shall be the underlying objective of the revised working plan. The revised working plan shall incorporate holistic management of forest resources keeping in view the need for conservation as well as utilization of forest produce. Reliance shall be made to scientific working parameters that confirm to the set criteria indicators of sustainable forest management. The broad objectives the revised working plan would be as under:

- I. Dynamics of Forests and Stands:** To protect the existing forests and forest land and increase the productivity of the forest ecosystem and maintain its vitality. Improvement of quality and density of existing forests.

- II. Forests and Soil:** Reducing soil erosion, enhancing fertility of the soil and ensuring stability of the forest ecosystem. Checking Soil erosion and denudation in the catchments area of rivers, lakes/reservoirs for soil and water conservation, mitigating floods and droughts and the retardation of siltation of reservoirs.
- III. Forests and Water:** Conservation of water sources, enhancing water conservation capacity of the forest ecosystem and assisting in regulating the flow of water from its catchment.
- IV. Forest Biodiversity:** Conserving genetic resources (both floral and faunal including micro-organisms) and their sustainable use.
- V. Climate and Forests:** To reduce Green House Gas (GHG) emissions, enhancing mitigation/carbon sequestration capacity of the forests and finding ways for adaptation with change in climate.
- VI. Socioeconomic considerations and generation of forest-based employment opportunities and livelihood options:** To meet the fuel wood, fodder and timber requirements of the local communities, enhancing livelihood and employment opportunities, ensuring usufruct/ benefit sharing and protection of their traditional knowledge and traditional/cultural practices, etc.
- VII. Tool for integrated development:** The management Plan shall act as a tool for integrated development of the entire forest division. Performance indicators shall be identified for different objectives of management.

1.5 Methods of Treatment to Be Adopted:

In the recent times there has been a marked shift in the focus of management. Revenue generation has taken a back seat whereas the Biodiversity conservation and preservation/development of natural resources is the need of the hour. The same aspect has also been highlighted in the National Working Plan code which states that:

“The existing survey and assessment of forest resources for the working plan is carried out based on random sampling to collect information mostly on forest timber production and very limited information on forest Biodiversity. In the present changing scenario of forest resource management at the global level with regard to

biodiversity, climate change and carbon emission/sequestration; it is necessary to have monitoring and assessment of forest resources on the basis of grid based systematic sampling, wherein the distribution of the sample plots within the surveyed population is homogeneous”.

Therefore, the assessment of forest resources is made on the basis of methodology stipulated in the National Working Plan Code -2014. After resource mapping is complete the prescriptions are made keeping in view the overall objective of Biodiversity conservation by adopting a holistic landscape level approach. The help of subject matter specialists have been taken in order to prepare an exhaustive resource map of flora and fauna in a scientific manner.

The other most important aspect on which special emphasis has been given is the Human-Wildlife conflict. Over the years the expectations from the Forest Department in dealing with wildlife conflicts have gone up sharply whereas the department has not been able to keep pace with the present challenges.

Scientific harvesting of Medicinal herbs and putting a check on their illegal extraction is another major issue which has been dealt. The field units do not have a database for the identification of various plant parts of rare medicinal herbs.

Forests are mainly of Chil , Deodar, Kail, Khair, bamboo and other miscellaneous broad leaved Species . Due to openings of forests, they have been invaded by fast growing species like lantana. Along the streams, *Acacia catechu* and *Dalbergia sissoo* have shown their presence whereas attempts in the past have been made to introduce Harar, bhera, amla, khair and *Albizia* species. As the species introduced are definite light demanders, growth is not in commensuration with invasive species; therefore, the stocking has not improved either in terms of Chil or other species. To maintain Deodar, Kail, Chil crop and to fill the gaps, to address the degraded areas and restocking the blanks, different silvicultural treatments will be required especially suited to different species and Working circles. Rehabilitation of degraded forests will need altogether a different approach through intensive soil and water conservation and afforestation based on the knowledge and experience gained in the past treatment of these forests. Whatever be the silvicultural system adopted, it will definitely be emphasized that the reproduction must continue to follow the felling and damage to the new crop is reduced to the minimum ,keeping off grazing and lopping and continually cleaning the crop for

quality growth of bamboos.

All silvicultural treatments must be directed to reduce the invasion of Lantana and stop its further invasion to new areas. The felling of coupes and felling of trees should be such that no gaps are developed to allow direct sunlight to substantial areas. Clear felling will not be done in any areas for this purpose.

Poor-quality scrub forests will need special treatment for soil and water conservation along with plantings of suitable species which are hardy and resistant to frost. The area needs no felling of any kind throughout the working plan period.

Due regard to steep slopes liable to erosion, along the banks of streams and areas on the south-west direction shall be taken while working owing to the paucity of growing stock..

1.6 Constitution of Working Circles:

Keeping in view the broad objectives of the management, socio-economic needs and biodiversity conservation, the following different working circles for sustainable management of forests are proposed as per the format prescribed in the National Working Plan Code -2014.

- (i) Regular (Deodar & Kail) Working Circle.
- (ii) Chil Working Circle
- (iii) Protection cum Rehabilitation Working Circle
- (iv) Plantation Working Circle
- (v) Soil and Water conservation Working Circle
- (vi) Water Resource Management (Overlapping) Working Circle.
- (vii) Grazing (Overlapping) Working
- (viii) Non-Timber Forest Products Working Circle.
- (ix) Wildlife Management (Overlapping) Working Circle
- (x) Biodiversity Conservation Working Circle
- (xi) Eco-Development and Human Resource Management Working circle
- (xii) Joint Forest Management (overlapping) Working Circle

i) Regular (Deodar & Kail) Working Circle :

It includes all DPFs allotted under Regular Working Circle in R.K.Singh Working Plan. These forests are situated on easy to moderate slopes, bearing mixed or pure

Deodar, Kail, Spruce and Fir Forests, at places there is a mixture of Chil on warmer aspect at lower elevation and Broad leaved species in depression, along Nallahs and are fit being worked under Punjab Shelter wood system, with fixed periodic blocks and definite allotment to each period block. Artificial regeneration will be carried out to supplement the natural regeneration for speedy restocking the area. In artificial regeneration, Deodar be favored, otherwise other species i.e. Kail, Rai Fir, may also be allowed to grow. Though green felling have been banned by the Govt., the stress on the forests continued to be on account of more timber distribution pressure ,which is creating opening in other P.Bs. and required to fill up with natural regeneration.

ii) **Chil Working Circle:** All the DPFs of R.K.Singh Working Plan in Chil Working Circle has been included in this working circle. In addition to these areas where Chil plantations have been raised and now fully established are also included in it. Similarly UPFs, where Chil plantations have established are also included in it. Some forests transferred to Nachan Forest Division have been excluded from the area of previous working plan. The forest under this circle will be managed under Punjab Shelter wood system with fixed periodic blocks. The natural regeneration of Chil will come up with the closure, but will be supplemented artificially as well, where felt necessary and where there are frequent forest fires.

iii) **Plantation Working Circle:** This working circle has been created in the working plan under revision with main objective to increase the area under forest cover and thereby reducing the pressure on existing forests. This working circle included all plantations raised under various development schemes in DPFs with species like Deodar, Chil, Khair, Shisham, and other misc. B.L. suitable species. The existing plantation will be tended, while definite areas have been earmarked for planting every year in the plan period. Failed plantations have been kept in the circle for restocking, whereas fully established Chil plantations has been transferred to PB-IV of Chil Working Circle.

iv) **Protection and Rehabilitation Working Circle:** This working circle comprises of all the DPFs, which are situated on steep to precipitous slopes and in difficult terrain and therefore, cannot be commercially exploited. All the degraded, sparsely stocked forests subject to heavy erosion requiring adequate effective protective cover have been assigned to this working circle. All Ban oak forests have been allotted to it, keeping in view their significant role in moisture conservation

and also there is a blanket ban of oak felling.

v) **J.F.M (Over Lapping) Working Circle:**

This will be another overlapping working circle giving role to community participation in management of forest areas through village level joint forest management committees. Sharing benefits with community in a sustainable manner shall be the objective of this Working Circle. 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 concept of Joint or Participatory Forest Management is an intervention to evolve organized and collective thinking on the issues of forest management keeping in view the fact that the forest resources are limited and the claim over these are varied, no single solution can satisfy the needs of all. The philosophy aims at involving all the stakeholders in resource generation activities through motivation, active involvement in the process of management and sharing of benefits through adequate institutional arrangements. This working circle will include DPFs near to habitation, which has become degraded due to excessive marking of T.D., overgrazing and frequently burnt due to forest fires. In addition to above, it will also include the UPFs and waste lands which are in small bits, after demarcation and proper settlement. These categories of areas are heavily encroached upon and will be a very good attempt to manage through people participation approach. The area already taken under DFID, Sanji Van Yojana and other external aided projects, will be included where some works had been left uncompleted.

vi) **Grazing Policy and Guidance:** This working circle will overlap the Protection Working Circle and other areas where the habitants have recorded right for grazing. Similarly areas where migratory graziers got permit in such areas efforts will be made to regulate cattle grazing of migratory graziers as well as of local graziers. The main thrust to be given to areas where migratory graziers graze their cattle. The fodder production capacity of the forests is to be increased. It will include all DPFs and UPFs and other Govt. lands and also all categories of forests. The main objective of this working circle is to be preserving the forest wealth from further deterioration in the interest of soil and water conservation.

vii) **Soil Conservation (Overlapping) Working circle:** It will include all DPFs and UPFs and other Govt. lands and also all categories of forests. The main objective of this

Working Circle is to be preserving the forest wealth from further deterioration in the interest of soil and water conservation.

viii) Water Resource Management (Overlapping) Working Circle.

This will be an overlapping working circle comprising areas of all forests which needs to be protected against soil erosion and needs water conservation. The overarching theme would be that based on identifying the recharge zones and spring-sheds, forest management would be linked with watershed management. The object is to basically enhance the hydrological regime building on the success models implemented in the past.

ix) Non-Timber Forest Products Working Circle:

This overlapping working circle aims to identify the NTFPs to be managed, evaluate the existing system of management, and evaluate the potential for future sustainable management for creating livelihood for the people.

x) Wildlife Management Working Circle

This will be an overlapping working circle comprising all forest areas. The objective will be to identify important area for wildlife and conservation, to reduce the man-animal conflict and address problems of poaching. Ecotourism potential shall also be explored. The whole tract has a variety of wild animals and birds since the forests are distributed from low elevation to the high snow areas. The provisions of the Wild Life Protection Amendment Act, 2002 are to be enforced and the man, animal conflict is reduced.

xi) Biodiversity Conservation Working Circle:

The diversity of the ecosystem in the forest areas and special needs of sensitive ecosystems and habitat will be identified, described and addressed. Along with conservation, maintenance and enhancement of biodiversity, the endangered species shall be identified and protected with special care.

Xii) Eco-Development and Human Resource Management Working circle

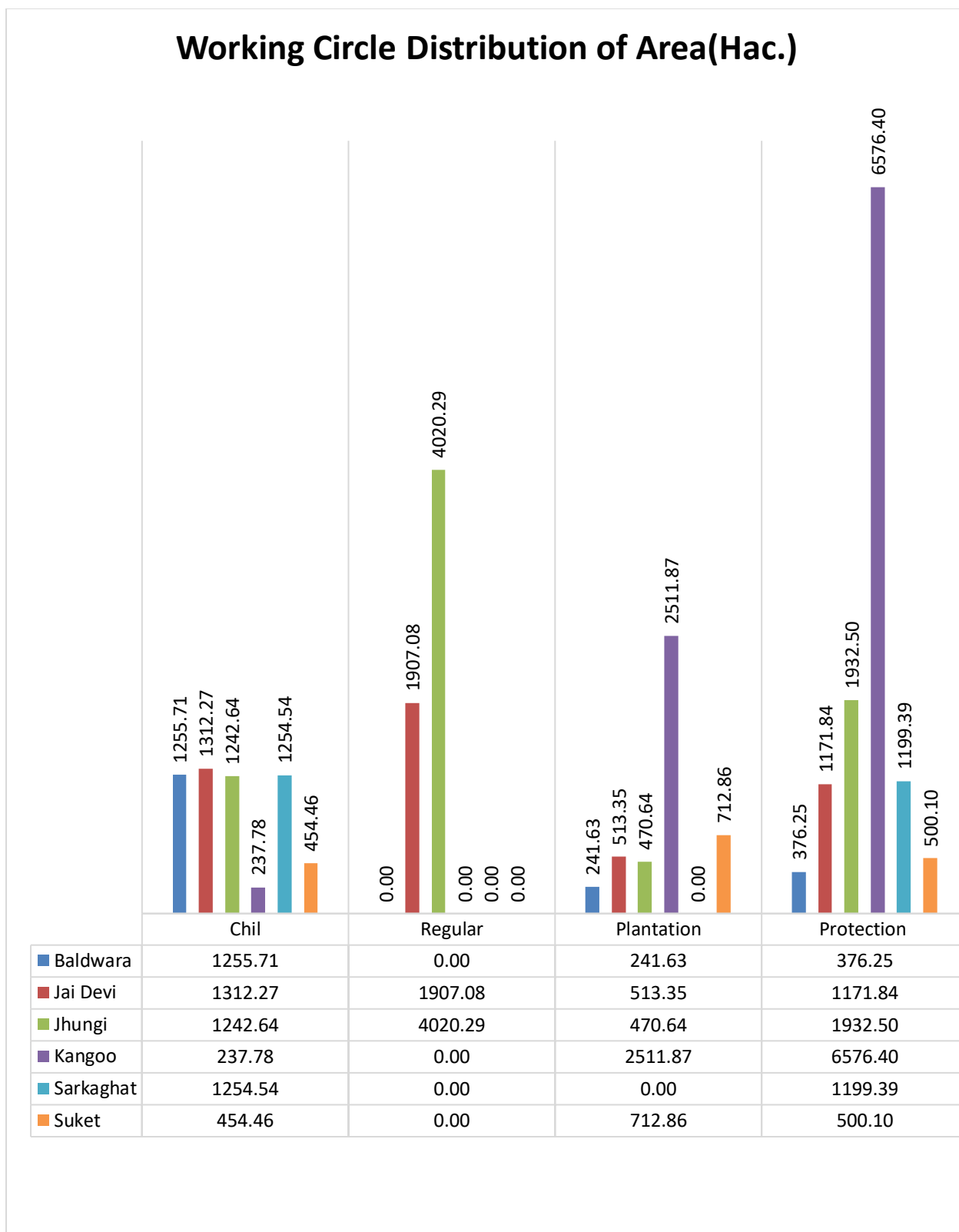
The working circle will look into aspects that will look into multiple stakeholders in

forests and natural resource conservation. It will look into the measures related to strengthening people's participation in forest management and utilization, and capacity building of forest field staff.

Table 1.1 Working circle and its range wise distribution. (ha.)

Working Circle Distribution of Area (Hac.)					
	Forest Working Circle				Grand Total
Range	Chil	Regular	Plantation	Protection	Area
Baldwara	1256.2	0.00	241.63	376.25	1874.08
Jai Devi	1312.32	1907.08	513.35	1171.84	4904.54
Jhungi	1242.64	4021.29	470.64	1932.50	7666.07
Kangoo	237.78	0.00	2511.87	6576.40	9326.05
Sarkaghat	1254.54	0.00	0.00	1199.39	2453.93
Suket	454.46	0.00	712.86	500.10	1667.42
Grand Total	5757.94	5928.37	4450.35	11756.48	27893.15

Fig 1.1 Working Circle distribution of area



1.7 Period of Working Plan And Necessity For Intermediate Revision:

This working plan will be in place for 10 years w.e.f. 2024-25 to 2033-34. A mid-term review shall be undertaken for mid-course correction by the consultative committee under the chairmanship of PCCF (HoFF) with representation from Regional APCCF (MoEF).

1.8 Interim Period Management:

Management of Forests during the Interim Period (2018–19 to 2023–24):-

The management of the Suket Forest Division during the interim period, from the conclusion of the previous working plan in 2017-18, (2018–19) to the commencement of this revised working plan (2024–2034), was conducted under the guidance of the prescriptions outlined in the existing working plan i.e . R K Singh's Working Plan. The delay in the preparation and approval of the revised working plan was primarily due to unforeseen disruptions, including the global COVID-19 pandemic, administrative constraints, and technical challenges. These challenges, however, were met with adaptive management strategies, ensuring minimal disruption to forest management during the interim period. The draft working plan (2024–2034) builds upon the foundations laid during the interim period. It integrates lessons learned, addresses management gaps identified, and aligns with the latest scientific and policy frameworks. This ensures that the Suket Forest Division continues its trajectory toward sustainable and climate-resilient forest management.

Chapter 2

REGULAR (DEODAR AND KAIL) WORKING CIRCLE

2.1 General Constitution: This working circle covers all the DPFs situated on comparatively moderate slopes and where Deodar and Kail either pure or intimately mixed, are the predominate species. Some of the forests having predominately Fir/Spruce Forest on easier slopes allotted in the working plan under revision, mainly for packing cases at that time, are also retained in this working circle. This working circle covers an area of 5928.37 ha.

The complete details regarding the forest/compartment/sub-compartment allotted to this working circle are given in para 2.3 below

2.2. General character of Vegetation: The crop is mainly deodar, Kail, Spruce/Fir with a varying inter mixture of evergreen and deciduous broad-leaved trees. The Deodar, Kail, Spruce and Fir forests occur either pure or in mixture. Fir and Spruce also met with in the upper reaches and depression. Some pure forests of Fir and Spruce also occurs e.g. D. 195 Kamru, D.197 Banwali. Chil also occupies in few forests of the lower zone on warmer aspects as in D.175 Kamand, C.2, 4 &, D.196 Bhun, D.251 Shivshankar, D.179 Jhalangar. All age classes are met with, but there is an overall preponderance of middle-aged trees, due to heavy marking in T.D. in the past and at present and removal of mature and over-mature trees in the past. The forests are fairly well stocked except on southern slopes, steep portion and adjoining habitations. All the fire blanks created by fire in the past are also stocked up; with Deodar, Kail, Spruce or Chil. Deodar, Kail and Fir trees have been heavily lopped in the forests adjoining habitation especially in Jhungi and Jai Devi Ranges.

2.3. Block and Compartment: The existing division of forests into compartment and sub compartment has been retained as such. There is no change of crop pattern due to non-working of forests during the currency of Working Plan due to blanket ban on green felling imposed by the H.P. Govt.

Table 2.1 List of Regular working circle

Regular Working Circle						
PB	Range	Block	Beat	Name of Forest	Compartment	Area (ha)
PB-I	Jai Devi	Jai Devi	Doldhar	O.D. 134 Hafwana	Whole	4.66

		Rohanda	Rohanda	O.D. 153 Kamrah	C-II	94.58
					C-III	86.27
				O.D. 154 Banwali	C-III	31.35
					C-IV	60.41
	Jhungi	Jhungi	Chanad Bahan	O.D. 261 Jogi Kufar	C-1	27.58
					C-2	26.92
					C-3	20.24
				O.D. 262 Narsingh	C-2	13.96
			Salani	O.D. 265 Salani	C-1-b	17.2
					C-3	32.4
		Jhungi	Barnog	O.D. 252 Bada Gadown	C-2	43.7

2.4 Special objects of Management:

- i) To continue the conversion of generally irregular Deodar, Kail, Spruce forests into more or less uniform crop.
- ii) To bring these forests gradually to normal conditions as near as possible by obtaining a more distribution of age classes with normal increment and normal regeneration by natural and artificial means.
- iii) To fully restock PB I areas, as early as possible by supplementary regeneration through artificial regeneration and to tend the already obtained.
- iv) To provide the requirements of right holders for the constructional timber, fire wood and grazing etc.
- v) To seek involvement of local people by adopting Joint Participatory Forestry Management, wherever possible.
- vi) To obtain maximum possible progressively increasing sustained yield of timber suited to the market demands
- vii) To thin and tend the forests already so covered.
- viii) To raise broad leaved species in depression which are best suited to them in order to meet regeneration of fodder and fuel and reduce fire hazards.

2.5 Area Statement: A total area of this Working Circle is 5928.37 ha. The distribution of the area according to ranges is given below:

Table 2.2 Distribution of the area according to ranges

Regular Working Circle					
Range	PB				Grand Total Area (Hac)
	PB-I	PB-II	PB-III	PB-IV	
Jai Devi	277.27	807.10	382.98	439.73	1907.08
Jhungi	2022.03	1424.34	158.83	416.09	4021.29
Grand Total	2299.30	2231.44	541.81	855.82	5928.37

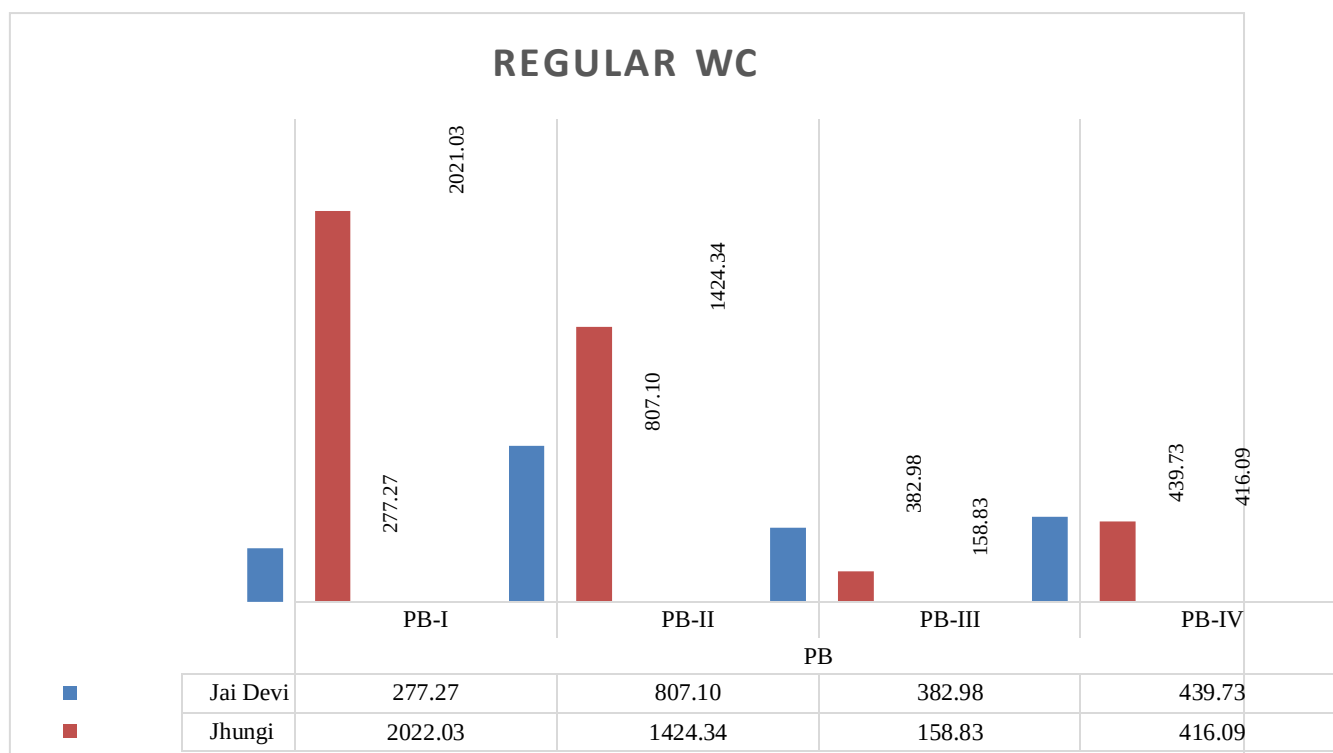


Fig 2.1 Forest allotted to working circle

Table 2.3 List of Forests under Regular Working Circle

Regular Working Circle						
PB	Range	Block	Beat	Name of Forest	Compartment	Area(Hac.)
PB-I	Jai Devi	Jai Devi	Doldhar	O.D. 134 Hafwana	Whole	4.66
		Rohanda	Rohanda	O.D. 153 Kamrah	C-II	94.58
					C-III	86.27
				O.D. 154 Banwali	C-III	31.35
					C-IV	60.41
	Jhungi	Jhungi	Chanad Bahan	O.D. 261 Jogi Kufar	C-1	27.58
					C-2	26.92
					C-3	20.24
				O.D. 262 Narsingh	C-2	13.96

			Salani	O.D. 265 Salani	C-1-b	17.2
					C-3	32.4
		Jhungi	Barnog	O.D. 252 Bada Gadown	C-2	43.7
					C-3	59.92
					C-4	32.6
				O.D. 253 Banesti	C-1-a	64.98
					C-1-b	47.9
					C-2-a	37.46
					C-2-b	45.64
			Dharwar	O.D. 254 Gohata	C-1	42.1
					C-2-a	61.1
					C-2-b	64.26
				O.D. 255 Richhan Nal	C-1	60.3
					C-2-a	35.42
					C-2-b	24.65
					C-2-c	41.82
				O.D. 256 Rang Jhol	C -1-b	30.81
					C -2	42.5
					C-1-a	43.91
				O.D. 257 Jabaltoo	C -1	14.6
					C -2	17.92
			Jhungi	O.D. 258 Garh Ka Chhol	C -1	22.7
					C -2-b	13.93
				O.D. 259 Chota Gadown	C-1-a	29.51
					C-1-b	35.61
					C-2	40
				O.D. 260 Khobla	C-3	30.04
		Nihri	Kanas	O.D. 194 Kanas	C 2 (a)	11.24
					C 3 (a)	49.76
					C 3 (b)	9.15
					C 3 (c)	24.87
					C 3 (d)	38.75
			Nihri	N.D. 191 Gera	C-1	21.88
			Raigi	O.D. 192 Riagi	C- 2	32.63
					C-1	32.11

		Pandar	Galukhar	O.D. 248 Daint	C-2	50.13
			Jaral	O.D. 246 Manjhki	C-1(a)	21.43
					C-1(c)	21.8
			Kathiuni	O.D. 242 Kathuini	C-1(a)	46.96
					C-1(b)	43.04
				O.D. 245 Dharli	C-1(a)	18.64
					C-1(b)	15.36
			Pandar	O.D. 183 Pandar	C-2(b)	24.45
					C-3(a)	26.62
					C-3(b)	25.28
					C-4 (b)	24.18
					C-I(b)	29.4
				O.D. 184 Dwarloo	Whole	18.36
		Trechh	Balag	O.D. 197 Bag	C 1 (a)	26.35
					C 1 (b)	34.27
			Trechh	O.D. 222 Trechh	C-1-a	22.8
					C-1-b	20.1
					C-1-c	24.5
					C-1-d	22.74
					C-2-a	34.8
					C-2-b	26.35
					C-2-c	46.95
					C-2-d	40.95
					C-2-e	13.5
Total Area PB-II						2299.3
PB -II	Jai Devi	Jai Devi	Ghiri	N.D. 115 Shakohar -1	Whole	4.97
				O.D. 108 Gadhyal	C-I	27.85
				O.D. 109 Jawar Shil	C-IV	18.7
				O.D. 109 Jhawarshilh	C-I	22.6
					C-II	20.4
					C-III	25
				O.D. 112 Sakohar - A	Whole	22.33
				O.D. 114 Chambu- Ra-Shilh	C-I	22.65
				O.D. 117 Trajugi-Ii	Whole	18.02

		Nandgarh	Kuttachi	N.D. 98 Rajot	Whole	21.35
			Nandgarh	N.D. 105 Drahal - 2Nd	C-III	45.12
				O.D. 106 Latogali	C-III	29.3
					C-IV	24.28
		Rohanda	Chowki	O.D. 177 Parala	C-I	14.65
				O.D. 178 Khabora	C-IIA	25.99
					C-IIB	17.66
					C-IIC	44.24
				O.D. 179 Jhalangar	C-I	13.31
					C-II	25.63
					C-III	19.33
					C-IV	20.9
				O.D. 180 Kathyal	C-I	16.02
					C-II	42.15
			Kamand	O.D. 159 Chichar	C-II	23.81
				O.D. 175 Kamand	C-I	21.7
					C-III	33.8
					C-IV	5.4
					C-V	24.39
					C-VI	22.4
			Khabri	O.D. 165 Sanora	Whole	2.33
			Rohanda	O.D. 147 Doghari (Whole)	Whole	25.16
				O.D. 151 Bhebal -B	C-I	28.3
				O.D. 154 Banwali	C-I	23.35
					C-II	16.33
				O.D. 156 Chandakufar	C-II	12.07
					C-III	7.82
				O.D. 157 Thach Silh (Whole)	Whole	17.79
	Jhungi	Jhungi	Chanad Bahan	N.D. 264 Chanad Bahan	C-2	14.36
					C-3	30.54

		Jhungi	Barnog	O.D. 251 Shivshankar	C-3	34
					C-4	37.87
				O.D. 252 Bada Gadown	C-1-a	20.77
					C-1-b	35.93
			Jhungi	O.D. 260 Khobla	C-1	31.6
					C-2-a	20.41
					C-2-b	28.09
		Nihri	Nihri	N.D. 236 Beh	Whole	19.94
				N.D. 240 Kamrah	C-1	17.83
					C-2	22.51
				O.D. 241 Kamrah	C-1	32.03
					C-2	39.63
			Kanas	N.D. 193 Bajaran	Whole	10.65
				O.D. 194 Kanas	C 1 (a)	27.01
					C 1 (b)	18.12
					C 1 (c)	28.25
					C 2 (b)	15.34
					C 4 (a)	23.2
					C 4 (b)	11.8
			Kanaun	O.D. 186 Kanoun	C-1(b)	40.02
					C-1(c)	25.94
					C-1(d)	19.32
					C-1(e)	22.77
					C-2(a)	19.66
					C-2(b)	43.5
					C-3(a)	35.2
					C-3(b)	38.18
					C-3(c)	33.1
			Marahra	N.D. 225 Kot	Whole	9.87
				N.D. 227 Marahara -I	C-2	13.24
					C-3	32.18
				N.D. 228 Marahara–Ii	C-1	7.63

				N.D. 232 Marehra	Whole	36.72
			Nihri	N.D. 191 Gera	C-2	24.07
				O.D. 190 Nehra	Whole	22.17
			Raigi	O.D. 192 Riagi	C- 3	17.15
					C- 4	8.57
					C- 5	25.43
		Pandar	Galukhar	O.D. 250 Galukhar	C-2	13.39
			Galukhar	N.D. 249 Neulidhar	Whole	5.4
				O.D. 248 Daint	C-1(a)	29.33
					C-1(b)	21.77
			Jaral	O.D. 246 Manjhki	C-1(b)	34.73
					C-3(c)	46.7
					C-5(a)	42.4
					C-5(b)	23.6
			Kathiuni	N.D. 244 Patang	Whole	1.94
				O.D. 242 Kathuini	C-2(a)	27.81
					C-2(b)	33.42
			Pandar	N.D. 182 Bhiunkar	Whole	1.8
				O.D. 181 Bhiunkar	C-2	41.26
				O.D. 183 Pandar	C-4 (a)	26.12
				O.D. 185 Batahar	C-2	29.14
					C-3	18.6
					C-I	32.33
Total Area PB-II						2231.44
PB -III	Jai Devi	Jai Devi	Ghiri	N.D. 116 Trajugi -I	Whole	3.43
				O.D. 111 Latogali	Whole	5.74
				O.D. 114 Chambu-Ra-Shilh	C-II	9.33
				O.D. 118 Bajahar	C-I	11.2
				O.D. 120 Kaulpur Ban	C-I	18.4
		Nandgarh	Nandgarh	N.D. 103 Silh	C-IV	12.2
				N.D. 104 Drahal 1St	C-III	31.13

				N.D. 105 Drahal - 2Nd	C-I	61.87
					C-II	37.18
					C-IV	27.63
				O.D. 100 Nandgarh	C-I	19.1
				O.D. 106 Latogali	C-II	29.13
		Rohanda	Chowki	O.D. 178 Khabora	C-IA	27.78
					C-IB	24.21
			Kamand	O.D. 170 Cheora	C-I	24.02
			Rohanda	N.D. 158 Thach Silh (Whole)	Whole	11.23
				O.D. 150 Bhebal-A	C-I	18.3
					C-II	11.1
	Jhungi	Jhungi	Chanad Bahan	N.D. 264 Chanad Bahan	C-1	62.9
		Nihri	Kanas	O.D. 194 Kanas	C 2 (c)	27.84
			Kanaun	O.D. 186 Kanoun	C-1(a)	30.77
			Marahra	O.D. 196 Bhaon	C 1 (b)	16.52
		Pandar	Pandar	O.D. 183 Pandar	C-I(a)	20.8
Total Area PB-III						541.81
PB -IV	Jai Devi	Jai Devi	Doldhar	N.D. 133 Jandroh	Whole	37.15
			Ghiri	N.D. 146 Chuhani	Whole	24.06
				O.D. 149 Tapli	Whole	18.29
		Rohanda	Chowki	O.D. 177 Parala	C-II	34.44
			Kamand	O.D. 159 Chichar	C-I	13.09
			Rohanda	O.D. 148 Thuhadhar	C-I	26.06
					C-III	25.51
				O.D. 151 Bhebal -B	C-II	17.45
				O.D. 152 Berumara	C-I	10.43
					C-II	8.81
				O.D. 153 Kamrah	C-I	171.37
				O.D. 155 Majhothisilh	C-I	19.5
					C-II	11.97
				O.D. 156	C-I	21.6

				Chandakufar		
	Jhungi	Jhungi	Chanad Bahan	O.D. 263 Rounce	C-1	32.91
		Jhungi	Barnog	O.D. 251 Shivshankar	C-1	14.2
			Jhungi	O.D. 258 Garh Ka Chhol	C -2-a	18.91
		Nihri	Kanas	N.D. 195 Bagari	Whole	14.37
			Marahra	N.D. 227 Marahara -I	C-1	35.19
				O.D. 196 Bhaon	C 2	26.55
		Pandar	Galukhar	O.D. 250 Galukhar	C-1	18.6
			Jaral	O.D. 246 Manjhki	C-2	45.8
					C-4	110
			Kathiuni	O.D. 245 Dharli	C-2(a)	28.16
					C-2(b)	14.66
			Pandar	O.D. 183 Pandar	C-2(a)	34.05
		Trechh	Trechh	O.D. 222 Trechh	C-3-a	22.69
Total Area PB-IV						855.82
Grand Total						5928.37

2.6 Area analysis and valuation of the crop: The forests allotted to this working circle have been stock mapped to show the species and age classes' distribution on 1:15000 scales and filled in the respective Compartment History Files.

The abstract of the area under different species has been given in a tabular form below:

Table 2.4 Abstract of species

Name of Range	Deodar	Kail	Chil	Rai/fir	Mixed conifers Ban	Ban	Cultural blank	Uncultural blank	Total
Jai Devi	382.77	258.65	14.15	251.12	935.72	42.80	12.76	9.01	1907.08
Jhungi	2366.08	1017.80	92.03	69.00	460.14	7.80	7.39	...	4021.29
Total	2748.85	1276.45	106.18	302.12	1395.86	50.60	20.15	9.01	5928.37

2.7 Quality classes: Quality class has been determined by taking height measurements of dominants trees of dominants species and comparison done with standard classes in the Yield Table of these species. Deodar varies from I to II class, majority of forests approaching I class. The quality class in respect of Deodar, Kail and

Spruce/Fir has been indicated in compartment description.

2.8 Age Classes: The crop is generally uneven aged due to marking of forest to bring normal crop. PB IV area is having young age with mature trees standing over. Similarly, PB I areas felled in regular working plan, having young age with mature to over mature trees due to non-removal of trees standing over established crop in spite of prescribed under corrective seeding felling and secondary fellings in the expiring working plan. In PB II trees are generally middle aged to mature with good proportion of young age classes. In PB III areas the crop is generally support irregular crop due to marking of trees under T.D. age classes' distribution is given in Summary of Enumeration. The percentage of each diameter class for Deodar, Kail of total growing stock is given below:

Table 2.5 Diameter class of Deodar and Kail

Diameter Classes in Cms.	Deodar %	Kail %
V (10-20)	24.50	2.77
IV(20-30)	21.99	13.88
III(30-40)	13.00	14.97
IIA(40-50)	6.99	22.22
IIB(50-60)	16.49	16.66
IA(60-70)	3.49	11.11
IB(70-80)	5.49	11.11
IC(80-90)	7.50	0
ID(90-100)	0.49	5.55

Analysis of the above enumeration figure reveals that young age classes is predominating in case of all species. V Class trees are the highest then follows IV class, then III and so on.

2.9. Density: The density of each compartment or sub compartment has been determined by ocular estimation as well as with the help of yield tables and the same has been incorporated in C.H. files. An ideally fully stocked has been assumed to be density 1.0 and decimal figures were adopted for the forest less

than fully density. On the whole density varies from 0.3 to 0.8 and averagedensity is 0.6.

2.10 Enumeration

The technique of Survey and Assessment of Forest Resource using Grid and Quadrants method (Sample Plots) has been adopted and complete counting of all tree species class wise has been done. A total of 18 Sample Plots of 0.1 hac. were laid in this working circle covering all PBs. The details of PB wise sample plots are as under. The detailed forest wise enumeration results are given in Appendix No- The results have been analyzed statistically and growing stock has been assessed / extrapolated.

S.No	PB	No. of plots	Total area counted Hac
1	PB-I	4	0.4
2	PB-II	7	0.7
3	PB-III	5	0.5
4	PB-IV	2	0.2
	Total	18	1.8

Results of enumerations

Table 2.6 Results of enumerations of different PB
PB I

Tree Count										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	0	0	0	0	0	0	0	0	0	0
Deodar	22983	51711	34474	22983	91932	28728	45966	45966	0	344743
Kail	0	0	0	0	0	0	0	0	0	0
Khair	0	5745	0	5745	5745	11491	22983	0	5745	57454
Ban	0	5745	0	0	0	0	0	0	0	5745
Fir Spruce	5745	0	0	0	0	0	0	0	0	5745
BL	0	0	0	0	0	0	0	0	0	0
Grand Total	28728	63201	34474	28728	97677	40219	68949	45966	5745	413687

Tree Volume										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Deodar	1287.05	10135.36	26062.34	36037.34	241965.02	112613.76	257409.60	328197.24	0.00	1013707.72
Khair	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	0.00	1206.45	0.00	7066.35	14649.75	43435.98	123418.71	0.00	42800.25	232577.49
Ban	0.00	1723.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1723.50
Fir Spruce	494.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	494.07
BL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Total	1781.12	13065.31	26062.34	43103.69	256614.77	156049.74	380828.31	328197.24	42800.25	1248502.78

PB II

Tree Count										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	165764	63755	0	0	0	0	0	0	0	229519
Deodar	44628	35065	22314	25502	25502	0	6375	3187	3187	165760
Kail	0	0	0	0	0	0	0	0	0	0
Khair	3187	12751	19126	22314	15938	6375	0	0	3187	82878
Ban	3187	9563	15938	25502	0	3187	0	0	0	57377
Fir Spruce	12751	3187	3187	6375	0	3187	0	0	0	28687
BL	0	0	0	0	0	0	0	0	0	0
Grand Total	229517	124321	60565	79693	41440	12749	6375	3187	6374	564221

Tree Volume										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	8288.20	7013.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15301.25
Deodar	2499.17	6872.74	16869.38	39987.14	67121.26	0.00	35700.00	22755.18	22755.18	214560.05
Khair	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kail	254.96	2677.71	11284.34	27446.22	40641.90	24097.50	0.00	0.00	23743.15	130145.78
Ban	0.00	2868.90	15938.00	45903.60	0.00	14660.20	0.00	0.00	0.00	79370.70
Fir Spruce	1096.59	901.92	2887.42	10531.50	0.00	12894.60	0.00	0.00	0.00	28312.03
BL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Total	12138.91	20334.32	46979.15	123868.46	107763.16	51652.30	35700.00	22755.18	46498.33	467689.81

PB III

Tree Count										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	1083	1083	0	0	0	0	0	0	0	2166
Deodar	0	3250	3250	1083	7585	1083	0	0	0	16251
Kail	0	0	0	0	0	0	0	0	0	0
Khair	0	0	0	0	0	0	0	0	0	0
Ban	10836	13003	4334	1083	1083	0	0	0	0	30339
Fir Spruce	0	0	0	0	0	0	0	0	0	0
BL	0	1083	0	1083	0	0	2167	0	0	4333
Grand Total	11919	18419	7584	3249	8668	1083	2167	0	0	53089

Tree Volume										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	54.15	119.13	0	0	0	0	0	0	0	173.28
Deodar	0	637.00	2457.00	1698.14	19963.72	4245.36	0	0	0	29001.22
Khair	0	0	0	0	0	0	0	0	0	0
Kail	0	0	0	0	0	0	0	0	0	0.00
Ban	0	3900.9	4334	1949.4	3249	0	0	0	0	13433.30
Fir Spruce	0	0	0	0	0	0	0.00	0	0	0.00
BL	0	301.69	0	1578.09	0	0	10351.59	0	0	12231.37
Grand Total	54.15	4958.72	6791.00	5225.63	23212.72	4245.36	10351.59	0	0	54839.17

PB IV

Tree Count										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	0	8558	0	0	0	0	0	4279	0	12837
Deodar	132652	89861	42791	4279	8558	4279	4279	25674	0	312373
Kail	0	0	0	0	0	0	0	0	0	0
Khair	0	0	0	0	0	0	0	0	0	0
Ban	0	0	0	0	0	0	0	0	0	0
Fir Spruce	4279	0	0	0	0	0	0	0	0	4279
BL	0	0	0	0	0	0	0	0	0	0
Grand Total	136931	98419	42791	4279	8558	4279	4279	29953	0	329489

Tree Volume										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	0.00	941.38	0.00	0.00	0.00	0.00	0.00	23363.34	0	24304.72
Deodar	7428.51	17612.76	32350.00	6709.47	22524.66	16773.68	23962.40	183312.36	0	310673.83
Khair	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
Kail	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
Ban	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
Fir Spruce	367.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	367.99
BL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
Grand Total	7796.51	18554.14	32350.00	6709.47	22524.66	16773.68	23962.40	206675.70	0	335346.55

Summary of Enumeration Regular working circle

Tree+N14:X37 Count										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	26179 2	11360 7	0	0	0	0	0	4939	0	380338
Deodar	24203 4	21733 6	12842 6	69152	16300 2	34576	54334	74092	4939	987891
Khair	0	0	0	0	0	0	0	0	0	0
Kail	4939	24697	29636	39515	29636	19757	19757	0	9878	177815
Ban	54334	79031	44455	44455	4939	4939	0	0	0	232153
Fir Spruce	29636	4939	4939	9878	0	4939	0	0	0	54331
BL	0	4939	0	4939	0	0	9878	0	0	19756
Grand Total	59273 5	44454 9	20745 6	16793 9	19757 7	64211	83969	79031	14817	1852284

Tree Volume										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	13089 .60	12496 .77	0	0	0	0	0	26966. 94	0	52553.3 1
Deodar	13553 .90	42597 .86	97090. 06	10843 0.34	42902 1.26	13553 7.92	30427 0.40	52901 6.88	35264. 46	169478 3.08
Khair	0	0	0	0	0	0	0	0	0	0.00
Kail	395.1 2	5186. 37	17485. 24	48603. 45	75571. 80	74681. 46	10609 5.09	0	73591. 10	401609. 63
Ban	0	23709 .30	44455. 00	80019. 00	14817. 00	22719. 40	0	0	0	185719. 70
Fir Spruce	2548. 70	1397. 74	4474.7 3	16318. 46	0	19983. 19	0	0	0	44722.8 2
BL	0	1375. 86	0	7196.8 3	0	0	47186. 45	0	0	55759.1 4
Grand Total	29587 .32	86763 .90	16350 5.03	26056 8.07	51941 0.06	25292 1.97	45755 1.94	55598 3.82	10885 5.56	243514 7.67

2.11 Silvicultural System: The forests of this working circle will be worked under Punjab Shelter Wood System with fixed periodic Blocks. Felling shall be done according to the nature of the terrain. Selection marking is done on steep, precipitous slopes, whereas no marking on precipitous slopes. and retention of compact groups of healthy and vigorous poles up to 30 cms dbh but not less than 0.2 ha in extent with 0.7 density will be retained as future crop in PB I marking. In the past scattered poles occurring singly or in groups of lesser extent than one indicated above has been retained and resulted un even aged crop in uniform PB I and PB IV areas. Now removal of these trees will not be possible except thinning as and when transfer to PB III .Regeneration in PB I will be supplemented by artificial means without waiting for natural regeneration, immediately after fellings and debris clearance. Young established regeneration PB IV shall be thinned and unwanted over wood standing over established crop shall be removed. Thinning cum improvement fellings shall be carried out in PB III areas and where advance growth retained at the time of PB I marking. No fellings be done in PB II except for the removal of dead, dry, uprooted and fallen trees as per norms of salvage marking.

2.11.1. Choice of species: The forests allotted to this working circle are, by and large pure Deodar and Kail forests with mixture of these species, Fir and Chil also occurs on suitable aspects. The species eminently suited to the locality will be favored and get preference over all other species. Deodar timber fetches the highest price among the coniferous as per present market trends. Kail is more susceptible to fire danger and is often have burnt. It is also lopped heavily and therefore, attacked by fungus Termites Pinni. Deodar will, therefore, be preferred to Kail and Fir will be introduced wherever it can be conveniently introduced. The proportion of Deodar can be increased by encouraging its natural spread through cleaning, thinning and improvement fellings favoring and discarding Kail where possible in preference to Kail as Spruce. Retaining Deodar as seed bearers in preference to Kail or Spruce can increase this proportion On hot southern slopes on exposed ridges Kail allow to come up. Similarly Spruce and Silver fir belt and pockets shall not be converted into Deodar and Kail. Therefore, Fir and Spruce will be encouraged, wherever they are growing naturally and efforts will be made to introduce them in suitable areas. Cool and moist locations should be invariably be planted with valuable broad leaved species like

Walnut, Mohru, Popular Birdcherry, Acer, Aesculus indica, Ash, Carpinus, Populus in their natural habitats, Robinia will be raised along boundary line. Detail treatment map should be prepared for areas where sowing/planting to be done with species to be planted.

2.11.2. Rotation: As per statistical data give in Para 2.6.2.1 Chapter VI Deodar takes 111 years, Kail 91 years to attain 60 cms diameters, which has been fixed as exploitable diameter. Accordingly the rotation/conversion period 120 years has been adopted. The forests are under the process of conversion to uniform. The irregular and generally under stocked nature of forests is coupled with the facts that most of the Kail is generally rotten, culled for short conversion period. But in the interest of sustained yield and to avoid the sacrifice of young crop, conversion period is fixed equal to the rotation. For quality class II, Deodar crops with proposed “D” grade thinning the mean annual increment for stem timber culminates at 120 years. As per statistical data given in Para 6.2.1 of Chapter VI of part I, Deodar takes 111 years, Kail 91 years to attain the exploitable diameter of 60 cms dbh. Accordingly the rotation/conversion period is fixed 120 years corresponding to 60 cms dbh a size suitable for economical conversion into sleepers/scantlings.

2.12 Regeneration Period: This is the period which is considered necessary for complete regeneration by natural or artificial supplemented and will reach the pole crop and will not be liable to damage due to grazing. On inspection of forests in the field show that period of 30 years is more than enough to regenerate a PB I areas. Therefore, the regeneration is kept at 30 years The crop for quality II areas attains an average height of 5 metres during the period, which can be considered as established, as is visible in old areas PB I areas and plantations done in blanks created by natural calamity and planting in Ban Oak forests in Treach Block of Jhungi range and in Gehru forest of Kangoo Range.

It is evident that the area felled in the past are most regenerated but due to non-removal of over wood standing over established crop it is being suppressed and not putting required growth in height and diameter. The areas where seeding felling prescribed but not felled are also having regeneration in the form of recruit and seedlings, occasionally patches of sapling and pole also noticed.

2.13. Division into Periodic Blocks: With a rotation/conversion period of 120 years and regeneration period of 30 years; the area of this circle, is divided into

four Periodic Blocks with definite allotment. Efforts have been made to allot areas to the most appropriate periodic blocks. Due to irregular nature of the existing crop and non felling of forests due to ban on green felling, it is not possible to differentiate the age classes by PBs.

P.B.I Areas: It includes the following types of areas:

1. Forests/compartment, which had been allotted to P.B.I area in Nanak Chand and RK Singh Working plan, but have not so far been fully regenerated.
2. Forest/compartment, which had been allotted by Nanak Chand and RK Singh in P.B. I area, but not felled during the working plan, e.g. D.254 Gouhta. C1 , D.258 Garh ka Chhol C.2a & 2b, D.183 Pandar C.3a&3b, D.159 Chicher C.1, D-Rangjhol C.2.
3. Some of the PB II area having middle aged to mature, PB III area having middle aged to mature open crop due to TD markings and regeneration is coming up ,allotted to PB I.
4. Mature or over mature trees and predominately diseased Kail areas are proposed to be replaced with healthy crop of Deodar and Kail.

P.B.II All forests which have preponderance of age classes approaching maturity have been allotted to P.B.II. Some of the PB-II areas of working plan under revision have been retained in this periodic block as these were not mature enough to be allotted to PB-I.

P.B.III The forests allotted to this block are those bearing generally from pole crop to middle aged trees, with a few scattered mature and maturing trees have been allotted to this periodic block.

P.B.IV All the compartments carrying established young pole crop with scattered mother trees, have been kept in PB-IV. Over wood require immediate removal.

The detailed allotment on the basis of the aforesaid analysis is given in sub-joined statement:

Regular Working Circle					
Range	PB				Grand Total Area (Hac)
	PB-I	PB-II	PB-III	PB-IV	
Jai Devi	277.27	807.10	382.98	439.73	1907.08
Jhungi	2021.03	1424.34	158.83	416.09	4020.29
Grand Total	2298.30	2231.44	541.81	855.82	5927.37

2.14. Felling Cycle: A felling cycle of 10 years corresponding to the period of the plan has been adopted. The seeding felling will be done during this period, as no felling done during the last 15 years due to ban on green felling.

2.15. Calculation of yield:

2.15.1. The total growing stock has been calculated from the enumeration carried out/computed from grid enumeration and results of different Periodic Blocks, as tabulated overleaf giving number of trees and volume. From the enumeration results given in the table, it is clear that bulk of the crop is IIA and IIB classes and then there is abrupt fall in higher classes, the highest number of trees are in Vth class followed by IV class and so on.

2.15.2. The volume of each P.B on the basis of estimation results as given under.

2.15.3. Method for the calculation of yield: The expected yield for the whole working circle has been calculated as under:

2.15.3.1. Von Mantel's Formula method:

$$Y = 2.G/R$$

Where Y= Annual yield in m³

G= Total growing stock of the working circle in m³

R= Rotation in years.

$$\text{Deodar} = 2 \times \frac{1694783.08}{120} = 28246.38 \text{ or say } 28000 \text{ m}^3$$

$$\text{Kail} = 2 \times \frac{401609.08}{120} = 6693.48 \text{ or say } 6600 \text{ m}^3$$

$$\text{Rai/Fir} = 2 \times \frac{44722.82}{120} = 745.38 \text{ or say } 750 \text{ m}^3$$

$$\text{Chil} = 2 \times \frac{52553.31}{120} = 875.88 \text{ or say } 800 \text{ m}^3$$

2.15.3.2. By Blanford and Simmon Formula:

$$Y = \frac{V}{\frac{1}{2} R(1 - x^2/R^2)}$$

Where Y= annual yield

V= Total growing stock measured down to 10 cm. diameter R=Rotation in years (i.e. 120 years)

X=age in years required to attain the diameter to which the stock has been measured.

The detail calculation is as under:

$$\text{Deodar} = \frac{1694783.08}{\frac{1}{2} 120(1 - 23^2/120^2)} = 29423.32 \text{ or say } 29400 \text{ m}^3$$

$$\text{Kail} = \frac{401609.63}{\frac{1}{2} 120(1 - 18^2/120^2)} = 6972.389 \text{ or say } 6950 \text{ m}^3$$

$$\text{Rai/Fir} = \frac{44722.82}{\frac{1}{2} 120(1 - 24^2/120^2)} = 776.4378 \text{ or say } 770 \text{ m}^3$$

$$\text{Chil} = \frac{52553.31}{\frac{1}{2} 120(1 - 15^2/120^2)} = 912.3839 \text{ or say } 900 \text{ m}^3$$

(iii) Main Yield (by Hufnagel's Formula) The PB wise yield is calculated by following this method. In view of the fact that only seeding felling will be carried out in P.B.I areas during the period of the plan, the yield has been calculated as under taking into view the silvicultural availability assessed on the basis of actual marking in some of the P.B. I areas performed during the period of Working Plan by Sharma and Pandey.

$$Y = \frac{C_1 V_1 + C_2 V_2}{P}$$

Where Y is annual yield

V1 is the volume of trees above 40 Cm dbh in P.B.1 V2 is the volume of trees up to 40 cm dbh in PB I

C1 is a constant to represent the proportion of 40 cm and above dbh trees required to be felled.

C2 is a constant represents the proportion of 40 cm dbh to be felled. P is the period of regeneration in the plan

The value of C1 and C2 is as per field inspection at the time of felling and adopted in the working plan under revision.

	C1	C2
Deodar	0.8	0.7
Kail	0.8	0.7
Rai/Fir	0.6	0.5
Chil	0.8	0.7
Y	$= \frac{C1V1+C2V2}{P}$	
Deodar	$= \frac{0.8 \times 976222.97 + 0.7 \times 37484.75}{30} = 26907.2567 \text{ or say } 26500 \text{ m}^3$	
Kail	$= \frac{0.8 \times 231371 + 0.7 \times 1206.45}{30} = 6198.04 \text{ or say } 6000 \text{ m}^3$	
Rai/Fir	$= \frac{0.6 \times 0 + 0.5 \times 494.07}{30} = 8.2345 \text{ or say } 8 \text{ m}^3$	
Chil	$= \frac{0.8 \times 0 + 0.7 \times 0}{30} = 0$	

The Hufnagel's Formula/ method has minimum yield hence adopted

2.16. Yield from P.B.II

Only dead and wind broken or otherwise seriously damaged trees will be marked under salvage marking as per norms of salvage prescribed. No yield is prescribed. Thinning will however to be carried out according to strict silviculture principles.

2.17. Yield from P.B.III The yield from this P.B. will be in the form of thinning and removal of dead, dry, uprooted and fallen trees. The demand of the right holders is in variably met with from the forests of this periodic block. The demand of right holders has been increased manifold due to improvement in the economic condition of the people and it is likely to show further increase year after year. But the per house hold consumption timber has reduced due to the construction of modern houses and increasing trend of single family system. The average annual removal of T.D. for the last 15 years is 3643 m³. Grant of T.D. therefore, needs to be controlled from this P.B. since the yield from thinning and improvement felling in this P.B. shall be mainly taken away by the right holders, the forest needs not to be included in the felling programme of thinning. It is estimated that not more than 5% of total growing stock will be available for felling under thinning-cum-improvement felling during the plan period:

Species	Total volume	Vol. available for Felling during the plan period	Annual prescription
Deodar	29001.22	1450	14.50 or say 14 m ³
Kail	0	0	0
Rai/Fir	0	0	0
Chil	173.28	8.664	0

2.18. Yield from P.B.IV Estimation down to 10 cm dbh have been carried out in all the areas of this periodic block. The abstract of the growing stock is given above. Calculation of yield has been based on the total volume of trees in P.B.IVs. 75% trees above IIB were prescribed for the removal in the previous working plan, but the same was not removed due to ban on green felling and trees become wolf and Kail having rotten and putting negative increment and total removal required. Increment has not been taken into account. All the trees above IIB and above do not warrant their retention in this block and as such can be removed during the plan period. Though silviculturally it is not possible to remove all such trees yet trees standing on precipitous and broken ground will have to keep as fire insurance and national emergency reserves. This being the position so it has been estimated that only 70% of volume of the trees of IIB and over can be removed during the Working Plan period.

Species	Total volume of IIB and above as estimated in P.B.IV	Vol. available for felling during the plan period	Annual prescription
Deodar	462573.1	323801.17	32380.11m ³ or say 32000 m ³
Kail	0	0	0
Rai/Fir	0	0	0
Chil	23363.34	16354	1635 or say 1600 m ³

Alternate method (By Hufnagel's Formula)

Where Y is annual yield

V₁ is the volume of trees above 40Cm dbh in P.B.1
V₂ is the volume of trees up to 40 cm dbh in PB I

C1 is a constant to represent the proportion of 40 cm and above dbh trees required to be felled.

C2 is a constant represents the proportion of 40 cm dbh to be felled. P is the period of regeneration in the plan

The value of C1 and C2 is as per field inspection at the time of felling and adopted in the working plan under revision.

	C1	C2
Deodar	0.8	0.7
Kail	0.8	0.7
Rai/Fir	0.6	0.5
Chil	0.8	0.7
Y	$= \frac{C1V1+C2V2}{P}$	

Deodar = (0.8 x 253282.6 + 0.7 x 57391.26) /30
= 8093.33207 or say 8000 m³

Chil = (0.8 x 23363.34 + 0.7 x 941.38)/30
= 644.987933 or say 600 m³

Kail = (0.8 x 0 + 0.7 x 0) /30
= 0 m³

Rai/Fir = (0.6 x 0 + 0.5 x 367.99) /30
= 6.133 or say 5 m³

The alternate method has minimum yield hence adopted

Hence the yield prescribed for this Working Circle in cubic meters is as under:

S.No.	Species	PB I	PB II	PB III	PB IV	Total
1	Deodar	26500	--	14	8000	34514
2	Kail	6000	---	0	0	6000
3	Rai/Fir	8	---	0	5	13
4	Chil	0	---	0	600	600
	Total	32508	---	14	8605	41227

The yield is, therefore, controlled by periodical blocks, In case

concentrated felling have to be carried out in some of the forests allotted to this Working Circle, for any reason what so ever reason, then the same will count towards the yield prescribed in P.B.I. In that case the territorial staff will be required to carry out compensatory plantation in suitable selected areas/patches. Definite prescription if laid down those removals must be compensated by replacement.

2.19. The yield prescribed under Para 2.21 will be inclusive of trees marked to meet right holders demand

2.20. Control of yield: All the removal in this working circle will count towards the yield. Deviation at the end of 5 year and at end of the plan period shall not exceed 10% +/- of the annual yield. These yields will be regulated for each 5 year period and total deviation will not be beyond +/- 10% of the prescribed yield. Yield removals will depend upon the progress of regeneration. If regeneration is not keeping pace with fellings, removals will have to be curtailed accordingly. The regeneration problem is not in this area except damage by fire for which special protection measures are to be adopted for this purpose. Regeneration assessment survey must be carried out once in 3 years. A detailed report is submitted along with the felling program for approval of Pr. CCA.H.P., through C.F. Working Plan for examination and orders. Territorial D.F.O. will submit the felling program for three years in advance for approval to avoid unnecessary felling without regeneration progress. This will also help to raise nursery stock in advance so that nursery plant are available for planting after felling operations are over.

2.21. Method of Execution of marking in P.B.I

The markings in PB1 areas shall be carried out by the Divisional Forest Officer / Assistant Conservator of Forests. Two types of markings viz; Seeding Felling and final felling shall be carried out. The secondary or corrective felling will be carried out as per requirement of crop. The complete removals of overwood would be done in areas where the regeneration has fully established. While carrying out markings of seeding felling, certain guiding principles are to be followed: -

Marking Rules:-

- 1) Marking will be done under Indian irregular Shelterwood System.

- 2) The objective of felling in this block is to replace the existing crop by young and more uniform crop. The marking in these areas shall be carried out by senior officers.
- 3) There will be only one felling i.e. seeding felling in P.B. I. Final felling will be done in PB IV.
- 4) Well grown, healthy, tall, clean bole trees with well-developed crown, preferably of IIB to IIA class, uniformly spaced will be retained as seed bearers. The number will be 35-45 trees in case of Deodar and Spruce, 25 to 35 trees of Kail and 70 to 80 in case of Fir and 20-25 trees of Chil per hectare. The spacing comes to 16-18 m, 18-21 m, 12-13 m, and 21-24 m in case of Deodar, Spruce, Kail, Fir and Chil respectively. The spacing of seed bearers should be less on hot dry aspect/steep slopes as compared to cold aspect, gentle moderate slopes. The spacing between seed bearers should be of about one crown width so as to allow sufficient light to reach the ground but the same time discourages unnecessary seed growth.
- 5) Spacing may be over looked to some extent to favour better seed bearers and the more valuable species. The order of preference of retention of seedbearer will be Deodar, Kail, Spruce and for depending of course on the fitness of site to suit these species.
- 6) In case of mixed forests of Kail and Deodar, opening of the canopy should be light so that Deodar regeneration gets a start over that of Kail. In a predominately Kail crop, retention of Deodar as seed bearer should be preferred.
- 7) Compact groups of vigorous growing pole crop upto 40 cm dbh & density not less than 0.6 and at least 0.2 ha in extent shall be retained as part of the future crop.
- 8) All dead, dying, diseased, malformed and fallen trees will be marked for removal.
- 9) A strip of 50 meters wide on either side along main roads and 25 meters wide on either side of Nallas and streams shall be left untouched.
- 10) On steep to precipitous (between 40°-45°) and broken ground, the marking will be done on selection principles.

- 11) Broad leaved trees not interfering with the conifer species or their regeneration should not be cut unnecessarily as they provide fuel / fodder to local people and also improve soil of this belt particularly in nallas/depressions which acts as barrier against fire.
- 12) Wolf trees, isolated young trees will be marked for felling.
- 13) All trees standing over established regeneration should be lopped before felling.
- 14) Broad-leaved species should also be marked on selection-on-selection principal along with principal spp.
- 15) The marking officer will prepare a detailed note/map of the area showing advance growth/selection markings/nalas, road sides and patches of concentrated fellings.
- 16) The marking officer will prepare a detailed note/map of the area showing advance growth/selection markings/nalas, road sides and patches of concentrated fellings.
- 17) The marking officer will prepare a detailed note/map of the area showing advance growth/selection markings/nalas, road sides and patches of concentrated fellings.

2.22. Method of Execution of Felling in P.B. IV areas: The marking in this periodic block will normally correspond to removal of over wood suppressing and standing over established and young crop. These felling will, therefore, conform more or less to final felling. Besides this, thinning in patches of advance growth is to be done. Following general principles are laid down:

- 2.22.1.** No attempt is to be made to obtain or induce regeneration. The markings should aim at freeing the established regeneration by removing over wood. Thus all IIB and over standing over established regeneration will be marked.
- 2.22.2.** All marked trees likely to damage young crop under it should be lopped before felling.
- 2.22.3.** Thinning in groups of poles and patches of advance growth shall be carried out if necessary.
- 2.22.4.** Broad leaved species should not be marked unnecessarily on the pretext of improved felling. They should be however, lopped where found suppressing the young crop.
- 2.22.5.** In sizeable patches where regeneration is not established the seed bearer

shall not be removed.

2.23. Sequence of felling in P.B.I: It will not be possible to carve out equal productive areas for each year due to irregular nature of crop. Therefore, it is laid down that marking should be carried out in the prescribed area, but in no case a compartment is to be left unmarked simply because that volume prescribed has been achieved. Seeding felling and corrective marking prescribed in the working plan further exaggerated problem for obtaining regeneration and having good established crop occurring in already felled area. Seeding felling will be done in areas for bringing in regeneration to the desire extent as under area prescribed for felling under packing cases also included in the sequence.

Table 2.7 Sequence of felling in P.B.I

Year	Name of Forest/compartment	Area	Type of marking
2024-25	D-183 Pandar C.1(b)	29.4	Corrective marking
	D./222 Treach C1(a)	22.4	Corrective marking
	D-252 Baragadon C2	43.7	Corrective marking
	D-155 Majothi Silh C.2	12	Corrective marking
	D.222 Treach C.1(b)	20.1	-do-
	D-252 Baragadon	59.9	-do-
2025-26	D-222 Treach C.1(c)	24.5	-do-
	D.252 Baragadon	32.6	-do-
	D-Jhalangar C 1	13.3	Seed Felling
	D-222 Treach C1(d)	22.7	Corrective marking
	D-254 Gohata C 1	42.1	Seed felling
2026-27	D-156 Chanda Kufar C1	21.6	Seed felling
	D-159 Chhichar C1	13.9	Seed felling
	D-256 Rangjhol C1(a)	43.9	-do-
	D-Banwali C2	16.3	-do-
	D.152 Berumara C1	10.4	Corrective Marking
2027-28	D.152 Berumara C2	8.81	-do-
	D-183 Pandar C2(b)	24.5	Seed felling
	D-265 Salani C3	32.4	-do-

	D-184 Dwarlu	18.4	Seed felling
	D-Richha Nali C1	60.3	-do-
2028-29	D-192 Riagi C1	32.1	-do-
	D-256 Rangjhol C2	42.5	-do-
	D-248 Daint C2	50.1	-do-
2029-30	D-185 Dharli C1(a)	18.6	Seed Felling
	D-222 Treach C3(b)	22.7	-do-
	D-246 Majhki C1(a)	21.4	-do-
	D-242 Kothuni C1(b)	43	-do-
2030-31	D-153 Kamroh C3	86.3	-do-
2031-32	D-186 Batehar C1	32.3	Seed felling
	D-196 Kanon C(d)	19.3	-do-
2032-33	D-154 Banwali C3	31.4	-do-
2033-34	D-194 Kanas 2(b)	11.2	-do-

2.23.1. Sequence of fellings in P.B.III: Thinning and improvement marking to meet the right holders demand be done, as timber rights of local people. No commercial felling prescribed hence no felling sequence is suggested.

Sequence of felling in P.B.IV: Final removal from P.B IV areas will be carried out as under. Some P.B.I area fully established have been transferred to this P.B. required special treatment and removal of over wood due to non- removal of over wood during period of working plan under revision. Light thinning will be carried out in denser pockets of these forests in addition to thinning in advance growth pockets kept at the time of marking in P.B.I

Table 2.8 Sequence of felling in P.B.IV

Year	Forest	Area
2024-25	D-183 Pandar C1(a)	20.8
	D-183 Pandar C2(b)	34.05
2025-26	D.155 Majothi Silk C.1	19.5
	D-158 Thach Shilk	11.23

	D-250 Galukhar C.1	18.6
	D-106 Lotgli C2	29.13
	D-108 Garchl C.1	27.85
2026-27	D-178 Khobra C1(a)	27.28
	D-178 Khobra C1 (b)	24.21
	D-263 Rauns	32.91
	D-251 Shiv Shankar C1(b)	14.2
	D-274 Chand Bahun	62.9
2027-28	D-150 Behbal C1	18.3
	D-150 Behbal C2	11.1
	D-197 Bahun C1(b)	16.52
	D-196 Bhaun C2	26.55
2028-29	D-258 Garh-ka-jhol C2(a)	18.9
	D-246 Majhki C2	45.88
	D-245 Dhali C2(a)	28.16
	D-245 Dharli C2(b)	14.66
	D-222 Treach C3(a)	22.69
2029-30	D-246 Majhki C4	110
	D-114 Chamu-ra-silh	19.5
2030-31	D-120 Kaulpu Ban C1	18.4
2031-32	D-186 Kanon C1(a)	30.77
2032-33	D-194 Kanas C2(c)	27.84
2033-34	D-195 Bagari	14.37

2.24. Treatment of P.B.III: Thinning-cum-improvement felling will be carried out in this periodic block on the following general principle:

- i) Dead, dying, diseased, over mature, damaged, malformed and stunted trees will be marked.
- ii) No tree will be marked with the object of obtaining fresh regeneration, or with the idea for freeing suppressed regeneration or young pole crop below 30 cm diameter forming the under wood.
- iii) All removals should aim at improving the composition, health, vigor and hygienic of the crop.

- iv) While carrying out thinning, the main aim will be to provide optimum growing conditions.
- v) Mature and over mature trees may be marked if silviculturally available, when its removal does not create a permanent gap in the canopy and when these are poles or trees of the same or an equally valuable species to take its place. No tree will be removed simply because there is young seedling or sapling regeneration under it.
- vi) All big trees will be lopped before being felled to avoid damage to young crop.

2.25. Treatment of P.B.II: No felling will be done except dead, dying and diseased tree as per norm of salvage marking given in appendix XIX-D

2.26. Subsidiary Silvicultural Operations in P.B.I:

These shall be carried out after main fellings and will consist of:

1. Slash disposal
2. Sowing and planting
3. Weeding
4. Cleaning and climber cutting
5. Thinning.

I. Slash disposal: After the exploitation work is over felling refuse has to be disposed off as cheaply and effectively as possible. It will be done during winter months following the year of working. The villager should be encouraged to remove as much of the felling refuse as possible, whatever felling refuse left the following manner depending upon the extent of regeneration in the area.

(a) The slash should be removed as effectively and cheaply as possible without damaging the seed bearers. Slash should be collected away from seed bearers at a distance of 5 meters. The branch wood and debris should be collected in small heaps in gaps but never under the crown of seed trees. Such heaps should not be very big and their height should never exceed one meter. The heaps should not be continuous and sufficient space should be left between them so that when one heap is burning the fire will not spread to the heaps above or below it. The slash should be burnt under strict supervision to avoid damage to the crown and seed bearers. After this operation control burning should be done in order to get clean and receptive seedbed. The detailed instruction in burning slash obtained in Technical order No. 6 of Punjab Forest Manual, Vol. III should be carefully studied and followed.

(b) In areas where there is young regeneration and advance growth has been retained, slash should be removed from the patches of regeneration or advance growth and collected in small heaps in gaps outside regeneration patches. Care should be taken that no debris or logs roll down in the young regeneration or advance growth during burning.

II Planting in P.B.I areas: At the time of marking, problematic area will be located and mapped for planting up in subsequent years. After debris burning in good year of seed, natural regeneration of deodar, kail and fir well come up in this tract, as there is no problem of regeneration. But to reduce the period of closure to shortest possible period and to restock these areas full with certainly in stipulated period artificial planting is proposed to be done without waiting for the natural regeneration to come up.

The P.B.I areas should be immediately closed after slash disposal. The closures should be completed by May of the year in which regeneration operations are to be taken and natural germination of seed started. The techniques of artificial regeneration described in Forest leaflet No. 4 and developed with experience must be carefully followed and for selection of species, the natural distribution of the old crop must be kept in view. Similarly B.L.species is planted as per occurrence in the areas.

III Weeding: Thorough weeding are very necessary for healthy growth of plants in areas under regeneration from the first year, the operation regeneration started in PBI to free seedling from competing weed growth. Generally two weeding in growing season is essential. First weeding in the month of April, May and June and second weeding during the month of July-August are essential and beneficial. The main object of weeding is that plants/seedlings/recruits must always be kept free from weeds during the growing season. The weeding will continue till the plants are free from damage of weeds. Two weeding in a year be done as quoted above. Weeding is unnecessary in case of Kail unless its existence is threatened by some troublesome growth of weeds.

IV Cleaning: This operation is essential when plants are two meters height. Cleaning should be done very carefully and should be minimum, because the undesirable species may sometimes be needed, to help the crop. At the same time light cleanings at short intervals will increase the cost on cleaning. Cleaning should, therefore, be sufficiently heavy so as to reduce the costs without any bad effect on the

future crop. This will offer an opportunity to regulate the mixture of the species to the advantage of superior species though at present it is immaterial as all the species have their own utility and requirement of the market. Healthy growing sapling should be retained and sickly forked, crooked and damaged stems be removed. The spacing of plants till the first regular thinning is done should be from 1.75 m to 2.75 meters. Unwanted scrubs/bushes should also be cut at the time of cleaning. All the cut material should be removed outside the regeneration area to minimize the fire hazards.

V Thinning: Thinning will be done in the pole wood retained as part of the advance growth and will be carried out as and when necessary along with the main fellings and as well as at the discretion of the Divisional Forest Officer on spot inspection as per the requirement of the crop.

2.27. Treatment of P.B.III: Thinning and improvement felling will be carried out in pockets by removing their competitors so that they put on maximum height and diameter growth. Most of the trees are marked under T.D. marking and it resulted in opening of crop near habitation and there is no scope further marking/thinning. The principle to favour deodar for retaining not possible in

present political set up. Most of the Kail in Jai Devi & Jhungi Ranges is base rotten and people not taking under T.A. marking. However areas away from habitations thinning will be carried out in accordance with the silvicultural requirement of the inferior trees of either species for the benefit of promising trees.

2.28. Cultural Operation in P.B.IV:

(1) **Cleaning:** Cleaning is most essential in P.B.IV's areas. The aim of cleaning is to remove the less valuable stems to provide growing space for better stems. This operation is to be done after the removal of over wood standing over established crop. At the time felling some saplings/poles will be damaged. So the same is removed in addition to sickly, damaged and forked crooked stems.

(2) **Unsalable thinning** is also necessary in P.B.IV areas after a gap of 5 years as per quinquennial programme laid down. Therefore, thinning will have to be carried out to favour Deodar, similarly in Kail and Spruce areas, thinning are to be carried out removing inferior trees of either species for the benefit of promising pole.

(3) **Pruning of branches** is very necessary for the better growth of the young poles, but it should be done very rarely to avoid wound and rot.

2.29 Artificial regeneration Operation in P.B.III The blank areas in the

following forests of P.B.III will be planted *denova*. The area prescribed for planting in working plan under revision is not stocked up due to un-affective closure and planting properly.

Table 2.9 Artificial regeneration Operation in P.B.III

Range	Name of Forest/Compartment	Area available for planting
Jai Devi	D-98 Rajot	4.00
	D-100 Nandgarh C1	8.00
	D-104 Drahl I C3	6.00
	D-112 Shankahor (A)	5.00
	D-114 Cham Ra Silh C1	3.00
	D-147Doghri	3.00
	D-148 Thahudhar C.1	4.00
	D-148 Thahudhar C2	6.00
	D-170 Cheora	3.00
	D-175 Kanand C1	3.00
Jhungi	D-190 Nehra	4.00
	D-227 Marehra IC2	4.00
	D-227 Marehara C.3	5.00
	D-232 Merehara II	3.00
	D-248 Daint C1(a)	4.00
	D-248 Daint C1(b)	3.00
	D-264 Chanad Baunk C3	6.00

2. Closures: After the exploitation work completed, the areas be cleared from slash and all the lopes and tops be converted into fence post and rest be disposed off by burning. After the completion of this operation the area should be closed to grazing for a period of 30 years. All the closures should be duly notified for which timely action should be taken so that no time is lost in fencing the area after the slash disposal

is over. No area should be thrown open to grazing unless regeneration is well established and final felling has been done.

2.30 Fire Protection: Deodar and kail are fairly susceptible to fires; all the forests allotted to this Working Circle will be strictly protected from fires. Young deodar plantations and regenerations areas require special attention and complete protection from fires. Special precautions are necessary in the areas adjoining Chil forest. To keep the fire out of these forests, it is suggested that forest floor is kept clean from combustible material. The fire lines, inspection paths and bridle paths should be kept clean of needles especially in weather. Adequate number of fire watchers should be engaged during fire season and should be provided with adequate firefighting equipment. New fire line suggested and mentioned in the C.H. files under prescription.

2.31 Regeneration Survey: -

The regeneration survey of felled PB-I areas shall be carried out every year till the stock is established. If regeneration is in adequate further felling will be curtailed for the next year. The reasons for failure should be detailed and corrective measures taken. The regeneration should be made to keep pace with the felling and in case there are short falls on this account with reference to the prescription of the Working Plan, the further felling should not be carried out and deferred till the problem is resolved.

CHAPTER- 3

CHIL WORKING CIRCLE

3.1 General Constitution: This working circle comprises all Chil bearing D.P.Fs of the Previous Working Plan. It also covers areas transferred from established Chil plantations fit for working under the Shelter Wood System. Besides, all the newly constituted D.P.F. during the expiring work plan and U.P.F. having established chil Crop and not covered in the expiring working plan have also been allotted to it for the first time.

3.2. General Character of vegetation: The vegetation of this circle corresponds to 9/c 1(b) sub-tropical Himalayan Chil pine forests. Chil is dominant species of all the forest allotted to this Working Circle. Chil forest generally occurs between 1200 -1800 meters elevation. At lower limits it occupied northern aspect and restrict itself to cooler locations. Its density and quality on southern and southwestern slopes along ridges is rather poor. The general character of the vegetation has already been described in Chapter-II of part I. The vegetation corresponds to age is rather poor even of middle class trees appear mature. Above 1780 meters Chil always occur on southern, well drained slopes as in D.251 Shiv Shankar and D-250 Galukhar part. Deodar and Kail encroach in Chil areas along Nallahs and other moist pockets as in D.250 Galukhar and D.251 Shivshankar. In depression and Nallahs on northern aspect Ban Oak grow as common associate along with *Rhododendron*, *Pistacia intergerrima*, *Lyonia ovalifolia*, *Grewia oppositifolia*, *Myrica nagi*. In the lower limits tropical deciduous broad leaved species replace it.

3.2.1. Young to middle aged trees predominate and mature to over mature trees are malformed and stunted mainly due to heavy demand of right holders for timber, fuel wood, litter and grazing as is visible in D-349 Bairkot, D.353 Sidhkot, D-379 Govartha Natural regeneration coming up but not established, mostly destroyed due to fire as seen in D-349 Bairkot. D-161 Khabri, D-251 Shiv Shankar. Ground cover is thin due to repeated fires. The trees are straight boles without twist, but badly lopped in all the ranges.

3.3. Block and Compartment: The compartment and sub compartment have already been split up into smaller in the expiring workings plan. There is no need to further bifurcate as no green felling took place during the period of expiring working plan and there is hardly change of crop.

3.4. Special Object of Management: The special objects of management are as under:

- i) To continue the conversion of generally irregular crop into more or less uniform crop.
- ii) To tend the existing stands properly so as to progress in the direction of a normal forest by obtaining more normal distribution of age classes, normal growing stock, with normal increment and normal regeneration by natural or artificial means.
- iii) To fully stock forest in such a way as to bring about rapid growth and increment so that large size timber is obtained for industries.
- iv) To bring fully established plantation under regular management for further working the existing areas.
- v) To protect these forests from fires.
- vi) To meet legitimate demand of right holders for timber, fuel wood, grass and grazing.
- vii) Consonance with above to obtain maximum possible yield of timber and resin as per units.

3.5 Area Statement: The area allotted to this working circle is 5757.94 ha. The distribution of the area by range wise is given below:

Table 3.1 Range wise distribution of area

Chil Working Circle					
Range	PB				Grand Total Area (Hac)
	PB-I	PB-II	PB-III	PB-IV	
Baldwara	44.50	27.0	1020.37	164.34	1256.2
Jai Devi	25.64	96.34	1067.58	122.77	1312.27
Jhungi	243.23	546.13	167.70	285.58	1242.64
Kangoo	0	33.89	54.06	149.83	237.78
Sarkaghat	0	0	169.08	1085.46	1254.54
Suket	0	0	10.45	444.01	454.46
Grand Total	313.37	703.35	2489.24	2251.99	5757.94

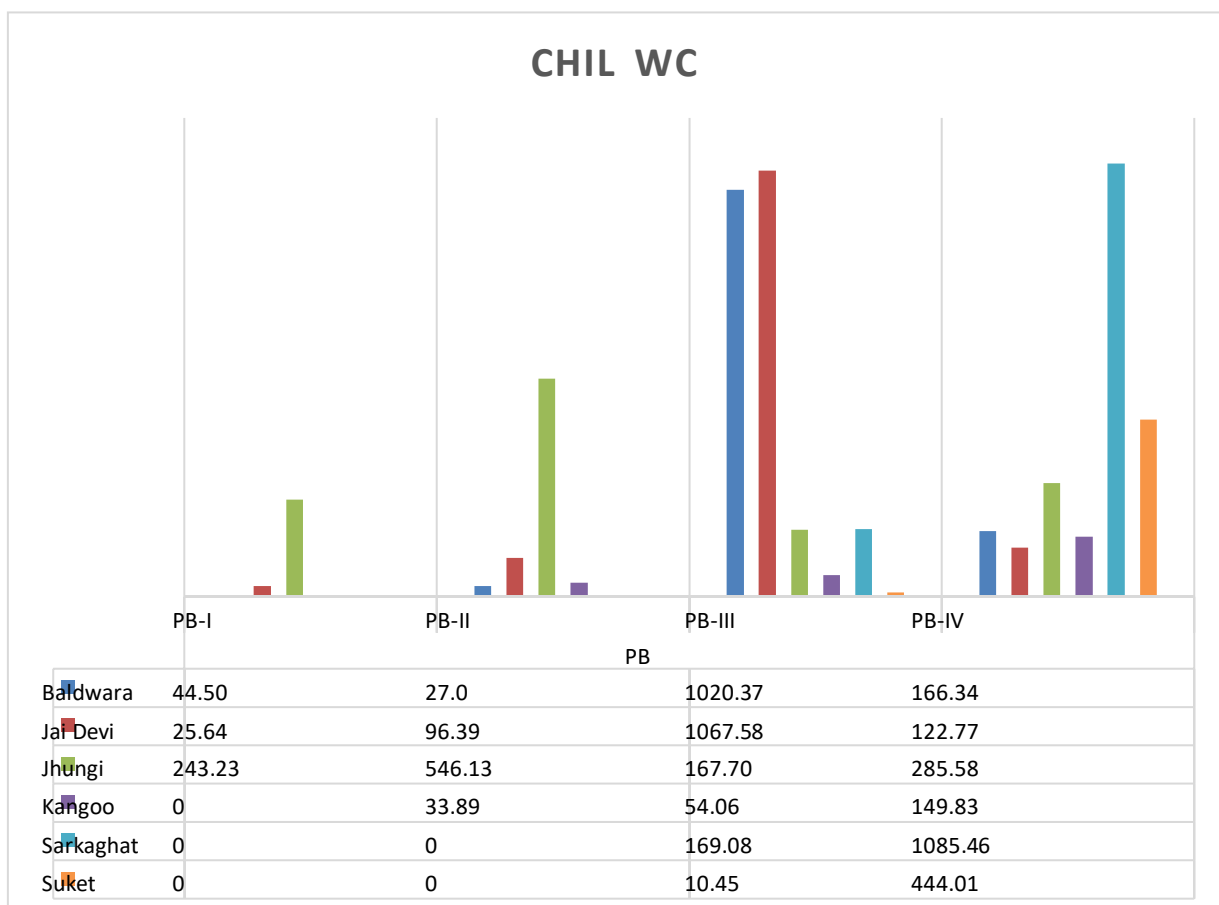


Fig.3.1 Chil working Circle

Table 3.2 Forests in working circle under Suket Forest Division

Chil Working Circle						
PB	Range	Block	Beat	Name of Forest	Compartment	Area (Hac.)
PB-I	Baldwara	Leda	Bairkot	O.D. 349 Bairkot	C-II	44.5
	Jai Devi	Nandgarh	Chhamyar	O.D. 77 Sangrair	C-II	25.64
	Jhungi	Jhungi	Salani	O.D. 265 Salani	C-2-a	32.7
					C-2-b	21.2
					C-2-c	29
		Jhungi	Barnog	O.D. 251 Shivshankar	C-2-a	20
					C-2-b	22.4
					C 1 (b)	37.47
	Kangoo	Behli	Badhu	O.D. 296 Challaun	Whole	33.89
Total Area PB-II						703.35
PB-III	Baldwara	Baldwara	Bahanu	N.D. 362 Dhaboi	Whole	11.79
				N.D. 364 Nizrishan	C-I	48.44
					C-II	13.09
				N.D. 387 Suhagara	C-I	44.19
					C-II	28.53
		Baldwara	Hatli	N.D. 365 Bhater	Whole	9.96
		Bhambla	Bhambla	N.D. 389 Gharshwan	Whole	7.13
				N.D. 390 Bangle Re Gehri	Whole	1.45
				N.D. 392 Bhambla I	Whole	3.9
				N.D. 393 Jaboth	C-II	64.55
			Dhalwan	N.D. 386 Phet	Whole	31.78

				N.D. 388 Bairasen	C-II	26.83
			Dhaulkhan	N.D. 371 Jakhair	Whole	5.94
				N.D. 372 Tamled	Whole	12.6
				N.D. 373 Tamled (P)	Whole	13.1
				N.D. 374 Patrighat	Whole	2.07
				N.D. 376 Chilchaugan	Whole	10.4
				O.D. 375 Chilchaugan	Whole	7.99
		Goverta	Amblagalu	N.D. 366 Mandaroo	Whole	5.12
				N.D. 367 Kalkhar I	Whole	15.3
				N.D. 368 Kalkhar II	Whole	4.54
			Batra pandhiri	N.D. 381 Batrachandhri	C-I	31.47
					C-II	14.13
				N.D. 382 Ropri Nala	Whole	6.98
				Ra Gehra		
				N.D. 383 Sadwal	C-I	23.15
					C-II	21.44
			Goverta	N.D. 378 Goverta	Whole	10.68
				O.D. 379 Goverta	C- III	23.36
		Leda	Bairkot	O.D. 349 Bairkot	C-III	32.68
					C-IV	53.23
					C-V	43.48
					C-VI	31.83
					C-VII	37.25

					C-VIII	21.22
			Balhra	N.D. 356 Kathyaun	Whole	22.99
				N.D. 357 Gurkotha	Whole	18.21
				N.D. 358 Sarsyalu	Whole	29.82
				N.D. 359 Duganal	Whole	8.9
			Leda	N.D. 350 Sikandara	Whole	20.53
				N.D. 352 Leda	Whole	31.35
				N.D. 355 Patroun	Whole	29.98
				O.D. 353 Sidhkot	C-II	27.6
					C-III	22.77
					C-IV	20.58
					C-V	52.42
					C-VI	15.62
	Jai Devi	Jai Devi	Doldhar	N.D. 135 Saikra	Whole	5.79
				N.D. 136 Khaneti	Whole	36.55
				N.D. 138 Panyas	Whole	15.08
				N.D. 139 Doldhar	Whole	12.48
				N.D. 140 Behlidhar	Whole	13.11
				N.D. 141 Sangari	Whole	5.8
				N.D. 143 Challela - I	Whole	16.58
			Jai Devi	N.D. 123 Jai Devi - Dumahan	Whole	8.35
				N.D. 128 Palauta	Whole	6.72
				N.D. 132 Khudinala	Whole	18.64
				O.D. 129 Jai Devi	Whole	7.32
				Banauni		
				O.D. 130 Jaral	Whole	2.06

				O.D. 131 Nagdhar	Whole	18.59
		Jai Devi	Jai Devi	O.D. 124 Kafla	Whole	7.77
				O.D. 125 Roparikoth	Whole	20.39
				O.D. 126 Kuthain	C-I	19.83
					C-II	15.21
					C-III	9.59
					C-IV	12.89
		Nandgarh	Chhamyar	N.D. 75 Nagchalaun	Whole	6.88
				N.D. 78 Makora	Whole	17.79
				N.D. 79 Chamiyar	Whole	5.78
				N.D. 86 Chattersilh- 1St	Whole	26.03
				N.D. 87 Chhattersilh 2Nd	Whole	14.57
				O.D. 76 Makora	C-I	11.53
					C-II	27.36
					C-III	28.92
					C-IV	51.98
					C-V	49.24
					C-VI	31.65
				O.D. 77 Sangrair	C-I	25.3
					C-III	29.18
					C-IV	32.04
			Hatgarh	N.D. 71 Patyani	Whole	3.33
				N.D. 72 Batehra	Whole	2.3

				N.D. 73 Dharver	Whole	3.64
				N.D. 74 Rajwari	Whole	6.4
				N.D. 81 Hatgarh	C-II	32.49
				N.D. 82 Hatgarh	Whole	5.26
				N.D. 83 Khaliphandhar	Whole	4.45
				N.D. 84 Fagohdhar - I	Whole	6.58
				N.D. 85 Fagohdhar - 2Nd	Whole	9.75
				O.D. 80 Madhogan	Whole	48.49
			Kuttachi	N.D. 89 Sarogi - 2(Whole)	Whole	5.72
				N.D. 91 Tikradhar 2Nd	Whole	3.11
				N.D. 92 Killing	Whole	23.88
				N.D. 95 Majhog	Whole	8.09
			Nandgarh	N.D. 101 Nandgarh	Whole	15.31
				N.D. 102 Badhu	C-I	13.48
					C-II	18.08
				N.D. 103 Silh	C-I	18.7
				O.D. 100 Nandgarh	C-II	18.9
		Rohanda	Kamand	O.D. 170 Cheora	C-II	37.44
				O.D. 171 Pakyora	Whole	8.99
				O.D. 175 Kamand	C-II	39.6
			Khabri	N.D. 163 Garhparala	Whole	11.88
				N.D. 164 Sanora	Whole	69.32

				O.D. 161 Khabri	C-I	11.8
					C-II	12.1
					C-V	10.3
				O.D. 166 Khariyand	Whole	7.19
	Jhungi	Jhungi	Salani	N.D. 268 Khoondhar	C-6	30.22
		Nihri	Nihri	N.D. 234 Chehar	Whole	22.66
				N.D. 235 Kharyana	Whole	7.66
				N.D. 237 Chiral Ii	Whole	14.76
				N.D. 239 Chiral Iii	Whole	19.92
			Marahra	N.D. 233 Boart	Whole	12.74
				O.D. 196 Bhaon	C 1 (a)	20.93
		Trechh	Balag	O.D. 197 Bag	C 2 (b)	38.81
	Kangoo	Dehar	Dehar	N.D. 332 Shilh	Whole	3.9
			Umri	O.D. 337 Umri Ii	C.2	50.16
	Sarkaghat	Durgapur	Kaldu	O.D. 415 Kaldu	C-IV	27.05
					C-V	54.39
		Sarkaghat	Chandrakari	N.D. 397 Shil Nal	Whole	4.33
			Dev Bradta	N.D. 399 Ropari	Whole	10.87
		Thona	Tikker	N.D. 419 Chobhra	C-I	23
					C-II	49.44
	Suket	Sadar	Sadar	N.D. 3 Bhanglera	Whole	10.45
Total Area PB-III						2489.24
PB-IV	Baldwara	Baldwara	Hatli	N.D. 363 Panwari	Whole	21.56
		Bham bla	Bhambla	N.D. 391 Bhambla Ii	Whole	2.54
		Govert a	Goverta	N.D. 380 Tharu	Whole	32.3

				O.D. 379 Goverta	C- IV	44.63
		Leda	Bairkot	O.D. 349 Bairkot	C-I	25.16
			Leda	N.D. 354 Sidhkot	Whole	15.38
				O.D. 353 Sidhkot	C-I	23.77
	Jai Devi	Jai Devi	Doldhar	N.D. 142 Kotla	Whole	4.67
			Ghiri	N.D. 119 Namana	Whole	6.78
		Nandgar h	Kuttachi	N.D. 90 Tikradhar 1 st	Whole	4.86
		Rohanda	Kamand	N.D. 172 Matoh	Whole	46.76
			Khabri	O.D. 161 Khabri	C-VI	28.3
					C-VIII	31.4
	Jhungi	Jhungi	Salani	N.D. 266 Idhar	Whole	23.6
				N.D. 267 Panjerthi	Whole	9.26
				N.D. 268 Khoondhar	C-2	31.59
					C-3	50.21
				N.D. 271 Fegal	Whole	60.8
		Nihri	Marahra	N.D. 224 Sarelu	Whole	22.09
		Trechh	Kinder	N.D. 202 Jhnu	C 1	43.2
				N.D. 221 Kandhe	Whole	7.38
			Trechh	N.D. 219 Ropa	Whole	34.01
				N.D. 220 Shilh	Whole	3.44
	Kangoo	Batwara	Batwara	N.D. 309 Batwara	Whole	29.77
		Behli	Behli	N.D. 275 Behli	Whole	34.53
		Dehar	Jyor	N.D. 340 Kun	Whole	17.49
				N.D. 341 Chawari	Whole	4.81
				N.D. 342 Ghangnu	Whole	25.21
				N.D. 343 Khanokhar	Whole	7.72
				N.D. 344 Masog	Whole	6.69

			Umri	N.D. 346 Chanol	Whole	13.25
				N.D. 347 Manjkhatir	Whole	10.36
	Sarkaghat	Durgapur	Bhaderwar	N.D. 413 Thathal	C-I	92.65
					C-II	84.93
			Kaldu	N.D. 417 Chamba Nal-I	Whole	9.59
				N.D. 418 Chamba Nal-Ii	Whole	13.43
				O.D. 415 Kaldu	C-II	55.13
					C-III	46.81
			Pingla	N.D. 411 Bera Dhar	Whole	26.32
				N.D. 412 Sandoh	Whole	9.12
		Sarkaghat	Bhangoh	N.D. 394 Bhangoh	C-I	74.36
					C-II	43.23
					C-III	57.07
					C-IV	16.51
			Chandrakari	O.D. 396 Chandrakari	C-I	26.45
					C-II	9.56
			Dev Bradta	N.D. 399 Ropari	Whole	5.6
			Gopalpur	N.D. 395 Barnog	C-I	58.47
			Maseran	N.D. 402 Batalri	Whole	4.31
				N.D. 403 Saroli (P)	Whole	9.31
				N.D. 404 Saroli-Ii	Whole	7.01
				N.D. 405 Doon Shilh	Whole	18.17
			Sarkaghat	N.D. 398 Jhinhnu I	Whole	31.94
				N.D. 401 Jhinhnu Ii	Whole	19.5
		Thona	Jamdwar	N.D. 406 Jamdwar -I	Whole	96.43
				N.D. 407 Jamdwar-Ii	Whole	22.09
				N.D. 408 Kalash	Whole	37.07
				N.D. 409 Ghamdol	Whole	11.66

			Thona	N.D. 410 Kholtu	Whole	29.14
			Tikker	N.D. 413 Thathal	Whole	47.14
				N.D. 420 Tikker	Whole	122.46
	Suket	Baggi	Baggi	N.D. 58 Kangroo	Whole	12.12
				N.D. 59 Jhuju- Mujhu	C-2	19.86
				N.D. 70 Chowkri	Whole	25.78
			Rajgarh	N.D. 54 Tarlaza	C5	18.63
					C6	41.78
				N.D. 55 Kandhlu	Whole	13.75
		Sadar	Jadroun	N.D. 10 Ghauroo-I	Whole	21.13
				N.D. 11 Ghauroo-Ii	Whole	9.46
				N.D. 12 Jadron	Whole	21.75
				N.D. 13 Upper-Sehli	Whole	8.67
				N.D. 14 Lower-Sehli	Whole	5.57
				N.D. 17 Sabyahan	Whole	3.83
				N.D. 18 Nalot-I	Whole	9.08
				N.D. 19 Nalot-Ii	Whole	10.98
				N.D. 21 Kurara	Whole	15.02
				N.D. 22 Thara	Whole	3.85
				N.D. 23 Trimi	Whole	5.51
				N.D. 5 Thalagdhar-I	Whole	22.88
				N.D. 9 Nal	Whole	7.32
			Jarol Beat	N.D. 30 Phagla	C-II	58.58
			Sadar	N.D. 1 Beena	Whole	6.25
				N.D. 2 Derdu	Whole	24.11
				N.D. 37 Bhechanna	C-I	36.12
					C-II	31.85
				N.D. 4 Dhar	Whole	10.13
Total Area PB-IV						2251.99
Grand Total						5757.95

3.6 Analysis and Valuation of the Crop and Stock map:

3.6.1. Stock Map: All the forest under this working circle has been stock mapped on GIS platform and maps prepared for each forest have been filed in the individual compartment history files.

3.6.2 The area under various species as worked out from stock maps and enumeration results is given below in tabulated form:

Table 3.3 Area of various species as worked out from stock map and enumeration results

Name of Range	Deodar	Kail	Chil	Mixed conifers	Ban	Misc. B.L	Scrubs	Cultural blank	Total
Suket	-	-	427.12	-	-	22.83	-	4.52	454.4
Jai Devi	20.90	12.61	1165.61	264.16	153.48	6.69	-	16.60	1665.15
Jhungi	32.55	156.27	739.00	65.39	6.41	12.72	-	50.39	1062.73
Kangoo	-	-	122.74	-	-	11.50	-	-	134.24
Baldwar	12.95	-	1175.36	-	-	14.37	32.30	9.32	1244.30
Sarkaghat	-	-	660.05	92.65	-	-	-	59.81	814.51
Total	66.40	168.88	4289.88	422.20	159.89	68.11	32.30	140.64	5375.40

3.7. Quality Class: The quality class of each compartment/sub-compartment has been determined by taking the heights of all classes in each forest and then comparing them to standard classes in the yield tables. The quality class corresponds to F.R.I quality Class is II. The quality class further declines due to biotic interference in the lower belt(Baldwara, Sarkaghat and Kangoo)

3.8. Age Classes: The stands are irregular with younger classes predominate in the tract V class trees are the highest then followed by IV class, then other classes, mainly due to transferring established plantation area into P.B.IV area. The percentage of each diameter with normal distribution is as under:

Diameter class (cms)	Class	Percentage of Chil actual as per total growing stock
10-20	V	63.36%
20-30	IV	24.95%

30-40	III	7.02%
40-50	IIA	2.35%
50-60	IIB	1.36%
60-70	IA	0.65%
70-80	IB	0.24%
80-90	IC	0.04%
90 & above	ID	0.01%

The V class trees are more in proportion as tabulated above where as the other classes less than normal growing stock.

3.9. Density: An ocular estimate of density has been made for each compartment or sub compartment and entered in the compartment history files. It varies from 0.2 to 0.7 and average for working circle being 0.5

3.10 Enumeration: The technique of Survey and Assessment of Forest Resource using Grid and Quadrants method (Sample Plots) has been adopted and complete counting of all tree species class wise has been done. A total of 26 Sample Plots of 0.1 hac. were laid in this working circle covering all PBs. The detail of PB wise sample plots are as under

S.No	PB	No. of plots	Total area counted Hac
1	PB-I	4	0.4
2	PB-II	5	0.5
3	PB-III	11	1.1
4	PB-IV	6	0.6
	Total	26	2.6

GROWING STOCK

PB I

Tree Count										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	115946	18018	11751	6267	3133	2350	1566	783	0	159814
Deodar	7050	13318	783	0	0	0	0	0	0	21151
Kail	0	0	0	0	0	0	0	0	0	0
Khair	1566	7050	2350	783	0	0	0	0	0	11749
Ban	783	1566	0	0	0	0	0	0	0	2349
Fir Spruce	0	0	0	0	0	0	0	0	0	0
BL	0	1566	0	0	0	0	0	0	0	1566
Grand Total	125345	41518	14884	7050	3133	2350	1566	783	0	196629

Tree Volume										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	5797.30	1981.98	3290.28	4574.91	4699.50	6180.50	6185.70	4275.18	0	36985.35
Deodar	394.80	2610.33	591.95	0	0	0	0	0	0	3597.08
Khair	0	0	0	0	0	0	0	0	0	0
Kail	125.28	1480.50	1386.50	963.09	0	0	0	0	0	3955.37
Ban	0	469.80	0	0	0	0	0	0	0	469.80
Fir Spruce	0	0	0	0	0	0	0	0	0	0
BL	0	436.24	0	0	0	0	0	0	0	436.24
Grand Total	6317.38	6978.85	5268.73	5538.00	4699.50	6180.50	6185.70	4275.18	0	45443.84

PB II

Tree Count										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	102689	54861	8440	8440	0	0	0	0	0	174430
Deodar	0	0	7033	7033	11253	1406	0	0	0	26725
Kail	0	0	0	0	0	0	0	0	0	0
Khair	0	0	0	0	0	0	0	0	0	0
Ban	1406	5626	1406	0	0	0	0	0	0	8438
Fir Spruce	0	0	0	0	0	0	0	0	0	0
BL	1406	1406	0	0	0	0	0	0	0	2812
Grand Total	105501	61893	16879	15473	11253	1406	0	0	0	212405

Tree Volume										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	I B	IC	ID	
Chil	5134.45	6034.71	2363.20	6161.20	0	0	0	0	0	19693.56
Deodar	0	0	5316.95	11027.74	29617.90	5511.52	0	0	0	51474.11
Khair	0	0	0	0	0	0	0	0	0	0
Kail	0	0	0	0	0	0	0	0	0	0
Ban	0	1687.80	1406.00	0	0	0	0	0	0	3093.80
Fir Spruce	0	0	0	0	0	0	0	0	0	0
BL	0	391.67	0	0	0	0	0	0	0	391.67
Grand Total	5134.45	8114.18	9086.15	17188.94	29617.90	5511.52	0	0	0	74653.14

PB III

Tree Count										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	411847	228552	104093	36206	15840	11314	11314	9051	2262	830479
Deodar	4525	9051	0	6788	0	0	0	0	0	20364
Kail	0	0	0	0	0	0	0	0	0	0
Khair	0	0	0	0	0	0	0	0	0	0
Ban	0	6788	2262	0	0	0	0	0	0	9050
Fir Spruce	0	0	0	0	0	0	0	0	0	0
BL	0	6788	2262	0	0	0	0	0	0	9050
Grand Total	416372	251179	108617	42994	15840	11314	11314	9051	2262	868943

Tree Volume										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	20592.35	25140.72	29146.04	26430.38	23760	29755.82	44690.30	49418.46	12350.52	261284.59
Deodar	253.40	1774.00	0	10643.58	0	0	0	0	0	12670.98
Khair	0	0	0	0	0	0	0	0	0	0
Kail	0	0	0	0	0	0	0	0	0	0
Ban	0	2036.40	2262.00	0	0	0	0	0	0	4298.40
Fir Spruce	0	0	0	0	0	0	0	0	0	0
BL	0	1890.94	1664.19	0	0	0	0	0	0	3555.13
Grand Total	20845.75	30842.06	33072.23	37073.96	23760	29755.82	44690.30	49418.46	12350.52	281809.10

PB IV

Tree Count										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	78802	281436	236406	71297	3752	0	0	0	0	671693
Deodar	0	0	0	0	0	0	0	0	0	0
Kail	0	0	0	0	0	0	0	0	0	0
Khair	0	0	0	0	0	0	0	0	0	0
Ban	0	0	0	0	0	0	0	0	0	0
Fir Spruce	0	0	0	0	0	0	0	0	0	0
BL	26267	15009	0	3752	0	0	0	0	0	45028
Grand Total	105069	296445	236406	75049	3752	0	0	0	0	716721

Tree Volume										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	3940.10	30957.96	66193.68	52046.81	5628.00	0	0	0	0	158766.55
Deodar	0	0	0	0	0	0	0	0	0	0
Khair	0	0	0	0	0	0	0	0	0	0
Kail	0	0	0	0	0	0	0	0	0	0
Ban	0	0	0	0	0	0	0	0	0	0
Fir Spruce	0	0	0	0	0	0	0	0	0	0
BL	0	4181.08	0	5467.20	0	0	0	0	0	9648.28
Grand Total	3940.10	35139.04	66193.68	57514.01	5628.00	0	0	0	0	168414.83

Tree Count										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	709284	582867	360690	122210	22725	13664	12880	9834	2262	1836416
Deodar	11575	22369	7816	13821	11253	1406	0	0	0	68240
Kail	0	0	0	0	0	0	0	0	0	0
Khair	1566	7050	2350	783	0	0	0	0	0	11749
Ban	2189	13980	3668	0	0	0	0	0	0	19837
Fir Spruce	0	0	0	0	0	0	0	0	0	0
BL	27673	24769	2262	3752	0	0	0	0	0	58456
Grand Total	752287	651035	376786	140566	33978	15070	12880	9834	2262	1994698

Tree Volume										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	35464.2	64115.4	100993	89213.3	34087.5	35936.3	50876	53693.6	12350.5	476730.05
Deodar	648.2	4384.33	5908.9	21671.3	29617.9	5511.52	0	0	0	67742.17
Khair	0	0	0	0	0	0	0	0	0	0
Kail	125.28	1480.5	1386.5	963.09	0	0	0	0	0	3955.37
Ban	0	4194	3668	0	0	0	0	0	0	7862
Fir Spruce	0	0	0	0	0	0	0	0	0	0
BL	0	6899.93	1664.19	5467.2	0	0	0	0	0	14031.32
Grand Total	36237.7	81074.1	113621	117315	63705.4	41447.8	50876	53693.6	12350.5	570320.91

3.11. Silviculture System: Chil is a light demander and grows in uniform system. The forest will be worked under Punjab Shelter Wood System the system ensures the retention of compact groups of pole crops up to 30 cm dbh with a density not less than 0.7 and an area not less than 0.2 ha. In extent as part of the future crop to avoid

unnecessary sacrifice of immature crop. Isolated trees are not to be retained as part of future crops. Precipitous and rocky pockets of forest will be worked under Selection principles. P.B.I area will be regenerated naturally subject to protection from fire, grazing. However, natural regeneration is supplemented by artificial means immediately without waiting natural regeneration, particularly in refractory area. Thinning and improvement felling shall be carried out in P.B.III, though there is very little scope due to heavy marking of trees in T.D. in the past. Over wood standing over established crop in P.B. IV area be removed and cleaning, thinning shall be carried out in young crop.

No felling shall be done in P.B.II except for salvage removal as per norms of salvage marking given in Appendix-XIX-D

3.11.1. Chil is the only species suited and will be planted. But in some Chil forests as visible in D.349 Bairkot C.5, D.419 Chobra D-262 Salani, D-250 Gulakhar, D-268 Khondhar, Deodar has been introduced in the past, without encouraging results, so this should be avoided. However in higher elevation and in depression suitable for deodar be planted. B.L species along Nallahs be planted, this will also check fire hazard. Area recently transferred from plantation to Chil Working Circle were thick forests of Ban Oaks and B.L. species but degraded due to defective management in the past and now they have stocked up with Chil. There are scattered blanks in these forest and the same be planted with Ban oak and B.L. Coppice shoots of Ban Oak also noticed in these forests that should be managed and encouraged.

3.12 **Rotation:** According to the growth data given in Chapter VI of Part-1 it takes 90 years to obtain diameter of 60 cms dbh, which is considered suitable for conversion into sizes most in demand. But to be on the conservative sides, a rotation of 100 years has been adopted. This period also facilitates in dividing this period into 4 periodic blocks.

3.13 **Regeneration Period:** There is no problem of natural regeneration in this tract and period which is considered necessary for complete regeneration of natural crop supplemented by artificial has been kept as 25 years. Under favorable condition i.e. absence of grazing, excessive fires and with good soil the regeneration will established it self with in 15 years as is visible in D.265 Salani C.2a,2b & c. In adverse conditions it may extend beyond 25 years. Thus on conservative side the period of 25 years has been taken as regeneration period. In this period much of the crop will attain the size of poles, which will be able to withstand the accidental fires if they run through the area.

3.14 Exploitable size: The extraction is still done through conventional method and mechanization is not tried in this strict in spite of most of the forests are served with roads. It has been checked that trees of 60 cm dbh and above, give maximum out turn in shape of sleepers. The exploitation size is therefore, fixed at 60 cms corresponding in age of 100 years.

3.15 Regeneration assessment: Regeneration assessment has been carried out in area where regeneration felling done in the past, and results are tabulated as under.

3.16 Division into periodic block: With the rotation of 100 years and regeneration period of 25 years, the whole working circles has been divided into 4 periodic blocks of 25 years. The crop on the whole is irregular, younger to middle classes and predominating 2403.68 ha have been brought under Chil Working Circle from plantation working circle and crop is younger age class. It is not possible to divide periodic blocks of equal area due to this. The condition of crop, status of regeneration, soil and other factors have been kept in view, while making allotment of areas to periodic blocks.

P.B.I: The area allotted to this periodic block is as under:

PB	Range	Block	Beat	Name of Forest	Compartment	Area(Hac.)
PB-I	Baldwara	Leda	Bairkot	O.D. 349 Bairkot	C-II	44.5
	Jai Devi	Nandgarh	Chhamyar	O.D. 77 Sangrair	C-II	25.64
	Jhungi	Jhungi	Salani	O.D. 265 Salani	C-2-a	32.7
					C-2-b	21.2
					C-2-c	29
		Jhungi	Barnog	O.D. 251 Shivshankar	C-2-a	20
					C-2-b	22.4
		Trechh	Kinder	O.D. 205 Dhamkon	C 2 (a)	31.28
					C 2 (b)	39.6

		Trechh	Trechh	N.D. 217 Tandidhar	C-2	47.05
Total Area PB-I						313.37

- (a) All the area of the plan under revision which has not fully regenerated due to various factors e.g. uncontrolled grazing and fire.
- (b) Some of the P.B II areas carrying middle aged to mature Chil crop
- (c) unfelled PB-I areas of previous working plan, besides forests in which stocking is very poor

Some of the P.B. II areas carrying middle aged to mature open crop due to T.D. marking and are fit for harvesting and regeneration.

P.B.II: This block consists of following areas in it:

- (a) P.B. II areas of the working plan under revision minus transferred to P.B. I
- (b) Some of the P.B.III areas of the working plan under revision, which the crop is mostly of middle aged trees.

P.B.III This constitutes irregular crop of Chil predominately young to middle aged .

Following areas have been put in it:

- (a) P.B.III area of the plan under revision minus area transferred to P.B. II.
- (b) Some of the P.B. IV area carrying young to middle aged crop.
- (c) Area carrying young to middle aged crop of Chil in the newlyconstituted DPFs.

P.B.IV This consists of following areas in it:

Forests mostly with young crop have been allotted to this P.B which requires removal of over wood over established crop. Plantation areas having well established crop in the form of young age of plantation origin transferred to Chil Working Circle.

3.17 Felling Cycle: Felling cycle will be of 10 years corresponding to the 10-year period of working plan.

3.18 Calculation of Yield: The yield from this working circle will consists of yields from P.B. I, from mature trees standing over regeneration of P.B.IV and some removal from thinning to be carried out in P.B.III. There will be no yield from P.B.II areas and only dead, dying, uprooted trees may be removed from this P.B. wherever necessary. The total growing stock has been calculated from the enumeration carried out

and calculated from partial enumeration is tabulated in the sub joined statement.

3.18.1 Yield for whole Working Circle: The yield have been calculated by the following methods:

(a) Von Mantel's Formula

$$Y = \frac{2G}{R}$$

Where Y= annual yield in m³

G= Total growing stock of the working circle in m³ R= Rotation

Deodar	$Y = \frac{2 \times 67742.17}{100}$	= 1354.8434 or say 1300 m ³
Kail	$Y = \frac{2 \times 3955.37}{100}$	= 79.1074 or say 75 m ³
Chil	$Y = \frac{2 \times 476730.05}{100}$	= 9534.601 or say 9500 m ³

(b) By Simon's Formula $Y = \frac{2G}{R} = \frac{2 \times n_2 xy}{R(n_2 - 1)}$

Where Y is annual yield

G= XY= Growing stock R=Rotation

$n_2 = \frac{R}{a}$ where a is the number of years required for trees to reach 10 cm dbh

$$\text{Deodar} = \frac{2 \times \frac{100}{23} \times 67742.17}{100 \left(\frac{100}{23} - 1 \right)} = 1763.65972 \text{ or } 1700 \text{ say m}^3$$

$$\text{Kail} = \frac{2 \times \frac{100}{18} \times 3955.37}{100 \left(\frac{100}{18} - 1 \right)} = 96.68 \text{ or say } 90 \text{ m}^3$$

$$\text{Chil} = \frac{2 \times \frac{100}{15} \times 476730.05}{100 \left(\frac{100}{15} - 1 \right)} = 11219.1595 \text{ or say } 11000 \text{ m}^3$$

C By Hufnagel's Formula for (PB-IV)

$$Y = \frac{C1 V1 + C2 V2}{P}$$

Where Y is the annual yield

V1 is the volume of trees above 30 cm dbh upper limit of advance growth

V2 Volume of trees up to 30 cm dbh in P.B.I

C1 is a constant to represent the proportion of 30 cm and required to be felled.

C2 is a constant to represent the proportion of trees up to 30 cm dbh to be felled.

P is period of the regeneration in years.

From the field inspection and stated in the working plan under revision it has been found that value of C1 and C2 for different species are as under:

Species	C.1	C2
Deodar	0.8	0.7
Kail	0.9	0.8
Chil	0.7	0.6
Rai/Fir	0.7	0.6

$$\text{Deodar} = \frac{0.8 \times 591.95 + 0.7 \times 3005.13}{25} = 103.08 \text{ or say } 100 \text{ m}^3$$

$$\text{Kail} = \frac{0.9 \times 2349.59 + 0.8 \times 1605.78}{25} = 135.97 \text{ or say } 130 \text{ m}^3$$

$$\text{Chil} = \frac{0.7 \times 29206.07 + 0.6 \times 779.28}{25} = 836.47268 \text{ or say } 830 \text{ m}^3$$

The annual yield calculated by Hufnagel's Formula is adopted and the final prescribed yield is as under

S.No	Species	Annual Yield	Or Say
1	Deodar	103.08	100
2	Kail	135.97	130
3	Chil	836.47268	830

3.19 Yield from P.B.II: No felling is prescribed in P.B. II Only dead

3.20 Only Dead, dying, wind fallen trees are to be removed. Hence no yield has been prescribed.

3.21 Yield from P.B.III: The yield from P.B. III will be in the form of thinning and salvage removals if available. The growing stock under this P.B. is as under. It is estimated that 5% of this stock will be available for removal.

Name of Species	Total Volume	@ 5% of total vol.	Annual Yield.
Deodar	12670.98	633.54	63.35 or say 60 ³
Chil	261284.59	13064.22	1306.42 or say 1300 m ³

3.22 : Yield from P.B.IV

(a) First method

The yield from P.B.IV will be in the form of final removal only and this will be the removal of trees of IIB and over from this P.B. Some trees will have to be retained on rocky strata and some trees will have to keep in blank portions. Therefore, 75% of the volume of IIB and above will be removed and the works out as under:

Spp	Total volume	75% volume	Annual yield
Chil	5628	4221	422.1 or say 420 m ³

(1) In addition to above, 5% of volume of V, IV and III class trees shall be available under cleaning/thinning as majority of areas are from plantation origin.

Total volume of V, IV & III	5% of the volume	Annual yield
101091.74. m ³	5054.58	505.45 or say 500 m ³

Total removal from PBIV 420 + 500 = 920 or say **900 m³**

(b) Alternate Method /Hufnagel's Formula

$$Y = (C_1V_1 + C_2V_2)/P$$

$$\text{Deodar} = \frac{0.8 \times 0 + 0.7 \times 0}{25} = 0 \text{ m}^3$$

$$\text{Kail} = \frac{0.9 \times 0 + 0.8 \times 0}{25} = 0 \text{ m}^3$$

$$\text{Chil} = \frac{0.7 \times 123868.49 + 0.6 \times 34898.06}{25} = 4305.87 \text{ or say } 4000 \text{ m}^3$$

Since, the first method has minimum yield hence adopted.

3.23 Prescribed yield: The prescribed yield for P.B. wise is given below (m³):

<u>Species</u>	<u>P.B.I</u>	<u>P.B.II</u>	<u>P.B.III</u>	<u>P.B.IV</u>	<u>Total</u>
Chil	730	---	1300	900	2930
Deodar	70	---	60	0	130

Total	800	---	1360	900	3060

In case felling not prescribed are to be carried out in some of the forests allotted to this working circle for any reasons whatsoever the same will count towards yield prescribed for P.B.I In such an event compensatory plantation is to be done in suitably areas. it should be done simultaneously. Felling in P.B.I to the extent felled for aforesaid reason is different from felling programme for the year.

3.23.1 The yield prescribed will be inclusive of trees marked to meet the right holders demand or for any other purpose.

3.24 Control of Yield: The prescribed yield will be controlled from each periodic block. The annual excess or deficit in the case of each species will be brought forward in the control form and adjusted at the end of 5 years period deviation should not be allowed beyond +/- 10% of total annual yield of the block.

3.24. Method of executing felling in P.B.I: Area allotted to this Periodic Block is already open and seeding felling means uniform opening with seed bearers equidistance spread well. Generally two felling viz. seeding felling and final fellings will be carried out except in few forests where corrective seeding fellings required. The following general principles are laid in Punjab leaflet No. 2 will be followed by the marking officers.

- i) While carrying out marking for seeding fellings about 20-25 trees of IIA and above are retained as seed bearers per hectare.
- ii) Trees of IIB and above are physical over mature though the class is less. So these trees are not healthy and preference be given to IIA class trees. They should be healthy, from twist, clean, straight and long bole and preferably with dense round crowns. The seed bearers should be uniformly distributed over the area.
- iii) Corrective seeding felling are about the same as seeding fellings, the only difference being that in the past seeding felling done on conservative and single tree of III class has been retained as future crop, regeneration has come up to some extent, but heavy felling/opening required so that regeneration can come up and groups of young crop are freed from over shade. This will sufficiently afford advantage of optimum growth to already under established crop.
- iv) The compact groups of well grown poles up to 30 cm dbh and with density not less than 0.7 and area not less than 0.2 ha in extent shall be retained as the part of future

crop. The advance growth shall not be opened up for regeneration however, over wood would be removed completely from the patches of established advance growth.

- v) Isolated poles and regeneration having stunted growth shall be removed irrespective of extent of area.
- vi) Marking over rugged and steep slopes will be conservative and at difficult places from where standing growing stock cannot be extracted and artificial cannot be carried out under selection principles.
- vii) Final felling is to be carried out where regeneration has established i.e. where regeneration is above 5 meters in height.
- viii) The advance growth retained should be shown on a marking map prepared by marking officer submitted to Divisional Office. A copy of marking map should be placed in History file along with a note on marking.
- ix) All, dying, diseased, malformed and damaged trees to be marked.
- x) Dense crop of poles retained, as advance growth shall be thinned/cleaned along with main fellings. If the resultant material is not saleable, cleaning operation may be done departmentally as soon as the exploitation work is completed in the forest.
- xi) Broad leave trees shall not be felled as it is desirable to retain them to form a healthy mixture with Chil, as also for meeting local requirements of fuel and fodder.
- xii) Along cultivation's and on periphery the marking should be conservative and no trees be marked on the boundary of forests to keep check on encroachment.
- xiii) All trees likely to damage advance growth/regeneration when felled should be lopped before felling and L be marked on such trees.
- xiv) Only selection-cum-improvement marking will be carried out in 10 m wide belt on either side of main roads for road protection
- xv) Secondary felling be made when the young regeneration has attained a height of 1-2 m and has been properly tended
- xvi) Final fellings will be made when young regeneration has attained a height of 3-4m and has been adequately spaced and control burnt twice

3.25 Method of Executing Felling in P.B.II No felling except of those of dead, dying and diseased trees will be marked in this periodic block. In case of natural calamity, salvage removal involved concentrated felling; the area shall be closed immediately after felling over and regenerate by artificial planting. Equal area may be deviated from P.B.I for not felling during that year or next year.

3.26 Method of Executing Felling in P.B.III The forests under this periodic block will be gone over under thinning cum improvement felling. Following general principles are laid down for the marking officers:

- i) The thinning should be carried out in such a way to provide optimum growing conditions to elite trees. The intensity of thinning is not to exceed the requirement of D grade thinning.
- ii) The removal shall aim at improving the condition of the crop.
- iii) No tree is to be marked to create opening to get regeneration.
- iv) Improvement fallings should be for removal of all dead, dying diseased, malformed and having stunted growth.
- v) Marking should be conservative along the periphery.
- vi) In no case, even for T.D., marking should degenerate into selection marking for any purpose.

3.27. Method of Executing Felling in P.B.IV In this periodic block felling shall aim at removal of over wood suppressing of young crop by mature trees or even middle aged trees. Following general rules are laid down for marking officers:

- i) The marking should aim at freeing the established regeneration by removing the over wood. Therefore, all the trees of IIB and over are to be marked standing over established crop.
- ii) Trees along Nallahs banks, boundary line and steep to precipitous slopes, the removal of over wood should be conservative.
- iii) Thinning in advance growth shall be carried out whenever necessary.
- iv) Badly formed, gnarled, dried, diseased and dry shall be removed in improvement fellings.
- v) Isolated II and III class trees which stand over young crop, and likely to be perspective wolf trees should be removed.
- vi) Broad leaved trees should not be marked unnecessary. These should be lopped, if they are suppressing the young crop.

3.28 Sequence of Felling in P.B.I

On account of the irregular nature of crop it is not possible to carve out equi productive area for each year. Chil have to be raised under plantation working circle and is in seedling to sapling stage and will be transferred to P.B.IV areas after 15 years and these areas are equally good as P.B.I areas. Felling programme has been framed keeping in view of this. The marking of compartment or sub compartment has to be in full and in case a part of the compartment should be left unmarked because of the prescribed volume has been achieved.

Table 3.4 Sequence of Felling in P.B.I

Year	Range	Forest	Compartment	Area
2024-25	Baldwara	O.D. 349 Bairkot	C-II	44.5
2025-26	Jaidevi	O.D. 77 Sangrair	C-II	25.64
2026-27	Jhungi	O.D. 265 Salani	C-2-a	32.7
2027-28	Jhungi	O.D. 265 Salani	C-2-b	21.2
2028-29	Jhungi	O.D. 265 Salani	C-2-c	29
2029-30	Jhungi	O.D. 251 Shivshankar	C-2-a	20
2030-31	Jhungi	O.D. 251 Shivshankar	C-2-b	22.4
2031-32	Jhungi	O.D. 205 Dhamkon	C 2 (a)	31.28
2032-33	Jhungi	O.D. 205 Dhamkon	C 2 (b)	39.6
2033-34	Jhungi	N.D. 217 Tandidhar	C-2	47.05

3.29 Sequence of felling in P.B. III: Stocking in the forest of this Periodic Blocks on the whole is much below normal and generally no thinning would be necessary. Felling will be carried out purely of dead, dry, uprooted, fallen and half broken trees as and when needed. T.D. marking if done wherever thinning is required in dense crops, hence no sequence of felling suggested for P.B. as all the forests has been reserved for T.D. marking for right holders.

3.30 Sequence of Felling in P.B. IV: Most of the areas allotted to this periodic block are from plantation origin and crop is mostly young and very few over wood standing over established crop. The same may be marked to right holders if removal of over wood standing over established crop is required. The crop is dense and not properly

attended in the past. So a programme of cleaning and light thinning is suggested for the better growth of young crop and to minimize fire hazard.

Table 3.5 Sequence of Felling in P.B.IV

Year	Range	Forest	Comp.	Area
2024-25	Baldwara	N.D. 363 Panwari	Whole	21.56
		N.D. 391 Bhambla Ii	Whole	2.54
	Jaidevi	N.D. 142 Kotla	Whole	4.67
	Jhungi	N.D. 266 Idhar	Whole	23.6
	Kangoo	N.D. 309 Batwara	Whole	29.77
	Sarkaghat	N.D. 413 Thathal	C-I	92.65
			C-II	84.93
	Suket	N.D. 58 Kangroo	Whole	12.12
		N.D. 59 Jhuju-Mujhu	C-2	19.86
		N.D. 70 Chowkri	Whole	25.78
				317.48
2025-26	Baldwara	N.D. 380 Tharu	Whole	32.3
	Jaidevi	N.D. 119 Namana	Whole	6.78
	Jhungi	N.D. 267 Panjerthi	Whole	9.26
	Kangoo	N.D. 275 Behli	Whole	34.53
	Sarkaghat	N.D. 417 Chamba Nal-I	Whole	9.59
		N.D. 418 Chamba Nal-Ii	Whole	13.43
	Suket	N.D. 54 Tarlaza	C5	18.63
			C6	41.78
		N.D. 55 Kandhlu	Whole	13.75
				180.05
2026-27	Baldwara	O.D. 379 Goverta	C- IV	44.63
	Jaidevi	N.D. 90 Tikradhar 1St	Whole	4.86
	Jhungi	N.D. 268 Khoondhar	C-2	31.59
			C-3	50.21
	Kangoo	N.D. 340 Kun	Whole	17.49
		N.D. 341 Chawari	Whole	4.81
	Sarkaghat	O.D. 415 Kaldu	C-II	55.13

			C-III	46.81
	Suket	N.D. 54 Tarlaza	C5	18.63
			C6	41.78
		N.D. 55 Kandhlu	Whole	13.75
				329.69
2027-28	Baldwara	O.D. 349 Bairkot	C-I	25.16
	Jaidevi	N.D. 172 Matoh	Whole	46.76
	Jhungi	N.D. 271 Fegal	Whole	60.8
	Kangoo	N.D. 342 Ghangnu	Whole	25.21
		N.D. 343 Khanokhar	Whole	7.72
	Sarkaghat	N.D. 394 Bhangoh	C-I	74.36
			C-II	43.23
			C-III	57.07
			C-IV	16.51
	Suket	N.D. 10 Ghauroo-I	Whole	21.13
		N.D. 11 Ghauroo-Ii	Whole	9.46
		N.D. 12 Jadron	Whole	21.75
		N.D. 13 Upper-Sehli	Whole	8.67
		N.D. 14 Lower-Sehli	Whole	5.57
		N.D. 17 Sabyahan	Whole	3.83
		N.D. 18 Nalot-I	Whole	9.08
		N.D. 19 Nalot-Ii	Whole	10.98
		N.D. 21 Kurara	Whole	15.02
				462.31
2028-29	Baldwara	N.D. 354 Sidhkot	Whole	15.38
		O.D. 353 Sidhkot	C-I	22.27
	Jaidevi	O.D. 161 Khabri	C-VI	28.3
			C-VIII	31.4
	Jhungi	N.D. 224 Sarelu	Whole	22.09
		N.D. 202 Jhnu	C 1	43.2
	Kangoo	N.D. 346 Chanol	Whole	13.25
		N.D. 347 Manjkhatir	Whole	10.36

	Sarkaghat	O.D. 396 Chandrakari	C-I	26.45
			C-II	9.56
		N.D. 399 Ropari	Whole	5.6
		N.D. 395 Barnog	C-I	58.47
		N.D. 402 Batalri	Whole	4.31
	Suket	N.D. 22 Thara	Whole	3.85
		N.D. 23 Trimi	Whole	5.51
		N.D. 5 Thalagdhari-I	Whole	22.88
		N.D. 9 Nal	Whole	7.32
				330.2
2029-30	Jhungi	N.D. 221 Kandhe	Whole	7.38
		N.D. 219 Ropa	Whole	34.01
		N.D. 220 Shilh	Whole	3.44
	Kangoo	N.D. 344 Masog	Whole	6.69
	Sarkaghat	N.D. 403 Saroli (P)	Whole	9.31
		N.D. 404 Saroli-Ii	Whole	7.01
		N.D. 405 Doon Shilh	Whole	18.17
	Suket	N.D. 22 Thara	Whole	3.85
		N.D. 23 Trimi	Whole	5.51
		N.D. 5 Thalagdhari-I	Whole	22.88
		N.D. 9 Nal	Whole	7.32
		N.D. 30 Phagla	C-II	58.58
				184.15
2030-31	Jhungi	N.D. 219 Ropa	Whole	34.01
		N.D. 220 Shilh	Whole	3.44
	Sarkaghat	N.D. 398 Jhinhnu I	Whole	31.94
		N.D. 401 Jhinhnu Ii	Whole	19.5
		N.D. 406 Jamdwar -I	Whole	96.43
	Suket	N.D. 1 Beena	Whole	6.25
		N.D. 2 Derdu	Whole	24.11
				215.68
2031-32	Sarkaghat	N.D. 407 Jamdwar-Ii	Whole	22.09

		N.D. 408 Kalash	Whole	37.07
		N.D. 409 Ghamdol	Whole	11.66
		N.D. 410 Kholtu	Whole	29.14
		N.D. 413 Thathal	Whole	47.14
	Suket	N.D. 37 Bhechanna	C-I	36.12
			C-II	31.85
				215.07
2032-33	Suket	N.D. 420 Tikker	Whole	122.46
				122.46
2033-34	Sarkaghat	N.D. 411 Bera Dhar	Whole	26.32
		N.D. 412 Sandoh	Whole	9.12
	Suket	N.D. 4 Dhar	Whole	10.13
				45.57

3.31 Subsidiary Silviculture Operation in P.B.I These will be carried out after the seeding/corrective felling and exploitation operations are completed.

i) Slash Disposal Most of the Chil are situated close to habitation and such after the seeding fellings and exploitation operations completed, the refuse would be collected and cleared by villagers. In other forests and where debris not cleared by villagers will be done departmentally during winter month following the year of working and disposed off in the following manners:

(a) All slash should be removed from around the bases of mother trees to a distance of about 5 meters. The branch wood should be heaped in gaps but never under the crowns of seed bearers. There should be gaps between the heaps. Slash should be burnt under strict control to avoid damage to the crowns of seed bearers. After the burning of refuse of lops and tops has been completed, the area should be control burnt in order to get a clean seed bed.

(b) In areas where young regeneration exists or advance growth has been retained as part of future crop, slash should be disposed off more carefully. The slash pieces and other debris should be removed from regeneration or advance growth and collected in small heaps, out side the regeneration patches. The burning of slash in blanks or Nallahs should be carried out as guided in above Para.

ii) Cuttings: The cutting of broad leaved trees to make room for Chil planting be avoided as per local demand. In Ban oak patches suitable for planting should be thinned and planting with Ban oak and other suitable broad leaved species be done. Chil be planted only where broad leaved species cannot come up.

iii) Planting: Artificial planting of Chil will have to be carried out after the exploitation works are over. This should be done during rainy season only. No winter planting be done in the lower belt even the upper belt is not fit for winter planting due to less snowfall for last so many years.

iv) Weeding: Weeding and bush cutting are necessary for proper development and establishment of seedling. Two weeding, bush cutting, in the forest for firsts three years are necessary during rainy seasons to free young seedling.

(a) Cleaning: Cleaning should commence at the age of about 10 years to produce healthy saplings and to reduce fire hazards. All the cut material should be removed and regeneration area be kept clean. The cut material can be used for fence post for fencing regeneration and plantation area.

(b) Pruning In regeneration area where plants have attained a height of 2 meters, pruning of side branches will have to be done up to 1/3 rd height from collar upwards. This induces fire hardiness at young age due to exposure of the bark to the sun; accelerate height growth and produce clean bole.

3.32 Cultural Operation in P.B. IV: In this working plan 2403.68 ha was included from Plantation Working Circles in P.B.IV of Chil Working Circle for the first time. These are the areas of plantation origin and brought under regular management for the first time. No. tending operations has been done in this area due to non availability of funds. Proper tending is required being crop of sapling to pole state. In P.B IV area cleaning/Unsaleable thinning will be carried out in addition to silvicultural thinning as per programme laid down vide Para No. 3.29.

(a) Cleaning: Where the established regeneration is congested cleaning shall be under taken and only promising poles should be favoured and only one sapling/pole will be left in each patch. This is essential to have a crop of clean boles.

(b) Thinning Early and frequent thinning should be done as per rules after the sapling have been grown to about 10 cm diameter at the base. The sapling/pole felling should be converted to fence posts for fencing and cut material be removed

and disposed off to avoid fire hazards.

3.33 Closure All the P.B. I area is to be closed for 15 years after the seeding fellings. All such closures must be properly notified and made effective. After the notification, these should be fenced with at least 3 stands. of Barbed wire. As soon as the area is fully established, it should be thrown open to grazing after 15 years.

3.34 Fire Protection: The entire area of the working circle will be protected against fires. It cannot be protected against fire without the good will and cooperation of the local people, which be obtained by meeting their reasonable demands for fuel wood, fodder, grazing etc., well in time and providing them employment in the off season. Strict fire protection will have to be carried out in P.B. I areas by adopting following method:

- i) Existing fire lines around P.B.I areas should be leaned and burnt every year
- ii) A 15 meters wide strip along the fence should be kept clean of needles and bushes especially in hot weather
- iii) Chil forest adjoining regeneration areas should be control burnt in alternate years.
- iv) Engaging adequate number of firewatchers
- v) Providing adequate fire fighting equipment to the firewatchers.
- vi) Fire lines should be laid in Chil tract and these must be kept clean.
- vii) A network of wireless is very essential and it is recommended that hand set of wireless be provided to each Range Officer and Block Officer for reporting against the outbreak of fires
- viii) Existing inspection paths and bridal paths should be improved so that they are as fire lines.
- ix) Record should be kept of the spots from the fires start and special attention should be paid to those places where the fires start frequently.

3.35 Marking for Right Holders: The right holders will be granted trees from forests where they have recorded rights. Trees should be marked purely on silvicultural requirement of the crop and not on the convenience of right holders. The trees to right holders should be given from P.B.I, P.B.III and P.B IV areas and not from P.B.II areas. No tree will be given to the right holders from P.B.I area after marking for seeding felling till the regeneration is not established. From

P.B.III areas, the trees are to be marked under thinning and in P.B.IV the trees are to be removed standing over established crop.

3.36. Regeneration Survey: The regeneration survey of felled PB-I areas shall be carried out every year till the stock is established. If regeneration is inadequate further felling will be curtailed for the next year. The reasons for failure should be detailed and corrective measures taken. The regeneration should be made to keep pace with the felling and in case there are short falls on this account with reference to the prescription of the Working Plan, the further felling should not be carried out and deferred till the problem is resolved

CHAPTER – 4

THE PLANTATION WORKING CIRCLE

4.1 General Constitution: This Working Circle comprises all the areas of the Plantation Working Circle in the expiring working plan of Nanak Chand, except area transfer to regular management for the first time being fully established pole crop. The depleted scrub forests have also been included in this Working Circle. The areas planted in the expiring working plan, being un-established areas, having marginal success, carrying young crop that needs protection, devoid of any tree growth, or carrying open crop have been retained in this working plan.

4.2 Area Statement: The details of the forests allotted to this working circle are given in Appendix-II. Total area of the working circle is 4450.35 ha. The area statement Range wise is given below in tabular form:

Table 4.1 Range wise Area statement under Suket Forest Division

Plantation Working Circle Ranges	
Range	Area (Hac.)
Baldwara	241.63
Jai Devi	513.35
Jhungi	470.64
Kangoo	2511.87
Suket	712.86
Grand Total	4450.35

PLANTATION WC RANGES

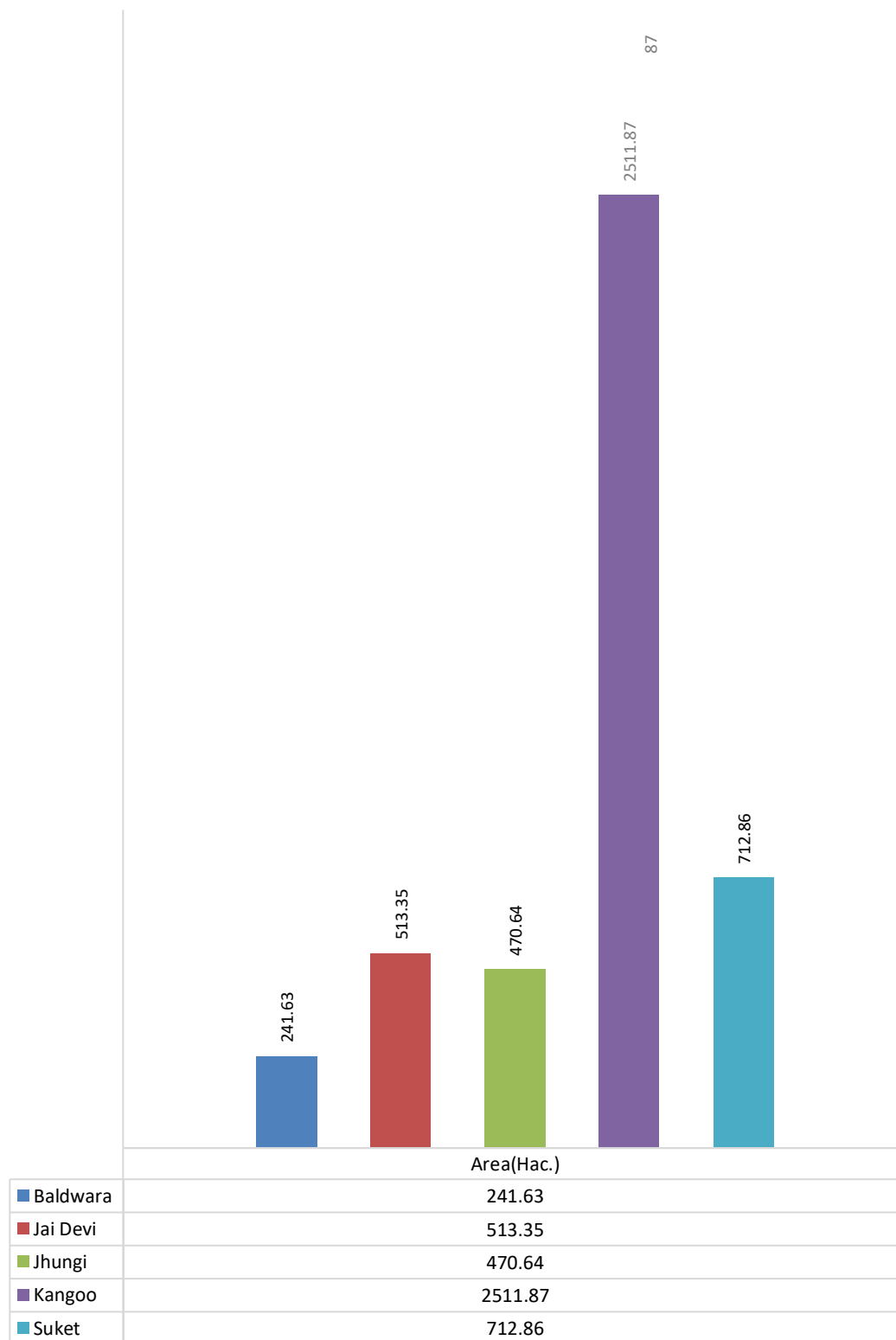


Fig 4.1 Range wise plantation working circle

4.3 Special Object of Management: The special objects of management will be as under:

1. To raise compact plantation of suitable species to meet the requirement of local people for small timber, fuel, fodder and fruits.
2. To raise plantation to make available raw material for wood based industries e.g. plywood, furniture and for building body of trucks and buses.
3. To restock the blanks, failed plantation areas and the areas which are under stocked or stocked with useless scrubs growth, with species of higher utility and economic value.
4. To nurse the existing young plantation and natural young growth under S systematic regime of cleaning and thinning
5. To plant the blanks alongside roads with species of aesthetic importance
6. To seek involvement of local people by adopting JFM wherever possible.
7. To provide employment to local village community particular in the interior locality.
8. To encourage sericulture.
9. To seek involvement of local people by adopting JPFM wherever possible as suggested under JPFM Chapter.

4.4. General Character of vegetation: Since the forests assigned to this Working Circle are situated in different altitudinal zone, therefore, the vegetation varies. The detail of forest types is already described in Part. I Chapter II and almost all forest types are found in this Working Circle.

4.5 Plantation Series: Plantation Programme is framed Range-wise so no plantation series required/suggested.

4.6 Block and Compartment: The forest have been divided into compartment or sub compartment, wherever felt necessary to separate the area suitable for plantation in the expiring working plan and no further bifurcation is required at present in this working plan period.

Table 4.2 Compartment wise detail of forest in working circle

Plantation Working Circle Forest					
Range	Block	Beat	Name of Forest	Compartment	Area (Hac.)
Baldwara	Baldwara	Bahanu	N.D. 361 Khol	Whole	1.85
	Baldwara	Hatli	N.D. 360 Dhardoo	Whole	2.42
			O.D. 393 B Math	Whole	4.19
	Bhambla	Dhalwan	N.D. 377 Silh	Whole	34.99
			N.D. 388 Bairasen	C-I	24.32
		Dhaulkhan	N.D. 385 Dhaulkhan	Whole	14.21
			O.D. 384 Dhaulkhan	C-I	20.01
				C-II	26
	Goverta	Amblagalu	N.D. 369 Raped	Whole	9.02
		Goverta	O.D. 379 Goverta	C -V	51.5
				C-II	53.12
Jai Devi	Jai Devi	Ghiri	N.D. 122 Baghyar	Whole	30.45
			N.D. 145 Garella	Whole	36.02
			O.D. 121 Kaulpur Chil	C-I	23.1
				C-II	37.04
	Rohanda	Kamand	N.D. 167 Bakalag-I	Whole	69.87
			N.D. 169 Bakalag -Ii	Whole	170.68
			N.D. 173 Kareru-I	Whole	118.57
			N.D. 174 Kareru-Ii	Whole	12.24
			O.D. 168 Bakalag	Whole	9.89
		Khabri	N.D. 160 Chichar -I	Whole	5.49
Jhungi	Jhungi	Salani	N.D. 269 Simoo	Whole	90.05
	Nihri	Marahra	N.D. 228 Marahara-Ii	C-2	45.8
			N.D. 230 Halnu	Whole	21.5
		Nihri	N.D. 189 Nehra	Whole	31.64
	Trechh	Balag	O.D. 199 Bunga	C 3	35.6
				C 4	20.2
				C 5	23.2
		Bandli	N.D. 212 Doghari	Whole	67.66
			N.D. 213 Mehra	Whole	8.12
			N.D. 214 Majhangan	Whole	18.86
		Trechh	N.D. 223 Mundli	Whole	20.06

			O.D. 222 Trechh	C-3-b	22.7
				C-3-c	22.15
				C-3-d	43.1
Kangoo	Batwara	Batwara	N.D. 306 Jaral	C.2	30.76
			N.D. 307 Patta	C.3	82.3
			N.D. 308 Panjolth	Whole	28
		Dhawal	O.D. 311 Ahen Sunali	C.1	61.36
			O.D. 312 Ahen Sunali Shisham	C.1	48.03
				C.3	56.86
				C.4	33.9
			O.D. 313 Dhawal	C.1	25.08
				C.4	104.38
				C.5	101.23
			O.D. 315 Barpat	C.1	77.6
		Gehru	N.D. 299 Gehru-Ii	Whole	24.97
			O.D. 200 Bunga Gehru	C-II	15.33
			O.D. 301 Gehru	C.1a	51.49
				C.1d	51.86
				C.2b	142.1
		Serikothi	N.D. 303 Dharli Brad	C.1	22
				C.2	28.16
				C.3	31.25
			N.D. 304 Lappar	Whole	70.61
			O.D. 305 Salyana	C.1	14.49
				C.2	37.16
				C.3	21.14
				C.4	35.97
	Behli	Badhu	N.D. 289 Chayori Silh I	C.1	34.97
			N.D. 294 Chouri Ii	Whole	37.55
			N.D. 295 Chouri Iii	Whole	11.44
			N.D. 298 Neri Ropru	C.2	29
			O.D. 291 Deoli	C.1	17.46
			O.D. 300 Chouri	C.1.c	19.02
				C.1.d	25.32
		Behli	N.D. 273 Bhalan	C.1	17.76
				C.2	28.91
			N.D. 274 Kathor	Whole	32
			N.D. 277 Mared	C.1	30.42
			N.D. 279 Bindloo	C.1	47.38

			O.D. 272 Karangal	C.2	32.32
				C.5	34.91
				C.6	90.74
		Haraboi	N.D. 284 Karla	C.1	38.35
			N.D. 285 Jalah	C.1	30.38
		Haraiboi	N.D. 276 Bragata	C.1	23.5
				C.2	31.71
				C.4	23.21
			N.D. 278 Sojha	Whole	41.36
			N.D. 281 Khalind	C.1	65.96
			N.D. 286 Hara	C.1	18.25
				C.2	35.3
			N.D. 287 Hara (P)	Whole	12.99
	Dehar	Dehar	N.D. 316 Siun	C.1	50.06
			N.D. 317 Slapper	Whole	2.14
			N.D. 319 Barota	Whole	46.85
			N.D. 320 Saroshi	Whole	31.44
			N.D. 321 Sordu	Whole	47.26
			N.D. 323 Kangri	Whole	3.35
			N.D. 325 Jabbal Badoun	Whole	7.36
			N.D. 333 Ghurana	Whole	16.39
			O.D. 318 Slapper	C.2	35.66
		Jyor	N.D. 324 Dhatak	C.1	20.98
			N.D. 326 Salwana-I	Whole	5.12
			N.D. 327 Salwana-Ii	Whole	13.79
			N.D. 328 Guddidhar-I	Whole	33.33
			N.D. 329 Guddidhar-Ii	C.2	37.5
				C.3	13.7
			N.D. 330 Guddidhar-Iii	Whole	19.22
			N.D. 331 Guddidhar-Iv	Whole	24.46
			N.D. 334 Bhantrahar	Whole	2.52
		Umri	N.D. 335 Namol	Whole	5.08
			N.D. 336 Umri I	Whole	2.78
			N.D. 338 Mugalwani	Whole	20.88
			N.D. 339 Dhar	Whole	27.85
			N.D. 345 Nalag	Whole	19.76
			O.D. 337 Umri Ii	C.1	18.15
Suket	Baggi	Baggi	N.D. 56 Bhebli	Whole	2.81
			N.D. 57 Kharidhar	Whole	12.94
			N.D. 59 Jhuju-Mujhu	C-I	18.18

			N.D. 64 Masyani	Whole	2.81
			N.D. 65 Dhangyara	Whole	11.73
			N.D. 69 Lot Maka	C2	31.67
				C-I	12.42
		Deodha	N.D. 50 Kummi	Whole	7.89
		Rajgarh	N.D. 51 Karol	Whole	14.07
			N.D. 52 Rajgarh	Whole	26.59
			N.D. 54 Tarlaza	C2	30.32
				C3	45.36
				C4	24.35
				C-I	31.27
	Sadar	Dhanotu	N.D. 48 Kafari	Whole	28.04
		Jadroun	N.D. 15 Talsai-I	Whole	14.81
			N.D. 16 Talsai-Ii	Whole	2.3
			N.D. 20 Baila- Balahar	Whole	33.45
			N.D. 24 Lusani	Whole	2.09
			N.D. 6 Thalagdhar-Ii	Whole	4.82
			N.D. 7 Thalagdhar-Iii	Whole	3.14
			N.D. 8 Thalagdhar-Iv	Whole	2.47
		Jarol Beat	N.D. 27 Sarauni	Whole	17.28
			N.D. 28 Jarol	Whole	20.58
			N.D. 29 Chila-Ri-Ridhi	Whole	7.08
			N.D. 30 Phagla	C-III	42.78
			N.D. 32 Ropari – Ii	Whole	10.8
			N.D. 34 Ghangal	Whole	14.16
			N.D. 35 Harabag	Whole	17.29
			N.D. 36 Phagla I	Whole	1.72
		Nalni	N.D. 39 Patya	Whole	33.63
			N.D. 41 Maloh	Whole	24.63
		Trambari	N.D. 45 Trambari	C1(a)	17.93
				C3(a)	45.91
				C3(b)	54.61
				C3(c)	31.73
			N.D. 46 Changar A	Whole	7.9
			N.D. 47 Changar B	Whole	1.3
Grand Total					4450.35

4.7. Analysis and valuation of the crop:

All the areas allotted to this working circle have been stock mapped on GIS platform. The stock map has been

placed in respective compartment history files.

4.8 Density: The density of all the compartments have been assessed and recorded in the compartment history files and also indicated in the stock maps wherever crop exist.

4.9 Quality class: The quality class of old plantation areas have been assessed after measuring height and given in respective compartment files.

4.10 Enumeration: The technique of Survey and Assessment of Forest Resource using Grid and Quadrants method (Sample Plots) has been adopted and complete counting of all tree species class-wise has been done. A total of 40 Sample Plots of 0.1 hac. were laid in this working circle covering all PBs. The detail of PB wise sample plots are as under

S.No	No. of plots	Total area counted Hac
1	40	4.00

Table 4.3 Results of Enumerations

Tree Count										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	I D	
Chil	1157091	2002657	2536699	945699	166888	11125	11125	22251	0	6853535
Deodar	33377	0	0	0	0	0	0	0	0	33377
Kail	244769	11125	0	0	0	0	0	0	0	255894
Khair	111258	22251	22251	0	0	0	0	0	0	155760
Ban	233643	300398	0	0	0	0	0	0	0	534041
Fir Spruce	0	0	0	0	0	0	0	0	0	0
BL	712056	545167	344902	144636	33377	0	11125	11125	0	1802388
Grand Total	2492194	2881598	2903852	109035	200265	11125	22250	33376	0	9634995

Tree Volume										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	57854.55	2202 92.27	7102 75.72	6903 60.27	2503 32.00	2925 8.75	43943.7 5	12149 0.46	0	212380 7.77

Deodar	1869.11	0	0	0	0	0	0	0	0	1869.11
Khair	17133.83	1335.00	0	0	0	0	0	0	0	18468.83
Kail	8900.64	4672.71	13128.09	0	0	0	0	0	0	26701.44
Ban	0	90119.40	0	0	0	0	0	0	0	90119.40
Fir Spruce	0	0.00	0	0	0	0	0	0	0	0
BL	0	151867.95	253749.33	210755.31	77023.85	0	53143.27	93854.55	0	840394.25
Grand Total	85758.13	468287.33	977153.14	901115.58	327355.85	29258.75	97087.02	215345.01	0	3101360.81

4.11 Silvicultural System: As the main object is to raise, plantation no silvicultural system is prescribed. The plantation may be raised by artificial means.

4.12 Calculation of Yield: No felling is prescribed from this working circle. The salvage removals and removal by right holders is permitted to an extent of 3000 m³ annually keeping in view the annual increment of the working circle

4.13 Choice of Species: The choice of species depends on the various factor such as climatic, edifice, topographic, and biotic, but the surviving of indigenous species give a clear indication to the most suitable species to beplanted. Since most of the degraded forests of Deodar, Kail, Ban, Chil has been allotted to this Working Circle, so the existing species is planted in the area of rather than other species. In the depressions and along Nallahs, in such forests beplanted with B.L species suitable to locality. Similarly blank having no vegetation and scrub growth is planted with indigenous, fast growing, hardy, species that can survive under adverse conditions of the locality. Sincere and strenuous efforts should be made to bring the blank area under vegetative cover as early as possible. The forester should follow the nature rather than compelling nature to follow him. Suggested list of species to be planted according to altitudinal zone

Altitude	Species suggested for plantation
Up to 1000 metres	Shisham, Bamboo, Khair, Ritha, Toon, Bihul, Siris, Khirk, Kachnar, Daru, Harar, Bahera

1000 to 1500 metres	Robinia,Bihul,Toon,Ritha,Kachnar, Willow, Leucaenia, Bamboo, Khair, Khirk, Kikker, Daru, Hill Poplar
1500 to 2500 metres	Deodar, Walnut, Hill Poplar, Willow, Robinia, Ban Oak, Horse Chestnut
2500 to 3000 metres	Silver Fir, Maple, Walnut, Moru Oak,Bird Cherry, Ash, Hill Poplar

However, DFO has liberty for planting different species depending on locality factors and site quality.

4.13.1 The forest areas in lower belts are heavily infested with Lantana and Ageratum.

The methodology developed by University of Horticulture

& Forestry, Nauni for the eradication of these obnoxious weeds is adopted. Method of control of Lantana and Ageratum. After the eradication of these obnoxious weeds these areas will be planted with tall plants of two years root system and one shoot. Shisham, Kachnar, Siris, Ohi, Mango, and Robinia (in higher area) are planted and follow up action be done.

Old plantation area with survival less than 30% will be treated as Para 4.13 and 4.13.1 depending upon bush growth and planted with suitable as already discussed in plantation programme.

Monoculture should be avoided and plants of mix B/L species of indigenous origin be planted, keeping in view the need of local people for fodder, fuel and small timber species.

4.14. Felling Cycles: This is not needed, except in successful plantation, which have been transferred under regular management and prescribed for felling as per requirement of the crop.

4.15 Regulation of Yield: No felling is prescribed from this working circle. The salvage removals and removal by right holders is permitted to an extent of 3000 m³ annually keeping in view the annual increment of the working circle.

Plantation Programme: In order to avoid hardship to local people from closure against grazing the plantation and area having survival less than 30% have been suggested to be

taken up during the initial years of the Working Plan period. Barbed wire already used be reaffixed. Year wise plantation programme Range wise is given overleaf.

Treatment of Existing Plantation: List of successful plantation raised in the last two decades has been prescribed under different working circle. The treatment in the remaining area also suggested and recorded in respective history files be studied and acted accordingly subject to availability of funds. All existing young plantations must be strictly protected and tended properly. Maintenance operations such as fence repair, weeding, bush cutting, beating up of failures etc. should be carried out for a period of at least 5 years after the planting

NURSERY: It is axiomatic that the degree of survival of plantations is directly linked to the quality of nursery stock raised in nurseries. More so, when we are faced with increasing swings in seasonal fluctuations, both in terms of erratic rainfall and rising temperatures. These recent changes in weather patterns exacerbate our historical woes of compacted soil, damage by fire and cattle and general lack of interest (and therefore concern) of local communities in our plantations.

Vastly improved nursery stock can in a major way address most of these impediments coming in the way of establishing successful plantations in and outside forests.

Few important qualities of any good nurseries would include:

It should be large in size (at least 0.5ha) so that it is cost effective and also proper infrastructure including water supply, germination chamber (poly-house), Mali-hut, soil mixing yard, vermicompost etc can be developed.

Adequately trained, dedicated staff should be available in each nursery. Mali and laborers should be trained and guided from time to time about raising of quality stock.

Each nursery should specialize in 5-6 species suited to the area and have large stock of each species, which is graded from time to time so that only quality stock goes for planting. Soil mixture is most vital component for raising quality stock. Thus, care must be taken not to compromise with quality of soil mixture (ideally 1:1:1 of soil: sand: vermicompost)

4.16 Tall Planting

One of the main reasons for failure of plantations is grazing / trampling by cattle. Also, drought, fire hazards contribute to failure. Thus, to overcome pressure of grazing and drought, planting of tall plants (above grazing height) with well developed root system and

good collar girth is desirable. Such plants will be able to cope with droughts owing to their well-developed spread- out root system, will be above grazing height and thus will survive grazing pressure and their good collar girth will help them withstand tampling. Such plants can be raised in nurseries for which month-wise operation activity has been given here.

Table-4.4 Raising of Deodar in Nurseries

Month	Activities for Raising Deodar
Nov-Dec Ist year activity	Sow seeds in trays filled with only Vermicompost. Keep the trays in polyhouse. (1 kg deodar seed contains 8000-10000 seeds approximately)
July (second year activity)	Prick the germinated seedlings in 9"x5" bags with potting mixture of 1:1:1 of sand :soil: vermicompost
July (Third Year activity)	Transfer to 9"x14" bag along with ball of earth, add some more soil at bottom and sides for raising tall plants as per requirement at least 50% and keep rest as same for raising normal plants in 5"x9" p bags itself as per the second year activity
July (Fourth year activity)	Normal plants of 2.5 years can be planted in normal Plantations whereas the tall plants will be kept as it for growth
July (Fifth year activity)	The tall plants of minimum height 90cm and collar diameter at least 1.1 cm will be tall plants as desired for effective plantation in the field

Similarly month wise activity chart for raising Ban is given here:

Table-4.5 Raising of Ban/Oaks in Nurseries

Month	Activities for Raising Ban/Oak
Nov	Sow seeds in fresh cow dung immediately after collection as oak seeds are viable only for 7-14 days.
Jan (1 st Year activity)	Prick the germinated seedlings in 9"x5" bags with potting mixture of 1:1:1 of sand: soil: vermi compost
April to march (second year activity)	Will be kept for one year in 5x9' p bags for growth
July (Third Year activity)	Transfer to 9"x14" bag along with ball of earth, add some more soil at bottom and sides for raising tall plants as per requirement at least 50% and keep rest as same for raising normal plants in 5"x9" p bags itself as per second year activity

July (Fourth year activity)	Normal plants of 2.5 years can be planted in normal plantations whereas the tall plants will be kept as it for growth
July (Fifth year activity)	The tall plants of age 3.5 years , minimum height 90cm and collar diameter at least 1.1 cm will be tall plants as desired for effective plantation in the field.

Tall plants of other deciduous species will also be raised in a similar way as that of Oak, sowing time and technique will be as per species requirement. For further detail please refer to nursery raising protocol of the department for raising normal and tall plants dated 21.02.2018.

4.17 Notification of Closures

Every area to be taken up for plantation should be notified for closure one year in advance. The period of closure may be 15-20 years.

4.18 Plantation Practices: -

Under the current departmental policy, a mixture of species in departmental plantations is required in the following proportion: -

30% medicinal trees suitable for the area, 20% wild fruit trees suitable for the area and the remainder to be the main species of the forest type either conifers or broad leaved. It has, therefore, to be ensured that for plantation programme sufficient diversity of tree species is grown and available in the nurseries. It is also prescribed that wherever deodar is being planted the plants should be at least 2 and a half years old. Similarly broad-leaved species should be at least 1 year old. Deciduous broad-leaved species are to be planted during winter while conifers are to be planted during the rainy season.

4.19 Plantation Journals: -

It is essential that whenever a site is selected for plantation a proper hard bound nursery journal is prepared for that site. The nursery journal must have a large sketch map of the area showing boundaries and other details like nallas, rocky outcrops, existing patches of trees etc. It is important that GPS coordinates of at least 6 to 8 points around plantations are recorded and entered in the plantation journal along with the altitude of the area. Details of all works carried out must be entered in the plantation journals and signed by the concerned

officials showing date of signature. All inspecting officers are to record their visits and comments/observations in the plantation journals. Once a plantation journal is complete i.e. in the fourth and fifth year of the plantation, it should be transferred to the division office and kept properly in record there.

4.20 Site Clearance: -

In the past it has been a practice to cut and remove all bushes & shrubs from the plantation area. This practice is to be discontinued as shrubs & bushes help prevent soil erosion and add in moisture retention. However, if the area has exotic weeds/ aliens' species like lantana, Parthenium etc. then these are to be removed when the area is fenced.

4.21 Advance earth work: -

Pits of the standard size (30cm x 30 cm x 30 cm for chil and broad leaved for normal planting and 60cm x 60cm x 60cm for tall planting should be dug about 3-4 months in advance and the soil be heaped on the lower side of the pit. This helps in weathering and improvement of the soil.

4.22 Other Subsidiary Silvicultural Operations: These will comprise of:

- i) Plantation technique:** The technique of raising plantations of various conifers, B.L. is now well known and needs no discussion.
- ii) Site selection:** Specific sites have been suggested and location of plantation is also indicated in plantation programme. However final decision will be of Divisional Forest Officer after spot inspection.
- iii) Closure Notification:** Every plantation area should be notified for closure and suspension of rights one year in advance of plantation works. The area should remain closed effectively till the regenerated crop reaches the stage beyond any damage due to frost, drought, weeds, and protection from animals. The area should not be closed for larger period to avoid hardship to local people. So, sincere efforts are to be made to regenerate areas as early as possible.
- iv) Fencing:** All the plantation area will be effectively closed with 3-4 stand barbed wire fencing and reinforced in fencing by bush fencing where material is readily available.
- v) Site Clearance:** The site shall be clear of bushes and unwanted growth only to the extent absolutely necessary. Dodanea, Desmodium should be left to afford side shade to

young plants on hot aspects.

vi) Preparation of Site: Digging of pits is done as per requirement of species and scheme.

vii) Spacing: Emplacements of pits be done as per norms of plantation under which scheme the area is taken up.

viii) Planting: As per practice and requirement of site and species to be planted.

However, the broad, principles of raising the important species in nurseries already exist for most of the species so further giving in the working plan is not required..

4.23 Miscellaneous Regulations:

(a) Grazing: All plantation areas shall be closed from grazing for 10 to 15 years period depending upon the progress of 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 plantation where after 5-7 years effective closure, the young crop will be nearly 2 meters in height and cattle grazing will also minimize damage by fire.

(b) Grass cutting: No grass cutting should be allowed except under strict supervision of the forest Guard. Removal of grass will minimize hare hazard.

(c) Lopping: Trees standing in the plantation areas shall be prohibited for lopping during the closure period.

(d) Fire protection: All the plantation area will be strictly fire protected. Young chil plantation should receive special attention in this behalf. The methods of fire protection and control burning suggested in Chil Working Circle shall be followed.

(e) 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.

(f) Plantation records: Plantation journal will be maintained for each plantation area on the standard form prescribed for the purpose. A location map on 1:15000 scales should also be prepared and prefixed to the journal. In addition to this all the works carried out in

plantation area having compartment history files be recorded in Form C as is done for P.B.I areas.

Plantation boards should be put at prominent places, and written in Hindi, giving name of plantation, area, and year commencement, and other details of works.

Note on germination, establishment, causalities due to fire, drought etc. be given regularly by the Range Officer, and inspection notes of visiting officers be incorporated in the journal

A detailed map showing various species and its extent should be prepared on 1:15000 scales and placed in Plantation Journal and marked on stock map.

CHAPTER – 5

THE PROTECTION AND REHABILITATION WORKING CIRCLE

5.1. General constitution: This Working Circle includes all the forest having precipitous and broken terrain comprising of conifers, Ban or open crop of broad leaved species which was subject to indiscriminate lopping and hacking in the past. The degraded, sparsely stocked subject to heavy erosion requiring adequate effective protection cover, and found unfit for allotment to other working circles have been allotted. Ban Oak forests, for their significant role in moisture conservation; have been banned for felling by the Govt. and all Ban Oak forests have been allotted to this working circle. Forest situated at the head of streams and Nallas for the preservation of water and moisture are also allotted to this circle.

5.2. General Character of Vegetation: The forests allotted to this Working Circle have their scattered distribution throughout the tract, hence they represent almost all types of forests starting from scrub in lower elevation and extending to Alpine pasture. So generally (a) scrub forests (b) Ban Mohroo and Kharsu forest (c) Northern dry mixed deciduous forest (d) Western Oak Fir forests are predominately found.

5.3 Block and Compartment: The existing compartment/sub compartment remained unchanged as bifurcation has already done in the working plan under revision. There is no change of vegetation's and crop so further division not considered necessary.

5.4. Special Object of Management: The special objects of management are as under:

- i) To protect the hilly tract from further denudation and erosion by preserving and enhancing the forest cover.
- ii) To prevent indiscriminate and ruthless lopping/hacking of trees for fuel wood and fodder for local people and graziers who come to these forests for grazing.

- iii) To initiate measures to increase the forage and fodder value of these forests to meet increasing grazing and fodder demands.
- iv) To conserve moisture and streamline the flow of water in streams and Nallahs by protecting and increasing vegetation cover at the head of their source and along banks.
- v) Consistent with the principles of soil conservation, to provide for grazing of sheep, goats and buffaloes of local and migratory grazers who come to these areas and also meet the genuine demands of right holders for timber and other forest products.
- vi) To protect non timber forest produce growing naturally in high lying area from indiscriminate exploitation.
- vii) To provide a suitable habitat to wild animals in forests and around the boundary of wild life sanctuary.
- viii) To protect the Ban Oak and other valuable broad leaved species from indiscriminate destruction and simultaneously improving their growing stock by artificial means, wherever possible.
- ix) Constant with the principles of sound Silviculture to meet the bonfire demands of right holders for timber, fuel and fodder etc.,

5.5 Area Statement: Area by ranges wise is given below in tabular form:

Table 5.1 Area wise ranges in Protection Working Circle

Protection Working Circle Ranges	
Range	Area (Hac.)
Baldwara	376.25
Jai Devi	1171.84
Jhungi	1932.5
Kangoo	6576.4
Sarkaghat	1199.39
Suket	500.1
Grand Total	11756.48

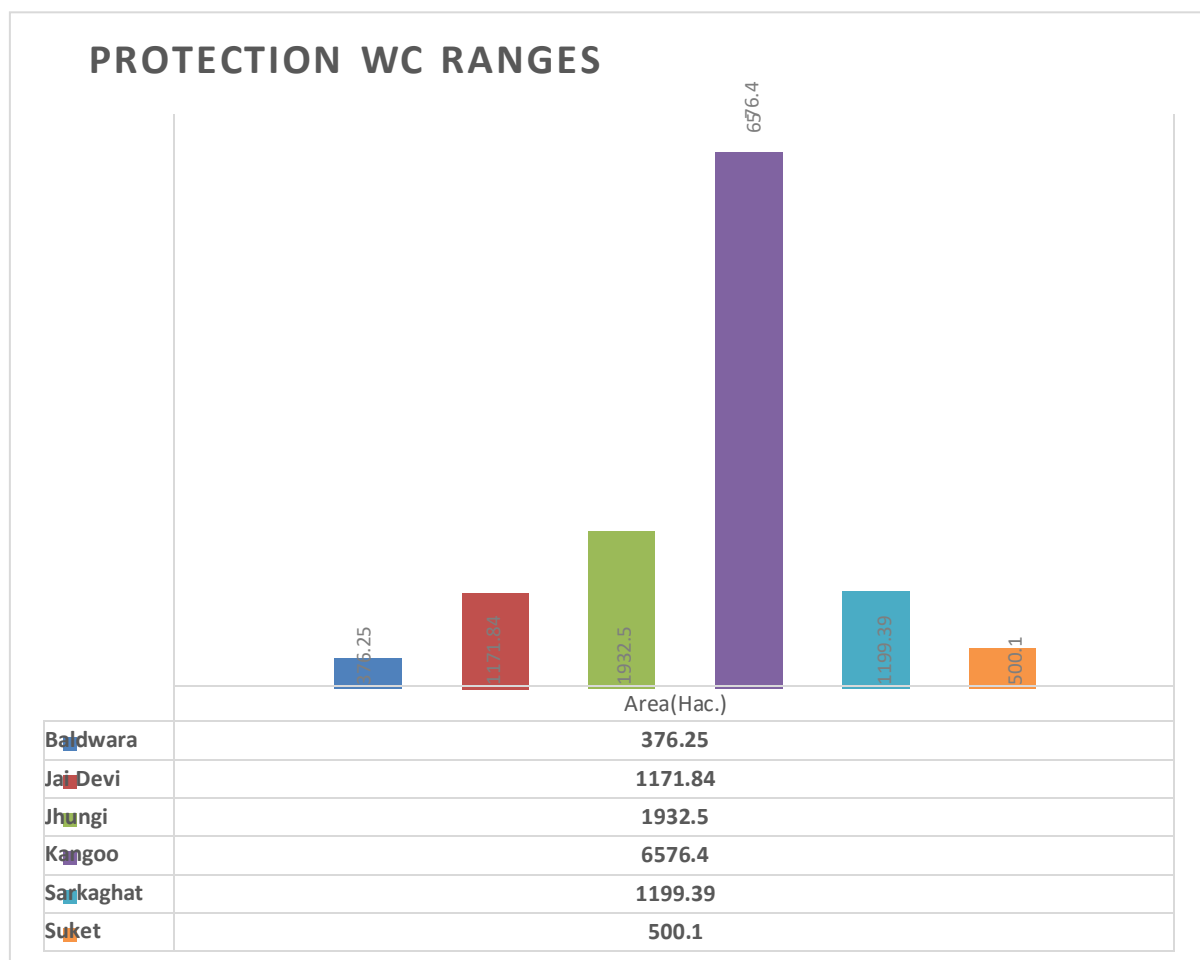


Fig 5.1 Range wise area in Protection working Circle

Table 5.2 Detail of forests in Working Circle

Protection Working Circle Forest					
Range	Block	Beat	Name of Forest	Compartment	Area(Hac.)
Baldwara	Leda	Balhra	U27 Gumal Garh	Whole	12
			U28 Ropari	Whole	3
			U29 Samlehar	Whole	7
			U30 Samlehar-Ii	Whole	3
			U31 Koulkot	Whole	10
			U32 Balhra-I	Whole	10
			U33 Balhra-Ii	Whole	10
		Triphalghat	U34 Chowki Thana	Whole	20
			U35 Batehra-I	Whole	12
			U36 Batehra-Ii	Whole	15

			U37 Batehra-Iii	Whole	6
			U38 Kakruhi	Whole	8
			U39 Badaun	Whole	15
			U40 Baswan	Whole	11
			U41 Batehrdu	Whole	9
			U42 Nawani-I	Whole	3
			U43 Gehri	Whole	8
Baldwara	Bhambla	Bhambla	N.D. 393 Jaboth	C-I	93.15
	Goverta	Amblagalu	N.D. 370 Majhwan	Whole	3.6
		Goverta	O.D. 379 Goverta	C-I	56.39
	Leda	Bairkot	N.D. 348 Halyater	Whole	61.11
Jai Devi	Jai Devi	Doldhar	N.D. 137 Banani Bhadrolu	Whole	7.17
			O.D. 144 Challela	C-I	13.1
				C-II	15.65
		Ghiri	N.D. 110 Jhawarshilh	Whole	6.59
			O.D. 108 Gadhyal	C-II	42.9
			O.D. 113 Sakohar -B	Whole	7.55
			O.D. 118 Bajahar	C-II	11.25
				C-III	16.9
				C-IV	14.22
			O.D. 120 Kaulpur Ban	C-II	33.4
				C-III	17.5
				C-IV	23.64
		Jai Devi	N.D. 127 Chatru	Whole	1.47
	Jaidevi	Dol Dhar	U22 Kotloo	Whole	10
			U23 Kataru	Whole	5
			U24 Movi	Whole	5
			U25 Cheli	Whole	5
			U26 Chamba Nal	Whole	5
		Jaidevi	U21 Bandhar	Whole	5
	Nandgarh	Chhamiar	U10 Dalechru	Whole	18
			U9 Dhaliar	Whole	22
		Chhamyar	N.D. 93 Sangrair -1St	Whole	9.99
			N.D. 94 Sangrair-2Nd	Whole	32.03
		Hatgarh	N.D. 81 Hatgarh	C-I	31.25
			U1 Slosra	Whole	60
			U11 Rajwari Nal	Whole	3
			U2 Tapani Dhar	Whole	15
			U3 Baleran	Whole	10
			U4 Trabli	Whole	6
			U5 Batehra	Whole	8
			U6 Gawalthi	Whole	10

			U8 Lambi Dhar	Whole	20
		Kuttachi	N.D. 88 Sarogi 1St	Whole	3.8
			N.D. 96 Kuttachi -1St	C-I	44.65
				C-II	32.5
			N.D. 97 Kuttachi-2Nd	C-I	36.75
				C-II	45.36
				C-III	35.17
				C-IV	34.82
				C-V	20.75
		Nandgarh	N.D. 103 Silh	C-II	26.57
				C-III	28.73
			N.D. 104 Drahal 1St	C-I	51.93
				C-II	74.59
			N.D. 107 Latogali	Whole	12.74
			O.D. 106 Latogali	C-I	37.28
			U12 Draman	Whole	8
			U13 Boudal	Whole	8
			U14 Ropri	Whole	8
			U15 Khagrao	Whole	2
			U16 Tarmora	Whole	4
			U17 Khurridhar	Whole	8
			U18 Sanoh	Whole	5
			U19 Tarmbl	Whole	5
			U20 Wahnalla	Whole	5
			U7 Nandgarh	Whole	10
	Rohanda	Khabri	N.D. 162 Thihkar	Whole	53.82
			O.D. 161 Khabri	C-III	22.55
				C-IV	22.9
		Rohanda	O.D. 154 Banwali	C-V	32.32
Jhungi	Jhungi	Salani	N.D. 270 Ukri	Whole	102.17
	Nihri	Kanaun	N.D. 187 Kanon-Ii	Whole	3.8
			N.D. 188 Kanon-I	Whole	27.83
	Pandar	Jaral	N.D. 247 Kanjhira	Whole	65.44
			O.D. 246 Manjhki	C-3(a)	86.34
				C-3(b)	86.46
		Pandar	O.D. 181 Bhiunkar	C-I	43.29
	Trechh	Bandli	N.D. 201 Kumaru	Whole	124.88
		Balag	N.D. 198 Bag	C 1	43.48
				C 2	11.6
			O.D. 199 Bunga	C 1	22.2
				C 2	15.7
				C 6	45.5

				C 7	30.8
		Bandli	N.D. 209 Bandli	Whole	75.76
			N.D. 215 Dhargalu	Whole	18.59
			N.D. 216 Malohi	Whole	63.1
			O.D. 207 Kufto	C 1	17.35
				C 2	26.16
				C 3	49.97
				C 4	85.4
			O.D. 208 Kufto 1St	C 1	23.6
				C 2	40.8
			O.D. 210 Gadahach	Whole	98.88
			O.D. 211 Rakol	Whole	9.85
		Kinder	N.D. 202 Jhnu	C 2	134.82
			N.D. 203 Trehri	Whole	131.3
			N.D. 204 Narehli	Whole	266.07
			O.D. 206 Charog	C 1	23.21
				C 2	23.68
				C 3	33.42
				C 4	28
		Trechh	N.D. 218 Supadhar	Whole	27.85
	Trechh	Trechh	N.D. 217 Tandidhar	C-1	45.2
Kangoo	Batwara	Batwara	N.D. 306 Jaral	C.1	56.17
			N.D. 307 Patta	C.1	619.07
				C.2	59.7
			N.D. 310 Jartu	C.1	179.91
				C.2	239.89
		Dhawal	O.D. 311 Ahen Sunali	C.2	61.43
			O.D. 312 Ahen Sunali Shisham	C.2	117.55
				C.5	78.94
			O.D. 313 Dhawal	C.2	60
				C.3	65.09
			O.D. 314 Mandheli	C.1	99.38
				C.2	136.41
				C.3	95.08
			O.D. 315 Barpat	C.2	100.36
		Gehru	N.D. 302 Gehru-I	Whole	254.86
			O.D. 200 Bunga Gehru	C-1	30
			O.D. 301 Gehru	C.1b	101.3
				C.1c	55.92
				C.2a	496.78
				C.2c	107.77
	Behli	Badhu	N.D. 288 Chayori Silh Ii	Whole	57.32

			N.D. 289 Chayori Silh I	C.2	25.56
				C.3	50.42
			N.D. 290 Deoli	Whole	132.94
			N.D. 292 Fafna	Whole	19.68
			N.D. 293 Chouri I	Whole	209.72
			N.D. 297 Challaun	Whole	305.92
			N.D. 298 Neri Ropru	C.1	97
				C.3	103
			O.D. 291 Deoli	C.2	34.02
				C.3	12.28
			O.D. 300 Chouri	C.1.a	37
				C.1.b	45.02
				C.2	331.8
		Behli	N.D. 277 Mared	C.2	85.58
			N.D. 279 Bindloo	C.2	75.44
			O.D. 272 Karangal	C.1	81.92
				C.3	69.31
				C.4	52.89
		Haraboi	N.D. 280 Tahli	Whole	380.69
			N.D. 282 Thung Dhar	C.1	128.52
				C.2	188.9
			N.D. 283 Barthia	Whole	203.75
			N.D. 284 Karla	C.2	31
				C.3	141.72
			N.D. 285 Jalah	C.2	24.85
		Haraiboi	N.D. 276 Bragata	C.3	30.96
			N.D. 281 Khalind	C.2	173.39
			N.D. 286 Hara	C.3	37.59
	Dehar	Dehar	N.D. 316 Siun	C.2	42.68
			N.D. 322 Bhuwana	Whole	241.19
			O.D. 318 Slapper	C.1	55.9
		Jyor	N.D. 324 Dhatak	C.2	36.31
			N.D. 329 Guddidhar-Ii	C.1	16.52
Sarkaghat	Durgapur	Bhadwar	U49 Thurd	Whole	15
		Kaldoo	U45 Khalanoo	Whole	10
			U46 Bhalyara	Whole	5
		Kaldu	N.D. 416 Kaldu	Whole	23.86
			O.D. 415 Kaldu	C-I	177.43
		Pingla	U47 Bhayalag	Whole	10
			U48 Pingla	Whole	5
	Sarkaghat	Chandrakari	O.D. 396 Chandrakari	C-III	22.12
		Dev Bradta	U50 Rachhot Pattii	Whole	5

			U51 Dharjol	Whole	5
			U54 Masdhawan	Whole	5
		Gopalpur	N.D. 395 Barnog	C-II	94.72
			N.D. 426 Bid	Whole	5.5
			N.D. 427 Chandesh	Whole	2.29
			N.D. 428 Tapon	Whole	34.34
			N.D. 429 Barnoh	Whole	4.88
		Maseran	N.D. 423 Bahlra	Whole	29.73
			N.D. 424 Hawani	Whole	9.47
			N.D. 425 Bhalyana	Whole	7.77
			U44 Talangra	Whole	10
	Thona	Jamdwar	U52 Beri	Whole	10
		Thona	N.D. 422 Murahdhar Ii	C-I	51.24
				C-II	39.71
				C-III	192.78
		Tikkar	U53 Kathogan	Whole	20
		Tikker	N.D. 421 Jhumdhar	C-I	195.71
				C-II	207.84
Suket	Baggi	Baggi	N.D. 68 Dagwahan	C2	29.82
				C3	38.26
				C4	32.23
				C-I	20.95
		Deodha	N.D. 49 Dea	Whole	19.32
		Rajgarh	N.D. 53 Khiuri	Whole	39.25
	Sadar	Jarol Beat	N.D. 26 Thana	Whole	17.51
			N.D. 30 Phagla	C-I	24.66
			N.D. 31 Ropari - Iii	Whole	6.93
			N.D. 33 Ropari – I	Whole	3.49
		Nalni	N.D. 40 Sariun	Whole	76.29
			N.D. 42 Behli Baderan	Whole	56.75
		Sadar	N.D. 38 Sundervan	Whole	30.07
		Trambari	N.D. 43 Drahal	Whole	56.33
			N.D. 44 Keran Silh	Whole	25.84
			N.D. 45 Trambari	C1(b)	22.4
Grand Total					11756.48

5.6 Analysis and Valuation of the Crop: All the forests in this working circle have been stock mapped on 1:15000 scales. The tracing of each compartment or sub compartment has been placed in each compartment history files. The details of areas under different species are given in a table overleaf.

5.7. Quality Class: There is hardly any need to know the quality class of these forests. Bulk of the area carries Misc. broad leaved or ban oak forests which are in degraded conditions.

5.8 Enumeration: The technique of Survey and Assessment of Forest Resource using Grid and Quadrants method (Sample Plots) has been adopted and complete counting of all tree species class wise has been done. A total of 30 Sample Plots of 0.1 hac. were laid in this working circle covering all PBs. The detail of PB wise sample plots are as under

S.No	No. of plots	Total area counted Hac
1	30	3.00

Summary of Enumeration

Tree Count										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	705388	428952	225597	57193	28596	9532	6354	0	0	1461612
Deodar	9532	6354	12709	12709	0	0	0	0	0	41304
Kail	15887	3177	0	0	0	0	0	0	0	19064
Khair	22241	0	15887	3177	0	0	0	0	0	41305
Ban	320920	136629	238307	50838	9532	22241	12709	0	0	791176
Fir Spruce	6354	6354	0	3177	0	3177	3177	12709	6354	41302
BL	384468	187468	60371	28596	19064	12709	0	0	3177	695853
Grand Total	1464790	768934	552871	155690	57192	47659	22240	12709	9531	3091616

Tree Volume										
Spp.	Class									Grand Total
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
Chil	35269.40	47184.72	63167.16	41750.89	42894.00	25069.16	25098.30	0	0	280433.63
Deodar	533.79	1245.38	9608.00	19927.71	0	0	0	0	0	31314.89
Khair	1112.09	381.24	0	0	0	0	0	0	0	1493.33
Kail	1779.28	0	9373.33	3907.71	0	0	0	0	0	15060.32
Ban	0	40988.70	238307.00	91508.40	28596.00	102308.60	80066.70	0	0	581775.40

Fir Spruce	546.4 4	1798.18	0.00	5248.4 0	0	12854 .14	17613 .29	9109 8.11	57999 .31	187157 .88
BL	0	52223.2 3	44415.8 1	41668.46	43993.85	43699 .41	0	0	35235 .82	261236 .56
Grand Total	39241.01	143821.45	364871.30	204011.57	115483.85	183931.31	122778.29	91098.11	93235.13	1358472.02

5.9. Silviculture System: As no exploitation of forest is proposed, therefore no Silviculture system has been prescribed. Wherever marking is to be done to meet right holders demand the same be done on selection principles.

5.10. Rotation: The main object of this working circle is protection and preservation of hills, no exploitation is involved. The rotations will therefore, be physical, one depending upon the natural longevity of the tree.

5.11. Method of Treatment: To achieve the main object of management of these forests as listed vide Para 5.4 constant strenuous efforts should be made to maintain, or increase the protective vegetation cover in these forests. These forests shall, therefore, be simply protected to save the valleys, plains from avenges of floods and soil erosion. These forests will be protected from soil and water conservation, aesthetic and tourist point of view besides maintaining the mountain ecological balances. No felling should be carried out except salvages removals or to meet the demand of right holders. If in case on natural calamity, salvage removal involved concentrated fellings the area shall be closed immediately, after the fellings are over, and regenerated with species coming up naturally in the particular locality. If it occurs in Ban oak forest only Ban be planted and no other species be tried as has been in the past. Most of the Ban Oak forest felled under Fuel wood and Charcoal felling in the past were degraded due to non-effective closure and the same is reclaimed/restocked with Chil which spoil ecosystem and scarcity of fuel and fodder requirement of local people.

5.11.1. The heavy grazing pressure is required to be brought down and grazing must be regulated. The rotational closure supplement with some soil conservation work in badly eroded forests would improve protective vegetation cover. Most of the forests in lower elevation and adjoining Sutlej bank in Behli, Batwara block of Kangoo Range are poorly stocked, carry scattered trees growth or devoid of adequate vegetation cover. Some inedible shrubs like Adhotada vasica, Carissa opaca, Cassia tora, Lantana also exist. Therefore, it is prescribed that area having such growth be planted with grasses of

high forage value if required uprooting of such species may also be done subject that soil erosion not occur.

5.12 Planting Programme: As already emphasized in the above paras that these forests be strictly protected and preserved. A suitable pockets already closed but failed have been again suggested for planting these forests after effective closure and protection from grazing and fire. The planting programme be decided by DFO territorial on annual basis keeping in view the gaps created from time to time due to natural calamity like soil erosion, Forest fires, landslides etc. by prioritizing keeping in view the availability of budget and approval of APO

5.13 Treatment of Waste lands: Most of the waste land pockets are in small bits honey combed surrounded by cultivations and most of the area are heavily encroached upon and it will be difficult to preserve and stocked up. These areas should be reclaimed under J.F.M Programme and planted with grasses of forage, fodder, fuel wood trees and Bamboo in lower belt. These will increase the fodder yield, which is essential for livestock and fuel wood yield for local requirement.

5.14 Treatment of Ghasinies: There is 8443 ha area under private Ghasinies (Kharetar) the owners of the Ghasinies are maintaining them nicely and these are well preserved. it was advocated in Nanak Chand Working Plan that grasses of high nutritive value should be introduced and suggested that owners of the Ghasinies can be motivated easily as it will pay them in long run. This was suggested keeping in view of Social Forestry Scheme at that time now this could be done under J.P.F.M.

5.15 Closure: All the plantation area will be put under effective closure against grazing for a period of 15 years. The area should be opened only when the plantation get established. Timely action will have to be taken for notifying the area for closure. Grazing permits are being issued adjoining these plantations to migratory graziers and they destroyed most of the plantation in the night. A condition is recorded that if any damage is done to adjoining plantation they will be responsible and their permit be canceled in the next year.

5.16 Fire Protection: It is to be ensured that all the areas under this working circle should be protected against fire. Negligence will destroy adjoining plantation and scattered tree growth. Special care will have to be taken that fire does not spread from (Private Ghasinies) or Ruta to the adjoining forests. Fire contour paths and fire lines be constructed and maintained.

5.17 Grazing: Most of the areas of this working circle are over grazed as the local people keep large herds of cattle. This resulted that the area turns to be barren and rock with little or no vegetation. Following measures are suggested for controlling and regulating grazing in these areas:

- a) People should be educated and persuaded to keep cattle of any goodbreed and to resort to stall feeding.
- b) The area which is suffering from over grazing should be closed to grazing for at least 3 month during rainy season.
- c) No further increase should be allowed in the number of migratory ships and goats, which visit these areas for grazing during winter.
- d) In the area closed for afforestation, pasture improvement works, fertilizers should be applied to get an increased yield. Grass cutting to be allowed only in October when seed has been shed.
- e) Suitable legumes should be introduced in pasturelands.
- f) Suitable area should be selected as demonstration areas where rotational closure will be enforced and beneficial effects of the rotational closures are demonstrated.

5.17.1. The number of animals vis-à-vis the available area and its carrying capacity has been discussed in Grazing (Over lapping) Working Circle.

5.18. Yield and removal from forests: No felling is prescribed from this working circle. The salvage removals and removal by right holders is permitted to an extent of 5000 m³ annually keeping in view the annual increment of the working circle.

Chapter 6

Soil and Water conservation (Overlapping) Working circle

6.1. General: This circle will include the total geographical area of the Division which forms the major part of catchments area of Sutlej River and some part of Beas River. Thus this circle includes all DPFs UPFs and other Govt. lands and also all categories of private lands.

6.2 General Character of the Vegetation: It has already been discussed in detail under respective working circle. The Deodar, Kail, Chil, Ban oak, Moru Oak, Behul, Kachnar, Morus, Prunus etc., occurs in scattered in private lands.

6.3. Block and Compartment: This being an overlapping Working Circle, no sub division is required.

6.4 Special Objective of Management: The chief objects of Soil Conservation and water management are:

1. To reduce the flow of silt in the catchments by adoption of multidisciplinary integrated approach in the catchments.
2. To promote land use to match land capability.
3. To improve the land capability and moisture regime in the water shed and thereby reduce run off and providing engineering structure wherever necessary so as to ensure stabilization and perennial supply of irrigation and drinking water.
4. To improve the ecology of the area.
5. To improve the grazing and fodder resources and reduce the grazing intensity in the area.
6. To increase the fodder and forest resources of the tract by improving the water supply, creating better growth conditions and adopting effective protected measures.
7. To involve the people in the management of catchments and also upgrade the skills in planning and execution of land development.
8. To stabilize the erosion infected areas by the use of vegetative cover and / or mechanical measures.

6.5. Definition and Type of Erosion: The natural agencies chiefly responsible for accelerated erosion in the tract is water. Erosion by water involves hydraulic action, abrasion, solution and transportation of soil. The velocity of flow has an

important bearing on its erosive power.

By erosion is meant the removal of soil and rock material by water; and gravity; generally at an accelerated rate in an environment disturbed by animals and man. Erosion caused by water produces gullies or more or less straight channels, called rills; erosion of fairly uniform layers of surface soil is referred to as sheet erosion. Sheet erosion is most active on cultivated lands but unimportant in forests where unincorporated organic matter covers up the soil.

6.6. Factor Affecting Erosion: Undiscriminating misuse of land by disturbing the prevailing ecology has led to degradation of land. Loose and friable nature of soil, steep slopes and undulating terrain, faulty agricultural practices, reckless cutting and removal of trees, shrubs etc., uncontrolled grazing and other adverse biotic factors have been aggravated the problem leading to erosion, rain cuts and ultimately resulting in deep gullies called ravines, which have done immense damage to fertile forests and cultivated lands and caused irreparable soil loss.

To reclaim such lands, heads of the ravines need to be treated by protecting controlled grazing and preserving vegetative cover by closures and afforestation. Only grass that needs to be cut may be used as fodder. The lower slopes and deep depressions should be tackled by afforestation supplemented by appropriate engineering works.

6.7. Soil Conservation: Soil conservation deals with the preservation of soil against deterioration and loss, by using the land within its capabilities, and applying those conservation practices that are necessary for its protection and improvement. It consists in the use of land within the limits of available funds. Scientific management of forests is the most effective soil conservation method that has been prescribed in the working plan. The most important prophylactic soil conservation measure is to protect forests against fire, control grazing in them and maintain an uninterrupted vegetative cover of adequate density. Various preventative methods are also used depending upon the intensity of erosion as mentioned below:

6.7.1 Contour Trenching and Bundling: Where the soil runs off is heavy, digging trenches and heaping the soil earth on the lower sides can make small bunds of earth and boulders. The drain thus catches the floodwater, loaded with silt and silt deposited at its bottom allows only clean water to flow and silt deposited at the bottom. During the rains, soil-binding species may be sown/planted to afforest the

area.

6.7.2 Terracing: The commonest type is referred as bench terracing. Benches are cut into the hill in a step like fashion and supported by almost vertical retaining walls made with stones and earth by vegetation. Slightly slope given towards hillside to prevent flowing water over the edges of the terrace.

6.7.3. Gully plugging: Where gullies have been formed, to prevent them from gapping wider to close them they are plugged by brushwood weighted down with stones and logs and covered with stones or earth.

6.7.4. Check Damming: After a watershed has been trenched and gully plugged the natural drainage channel is obstructed by a structure which retards the flow of run off and induces deposition of silt and debris, it allows the main current to flow over the dam or over lowered position on it. Such a check dam may be stonewalled or a wall of interlaced brushwood with a pitching of stones. Just below the overflow an apron of stones and rubble is built to prevent scouring. If the ravine gapes widely a pucca dam is built to prevent soil run off and eventually to fill it. When a series of dams are built the height of the lower one is practically at level with the base of the next upper one.

6.7.5 Stream/Khud Training: After check damming, the streambed is reclaimed to afforest it. Confining the khud/stream to a narrow channel does this. Low spurs are made by putting cutting of agaves, Vitex negundo, Ak, Dodanea, Adhatoda vasica, Alder etc. more or less parallel to the stream flow. After the soil deposited the reclaim areas is afforested with suitable species.

6.7.6 Integrated Approach: This approach involves adoption of all the measures discussed above to treat catchments.

6.8. Management Units: According to the guidelines of All India Land Use and Soil Survey Organization, the area of the whole Division is divided into a number of units called Micro water sheds. Govt. of India has stressed that the works of soil conservation in a catchment is to be done in a concentrated manner in priority areas of very high and high intensities. Thus the unit of management of soil conservation purpose is a micro water shed where different types of operations of conservations will be executed. The list of micro water shed of different intensity is given below as per survey report.

Table 6.1 Sub water shed code in Sutlej catchment
SUTLEJ CATCHMENT

Sl.No.	Sub water shed code	Area in Ha	Sediment index	yield	Relative Priority.
1.	2.	3.	4.		5.
Very High					
1.	Sf21	2072	1510		5
2/	Sf2c	1520	1497		7
3.	Shle	1432	1478		10
4.	Sf2d	2540	1464		16
5.	Sd2e	2556	1464		17
6	Sf2e	1204	1457		19
7	Sh2b	1406	1447		25
8	Sf3c	800	1445		29
9	Sc3k	4944	1418		35
10	Sf3a	824	1404		43
11	Sf3c	3136	1389		51
12	Sc3a	2300	1389		51
13	Sf2b	1260	1383		54
14	Sh1a	1920	1380		58
15	Sh1c	1680	1380		59
16	Sc3m	3120	1375		65
17	Sf3d	1728	1353		84
	Total	34452	24231		629
High					
1	Sh1d	1258	1342		92
2	Sf3g	1724	1329		104
3	Sh2d	2554	1310		105
4	Sh1d	1560	1316		108
5	Sf3h	2852	1279		121
6	Sh2f	2096	1275		126
7	Sc3s	2492	1267		128
8	Sh2i	2112	1264		137
	Total	16658	10372		921
Medium					
1	Sf3f	1948	1171		193
Low					
1	Sc3f(point)	5748	1070		243

Grand Total of Sutlej Catchment

Very High	=	34452
High	=	16658
Medium	=	1948
Low	=	5748
Total	=	58806

6.9 Work Plan: 21 Work Plans of Micro watershed in Sutlej catchments falling in Suket Forest Division have been prepared in the past and work executed accordingly. The achievement under Centrally Sponsored Scheme of Soil Conservation in the catchments of River Valley Project of Sutlej is given in Appendix VIII-A

6.9.1. In addition to above the following work plan has also been prepared for the left over area and work executed as under:

Table 6.2 working plan for left over area

S.No.	Sub watershed	Priority	Range	Location	Remarks.
1.	S.h.1.(a)	Very High	Kangoo	Batwara beat	w.e.f.2000
2.	S.h.1.c	-do-	-do- /Jhungi	Behli/BaraBohli Kinder	w.e.f.2000
3.	S.h.1.e	-do	Jhungi	Kinder beat	w.e.f.1999
4.	S.h.i.d	-do-	Jhungi	-do-	w.e.f.1998
5.	S.f.3.d	-do-	-do-	-do-	w.e.f.1998

6.9.2. In all the micro water shed work executed not successful and required afresh preparation of work plan. The area intended to be tackled under different soil conservation scheme are to be identified and survey in micro water shed. This forms the basis of a work plan. Therefore, before actual treatment of the micro water shed, their work plans will have to be prepared and the work plans will only be prepared for the areas falling under very high and high erosion intensities. Preparations of a work plan is very laborious and time consuming but timely action has to be taken for its preparation for the micro water sheds which is going to be treated under each centrally sponsored soil conservation scheme. The work plan shows the failed area already afforested and Engineering work damaged due to flood and excessive rains and biotic factors. Similarly work plan shows the different works more to be carried out in micro water shed in phased manner. Thus a detailed survey is carried out and areas are pinpointed to be treated under different modes of soil conservation. In the previous working plan no

provision for the repair/maintenance of engineering works has been made resulting disappearance on the site. This should be done this time.

6.9.3. The areas of micro water shed are thus categories under the following different classes.

- (a) Agriculture lands
- (b) Forest Land
- (c) Waste land
- (d) Horticulture land
- (e) Other land use etc.

6.9.4. Work plans of micro water sheds in Sutlej catchments falling in Suket Forest Division was prepared afresh for the area left untreated in the previous Work plan and work executed accordingly

Table 6.3 Work plans of micro water sheds in Sutlej catchments

S.No.	S./W.S	Priority	Range	Remarks.
1	S.f.s.d	Very High	Kangoo	w.e.f. 1993-94
2	S.h.1.b	Very High	Kangoo	-do-
3	S.f.3,a	Very High	Kangoo	-do-
4	S.f.2.c	Very High	Suket	-do-
5	S.h.2.b.	Very High	Jhungi	-do-
6	S,h.2.d	Very High	Jhungi	w.e.f.1994-95
7	S.h.2.f.	Very High	Jhungi	-do-
8	S.h.1.d	Very High	Kangoo	-do-
9	S.f.3.b	Very High	Kangoo	-do-
10	S.c.3m	Very High	Baldwara	-do-
11	S.c.3.g	Very High	Baldwara	-do-

A sample of work plan for the micro watershed s.h.1.e is given in Appendix-XXII

6.10. Achievement of Soil Conservation Works in different Micro-watershed:

The various centrally sponsored soil conservation schemes are being implemented for the last so many years. The achievement under Centrally Sponsored Scheme of soil conservation in the catchments of River Valley Project of Sutlej is given as above.

6.11. Monitoring & Evaluation: Data in the prescribed forms be maintained at the Divisional and State level. It may be submitted to Govt. of India through periodical reports where it is studied and evaluated to ascertain whether the programme is going according to the approved work plans or not. Data in respect of benchmarks, which have been identified for the evaluation of the Project, be collected annually to make judgment of fulfillment of the objectives and the extent to which these have been achieved. Hydrologic and sediment monitoring data on run off and sedimentation at the exit point of Micro-water shed be collected at the time of undertaking work and there after annually along with rainfall data be submitted to higher up.

Similarly evaluation of soil conservation work in the micro-water shed can be gauged by:

- 6.11.1.** Protection provided by structures and storage work
- 6.11.2.** Irrigation potentials created and utilized.
- 6.11.3.** Employment opportunities generated.
- 6.11.4.** Return from areas treated
- 6.11.5.** Overall benefit cost analysis
- 6.11.6.** Summary findings of evaluation by Team report.

6.12. Annual Programme of Soil Conservation Works: From the perusal of achievement of Soil Conservation works, most of the micro-water shed have reached saturation point. Therefore, Divisional Forest Officer must prepare work plan for the micro-water shed are in which work is yet not completed. It should also be ensured that work should be done as per work plan prepared and envisaged only in priority areas. i.e. very high and high erosion intensity should be included. All the work should be completed within the time frame of saturation point has reached it will have to shed off.

In addition to areas under reverse erosion be tackled under J.F.M. as per Micro-planning. As water shed management needs the local community's active involvement in the planning and project formulation, and participation in the execution and maintenance of assets. The people's participation will be ensured by:-

- a) Consulting local people in identifying treatment measures.

- b) Securing local communities consent and commitments to protect and maintain the common resources.

6.13. Treatment of Non Priority watershed: In the implementation of the Programme is presently confined only in the very high and high priority watershed, identified by the AISLUS. Since the process of erosion and land degradation is dynamic, the non-preventive measures are not taken up immediately. The territorial D.F.O. should therefore, take step to ensure adoption of proper land use and land conservation practices in such non-priority water shed as and when funds made available.

6.14. Proposed Future Treatment:

- Identification of SWC related issues during micro planning.
- Technical and social feasibility of soil and water conservation works.
- Development of detailed project report.
- Gully plugging works to check further extension of the gullies.
- Minor engineering works in eroded areas and in slips prone areas to check the soil erosion and reduce runoff.
- Create works on the sides of diversion drains to checking further cutting of the drains/channels.
- Planting of cuttings of soil binding species in vegetative spurs but avoid exotic species.
- Gabion structures mainly retention walls, diversion drains if required after technical feasibility would be proposed. Proper anchorage of the gabion structures needs to be ensured.
- Creation of continuous trenches across the slope and planting of soil binding species in the pit. The dug-out soil will be placed towards the flow of water to check the soil erosion and reduce run-off.
- Riparian species and other less transpiring, water conserving species should be planted on the riparian areas and near water bodies.

CHAPTER-7

WATER RESOURCE MANAGEMENT WORKING CIRCLE

7.1 Constitution of working circle: The working circle is overlapping in nature and will include all working circles. Water resource management is the activity of planning, developing, distributing and managing the optimum use of water resources. It is an aspect of water cycle management. The field of water resources management will have to continue to adapt to the current and future issues facing the allocation of water. With the growing uncertainties of global climate change and the long-term impacts of past management actions, this decision-making will be even more difficult. It is likely that ongoing climate change will lead to situations that have not been encountered. As a result, alternative management strategies, including participatory approaches and adaptive capacity are increasingly being used to strengthen water decision-making.

Ideally, water resource management planning has regard to all the competing demands for water and seeks to allocate water on an equitable basis to satisfy all uses and demands. As with other resource management, this is rarely possible in practice so decision-makers must prioritize issues of sustainability, equity and factor optimization (in that order!) to achieve acceptable outcomes. One of the biggest concerns for water-based resources in the future is the sustainability of the current and future water resource allocation.

Sustainable Development Goal 6 has a target related to water resources management: "Target 6.5: By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate."

7.2 Sustainable water management: At present, only about 0.08 percent of all the world's fresh water is accessible. There is ever-increasing demand for drinking, manufacturing, leisure and agriculture. Due to the small percentage of water available, optimizing the fresh water we have left from natural resources has been a growing challenge around the world.

Much effort in water resource management is directed at optimizing the use of water and in minimizing the environmental impact of water use on the natural environment. The observation of water as an integral part of the ecosystem is based on integrated water resources management, based on the 1992 Dublin Principles (see below).

Sustainable water management requires a holistic approach based on the principles of Integrated Water Resource Management, originally articulated in 1992 at the Dublin (January) and Rio (July) conferences. The four Dublin Principles, promulgated in the Dublin Statement are:

1. Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment;
2. Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels;
3. Women play a central part in the provision, management, and safeguarding of water;
4. Water has an economic value in all its competing uses and should be recognized as an economic good.

Implementation of these principles has guided reform of national water management law around the world since 1992.

Further challenges to sustainable and equitable water resources management include the fact that many water bodies are shared across boundaries which may be international (see water conflict) or intra-national (see Murray-Darling basin).

7.3 Special Objects of Management: The special of Management are as under

1. To survey and identify the available source of water in the jurisdiction of working plan area
2. To identify the recharge zone.
3. To prepare and implement spring shed management plan.
4. To link forest management with watershed management.
5. To develop /increase forest, to increase percolation and to reduce run-off.
6. To prioritize critical areas that requires immediate and effective preventive and remedial measures for water conservation

Constitution of working circle:

The working circle is overlapping in nature and will include all working circles

7.4 Identification of spring sheds:

The field survey was conducted and different information was compiled and the list has been prepared which has been tabulated as Table 7.1

Table 7.1 List of Spring sheds
List of water spring identified in Suket forest Division

Sr No.	Range/block	Beat compartment	Name of source	GPS coordinates	Permanent/Seasonal	Discharge ltr/sec	Purpose
1	Sarkaghat/Sarkaghat	Maseran/Whole	DPF Sarohali-I Whole	31°41'07.72" 76°45'47.49"	Permanent	1 liters	Drinking
2	Sarkaghat/Sarkaghat	Maseran/Whole	DPF Bhalyana Whole	31°41'50.45" 76°45'55.63"	Seasonal	1.5 liters	Drinking
3	Sarkaghat/Sarkaghat	Deo Bradta/Whole	DPF Deo Bradta Whole	31°43'04.92" 76°45'02.02"	Permanent	0.5 liters	Drinking
4	Sarkaghat/Sarkaghat	Deo Bradta/Whole	DPF Deo Bradta Whole	31°42'58.24" 76°45'02.96"	Permanent	2.0 liters	Drinking
5	Sarkaghat/Sarkaghat	Deo Bradta/Whole	DPF Deo Bradta Whole	31°42'59.39" 76°45'03.18"	Permanent	1 liters	Drinking
6	Sarkaghat/Sarkaghat	Gopalpur /C-1	DPF Barnog C-I	31°39'33.94" 76°45'50.90"	Permanent	0.5 litre	Drinking
7	Sarkaghat/Sarkaghat	Gopalpur /C-I	DPF Barnog C-I	31°39'50.35" 76°45'53.79"	Permanent	1 litre	Drinking
8	Sarkaghat/Sarkaghat	Gopalpur /C-I	DPF Barnog C-I	31°39'10.67" 76°45'38.68"	Permanent	1 litre	Drinking
9	Sarkaghat/Sarkaghat	Gopalpur /C-II	DPF Barnog C-II	31°40'14.90" 76°45'36.56"	Permanent	0.5 litre	Drinking
10	Sarkaghat/Sarkaghat	Gopalpur /C-II	DPF Barnog C-II	31°40'01.19" 76°45'27.81"	Permanent	2 litre	Drinking
11	Sarkaghat/Sarkaghat	Gopalpur /C-II	DPF Barnog C-II	31°39'59.08" 76°45'29.24"	Permanent	1.5 litre	Drinking
12	Sarkaghat/Sarkaghat	Gopalpur /C-I	DPF Barnog C-I	31°39'10.75" 76°45'30.31"	Permanent	2 litre	Drinking
13	Sarkaghat/Sarkaghat	Gopalpur /C-II	DPF Barnog C-II	31°40'15.54" 76°45'23.66"	Permanent	1.5 litre	Drinking
14	Sarkaghat/Sarkaghat	Gopalpur /C-I	DPF Barnog C-I	31°39'35.02" 76°45'58.68"	Permanent	1 Litre	Drinking
15	Sarkaghat/Sarkaghat	Chandrakari Whole	ND.397 Sihnal	31°42'01.32" 76°42'21.73"	Permanent	0.5 liter	Drinking

16	Sarkaghat/ Sarkaghat	Sarkaghat/ Whole	ND- Jhinjroo-I	31°42'20.68" 76°44'17.83"	Permanent	0.5 liter	Drinking
17	Sarkaghat/ Sarkaghat	Sarkaghat/ Whole	ND- Jhinjroo-I	31°42'27.12" 76°44'30.36"	Permanent	01 liters	Drinking
18	Sarkaghat/ Sarkaghat	Sarkaghat/ Whole	ND- Jhinjroo-II	31°42'00.25" 76°44'55.32"	Permanent	01 liter	Drinking
19	Sarkaghat/ Sarkaghat	Bhangoh /C-II	ND BhangohC-II	31°37'54.00" 76°45'31.00"	Permanent	01 liter	Drinking
20	Kangoo/ Dehar	Sordu /Whole	Sordu Whole	31.440507 76.849476	Seasonal	0.001 liter	Drinking
21	Kangoo/ Batwara	dhawal /C-III	C-III	31.409916 76.891160	Permanent	5 Liter	Drinking
22	Jaidevi/ Rohanda	Rohanda Kamrah C-III	Kamrunag Lake	31.473108 77.049753	Permanent	01 liter	Drinking and Irrigation
23	Jaidevi/ Rohanda	RohandaBan wali C-V	Seri Nalla	31.469540 77.058117	Permanent	1ltr / sec	Drinking and Irrigation
24	Jaidevi/ Rohanda	RohandaKam rah C-I	Khanad Nalla	31.466858 77.033224	Perma nent	1ltr / sec	Drinking
25	Jaidevi/ Rohanda	Rohanda Berumara C-I	RohandaNalla	31.467093 77.032657	Seasonal	1ltr / sec	Drinking
26	Jaidevi/ Rohanda	Rohanda Berumara C- II	Tapli Nalla	31.465871 77.028143	Permanent	1ltr / sec	Drinking and Irrigation
27	Jaidevi/ Rohanda	RohandaBeru mara C-I	Hanuman Nalla	31.463067 77.032202	Permanent	1ltr / sec	Drinking and Irrigation
28	Jaidevi/ Rohanda	Rohanda Majothi Ra Silh C-I	MahuNalla	31.457288 77.035171	Seasonal	1ltr / sec	Drinking
29	Jaidevi/ Rohanda	ChowkiKathy al C-I	Galukhru Nalla	31.455252 77.043441	Seasonal	1ltr / sec	Drinking
30	Jaidevi/ Rohanda	ChowkiKathy al C-I	ChowkiNalla	31.446333 77.050573	Permanent	1ltr / sec	Drinking and Irrigation
31	Jaidevi/ Rohanda	KhabriKhabri C-I	LadhmuaNalla	31°26'59.712 76°59'48.864	Permanent	.5 ltr/ Sec	Drinking
32	Jaidevi/ Rohanda	Khabri Thikar	Kutal Step well	31°27.847 76°59.089	Permanent	.45 ltr/Sec	Drinking
33	Jaidevi/ Rohanda	Khabri Thikar	ChhaterNalla	31°27'43.422 76°58'43.956	Permanent	.5 ltr/ Sec	Drinking
34	Jaidevi/ Rohanda	Khabri Khabri IV	KhabriNalla	31.457699 76.986990	Permanent	.5 ltr/ Sec	Drinking
35	Jaidevi/ Rohanda	Kamand ND 169 Bakalag	DobhuNalla	31.431852 76.98384	Permanent	.25 ltr/Sec	Irrigation

36	Jaidevi/ Rohanda	Kamand DPF Kamand C - III	DhanguNalla	31.435764 77.005717	Permanent	.5 ltr/ Sec	Drinking
37	Jaidevi/ Rohanda	Kamand ND 169 Bakalag	Dobhu Step well	31.431999 76.982076	Permanent	.25 ltr/Sec	Drinking
38	Jaidevi/ Rohanda	Kamand DPF Kamand C - IV	Dhangu Step well	31.430627 77.012855	Permanent	.25 ltr/Sec	Drinking
39	Jaidevi/ Nandgarh	Chammyar OD77 Sangrair	Sangriar Step well	31.526993 76.985276	Permanent	0.25 ltr/sec	Drinking
40	Jaidevi/ Nandgarh	Chammyar N D 86 Chhater Silh	Chhater step well	31.515101 76.965983	Permanent	0.25 ltr/se c	Drinking
41	Jaidevi/ Nandgarh	Chammyar N D 78 Makora	Riyul Step well	31.530581 76.986356	Permanent	0.20 ltr/se c	Drinking
42	Jaidevi/ Nandgarh	ChammyarDP F Chamyar	ChammyarStep well	31.519818 76.967714	Permanent	0.20 ltr/sec	Drinking
43	Jaidevi/ Nandgarh	KuttachiKutta chi C-V	Gamaharu Nalla	31.518518 77.012261	Permanent	.5 ltr/ Sec	Drinking and Irrigation
44	Jaidevi/ Nandgarh	KuttachiKutta chi C-IV	DamahauNalla	31.512680 77.014176	Permanent	.5 ltr/ Sec	Drinking and Irrigation
45	Jaidevi/ Nandgarh	KuttachiKutta chi C-III	Changhar Nalla	31.508155 77.017081	Permanent	.25 ltr/ Sec	Drinking and Irrigation
46	Jaidevi/ Nandgarh	KuttachiKutta chi C-I	Bada Nalla	31.522887 77.005824	Permanent	.5 ltr/ Sec	Drinking and Irrigation
47	Jaidevi/ Nandgarh	NandgarhND 103Shilh,C-II	Chhiaanala	N31°29'52" E 77°00'34"	Parmanent	0.05	Drinking
48	Jaidevi/ Nandgarh	Nandgarh ND103Shilh, C-IV	Devi dhar Stepwell	N 31°29'38" E77°00'28"	Parmanent	0.2 ltr	Drinking
49	Jaidevi/ Nandgarh	NandgarhOD 106 Latogali C-IV	DehraNalla	31.4826152 77.0197056	Parmanent	0.05 ltr	Drinking
50	Jaidevi/ Nandgarh	NandgarhOD 106 Latogali C-I	Natural source at Dogari	31.4887841 77.0195658	Parmanent	0.05 ltr	Drinking
51	Jaidevi/ Nandgarh	NandgarhND 105 Drahal 2 C -IV	Natural source at Handkro Nalla	31.4850804 77.0267173	Parmanent	0.6ltr	Drinking
52	Jaidevi/ Nandgarh	NandgarhND 105 Drahal 2C	Natural source at	31.4858083 77.0338311	Parmanent	0.10 ltr	Drinking and Irrigation

		-II	Budhakedar				
53	Jaidevi/ Nandgarh	NandgarhND 105 Drahal Ist C -IV	Natural source at Thatadhar	31.4961123 77.0234054	Parmanent	0.05 ltr	Drinking
54	Jaidevi/ Nandgarh	Nandgarh ND 102 Badhu C _II	Natural source at Keos Nalla	31.4942189 77.0149896	Parmanent	0.150 ltr	Drinking
55	Jaidevi/ Nandgarh	NandgarhND 103 Silh C -II	Natural source atSilh Nalla	31.4987847 77.0151489	Parmanent	0.10 ltr	Drinking
56	Jaidevi/ Nandgarh	Nandgarh ND 105 Drahal 2 C -II	Natural source at kansha Khad	31.48083333 77.04194444	Parmanent	0.014 ltr	Drinking and Irrigation
57	Jaidevi/ Nandgarh	NandgarhND 101 Nandgarh	Salohdhar Nala	31.49094 076.99646	Permanemt	0.050 ltr /sc	Irrigation
58	Jaidevi/ Jaidevi	JaideviND 135 Chhatru (Whole)	Bavdi	31.527655 ,76.98000 8	Permanemt	0.035 ltr/sec	Drinking
59	Jaidevi/ Jaidevi	JaideviND 128 Kutain(c- iv)	Bavdi	31.519212 76.928306	Permanemt	0.040 ltr/se c	Drinking
60	Jaidevi/ Jaidevi	JaideviND 128 Kutain(c- 1)	Nalu	31.514365 76.930467	Permanemt	0.20 ltr/sec	Drinking
61	Jaidevi/ Jaidevi	JaideviOD124 Kafla (Whole)	Bavdi	31.505693 76.944091	Permanemt	0.040 ltr/sec	Drinking
62	Jaidevi/ Jaidevi	JaideviND 132 Khudinala(W hole)	Bavdi	31.485565 76.96801	Permanemt	0.050 ltr/sec	Drinking
63	Jaidevi/ Jaidevi	JaideviOD125 Roparkothi(Whole)	Bavdi	31.506870 76.933240	Permanemt	0.030 ltr/sec	Drinking
64	Jaidevi/ Jaidevi	JaideviND132 Khudinala(W hole)	Nalu	31.486059 76.971969	Permanemt	0.10 ltr/sec	Drinking and Irrigation
65	Jaidevi/ Jaidevi	Jaidevi UPF Bodal	Bavdi	31.507156 76.931909	Permanemt	0.040 ltr/sec	Drinking
66	Jaidevi/ Jaidevi	DoldharOD 144 Chhellela (C-I)	Bavdi	31.462227. 76.952269	Permanemt	0.040 ltr/sec	Drinking

67	Jaidevi/ Jaidevi	DoldharND 139 Doldhar (Whole)	Bavdi	31.478781, 76.933279	Permanemt	0.040 ltr/sec	Drinking
68	Jaidevi/ Jaidevi	DoldharND 137 Banoni Bhadrolu(Wh ole)	Bavdi	31.458517, 76.941902	Permanent	0.035 ltr/sec	Drinking
69	Jaidevi/ Jaidevi	DPF Kaulpur Ban	Bavdi	31.476860 E76.997162	Permanent	0.5	Drinking
70	Jaidevi/ Jaidevi	DPF Kaulpur Chil	Bavdi	N31.478667 E 76.985623	Permanent	0.2	Drinking
71	Jaidevi/ Jaidevi	DPF Sakohar	Nalla	N31.474560 E77022382	Permanent	0.5	Irrigation/Dri nking
72	Jhungi	Salani	BawariNelnu	N- 31°23'23.4 9"E-077°03'28. 48"	Pereni al	1.33	Drinking
73			BawariSarcha	N- 31°23'31.9 9"E- 077°03'50.68"	Pereni al	1.6	Drinking
74			SalaniNala spring	N- 31°23'50.4 1"E- 077°04'10.36"	Pereni al	1.25	Drinking
75		ChanadBahan	Bawari Raounce Bai Nal	N- 31°24'05.2 6"E- 077°04'41.51"	Pereni al	1	Drinking
76			Bawari Khaneri	N- 31°24.45.6 1"E- 077°05'2.25"	Pereni al	1.1	Drinking
77			KhaneriNalla	N- 31°24'33.4 7"E- 077°05'2.13"	Pereni al	1.35	Drinking
78		Jhungi	BawariShilah	N- 31°25'23.7 1"E- 077°05'53.57"	Pereni al	1.12	Drinking
79			Bawari Bai Naal	N- 31°25'16.4 7"E- 077°04'52.14"	Pereni al	1.09	Drinking
			MajhasNalla Kufar	N- 31°25'00.1 5"E-	Pereni al	2.3	Drinking

80				077°05'37.33"			
81			KhoblaNala	N- 31°24'57.34"E- 077°05'48.52"	Pereni al	4	Drinking, irrigation
82			Badiuli Nalla	N-31°24'50.43"E- 077°05'33.23"	pereni al	1.07	Drinking
83			JhungiKhadd	N- 31°25'29.36"E- 077°06'00.82"	Pereni al	8	Drinking, irrigation
84		Barnog	ChakradNalla	N- 31°26'03.81"E- 077°05'49.42"	Pereni al	3	Drinking, irrigation
85			Jahra Naal	N- 31°26'29.38"E- 077°05'31.79"	Pereni al	2.5	Drinking
86		Dharwar	Bawari Dharwar Nalla	N- 31°26'29.83"E- 077°06'21.70"	Pereni al	1.1	Drinking
87			Bawari Jagrehri	N- 31°26'49.63" E- 077°06'33.09"	Pereni al	1.02	Drinking
88	Pandar	Galukhar	Bawari Galukhar	N- 31°24'55.43" E- 077°04'49.94"	Pereni al	1.6	Drinking
89			GalukharNalla	N- 31°25'13.38" E- 077°04'27.91"	Pereni al	1.1	Drinking
90			Bawari Brohkhri	N- 31°26'05.34" E- 077°04'04.30"	Pereni al	1.5	Drinking
91			Bawari Bai Nalla	N- 31°25'49.18" E- 077°04'41.83"	Pereni al	1.1	Drinking
92			Daint Nalla	N- 31°25'35.77" E- 077°04'42.07"	Pereni al	2.5	Drinking
93			Bawari Neulidhar	N- 31°25'49.64" E- 077°04'19.71"	Pereni al	2.1	Drinking
94			KhanelaNalla	N- 31°25'32.85" E- 077°04'14.93"	Pereni al	1.1	Drinking

95			KhalotNalla	N- 31°25'09.61" E-077°04'15.83"	Pereni al	1.1	Drinking
96			DobanKufar	N- 31°26'13.25" E-077°05'05.41"	Pereni al	2.3	Drinking
97			ThalogNalla	N- 31°25'48.93" E-077°04'51.61"	Pereni al	1.5	Drinking
98		Jaral	Brohkhari Khadd	N- 31°26'03.24" E-077°04'07.01"	Pereni al	7.5	Drinking
99			Real Nalla	N- 31°26'26.36" E-077°04'48.99"	Pereni al	4.5	Drinking
100			Jaral Nallla	N- 31°26'09.23" E-077°04'34.69"	Pereni al	3.8	Drinking, irrigation
101			Chohlra Nalla	N- 31°26'33.95" E-077°03'56.58"	Pereni al	3.6	Drinking, irrigation
102			Kahli Nalla	N- 31°26'34.16" E-077°04'28.29"	Pereni al	4.8	Drinking
103		Pandar	Bawari Chamdaar	N- 31°26'14.11" E-077°03'21.20"	Pereni al	1.6	Drinking
104			Bawari Khalyar	N- 31°26'35.40" E-077°03'15.73"	Pereni al	1.2	Drinking
105			Chouki Nala	N- 31°26'52.54" E-077°03'08.05"	Pereni al	1.6	Drinking
106			Devi Naala Pandar	N- 31°26'03.23" E-077°03'07.91"	Pereni al	2.3	Drinking
107			Latahar Nala	N- 31°26'36.61" E-077°03'05.29"	Pereni al	2.45	Drinking
108			Kufar Bhiunar	N- 31°26'33.39" E-077°03'21.81"	Pereni al	1.3	Drinking
109			Spring Galaash	N- 31°25'39.99" E-	Pereni al	0.6	Drinking

				077°02'48.22"			
110		Kathiuni	Bawari Chawari	N- 31°26'28.54" E- 077°03'39.26"	Pereni al	0.7	Drinking
111			Bawar Kanoun Nalla	N- 31°25'34.7 0" E- 077°03'27.09"	Pereni al	1.2	Drinking
112			Mahadev Nala	N- 31°24'33.1 0" E- 077°03'45.23"	Pereni al	2.08	Drinking
113			Kathiuni Nalla	N- 31°25'24.3 5" E- 077°03'10.60"	Pereni al	2.3	Drinking
114			Tharu Nalla	N- 31°25'30.7 8" E- 077°03'38.14"	Pereni al	2.1	Drinking
115			Spring Matahar	N- 31°25'19.0 4" E- 077°02'52.24"	Pereni al	0.8	Drinking
116			Ghalendhi Nalla	N- 31°25'29.1 3" E- 077°03'02.44"	Pereni al	1.3	Drinking
117	Nihri	Nihri	Bawari Bhakha		Pereni al	1.45	Drinking
118			Bawari Chiral		Pereni al	1.2	Drinking
119			Spring Hacchai		Pereni al	1.3	Drinking
120		Marehra	Spring Makrahad		Pereni al	1.5	Drinking
121			Bawari Marehra		Pereni al	1.2	Drinking
122		Kanoun	Spring lajhaag		Pereni al	1.1	Drinking
123			Bawari Jabraas		Pereni al	1.08	Drinking
124			BawariBahi		Pereni al	1.6	Drinking
125		Reagi	Bawari Bai Naal		Pereni al	1.02	Drinking
126			BawarikooH		Pereni al	1.03	Drinking

127			Bawarishout		Pereni al	1.04	Drinking
128		Kanas	BawariLess		Pereni al	1.5	Drinking
129			Spring less		Pereni al	0.9	Drinking
130			KanasNalla		Pereni al	1.2	Drinking
131			Bawari Bharmeli		Pereni al	1.1	Drinking
132	Trechh	Trechh	JanoulKufar		Pereni al	2.3	Drinking
133			Hari Kufar		Pereni al	1.3	Drinking
134			Spring Janoul Nallu		Pereni al	1.2	Drinking
135			BawariJanoul		Pereni al	1.1	Drinking
136			BarehliNalla		Pereni al	2.3	Drinking
137			MundaliKufar		Pereni al	1.08	Drinking
138		Balag	BawariShalag		Pereni al	2.1	Drinking
139			SpringBunga		Pereni al	2.09	Drinking
140			SpringKoon		Pereni al	1.2	Drinking
141		Bandli	SpringBandli		Pereni al	1.2	Drinking
142			Gadahach Nalla		Pereni al	2.3	Drinking
143			SpringRakol		Pereni al	1.5	Drinking
144			Spring Majhangan		Pereni al	1.5	Drinking
145		Kinder	Kinder Kufar		Pereni al	0.8	Drinking
146			DonalaKufar		Pereni al	0.9	
147	Kangoo/Dehar	Dehar/ Bhuwana Whole	D.P.F Bhuwana	N- 31.441450 E- 76.855022	Permanent	1.5	Drinkingwater
148	Kangoo/ Dehar	jyor	Nil				
149	Kangoo/ Dehar	Umri	Nil				
150	Kangoo/ Batwara	Batwara	Nil				
151	Kangoo/ Batwara	Dhawal	Nil				

152	Kangoo/ Batwara	Gehru / C-I-d	O.D. 301 Gehru	N- 31.395698 E- 76.960142	Permanent	1.5	Drinkingwater
153	Kangoo/ Batwara	Serikothi	Nil				
154	Kangoo/ Behli	Behli	Nil				
155	Kangoo/ Behli	Haraboi	NIL				
156	Kangoo/ Behli	Badhoo	Nil				
157	Baldwara/ Leda	Bairkot/C8	Kheta	N31°52'75 .14" E76°80'67. 31"	Permanent	1.5	Drinking water for villagers and Nry. Use
158	Baldwara/ Leda	Bairkot/C2	Chari	N31°53'09 .4" E76°81'22. 53"	Permanent	1.2	Drinking water for villagers and Wildlife
159	Baldwara/ Leda	Bairkot/C7	MalounaRa Pani	N31°52'36 .05" E76°81'26.77"	Permanent	0.8	Drinking water for villagers and Wildlife
160	Baldwara/ Leda	Bairkot/C4	Liyuna Ra Pani	N31°52'14 .18" E76°82'14.48"	Permanent	1.2	Drinking water for villagers and Wildlife
161	Baldwara/ Leda	Bairkot/C1	PanditNoun	N31°53'84 .03" E76°80'61.87"	Permanent	0.8	Drinking water for villagers and Wildlife
162	Baldwara/ Leda	Leda	FRH Leda (Bauri)	N31°53'33 .19" E76°81'79.79"	Permanent	1.5	Drinking water for villagers and Wildlife
163	Baldwara/ Goverta	Goverta	Fgd Hut Goverta (Bauri)	N31°61'93 .67" E76°81'27. 71"	Permanent	1.2	Drinking water for villagers and Wildlife
164	Suket/ Sadar	Nalni	UPF Nalni	N 31 28 51.000 E 76 55 23.4	Permanent	0.8	Drinking water for villagers and wildlife

7.5 Core Strategy

Watershed approach to protect soil and water would be undertaken in the Division. The stream/river sand will be protected as it acts as cushion for the meandering waterways. Catchment area treatment will be carried out based on the need to protect the fertile soil of the forest. The concept of springshed sanctuaries will be promoted. Hydrological regime will be maintained and flow of environmental goods and services is to be ensured by maintaining the runoff. The regenerative capacity of the endemic species will be enhanced by maintaining the optimum soil moisture. Activities would be undertaken with involvement of fringe village population. A total ecosystem conservation concept will be adopted for conservation of the wildlife habitat and conservation of biodiversity in these forests. An effective naturalization plan needs to be devised based on principles for maintaining natural diversity. To enrich the low diversity areas, efforts should be made to restore native (indigenous) complementing natural species. Mono crop should be avoided. Natural regeneration should be encouraged and wherever necessary, aided natural regeneration should be taken up. Introduction of exotic species in the area will be restricted and plantation of both, slow and fast-growing native species of herbs, shrubs, and trees shall be promoted. Involvement of local communities especially youth, women from the forest and fringe villages will be sensitized in forest protection.

7.6 Proposed treatment

1. The recharge zone of water resource area be protected from biotic interferences
2. The forest cover around spring shed area should be increased by planting suitable tree, herb, shrubs and grasses species.
3. The rights and concessions of local right holders in recharge zone areas should be exercised in exigencies and in minimum quantities.
4. The measures like contour bunding, Contour trenching, percolation trenches etc. should be included in annual plan operations.
5. The engineering structures like water harvesting structures, farm ponds, percolation tanks /wells be included in annual plan operations
6. The funding be ensured from various schemes like state plan, centrally sponsored schemes, Campa etc.
7. Creation of continuous trenches across the slope and planting of soil binding species in the pit. The dug-out soil will be placed towards the flow of water to check the soil erosion and reduce run-off.
8. Riparian species and other less transpiring, water conserving species could be planted on the riparian areas and near water bodies.

CHAPTER-8

GRAZING POLICY AND GUIDANCE

8.1 General Constitution: This Working circle overlaps all other working circle. Apart from this, it also includes all UPFs, Charagah Darkhtan, and Charagah-bila drakhtan occurring in this Division. However, the main thrust would be given to the improvement of the area allotted to the Protection Working Circle and hence this working circle will overlap the Protection Working Circle.

8.2. General Character of Vegetation: It has been discussed in detail under respective working circles. A list of important fodder grasses, shrubs, and trees occurring in the tract is given below:

(A) Grasses:

Andropogon species
Aristida depressa
Arundinaria spathiflora
Arundinella brasiliensis
Avena aspera
Bothrilchloa intermedia
Bromus species
Chrysopogon montanus
Cymbopogon martini
Cyperus niveus
Erianthus fulrus
Heteropogon montanus
Ischaemum angustifolium
Panicum flaccidum
Panicum platcatum
Pheleum asperum
Poa annua
Setaria glauca
Setaria viridis

(B) Shrubs and Herbs

Berberis species

Contoneqaster bacillaria

Cotoneaster microphylla

Desmodium tillaefolium

Jasminum species

Rubus niveus

Salix flabvellaris

Viburnum species

Zizyphus species

(C) Trees

Acacia Catechu

Acer species

Albizzia species

Alnus species

Anogeissus latifolia

Bauhinia purpurea

Bauhinia variegata

Broussonetia papyrifera

Cedrella serrata

Cedrella australis

Corylus colurna

Dalbergia Sissoo

Embelica officinale

Ficus palmate

Grewia elastic

Grewia oppositifolia

Kydia calycina

Litsaea species

Leucaena leucocephala

Morus alba

Morus serrata

Olea species
Pyrus pashia
Prunus corruta
Quercus dilatata
Quercus glauca
Quercus incana
Quercus Samecarpifolia
Robinia pseudoacacia
Salix species
Terminalia balerica
Terminalia tomenosa
Ulmus laevigata

8.3 Block and Compartment: This is being an overlapping working circle, no further sub-division is required.

8.4. Special Objects of Management: These are as under:

- i) To maintain and improve the existing grazing area.
- ii) To improve fodder production to ensure continuous supply of different types of fodder to local right holders, consistence with the productive capacity of different areas (Private land as well as Govt. forests)
- iii) To inculcate and encourage the habit of stall feeding.
- iv) To make integrated efforts for replacing large number of inferior cattle breed with lesser number of better cattle bred.
- v) To give rotational closure giving due consideration to the carrying capacity.

8.5. Area Statement: The area, which will be available for grazing, is given below:

1. Area of Regular Working Circle other than P.B.I	= 4561.37 ha
2. Area of Chil Working Circle other than P.B.I	= 4698.46 ha
3. 1/3 rd area of Plantation Working Circle	= 3604.76 ha
4. 2/3 rd area of Protection Working Circle not recommended for closure	= 7694.55 ha
5. 2/3 ^{rs} area of Undemarcated Protected Forest, Ruta Sarkar Charagah, Bila Drakhtan,	

Charagah Drakhtan that have left out and not brought under the management of working plan =13692.00 ha

6. Private Banjar Kadin, Banjar Jadid, Khareta =10860.00 ha

Total Area, thus available for grazing is =45111.14 ha

8.6 Cattle Population: The cattle population of the tract for 1996 census is as under:

Sl.No.	Kind of animal's cattle	Total population
1.	Cattle	90225
2.	Buffaloes	38457
3.	Horses & Ponies	575
4.	Mules	540
5.	Sheeps	24280
6.	Goats	47154
Total		201231

8.6.1. In addition to above local cattle population, Gujars, Gaddies from Kangra, Chamba and Kinnaur Districts visit these areas during summer and winter for grazing their buffaloes, sheep and goat. The total number of these animals is given below:

Sl.No.	Kind of Animal	Total population
1.	Cattle	5
2.	Buffaloes	75
3.	Horses	30
4.	Sheeps	12535
5.	Goats	11040
Total		23685

8.6.2. The details of Permit Holders is given Appendix VIII-B and abstract is given below:

Range	No. of Graziers	Total Area	Sheep/lamb	Goats/kids	Buffaloes	Horse	Cow/ox	Ox	Total
Suket	16	944	1961	1994	-	3	-	-	3958

Jaidevi	15	891	1122	1026	9	2	4	-	2163
Jhungi	11	426	308	124	26	5	-	1	464
Kangoo	61	676	7413	6730	-	17	-	-	14160
Baldwara	7	350	1066	717	-	2	-	-	1785
S/Ghat	13	375	665	449	40	1	-	-	1155
Total	123	3662	12535	11040	75	30	4	1	23685

8.7. Grazing Requirement of Cattle Population: The grazing requirement of animals has been determined in the Grazing Policy of Himachal Pradesh. Keeping in view the weight and feeding habits of the various animals and taking sheep as a unit, the following values in terms of units has been assigned to different animals.

<u>Types of Animals</u>	<u>No. of units assigned to each</u>
Sheep	1
Goat	1.5
Donkey	3
Kine and cattle	4
Mules	5
Buffaloes	6

8.7.1. The grazing area of 0.5 per unit has been considered necessary as bare minimum in grazing Policy of H.P. Accordingly the total areas required for the local cattle population and migratory grazing works out as under:

Name of Animal	No of Animals	Total Unit	Total area required in ha i.e. 0.5 ha per unit.
(a) Local Cattle Population:			
Sheep	= 24280	24280	
Goats	= 47154	70731	
Horses & Ponies	= 575	1725	
Cattle	= 90225	360900	
Buffaloes	= 38457	230742	
Mules	= 540	2700	
Total	201231	691078	345539

(b) Migratory and Nomadic Graziers:

Sheep	12535	12535	
Goats	11040	16560	
Horses	23	92	
Cattle and Kin	12	60	
Buffaloes	75	450	
Total	23685	29697	14848.50
Grand Total	224916	720775	360387.5

8.8 Incidence of Grazing: From the above, it is evident that against total area of 45111.14 ha is available against the total area required 360387 ha for grazing per norm of 0.5 ha per unit as per approved by H.P. Grazing Policy. It is evident that forests of this Division are over grazed. The incidence of grazing is not uniform all over the tract as found during the field inspection. Area especially those near to habitation, roads, paths and migratory routes are heavily grazed, while other areas less burden with grazing. The incidence of grazing is 0.055 ha per unit against the norm 0.5 ha fixed in the Advisory Committee, the average figures of grazing in Himachal Pradesh are 0.25 ha per unit, which indicate that condition are worst than other part of H.P. Grazing right is exercise almost everywhere and in an unrestricted manner. The imminent result is that some of the grazing lands have already been destroyed while other is fast approaching that stage. So it is the time to make strenuous, sincere and constant efforts to overcome this problem to arrest further deterioration and to reduce the grazing incidence bringing it as near to normal as possible.

8.9 Method of Treatment: The rural population depends on the forest for their daily requirement of timber, fuel wood, fodder and grazing etc. At the same time function of forest are manifold. They conserve soil and water, prevent erosion and control floods, reduce siltation of reservoirs and lengthen the life of hydroelectric project etc. The rearing of livestock by rural population have been continued as indispensable chief source of livelihood next to the agriculture in this hilly region since time immemorial. Grazing is one of the principles recognized in the settlement. We can ill afford to ignore it, as it would antagonize the local population. This will not brood well for the forestry activities envisaged, wisdom and skill, thus in adjusting the requirement of the people without forestry programme.

8.9.1. Suggestions: Suggestion made in the last working plan, to control and regulate grazing and for improvement of pasture still hold good. The following suggestions are made to control and regulate grazing and for improvement of grazing grounds:

- i) List up all the existing and other suitable grazing areas, grazing capacity be assessed at the rate of 0.5 hectares per unit. Strict control and check must be exercised and it must be ensured, that no further increase in the number of migratory cattle i.e. sheet, Goats and buffaloes, who enter during summer and winter is allowed.
- ii) Educate and persuade the migratory graziers to reduce their herds. Further educate the local people requesting them to only keep a few cattle of superior breed. Local graziers should not be allowed to increase their flocks and should be dissuaded from keeping non-working cattle for manure purposes only. Adoption of stall feeding should be encouraged. Loans and subsidies should be provided to the needy persons under pasture improvement schemes for purchase of feed and for purchase of superior breed of animals.
- iii) Provision to supply fertilizers at subsidized rates and use of chemical manures is encouraged, so that dependence on cattle manure is reduced.
- iv) Suitable areas should be taken up, as demonstration plots and beneficial effects of rotational grazing and other improved application are made known to the people.
- v) Rotational closures should be enforced to give rest to the pasture and increase productive capacity. Permanent or periodic closure should be encouraged, in areas under erosion, gully formation or slips.
- vi) Afforestation in hilly slopes through silva-pastrol System should be encouraged amongst local people. Planting of fodder trees, shrub, and legumes along with soil conservation measures be adopted to stabilize slopes.
- vii) Obnoxious weeds and unpalatable grasses should be eradicated and more nutritive fodder grasses suitable to locality should be introduced in the pastures. Pastures, which have deteriorated through over use, will be closed to grazing for 3 years. Sowing of grasses like prairie grass i.e. *Bromus unioloides*, Preenial rye grass-*Lolium perenne*, orchard grass or cockfoot dactylic, *glomerata*, *Limothy Phleum*, and other grasses.
- viii) The lower areas of Baldwara, Kangoo and Sarkaghat is infested with Lantana. Special programme be made to control of lantana and *Ageratum* as given in Appendix-X.

8.10. Grazing right and Fees:

- (a) **Local:** The rights of free grazing and free grass cutting have been admitted in

all the protected forests and Charagah areas. No fee is realized.

(b) Migratory:

(i) **Gaddies Grazing:** Herds of gaddies consisting of sheep and goats are permitted grazing as a privilege at the following rates:

Sheep = 20 paise each Goat = 40 paise each

This fee is charged once a year.

(ii) **Gujjar Grazing:** Gujjar are also migratory and visit various part of the Division during the winter and Summer for grazing of buffaloes. The rates charged are Rs.8/- per buffalo.

8.11. Registration and Enumeration: The most important prerequisite for the control of migratory and nomadic herds and flocks and management of pastures grazed by them is the correct enumeration of these flocks and registration of their owners. Registration implies the preparation of list of grazers together with the grazing grounds and pastures showing also the recorded rights. So far as the migratory and nomadic graziers are concerned no where has their grazing in summer or winter pastures have been recorded as a right. No doubt, in a majority of cases, a particular individual and his dependents by simple usage and not by any recorded right to do have made a particular pasture or grazing run. On the basis of grazing done during the year 1952 the Divisional Forest Officer will carry out registration of these graziers in the following performa:

S.N o.	Name of Graziers, parentage & address.	Name of the grazing ground Compt./sub Compt.	Whether summer/ winter grazing ground	Area	Kind & No. of animals	Remarks
1	2	3	4	5	6	7

It is stated that great vigilance is required for correct registrations and enumeration to be prepared in the above manner. One this has been done, it will be particular to enforce the methods for the control of grazing, for reducing their present number and for applying a check to the increase in the number of their cattle.

At the time of collection of data regarding number of Permit Holders as per details given in Appendix VIII-B it shows that no boundary has been defined on the permit to graze particular area. It is only given name of forest and area in hectare in particular forest without giving compartment or sub compartment it resulted

that they are grazing in whole of the forest, even in plantation areas they graze. This is wrongly done to give benefit to the graziers. This practice should be abandoned and particular compartment or sub compartment is to be mentioned on the permit giving details of boundary.

8.12. Fixation of Routes and Check Post: Another prerequisite for the control of the migratory and nomadic graziers is the fixation of routes and establishment of seasonal checking posts on these routes at suitable places, preferably at bridges or at which places on the border of a Division through which the morning herds and flocks have enforce to pass. A mention of the main routes used by nomadic and migratory grazers has been made in the forest settlement, but it has not been made clear whether it is obligatory for the flock and herds to stick to this or not.

Keeping in view the convenience of graziers with respect to the movement of flocks and their grazing grounds and compatible with the proper supervision, the following routes are suggested to be fixed for future:

8.12.1. Nihri-Langara bridge over Beas to different forests of Sarkaghat and Baldwara ranges.

8.12.2. Dadaur to Slapper and vice versa

8.12.3. Chail Chauk to Sarour Bridge and via Nihri vice versa

8.12.4. Sarour Bridge to Slapper along river Sutlej and vice versa.

The movement of herds and flocks must stick to these routes, in case of deviation, they should suitable be dealt with. The seasonable checking post proposed to be set up on these routes fixed above are Neri-Langna Bride, Dadour Bridge, Chail Chauk and Sarour Bridge.

For this purpose suitable subordinates will be posted at these checking posts during the movements of the herds and flocks. They will count the number of cattle, sheeps,goats etc and issue either permits or verify the permits already issued.

8.13. Records of Grazing Grounds and Pastures: The grazing done by these graziers, is spread over three kinds of areas viz. summer pastures to winter runs and vice versa. It means that these migratory and nomadic flocks graze in all classes of forests. In order to find the correct grazing incidence and to make its satisfactory distribution, it is essential to have a record of all the pastures, both summer and winter with respect to their situation, areas, and grazing capacities. This record should be maintained in the Divisional Office as well in the Range Office.

8.14. Imposition of Restriction on the movement of Migratory and

Nomadic Graziers: After recording of the grazing runs, fixation of routes and the establishment of check posts, what remains to be done is to exercise control over the movements of herds and flocks during transit from summer pasture to winter runs and vice versa. It is during these movements that maximum damage is done to the forest and these graziers try to prolong their stay in forest en-route. The graziers pass through the territory of a Forest Division for two objects.

Either they pass through the grazing grounds situated in some other Division or they pass through the Division to reach the pastures situated in the same Division. In the former case they pay only *rahdari* fee and in the later full grazing fees. To control the movement of the animals in both the cases, the following restrictions should be imposed:

- i) Date of entry should be fixed.
- ii) The owner of all flocks and herds entering the territory of the Division must get a permit at the check post. Those who simply pass through will get *rahdari* permits and those who enter for grazing will get grazing permits.
- iii) Each permit will bear the period of transit both through the Division and to the grazing ground inside the Division. Any over stay should be treated as trespass under the Forest Act.
- iv) Minimum period of transit through the Division should be fixed. The graziers should not be allowed to halt their herd and flocks for longer than one night at any single halting place in any forest in which they have not a right of grazing. Halting places shall be at least 8 kms apart. Halt may be granted for two nights at one place if there has been heavy rain or if salt has been given to the animals.
- v) All herds and flocks must stick to the fixed routes and must not be allowed a deviation of more than 400 meters on each side of the fixed route.

Chapter 9

N.T.F.P (OVERLAPPING) WORKING CIRCLE

9.1 General Constitution: This working circle overlaps all the working circles and is constituted to ensure systematic development and exploitation of nontimber forest produces that occur or can be introduced in this Division.

9.2 General Character of N.T.F.P. In the earlier years the policy and practice focused on production of quality timber and these smaller and significant forest products were termed as Minor Forest Produce (MFPs) but with the change in National Forest Policy and recognition of their role, these important products are now rightly termed as N.T.F.Ps. With the people friendly and conservation oriented policy the practice should now change to focus attention on the development, conservation and their management and these should not be allowed to be continued as by products of tree focus forestry, apart from biological resources, slates, sand and Bajri.

9.3. Special objects of Management:

- i) To ensure scientific harvesting of non-timber wood forest produce by enforcing control of methodology of harvesting of N.F.F.P. species found in the tract.
- ii) To develop the resources by natural or artificial means where ever and to the extent possible.
- iii) To identify economical and useful species of herbs, shrubs and fungi and other important floras for harvesting.
- iv) To collect data about occurrence, distribution, method and cost of harvesting and also out turn and statistics of important N.T.F.P. species.
- v) To promote ex-situ and in situ cultivation and conservation of important N.T.F.P. species.

9.4. Analysis and valuation of Crop: The entire tract is rich in many useful shrubs, herb's or even fungi which are being exploited from time to time. The right holders have the right of collection of these medicinal and aromatic plants which are then exported outside through a chain of middlemen after obtaining export permits from D.F.O. on paying export fee, which is notified for each species by the Govt. from time to time. Chief non timber forest products other than

medicinal herbs are resin, mushrooms, wild fruits and vegetables, incense and condiments. The single most important factor governing the distribution of N.T.F.Ps is the altitudes with low value species occurring at lower elevation and high value species are extracted in smaller quantities at higher altitudes. The main species found in the tract are tabulated below:-

Table 9.1 NTFP Species found in tract

Local/Trade name	Botanical name	Plant type	Altitude above msl	Habitat	Part used	Use
Amaltash	<i>Cassia fistula</i>	Tree	Upto 1000m	Sub tropical forest	Fruit	Unani medicine.
Amla	<i>Embelica officinallis</i>	Tree	Upto 1000 m	-do-	-do-	-do-
Anardana / Daru	<i>Punica granatum</i>	Tree	Upto 1300 m	-do-	Seed	-do-
Arjun	<i>Terminalia arjuna</i>	Tree	Upto 1000m	-do-	Bark	-do-
Basuti	<i>Adhatoda belerica</i>	Herb	Upto 1600 m	-do-	Whole herb	Alkaloids and essential oil
Bhera	<i>Terminalia belerica</i>	Tree	Upto 1600m	-do-	Fruit	Ayur. Med.
Brahmi	<i>Centelia asiatica P</i>	Herb	Upto 1600 m	Open grass	Whole	-do-
Minaki Chil Pine	<i>Pinus roxburghii</i>	Tree	800-1500 m	Sub Trop.	Resin	Resin Turpentine.
Dhara phool	<i>Woodfordia fruticosa</i>	Shrub	Upto 1000 m	Pine forest scrub	Extract Flower	Ayur. Med.

Galoi	<i>Tinospora cordifolia</i>	Shrub	Upto 1000 m	Waste land around habitation	Whole plant	-do-
Harar	<i>Terminalia chebula</i>	Tree	Upto 1000 m	Sub tropical forests	Fruit	-do-
Kamila	<i>Mallotus philippinensis</i>	Tree	Upto 1000m	-do-	Fruit	-do-
Languli	<i>Gloissa superosa</i>	Climber	Upto 1000m	-do-	Root leaves	-do-
Pudding/ flavouring	<i>Menthe longifolia</i>	Herb	Upto 1500m	Around spring	Leaves	-do-
Shara	<i>Prunus</i>	Tree	4000 & above	Springs	Seed	Essential oil
Tejpatta	<i>Cinnamomum tamala</i>	Tree	Upto 1000 m	Sub tropical forest	leaves	
Reetha	<i>Sapindus mukrossi</i>	Tree	Upto 1000m ,	-do-	Fruits	Soapnuts
Tirmara	<i>Xanthoxylum armatum</i>	Tree	1000-1500m	Forest/farm borders	Fruit	Aur med.
Wild	<i>Tegetus</i>	Shrub	Upto	Sub	Flower	Oil

	<i>minuta</i>		1500m	tropical forests		
Marogold mohu	<i>Oleo cuspidate</i>	Tree	Upto 1200 m	-do-	Fruits	OIL
Temperate Zone						
Bach/barr e	<i>Acorus calamus</i>	Herb	Upto 2000m	Marshes	Rhizomes	Calamus oil
Banafsha	<i>Viola serpens</i>	Herb	Upto 2000 m	Oak conifer	Flower	Aur Med.
Banajwain	<i>Thymus sechillum</i>	Herb	Upto 1600-3500m	Open forest	Leaves	--do--
Bhang	<i>Cannabis sativa</i>	Shrub	Upto 3000m	Waste land	Whole plant	Fibber, marijuana
Chora	<i>Angelica glauca</i>	Herb	2500-3500m	Temperate forest	Roots	Aur. Med.
Deodar	<i>Cedar deodar</i>	Tree	1500-3000m	Deodar Forest	Stem cones	Cedarwood oil, torches.
Guchhi	<i>Morchella</i>	Fungus	Above 2000m	Deodar forest	Mushroom cones	Edible mushroom
Kail	<i>Pinus wallichiana</i>	Blue	Above 2000m	Coniferous forests	Cones	Decorative
Kakkarsinghi	<i>Pistacia intergerrima</i>	Tree	1000-2000m	Oak pine	Galls	Aur Med.
Lichen	<i>Parmelia spp.</i>	Lichen	1000-3500m	On trees	Lichen	Medicinal
Mamira	<i>Thalictrum foliolosum</i>	Herb	1500-2500	Oak conifer forest	Root	-do-

Mushkbal a	<i>Velerina wallichii</i>	Herb	1500- 3000 m	Temperat e	Root	-do-
Nihani/ Rakhal Talispatra	<i>Taxus beccata</i>	Herb	2000- 3000	Valley for.	Leaves bark	-do-

9.5. Rotational Extraction: No information or data is available for laying down method of extraction or fixing rotation for obtaining maximum yield of the plant without damage to its multiplication. To put a stop of excessive extraction year after year it is necessary to give rest to the area at least once in three years. It is therefore, prescribed that after the extraction is picked up, plants would be extracted on rotational basis. If it was not followed it is likely to reduce the yield and quality of the plant and may eventually lead to disappearance of the species. So the unit of closure should be territorial Block of the Range.

9.6. Contribution to income and quality of life in Rural Area:

N.T.F.P., collection for sale is an age old practice and contributes significantly towards rural economy. Within house hold, women and children are more active collectors of these products and income from such sales form a very handy income in poor house hold (e.g. for meeting education and recreational needs during local fairs and festivals).

Apart from purely economic benefits, N.T.F.P. are used in every aspect of daily life in rural life. The list includes nutrition (fruits, tuber, leafy vegetables mushrooms, spices, cooking oil) personal hygiene (tooth brush, soaps, detergents, hair dyes, massage oil) house hold goods (bedding, utensils, baskets, storage bins, leaf plates, brooms) forming (implements, leaf manure, stick, slates, baskets, pesticides, fencing) live stock care (fodder, bedding, ropes) and many other products of varied uses. The forest thus contributes significantly to consumption level and the over all quality of life in the area.

9.7. Collection and Export of Medicinal Herbs: As already stated that chain of middlemen is involved for collection and export of medicinal plants, resulting unorganized collection and export. The common man gets very little benefit from this valuable product after doing very hard labour in the difficult terrain. If the un-organized individuals are organized through some common forum with shared objectives and benefits, they can turn into managers of NTFPs as despite all checks the

extraction still remain an invisible and unmanaged activity. Therefore, the idea of people's cooperatives for extraction and marketing should be tried on Pilot scale using JFM approaches. As an immediate measure, the forest officers and field staff can protect local collectors from the whims, fancies and dictates of the middlemen by ensuring them minimum fixed rates approved and notified by the government, which are based on recommendations of the collector's organizations such as VFDCs of Coops. or an Advisory committee.

9.7.1. There are lots of valuable medicinal Herbs in this tract which are collected and exported to the plains where these are used for preparing the medicines.

9.8. Training and Sensitization of collectors: The J.F.M experiences have shown that if a constructive dialogue is continued and followed by supporting activities, then people forget individual gains and do think of resource regeneration through collective efforts. It is thus advisable that the local people, who collected N.T.F.Ps, should be sensitized and trained in appropriate technologies using local knowledge and skills. N.T.F.P. management is emerging as one of the possible post formation supports for the V.F.D.Cs. The sensitized communities have better chance of practicing established methods of rotational, deferred or cyclic extractions.

9.9. Extraction cycles: Four year extraction cycle should be devised by the D.F.O. and once approved, should be put to practice for *Taxus baccata*, Pine cones, Deodar stumps, and other important species having in large quantity. Extraction of old stump of Deodar is being done in this area. Details of old stumps of Deodar uprooted is given in Appendix

9.10 Artificial Propagation and Conservation: Keeping in view the economic importance and demand of medicinal herbs, it is desirable to encourage naturally occurring medicinal plants in suitable localities. The demand of medicinal plants has picked up with setting up of pharmaceutical industries in the state. The existing germplasm of different herbs needs to be conserved. Following measures are suggested for the conservation, protection and propagation of medicinal plants:-

- Heavy grazing and destruction of medicinal herbs should be checked as these species do not produce sufficient seeds/vegetative form of regeneration.
- The raising of nurseries/herbal gardens, drug farms should be developed through various research institutes like HFRI, UHF, Nauni, HPKV Palampur, CSIR Palampur, Ayurveda department who are engaged in medicinal and aromatic plants .
- Medicinal plant collectors should be educated and provided proper information or guidelines so that there is continuous regeneration of medicinal herbs.
- The community based organizations like Mahila Mandals, Yuvak Mandals, VFDCs and other rural co-operatives should be involved in the development, protection, propagation and conservation of medicinal plants.

9.11 Propagation Techniques:-The technique of propagation and harvesting of some important plants is as under:-

Table 9.2 Method of Propagation of Medicinal Plant

Name	Method of Propagation	Harvesting/Collection	Uses
<u>Artemisia nilagirica</u>	The seeds are minute. The sowing is done in Feb./March. Seedlings are transplanted in June-July in pits at a spacing of 0.5m × 0.5m.	The crop is harvested in October when the plants flower.	The flowers are used in extraction of drug used as wormicide.
<u>Acorus calamus</u>	The species is propagated by sowing as well as planting rhizomes at 15m deep at 30cm × 30cm spacing during Feb.-March. If direct sowing is decided, then the soil is worked up to a depth of 15 cm. Sowing is done in patches which may be spaced at 30 cm X 30 cm	Harvesting is done after one year during Nov.-Dec.	The dried rhizome is generally used in the form of infusion. It produces best results in case of dyspepsia and chronic diarrhoea.
<u>Aconitum heterophyllum</u>	The species is propagated by direct sowing in patches at 30cmX30cm during Feb.March	Roots are dug out in the month of Oct.-Nov.	Roots are used as astringent, tonic and in diarrhea, cough

<u>Angelica glauca</u>	The species is easily propagated by sowing in patches at spacing of 3m x 3m. Sowing is carried out in Feb.-March.	Collection/harvesting is	Roots, fruits used for flavouring. Used in medicines for digestion, heart burn, flatulence.
<u>Dioscorea deltoidea</u>	It is propagated by planting rhizomes in 15cm deep pit at the spacing of 60cm x 45cm during March. About 15-18 Qtls. Of rhizomes are required for one hectare area.	Tubers are dug out in Nov.-Dec.	Tubers yield steroidal sapogenin which is a source for manufacture of oral contraceptive.
<u>Raclem candidans</u>	The species is propagated by seeds and root cuttings. Seeds @ 10-15 Kg/ha are required. The root cuttings 2.5cm to 4 cm long should be planted in 30 cm deep pits at a spacing of 75cm x 50cm in March April.	After one year, the roots/tubers are dug in Oct.-Nov.	Roots are source of xanthotoxin, a furocoumarin which is used in treatment of leucoderma, fruits as aphrodisiac & nervetonic
<u>Podophyllum emodii</u>	The rhizomes are planted in 15cm deep pits in the zone of natural occurrence. The seeds germinate in about 3 years but if sowing is done in bores at low altitudes, it can germinate in 6 months, then the seedlings can be taken to sub alpine region and transplanted.	The rhizomes are collected when fully developed.	
<u>Picrorhiza kurroo</u>	It is easily propagated by planting rhizomes in 15 cm deep pits at a spacing of 60cm x 60cm during Nov.-Dec	Collection is done after 3-5 years when rhizomes are fully developed.	Roots are used as stomachic, tonic, improve appetite and stimulate gastric secretion.
<u>Swertia chirayita</u>	It is propagated by sowing of seeds in patches at a spacing of 30cm x 30cm during Feb.-March.	Harvesting is done in following November-December.	The dried plant yields drug used as tonic, stomachic, bronchial asthma & liver disorders.
<u>Valeriana wallichii</u>	The species is propagated by direct sowing or	Rhizomes are dug out after 3-5 years when full developed.	Dried rhizomes are employed for hair

	planting rhizomes in 15 cm deep pits at spacing of 30cm × 30cm during Feb.-March. About 25-40 Qtls.of root stock is sufficient for one hectare.		and perfumes, as incense and in drugs for hysteria and nervous problems.
<u>Viola serpens</u>	propagated by sowing or planting root suckers at a spacing of 15cm × 15cm during June-July.	Feb.-March in low lying area and in April-May in higher reaches.	Trouble, eye and ear diseases. Also used as blood purifier.

9.12 Discussion on Medicinal Plants and Grass: The resin has already been dealt with under chil working circle and the remaining is discussed separately as under:

i) MEDICINAL PLANTS:

A large number of medicinal herbs are found growing all over the tract. The area below Nargoo peak and along Nargoo-Hathidhar in this division herbs met within the tract have been given in the appendix of the many medicinal herbs, growing in the area the following are some of the important ones.

ii) VIOLA SERPENS (Banafsha):

It occurs in almost all the forest between an elevation of about 2000 to 3000 meters except those areas which are very much overgrazed. It is collected by the local people and then exported through the local dealers. A large quantity of Banafsha is extracted and exported outside the state.

iii) VALERIANA WALLICHII (Mushak bala):

It is quite common in all the forests between an elevation of 2000 to 3000 meters. Sheltered localities and comparatively areas are richer in these medicinal herbs than the exposed spurs and overgrazed areas. Its roots are collected in small quantities by the local people and are exported. The quantities exported outside in different years in the past, are given in separate table.

iv) PODOPHYLUM HEXANDRUM (Ban kakri):

It grows scattered in fir forest between an elevation of about 2500 and 3000 meters. It has been exploited from the accessible areas and now only some scattered plants are

found. In this division Ban Kakri is not found in quantities sufficient for commercial exploitation.

v) SWERTIA CHIRATA (Charaita):

It is found in Fir forests and alpine pastures between an elevation of about 2000 to 3500 meters. Deodar, JahkhwanGahar, Pachhaundgahar, GramanGahar, Daman Gahar, Bhuboonal forests of this division are comparatively richer in Chirata than other areas. Chirata is collected by villagers for their own use for export in small quantities.

vi) DIOSCORIA DELTOIDEA:

It is found scattered in forests between an elevation of about 1000 to 25000 meters. Lower areas of Malwara and Barot blocks are comparatively richer in this medicinal herb. Dioscorea has not been extracted on any commercial scale from this tract so far. Because of the importance in recent years and the attractive price being paid by some private firms, its extraction has been started from areas where this medicinal herb is available in large quantities. Details of quantities extracted during the last 10-15 years are given in the table which clearly indicates the increasing interests taken by the local people in this particular commodity. But timely and adequate

vii) TEJPATA (Cinnamomum tamala):

It occurs in some forests of Darang range. Though it does not occur extensively but it can be auctioned in small lots. Besides the above medicinal herbs *Berberis* spp (Rasaut) *Embllica officinalis* (Amala) *Pistacia intergerima* (Kakarsingi) *Myrica nagi* (kaphal) and *Polygonatum vertillatum* (salamishri) are also extracted for medicinal purposes.

9.13 Extraction: Continued and excessive extraction of medicinal herbs and may at place result in the extinction of more valuable species. It is therefore, suggested that those medicinal herbs, whose roots or stems are used as medicine should be extracted from a particular area in alternate year not continuously. In view of the unrestricted rights of local people to collect medicinal herbs, it will not be possible to place this restriction on the local people but where the areas are to be auctioned for the extraction of medicinal herbs, this suggestion should be kept in view.

9.14 Artificial Propagation: In view of the increasing demand and great economic importance of the medicinal herbs, it is considered desirable to cultivate important medicinal plants in suitable areas. In view of the fluctuating and changing market demand for different medicinal herbs, it is difficult to formulate a definite plan for the propagation of medicinal herbs. It is however, suggested that 5 acres should be planted or sown annually with medicinal plants having definite market demand.

9.15 Technique Of Plantation: The technique of propagation and collection of the medicinal herbs suggested for artificial propagation is discussed below for the guidance of the staff.

i) Dioscorea deltoidea (KINAS):

It prefers warm, temperate climate, Sandy loam soil which is better than either sandy or clayey soil. It requires sufficient soil moisture but can not withstand water logging.

Dioscorea deltoidea can be propagated either by sowing the seed or by planting of tubers.

Tubers planting gives better results & quicker growth of plants and is therefore recommended. The tubers should be planted in the month of March, in well prepared pits. Planting distance should be kept about one meter x 40 cms.

Two and half years old plants are expected to yield exploitable tubers. To get the highest yield of alkaloid, the tubers should be dug in the month of September or October. The tuber should not be cut injured during digging and should be dried in the sun. It should be ensured that tubers are not attacked by fungus during digging. The yield from a well stocked crop is expected to be about 20 quintals per hectare.

ii) Podophyllum hexandrum (BAN KAKRI):

It thrives best on deep, rich, well drained soil with partial forest cover and good supply of moisture. Cool depressions under the canopy of spruce or silver fir are the best sites for this plant. It can be propagated either by sowing seeds or by planting rhizomes.

9.15.1 FROM SEEDS: Berries ripen towards the end of August and should be immediately collected thereafter otherwise are eaten by birds or rodents and sometimes removed by villagers. Seeds should be sown in nursery either in November- December before snowfall or in March soon after the snow melts. Before sowing the seeds should be put in hot water for 1 to 2 minutes to hasten germination. The seedlings should be planted at a spacing of about 40cm x 40cm in July.

9.15.2 FROM ROOTS: Root portions about 4-5cms in length should be planted in

the field in November-December before the snowfall. The spacing be about 15cmsx60cm. Weeding is necessary to save plants from being smothered by grasses and weed, irrespective of whether the plants have been raised from seed root cuttings.

Four years old plants are expected to produce to produce rhizomes fit for extraction. The rhizomes and roots should be dug out in Oct. before the soil become too hard for digging. These should be cleaned of soil and dried in sun. Long roots may be cut in convenient sizes. In well stocked and well grown crops the yield of roots is expected to be about 400 to 500 kg. per hectare.

i) Saussurea lappa (KUTH):

It grows in the area where the total annual precipitation in the form of snow is at least 1000mm. It prefers deep rich porous soil and light cover head shade. Kuth is easily propagated either by transplanting the seedling raised from seed or by planting out the root cuttings.

9.15.3 FROM SEEDS: The seeds ripen in the month of September and are collected a little before they are fully ripe. The seeds should be sown in Oct& Nov. The seed will germinate in spring and there after nursery bed should be regularly weeded out. The seedling is planted out in the field in next July-August when they are about 15 months old. The plants attain height of about 12 to 15 cms when they are transplanted. The spacing should be about 1x1 meters. Timely weedings are necessary to ensure that the plants are not smothered by weeds.

9.15.4 FROM ROOT CUTTINGS: Root cutting, about 3 to 5 cms in length should be planted in the field in pits at a spacing of about 1x1 meter. Cuttings may either be planted in autumn before the snowfall or in spring just after the snow melts. Spring planting gives better results.

The roots are dug in sixth year in the month of Aug-Sep, when the alkaloid content in these is maximum. Each plant produces several tubers varying in length from 15 to 20 cm. At the time of digging out the tubers, one of the tubers should be left for further reproduction. The yield is expected to be about 50 quintals of dry kuth roots per ha.

9.15.5 DIGITALIS PURPUREA: It prefers sandy loam well drained and fertile soil. It grows in temperate climate and high atmospheric temperature kill the plants out right. It can withstand shade. It is propagated from seeds. The seeds are sown in

nursery in March- April 10 to 200 ounces of seed will produce sufficient seedling for planting one ha. the seedlings are transplanted in the field in the month of July when they are about 6 to 8 cm in height. The spacing should be about 30 cm in between the plants and about 75 cm in between the lines.

Leaves should be plucked when the plants are in full bloom and about 2/3rd of the flowers on each spike have opened. Three fourth of the total number of leaves on each plant are removed at a time. The leaves are dried for 36 hours. When completely dry, they should be stored in air tight containers in a dry place. The yield is expected to be about 2 to 6 quintals of air dried leaves per ha.

9.16. Commercial plants: In addition to the medicinal plants, some of the other important plants of their products are economically exploited are:

9.16.A.Resin: Resin tapping is very important, which is extracted from Chil trees. In this Division resin blazes and quantity extracted from 1986-87 to 2001 is give in Para 3.5.11 in chapter 3 of part. I. Resin is processed in Rosin & Turpentine Factories Nahan and Bilaspur. By products of resin are Rosin & Turpentine and exported out, which are being further put to various uses after preparing by products.

9.16.B.Nirgal: It is also known as hill bamboo. There are two important varieties of Nirgals found in the tract. These are *Arundinaria falcate* and *Arundinaria spathiflore*. These occur in Ban Oak forest and Fir forests of Jai Devi and Jhungi Ranges. The quality and stock is going to poor due to irregular cutting and destruction by local people as well by migratory graziers. It is being used by local people for preparation of Kilta, baskets, Mats, Grain vats, Hooka pipes.

9.16.C.Taxus baccata leave (Brahmi): These leaves are collected in large scale and are exported to the plain where these are used for preparing medicines. This is available in upper reaches of forests of Jai Devi and Jhungi ranges. The Govt. of H.P. has formulated a policy regarding grant of permission for collection of *Taxus Bacata* leaves and export permission thereof vide letter No.FFE-B- E(13)2/95 dated 4.6.96 from F.C.cum Secretary (Forest) to the Govt. of H.P. addressed to Pr. CCF, H.P. Shimla and regulated accordingly.

9.16.D.Fungi: The area having varieties of fungi which consist of large number of edible and nonedible fungi. The most important of all these fungi are the morels (*Morchella* species) and dhingri (*Pleuratis* species) These are collected,dried and exported out.

9.17. Edible Products: Several fruits, flowers and even leaves and tuberous roots are eaten. Species of fruits is eaten are Am or mango (mangifera indica) Ber (Ziziphus mauritiana); Jamun (Syzygium cumini). There are some species of which the kernels are eaten; which are Akhrot or Walnut (Juglans regia)

Singhara. Species of which are used as pickles or vegetables are Anar or Wild pomegranate (Punica granatum); Karundu (Carissa opeca) Kachnar (Bauhinia variegata), Guchehi (Morchella esculata), Shahtoot (Morus alba) fruits is eaten or made Sharbat.

Leaves of certain species used for various purposes, soap substitutes such as Ritha (Seed of Sapindus emarginated or mukrossi), Rudroksha (the drupes of Elaeocarpus granitrus) used as beads for rosaries.

Leaves of woody climber Bauhinia Vahlia found in deciduous forest of this tract are collected in large quantities and made into plates and leaf cups or else used as wrappers by venders of sweets etc.

Animals products found in forests are honey and wax, tussar or kosa silk moths' horns, hides of dead animals, antlers of deer.

9.18. Fixation of export Royalty Rates of Medicinal Herbs

Government of Himachal Pradesh through notification number No.FFE-B-A003/7/2023 Forest – B Dated 11.07.2024 vide which the export permit/pass fee prescribed vide schedule II of HP Forest Produce Transit (Land Routes) Rules 2013 were amended. The new rates are given below.

Table 9.3 List of Forest Produce and Permit Fee thereon

S.No.	Botanical Name	Local/Trade Name	Plant Part	Permit/Pass Fee Rs./Qtl.	Proposed Transit / Pass Fee Rs. Qtl.
1.	<i>Abies spectabilis</i> / <i>A. pindrow</i>	Talis Patra	Needless/leaves	125	250
2.	<i>Acacia catenata</i>	Khair	a) Heartwood/ Chips b) Khair billet. (with bark) c) Khair waste Chipss after Katha extraction d) Katha e) Kutch	250 175 25	500 350 50 1500 50
3.	<i>Aconitum dienerianum</i>	Vatsnabh/Mohra	Tubers	7500	15000
4.	<i>Aconitum heterophyllum</i>	Atis/Patis/Karvi Patis	Tubers	5000	10000

5.	<i>Aconitum violaceum</i>	Mitha Telia/Matha Patis	Tubers	1000	2000
6.	<i>Acorus calamus</i>	Bach/Bare/Ghorbach	Rhizomes	150	300
7.	<i>Adhatodazeylanica/A. Vasic</i>	Basuti/Bansa	Leaves	125	250
8.	<i>Asiantumlunulatum</i>	Dungtuli/Hansraj	Fronds/Whole Plant	125	250
9.	<i>Aegle marmelos</i>	Bilgiri	Fruits	500	1000
10.	<i>Aesculus indica</i>	Khanor	Fruits/Seeds	150	300
11.	<i>Ainsliaeaptera</i>	Sathjalori	Roots	150	300
12.	<i>Ajugabeacteosa</i>	Neelkanthi	Leaves	125	250
13.	<i>Alnus nitida</i>	Kosh Cones	Dry Cones	150	300
14.	<i>Angelica glauca</i>	Chora	Roots	125	250
15.	<i>Arctium lappa</i>	Jangli Kuth	Roots	125	250
16.	<i>Arnebiaeuchroma/A. Benthami</i>	Ratanjot	Roots	200	400
17.	<i>Artemisia brevifolia</i>	Seski	Flowering shoots	125	250
18.	<i>Asparagus adscendens</i>	Shatavati/Sanspai/Safe d Musli	Roots tubers	200	400
19.	<i>Atropa acuminata</i>	Belladonna/Jharka	Leaves	125	250
20.	<i>Berberis sap</i>	Kashmal/Daruhaldi	Roots/Stems	200	400
21.	<i>Bergenia ciliata/B. stracheyi</i>	Pasahnbed/Patharchat	Roots	150	300
22.	<i>Betula utilis</i>	Bhoj Pattar/Birch pine	Bark Dry cone	500 200	1000 400
23.	<i>Bunium oersicum</i>	Kala Zira	Fruits	2000	4000
24.	<i>Carum carvi</i>	Shingu Zira	Fruits	1000	2000
25.	<i>Cedrus deodara</i>	Deodar Rosette	Dry Cone part	150	3000
26.	<i>Cinnamomum tamala</i>	Tejpatra	Leaves	500	1000
27.	<i>Colebrookia oppositifolia</i>	Bindi Phool	Leaves/Roots	125	250
28.	<i>Coleus aromaticus</i>	Pathan Bail	Leaves, seed	30	60
29.	<i>Curcuma angustifolia</i>	Ban Haldi	Rhizomes	150	300
30.	<i>Dactylorhiza hatageria</i>	Salam Panja/Hath Panja	Root tubers	6000	12000
31.	<i>Dioscorea deltoidea</i>	Singli Mingli/Kins	Roots	900	1800
32.	<i>Emblica officianalis</i>	Ambla	Fruits	150	300
33.	<i>Ephedra gerardiana</i>	Somlata	Twigs	200	400
34.	<i>Fritillaria roylei</i>	Ban Lehsun/Mushtanda	Bulb	10000	20000
35.	<i>Geranium nepalense</i>	Lalijari/Raktjari	Roots	125	250
36.	<i>Girardinia diversifolia</i>	Bichhu Buti	Roots	150	300
37.	<i>Hedychium acuminatum</i>	Kapur Kachri/Kachur/Van Haldi	Roots	100	200
38.	<i>Heracleum spp (H. candicans; H. Lanatum)</i>	Patishan./Patrala	Roots	100	200
39.	<i>Hyocymus niger</i>	Khurasani Ajwain	Seeds/Leaves	150	300
40.	<i>Hypericum patulum/H. perforatum</i>	Khaarera/basant	Whole Plant	250	500
41.	<i>Hyssopus officinalis</i>	Juffa	Flowering Twigs	500	100

42.	<i>Iris germanica</i>	Safed ach	Rhizomes	125	250
43.	<i>Juglans regia</i>	Akhrot/khod	Bark	1000	2000
44.	<i>Jantiperus communis</i>	Hauber	Leaves	250	500
45.	<i>Juniperus recurva/J. Macropoda</i>	Bether Patta	Leaves	150	300
46.	<i>Jurinea macrocephala=J.dolomorea</i>	Dhoop/ Guggaldhoop	Roots	500	1000
47.	<i>Lichens</i>	Chalora/Chharila/Jhula /Mehndi/ Store flower	Thallus	500	1000
48.	<i>Mentha longifolia</i>	Jangli Pudina	Leaves	125	250
49.	<i>Morchella esculenta</i>	Guchhi/Cheun	Fruiting Body	10000	20000
50.	<i>Mosses</i>	Green Moss Ghas	Thallus	250	500
51.	<i>Murrayakoenigil</i>	Mithi Nim	Leaves	150	300
52.	<i>Myrica esculenta</i>	Kaphal	Bark	200	400
53.	<i>Nardostachys grandiflora</i>	Jatamansi	Roots	1000	2000
54.	<i>Origanum vulgare</i>	Ban Tulasi	Leaves	150	300
55.	<i>Oroxylum indicum</i>	Shyonak Tatpalanga	Bark, Pod	125	250
56.	<i>Paris polyphylla</i>	Dudhiabach / Satva	Rhizomes	200	400
57.	<i>Picrorhiza kurroa</i>	Karoo/Kutki	Rhizomes	1000	2000
58.	<i>Pinus gerardiana</i>	Chilgoza/Neoza	Seeds	1000	2000
59.	<i>Pinus roxburghii</i>	Chil Cones Chilaru	Dry Cones Dry needles	1000 5	2000 10
60.	<i>Pinuswallichiana</i>	Kail cones	Dry Cones	500	1000
61.	<i>Pistacia integerrima</i>	Kakarsinghi	Leaf Galls	1000	2000
62.	<i>Podonphyllum hexandrum =P.emodi</i>	Bankakri	Fruits Roots	250 450	500 900
63.	<i>Polygonatum spp</i>	Salam Mishri/Meda/Mahame da	Rhizomes	1000	2000
64.	<i>Potentilla nepalensis</i>	DoriGhas	Roots	125	250
65.	<i>Prunus cerasoides</i>	Pajja/Padam/Padmaka sht	wood	125	250
66.	<i>Punica granatum</i>	Daru/Anar	Fruints/Seeds	500	1000
67.	<i>Pyrus pashia</i>	Kainth/Shegal	Fruits	125	250
68.	<i>Rauvolfla serpentina</i>	Sarpagandha	Roots	500	1000
69.	<i>Rheum spp (R austral= R. Emodi/R. speciforme)</i>	Revandchini	Roots	200	400
70.	<i>Rhododendron anthopogon</i>	Talispatra	Leaves	125	250
71.	<i>Rhododendron arboretum</i>	Brash/Burah	Flowers	150	300
72.	<i>Rhododendron campanulatum</i>	Kashmiri Patta	Leaves	150	300
73.	<i>Salvia moorcroftiana</i>	Thuth	Roots	200	400
74.	<i>Sapindus mukorossi</i>	Ritha/Dodde	Fruits	150	300
75.	<i>Saussurea costus/s. lappa</i>	Kuth	Roots	300	600
76.	<i>Selinumspp (S.vaginatums. tenuifolium)</i>	Bhutkesi	Roots	400	800
77.	<i>Swertiaspp.</i>	Chirata	Whole plant	700	1400
78.	<i>Taraxacum officinale</i>	Dhudhi/Dandelion	Roots	125	250
79.	<i>Taxus wallichiana= T. baccata</i>	Bimi/Thuna/Rakhal	Needles	600	1200

80.	<i>Terminalia bellirica</i>	bahera	Fruits	300	600
81.	<i>Terminallia chebula</i>	harar	Fruits	500	1000
82.	<i>Thalictrum foliolosum</i>	Mamiri	Roots	350	700
83.	<i>Thymus serpyllum</i>	Banajwain	Aerial Parts (Herb)	125	250
84.	<i>Tinospora cordifolia</i>	Giloe/Guduchi	stems	125	250
85.	<i>Toonaciliata/Cedrelatona</i>	Bari phool	Dried fruits	125	250
86.	<i>Trillidium govanianum</i>	Nag Chhatri	Roots/Rhizomes	8000	16000
87.	<i>Valerianaspp</i>	Mushakbala/Tagar/ Nihanu	Roots/Rhizomes	600	1200
88.	<i>Viola spp</i>	Banafsha	Flowers/aerial parts	2250	4500
89.	<i>Withania somnifera</i>	Ashvagandha	Roots	200	400
90.	<i>Woodfordia fruticosa</i>	Dhatki/Dhai	Flowers	150	300
91.	<i>Zathoxylum armatum</i>	Tirmir	Fruits/Seeds	250	500
92.	Dry uprooted waste Lantana (not processed) in Govt. and Private land.			10	20
All other Non-Timber Forest Produce (NTFP) not listed above				100	200

9.19 Challenges:

Current challenges in NTFP sector are:-

- Low priority at the policy & planning level, and hence low investments for developing this sector.
- Being unorganized in most part(except for few like Bidi leaves and bamboo) there is a lack of clarity on the actual collection, trade, pricing and other related aspects like the number of primary collectors.
- Inadequate value addition & storage.
- Dwindling resource base.
- Poor interest of entrepreneurs in commercial farming of NTFPs (this is chiefly due to the insecure market)
- Unsustainable harvesting practices.
- Bio-Piracy of NTFP by commercial Giants.

The current working plan will continuously aim to work on the challenges in the NTFP sector during its tenure. The working circle is overlapping in nature and will include all working circles.

CHAPTER 10

WILDLIFE MANAGEMENT (OVERLAPPING) WORKING CIRCLE

10.1 General Constitution of Working Circle: The working circle overlaps all the other working circles falling in the territorial jurisdiction of Suket Forest division. Forests are inseparable part of wildlife habitat. If the forests flourish, the wildlife self-generates. However, since the beginning of the nineteenth century, ruthless destruction of wildlife habitat has resulted in pronounced improvement and regression of wild animals. Especially in the past five decades, the habitat of wild animals has been greatly affected by intensive agriculture, urbanization, and construction of dams and canals etc. Most of the land in the state has excess to human interference including forests. Intensive agriculture on one hand has depleted the habitat of large mammals and on the other hand has favored rodent pests. The intensive use of pesticides and chemical fertilizers has a bad effect on the population of many of the aquatic and terrestrial animals. Effect of use of deadly pesticides has been pronounced on the populations of partridges, house sparrows, vultures and many others. After clearance of vegetation, the wild animals particularly the carnivores were indiscriminately hunted and killed from this area to the point of extinction. After independence, though, measures have been taken to restore the vegetation cover which has yielded positive results. The Wildlife (Protection) Act, 1972 was enforced in the state w.e.f. 01.04.1975 to save the environment and wildlife. The rules under this Act were also framed and notified Wildlife Divisions has been created to manage protected areas with its headquarter at Hamirpur later changed to Shimla to look after the protection of wildlife in this area. Besides, the Divisional Forest Officer (wildlife), the territorial D.F.O. and the subordinate staff is equally responsible for the protection and enforcement of wildlife (Protection) Act, 1972. Wildlife Working Circle has been created to look after the interests of wildlife and their habitat while managing the forests.

10.2 Objectives of Management: The following are the special objectives of management:

1. To conserve and protect the existing biodiversity of the ecosystem as a whole.
2. To improve the wildlife habitat in terms of living space, forage conditions, protective and breeding cover, water holes and salt licks.

3. To supplement the existing natural vegetation by planting fruit and fodder species with special emphasis on trees that provide shelter to wild animals and birds.
4. To prepare scientific data base for the maintenance and development of viable populations of fauna.

10.3 Importance of Wild Life

A) Cultural value of Wild Life

Indian mythology, art and literature are bound intimately with animals and birds in a hundred verses are echoed in the prayers of the Vedic hymns, praising the cattle Nandi as the Vahan of Shiva, Garuda of Vishnu, Swan of Saraswati and Peacock of Kartikeya, while Lakshmi is surrounded by elephants. How Krishna leans against a Kadamba tree attended by cows or driving them home at sun set to the gates of Vrindavan is depicted in thousand pictures. Similarly, lion is the charger of Durga in her fight against the forces of darkness and barbarism. It is because of this association that lion has become the symbol of Dharma.

B) Scientific and Biological Values: In some quarters there is an erroneous notion prevalent that the wild animals are instrumental in damaging the field crops and domestic animals. Hence out of ignorance many people resort to indiscriminate destruction of these animals. The fact is other way round. The herbivorous animals do not damage the field crop if sufficient food is available in their natural habitat. The animals check the cover growth of vegetation and their population provides food for the carnivore. If man does not indiscriminately destroy the wild animals, the Carnivorous animals will not lift his domestic animals or attack him. When the natural balance of wild animal population is upset by the callousness of human beings, they invade the fields and human habitations. The birds are helpful and useful to man in innumerable ways. Apart from their beautiful look, feathers and sweet songs, they devour millions of crop pests and rodents. They also scavenge the forests; bring about pollination of flowers of some of the fruit and forest trees and help in dispersal of seeds. But for the help of birds in destroying the crop pests, which multiply at a tremendous rate, it would have been rather impossible to raise field crops. These pests live on wood, living on plant leaves, flowers and fruits and eat 2 to 200 times of their body weight per day, on alarming magnitude indeed. Thus, the contribution of bird population in maintaining the vegetational cover on earth and help in raising the field crops for food cannot be over emphasized. And hence the importance of balance in the constituents of nature nevertheless, the animals

damaging crops, lifting domestic animals and man eaters have to be killed and thus the balance restored.

How then, can we dis-associate ourselves from these creatures? Ancient oriental wisdom constantly emphasized on the unity of all earthly life and science is bringing us back to some point. And yet, we appear to be utterly impervious to the urges of the wisdom distilled either from ancient philosophy or from modern science. It is also wise to remember that we can destroy a species but surely, we can never recall it.

C) **Economic value:** There is economic side of wild life too. This implies the benefits or profits; we may get from the use of wild animals. The monkeys, for instance, have been useful in research for cures of human diseases. The musk pods of the musk deer are of great repute. Activities such as ecotourism & birdwatching heavily influences the economic condition of the region.

D) **Recreational & Aesthetic value:** The beauty of wild animals and birds fascinates the bird watchers, sport enthusiasts, photographers-both immature and professionals, animal and bird ecologists and biologists, and the gaiety hunters, the tourists from within and outside the country. The country side blessed with natural beauty bearing beautiful woods, wild animals and birds attract a multitude of tourists for sightseeing, sport and rest in such surroundings. Tourism earns substantial revenue for the state. Besides, revenue, people of the areas including hoteliers, transporters etc. are also benefitted in many ways.

10.4 Character of Vegetation: As already mentioned, the forests in the area comprise of Northern Dry Mixed Deciduous forests, Dry Deciduous Scrub Forests, Khair & Sissoo Forests, Dry Bamboo Brakes, Sub Tropical Pine Forests, Lower or Shiwalik Chil Forests, Himalayan Chir Pine Forests, Himalayan Scrub Forests, Olea cuspidate Scrub Forest, Himalayan Moist Temperate Forest, Ban Oak Forests, Moru Oak Forest, Moist Deodar Forests, Western Mixed Coniferous Forests, Low level Blue Pine Forest, Kharsu Oak Forests, West Himalayan Upper Oak/Fir Forests and Himalayan Temperate Park with predominance of trees such as Chil, Deodar, Kail, Fir, Spruce khair, simul, shisam, Rajain, Amaltas, Pyrus, and Kangu etc. The common bamboo found is *Dendrocalamus strictus*.

A number of fruit and fodder trees for wildlife importance occur in the areas of which

the following are important:

TREES: *Acacia catechu*, *Anogeissus latifolia*, *Lannea coromandelica*, *Aegle marmelos*, *Mallotus philippinensis*, *Flacourtia indica*, *Limonia acidissima*, *Ehretia laevis*, *Zizyphus mauritiana*, *Ougeinia ougeinesis*, *Butea monosperma*, *Holoptelea integrifolia*, *Diospyres Montana*, *Cassia fistula*, *Mitragyna parvifolia*, *Cassia fistula*, *Casearia elliptica*, *Bauhinia variegata*, *Toona ciliata*, *Albizzia lebbek*, *Albizzia odoratissima*, *Acacia modesta*, *Acacia nilotica*, *Acacia leucophloea*, *Bombox ceiba*, *Litsea glutinosa*, *Emblica officinalis*, *Erythrina glabrescens*, *Spondias pinnata*.

SHRUBS: *Carissa spinarum*, *Mimosa himalayana*, *Nyctanthes arbor-tristis*, *Dodonea viscosa*, *Woodfordia floribunda*, *Adhatoda zeylanica*, *Murraya koenigii*, *Zizyphus mauritiana*, *Holarrhena antidysenterica*, *Vitex negundo*, *Xeromphis spinosa*, *Lantana camara*.

GRASSES: *Chrysopogon montanus* (Dholoo), *Heteropogon contortus* (Lamboo), *Chloris incompleta* (takkevmadhana), *Themeda anathera* (Lungji), *Bothriochloa pertusa*, *Brachiaria Spp.*, *Eulalispis binata* (bhabor), *Aristida spp.*

CLIMBERS: *Pueraria tuberosa*, *Bauhinia vahlii*, *Acacia totilis*, *Clematis gouriana* and *Cuscuta reflexa*.

Therefore, there is a variety of tree and grass forage found in these forests. However, there is a persistent scarcity of water in the dry and winter months in part of Sarkaghat, Kangoo and Baldwara ranges.

10.5 Analysis and evaluation of wildlife and its habitat

The alarming decline in vulture populations across the country due to the widespread use of *diclofenac* (a now banned drug), has become an area of concern prompting documentation of vulture breeding sites and initiating conservation action like prevention of forest fires around these sites, as a matter of urgency. The forest department & forest corporation staff needs to be made aware of this priority and constantly monitor the status of vulture breeding sites in their areas.

Wildlife Institute of India in its biogeographical classification has recognized Shivalik region as one of the regions of biological significance. In this region, animals like Pangolin and Pythons are rare which are included in the International Red Data list of I.U.C.N. Sambar, barking deer and hog deer which are included in the schedule III of Wildlife (Protection) Act, 1972 are also found in these forests. Leopards are found in the area. Apart from above, other animals such as Black buck, blue bull, Wild boar, Jackal, Rufous tailed hare, small Indian mongoose, fruit bat, Rhesus monkey, Indian Porcupine

are common. The others noticed are Pale hedgehog, Grey Musk shrew and Indian Fox. The list of recorded animals in these forests is given in Table 14.1.

A variety of birds are also found in the area of which are peacock, koel, pied- crested cuckoo, red jungle fowl, blue rock pigeon, doves, lapwings, babblers, hoopoe, bulbuls, jungle mynas, grey tit, golden backed wood pecker, king crow, shama, common grey hornbill and grey partridges are important occurring in numbers. The main bird species which are not seen in other parts of the state but found in this tract include Himalayan slaty headed parakeet, Blue headed Rock thrush, yellow backed sunbird and paradise flycatcher. The list of birds found in the tract are given in Table 14.1.

10.6 Wildlife Conservation Measures

The protection to wildlife can be afforded by adopting preventive, remedial and control measures. The preventive measures suggested are creation of public awareness, immunization of cattle in the surrounding areas to ensure that contagious diseases do not spread to wildlife. Controlling of grazing in the wildlife rich areas so that cattle do not encroach upon the rights of forage of wild animals. The awareness about the benefits of wildlife can be created effectively through meeting the elderly people, delivering lectures in schools and colleges, and arranging public shows during village melas and Govt. functions. The public at large and concerned staff should be suitably rewarded for prevention, investigation and prosecution of cases relating to wildlife offences. Wild life club can be constituted to foster interest in wild life conservation as the town is inhabited by a large number of government employees and educated populace.

The remedial measures like habitat improvement, pasture development, creation of water holes, provision of salt licks, and periodical census of wildlife are of importance. The control measures suggested are anti-poaching measures through strengthening of infrastructure and communication network, prevention of forest fires and enforcing legal provisions of wildlife (Protection) Act, 1972.

10.7 Habitat Improvement: Habitat especially for the endangered species and the species in the schedule-I of the Wildlife (Protection) Act, 1972 requires to be protected by all means. The areas where schedule-I animals are found, needs to be specially protected and entry of domestic animals should be stopped so that wild animals get the required forage and shelter. Regular monitoring of their habitat should

be done.

There should be no felling amounting to alteration of crop composition near the water holes and on the paths frequented by the wild animals. Gap planting with species such as Amla, Bahera, Jamun, Ber, Mallah, Bel, Kinu, Bauhinia and Dhak should be carried out in pockets.

Lantana weed is the biggest hazard for the deterioration of wildlife habitat. Measures to control its further spread, and eradication and utilization of the existing lantana weed as suggested in the Plantation Working Circle should be vigorously adopted.

Provisions have also been made in the various Working Circles to reserve the trees of wildlife importance near the water holes, baulis, near temples and shrines. Similarly, trees providing roosting and nesting sites for birds are to be left intact. One dead tree preferably of low commercial value per hectare should be retained for shelter and resting of wildlife. Unsound and hollow logs are to be left in the forest as shelter for wildlife provided, they are not fire hazard.

Salt licks may be provided at important water holes where the wild animals regularly make a visit.

10.8 Provision of Water holes: Due to high gradient and lack of suitable water harvesting structures, the area is deficient in water to meet the needs of the wild animals. As a result, the animals in the dry months of summer and winter months usually migrate to the lower foothills and the farmers' fields to find water. It is therefore absolutely necessary to construct water holes at suitable locations for storage of water in the lean months. Such water holes may be in the form of ponds, water tanks, check dams at the choe heads, but they should be constructed in a manner to allow storage of water for the maximum period. To stop the seepage of water layers of bajri /gravel, two layers of polythene sheet in between the sand layers, and the uppermost layer of bajri should be prepared. Silt retention dams should be prepared in the catchment area. No vertical concrete walls are allowed around the ponds and they should be gradually slanted, for easy approach of wild animals.

10.9 Fire Protection: Fire is potentially a deadly enemy of both forests and wildlife. Rapid running forest fires particularly crown fires are very destructive to wildlife. If it occurs in the nesting season of birds, breeding stock may be destroyed. The wild animals are usually trapped in the thick lantana bushes in case of fire. The rodents and reptiles are usually the bigger casualties as they are holed up. Therefore,

strict fire protection measures as prescribed in the Protection Working Circle should be followed. The fire watch towers should be used for detection of fire outbreaks.

10.10 Anti-Poaching Measures: Poaching is one of the main causes for destruction of wildlife. For effective protection of wildlife from poaching and hunting, preventive patrolling, establishment of check posts, arming of staff with vehicles and weapons and communication network are being done by the wildlife wing. Joint inspections by the wildlife and territorial staff should be conducted to stop the hunting of wild animals.

10.11 Census of Wild animals: Census of wild animals give useful data for management. To have a clear picture of wildlife species and their diversity, the department should conduct at least one census during the period of Working Plan. Special census of red jungle fowl should be undertaken in the working plan period to know the population size of the species.

10.12 Coordination between Forests and Wildlife Sectors: Coordination between forests and wildlife wings is imperative in the interest of forests and wildlife. Forest is the habitat for wildlife and wildlife is the protector of forest growth. The survival of wildlife is dependent on the existence of forests. The role of each component is required to be understood and appreciated in their respective roles. It is therefore suggested that not only the level of existing position of divisional functionaries of wildlife improved but effective wildlife management should be created.

10.13 Man-animal conflict: Usually in the winters and in the hot month of April- June when there is a scarcity of water and fodder inside the forests, the wild, animals move out of the forests and raid the adjoining fields of farmers. Thus, damaging the agricultural crops and also increases the incidence of human and wildlife encounter. To compensate the farmers and nearby inhabitants of the forest areas, the Forests Department has framed the rules. The compensation is provided to the farmers after assessment of damage by the local forest officer, or the revenue officer of the area.

10.13.1 Monkey- Human Interaction: The monkeys have become a problematic animal for last 10 to 15 years in Himachal. Whether it is the townships or the rural areas

now monkey menace is quite common. Not many efforts were made to address this problem in the past as this problem was never considered a public problem.

Causes of increase in Monkey Population: -

i) Change in Land use pattern –

- a. Shift from traditional cropping pattern.
- b. Off season cropping and high nutritional value cropping.

ii) No garbage management in townships-

- a. Easy food availability leads to multiplicity.
- b. Increases the life span

iii) Bifurcation of the groups due to the Fragmentation of Habitat or other reasons.

- a. The bifurcated group tend to regain the minimum same size (Group behavior)
- b. Abnormal behavior when get separated from the group.

iv) Manual Feeding-

- a. Due to religious reasons.
- b. Increased tourism and increased number of the temples.
- c. Disposal of the waste food.

v) No predators of the Monkeys in the wild

Monkeys are not the preferred food of leopard. Earlier large Eagles/Vultures used to pick up the infants of monkeys but now their population has gone down drastically.

Mitigation Measures: We have to address all the above causes if we want to have the effective results. Before doing so actually we need to study all the above causes in detail and then we can come to the conclusion of making recommendation of some measure to control the population of Monkeys. However some of the recommendations are as under:

- i) If less than 70% animals of a particular group are not sterilized within 6 months (period of gestation) the impact of the sterilization will be minimal.
- ii) Right from capturing the monkeys, sterilization to release back at the same area the group identity has to be maintained and not to be mixed with the other group of the monkeys.
- iii) Though the females should be preferred for the sterilization but for the practical purpose both the sexes are to be sterilized to have maximum impact.

- iv) The post operative behavior of the monkeys needs to be studied especially after release.
- v) The success of the sterilization programme depends upon the percentage of the catches in a group in the first go.
- vi) The monkeys confined to the townships need a different treatment than the rural/forested areas.
- vii) The monkeys of the rural areas can be pushed back to the forest areas by making them scare and by increasing the natural food base in the wild.
- viii) The groups in rural areas which are habituated and feeds on the agricultural crop only may need to be scientifically culled. (the sterilization will not have considerable impact as it is very difficult to capture more than 70% of the group at a time in rural areas as the monkeys being semi co-mensal)
- ix) In the first go we should confine to the townships for the sterilization and release back.
- x) Modern technologies like drop nets need to be used for capturing the monkeys and to increase the catches.
- xi) Training of the staff for monkey capturing.
- xii) Focus should be the GROUP rather than number from different groups.
- xiii) Stop manual feeding (Donations be put in containers).
- xiv) Creating a mass awareness about garbage disposal, no manual feeding, how to avoid monkeys" attacks and post care etc.
- xv) Exploring the options for Export.
- xvi) As pointed out earlier, the major animals responsible for Human- Wildlife interface are Leopards, Monkeys, Wild Boars and the Black Bears.
- xvii) Some of the suggested measures for the reduction in the conflict between man and animals.

The following are the compensation rates and ex-gratia relief payable to the victims of predation/depredation by wild animals as under

Table 10.1 Compensation rates

S.No	Particular	Rate
1	Death of Human Being	4,00,000
2	Permanent disability to human being	2,00,000

3	Grevioux injury to human being	75,000
4	Simple injury to human being	15,000
5	Loss of horse, mule, buffalo, ox, yak and camel	30,000
6	Loss of Cow Jersey and cross bred	15,000
7	Loss of Cow (Local), donkey, churu, churi and pashmina goat	6,000
8	Loss of sheep, goat and pig	3,000
9	loss of young one's of sheep, goat, cow all breeds, horse, mule, buffalo, yak, camel, churu, churi, and pashmina goat	1,500

Table 10.2 List of Wild Animals found in Suket Forest Division

S.No.	Common Name	Scientific Name
1.	Black buck or Indian Antelope	<i>Antelope cervicapra</i>
2.	Blue Bull	<i>Boselophilus tragocamelus</i>
3.	Wild boar	<i>Sus scrofa</i>
4.	Spotted deer	<i>Axis axis</i>
5.	Barking deer	<i>Muntiacus muntlak</i>
6.	Sambhar	<i>Cervus unicolor</i>
7.	Hog deer	<i>Axis porcinus</i>
8.	Indian Pangolin	<i>Manis crassicaudata</i>
9.	Jackal	<i>Canis aureus</i>
10.	Rufous tailed hare	<i>Lepus nigricollis</i>
11.	Small Indian Mongosse	<i>Herpestes autopundatus</i>
12.	Common Mongoose	<i>Herpestus edwardsi</i>
13.	Fruit bat	<i>Rousettus leschenaultia</i>
14.	Smaller Indian Civet	<i>Viverricula indica</i>
15.	Rhesus Monkey	<i>Macaca mulatta</i>
16.	Indian Porcupine	<i>Hystrix indica</i>

17.	Common house rat	<i>Rattus rattus</i>
18.	Pale Hedge hog	<i>Paracchinus micropus</i>
19.	Grey Musk shrew	<i>Suncus murinus</i>
20.	Indian Fox	<i>Vulpes bengalensis</i>
21.	Palm squirrel	<i>Funambulus pennanti</i>
22.	Yellow monitor lizard	<i>Varanus flavescens</i>

Table 10.3 List of Birds found in Suket Forest Division

S.No.	Common Name	Scientific Name
1.	Little Grebe	<i>Podiceps luficollis</i>
2.	Large Cormorant	<i>Phalacrocorax carbe</i>
3.	Little Cormorant	<i>Phalacrocorax nigher</i>
4.	Darter and Snakebird	<i>Anhinga rufa</i>
5.	Grey heron	<i>Ardea cinerea</i>
6.	Purple Heron	<i>Ardea purpurea</i>
7.	Pond Heron	<i>Ardeola grayii</i>
8.	Eastern Grey Heron	<i>Ardea cinerea rectirostria</i>
9.	Eastern Purple Heron	<i>Ardea purpurea manilensis</i>
10.	Cattle Egret	<i>Bubulcus ibis</i>
11.	Large Egret	<i>Ardea alba</i>
12.	Median Egret	<i>Ergetta intermedia</i>
13.	Little Egret	<i>Egretta garzetta</i>
14.	Night Heron	<i>Nycticorax nycticorax</i>
15.	Chestnut Bittern	<i>Ixobrychus cinnamomeus</i>
16.	Black ibis	<i>Pseudibis papillosa</i>
17.	Glossy ibis	<i>Plegadis falcinellus</i>
18.	Barheaded goose	<i>Anser indicus</i>
19.	Brahminy duck	<i>Tadorna ferruginea</i>

20.	Pintail duck	<i>Anas acuta</i>
21.	Common teal	<i>Anas crecca</i>
22.	Spotbill Duck	<i>Anas peocilorhyncha</i>
23.	Mallard	<i>Anas platyrhynchos</i>
24.	Gadwall	<i>Anas strepera</i>
25.	Wigeon	<i>Anas penelope</i>
26.	Garganey	<i>Anas quersuedula</i>
27.	Shoveller	<i>Anas clypoata</i>
28.	Redcrested pochard	<i>Netta rufina</i>
29.	Common pochard	<i>Aythya ferina</i>
30.	Whiteeyed pochard	<i>Aythya hyroca</i>
31.	Tufted pochard	<i>Aythya fuligula</i>
32.	Cotton Teal	<i>Nottapus coromeddellianus</i>
33.	Comb Duck or Nakta	<i>Sarkidiernis melanotos</i>
34.	Black winged Kite	<i>Elanus caeruleus</i>
35.	Pariah kite	<i>Milvus migrans</i>
36.	Laggar Falcon	<i>Falco hiarmicus jugger</i>
37.	Asiatic merlin	<i>Falco colummarius insignis</i>
38.	Brahminy kite	<i>Haliastur indus</i>
39.	Shikra	<i>Accipitar badius</i>
40.	Imperial Eagle	<i>Aquila helieca</i>
41.	Tawny Eagle	<i>Aquila vindhiana</i>
42.	Lesser spotted Eagle	<i>Aquila pomarina</i>
43.	Greater spotted Eagle	<i>Aquila clanga</i>
44.	Fall's Fishing Eagle	<i>Haliaeetus leucoryphus</i>
45.	Whitebecked vulture	<i>Gyps bengalensis</i>
46.	Scavenger vulture	<i>Neophron perenopterus</i>
47.	Pale Harrier	<i>Circus macrourus</i>
48.	Marsh Harrier	<i>Circus aeruginosus</i>
49.	Osprey	<i>Pondion heliactus</i>

50.	Peregrine Falcon	<i>Falco peregrinus</i>
51.	Black partridge	<i>Francolinus francolinus</i>
52.	Grey partridge	<i>Francolinus pondicerisnus</i>
53.	Bush Quail	<i>Perdica asiatica</i>
54.	Grey Quail	<i>Coturnix coturnix</i>
55.	Kalij Pheasant	<i>Lophura leucomelana</i>
56.	Pea fowl	<i>Pavo cristatus</i>
57.	Red jungle fowl	<i>Gallus gallus murghi</i>
58.	Ruddy crake	<i>Amaurornis fuscus</i>
59.	Brown crake	<i>Amaurornis akool</i>
60.	Baillon"s crake	<i>Porzana pusilla</i>
61.	Whitebreasted water-hen	<i>Amaurornis pheenicurus</i>
62.	Indian Moorhen	<i>Gallinul chloropus</i>
63.	Purple moorhen	<i>Porphyrio porphyrio</i>
64.	Coot	<i>Fulica atra</i>
65.	Pheasant tailed Jacana	<i>Hydrophasianus chirurgus</i>
66.	White tailed lapwing	<i>Venellus leucurus</i>
67.	Red wattled lapwing	<i>Venellus indicus</i>
68.	Peewit	<i>Venellus venellus</i>
69.	Little ring plover	<i>Charadrius dubius</i>
70.	Kentish Plover	<i>Charadrius alexandrinues</i>
71.	Curlew	<i>Numenius arquata</i>
72.	Redshank	<i>Tringa tetanus</i>
73.	Dusky Redshank	<i>Tringa ery-thropus</i>
74.	Green Sandpiper	<i>Tringa ochropus</i>
75.	Marsh Sandpiper	<i>Tringa stragnatilis</i>
76.	Green shank	<i>Tringa nebularia</i>
77.	Dunlin	<i>Calidris alpina</i>
78.	Curlew Sandpiper	<i>Calidris testacea</i>
79.	Common Sandpiper	<i>Tringa hypoleucas</i>
80.	Spotted Sandpiper	<i>Tringa gallingao</i>
81.	Funtail snipe	<i>Callinago gallingago</i>

82.	Little stint	<i>Callinago minutus</i>
83.	Temrenik's stint	<i>Calidria Lemmenckii</i>
84.	Ruff & feaf	<i>Philomachus pugnax</i>
85.	Blackwinged stilt	<i>Himantopus himantopus</i>
86.	Great stone plover	<i>Rscacus magnirostria</i>
87.	Lesser Blackbacked gull	<i>Larus fuscus</i>
88.	Great Blackheaded gull	<i>Larus ichthyaetus</i>
89.	Brownheaded gull	<i>Larus brunnicephalus</i>
90.	Blackheaded gull	<i>Larus ridibundus</i>
91.	Whishered Tern	<i>Childonias hybrida</i>
92.	Gullbilled Tern	<i>Gelocheliden nilotica</i>
93.	Indian River Tern	<i>Sterna aurantia</i>
94.	Blackbellied Tern	<i>Sterna acutiaauda</i>
95.	Indian Skimmer	<i>Rhynchops albicollis</i>
96.	Blue rock pigeon	<i>Columba livia</i>
97.	Green pigeon	<i>Treron phoenicoptera</i>
98.	Indian ring dove	<i>Streptopelia decaocto</i>
99.	Spotted dove	<i>Stroptapelia chinensis</i>
100.	Red Turtle Dove	<i>Stroptopelia tranquebarica</i>
101.	Large Indian Parakeet	<i>Pasittacula eupatria</i>
102.	Rose Ringed Parakeet	<i>Pasittacula kramori</i>
103.	Blossom headed parakeet	<i>Psittacula cyanocephala</i>
104.	Slaty headed parakeet	
105.	Common hawk Cuckoo	<i>Cuculus yarius</i>
106.	Indian Cuckoo	<i>Cuculus micrope terus</i>
107.	Plaintive Cuckoo	<i>Cacomantis passerines</i>
108.	Pied crested cuckoo	<i>Clamator Jacobinus</i>
109.	Crow Pheasant	<i>Centropus sinensis</i>

110.	Dusky Horned Owl	<i>Bubo Coromandus</i>
111.	Brown Fish owl	<i>Bubo Zeylonenensis</i>
112.	Mottled Wood owl	<i>Strix ocellata</i>
113.	Barn Owl	<i>Tyto alba</i>
114.	Spotted Owlet	<i>Athene brama</i>
115.	Great horned Owl	<i>Bubo bengalensis</i>
116.	Shorteared Owl	<i>Asto flammous</i>
117.	House swift	<i>Apus affinia</i>
118.	Palm swift	<i>Cypsiurus parvus</i>
119.	Pied King fisher	<i>Ceryle rudis</i>
120.	Common king fisher	<i>Cerylo athis</i>
121.	White breasted king fisher	<i>Halcyen smyrenesis</i>
122.	Green Bee Eater	<i>Merops orientalis</i>
123.	Blue tailed bee eater	<i>Merops superciliosus</i>
124.	Indian Roller	<i>Coracias benghalensis</i>
125.	Hoopoe	<i>Upupa epops</i>
126.	Large green barbet	<i>Megalaima zeylanica</i>
127.	Crimson breasted barbet	<i>Megalamia haemacephala</i>
128.	Coppersmith	<i>Megalaima haemaceptala</i>
129.	Wryneck	<i>Jynx torquilla</i>
130.	Goldenbacked Wood-pecker	<i>Dinopium javanense</i>
131.	Yellow fronted pied	<i>Picoides maharattensis</i>
132.	Ashy wined Finch Lark	<i>Eremopterix grisea</i>
133.	Rufoustailed finch Lark	<i>Ammomanes phoenicurus</i>
134.	Redwinged bush Lark	<i>Mirarfa erythroptera</i>
135.	Singing Bush Lark	<i>Mirafra javanica</i>
136.	CresedLark	<i>Galerida cristaca</i>
137.	Sky Lark	<i>Alauda gulgula</i>
138.	Indian Collard Sand Margin	<i>Riparia riparia</i>

139.	Common Swallow	<i>Hirundo rustica</i>
140.	Wiretailed Swallow	<i>Hirundo smithii</i>
141.	Grey shrike	<i>Lanius excubitor</i>
142.	Baybacked shrike	<i>Lanius vittatus</i>
143.	Rufousbacked shrike	<i>Lanius schach</i>
144.	Black drongo	<i>Dicrurus adsimilis</i>
145.	Starling	<i>Sturnus vulgaris</i>
146.	Pied Myna	<i>Sturnus contra</i>
147.	Common Myna	<i>Acridotheres tristis</i>
148.	Bank Myna	<i>Acridotheres ginginianus</i>
149.	Tree pie	<i>Dendrocitta vagvunda</i>
150.	Grey Hornbill	<i>Tocks hirortris</i>
151.	House crow	<i>Cervus splendens</i>
152.	Jungle crow	<i>Corvus macrohynchos</i>
153.	Raven	<i>Corvus cora</i>
154.	Common wood shrike	<i>Tephrodornis pondicerianus</i>
155.	Scarlet Minivet	<i>Pericrocotus flammeus</i>
156.	Small minivit	<i>Pericrocotus cinnamomeus</i>
157.	White cheeked bulbul	<i>Pycnonotus leucogenys</i>
158.	Red vented bulbul	<i>Phononotus cafer</i>
159.	Yellow eyed Babbler	<i>Chrysomma sinense</i>
160.	Common Babbler	<i>Turdoides caudatus</i>
161.	Striated Babbler	<i>Turdoides earlei</i>
162.	Jungle Babbler	<i>Turdoides striatus</i>
163.	Red Wrested fly eatcher	<i>Muscicape parva</i>
164.	Vorditor Fly catcher	<i>Muscicape thatssima</i>
165.	White browed faintail fly catcher	<i>Rhipidura aurejola</i>
166.	Brown fly catcher	<i>Muscicapa latirostris</i>

167.	Paradise Fly catcher	<i>Terpsiphone paradise</i>
168.	Indian wren warbler	<i>Prinia subflava</i>
169.	Ashy wren warbler	<i>Prinia socialis</i>
170.	Franklin's warbler	<i>Prinia hodgsoni</i>
171.	Yellow bellied wren warbler	<i>Prinia flaviantris</i>
172.	Striated Marsh warbler	<i>Magalurus palustris</i>
173.	Indian Great Reed Warbler	<i>Acrocephalus stentorous</i>
174.	Blyths warbler	<i>Acrocephalus dumetorum</i>
175.	Sand Lark	<i>Clandrella roytal</i>
176.	Lesser Whitethroat	<i>Sylvia curruca</i>
177.	Chiff Chaff	<i>Phylloscopus collybita</i>
178.	Yellow browed loaf warbler	<i>Phylloscopus znorotus</i>
179.	Greyhead Fly catcher warbler	<i>Phylloscopus znorotus</i>
180.	Blue throat	<i>Eritacus svecicus</i>
181.	Magpie Robin	<i>Copsychus saularis</i>
182.	Black rodstart	<i>Phoenicurus ochrurus</i>
183.	Plumbeous Redstart	<i>Rhyacornis fuliginosus</i>
184.	Whitesped Redstart	<i>Chaimarrornis laucocephalus</i>
185.	Collared Bush Chat	<i>Saxicola torquata</i>
186.	Pied Bush Chat	<i>Saxicola caprata</i>
187.	Pied Chat	<i>Conanthera picata</i>
188.	Black throated thrush	<i>Turdus ruficollis</i>
189.	Grey tit	<i>Parus major</i>
190.	Wall Creeper	<i>Tichodroma muraria</i>
191.	Tree pipit	<i>Anthus trivialis</i>
192.	Paddyfield pipit	<i>Motacilla alba thunbergi</i>
193.	Greyheaded yellow wagtail	<i>Motacilla alba thunbergi</i>
194.	Yellow headed wagtail	<i>Motacilla citreola</i>

195.	Black yellow wagtail	<i>Motacilla flava calcarate</i>
196.	Grey wagtail	<i>Motacilla cinerea</i>
197.	Indian white wagtail	<i>Motacilla albe</i>
198.	Masked Wagtail	<i>Motacilla personata</i>
199.	Purple sunbird	<i>Nectarinia asiatica</i>
200.	Large pied wagtail	<i>Motacilla maderspatensis</i>
201.	White eye	<i>Zosterops palpobrosa</i>
202.	House Sparrow	<i>Masser domesticus</i>
203.	Spanish Sparrow	<i>Passer Hisapniclonsis</i>
204.	Crested Buntings	<i>Melophus lathami</i>
205.	Black headed Bunting	<i>Emberiza melanocephala</i>
206.	Yellow throated sparrow	<i>Potronia zenthecollis</i>
207.	Indian weaver bird or Baya	<i>Ploceas phillippinus</i>
208.	Black throated weaver bird	<i>Ploceas Benghalansis</i>
209.	Streaked weaver bird	<i>Ploceas manyar</i>
210.	Red Munia	<i>Estrilda amandaya</i>
211.	Spotted Munia	<i>Lonchura Buntautata</i>
212.	White throated Munia	<i>Lonchura malabarica</i>
213.	Braminy Mynah	<i>Sturmus pagodrun</i>
214.	Tailor Bird	<i>Orthetonues sutorius</i>
215.	Golden ural	<i>Oriulus oriulus Kundoo</i>
216.	Kool	<i>Eudyananmy scolopacea</i>
217.	Common sand grouse	<i>scolopacea</i>
218.	Imperial Sandgrouse	<i>Teminnic austus</i>
219.	Pitta	<i>Plerocles orientalis</i>
220.	Grey headed gold finch	<i>Cardulinae carduelinae</i>
221.	Black winged kite	<i>Elanus cearuleus</i>
222.	Sparrow hawk	<i>Accipiter nisus</i>

Table 10.4 List of Reptiles under Suket Forest Division

LOCAL NAME	ENGLISH NAME	SCIENTIFIC NAME
Girgit	The Common Indian monitor lizard	Varanus griseus Daudin
Gobilda	Chameleon lizard	Chameleon ealcaratus
Kharpa	The Indian Cobra	Naja naja
Karait	The common Indian karait	Bangarus caeruleus
Sapp	The Himalayan pit viper	Vipera ruselli

10.14 General: This division has a varied topography, climate and forest cover and is as such endowed with a variety of fauna. The main among the mammals and birds found in the tract are the following.

10.15 Mammals

10.15.1 GORAL (NEMORHAEDUS GORAL): It is found in the area East of Rohanda. Ghoral is not uniformly distributed throughout this area but is mostly concentrated in valley. This goat antelope is found on rugged grassy and rocky hill sides covered with open tree growth. This animal is reported to be occurring in fair abundance in the tract about 90 years back. It has suffered very much at the hands of poachers because of its great value and has consequently receded to more interior and difficult areas. The general color of Goral is yellowish grey diffused with black. They generally associate in small parties of 4-8 feeding on rugged grassy slopes. They usually come out in the morning and evening but are seen throughout the day in cloudy weather. The ringed or dodged horns which curve slightly backwards, are 10-12 cms long. The Youngs are born in May-June. This is the critical time when they need cover and plenty of food.

10.15.2 KAKKAR (MUNTJAK OR BARKING DEER) (MUNTIACUS MUNTJAK): This is small deer mostly found in thickly wooded areas and coming out for grazing in open grassy blanks. It feeds on grass, leaves and wild fruits. The color of the animal is rufous grey to brown. The antlers in male are small, consisting of short brow line and in unbranched beam. They are set on bony hair covered pedicels which extend down each side of the face as bony ridges.

Munt-jak frequents in thickly wooded hills. They are seen singly or in pairs or in small

family parties. The typical call from a distance sound much like the bark of a dog. It is given out at intervals usually in the morning or evening, sometimes after nightfall.

10.15.3 SAMBHAR (CERVUS UNICOLOR): This largest deer is also occasionally met with in the lower areas. It is not very common and only a few animals are reported to be found. On account of its being found in comparatively easy and accessible areas, it has met the fate of large-scale destruction. The remaining few animals can also not escape for long unless very strict protection measures are taken.

This large deer has more nocturnal habit and it retreats into heavy forest cover at dawn. It feeds on grass, leaves and wild fruits. Its coat is coarse and brown in colour with yellowish tinge. Its height at shoulders may be up to 140 Cms and may weight up to 300 Kgs. It is capable of moving very silently in even the dense forests.

10.15.4 INDIAN WILD PIG (SUS SCROFA): Wild pig is found in the lower areas. During the past few years, the wild pigs have been indiscriminately killed by local people and outside poachers and their numbers are now very small.

This notorious and omnivorous animal lives in grassy, bushy and also thickly wooded areas. It feeds on field crops, roots and tubers of wild plants and even insects. It feeds during morning and evenings. It is black in colour; the skin is covered by a sparse growth of bristles which form a conspicuous mane.

10.15.5 INDIAN PORCUPINE (HYSTRIX INDICA): This destructive rodent is found in all areas of this division up to the elevation of about 2500 meters. It adapts itself to any type of land but favors rocky hill sides where it lives in burrows dug by itself. The burrows consist of an entrance gallery and a few emergency exits. The burrows or galleries some times are 15-18 meters in length. The porcupines are characterized by the spines borne on the neck, back and hind quarters. The spines or quills on the shoulder are 15 to 30 cms long and those on the back are shorter and stout, when provoked porcupines erect their quills and rattle their hollow tail quills. Its mode of attacking the enemy is peculiar. It launches itself backward with incredible high speed and strike its hind quarters against the enemy driving its strong spines deep into it.

They are very much destructive to field crops, and gardens when adequate food is not available in the forest. The porcupine feeds on field crop, fruits, roots and tub.

10.15.6 FLYING SQUIRREL: It is found from an elevation of about 1000 to 3000 meters. It is nocturnal in habit. They eat fruits of various tree species and also eat the insects, hiding under the bark. Damage they do to forest crops thus compensated by the help they render by eating injurious insects.

10.15.7 THE INDIAN HARE (LEPUS RUFICANDATUS): This hare is found in lower areas of this division. It likes bushy forest growth and generally lives in the neighborhood of cultivations and villages. During summer when the grass is scarce, it enters even the house compound for fresh leaves of grass. It is in general, nocturnal in habit. By day it comfortably sleeps in a bush. This animal, though small is hunted for its flesh.

10.15.8 KALA BHALU OR HIMALAYAN BLACK BEAR (SELENARCTOS THIBETANUS): Black bear is found throughout the tract generally between an elevation of 1500 and 3000 meters. In winter months, when the higher areas are under snow, it descends down to lower elevations.

It is a solitary animal living in caves, hollow tree trunks or in areas infested with heavy bush growth. Being omnivorous, it lives on a variety of foods ranging from wild flowers, fruits, roots tubers, berries, insects of all sorts and honey. It has to know, where and when and how to procure all these things. It has also been stated that they occasionally eat eggs and carrion, in their search for food black bears have to climb trees for fruits & to nab bee-nests. During rains it migrates to the vicinity of villages where it damages the maize crops & fruit trees. It also debarks young deodar and Kail to lick exuded sap & resin.

10.15.9 BAGHERA OR LEOPARD (PANTHERA PARDUS): Baghera is found throughout the tract upto an elevation of 2500 meters. It is very reclusive creature and generally remains close to habitation & often carries away, sheep, goats and dogs. It prefers scrub forest or open country. It does not normally attack human beings unless provoked.

In addition to the animals mentioned above, all other animals viz. Himalayan Langur, common monkey, jackals, foxes are also commonly found.

BIRDS & PHEASANTS: Among game birds found in the tract the following are the important ones:

10.15.10 MONAL (*Lophophurs impejanus*): Of all the Himalayan pheasants, this is one of the most beautiful. It is found in abundance above 2450 meters elevation in spruce, fir, Kharsu and birch forests. Monal is rarely found above the tree line though for feeding purposes, it may sometime prey in the grassy slopes above the snow line also. During winter months it descends down to an elevation of about 2000 meters.

The male bird is characterized by brilliant metallic green head, glistening purple upper part and velvety black breast and a crest of beautiful feathers. The female is a plain looking brown bird. In Autumn, the monal feeds chiefly on grubs & maggots which it finds under the decayed leaves. In winter it often feeds in the wheat and barley fields.

The male is very much sought for plume and the female is killed for its meat. Monal breeds in May & June.

10.15.11 THE RED JUNGLE FOWL (*Gallus gallus*): It is found in the scrub forests upto an elevation of about 1500 meters but during summer months it ascends to an elevation about 2000 meters. Though it is met with through-out the tract within the above altitudinal zones, the lower areas of Kataula range have comparatively more population of red jungle fowl than the other areas.

It is spotted on the fringes of cultivations and forests clearing in the morning & evenings. It is very shy and cunning bird, scuttles into cover on slightest disturbance or suspicion.

10.15.12 KALESHA OR WHITE CRESTED KALEEJ

PHEASANT (*Lophura leucomelanos hamiltonii*): It is found throughout upto an elevation of 3000 meters. It generally likes thick forest and is usually found in pairs or small flocks of 5 or 6 birds. Though found in forests yet it prefers thick clumps of bushes or thorny thickets near cultivations.

The male is black above, glossed with steel blue, with a whitish rump, brownish grey under parts and long tail of glossy black sickle shaped pointed feathers. Female is chiefly reddish with place scale markings brown crest & scarlet eye patch.

10.15.13 KOKLASH PHEASANT (*Pucrasia macrolopha*): It is very common pheasant and is met with throughout the tract on steep forested hill sides at elevations above 1800 meters and is of almost the same size as the domestic fowl, the

male is grey above, streaked blackish, chestnut below. A brown lying down crest, between two long metallic green horn blue tufts feting out behind its metallic green head, its characteristic feature. The female is black and brown with buff streaks above, buff with black streaks below & prominent white through.

10.16 Wild Life Preservation and Management: In the fore-going paras, the miserable condition of wild animals and birds and their annihilation even from the sanctuary area, has been described. Indiscriminate killing of birds and animals by poachers, granting of too many crop protection licenses for fire arms and also increase in human population have been responsible for this apathetic state of wild birds and animals. Some of the important measures which should be adopted for the preservation and propagation of wild life are:

1. Crop protection gun licenses be granted only in areas where there is a real danger from the wild animals to the fields. In case of any misuse of guns, the licenses be cancelled and guns confiscated.
2. The License of a poachers be cancelled and gun confiscated for this offence.
3. The vigilance to check poaching and shooting be increased and whenever, an offender is apprehended, his gun be confiscated. The civil administration and forest department should cooperate in apprehending the offenders and putting down this crime.
4. Prizes and certificates be instituted to be awarded to the subordinates of forest department, police and also the villagers who help in detecting the offence and apprehending the offenders.
5. Public, village leaders and all other be educated to preserve the wild life. Its importance from economic, aesthetic and biological balance in nature, points of view be brought home to all by showing pictures, giving short talks and putting up suitable posters at prominent places.
6. Posting of wild life guards to check any poaching particularly in winter when the animals and birds migrate to lower elevations.
7. Provision of salt lick and water holes for the wild life, be made at suitable places.

8. Elimination of all grazing from the sanctuary areas so that enough food forth wild life to live on and to prevent spread of disease in the area through grazing animals.
9. Hay be stacked at various places in the sanctuary area for the use of wild lifeduring the winter.
10. Suitable shrubs and bushes which provide food and shelter to the animals and birds should be propagated in the area. All shrubs on the fruits of which wild birds feed like Prinsepia, Rosa, Viburnum, Spirea and Ficus merit special mention. Where exotic fodder plants such as Clover can be safely introduced in not far distant parts of the same tract, the cultivation of these crops could be added to the local grazing supplies.

10.17 Brush Piles and Slash Disposal: Brush piles supply valuable safety cover for wild life in the forests, especially in the open woods. Slash disposal should be left piled rather than burnt unless hazards dictate its destruction.

10.18 Ecology of Wild Life: Study of animal ecology evolving the knowledge of interdependence of plant and animal population fluctuate, food chains propagation and succession is very necessary for proper management of wild life. Hardly any information has so far been collected on this aspect for this tract. The field staff both of wild life wing and territorial wing should collect data about wild life ecology so that it may be of help in planning proper wild life management. Enlightened and improved methods of management of wild animals and birds, proposes adequate inventories and without such surveys and censuses, estimates of population of wildlife in any areas, will continue to be a matter of guess.

The tract has attraction or lack of attraction to a species according to how well it supplies, the essential. It is known to all that these essentials are food, cover and such other requirements as the species may need. Obviously, the critical time of the year will be most important and, in this area, the pinch period is usually winter. The number for which an area can provide essentials and thus carry through pinch period is designated as carrying capacity. It stands to reason that an area will not be able to maintain more than its carrying capacity in safety and that all above this capacity is subject to loss. But measuring the cover, determination of forage and range capacity, proper use factor for big game is not so easy as it may seem. In fact, determination of density and composition of the vegetation is baffling at time.

It is a fact that no sincere efforts were made in the past to save range and habitat conditions for the sake of wild animals of this tract and so, heavy incidence of grazing was recorded. Over grazing and damage to the forest as well as to the wild life has generally been underemphasized because of the economic factor involved. Reduction in grazing intensity is urgently needed in the sanctuary area at least not only for the sake of wild animals but also as a measure of protection of the range and animals in their rehabilitation. Though the principle of multiple use calls for grazing as one of the methods of utilizing forest resources, yet grazing requires rigid regulation not only from the stand point of forest reproduction but also from the stand point of wild life.

Chapter 11

JFM (OVERLAPPING) WORKING CIRCLE

11.1 GENERAL: By definition Joint Management would mean involving people in the decision-making process in the management of forests. The participatory forest management started in 1972 in India from west Bengal. A need for participatory forest management arose in Himachal, and the PFM started in H.P in 1985 through National Social Forestry (Umbrella) project. The project achieved its objectives by covering more than 1, 00,000 ha. area under plantations. During the implementation of this project more emphasis was given on achievement of physical and financial targets than social i.e. participatory and equity issues.

In the 1980s, the World Bank Bank supported Social Forestry project (1984-92) and the Indo-German Integrated Dhauladhar project (1982-92) were implemented in H.P. In these projects the draw backs of Umbrella projects were well addressed. Therefore in 1990s, World Bank funded IWDP Kandi project started in the Shivalik hills in which participatory approach was emphasized, later came the mid Himalayan watershed development project and at present IDP project, JICA Forestry project and KFW Project where all three issues i.e. physical targets of Forest Department, social and equity were taken all together as per guidelines of world bank and funding agencies.

The framework for JFM in H.P is provided by the Govt. of H.P order of 12.5.1993, which followed the Govt. of India (JFM) circular of 1st June 1990 from the then Secretary (Environment and Forests) enabling the spread of JFM to the Village Forest Development Committees (VFDC's) for Joint Forest Management in the Villages of Himachal Pradesh.

This working circle will be overlapping working circle and includes both degraded forests as well as healthy forests, which needs immediate treatment through protection, afforestation, pasture development, soil and water conservation etc. Treatment plan and memorandum of understanding will be different for degraded and healthy forests. As in other parts of Himachal Pradesh, most of the rural populace in Suket Forest Division uses significant quantities of forest benefits both tangible and intangible from the forest areas. There is lot of pressure on the forests, apart from the usual demand for fuel, fodder and timber. The other rights enjoyed by the right

holders as per the provisions of the Settlements, also are a major stake in the forests besides the livelihood issues.

11.2 THE NEED FOR JOINT FOREST MANAGEMENT:

To address the long standing problems of deforestation and land degradation, the approach of involving local communities in an effective and meaningful manner, is gaining acceptance significantly. Even the present National Forest Policy 1988, emphasizes on participatory management and common property management. It also specifically mentions that to achieve the objectives of the policy, a massive people's movement should be created, especially involving women. Consistent with the NFP of 1988, the Government of India, on 1st June 1990, issued policy instruction to all state governments supporting greater participation of village communities and NGOs in regeneration, management and protection of the forests. In keeping with the above notification, the Government of Himachal Pradesh has formulated a policy vide No. Forest(C) 3-4/80-V dated 12.5.1993, 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 inter alia 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 ^{Oo JO} 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, Mandi, Govt. of India

backed initiatives. Recently 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.

11.3 JOINT FOREST MANAGEMENT IN HIMACHAL PRADESH:

In 1985, social forestry was given impetus by 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. Now, they 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. 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 of 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 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 support the state JFM Order, Participatory Forest Management (PFM) Rules were developed for HP, and notified on 23rd 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 ward wide thereby attempting to link these bodies directly with the structure with each elected punch 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 percent share in intermediate usufructs while on final harvest 75 percent would go to the VFDS and 25 percent to the Panchayat. The GoHP agreed to completely forgo any share from JFM areas. Under 'New SVY' entry point activities are abandoned but "Income-generating activities" introduced; forest guard will not be member secretary of the Executive Committee; but local organizers-usually led by a literate woman linked to a local community-based organization, helps mobilize 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 SVY Rules and Guidelines of August 2001 are seen as a major step forward, laying the basis of uniformity in approach to community based forest management. It also makes JFM poverty focused and is targeted to the resource dependent. In 2003, MoEF started the Forest Development Agencies (FDAs) at district level-with DFOs getting direct access to central funding- for forest and plantation work for employment generation objectives. This is an 100 percent central 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 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 Km² distributed in RFS, DPFs & UPFs. In March, 2005, 1690 JFMCs are reported covering a forest area of over 4200 Kms. 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 Kms.

11.4 SPECIAL OBJECTS OF MANAGEMENT:

The main objectives of the participatory approach to forests production and management are:

1. To give the local village communities a stake in the well being of the forest by giving a share of the produce.
2. To develop institutions at the local level to provide a forum for developing the participatory approach and to manage the sharing of responsibilities and benefits.
3. To enlist the help of committed non-governmental organizations, collages and schools, local women and youth clubs and other groups with a proven track record to start the dialogue between the Forest Department and the villagers.
4. To provide an effective treatment for waste lands degraded forests and forest lands situated near villages through protection, afforestation, pasture development and soil conservation by active participation of local people.
5. To augment fuel wood, fodder and small timber production for use by local people.
6. To convert a hostile population living on fringes of forest areas into friends ultimately into resource managers and resource users
7. To evolve consensus on the basic issues to conservation of soil, water and forest resources.
8. To document the indigenous traditional knowledge and incorporate the same in the micro plans of the JFMCs
9. To associate the people of JFMCs with identification, documentation and implementation of ecotourism activities

The Govt. of H.P has notified Himachal Pradesh Participatory Forest Management Regulations 2001 and the Sanjhi Van Yojna Scheme, 2001 which have strengthened JFM approach to a great extent.

To achieve these objective 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".

11.5 STATUS OF JFM IN SUKET FOREST DIVISION

Status of empowerment of JFMCs

Table 11.1 Detail of JFM societies registered in Suket division

Sr. No.	Name of JFMSc	Range	Block	Beat	Committee Members	Remarks
1	VFDS Dolan Chirr	Sarkaghat	Thona	Jamdwar	19 Members	
2	VFDS Kals Kharaut	Sarkaghat	Thona	Jamdwar	16 Members	
3	VFDS Dhalyat Gehra	Sarkaghat	Thona	Thona	14 Members	
4	VFDS Kathogan	Sarkaghat	Thona	Tikker	14 Members	
5	VFDS Druman Banyorka	Sarkaghat	Sarkaghat	Deo-Brarta	16 Members	
6	VFDS Masdhwan	Sarkaghat	Sarkaghat	Deo-Brarta	16 Members	
7	VFDS Khalanu Sarnota	Sarkaghat	Durgapur	Kaldoo	18 Members	
8	V.F.D.S Veh	Kangoo	Dehar	Jyor	16 Members	
9	V.F.D.S Gamohu & Jabbal	Kangoo	Dehar	Dehar	16 Members	

10	V.F.D.S. Upper Bari & Dhawal	Kangoo	Batwara	Dhawal	16 Members	
11	V.F.D.S Sanihan	Kangoo	Batwara	Dhawal	16 Members	
12	V.F.D.S Ropa Bandla	Kangoo	Batwara	Serikothi	13 Members	
13	V.F.D.S Chiral	Kangoo	Batwara	Serikothi	16 members	
14	V.F.D.S Anu Balh	Kangoo	Behli	Behli	15 Members	
15	VFDS Bhatera	Baldwara	Baldwara	Trifalghat	16 members	
16	VFDS Thana chowki	Baldwara	Baldwara	Trifalghat	16 members	
17	VFDS Mandoli	Baldwara	Baldwara	Bahanu	16 members	
18	VFDS Bahanu	Baldwara	Baldwara	Bahanu	15 members	
19	VFDS Gobharta	Baldwara	Goverta	Goverta	17 members	
20	VFDS Sarua Dhar I	Baldwara	Leda	Bairkot	16 members	
21	VFDS Ghanera	Baldwara	Leda	Bairkot	16 members	
22	VFDS ROPARI	Suket	Sadar	Jarol	16 members	
23	VFDS CHAMUKHA	Suket	Sadar	Jarol	16 members	
24	VFDS Bhanglera	Suket	Sadar	Sadar	16 members	
25	VFDS Thalla	Suket	Sadar	Sadar	16 members	
26	VFDS Rigger	Suket	Baggi	Rajarh	16 members	
27	VFDS Gharot/ Dhamasan (Dev Bala Tika)	Jhungi	Pandar	Galukhar	16	
28	VFDS Pandar (Mahamaya)	Jhungi	Pandar	Pandar	16	
29	VFDS Ukari	Jhungi	Jhungi	Salani	14	
30	VFDS Manjhagan	Jhungi	Trechh	Bandli	12	
31	VFDS Kumahru-I	Jhungi	Trechh	Bandli	11	
32	VFDS Bandli-II	Jhungi	Trechh	Bandli	10	
33	VFDS Charog	Jhungi	Trechh	Kinder	12	
34	Manjhar VFDS	Jaidevi	Rohanda	Rohanda	13 members	
35	Singhwa VFDS	Jaidevi	Rohanda	Khabri	15 members	
36	Behli I and II VFDS	Jaidevi	Rohanda	Kamand	14 members	
37	Anushi VFDS	Jaidevi	Rohanda	Kamand	12 members	
38	Kharloh VFDS	Jaidevi	Jaidevi	Ghiri	13 members	
39	Jaidevi VFDS	Jaidevi	Jaidevi	Jaidevi	16 members	
40	Dayola VFDS	Jaidevi	Nandgarh	Chamyar	16 members	
41	Salyandi VFDS	Jaidevi	Nandgarh	Nandgarh	16 members	

11.6 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

a) Future Scope

There is some scope for the JFM activities in the division.

The forest areas where plantation and protection is the main focus are suitable/ potential sites for afforestation, soil conservation, grassland improvement, NTFP development besides other forests.

i) Potential Activities of JFM Committees

The JFM/PFM committees can be the future agencies of forest development, conservation and expansion. The potential activities to be executed through JFMCs can be:

- i) Afforestation activity (both departmental and MNREGA)
- ii) Soil & water conservation through treatment of micro watersheds in a catchment.
- iii) Recharging of water bodies like boulders, ponds and underground water.
- iv) Minor construction work of road, paths and buildings.
- v) Awareness programme for forest protection, fire protection, propagation of medicinal herbs on a large scale.
- vi) Livelihood options like bee keeping mushroom cultivation, vermicomposting, cutting & pruning etc. through effective training.
- vii) Collection, value addition and marketing of NTFP.

iii) Selection of JFM Working Areas

The following broad guidelines have been devised for selection of potential (pilot) areas:

- i) Interest of local forest staff in involvement in joint forest planning

and management;

- ii) Interest of local people in involvement in joint forest planning and management;
- iii) Existence of ongoing 'successful' collective land management systems;
- iv) Resource poor areas where there are constraints on the forest and farming system in term of access to grazing and forest products;
- v) Relatively homogenous local communities.

The information will be gathered from village-level PRA studies; workshops held with range officers and forest guards, in conjunction with village visits and meetings to determine local people's perception of problems and possible intervention. User's definition of problems and approaches will provide the principal guide to action. Complex social environments will not be tackled in the initial stages. It is not expected that there will be 100% success rates in the establishment of Village Forest Development Committees. In some cases the field staff may have to withdraw from certain villages, because conflicts are too great. This should not be seen as a failure of the process, rather it is part of the process of adapting to and accepting village-level realities, where there is sometimes irreconcilable difference between groups. In order to reduce the risk of failure, planning exercises will focus on assessing the current and future needs of all the users of the forest resources (including women, poorer villagers and migratory graziers), and reaching consensus through negotiation in order to establish sustainable ways of managing resources for those who most need them.

ii) Participatory Rural Appraisal (PRA):

Participatory Rural Appraisal (PRA) will be used as a way to facilitate Communication between users and the Forest Department and to determine problems and priorities. At this initial discussion stage it is likely that only partial information will be obtained from the village, so it will be necessary to repeat the PRA exercise. Repeated PRAs would be used to continue the dialogue and build on the information base. PRA will be used to identify particular area needing more detailed socio-economic research.

iii) Specifically PRAs will be used to:

- i) Finalize village selection

- ii) Build up baseline information
- iii) Identify forest users and their priorities
- iv) Provide the context for experimental learning for the staff and to create the basis for effective interaction between the department and forest users.
- v) Identify local option for institution building
- vi) Draw up village level agreements.

vi) The key objectives of this PRA would be:

- i) To identify local resource use system; access rules; differential control; legal and customary status of land of land; past and current tenurial status of land.
- ii) To document existing land use practices and management as a basis of their development.
- iii) To document current interaction between forest, farm and pasture; type of usage; division of labour.
- iv) To build a detailed picture of the socio-economic context of villages; identify different categories of household (i.e. household profiles); to identify and assess effectiveness of village institutions and leaders; to identify different levels of decision making in resource use and their relative importance, i.e. village council. Men, women, rich, poor.
- v) To identify user's priorities and means of reaching consensus.
- vi) To identify different users' constraints to participation, for example women's labour time, poorer people's lack of access to decision making.
- vii) To identify and assess effectiveness of existing village level institutions, cooperative action between villages as a means to build more effective village or user group organizations.

vii) PRA Process

The PRA process will be initiated to provide a growing dialogue between the department and forest users. Initially, information may be coloured by misunderstanding and mistrust on both sides. It is only as familiarity and participation in the benefits of joint management become apparent to forest users that a relationship of understanding and trust will be

built between the staff of

viii) PRA Technique

The PRA technique to be used in joint forest planning and management will include:

- i) Review of secondary data and existing information.
- ii) Direct observation.
- iii) Semi-structured interviews.
- iv) Group interviews (casual, focused, village).
- v) Use of key information's, local experts.
- vi) Use of local researchers.
- vii) Ranking: wealth ranking, pair-wise ranking, direct matrix ranking.
- viii) Livelihood analysis.
- ix) Seasonal diagramming (firewood, fodder, NTFPs, labour etc.)
- x) Transects (systematically walking through an area with a group of local people).
- xi) Participatory mapping, modeling; people's mapping and modeling.
- xii) Linkage chart (showing links between village organizations, between villages, and forest resources).
- xiii) Case studies and stories.
- xiv) Ethno-histories.
- xv) Brainstorming (especially joint sessions with villagers).

ix) Role of FRONT-LINE Staff

Forest Guards will coordinate all inputs to the village and will act as the interface between villager and the department. They will be conduit for the flow of information both up and down the system. They will establish links with other village-level organizations and government extension agents where appropriate. The departments most likely to be involved are Animal Husbandry, Agriculture and Rural Development.

Forest Guards will have the following responsibilities:

- i) To establish effective and representative Village Forest Development Committees;
- ii) To maintain contact with joint forest management groups(VFDCs);

- iii) To provide technical advice as required;
- iv) To arbitrate between groups if conflict arises and requested ;
- v) To collect information through PRAs;
- vi) To provide feedback to the department;
- vii) To facilitate the full participation of women and poorer people;
- viii) To liaise between villagers and the department.

Although these activities are all additional to the current work of forest guard; the experience elsewhere indicates that as the JFPM process strengthens the more onerous protection workload of the guard will reduce.

x) Field level Training

Field level training will be carried out through participatory workshops which encourage an experience based learning approach. At outset these workshops may be facilitated by some JFPM Training specialist. Each person participating in the workshop should share his experience and knowledge with other participants including the facilitators. A series of workshops should be organized at different levels, such as:

- i) Circle-level workshops
- ii) Divisional-level workshops
- iii) range-level workshops
- iv) Beat-level workshops

xi) Villagers Reorientation

Reorientation is not essential for the staff only; villagers will also need to be reoriented in their approach to the management of local natural resources, and in their perception of the role of the staff. The joint forest planning and management system forms a major part of this reorientation. Workshops should be organized for local leaders (local politicians, ehaviors leaders, teachers, other key persons); and VFDCs. This will provide a forum where VFDCs can share experiences, learn from each other, and develop combined strategies and approaches to JFPM.

xii) Micro Plan

Before a VFDC can manage a forest, it will be required to prepare a micro plan. The micro plan will be prepared jointly by Executive Body of the VFDC and the Range staff, and will be discussed with the General House. It will be finally approved by the concerned DFO. The

information's gathered during the PRA exercise will be helpful in preparation of the micro plan. Locally drawn maps of the area may be useful to ensure that everyone understands what areas are to be managed.

xiii) The micro plan should:-

- i) Detail which households and villages have access and right to the forest lands and forest products;
- ii) Include detail on protection and decision-making mechanisms;
- iii) Detail forest management prescription;
- iv) Detail soil conservation measures if considered necessary by the VFDC
- v) Detail grassland management measures if considered necessary by the VFDC
- vi) Demarcate the responsibilities of the department and the villagers (forest users);
- vii) Detail unambiguous rights to the usufruct and harvesting of common plantation, grassland and forest area;
- viii) Detail clear rules and mechanisms for the distribution of benefits: intermediate and the final harvest, among users.

xiv) Duties and Responsibilities of JFM Committees

To make the JFMCs active and functional, each member of JFMC should shoulder certain duties and responsibilities.

xv) Duties of JFM Committees

- i) To persuade the villagers to give available areas for plantation.
- ii) To assist the Forest Department in planning, protection, afforestation.
- iii) To help the F.D. in judicious use, of all existing rights and behavior sharing of usufructs, eco-development of the area as per approved management plan.

xvi) Responsibilities of JFM Committees

It will be the responsibility of committee to ensure:

- i) Just and fair distribution of the usufructs derived.
- ii) Ensure its management as per prescribed norms.
- iii) Settlement of all disputes between villagers

- iv) To honor all commitments.

xvii) Power to JFMCs

The committee should make its own bye-law with the concurrence DFO. The concerned DFO should carry out necessary procedure for granting powers of a forest officer as mentioned in HPPFM regulations, 2001.

- i) Power to register Damage report.
- ii) Power to summon the accused to the general house of JFMC.
- iii) Make recommendations to Range officer regarding Compounding of damage in respect of offences committed on JFMC areas.

xviii) MOU between Forest Department and JFMCs

In the participatory mode, the scheme is being implemented by setting up Forest department agency (FDA) at Forest division level and JFMC at village level. As per the notified regulation titled HPPFM regulations, 2001 notified vide no. Fts. IIB/15-10/87 dated 23.8.2001, MOUs were signed between State Govt. represented by DFO of Forest Division in which FDA is being implemented and JFMC through its president during November 2009. Govt. of H.P has approved this MOU after getting vetted from the law Department. This MOU shall be valid for a period of five years from the date of signing as per terms and conditions detailed in the MOU for proper protection, maintenance, regeneration and management of plantation created under FDA and other forestry schemes within the jurisdiction of the JFMC.

In addition, a MOU has been signed between Forest Department and JFMCs for fire protection. No fire watcher is engaged in the area of JFMC. Further, a provision of honorarium/ assistance has been made to be paid to JFMCs for doing excellent works in firefighting.

xix) NTFPs

JFMCs can play an important role, in collection, marketing and propagation of NTFPs.

Many villagers are dependent on collection of NTFPs to sustain their livelihood.

So there is need to introduce such medicinal plants in the locality of JFM.

The JFM activities would concentrate on NTFP management and no alteration should be permitted in the basic silvicultural prescription but to promote regeneration, development and sustainable harvesting of following NTFPs:

- i) Medicinal and aromatic plants
- ii) Grasses
- iii) Fiber and flosses
- iv) Tans and dyes
- v) Gums and resin etc.

xx) Development of Technology for Value Added Products

There is a lot of scope for development of technology for value added products.

Various NTFPs are growing in the vicinity of JFMCs area. The value of original products collected directly from the forest is very less but if it is processed the value goes 2-4 times more than the original one. For example, Anardana, Amla Pickles, Murabba, Jam, Squash etc.

xxi) Eco-Tourism

There is need to develop specific sites for eco-tourism in JFM localities. Through various projects like stay home scheme, traditional food/ Ethnic food serving etc. through eco-tourism the villagers not only get employment but self-business will raise their income and it will become a source of livelihood.

xxii) Vermi Compost

Almost each JFMCs member has domestic animals. So they are dependent on forest for grazing of animals, collection of grass and fodder from forests. By collecting leaves and grasses for preparing vermicompost the villagers can manufacture vermicompost at their door steps. Thus through training for preparation of vermicompost to the JFMCs members' large amount of vermi compost can be prepared and sold in market in view of its large demand. This activity will definitely increase the agricultural and horticultural production. Moreover, this will help to save and protect the micro and macro natural nutrients of the soil which will subside the adverse effects of use of artificial fertilizers, and therefore will go in the long run to boost the economy of local people and raising their living standard.

xxiii) 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.

11.7 PAST EXPERIENCES IN PARTICIPATORY APPROACHES

The Social Forestry Umbrella project was a pioneering effort in perhaps, for the first time people were associated with forestry works and forestry was taken outside forest areas to village lands. This Project ended in 1993. A new scheme “Van Lagao, Rozi Kamao” was launched in 1992 in which plantation over 2 ha land was awarded to a person belonging to Antodaya category and in lieu of protection and care of this area, the beneficiary was to be given remuneration depending upon the survival percentage of the plantation.

11.6.1 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.

11.6.2 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.

Chapter-12

BIO-DIVERSITY CONSERVATION (OVERLAPPING)

WORKING CIRCLE

12.1 Constitution of the Working Circle: Biodiversity is the totality of genes, species and ecosystem in a region. Richness of biodiversity of a region or country shows its richness of biological heritage, high conservation values and the richness of its population's socio-economic culture, as the biodiversity directly or indirectly affects the living standards of the human populations, health conditions and overall prosperity. In a bio-diversity rich country, there are multiple food choices, multiple choice of medicinal plants and multiple economic avenues. While biodiversity provides the people with a host of organic products, it is the people's duty to conserve the biodiversity which is the product of hundreds of millions of years of evolutionary history.

In the recent past, biodiversity as a subject was not given the due importance. It is only after the Earth Summit held in 1992 at Rio de Janeiro, where on "Convention on Biological Diversity" (CBD) was adopted. The CBD having near universal membership has set out commitments for maintaining the biological resources underlining three main goals: conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources. India is a party to the CBD and committed to conserving the natural heritage.

Biodiversity is conveniently studied into genetic diversity, species diversity, and ecosystem diversity. Genetic diversity refers to the variation of genes within species, covering distinct populations of the same species or genetic variations within a population. Species diversity refers to the variety of species within a region. Ecosystem diversity is harder to measure than species or genetic diversity.

The Shivalik hills are the area in Himachal having remnants of biodiversity which needs to be preserved. The forests dealt in this working plan are situated in the Shivalik hills. It is imperative to have special consideration of these forests for conservation of biodiversity by constituting a separate Working Circle. The biodiversity Working Circle will encompass all areas of the Working Plan.

12.2 Objectives of Management: The state has prepared the strategy and Action Plan for Conservation of Biodiversity. The principal objectives of the plan are to:

1. Assess the existing status of biodiversity.

2. Identify the causes of its deterioration, if any.
3. Promote conservation and sustainable use of the state's biological resources.
4. Promote awareness among and dissemination of information amongst government departments and the public for realizing people's involvement and participation in conservation activities.
5. Create mechanisms required to plan for natural resource management and long-term conservation.
6. Promote cooperation between all stakeholders including government, public institutions, social and economic groups and the masses.
7. Incorporate principles of restoration, conservation and sustainable use of biodiversity in planning and execution of sectoral and cross- sectoral policies.
8. Identify legal and financial instruments to achieve these objectives.

The conservation strategy is guided by the following principles:

1. Recognizing the right of survival of each species.
2. Identifying the root causes of biodiversity loss and taking corrective action.
3. Restoring degraded habitat components to recover dwindling species.
4. Promoting in situ and ex-situ conservation of particular species.
5. Ensuring the share of local communities in the benefits obtained from use of natural resources which they have helped to conserve over long periods of time.
6. Ensuring sustenance of common property resources through local institutions.
7. Promoting biodiversity education
8. Generating biodiversity data base.
9. Adopting a multi-disciplinary approach in biodiversity research.
10. Taking up economic evaluation of bioresources.

The above objectives and principles will guide the conservation of biodiversity of this Working Circle.

12.3 The Present Status of Biodiversity: Because of different geological formations, physical geographical conditions and climate regime of the area, there are different bio-forms, ecosystems and forest types in the area. Deodar forests are often found in association with a variety of other tree species that thrive in similar cool, moist conditions. Commonly found alongside Deodar (*Cedrus deodara*) are species such as Blue Pine (*Pinus wallichiana*), Himalayan

Oak (*Quercus* spp.), and the stately Himalayan Fir (*Abies pindrow*). These species together form mixed coniferous forests that contribute to the rich biodiversity of the region. The coexistence of these trees not only enhances the structural complexity of the forest but also supports a diverse range of flora and fauna, making these forests ecologically significant. The biodiversity of the area was studied during the Resource Assessment Survey. The tree component was assessed by laying out quadrats of 36.2m×36.2m, the shrubs component by laying out quadrats of 3m×3m and herbs and grasses in 1m×1m quadrats.

The list of recorded trees, shrubs and herbs is given in Table 15.1

The analysis shows that there is a high species diversity as many equally or nearly equally abundant species are found in the population. The number of tree species in the Dry deciduous forests is high. It is also seen that the number of tree species is as high as the number of herb species. This is because the survey was done in one season and also due to thick mass of invasive species. The diversity of herb species has declined.

Importance Value Index (IVI) is the sum of relative density, relative frequency, and relative dominance for each species involved. It may be expressed as a range from 0 to 3 to give importance percentage, which will range from 0 to 1 or 100 per cent, may be divided into 300 per cent. In the present case, 300 per cent has been considered. Importance value provides an overall estimate of the influence or importance of a species in a community. IVI of tree species found in three different forests were calculated and given in Table 21.3.

It is found that *Cedrus deodara* has the maximum IVI in Regular working Circles. *Pinus roxburgii* in Chil & Plantation working circles working circles forests.

Among the economically important species are *Acacia catechu*, *Dalbergia sissoo*, *Diospyros tomentosa*, *Embllica officinalis*, *Eucalyptus*, *Mangifera indica*, and *Chhal*.

There are a number of medicinal plants as well. Among them are *Acacia catechu*, *Adhatoda vesica*, *Aegle marmelos*, *Azadirachta indica*, *Casia fistula*, *Cordia myxa*, *Embllica officinalis*, *Nyctanthes arboretristis* and *Murraya koengii*.

Species recorded were screened for their uniqueness with references in the literature. No species under Red Data Book was recorded. All the species were found abundant in nature. No rare plants were encountered during the survey.

Table 12.1.: Biodiversity recorded in the Working Plan area

(A) Trees			
<u>Botanical Name</u>	<u>(A) Family</u>	<u>Local name</u>	<u>English Name</u>
<i>Abies pindrow</i>	Coniferae	Tosh	Silver
<i>Acacia nilotica</i>	Leguminosae (Mimosaceae)	Kikar	-

<i>Acacia cateche</i>	Leguminosal(Minosaceae)	Khair	-
<i>Acer caesium</i>	Sapindaceal	Mandlu	Mandar Maple
<i>Acer oblongum</i>	Sapindaceal	Parange	
<i>Acer villosum</i>	Sapindaceal	Chirandru	Maple
<i>Adina cordifolia</i>	Rubiaceae	Haldu	
<i>Aegle marmelos</i>	Rutaceal	Beel,Beelgiri	
<i>Aesculus indica</i>	Sapindaceal	Khanor	Horse chestnut
<i>Ailanthus glandulosa</i>		Ailanthus	Ailanthus
<i>Albizzia procera</i>	Leguminosal(Mimosaceal)	Siris White	
<i>Albizzia Stipulata</i>	Leguminosal(Mimosaceal)	Ohi	-
<i>Albizzia lebbek</i>	Leguminosal(Mimosaceal)	Siris (Black)	-
<i>Albizzia ororatisissima</i>	--do--	Siris	
<i>Alnus nitida</i>	Cupliferae	Kosh, Kunish	Alder
<i>Alnus nepalensis</i>	--do--	Kosh	Alder
<i>Anogeissus Latifolia</i>	Combretaceae	Dhou, Chhal	-
<i>Beupinia pururea</i>	Leguminosal	Karal	
<i>Beuhinia variegata</i>	Leguminosal	Kachhnar, Karale	-
<i>Betula alnoides</i>	Cupliferal	Shagra	Birch
<i>Bombax ceiba</i>	Bombacaceal	Semal	Red Cotton tree
<i>Baxus Wallichiana</i>	Euphorbiaceal	Shamshad	Box woos
<i>Broussonetia Papyrifera</i>	Niraceak		Paper mulberry
<i>Careva Arborea</i>	Mytaceae		
<i>Carpinus viminea</i>	Cupuliferae	Khirki,chevs	Himalayan Hornbean
<i>Cassia fistula</i>	Caesalpinni-aceal	Amaltas	India Laburnum
<i>Cassia siamea</i>	--do--		
<i>Cassia frondosa</i>	--do--		
<i>Callistemon viminalis</i>	Myrtaceal	-	BottleBrush
<i>Caseria tementosa</i>	Samydaceal	Pimpla,geolapula	-
<i>Cedrela Serrata</i>	Meliaceae	Darke	Hill Toon.

<i>Cedrela toona</i>	Meliaceae	Tooni, Tun	Toon
<i>Cedrus deodara</i>	Coniferae	Kelo, Diar	Deodar
<i>Australis</i>	Urticaceae	Khirak	Nettle tree
<i>Citrus mediaca</i>	Rutaceae	Jhamirdi	
<i>Cordia myxa</i>	Boraginaceae	Lasura	
<i>Cordia vestita</i>	--do--	Lasura	
<i>Comus capitata</i>	Cornaceae	Kreeva	Dog wood
<i>Cornus macrophylla</i>	Cornaceae	Kreeva	Dog wood
<i>Corylus columna</i>	Cupuliferae	Sharol	Hazelnut
<i>Cupressus Sempervirens</i>	Conferae	Saru	Syramidalcyprus
<i>Cupressus torulosa</i>	Conferae	Davidiar	Himalayan Cyprus
<i>Dalbergia sissoo</i>	Papilionaceae	Shisham Tali	Sissoo
<i>Ehretia acuminata</i>	Boraginaceae	Bakli	
<i>Ehretia laevis</i>	--do--	Chamror	
<i>Embilica officials</i>	Euphorbiaceae	Amla	
<i>Engelhardtia colebrookiana</i>	Euglandaceae	Samma	
<i>Erythrina subarosa</i>	Papilionaceae	Pariara	Coral tree
<i>Eucalyptus camaldunensis</i>	Myrtaceae	Safeda	River Red gun
<i>Eucalyptus citriodora</i>	Myrtaceae	-do-	Lemon scented gun
<i>Eucalyptus globules</i>	Myrtaceae	-do-	Blue gun
<i>Eucalyptus grandis</i>	-do-	-do-	Rose gun
<i>Eucalyptus hybrid</i>	-do-	-do-	
<i>Euonymus lacerus</i>	Celastraceae	Kala chindwara	Indian spindle tree
<i>Euonymus tingens</i>	-do-	-do-	
<i>Ficus hispida</i>	-do-	Debre	-
<i>Ficus palmate</i>	Urticaceae	Fagura, Fegra	Wild fig
<i>Ficus religiosa</i>	-do-	Pipal	-
<i>Ficus roxburghii</i>	-do-	Tremal, Traimbai	-
<i>Ficus bengalensis</i>	Urticaceae	Bar	Banyan
<i>Floccurtia ramentchii</i>	Bixaceae	Kaodei Kangu	
<i>Fraxiuns micranthus</i>	-	Ash	Ash
<i>Fraxiuns floribunda</i>	-	-do-	Ash
<i>Grevillea rebusta</i>	Proteaceae	-	Silver Oak

<i>Grewia oppositifolia</i>	Tiliaceal	Bihul	-
<i>Grewia elastica</i>	-do-	-do-	
<i>Holarrhena antidyenterica</i>	Apocynaceae	-	-
<i>Ilex disyrena</i>	Ilcineae	Jacraanda	
<i>Jacaranda ovalifolia</i>	Bignoniaceae	Khor,Akhrot	Walnut
<i>Kydia calycina</i>	Micxww	Pula	
<i>Lagerstroemia indica</i>	Lythraceae	Har Singar	
<i>Lannea grandis</i>	Anacardiaceae	Salambra	
<i>Litsaea umbrosa</i>	Lauraceae	Paror	Laurel
<i>Litsaea chinensis</i>	-do-	-do-	
<i>Lisaea polyantha</i>	-do-	-do-	
<i>Leucaenaleucocephala</i>	Leguminosal(Minisaceal)	Subabool	
<i>Lyonia Ovalifolia</i>	-	Airean, Eهران	
<i>Machilus duthiei</i>	Lauraceae	Chirindi	-
<i>Machilus odoratissima</i>	-do-	-do-	
<i>Mallotus philippineusis</i>	Euphorbiaceae	Kambal	Kamila tree
<i>Mangifera indiaca</i>	Anacardiaceae	Am	Mango
<i>Melia azedarach</i>	Meliaceae	Drek	Persian lialac
<i>Moringapterogosperma</i>	Moringaceae	Saunjna	
<i>Morus alba</i>	Urticaceae	Chimmu	Mulberry
<i>Morus serrata</i>	-do-	Paharitut	Hill mulberry
<i>Myrica nagi</i>	Myrtaceae	Kaphal	
<i>Olea cuspidate</i>	Obaceae	Kahu	Olive tree
<i>Oroxylum indicum</i>	Bignoniaceae	Arlu	
<i>Ougeinia dalbergioides</i>	Leguminosal	Sandan	
<i>Pheonix sylvestris</i>	Palma	Khajur, Khajri	Wild date palm
<i>Phoenix humilis</i>	Palma	Khajri	Wild date palm
<i>Picea smithiana</i>	Coniferal	Rai	Spruce
<i>Pinus roxburghii</i>	Coniferal	Chil	Chirp pine
<i>Pinus wallchiana</i>	Coniferal	Kail	Blue pin
<i>Pistacia integerrima</i>	Auacardiaceae	Kakare	

<i>Populus deltoids</i> G.3	Salicaceae	Chiluna, Pahari	Poplar
<i>Populus ciliate</i>	Salicaceae	Pipal	Poplar
<i>Populus deltoids</i> G.48	Salicaceae	-	Poplar
<i>Populus deltoids</i> G.121	Salicaceae	-	Poplar
<i>Pongamia pinnata</i>	Papilionaceae	Karanj	Indian Beech
<i>Prunus armenica</i>	Rosaceae	Chuli	Wild apricot
<i>Prunus cerasoides</i>	Rosaceae	Paja	Wild cherry
<i>Prunus cernuta</i>	Rosaceae	Jamun	Bird cherry
<i>Punica granatum</i>	Lythraceae	Auar,Daru	Pomegranate
<i>Pyrus lanata</i>	Rosaceae	Bumfal	
<i>Pyrus pashia</i>	Rosaceae	Segal, Kainth	
<i>Quercus dilatata</i>	Cupliferae	Mohru	Green Oak
<i>Quercus glance</i>	Cupliferae	Banni	
<i>Quercus incana</i>	Cupliferae	Ban	While Oak
<i>Quercus semicarpifolia</i>	Cupliferae	Kharsu	Brown Oak
<i>Rhododendron orboreum</i>	Ericaceae	Burah	
<i>Rhus punjabensis</i>		Titri	
<i>Robinia pseudoacacia</i>	-	Robinia	-
<i>Salix babylonica</i>	Salicaceae	Majnu	Weeping willow
<i>Salix elegans</i>	Salicaceae	Beuns	Willow
<i>Sapinfud mukurossi</i>	Sapindaceae	Ritha	Soap nut tree
<i>Symplocos crataegoides</i>	Styraceal		
<i>Taxus baccata</i>	Coniferal	Barmi, Rakhale	Yew
<i>Terminalia belerica</i>	Combretaceal	Bahera	
<i>Terminalia chebula</i>	Combretaceal	Hard	
<i>Terminalia tomentosa</i>	Combretaceal	Alsan	
<i>Ulmus wallichiana</i>	Urticaceal	Marinu	
<i>Ulmus laevigata</i>	Urticaceal	Marinu	Small leaf elm
<i>Urighia tinctoria</i>	Apocynaceal	Summa	
<i>Wrightia tomentosa</i>	Apocynaceal	Summa	

<i>Xylosmalongifolium</i>	Bixaceae	Draindu	
<i>Zizyphus jujubai</i>	Rhamnaceas	Beri	

(B) SHRUBS

<u>Botanical Name</u>	<u>(A) Family</u>	<u>Local name</u>	<u>English Name</u>
<i>Adhatoda vasica</i>	Acanthaceae	Basuti	
<i>Agave Americana</i>	-	Ramban	
<i>Andrachna cordifolia</i>	Euporbiaceae	Darlu	
<i>Artemesia vulgaris</i>	Composital	Drubsha	
<i>Artemesia Vestata</i>	Composital		
<i>Balikospermum axillare</i>	Euphorbiaceae		
<i>Berberis aristata</i>	Baeberidaceae	Kasmal	
<i>Berberis chitriaaristata</i>	Berberidaceae	Kasmal	
<i>Berberis lyceum</i>	Berberidaceae	Kasmal	
<i>Beohmeria pletyphyla</i>	Urticaceas	Sisar	
<i>Calatropis procera</i>	Asclepiadaceas	Akh	
<i>Caragana brevispina</i>	Leguminosae	Shameh	
<i>Carissa opaca</i>	Leguminosae	Garna	
<i>Carissa spinarium</i>	Leguminosae	Garna Kharn	
<i>Caryopteris wallichiana</i>	Verbenaceae	Chingari	
<i>Caryopteris grata</i>	Verbenaceae	Rumri	
<i>Cassia occidentalis</i>	Leguminosae	Chakunda	
<i>Cassia tora</i>	Leguminesal		
<i>Cleroden drom serratum</i>	Verbenaceae	Bankakri	
<i>Colebrookea Oppositifolia</i>	Labiatae	Bansa	
<i>Cotoneaster acuminata</i>	Rosaceae	Riunsh	
<i>Cotoneaster microphylla</i>	Rosaceae	Riunsh	
<i>Cotoneaster bacillaris</i>	Rosaceae	Riunsh	
<i>Crotalaria prostate</i>	Leguminesa		

<i>Debregeasia hypolenca</i>	Urticaceae	Sairu	
<i>Daphne cannabina</i>	Thymelaeaceae	Kaola	
<i>Desmodium sambuense</i>	Leguminosae	Safed Kathi	
<i>Desmodium tiliaefolium</i>	Leguminosae	Fafed Kathi	
<i>Deutzia corymbosa</i>	Saxifragaceae	Chururu	
<i>Dentzia staminea</i>	Saxifragaceae	Chururu	
<i>Dentzia visocosa</i>	Sapindaceae	Mendru	
<i>Duranta ploumieri</i>	Verbenaceae		
<i>Elaeagnus umbellate</i>	Elaeagaceae	Geai	
<i>Elsholtzia polystachya</i>	Labiatae	Pothi, Jaunkra	
<i>Euphorbia royleana</i>	Euphorbiaceae	Thor	
<i>Euphorbia prolifera</i>	Euphorbiaceae		
<i>Enonymus lacerus</i>	Cdastraceae		
<i>Flemingia prostrate</i>	Leguminosae		
<i>Hamiltonia suaveolens</i>	Rubiaceae	Bari podri	
<i>Hypericum vermuum</i>	Hypercaceae	Bani wakra	
<i>Indigofera geradiana</i>	Leguminosas	Kathi	
<i>Indigofera hebepetala</i>	Leguminosae		
<i>Indigerfera heterantha</i>	Leguminosae		
<i>Indigofera pulchella</i>	--do--		
<i>Inula cappa</i>	Compositae		
<i>Inula grandiflora</i>	-do-		
<i>Impomaea spp</i>	Convolvulaceae	Japlota	
<i>Jatropha curcas</i>	Euphorbiuaceae	Panch-phuli	
<i>Lantana camara</i>	Verbenaceae	Choti podari	
<i>Laptodermis lancevlata</i>	Rubiaceae	Bilan	
<i>Limenia crenulata</i>	Rutaceae	Reeni parasite	
<i>Leranthus ligusrinus</i>	Loranthaceae	Changari	
<i>Lonicera angustifolia</i>	Caprifeliaceae		
<i>Lonicera parviflora</i>	Caprifeliaceae		
<i>Lonicera guinguelocukarus`</i>	Caorufikuaceae	Caprifeliaceae	

<i>Muraya exotica</i>	Rutaceae	Caprifoliaceae	
<i>Muraya Keenigii</i>	Rutaceae	Caorufikuaceae	
<i>Myrsin Africana</i>	Myrsinaceae	Rutaceae	
<i>Nerium ororatum</i>	Apecynaceae	Rutaceae	Oleander
<i>Nycatasnhes orbortristis</i>	Oleaceae	Myrsinaceae	
<i>Opuntia monocantha</i>	Cactaceae	Apecynaceae	
<i>Ougeinia dalbergioides</i>	Leuminosal	Oleaceae	
<i>Phoenix acaulis</i>	Palmae	Cactaceae	
<i>Plectrenthus rugosus</i>	Labiatae	Leuminosal	
<i>Plectrenthus coeytsa</i>	Labiatae	Palmae	
<i>Potentilla fruticosa</i>	Rosaceae	Labiatae	
<i>Potentilla rigida</i>	Rosaceae	Labiatae	
<i>Priosepia utilis</i>	Rosaceae	Rosaceae	
<i>Rhus continus</i>	Anacardiaceae	Rosaceae	
<i>Rhus semialata</i>	Anacardiaceae	Rosaceae	
<i>Rhododendron companula</i>	Ericaceae	Anacardiaceae	
<i>Ricinus communis</i>	Enphorbiaceae	Anacardiaceae	
<i>Roylea celycina</i>	Lebiatae	Karnoi titpati	
<i>Rubus biflorus</i>	Rosaceae	Kala akha	
<i>Rubus ellipticus</i>	Rosaceae	Kala akha	
<i>Rubus lasiocarpus</i>	Rosaceae	Kala akha	
<i>Rubus paniculatus</i>	Rosaceae	Kala akha	
<i>Salix hastate</i>	Salicaceae	Buinbs	
<i>Salix denticulate</i>	Salicaceae	Buins	
<i>Salix dephnoides</i>	Salicaceae	Buins	
<i>Sarcococca salingna</i>		Euphoirbiuaceae	
<i>Skimmia laureola</i>	Rutaceae	Nayr	
<i>Spiraea canescens</i>	Resaceae	Chakh Khosti	
<i>Spiraea bella</i>	Resaceae		
<i>Spiraea lindleyana</i>	Resaceae	Katbri	
<i>Solanum verbascifolium</i>	Solanaceae	Ban temaku	
<i>Staphylea emodii</i>	Sapindaceae	Nagdaun Snahe sticks	
<i>Tamaris gallica</i>	Tamaricaceae	Jhao	
<i>Viburnum coriaceaum</i>	Caprifoliaceae	Diha	

<i>Viburnum cotinifolium</i>	Caprifoliaceae	Dab	
<i>Viburnum stallulatum</i>	Caprifoliaceae		
<i>Viburnum nerve sum</i>	Caprifoliaceae	Tilenal	
<i>Visum album</i>	Loranthaceae	Bhangra Mistletoe	
<i>Vitex negundo</i>	Verbenaceae	Banha	
<i>Wikstroemia canescens</i>	Thymelaeaceae	Tilak	
<i>Woodfordia floribunda</i>	Lythraceae	Dawe	
<i>Zenthoxylum alatum</i>	Rutaceae	Tirmira	

(C) HERBS			
<u>Botanical Name</u>	<u>(A) Family</u>	<u>Local name</u>	<u>English Name</u>
<i>Achilies milefolium</i>	Compositae	Foa	-
<i>Achyranthes bidentata</i>	Amarantaceae	Putkanda	-
<i>Achyranthes aspera</i>	Amarantaceae	Putkanda	
<i>Aconitum heteropohyllum</i>	Ranunculaceae	Padish, Mohra	
<i>Acorus calamus</i>	Avaceae	Barin	Sweat flag
<i>Adiantum capillus</i>	-	-	Maiden hair fern
<i>Agrimonia enpaterium</i>	Rosaceae	Kanaula	-
<i>Ainsliaca aptera</i>	Compositae	Durwa	-
<i>Ajuga parviflora</i>	Labiatae	Darpatre	-
<i>Allium loratum</i>	Liliaceae	--	-
<i>Anaphalis cinnamomea</i>	Compositae	-	Pimperial
<i>Anaphalis contorta</i>	Compositae		
<i>Anaphalis triplinervis</i>	Compositae		
<i>Anemone obtusiloba</i>	Ranunculaceae		
<i>Anemone rivularis</i>	Ranunculaceae	Carbini mamiri	
<i>Aquilegia pubiflora</i>	Ranunculaceae	-	Columbine
<i>Aralia cachemirica</i>	Araliaceae	-	-
<i>Argemone mexicana</i>	Papaveraceae	-	-

<i>Arsaema hellebarifolium</i>	Araceae		
<i>Arisaema intermedium</i>	Araceae		
<i>Arisaema wallichianum</i>	Araceae		Cobra plant
<i>Asparagus adscendens</i>	Liliaceae	Shasi mulu	
<i>Asplenium polypotioides</i>		Linger	
<i>Aster molliusculus</i>	Compositae		
<i>Aster asperulus</i>	Compositae		
<i>Atropa belladonna</i>	Solanaceae	Saagngur	
<i>Beonninghausenia albiflora</i>	Rutaceae	Pessumar	
<i>Brunnella vulgaris</i>	Labiatae	Potindu	
<i>Bupleurum lanceolatum</i>	Umbelliferae	Banjwain	
<i>Buplerum tenue</i>	Umbelliferae	Banjwain	
<i>Companula tatifokia</i>	Companulaceae		
<i>Companula colorata</i>	Campanulaceae		
<i>Cannabis sativa</i>	Urticaceae	Bhang	Hemp
<i>Capsella Bursapastoris</i>	Cruciferae		Shepherds purse
<i>Carum copticum</i>	Umbelliferae	Ajwain, Jawain	
<i>Cassia tora</i>	Leguminosae		
<i>Chaerophyllum villosum</i>	Umbelliferae	Khelti	
<i>Chenopodium album</i>	Chenopodiaceae		
<i>Colons aromaticus</i>	Labiatae	Pathan beg	
<i>Datura stramonium</i>	Solanaceae	Datura	
<i>Delpinium spp.</i>	Ranunculaceae		
<i>Delpinium elatum</i>	Ranunculaceae		
<i>Delpinium vestitum</i>	Ranunculaceae	Kalulu	
<i>Echinops niveus</i>	Compositae		
<i>Elsholtzia incisa</i>	Labiatae	Banjwana	
<i>Erigeron multirariatus</i>	Compositae		
<i>Foeniculum vulgare</i>	Umbelliferae	Saunf	Fenua
<i>Fragaria indica</i>	Rosaceae	Bhumla	Strawberry

<i>Fumaria Parviflora</i>	Fumariceae	Pitpapra	
<i>Fagaria vesca</i>	Rosasceae		
<i>Galium spp</i>	Rubiaceae		
<i>Gentaiana Kurroo</i>	Gentianaceae	Karu	
<i>Geranium naplалense</i>	Geraniaceae		
<i>Geranium rebertianum</i>	Geraniaceae		
<i>Geranium wallichianum</i>	Geraniaceae	Chowhri	
<i>Gerbera lannginosa</i>	Compositae	Kopra	
<i>Girardiana heterophylla</i>	Urticaceae	Bichhubuti	
<i>Habenaria dense</i>	Orchidaceae	Kharwar	
<i>Habenaria goleondra</i>	Orchidaceae	Sirab	
<i>Halenia elliptica</i>	Gentianaceae	Pitpapra	
<i>Hydrocotyle aristica</i>	Umbelliferae	Brahmi	
<i>Impatiens amphorata</i>	Geraniaceae		
<i>Impatiens roylei</i>	Geraniaceae		Balsam
<i>Iris napalensis</i>	Iridaceae	Brechra, Kharera	
<i>Justicia simplex</i>	Acathacea		
<i>Lathyrus pratensis</i>	Leguminosae		
<i>Lilium giganteum</i>	Liliaceae		
<i>Malva rotundoifolia</i>	Malvaceae	Dodu	
<i>Mehtha sylvestris</i>	Labiatae	Podina	
<i>Nardostachys Jatamansi</i>	Valerianeae	Jatamansi	
<i>Nepta ciliaris</i>	Labiatae	Brun	
<i>Nepta elliptica</i>	Labiatae		
<i>Nepaver dubium</i>	Papaveraceae		Poppy
<i>Pichrohiza kurrooa</i>	Scrophularineae	Karu	
<i>Pilea imbrosa</i>	Urticaceae	Charmali	
<i>Pipinella acuminata</i>	Umbelliferae		
<i>Podophyllum hexandrum</i>	Berberidaceae	Bankakri, Papri	
<i>Polygonatum cirrhifolium</i>	Liliaceae		
<i>Polygonatum verticillatum</i>	Liliaceae	Salang mishri	
<i>Polygonatum alatum</i>	Polygonaceae	Malora	
<i>Polygonum capitatum</i>	Polygonaceae		
<i>Potertilla argyrophylla</i>	Rosasceae		
<i>Potertilla fulgens</i>	Rosasceae		
<i>Potertilla nepalensis</i>	Rosasceae	Dora	

<i>Prenanthes brunoniana</i>	Compositae	Dudhli	
<i>Primula denticulata</i>	Primulaceae	Kauri	
<i>Renunculus orvensis</i>	Ranunculaceae		Butter cup
<i>Rumex hastatus</i>	Polygonaceae	Malori	
<i>Rumex nepalensis</i>	Polygonaceae	Malori	
<i>Salvia glutinesa</i>	Labiatae	Gwadra	
<i>Salvia lanata</i>	Labiatae		
<i>Saussurha spp</i>	Compositae		
<i>Saxifraga diversifolia</i>	Saxifragaceae		
<i>Scutellaria linearis</i>	Labiatae		
<i>Sida rhombifolia</i>	Malvaceae		
<i>Sisymbrium thalianum</i>	Cruciferae	Jangli Sarson	
<i>Sisymbrium Iris</i>	Cruciferae	Jangli Sarson	
<i>Strobilanthes atropurpurea</i>	Acathacea	Mashna	
<i>Strobilanthes angustifolia</i>	Acathacea		
<i>Strobilanthes glutinosa</i>	Acathacea		
<i>Strobilanthes dalhosiana</i>	Acathacea		
<i>Swertia chirata</i>	Centianaceae	Charaita	
<i>Swertia cordata</i>	Centianaceae	Charaita	
<i>Swertia paniculata</i>	Centianaceae	Charaita	
<i>Thalictrum foliolosum</i>	Ranunculaceae		
<i>Thymus serpyllum</i>	Labiatae	Ban ajwayan	
<i>Tragopogon gracile</i>	Compositae		
<i>Tripolium protense</i>	Leguminosae		
<i>Urtica dioica</i>	Uricaceae	Kugas	
<i>Valeriana parviflora</i>	Valerianeae	Kugas	
<i>Valeriana hardwighii</i>	Valerianeae	Nihani, Nakh	
<i>Valeriana wallichii</i>	Valerianeae	Mushkbala	
<i>Verbascum thapsus</i>	Scrophularineae	Gaddi Tamaku Mulle	
<i>Veronica serpyllifolia</i>	Scrophularineae		
<i>Vicia rigidula</i>	Leguminosae		
<i>Vicia tetrasperma</i>	Leguminosae		
<i>Viola canescens</i>	Violaceae	Banafsha	
<i>Viola serpens</i>	Violaceae	Banafsha	

Table 12.2 : IVI of Tree Species in Suket Forest Division

Working Circle	Species	Relative Density	Relative Frequency	Relative basal Area	IVI=RD+RF+RBA
Chil Working Circle	<i>Ailanthus excelsa</i>	3.36	2.56	0.21	6.14
	<i>Albizzia Spp</i>	5.60	2.56	0.20	8.36
	<i>Bombex ceiba</i>	1.12	2.56	0.29	3.98
	<i>Cedrus Deodara</i>	15.40	10.26	8.63	34.29
	<i>Lannea grandis</i>	2.24	2.56	0.12	4.92
	<i>Myrica esculenta</i>	2.24	5.13	0.42	7.79
	<i>Pinus roxburghii</i>	49.13	53.85	87.34	190.32
	<i>Pinus wallichiana</i>	8.96	5.13	1.49	15.58
	<i>Prunus cerasoides</i>	1.12	2.56	0.02	3.70
	<i>Pyrus pashia</i>	2.24	2.56	0.13	4.94
	<i>Quercus leucotrichophora</i>	6.35	7.69	1.05	15.09
	<i>Toona Ciliata</i>	2.24	2.56	0.08	4.89
Chil Working Circle Total		100.00	100.00	100.00	300.00
Plantation Working Circle	<i>Acacia catechu</i>	13.73	1.01	0.69	15.43
	<i>Ailanthus excelsa</i>	1.19	1.01	0.22	2.42
	<i>Albizia Chinensis</i>	1.43	5.05	1.46	7.95
	<i>Albizia lebbeck</i>	1.19	1.01	0.08	2.29

	<i>Albizia Stipulata</i>	0.60	2.02	0.49	3.11
	<i>Albizzia Spp</i>	1.79	1.01	0.04	2.84
	<i>Bauhinia variegata</i>	0.60	1.01	0.03	1.64
	<i>BL</i>	2.69	2.02	0.31	5.01
	<i>Bombex ceiba</i>	1.19	5.05	0.95	7.19
	<i>Cassia fistula</i>	2.24	4.04	0.69	6.97
	<i>Cedrus Deodara</i>	2.09	2.02	0.16	4.27
	<i>Celtis australis</i>	1.79	2.02	1.29	5.10
	<i>Dalbergia sissoo</i>	2.39	3.03	0.87	6.29
	<i>Emblica Officinalis</i>	0.80	3.03	0.12	3.95
	<i>Ethretia Acumniata</i>	0.60	1.01	0.14	1.75
	<i>Eucalyptus hybrida</i>	0.60	1.01	0.13	1.74
	<i>Eucalyptus spp</i>	4.18	1.01	1.01	6.20
	<i>Ficus racemosa</i>	0.60	1.01	0.02	1.63
	<i>Ficus Spp.</i>	0.60	1.01	0.03	1.63
	<i>Flacourtia Sapida Roxb</i>	0.60	1.01	0.02	1.63
	<i>Grewia optiva</i>	0.60	1.01	0.03	1.63
	<i>Lannea grandis</i>	3.88	4.04	2.25	10.17
	<i>Litsaea umbrosa</i>	0.60	1.01	0.06	1.66
	<i>Mallotus philippensis</i>	1.39	3.03	0.14	4.56
	<i>Myrica esculanta</i>	3.58	2.02	1.45	7.05
	<i>pinus phicia</i>	13.14	1.01	1.22	15.37

	<i>Pinus roxburghii</i>	11.94	31.31	79.68	122.93
	<i>Pinus wallichiana</i>	7.76	2.02	0.80	10.59
	<i>Pistacia integerrima</i>	1.00	3.03	0.27	4.30
	<i>Populus Ciliata</i>	0.60	1.01	0.92	2.53
	<i>Prunus cerasoides</i>	1.19	1.01	0.05	2.25
	<i>Quercus leucotrichop hora</i>	7.16	4.04	2.70	13.90
	<i>Rhododendro n</i>	2.39	1.01	0.20	3.60
	<i>Syzygium cumini</i>	0.90	2.02	0.38	3.30
	<i>Terminalia bellirica</i>	1.79	2.02	0.76	4.57
	<i>Toona ciliata</i>	1.19	1.01	0.34	2.54
Plantation Working Circle Total		100.00	100.00	100.00	300.00
Protection Working Circle	<i>Abies pindrow</i>	5.41	0.92	7.51	13.84
	<i>Acacia catechu</i>	1.80	1.83	0.15	3.79
	<i>Acer oblongum</i>	5.41	0.92	0.30	6.62
	<i>Albizia Stipulata</i>	0.60	0.92	0.04	1.56
	<i>Anogeissus latifolia</i>	0.60	0.92	0.23	1.74
	<i>Areia indica</i>	0.60	0.92	0.04	1.56
	<i>Bahunia Vehlii</i>	3.01	1.83	1.75	6.59
	<i>Bauhinia variegata</i>	6.01	3.67	1.22	10.90
	<i>BL</i>	2.70	3.67	1.57	7.94

	<i>Bombex ceiba</i>	0.60	0.92	0.06	1.58
	<i>Cassia fistula</i>	1.80	1.83	0.73	4.37
	<i>Cedrus Deodara</i>	2.10	5.50	1.91	9.51
	<i>Celtis australis</i>	1.20	1.83	0.05	3.09
	<i>Dalbergia latifolia</i>	9.62	0.92	0.55	11.08
	<i>Emblica Officinalis</i>	5.41	1.83	0.71	7.95
	<i>Erythrina subarosa</i>	0.90	1.83	0.71	3.44
	<i>Ficus roxburgie</i>	0.60	0.92	0.04	1.56
	<i>Flacourtia Sapida Roxb</i>	0.60	0.92	0.09	1.61
	<i>Grewia optiva</i>	1.20	1.83	0.16	3.20
	<i>Lannea grandis</i>	2.40	2.75	1.20	6.35
	<i>Mallotus philippensis</i>	1.40	8.26	1.03	10.69
	<i>Myrica esculanta</i>	0.60	0.92	0.08	1.60
	<i>Phoenix sylvestris</i>	1.20	0.92	0.92	3.04
	<i>Picea smithiana</i>	1.20	1.83	0.22	3.26
	<i>Pinus roxburghii</i>	17.24	14.68	40.95	72.87
	<i>Pinus wallichiana</i>	3.91	3.67	2.62	10.20
	<i>Pistacia integerrima</i>	1.60	2.75	0.50	4.86
	<i>Prunus cerasoides</i>	1.50	1.83	0.23	3.57
	<i>Punica grantum</i>	1.80	0.92	0.02	2.74
	<i>Pyrus pashia</i>	0.72	4.59	0.34	5.65

	<i>Quercus leucotrichophora</i>	12.16	11.93	29.67	53.76
	<i>Rhododendron</i>	1.65	7.34	2.92	11.91
	<i>Taxus baccata</i>	0.60	0.92	1.10	2.61
	<i>Toona ciliata</i>	0.60	0.92	0.20	1.72
	<i>Toona ciliata</i>	0.60	0.92	0.08	1.60
	<i>Xylosma longifolium</i>	0.60	0.92	0.10	1.62
Protection Working Circle Total		100.00	100.00	100.00	300.00
Regular Working Circle	<i>Abies pindrow</i>	2.57	12.50	1.71	16.78
	<i>Acer oblongum</i>	31.75	3.13	0.27	35.15
	<i>Cedrus Deodara</i>	20.24	37.50	67.00	124.74
	<i>Myrica esculanta</i>	0.86	3.13	0.10	4.08
	<i>Pinus roxburghii</i>	28.61	9.38	5.02	43.00
	<i>Pinus wallichiana</i>	5.88	21.88	18.42	46.18
	<i>Quercus leucotrichophora</i>	10.08	12.50	7.49	30.08
Regular Working Circle Total		100.00	100.00	100.00	300.00

Graph of Importance Value Index (IVI) Chil WC

IVI=RD+RF+RBA

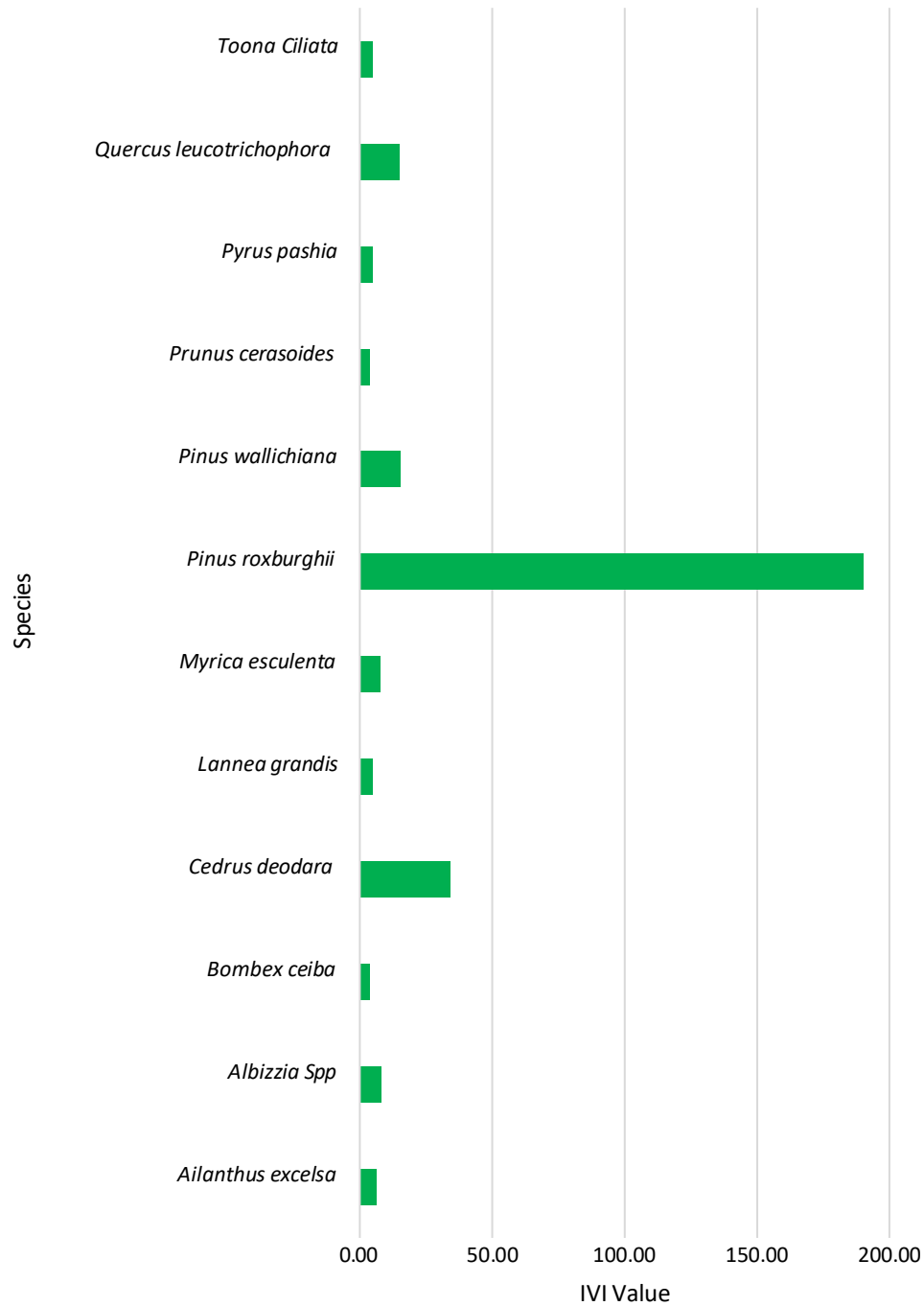


Fig12.1 Graph of IVI of Chil Working Circle

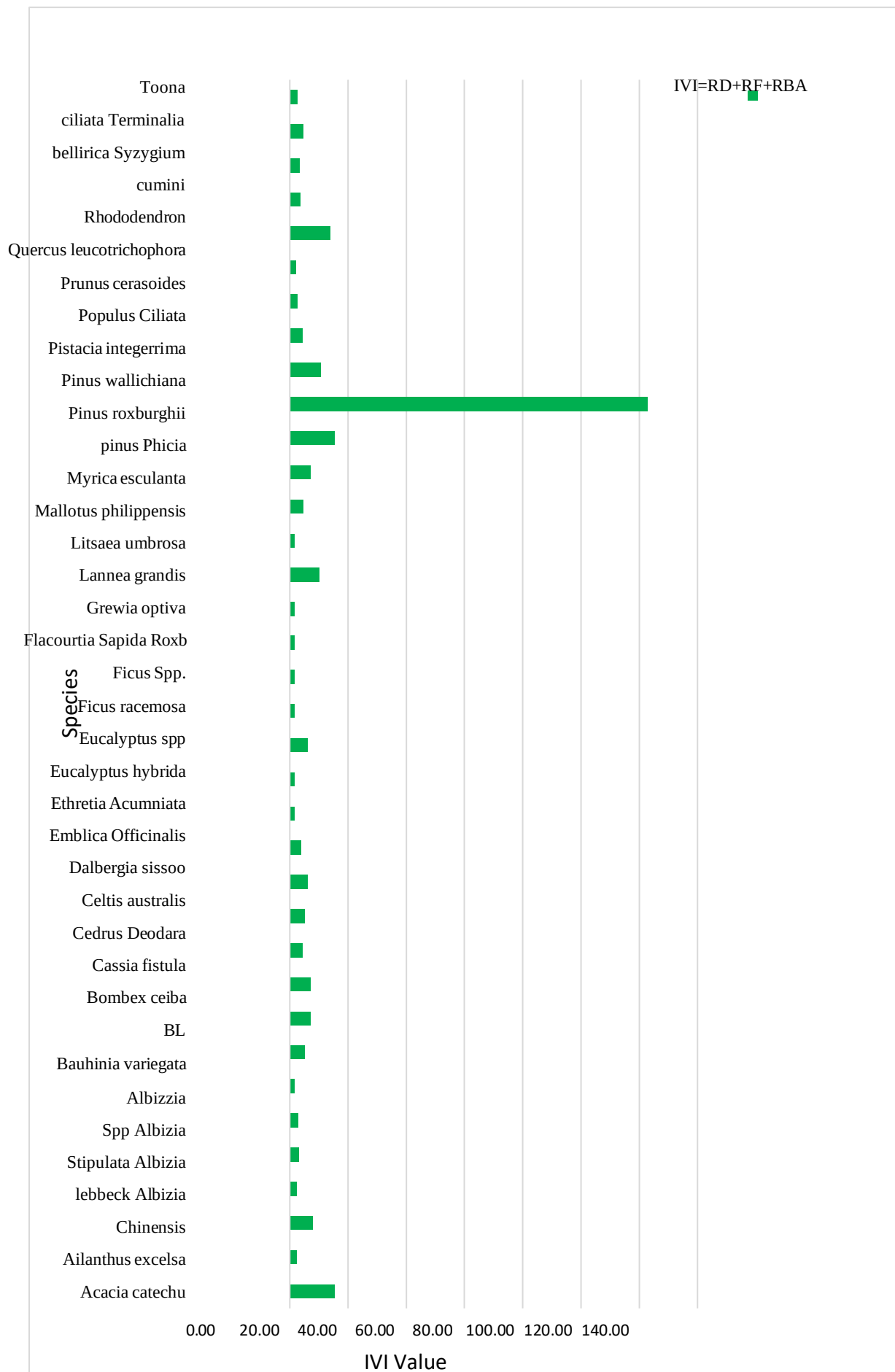
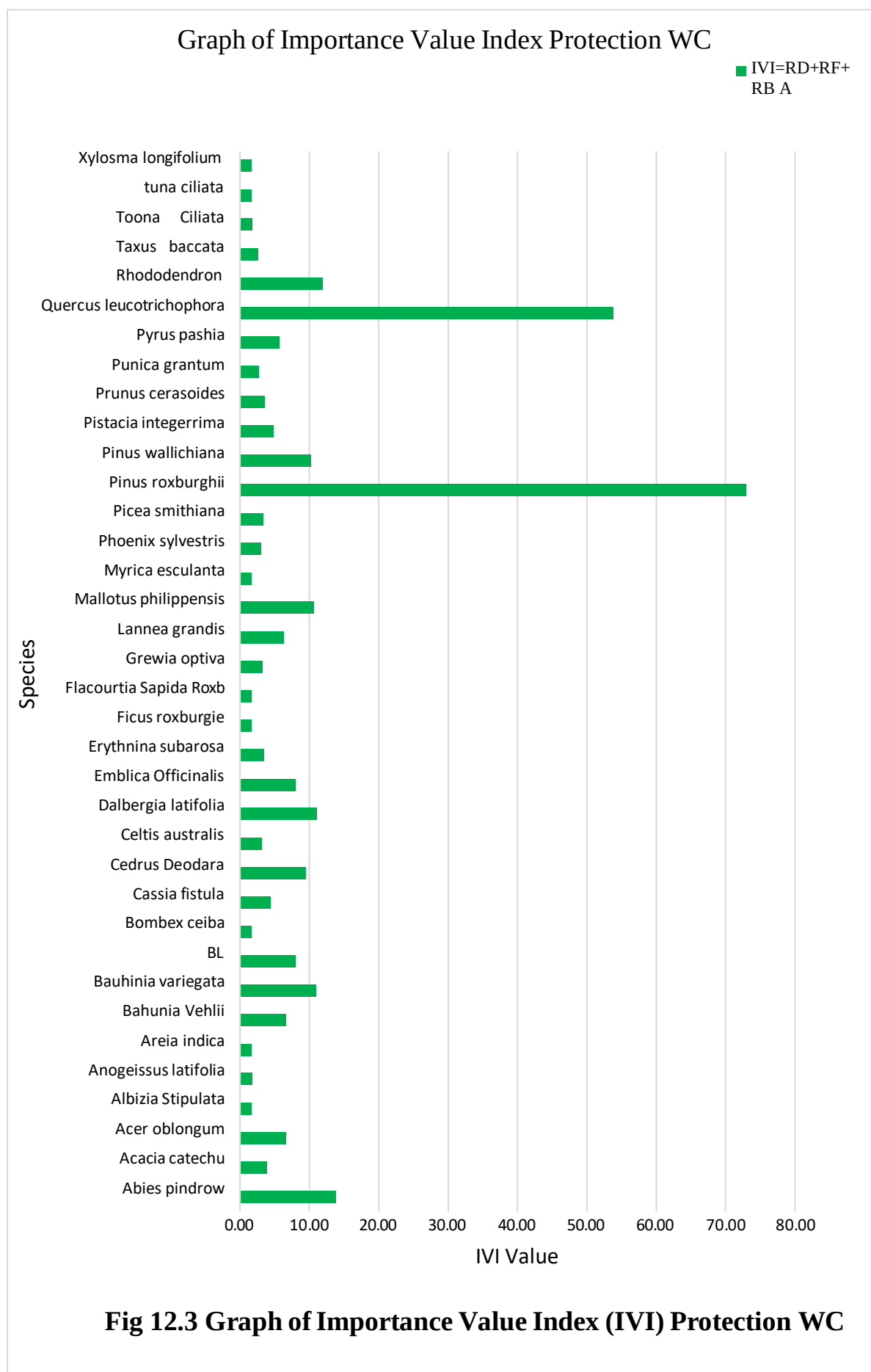


Fig 12.2 Graph of Importance Value Index (IVI) Plantation WC



Graph of Importance Value Index Regular WC

$$IVI=RD+RF+RBA$$

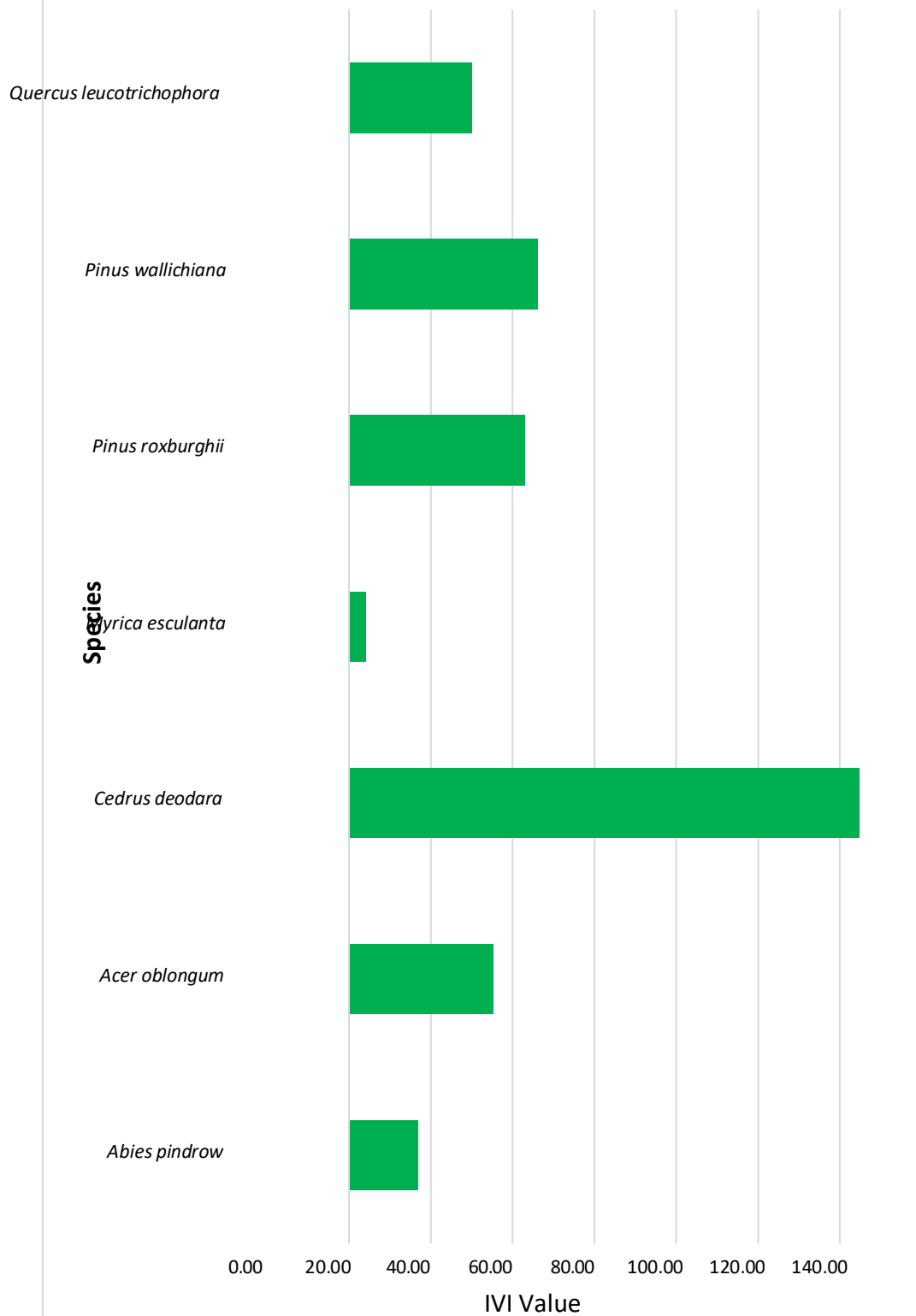


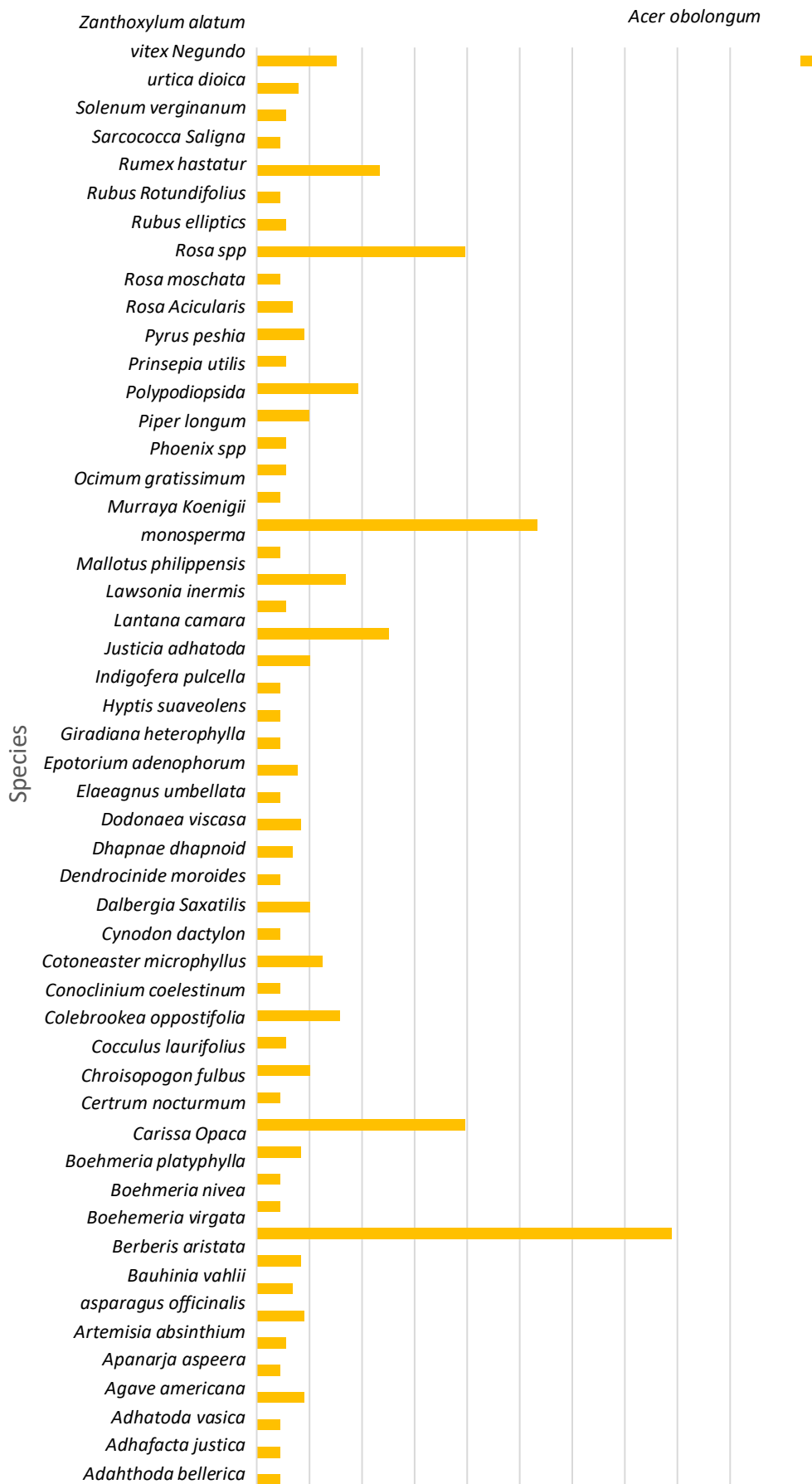
Fig 12.4 Graph of Importance Value Index (IVI) Regular WC

Table 12.3 Ecological parameters of Shrub species

Importance Value Index Shrubs				
Species	Relative Density	Relative Frequency	Relative Cover (Abundance)	IVI=RD+RF+RCo
<i>Acer oblongum</i>	0.26	0.31	1.69	2.25
<i>Adathoda bellerica</i>	0.26	0.31	1.69	2.25
<i>Adhafacla justica</i>	0.26	0.31	1.69	2.25
<i>Adhatoda vasica</i>	1.29	1.55	1.69	4.52
<i>Agave americana</i>	0.26	0.31	1.69	2.25
<i>Apanarja aspeera</i>	0.51	0.62	1.69	2.82
<i>Artemisia absinthium</i>	1.29	1.55	1.69	4.52
<i>asparagus officinalis</i>	0.77	0.93	1.69	3.39
<i>Bauhinia vahlii</i>	0.51	0.31	3.37	4.20
<i>Berberis aristata</i>	19.79	17.34	2.32	39.45
<i>Boehmeria virgata</i>	0.26	0.31	1.69	2.25
<i>Boehmeria nivea</i>	0.26	0.31	1.69	2.25
<i>Boehmeria platyphylla</i>	0.51	0.31	3.37	4.20
<i>Carissa Opaca</i>	8.48	9.60	1.80	19.88
<i>Certrum nocturmum</i>	0.26	0.31	1.69	2.25
<i>Chroisopogon fulbus</i>	1.54	1.86	1.69	5.09
<i>Cocculus laurifolius</i>	0.51	0.62	1.69	2.82
<i>Colebrookea oppositifolia</i>	2.83	3.41	1.69	7.92
<i>Conoclinium coelestinum</i>	0.26	0.31	1.69	2.25
<i>Cotoneaster microphyllus</i>	2.06	2.48	1.69	6.22
<i>Cynodon dactylon</i>	0.26	0.31	1.69	2.25
<i>Dalbergia Saxatilis</i>	1.54	1.55	2.02	5.11
<i>Dendrocinide moroides</i>	0.26	0.31	1.69	2.25
<i>Dhapnae dhapnoid</i>	0.77	0.93	1.69	3.39
<i>Dodonaea viscosa</i>	1.03	0.93	2.25	4.21
<i>Elaeagnus umbellata</i>	0.26	0.31	1.69	2.25

<i>Epatorium adenophorum</i>	0.77	0.62	2.53	3.92
<i>Giradiana heterophylla</i>	0.26	0.31	1.69	2.25
<i>Hyptis suaveolens</i>	0.26	0.31	1.69	2.25
<i>Indigofera pulcella</i>	0.26	0.31	1.69	2.25
<i>Justicia adhatoda</i>	1.54	1.86	1.69	5.09
<i>Lantana camara</i>	5.14	5.57	1.87	12.59
<i>Lawsonia inermis</i>	0.51	0.62	1.69	2.82
<i>Mallotus philippensis</i>	3.08	3.72	1.69	8.49
<i>monosperma</i>	0.26	0.31	1.69	2.25
<i>Murraya Koenigii</i>	12.08	12.69	1.93	26.71
<i>Ocimum gratissimum</i>	0.26	0.31	1.69	2.25
<i>Phoenix spp</i>	0.51	0.62	1.69	2.82
<i>Piper longum</i>	0.51	0.62	1.69	2.82
<i>Polypodiopsida</i>	1.29	0.93	2.81	5.03
<i>Prinsepia utilis</i>	3.86	3.72	2.11	9.68
<i>Pyrus peshia</i>	0.51	0.62	1.69	2.82
<i>Rosa Acicularis</i>	1.29	1.55	1.69	4.52
<i>Rosa moschata</i>	0.77	0.93	1.69	3.39
<i>Rosa spp</i>	0.26	0.31	1.69	2.25
<i>Rubus elliptics</i>	9.77	7.43	2.67	19.87
<i>Rubus Rotundifolius</i>	0.51	0.62	1.69	2.82
<i>Rumex hastatur</i>	0.26	0.31	1.69	2.25
<i>Sarcococca Saligna</i>	5.14	3.72	2.81	11.67
<i>Solenum verginatum</i>	0.26	0.31	1.69	2.25
<i>urtica dioica</i>	0.51	0.62	1.69	2.82
<i>vitex Negundo</i>	1.03	1.24	1.69	3.95
<i>Zanthoxylum alatum</i>	2.83	2.48	2.32	7.62
Grand Total	100	100	100	300

Fig 12.5 Importance Value Index Shrubs



$IVI=RD+RF+RCo$

0.00 5.00 10.00 15.00 20.00
25.00 30.00 35.00 40.00 45.00

IVI Value

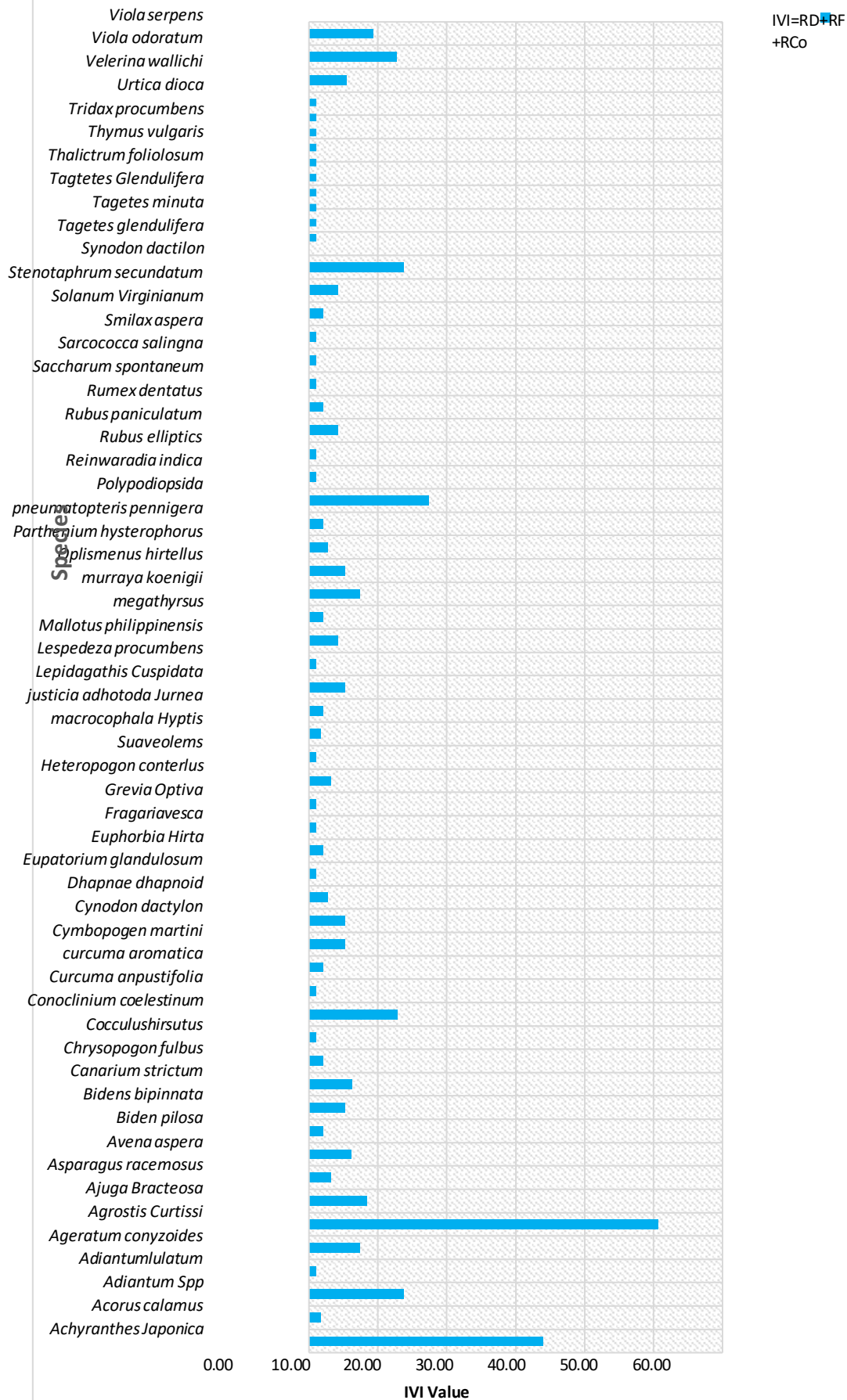
Table 12.4 Ecological parameters of Herb species

Importance Value Index Herbs				
Species	Relative Density	Relative Frequency	Relative Cover	IVI=RD+RF+R Co
<i>Achyranthes Japonica</i>	10.54	12.92	10.54	34.00
<i>Acorus calamus</i>	0.64	0.42	0.64	1.69
<i>Adiantum Spp</i>	4.79	4.17	4.79	13.75
<i>Adiantumlulatum</i>	0.32	0.42	0.32	1.06
<i>Ageratum conyzoides</i>	2.24	2.92	2.24	7.39
<i>Agrostis Curtissi</i>	20.77	9.17	20.77	50.70
<i>Ajuga Bracteosa</i>	2.56	3.33	2.56	8.45
<i>Asparagus racemosus</i>	0.96	1.25	0.96	3.17
<i>Avena aspera</i>	2.24	1.67	2.24	6.14
<i>Biden pilosa</i>	0.64	0.83	0.64	2.11
<i>Bidens bipinnata</i>	1.60	2.08	1.60	5.28
<i>Canarium strictum</i>	1.92	2.50	1.92	6.33
<i>Chrysopogon fulbus</i>	0.64	0.83	0.64	2.11
<i>Cocculushirsutus</i>	0.32	0.42	0.32	1.06
<i>Conoclinium coelestinum</i>	4.15	4.58	4.15	12.89
<i>Curcuma anpustifolia</i>	0.32	0.42	0.32	1.06
<i>curcuma aromatica</i>	0.64	0.83	0.64	2.11
<i>Cymbopogen martini</i>	1.60	2.08	1.60	5.28
<i>Cynodon dactylon</i>	1.60	2.08	1.60	5.28
<i>Dhapnae dhapnoid</i>	0.96	0.83	0.96	2.75
<i>Eupatorium glandulosum</i>	0.32	0.42	0.32	1.06
<i>Euphorbia Hirta</i>	0.64	0.83	0.64	2.11
<i>Fragaria vesca</i>	0.32	0.42	0.32	1.06
<i>Grevia Optiva</i>	0.32	0.42	0.32	1.06
<i>Heteropogon conterlus</i>	0.96	1.25	0.96	3.17
<i>Hyptis Suaveolems</i>	0.32	0.42	0.32	1.06

<i>Jurnea macrocephala</i>	0.64	0.42	0.64	1.69
<i>justicia adhotoda</i>	0.64	0.83	0.64	2.11
<i>Lepidagathis Cuspidata</i>	1.60	2.08	1.60	5.28
<i>Lespedeza procumbens</i>	0.32	0.42	0.32	1.06
<i>Mallotus philippinensis</i>	1.28	1.67	1.28	4.22
<i>megathyrsus</i>	0.64	0.83	0.64	2.11
<i>murraya koenigii</i>	2.24	2.92	2.24	7.39
<i>Oplismenus hirtellus</i>	1.60	2.08	1.60	5.28
<i>Parthenium hysterophorus</i>	0.96	0.83	0.96	2.75
<i>pneumatopteris pennigera</i>	0.64	0.83	0.64	2.11
<i>Polypodiopsida</i>	6.39	4.58	6.39	17.36
<i>Reinwaradia indica</i>	0.32	0.42	0.32	1.06
<i>Rubus elliptics</i>	0.32	0.42	0.32	1.06
<i>Rubus paniculatum</i>	1.28	1.67	1.28	4.22
<i>Rumex dentatus</i>	0.64	0.83	0.64	2.11
<i>Saccharum spontaneum</i>	0.32	0.42	0.32	1.06
<i>Sarcococca salingna</i>	0.32	0.42	0.32	1.06
<i>Smilax aspera</i>	0.32	0.42	0.32	1.06
<i>Solanum Virginianum</i>	0.64	0.83	0.64	2.11
<i>Stenotaphrum secundatum</i>	1.28	1.67	1.28	4.22
<i>Synodon dactilon</i>	4.15	5.42	4.15	13.72
<i>Tagetes glendulifera</i>	0.32	0.42	0.32	1.06
<i>Tagetes minuta</i>	0.32	0.42	0.32	1.06
<i>Tagtetes Glendulifera</i>	0.32	0.42	0.32	1.06
<i>Thalictrum foliolosum</i>	0.32	0.42	0.32	1.06
<i>Thymus vulgaris</i>	0.32	0.42	0.32	1.06
<i>Tridax procumbens</i>	0.32	0.42	0.32	1.06
<i>Urtica dioca</i>	0.32	0.42	0.32	1.06
<i>Velerina wallichii</i>	1.92	1.67	1.92	5.50

<i>Viola odoratum</i>	3.83	5.00	3.83	12.67
<i>Viola serpens</i>	3.19	2.92	3.19	9.31
Grand Total	100	100	100	300

Fig 12.5 Graph of Importance Value Index Herbs



12.4 Proposed Management:

The following guidelines are proposed for follow-up:

1. Tree species whose IVI is less than 5.00 will be promoted by planting and preservation.
2. Fruit trees such as Mango, Amla, Bel, Diospyros, Jamun, Bahera, Bohr and Pipal will not be felled during any operation.
3. Areas infested with dense lantana and Parthenium be replaced by useful economical species.
4. Fire protection will be done to save the biodiversity.
5. Compartments or parts of compartments which have population of fruit trees, or trees of lesser known species shall be preserved against any exploitation activity.
6. During plantation or felling operations, care should be taken not to sacrifice the rarely found species or their regeneration.

12.5 Treatment Proposed:

Natural regeneration or assisted natural regeneration shall be promoted. The regenerative capacity of the species shall be studied and on the basis of their capacity to regenerate, exploitation of medicinal herbs and plants shall be followed.

A total ecosystem conservation concept needs to be adopted for conservation of these forests. An effective naturalization plan needs to be devised based on principles for maintaining natural diversity. To enrich the low diversity areas, efforts should be made to restore native complementing natural species rather than planting as many different kinds of trees as possible without looking into the natural regeneration and the needs of the natural fauna of the site. Further, introduction of exotic species in the area be restricted and plantation of both, slow and fast growing native species of herbs, shrubs, and trees shall be promoted.

Involvement of local communities especially women in forest and wildlife protection through awareness, participatory planning and equitable sharing of responsibility and benefits needs to be promoted. Excluding local population can often lead to illegal activities

which can cause further degradation of the environment. The efforts therefore be to impose minimum restrictions on local populations and allow traditional practices to continue to ensure their long-term success. For this purpose capacity building programmes may be taken up. Further efforts should be made to preserve as many patches of natural communities as possible. This will help to sustain regional diversity.

Wherever possible, fragmentation of large patches of natural vegetation be avoided. Even a narrow access road through a forest can act as a barrier to movement of small organisms and effect their habitats.

Ecotones between natural communities support a variety of species from both communities. Hence, these should be allowed to develop naturally between adjacent communities.

Regular monitoring and updation of species data through R & D activities needs to be taken up taking the present data as the base. Ethno biological information also needs to be generated.

12.6 Permanent Preservation Plot: Due to increasing biotic pressure and imminent climatic change, the natural regeneration of most of the tree species has not been coming. To preserve the natural floristics of the forest, it is proposed to establish a permanent preservation plot in each working circle. The area preserved will be demarcated on the ground with erection of suitable stone structures. The various coordinates of longitude, latitude, altitude will be recorded along with a map. This preservation plot shall not be less than 3 ha area and will be studied for ecological succession and biodiversity of the area. No grazing shall be allowed in this area nor any type of cultural operations will be done. Biannual studies on composition and structure of the forest will be done. In case of trees, girth at breast height shall be recorded. The biodiversity will be studied by laying out 3m×3m and 1m×1m quadrats as explained in the methodology of Resource Assessment Survey. The Conservator of Research Circle shall inspect the area annually along with the Divisional Forest Officer of Suket Forest Division to record their findings. A copy of the findings should be sent to the Central Silviculturist, FRI Dehradun for further investigations.

CHAPTER 13

FINANCIAL FORECAST AND COST OF THE PLAN

13.1 GENERAL: In view of the rising price trend of timber and other forest produce and because of the fact that this tract is being opened by more motorable roads, it is difficult to make any accurate estimate of the price which the forest is likely to fetch during the period of the plan.

Similarly, it is equally difficult to correctly assess the expenditure likely to be incurred in carrying out the prescriptions of this working plan. An attempt has however been made to estimate the future surplus on the basis of the current prices of the forest produce and keeping in view its rising trend. Similarly, the expenditure for carrying out various prescriptions for this working plan has been projected. The price of timber expected has been calculated at current rate i.e. for 2023-24.

13.2 PAST YIELD:

The details of past yield removed have been given in chapter III.

13.3 PAST REVENUE AND EXPENDITURE

The details of past revenue and expenditures are given in chapter III.

13.4 FUTURE YIELD:

Table 13.1 Prescribed annual yield in cubic under various working circle

Working Circle	PB	Species				
		Deodar	Kail	Fir/spruce	Chil	Total
Deodar & Kail	I	26500	6000	8	0	32508
	III	14	0	0	0	14
	IV	8000	0	5	600	8605
	Total	34514	6000	13	600	41127
Chil	I	70	0	0	730	800
	III	60	0	0	1300	1360
	IV	0	0	0	900	900
	Total	130	0	0	2930	3060
Fir/ Spruce						
Grant Total		34644	6000	13	3530	44187

13.5 FUTURE REVENUE: It is difficult to make any definite financial Forecast since the prices keep in fluctuating. However, there has been general trend of hike in the timber prices. Taking into consideration the market price of standing trees for the year 2023-24, the annual future expected revenue is thus estimated as under:-

Spp	Volume (m ³)	Rate/ m ³	Anticipated Amount in rupees
Deodar	34644	84,683/-	29,33 ,75 ,78 ,52 /-
Kail	6000	73081/-	43,84 ,86,000/-
Chil	3530	55596/-	19,62 ,53 ,880/-
Fir/Spruce	13	53082/-	6,90,066 /-
Grass Cutting		L/S	2,000/-
Medicinal Plants		L/S	10,00,000/-
Resin Blazes	156817	45	70,56,765/-
Other Misc Revenue		L/S	15,00,000/-
		Total	3,57 ,87 ,46 ,563 /-

Thus, the estimated future revenue during the plan period (10Years) will be as under-

3,57 ,87 ,46 ,563 X 10 =3,57 ,87 ,46 ,5630 (or say rupees3578.74 crores)

13.6 FUTURE ANNUAL ANTICIPATED EXPENDITURE

Table 13.2 Future Annual Anticipated Expenditure

Sr. No.	Particulars	Amount in Crores
1.	Felling and extraction by Govt. agency	1.50
2.	Marking and numbering of trees to purchasers	0.15
3.	Purchase of stores, tools and plants	0.13
4.	Demarcation and construction and repair of BPs	2.50
5.	Const of roads and Paths	1.70
6.	Construction and repair of building	1.90
7.	Maintenance of compound and Water supply	0.70
8.	Regeneration and cultural works	0.60
9.	Cost of raising new plantations and maintenance	4.50
10.	Forest Protection	1.50
11.	Research and experiments	0.30
12.	Compensation for acquiring land etc.	0.30
	Total	15.78
	Establishment	
1	Establishment charges	15.00
2	Contingencies and Sundries	0.7
	Total	15.70

Total expenditure during the plan period (10 years) will be as under :-

(15.78 +15.70) X 10 =Rs. 314.80/- Crores.

13.7 FUTURE ESTIMATED SURPLUS:- Based on the above figures of estimate revenue and expenditure, the surplus works out as under:

Sr. No.	Particulars	Amount in Crores
1.	Estimated Revenue	3578.74
2.	Estimated Expenditure	314.80
3.	Estimated Surplus	3263.94

13.8 COST OF THE PLAN: -The expenditure incurred on the preparation of this working plan is summarized below:-

Table 13.3 Expenditure incurred on the preparation of this working plan

Sr. No	Particulars	Amount in Lacs	Remrks
1.	Pay and allowances of WPO.	Nil	No extra salary and allowances was paid.
2.	Pay and allowances of executive staff and Ministerial staff.	Nil	-do-
3.	Enumeration and other filed works including technical assistance.	10,00,000/-	-----
4.	Preparation/ composition and Geo Marking-digitization of stock maps of all compartments.	2,50,000/-	-----
5.	Requirement of martial.	1,50,000/-	-----
6.	Office expenditure including printing of documents and CH files.	3,00,000/-	-----
	Total	17,00,000/-	

The cost of this working Plan is insignificant keeping in view the efforts involved in the preparation of this document.

CHAPTER 14

FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE

14.1 General Constitution: General principles followed in the constitution of this working circle have been explained in the previous chapters. The overlapping working circle will embrace the protection to forests, and conservation of flora and fauna, forest fire management, invasive species, and weed management, prevention of illicit removals of bamboos and maintaining the boundaries of forests against encroachment. Therefore, the objective of this working circle is very important for the overall conservation of forests.

Forest resources being open wealth are liable to theft and illegal activities by opportunists and also by those who cannot afford to acquire for their survival. The biotic pressure on the forests has increased tremendously over the years and it is important to know the causes to bring a halt to these forces. Forest produce such as timbers and NTFP are valuable and have high market value which also tempt the people to gather the money through quick means. The land has also become a costly asset and there are always attempts to grab the land by illegal means and encroachments. The forests are also under stress from causes like forest fires, soil erosion, weeds, and firewood collectors. The protection against these causes is necessary to save the forests to let them perform their ecological functions. The Working Circle therefore extends over the whole area of this Working Plan.

14.2 Special Objects of Management:

- i) To provide protection to the forest and wildlife against illegal removals of timber and poaching of wild animals.
- ii) To protect the forests against forest fire, soil erosion, and invasive weeds.
- iii) To secure the involvement of local people on the management of forests through JFM.
- iv) To address the problem of forest fire to the best possible extent by adopting the legal measures and other preventive measures under the provision of Law i.e. IFA, 1927, IPC and Prevention of Damage to Public Property Act, 1984.
- v) To manage grazing in the Division as per carrying capacity while keeping in view the rights of various stakeholders
- vi) To protect and conserve all forest land to ensure no illegal mining, encroachment and

non-forestry activities on forest land under the provision of Indian Forest Act, 1927, HP Mines & Mineral (Concession) Revised Rules, 1971, Mines & Minerals (Development & Regulation) Act, 1957, Forest (Conservation) Act, 1980, HP Land Revenue Act, 1954 and HP Public Premises & Land (Eviction & Rent Recovery) Act, 1971 etc.

14.3. Methods of Treatment: Forest is a renewable resource and its management involves both legal and preventive measures, management, and silvicultural measures. The administrative machinery of the Forest Division should be geared up to take legal and preventive measures, education and participatory approach for the protection of forests. At the same time, steps are necessary against degrading and deforestation forces such as soil erosion and land encroachments. Prevention of forest fires and weed management are other important activities for protection of forests.

Legal Provisions: There are legal provisions for the protection of forests in the Indian Forest Act, 1927, Wildlife (Protection) Act, 1972 and the Forest (Conservation) Act, 1980. The Indian Forest Act of 1927, with its amendments, particularly (2nd amendment) in the context of Himachal Pradesh, addresses various aspects of forest conservation and management. Section 52 of the Act grants forest officers the authority to seize forest produce, vehicles, and tools involved in offenses against forest laws. Additionally, Section 52A deals with the confiscation of seized property, empowering the forest department to retain or dispose of such property, even before the conclusion of legal proceedings. Section 52B provides provisions for the appeal process regarding the order of confiscation, ensuring that affected parties have a legal recourse. These amendments enhance the effectiveness of forest law enforcement in the state, reflecting a robust approach to combating illegal activities and protecting forest resources. In 2016, the Government of India introduced regulations to govern wood-based industries with the aim of promoting sustainable forest management and ensuring legal compliance in the trade of forest produce. The regulations mandated that wood-based industries obtain proper licenses and adhere to specific guidelines for sourcing, processing, and marketing timber and other wood products. An amendment in 2017 further refined these regulations by implementing stricter controls on the documentation and verification processes for the legal acquisition of wood. This amendment aimed to enhance transparency and accountability in the industry, curbing illegal logging and trade practices while supporting the sustainable development of forest resources.

14.4 Duties and Responsibilities of Forest Officers: The forest officer is defined in the Indian Forest Act as “any person the state Government or any office empowered by the state Government on this behalf, may appoint to carry out all or any of the purposes of this Act or do anything required by this Act or any Rule made thereunder to be done by a Forest-Officer”. Divisional Forest Officer is the overall head of the Forest Division and is responsible for the overall protection, upkeep, maintenance, record and enforcement of law in the Division. He is the administrative, and management head of the Forest Division and advises his subordinates about the steps taken for the protection of forests and its management. He is responsible for arranging funds from the Government through the preparation of annual schemes/plans. He also keeps liaison with the district administration and seeks help for the protection of forests in the event of natural calamity like floods, fires and public apathy. The Divisional Forest Officer is supported by Range Officers, who are in charge of the respective Ranges and entrusted with the responsibilities of enforcing protection measures in their area by way of patrolling and detecting forest offenses. The Range Officer is required to draw offence reports, incidences of forest fires and forward it to the „DFO“ to get it sanctioned either for compounding of offence or for prosecution in the court.

The Block Officer is entrusted with the responsibility of enforcing protection measures in the block area by way of patrolling and detecting forest offences. Block officer is empowered for accepting the compounding fee from the offenders as well as sending the cases for prosecution. Block officers (Foresters) are directly assisted by the Forest Guards posted under him. The Forest Guards are entrusted with the responsibility of detecting forest offences by keeping a daily vigil in their beat forests and report to the Block Officer under whom their service have been placed.

The forest officer under the Wildlife Protection Act, 1972 has the same meaning as in the Indian Forest Act, 1927 or under any other Act for the time being in force in a state.

Under the JFM policy resolution, the block officer is the ex-officio secretary of the JFMCs. The JFM policy has the provision for formation of JFMCs and Self-Help Groups which can be given the responsibility of protection in lieu of the usufructs that they receive from the areas provided protection.

14.5. Execution of Search Warrants: The forest officers up to the rank of Range Officers and above are empowered with the power of executing search warrants in any premises for finding out the hidden or illegally collected forest produce. Under the

Wildlife (Protection) Act, 1972 Section 30, the forest officer may require any such person to produce for inspection any captive animal, wild animal, animal article, meat, trophy, specified plant or part or derivative in his control or possession or stop any vehicle to search or inquiry, if he has reasonable grounds for believing that an offence has been committed under this Act.

Powers of Arresting the Offenders: The forest officers upto the rank of foresters have the powers to arrest any person against whom a reasonable suspicion exists of his having been concerned in any forest offence punishable with imprisonment for one month or upwards. The offender/offenders is/are to be released or handed over to the nearest police station within 24 hours from the time of arrest for other legal action required under the law.

Collection of Information: Range in charge and Block Officers should maintain a system of collection of information on illicit felling in the forests, extraction of illegal produce from the forests, illegal transport used to the markets and other places, and a list of the habitual offenders. The information regarding illegal sale of timber and other produce may be got from the labourers when direct patrolling may not be working.

Special patrolling during nights: As the crime of timber and wildlife trade usually takes place in the dark, special patrolling should be done in the night hours by making groups and erecting nakas at the exit points of the roads leading from forests. Special patrolling can control the organized illicit felling and wildlife poaching in the forests. The police station posts are to be reminded from time to time for effective control of smuggling of timber and wild animal products from the state.

Posting of young and healthy personnel: Young, energetic and physically fit forest personnel should be posted in the patrolling parties for performance of tough duties. Aged, unhealthy and sick personnel should not be given the protection duty. Patrolling staff should however be changed from time to time.

Protection against lopping : Though people have no rights for lopping of bamboos, yet this practice is going on without any curbs by the Department. Lopping of bamboos has been noticed in the areas near the habitations. Even people using bamboo stairs were noticed lopping bamboo fodder. This leads to irreparable loss to the bamboos, congestion and development of damaged bamboos. The Department should organize camps by the Animal Husbandry Department and educate them about the new schemes of the Government for stallfeeding and dairy development. The Department should act strictly against the habitual offenders.

14.6 Protection against forest fires: Forest fires, undoubtedly have rendered the forests in degraded condition. So far, no strategy is followed to prevent and control the fires. Fires are still considered a natural calamity and allowed to spread unhindered and unobstructed without any action unless they become too big to handle effectively. The response time lag is very high. There is no preparedness at the field level and no system of detecting fires. On the basis of the data of forest fires in the past, it is noticed that there is a fire-cycle repeated after every 5-6 years. The big forest fires have occurred in 2010-11, 2012-13- 2016-17, 2018-19 and 2021-22 affecting 557.50 ha, 212.50 ha, 308 ha. and 166 ha forest area, respectively. It is also noticed that the intensity of forest fires has not increased tremendously. It can be well imagined that the direct loss ran into lac. of rupees besides ecological and environment hazards. Therefore, there is a strong need to develop a well-developed strategy to prevent and control the fires. The following strategy is suggested for the area:

programs including preventive, pre-suppression planning and suppression of fires.

- i. Accelerate salvage of dried bamboo and fuel management programs to reduce the hazard of wildfire in the forest.
- ii. Chalk out well planned programme to eliminate lantana and control its further spread.
- iii. Prepare a fire management plan and implement it.

The fire management plan should contain the following:

1. Description of area and the management objective.
2. Statement of fire management goals and policy.
3. Fuel management plan including expected statement hazard reduction, fire break and fuel break construction and maintenance.
4. Fire prevention plan including all specific activities such as public Meetings, exhibition and time table for each activity.
5. Detection including all detection activities by JFMCs and Self-Help-Groups.
6. Manning plan to govern initial dispatching of personnel and equipment by fire location and fire damage class.
7. Reinforcement plan listing procedure for back up, if initial attack predicted to be unsuccessful.
8. Communication plan establishing links among the DFO, Range Officer and the fire fighters.

A proper coordination of various activities of forest fire prevention, pre- suppression and suppression is a must. A proper institutional framework for training of personnel and research is of importance. Keeping relevant and accurate records are essential for future planning. The records include, the time of forest fire when occurred, location of fire, size of fire, time taken to extinguish a fire, area of productive forest burnt and the extent of damages. The fire plan shall also give a programme of maintenance of fire lines and construction of new fire lines.

Maintenance of fire lines:

Maintenance of all fire lines should be made an annual feature.

Annual maintenance should be done in January and February each year clearing off all vegetation live or dead including the organic matter.

Construction of new fire lines: So far there are no fire lines in some of the forests, they are insufficient to reach out link compartments. Therefore, construction of new fire lines should be attempted to approach the areas to stop fires from spreading to larger areas. As proposed elsewhere, along the entire boundary of all forests, a 3 m wide path should be developed which can also help in inspection and prevention and fire suppression.

Fire lines are essential for forest protection, acting as barriers that help prevent the spread of forest fires by creating clear, vegetation-free zones. In the Suket Forest Division, many existing fire lines have become overgrown or degraded, reducing their effectiveness. To mitigate the risk of forest fires and protect the forest ecosystem, a focused effort will be made on the construction and maintenance of fire lines. Each range will be responsible for developing and executing a comprehensive fire line construction and maintenance program tailored to their specific areas. This initiative will enhance the division's capacity to manage and control forest fires, thereby ensuring the safety and sustainability of the forest & environment.

Construction of fire watch towers: It is recommended to construct new watch towers at the highest points. The fire watch towers should be linked to the fire lines and communication links with ROs.

Notification of Fire season: The Divisional Forest Officer should notify the fire season giving the detailed instructions to the field staff about the preparation work and necessary preventive measures. Posting of fire watchers should be done and the do's and don'ts in the vicinity of the forests and inside the forests should be laid down by issuing

notices/ placards in the forests fringe villages. Meetings with JFM committees and the local representatives should be done to facilitate their cooperation. DFO can also cancel the leaves/holidays to the local staff in the public interest.

Fire drills: Fire drills should be done with the help of local departments/JFM committees to fight off any eventuality.

14.7 Boundary Pillars: During the process of Forest Resource Assessment, physical verification of each and every boundary pillar was done and their coordinates of longitude, latitude and altitude at mean sea level were recorded along with the condition of boundary pillars. It was noticed that boundary pillars of some protected forests were missing at some places and at others were in a bad condition, some were also displaced.

On the basis of above information, boundary register of all the forests should be prepared and maintained permanently in the office of Divisional Forest Officer as well as in the Range Office. The digitized maps also be prepared and made available to the concerned Forest Guard and the Block Officer as the permanent record and made a part of charge. The maps and the information about the coordinates will be of great use in the future for verification of boundary pillars, boundary disputes and court cases. It is the duty of the Range Officer to physically verify each and every boundary pillars after every year and record his certificate to this effect. This will check the tendency of encroachment and also personally converse him about the condition of forests and its vulnerability to degradation at the outer boundary. As a number of boundary pillars need repair, a ten year programme of making these pillars strong is prepared and given in Table 22.1. After repairs, boundary pillars should be numbered by grooving stones.

Boundary pillars serve as crucial markers that delineate forest boundaries, thereby playing a vital role in the protection and preservation of forest areas. Over time, many of these boundary pillars have been damaged or have weathered, which has compromised their effectiveness in preventing encroachment. To address this issue, there will be a focused effort on the construction and repair of boundary pillars within the Suket Forest Division. Each range will be responsible for formulating and implementing a comprehensive boundary pillar construction and repair program for their respective areas. This initiative is expected to further strengthen the integrity of the forest boundaries, thereby safeguarding the forest land from encroachment and other forms of unauthorized use.

Chapter 15

WEED MANAGEMENT

15.1 Weed management is the practice of preventing, controlling, or eradicating unwanted plants, commonly known as weeds, in various environments such as agricultural fields, gardens, lawns, parks, and natural areas. Weeds are plants that grow aggressively and compete with desired plants for resources such as water, nutrients, and sunlight. They can cause significant damage to crops, reduce agricultural productivity, and impact the overall health and aesthetics of landscapes. Effective weed management involves employing a range of strategies and techniques to minimize weed infestation and control their spread. These strategies can include cultural, mechanical, biological, and chemical methods, often used in combination, depending on the specific circumstances and goals of weed control. Cultural methods of weed management involve implementing practices that promote the growth and vigor of desired plants, making it difficult for weeds to establish and compete. Examples of cultural techniques include proper crop rotation, maintaining healthy soil fertility, utilizing cover crops, and employing suitable planting densities. Mechanical methods involve physically removing or reducing weed populations. This can be achieved through techniques such as hand-pulling, hoeing, mowing, tilling, or using various types of weed control equipment. Mechanical methods are commonly used in smaller-scale settings, like gardens or lawns. Biological methods involve using living organisms to control weeds. This can be achieved by introducing or encouraging natural enemies of weeds, such as insects, pathogens, or grazing animals that selectively target and suppress weed populations. Biological control methods are often implemented in natural areas or large-scale agricultural settings. Chemical methods, known as herbicides, involve the use of specific chemicals that are designed to kill or inhibit the growth of weeds. Herbicides can be selective, targeting specific types of weeds while leaving desired plants unharmed or non-selective, affecting all plants they come into contact with. Herbicides are widely used in agriculture, landscaping, and other areas where weed control is essential. There are several factors which favour their invasion. Control measures such as mechanical, chemical and biological measures are prescribed to control the further spread to save the rich floral diversity of the forest.

15.2 *Lantana camara* (Phul lakdi, Fulnu buti, Lantana) This Tropical American species belongs to family Verbenaceae. It has occupied most of the forests and non-forests areas in the sub-tropical belt and badly affecting the native floral diversity and availability of grasses. It is a perennial shrub with fragrant evergreen foliage, dark green in colour. The flowers are pink, yellow and orange

15.2.1 Interaction with animals – The success of lantana may be attributed to the presence of a range of pollinators, accounting for high percentage of fruit set. Pollinators are Lepidopteran species and thrips. The process of invasion is further augmented by nutrient additions, with animal droppings, canopy removal, and soil disturbances creating good seed bed. Lantana itself benefits from the destructive foraging activities of vertebrates, such as pigs, cattle, goats, horses, sheep, and deer, through enhanced vegetative propagation. 16.2.2 Geographical range- The plant is tolerant to Drought, heat and wind. It can grow in sandy to clayey loam soil and prefers unshaded habitats but can tolerate some shade. It is intolerant to frequent and prolonged freezing. It can sustain in wide annual rainfall range i.e., between 1000-4000 mm. thus it has the ability to consistently maintain its population over a range of environments. It can grow in slopes and exposed sites. It has wide range of phenotypic plasticity which makes it adaptable to broad range of environment.

15.2.3 Vegetative reproduction- Once established, the rapid vegetative growth of Lantana facilitates the formation of large, impenetrable clumps and high seed production. The more common means of vegetative spread is through layering, where horizontal stems produce roots when they come in contact with soil in addition, suckering also can occur. Prostrate stems can root at the nodes if covered by moist soil, fallen leaves or other debris. Dumped Lantana stems can develop roots and grow into plants and eventually flower.

15.2.4 Fire tolerance- Although Lantana burns readily during hot dry conditions, even when green, moderate and low intensity fires can promote the persistence and spread of Lantana thickets, rather than reducing them. After a low intensity fire, the removal of competing neighborhood plant species and increases in soil nutrients following burning can increase its germination.

15.2.5 Competitive ability- Under conditions of high light, soil moisture and soil nutrients, the mortality rate of mature Lantana plants in its naturalized range is very low. Lantana infestations are very persistent and, in forest communities, have the potential to block succession and displace native species, resulting in a reduction in biodiversity.

At some sites, Lantana infestations have been so persistent that they impede the regeneration in forest. Lantana is a very effective competitor with native colonizers and is capable of interrupting the regeneration processes of other indigenous species by decreasing germination, reducing early growth rates, and increasing mortality. This results in marked changes in the structural and floristic composition of natural communities. Therefore, as the density of Lantana in forests increases, species richness decreases. Lantana does not invade intact forests but is found on its margins

15.2.6 Allelopathy- The allelopathic effect of Lantana results in severe reductions in seedling recruitment of nearly all species under its cover. No growth or only stunted growth has been observed for other species growing close to Lantana due to allelopathic effects. Allelo chemicals promote or inhibit the crop growth based on their concentration, and the concentration increases from root, stem to leaf, making the leaf toxic to grazing animals. Lantadene A and lantadene B as more potent allelochemicals.

15.3 Physical Control Measures- The best time for removal of Lantana is just before rainy season, i.e. when the plants are not in flowering and fruiting. However, prescribed period for lantana removal in Himachal Pradesh is from 1st Nov to 31st Jan.

For restoration of lantana eradicated areas broadcast sowing of grass seed is done in January and February.

15.3.1 RECOMMENDATIONS- following are the recommendations for lantana removal:-

1. Lantana removal has both ecological and socio-economic benefits. The need is to continue efforts at removal combined with regular training and increased monitoring.
2. Regular training of field staff in techniques of removal of Lantana viz. CRS Method, Calendar of activities and maintenance of documents.

3. Site selection should follow watershed approaches like ridge-to-valley, removing lantana from upper areas first. Larger patches of area need to be preferred. Highly infested areas need to be considered first.
4. Disposal of removed lantana needs to be strategized in an SOP for undulating and steep areas. Incentives to locals and firms need to be promoted.
5. Lantana infested areas could be mapped using satellite imagery and ground truthing by field staff. This will help in prioritizing areas.
6. As Lantana removal would be an extensive activity, there is a need to have a portal like FONIS, to plan and monitor the lantana eradication work. It should have systems to upload kml boundaries, update registers and photographs from the site. The portal may also have a system that integrates manuals and site-specific recommendations using Artificial Intelligence.
7. During maintenance operations, weeds like Ageratum, and Eupatorium need to be removed. The norms for the removal of these should also be formulated.
8. For soil moisture conservation, trenches and other measures are recommended to prevent soil erosion and promote retention after the removal of Lantana.
9. Rehabilitation - fast-growing species to be marked specific to the site. The same needs to be raised in the nurseries.

Planning at least 3 years into the future

- a. There is a need for a proper plan to link the sites systemically to be automatically taken up for plantation in next year.
 - b. Protection measures from fire, grazing, others need to be linked
 - c. There is a need to create a long-term plan for targeted areas where fast growing species are a part of nursery protocol. Further the species suggestions need to be provided based on forest types and local ecological conditions and needs of local people.
10. Non-Forest land surrounding Lantana removal sites need to be considered as part of treatment. Convergence with other schemes like MGNREGA and incentives to landowners as well as firms focussing on value addition of lantana needs to be promoted.

15.4 Parthenium hysterophorus- (Carrot Weed, Congress Grass, Gajar ghas, Chatak Chandni) A member of family Asteraceae and a native of Tropical America, this herb is an aggressive colonizer of degraded areas with poor ground cover and exposed soil such as agricultural fallows, wastelands, roadsides, soil dumps, overgrazed pastures and degraded forests. The species, in addition to its adverse ecological impacts, has become a serious health hazard, causing allergic reactions in human beings. The weed was first revealed in India in 1955.

15.4.1 Habitat- This weed is spotted on bare lands, industrial areas, developing residential colonies, railway tracks, roads, drainage and around the ditch etc. High temperature is favourable for the development of this noxious weed production. Low temperature represses the development of the plant and the seed productivity. It invaded sites mostly have sandy loam soil with pH ranging from 5.4 to 7.4 and water holding capacity 16.8 to 63%.

15.4.2 Life cycle- It can flower at any time of the year, but commonly occurs during raining season. After 24-48 days of germination flowering takes place. The best alternating temperature regime for its weed seed germination is 21/16°C (day/night). Further its seeds can live for between 4-6 years in the soil as seed bank.

15.4.3 Causes of rapid spread- Seeds of Parthenium can survive under harsh conditions and remain viable for a long time period. These qualities of this weed help in its fast spreading. Seeds of Parthenium can germinate any time of the year, when suitable moisture is available.

15.4.4 Fast growth rate- It is vigorously growing annual herbaceous weed. Generally, Parthenium flowered when it is only 4-8-week-old and can flower for several months. Under unfavorable conditions like salt and drought stress, the weed can complete its life cycle within 4-5 weeks.

15.4.5 Allelopathic potential- This noxious weed suppresses the development of nearby plants by allelopathy. Leachate and extract of leaves and inflorescence prevent the germination and growth of associated economically important crops.

15.4.6 Unpalatable to animals: *Parthenium hysterophorus* is unpalatable to the animals. Generally, animals do not eat *Parthenium hysterophorus* because of its bitter taste and intense odour. Earlier investigations in India had revealed its serious health hazards to the livestock in *Parthenium hysterophorus* invaded areas.

15.4.7 Control measures

a) Mechanical measures

i. Controlling overgrazing: Overgrazing decreases the vigor and diversity of grassland that enable the spread of *Parthenium hysterophorus* weed luxuriously. Grazing during winter is generally safe since the period has low risk of *Parthenium* spread. However, *Parthenium* may grow and germinate in this time also.

ii. Burning: Mass vegetation of the weed can be destroyed by this practice. But it cannot be considered as safe control strategy for the weed since there is great risk to soil, air and existing plant and animal diversity.

iii. Manual control: Manually, *Parthenium* weed can be controlled by simple hand plucking. But this is not recommended since it might cause serious health hazard. Further, the seeds may drop off and increase the area of infestation.

15.5 *Eupatorium adenophorum* (Crofton Weed)

Eupatorium adenophorum is a member of family Asteraceae, this shrub is a native of Mexico. It forms dense thickets in fallow and wastelands, degraded forests and forest fringes out-spacing the indigenous species. The plant also causes allergic reactions and is a potential health hazard.

It is found upto 2200 meters above mean sea level, in ravine slopes and grassy localities. The plant inhabits moist conditions, extremely aggressive competitor, especially in shaded conditions although seeds do not germinate in dense shade. The plant increases its competitive advantage through allelopathic action and by altering the soil microbial activity. Flowering occurs in spring and summer around 10,000 to 100,000 seeds are produced per year when mature, mid to late spring with high Germination rates. It is reported to produce seed by means of apomixes. It is therefore likely that there is limited genetic variation within populations, especially in its introduced range, which in turn may make it easier to control.

15.5.1 Causes for rapid spread It is perennial, fast growing and due to wide adaptability, it is able to colonize vast tracts in Himachal Pradesh. It is light demander and its seeds remain dormant in the absence of direct sunlight, continuous slashing of stem give rise to affirly thick root stock

15.5.2 Control measures

15.5.2.1 Mechanical measures

Manual uprooting, Mowing, cutting with machete or burning of live plants. Furthermore, at the maturity stage, uprooting of plants results in dispersal of seeds to other areas. 16.5 *Ageratum conyzoides* (Goat Weed, Neel- phulnu)

Ageratum conyzoides is a noxious herb, a member of family Asteraceae present in many tropical and subtropical environments. It thrives best in rich, moist, mineral soils with high humidity and tolerates shading. It may grow from sea level to at least 2400 meters in altitude. In Himachal Pradesh, India, the weed is established up to 1800 meters.

15.5.2.2 Lifecycle Stages-It can complete its life cycle (germination to flowering) in less than two months. The plant flowers almost throughout the year, precisely from June to March. The seeds germinate in response to light (photoblastic) and are often no longer viable within 12 months. *A. conyzoides* has the potential to produce many seeds (94,772 seeds per plant) and to shed seeds over extended times (5 to 8 months), as well as its extraordinary physiological plasticity, has enhanced its persistence in arable fields.

15.5.2.3 Features imparting invasiveness- Fast growth and rapid spread Wide ecological amplitude; High reproductive potential

Long flowering and fruiting periods; Absence of natural predators/enemies/competitors; resistance to predators; Unpalatable due to high phytotoxin content; and resource competition along with novel weapons such as allelopathy.

15.5.2.4 Management Physical methods- These include manual uprooting, mowing, cutting with machete or burning of live plants. In general, these are of some use when the plant is at the vegetative stage. However, certain limitations are associated with these methods, for example the high cost of labour, ill-effects on workers' health,

vegetative regeneration from stolons, etc. Furthermore, at the maturity stage, uprooting of plants results in dispersal of seeds to other areas.

In conclusion *Lantana camara*, *Parthenium heterophyllum*, *Eupatorium adenophorum* and *Ageratum conyzoides* are highly invasive exotic weed in sub-tropical and temperate forest of North Western Himalaya. *Lantana* is recorded most dominating shrub in the forest ecosystem. The main reasons of their invasion are fast growth and rapid spread, wide geographical range, high reproductive potential and allelopathic effect. Due to their allelopathic effect and gregarious habitat they affect the native biodiversity and also the regeneration process. Preventing the spread of these weed species is most cost-effective management tool. However, various control measures (mechanical) are being undertaken throughout the world to reduce the further spread of these weeds. This would require the restriction of further importation to our country, sale and use of these weeds and strategically controlling infestations wherever it currently occurs.

Chapter 16

TREES OUTSIDE FOREST (TOF)

16.1 Introduction: Trees outside of forests refer to individuals or groups of trees found in non-forest areas such as urban environments, agricultural lands, parks, gardens, or along roadsides. These trees play a significant role in improving the aesthetic appeal of the surroundings, providing shade, and offering various environmental benefits. Here are some common examples of trees found outside forests:

Street Trees: Trees are planted along streets and sidewalks in urban areas to enhance the beauty of the cityscape, reduce noise pollution, absorb carbon dioxide, and provide shade.

- **Park Trees:** Trees planted in public parks and recreational areas to create green spaces, offer shade for park visitors, and promote biodiversity.
- **Orchard Trees:** Trees cultivated in agricultural settings, such as apple orchards, citrus groves, or vineyards, for the production of fruits.
- **Garden Trees:** Trees planted in private or public gardens for landscaping purposes, adding beauty to the surroundings, and providing a habitat for birds and insects.
- **Shelterbelt Trees:** Rows or groups of trees planted to serve as windbreaks and protect farmland or residential areas from strong winds.
- **Avenue Trees:** Trees planted along roadsides or avenues, often forming a canopy over the road, providing shade, and improving air quality.
- **Trees in Residential Areas:** Trees found in residential neighborhood, contributing to the overall ambiance, providing shade, and attracting wildlife.

16.2 Importance of Trees Outside Forest (TOF): Trees outside the conventional forest boundaries play a vital role in the ecosystem. They are found in village common lands, along roadsides, in agricultural fields, and even on private properties. These trees provide a myriad of ecological, economic, and social benefits to the local communities and the environment.

16.3 Ecological Significance: TOF species contribute to soil conservation, preventing erosion in hilly terrains like those in Suket Forest Division. Their roots hold the soil together, preventing landslides during heavy rainfall. Additionally, TOF species aid in maintaining water quality by acting as natural filters, reducing sedimentation and pollutants from entering water bodies.

16.4 Socio-Economic Benefits: The local communities in Suket Forest Division rely on TOF species for various resources. Fodder from these trees serves as a critical source of nutrition for livestock. Moreover, fruits, nuts, and leaves collected from TOF species often supplement the diets of villagers. Additionally, non-timber forest products like resins, gums, and medicinal plants found in TOF contribute to the local economy.

16.5 Challenges in Tof Management: Despite their ecological and socio-economic significance, managing TOF comes with its own set of challenges. Encroachment on common lands and roadside trees for urban expansion poses a threat to these resources. Lack of awareness among local communities about sustainable harvesting practices can lead to overexploitation of TOF species. Balancing the extraction of resources with the conservation of these trees is a complex task.

16.6 Sustainable Management Strategies: Following strategies can be implemented to address the challenges associated with TOF management, Community Engagement and Awareness: Creating awareness among local communities about the value of TOF resources is essential. Workshops, seminars, and educational campaigns are conducted to highlight the ecological, economic, and social benefits of TOF species. Engaging communities in the decision-making process fosters a sense of ownership and responsibility towards TOF management.

16.6.1 Sustainable Harvesting Practices: Promoting sustainable harvesting practices is crucial to prevent overexploitation. Implementing guidelines for the collection of non-timber forest products ensures that the ecological balance is maintained. Local communities are educated about selective harvesting methods that allow the trees to regenerate naturally.

16.6.2 Legal and Policy Frameworks: The forest department collaborates with local authorities to enforce legal protection for TOF species. Policies are formulated to regulate the use of TOF resources, preventing illegal felling and ensuring that only permitted activities are carried out.

16.6.3 Agroforestry and Reforestation: Promoting agroforestry practices encourages the integration of trees into agricultural landscapes. This not only enhances soil fertility but also provides an alternative income source for farmers. Additionally, reforestation initiatives are undertaken to restore degraded TOF areas and improve biodiversity.

16.7 Conclusion: Trees outside forest areas are a valuable asset that contributes to the well-being of both nature and communities. Through community engagement, sustainable practices, and policy support, TOF resources can be conserved and harnessed for the benefit of present and future generations.

Chapter 17

MONITORING, ASSESSMENT AND REPORTING

17.1 Control Forms: The Control forms provide for performance parameters /targets /annotations /norms for all prescriptions /suggestions for every working circle to be monitored, assessed, and reported on an annual basis during the period of the working plan. Control forms should be prepared to include each of these prescriptions. The following control forms will be used for monitoring all the important operations prescribed and suggested in this working plan:

17.1.1 Felling Control Form: For controlling and maintaining the record of all trees marked for felling and trees retained.

17.1.2 Silvicultural Control Form: For the control of all silvicultural operations such as fellings, subsidiary cultural operations, cleanings, thinnings, burnings, etc., which may be prescribed or suggested to be carried out in a given management unit for the duration of the working plan.

17.2 Deviation Statement: Any large and unusual operation, variation from yield and target for plantation/regeneration and or other activities provided in control forms of the working plan constitutes a deviation. These also should be spelled out. The check is through control forms and reporting is through deviation statements. Deviation beyond 20% of the target is considered to constitute a major deviation. Following is the format of Deviation Statement. Statement showing deviations from working plan prescriptions

The DFO territorial will forward through the Head, territorial circle, typed copies of this form in triplicate yearly with his copy of control forms. No explanatory remarks are required on this form, but these should be given in the forwarding letter. All minor deviations, which do not permanently alter the basis of management, may be approved and sanctioned by the Head, Working Plan Organization on behalf of the PCCF (HoFF) provided he agrees with the necessity of these deviations. One copy of the statement will be returned to the DFO territorial through the Head, territorial circle after the deviations have been sanctioned by the Head, Working Plan Organisation and the other copy will be sent to WPO for record. All major deviations without

altering the basis of management, the prior sanction of the PCCF (HoFF) should have been obtained in advance; the sanction number and date should be quoted in the last column. For all major deviations with respect to prescriptions where sanction of the MoEF is mandatory, an explanatory note along with request for regularization has to be sent by PCCF (HoFF) to RAPCCF (MoEF). In case where there is difference of opinion between the PCCF (HoFF) and RAPCCF (MoEF), the former will refer the matter to DGF&SS (MoEF), whose decision shall be final. The PCCF (HoFF) will countersign the deviation statement for reporting to the MoEF.

17.3 Registers and Records Including Spatial Data: The following updated (till last financial year) registers and records will be maintained by the division:

1. Compartment history file
2. Divisional notebook
3. Fire records and registers
4. Register of boundary pillars
5. Plantation journals (along with list of plantation raised area and location last five years)
6. Nursery register (location, permanent nursery)
7. Register of rights and concessions
8. Record of forest produces harvested
9. Free grants
10. Register of land transferred to other departments or under FC act and FRA
11. Register of soil and water conservation works (along with list of plantation raised, area and location last five years)
12. Register of invasive species eradication e.g., Lantana eradication, etc.

13. Register of wildlife management may include detailed record of human-wildlife conflicts that includes data on human casualties and injuries, loss of domestic animals and crop damage and compensation paid etc.

14. Register of government buildings that includes log of the repairs and addition (if any) undertaken in the buildings.

15. Register of licensed gun holder(s) in the division.

16. Register of places of religious significance that has been historically been given recognition (However, mention must be made of the fact that mere mention in the register does not automatically give legal sanctity to the structure).

17. Register of registered saw-mills in the division.

18. The divisional note book must have record of water table and springsheds at various places in the division.

17.4 Annual Inspection: Annual inspection of DFO territorial office by CF/CCF and Range office by DFO territorial is mandatory within three months of completion of financial year to have checks on annual statements in control forms and deviation statements and maintenance of registers and records.

Chapter 18

CLIMATE CHANGE

18.1 Introduction:

A long term weather pattern in any Area is called Climate. **Climate change** refers to significant, long-term changes in the average weather conditions of a region or the entire planet. It includes changes in temperature, precipitation patterns, wind, and other climate-related factors over decades or longer which thus means that the Climate change is the global phenomenon of long-term climate transformation i.e., Temperature, Wind, Precipitation and Rain pattern. Now days Climate Change has emerged as a big problem. It is creating disbalance in entire biodiversity with increase in global temperature in fast rate. Earth has history of many climate changes, but the changes have occurred slowly over thousands of years. This phenomenon can occur naturally due to factors like volcanic eruptions, solar radiation, or changes in the Earth's orbit. However, in recent times, human activities such as burning fossil fuels, deforestation, and industrial processes have significantly accelerated climate change by increasing greenhouse gas concentrations in the atmosphere. It is generally considered a natural phenomenon but, what makes it of bigger concern is its fast rate. Temperature is just one component of it. It is very broader term. This situation has arisen due to the undesirable and unwanted over exploitation of natural resources. The effects of climate change include global warming, rising sea levels, shifting ecosystems, more frequent and intense weather events (like floods, droughts, and storms), and disruptions to natural systems. Considering the rapid increase in global temperature the 196 countries (fully developed and under developed) of the world has decided to take this matter seriously. For that, they did an agreement which is called Paris Agreement.

It is a legally binding international treaty on climate change, adopted by 196 countries at COP-21 in Paris on dated 12-12-2015 entered into force on 4-11-2016. It was aimed at an agreement that all the parties of the agreement would work together to curtail the rise of global temperature well below 2°C, preferably to 1.5°C compared to pre-industrial level. All would increase the ability to adapt the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production. This agreement talks about 20/20/20 targets i.e.

1. Carbon dioxide emission reduction by 20%
2. Increasing the renewable energy market share by 20%
3. Target to increase energy efficiency by 20%

Among the 196 countries of world, India was also the part of that agreement. India also set its target at COP 21 to limit the global rise in temperature, which are given below: -

1. India put out a statement that we need to grow rapidly to meet the aspiration of 1.25 billion populations, and out of this 300 million people are without access to energy.
2. Yet despite the growing demands, India has pledged to reduce emissions intensity per unit GDP by 33-35% of 2005 levels.
3. Aiming to reach 40% of installed capacity from non-fossil fuels.
4. Targeting 175 GW of renewable energy generation by 2022.
5. Planning to enlarge forest cover to 2.5 billion tons worth of carbon sequestration. The HP Forest Department is also committed to achieving the target of getting 30% of the geographical area of the state under Forest cover by 2030 under the SDGs.
6. Reducing dependence on fossil fuels through levies and reduction in subsidies
7. India exhorted on the principles of equity and differentiated responsibilities
8. As per India, Equity means national commitments that must be consistent with the carbon space nations occupy.
9. India expects developed countries to mobilize 100 billion US dollars annually by 2020 for mitigation and adaptation in developing countries.

18.2 Danger of Climate change:

With change in climate the temperature is rising and it will cause to shift the habitat of many floral species upward from their current situation. With shift in upward the upward species of alpine ecosystem will get extinct because of having no space. For an example Under the jurisdiction of the Suket Forest Division, changes have been observed in the flowering time of *Rhododendron arboreum*, a key species of the region. This may be attributed to the rising temperature, altered precipitation pattern or climate change. The same applies to the faunal species. More frequent and severe events like hurricanes, floods and droughts are also result of the changing climatic patterns. Coastal areas are particularly vulnerable to storm surges and cyclones due to rising sea levels. Similarly Changes in rainfall patterns can lead to prolonged droughts in some areas and flooding in others. Changes in temperature and rainfall can disrupt crop production, leading to food shortages.

18.3 Challenges of Climate Change:

- Alpine biodiversity will get affected badly with increase in overall temperature of earth. The species habitat will shift upward and the higher altitude species will face the threat of extinction.

- With shift in biodiversity upward the local communities will also have to shift upward for yield of same agricultural and fodder species which they were extracting on downward areas.
- With change in climate the weather pattern will also change and thus the change in monsoon season will be noticed. This will disrupt the food production and availability.
- With rise in temperature of earth the glaciers of Himachal will melt rapidly and the discharge of water will increase. This will cause rise in sea level due to it, the coastal areas will face a greater threat even of submerging.

18.4 Climate Change impact on the Forests of Himachal Pradesh:

India has rich biodiversity of the bio geographically distinct regions because of varying environmental conditions in different parts of the country. Geologically the Himalayas are one of the youngest mountain systems of the world. Himachal Pradesh is hilly state of India situated in western Himalayan region between 32°22'40"N to 33°12'40" N and 75°45'55"E to 79°04'22" E. It covers 55,673 sq. km area and is covered by different type of forests, which constitute about 27.33% of the total geographical area. Physio graphically the state comprises of three distinct regions i.e. Shivalik, Mid hills, outer Himalaya and greater Himalaya or high altitude zone. About 3500 species of plant has been reported from the Himachal Pradesh. The Suket Forest Division is located between latitudes 31°16'02" to 31°46'08" and longitude 76°40'50" to 77°08'00" in Mandi District of Himachal Pradesh. It lies at an altitude between 502mtr to 3086 mtr from boundry of Dharmpur Range of Jogindernagar Division to Kamroonag Temple. It is great repository of floral diversity due to variable climatic condition. Most of the people in rural areas of this division depends directly or indirectly on forests for their livelihood and other household uses.

The change in climate with rapid rate is causing the shifting of tree line to higher altitude and movement of areas of growth of some spps to higher elevation. The higher areas of Suket Forest Division comprises the area of Jai Devi and Jhungi Forest Ranges. With increase in global temperature the warmer area in getting upward. The clear evidence of which is that some tree Species of warmer area is now growing in the higher area. It is a well noticed change reported by local villagers. The available data on Climate suggested that by 2100, the global temperature of the state is likely to increase by 3 ° C and precipitation will be reduced by 20%. The affect will be more alarming in that situation.

18.5 Climate Change impacts on wildlife and Agriculture of Himachal Pradesh:

Unseasonal rain and snowfall are the main reason for agriculture failing in Himachal Pradesh. This can be understood by an example of incident During 2018 when the unseasonal

snowfall took place in in lower parts of Suket Division. Snowfall in late September or in early October was disastrous for the summer crop of potatoes, cauliflower, cabbage as well as apples, pears, plums and cherries. Whereas in the year 2023 the region received meager snowfall. Due to it the farmers of upper areas of division has to suffered collective loss. People living at higher zones are now forced to give their cultivation and look out for other sources of income. It is strange to notice that temperature in higher zone is reaching upto 30-35 degree Celsius which usually floats 25-30 degree Celsius range.

18.6 Climate Change: Suket Forest Division

As per different references of climate change is the reality and as far as forests in Suket Forest Division concerned. Following points indicates the vulnerability of Mandi district and especially the Suket Forest Division to the changing climate.

1. People in rural areas who are dependent on farming now looking for other sources of income as climate change is hampering their crop yield.
2. **Decline in snowfall:** Due to it some higher area of Jai Devi and Jhungi range which always get snow during winter is not getting any snowfall from last few years which hit apple business.
3. **Scarcity of water in spring water:** With gradual increase in earth temperature and deforestation the many ground water and surface water stream has got dry during summer. These were once the source of water for 12 months a year.
4. Climate change has significantly increased the risk of forest fires due to rising temperatures, prolonged dry spells, and erratic rainfall patterns. These conditions make forests more susceptible to ignition and accelerate the spread of fires, posing a severe threat to biodiversity, ecosystems, and forest-dependent communities.
5. Incidents of Cloudburst in hilly areas as year 2023 recorded a number of cloud burst in Jai Devi, Kangoo and Jhungi Ranges.
6. With increase in temperature the river water temperature also getting higher. The cold-water species are in threat due to it.
7. The Suket, Kangoo & Jai Devi Forest ranges of this division which are adjoining the proposed ESZ & BAndli WLS are witnessing increase in the number of Human-Wildlife Conflict.
8. Failure of Number of plantations. Scarcity of rain decreases the survival of plantation.
9. Unseasonal Snowfall: Unseasonal snowfall in happening frequently.

18.7 Strategies to cope up with Climate Change:

Following strategies can be adopted to address the challenge posed by the the changing climate.

1. Planting climate-resilient and native species that can withstand changing temperatures and rainfall patterns.
2. Ex-situ conservation of the genetic diversity of both the flora and fauna.
3. Documentation and monitoring of the biodiversity of various eco-systems.
4. Evaluation of total carbon stock and annual increment for Himachal Pradesh.
5. Establish phenological observation plots to monitor changes in flowering, fruiting, and wildlife patterns due to climate change.
6. Maintain detailed records of temperature, precipitation, and fire incidents to analyze trends.
7. RS-GIS analysis of the whole state to evaluate/monitor the carbon stock
8. Research on the eradication of invasive alien species.
9. Management of forest Fires.
10. Collaborate with research institutions like HFRI, FRI etc to study local climate impacts and develop innovative solutions
11. Monitoring the population dynamics and movement of wildlife.
12. Documentation of traditional knowledge related to biodiversity
13. Studying the impacts on high altitudes wetlands, Alpine meadows and moraines
14. Focus on the restoration of degraded lands to enhance carbon sequestration and biodiversity.

18.8 Proposed Action plan

1. Management in alpine forests.

- Plantation of climate- resilient species , which are beneficial to local communities also
- Assisted natural regeneration in moderately dense forests.
- Enhancing natural resources and livelihood options of the vulnerable sections

2. Soil and water conservation

- Identifying vulnerable areas with the help of experts
- Minimizing the human interference in the ecology of the glaciers.
- Strategies and scientific planning for road cutting that result in minimal loss of soil and water resources.

- Construction of large-scale rainwater harvesting structures to reduce the water stress in moisture- deficient areas.
- Enhancement of soil and moisture conservation regime by introduction of multitier forest plantation

3. Fire Management

- Making Quick response team for fire fighting
- Utilization of pine needles for further valuable non timber forest produce product or energy-efficient eco-friendly energy source.
- Daily monitoring of fire threats with the help of satellite imagery and other modern tools and technologies.

CHAPTER-19

SCIENCE & RESEARCH

In recent years, concerns have emerged regarding the health of coniferous tree species in the Suket Forest Division, specifically in the Jhungi and Baldwara ranges. Observations of the drying and mortality of Deodar (*Cedrus deodara*) trees in the Jhungi Forest Range and similar issues with Chil (*Pinus roxburghii*) trees in the Baldwara Range prompted immediate attention from the forest authorities of the Suket Forest Division. To understand the underlying causes of these issues, a scientific investigation was initiated in collaboration with the Himalayan Forest Research Institute (HFRI), Shimla. The study focused on identifying the potential biotic and abiotic factors contributing to the declining health of these species. Experts from HFRI, including pathologists, entomologists, and forest protection specialists, conducted detailed field surveys and laboratory analysis. These investigations sought to uncover the role of various pathogens, pests, and environmental stressors in the observed tree mortality. The findings from both studies were integrated to provide a comprehensive understanding of the issues affecting Deodar and Chil trees, enabling forest management strategies to be developed for their effective mitigation and long-term conservation.

19.1 Investigation on Drying of Chir Pine Trees in the Baldwara range of the Suket Forest Division

19.1.1 Background

In response to reports of mass drying of Chir pine (*Pinus roxburghii*) trees in the Bairkot Beat of Baldwara range of the Suket Forest Division. Therefore, an investigation was conducted by the Himalayan Forest Research Institute (HFRI), Shimla. Following information received from the Conservator of Forests, Mandi, Director HFRI constituted a team comprising experts in plant pathology and entomology, along with a Junior Research Fellow, who visited the affected areas during 13-14 November 2019. The study aimed to assess the extent and cause of damage and to recommend appropriate management strategies.

The drying phenomenon, first observed after a fire incident in 2016, has led to widespread tree mortality, especially in the ND Halyatar where nearly 90% of the trees have been affected.

19.1.2 Affected Site

The study area, located at an altitude of 1656–1700 meters (31°31'55.1"N, 76°49'05.3"E), is dominated by *Pinus roxburghii* with sporadic *Cedrus deodara*. Two compartments were studied: ND Halyatar (90% mortality) and C-5 (30–40% mortality). Mortality was highest among trees of girth 30–35 cm. The forest floor was dominated by weeds, such as *Ageratum*

conyzoides, *Eupatorium odoratum*, and *Bidens pilosa*. Scars from the 2016 forest fire were evident, and resin tapping was prevalent in the affected area.

19.1.3 Preliminary Observations

1. Ecological Aspects

- Middle-aged/girth class trees were most affected.
- Fire scars on tree stems were prominent, and resin tapping was widespread.
- Poor natural regeneration of Chir pine was noted.
- The slope was steep, reducing waterlogging possibilities.

2. Entomological Aspects

- Bark perforations caused by bark beetles (*Dendroctonus* spp.) were observed on dead trees.
- No active insect-pest attacks were noted on healthy trees.

3. Pathological Aspects

- Fruiting bodies of wood decay fungi were abundant on dead trees but absent on healthy ones.
- The identified fungi included species such as *Trametes versicolor*, *Heterobasidion annosum*, and *Inonotus hispidus*.
- These fungi primarily colonized weakened trees, a condition exacerbated by the 2016 fire.

19.1.4 Management Strategies

Based on preliminary findings, the following management practices are recommended for these compartments of the Suket Forest Division to mitigate and control the drying of Chir pine trees:

1. Silvicultural Practices

- Removal and proper disposal of dead trees and stumps to prevent disease spread.
- Avoid monoculture plantations; promote mixed-species afforestation.
- Implement proper maintenance, including controlled pruning and lopping.
- Establish isolation trenches (30 cm wide, 70 cm deep) to limit the spread of root-borne diseases.

2. Fire Prevention

- Strengthen fire prevention measures, including fire line maintenance and controlled prescribed burning to manage invasive weeds and mimic natural fire cycles.

3. Control of Wood Decay Fungi

- Destroy fruiting bodies of fungi on dead trees to minimize inoculum sources.
- Avoid replanting immediately after tree removal, as soil-borne fungi may persist.

4. Biological Control of Bark Beetles

- Introduce natural predators such as clerid beetles (*Enoclerus lecontei*) and parasitic wasps to manage bark beetle populations.

5. Awareness and Community Involvement

- Educate local communities about forest health and the importance of preventing damage to tree trunks and roots.

19.1.5 Conclusion

This study highlighted the critical role of post-fire management in ensuring forest health. The drying of *Pinus roxburghii* in the Bairkot beat of the Baldwara range under the Suket Forest Division is primarily attributed to the 2016 fire, which weakened trees, making them vulnerable to fungal pathogens and secondary insect attacks. Implementation of the recommended silvicultural practices, combined with fire prevention and biological control measures, can help restore the forest ecosystem and prevent future outbreaks. The Suket Forest division is strictly following the recommendation.

19.2 Management of Drying Deodar Trees (*Cedrus deodara*) in Jhungi Forest Range, Suket Forest Division

19.2.1 Introduction

The Devdar (*Cedrus deodara*), also known as the Himalayan Cedar, is an iconic coniferous species native to the western Himalayas. It plays a significant role in the ecology of the region, thriving at altitudes ranging from 1500 to 3200 meters. Its natural range spans across eastern Afghanistan, northern Pakistan, northern and northeastern India (especially Himachal Pradesh and Uttarakhand), southwestern Tibet, and western Nepal. The species is known for its gregarious nature, often forming pure stands, though it can also occur in mixed forests where it frequently dominates the crop.

In the Jhungi Forest Range of the Suket Forest Division, an alarming issue has been observed where Deodar trees are experiencing drying and mortality. This study addresses the drying of *Cedrus deodara* trees in these regions, investigates the potential causes behind the problem, and outlines management strategies for restoring tree health and preventing further spread.

19.2.2. Background of the Study

The issue of tree drying and mortality in *Cedrus deodara* was first reported by the Divisional Forest Officer of Suket Forest Division to the Himalayan Forest Research Institute (HFRI), Shimla. A team of experts led by Dr. Pawan Kumar, Scientist-E (Entomologist) and Head of the Forest Protection Division, HFRI, was constituted to investigate the cause behind the decline in tree health. The team visited the affected sites in the O.D. 259 Chhota Gadwon and O.D. 260 Khobla Forests within the Jhungi Forest Range to identify the factors contributing to this problem. A detailed examination of the trees revealed widespread drying across the forest area, with symptoms including wilting, yellowing of foliage, premature needle loss, and visible fungal activity.

The study concluded that multiple biotic and abiotic factors, including fungal infections, root rot, and pest infestations, were playing a significant role in the deterioration of tree health in this area.



Dieback symptoms in affected Deodar trees

19.2.3 Review of the Problem

Cedrus deodara is naturally resistant to many pests and diseases, but under certain environmental conditions, it becomes vulnerable to pathogens like root rot and dieback. Root rot, particularly caused by fungi such as *Phytophthora cinnamomi*, *Fusarium spp.*, and *Cylindrocarpon spp.*, has been identified as a leading cause of tree decline. These pathogens

are typically spread through soil moisture and poor drainage conditions. The pathogen invades the root system, leading to decay and dysfunction, disrupting the plant's ability to absorb water and nutrients. Symptoms of root rot include wilting, yellowing leaves, and premature leaf drop, ultimately leading to tree mortality if left unmanaged.

19.2.4 Observations from Affected Sites

1. **Visual Symptoms:** Affected trees exhibited stunted, yellow to brown leaves that eventually dried out. Premature needle loss was also observed, indicating early defoliation.
2. **Dieback:** Dieback symptoms were evident, progressing from the top of the tree downward.
3. **Root Decay:** Roots showed clear signs of fungal invasion, with white, thread-like mycelial growths visible inside the damaged roots.
4. **Fungal Pathogens:** *Phytophthora cinnamomi*, *Armillaria spp.*, and *Fusarium* species were identified as the major fungi causing white root rot, leading to significant structural damage and eventual tree death.



White Root rot decaying the roots

In addition to fungal infections, the presence of the root borer beetle, *Dorysthenes huegelli*, was noted. The beetle's larvae feed on the roots of weakened trees, exacerbating the decline by causing mechanical damage to the root system, further weakening the tree's health and increasing susceptibility to pathogens.

19.2.5 Management and Treatment

A comprehensive management strategy was developed based on the observations and findings from the investigation:

1. **Biological Control:** In August 2023, HFRI applied a biological treatment using *Trichoderma spp.*, a fungus known for its antagonistic properties against wood rot fungi. The treatment, known as Trichokawach, was applied to the infected trees, allowing a one-year recovery period for the trees. A follow-up inspection showed significant improvement, with the cessation of premature defoliation, emergence of healthy foliage, and reduced fungal activity in the roots.
2. **Entomological Control:** To manage the *Dorysthenes huegelli* root borer infestation, HFRI has developed an eco-friendly solution, Biokil, which effectively controls the root borers without harming the environment. Chemical control options, including the use of Endosulphon, Quinalphos, and Dimethoate, are suggested if the infestation is severe.

19.2.6 Management Strategies for Root Rot and Pest Control

The primary focus for managing the drying and mortality of Deodar trees in the Jhungi Forest Range involves the following strategies:

1. **Fungal Management:**
 - **Biological Control:** The application of *Trichoderma spp.*, such as Trichokawach, combined with dung and water, helps control pathogenic fungi in the soil.
 - **Chemical Control:** Systemic fungicides like phosphonates or metalaxyl-based soil drenches can be used to reduce root rot fungi.
2. **Root Borer Management:**
 - Application of eco-friendly Biokil or chemical insecticides like Endosulphon and Quinalphos can help control the *Dorysthenes huegelli* infestation.
3. **Forest Silviculture:**
 - Good cultural practices, such as proper planting, pruning, and controlled lopping, help maintain the health and vigor of the tree stand.

- Avoiding physical damage to the trunks and roots of trees is essential to prevent infection by decay fungi.
- The isolation of infected areas through fencing can help prevent the spread of disease to healthy trees.
- Isolation trenches, 30cm wide and 70cm deep, can effectively contain the disease by blocking root-to-root contact.

4. Dead Tree Removal:

- The removal of dead and fallen trees is critical to reduce fungal inoculum. Care must be taken to avoid wounding healthy trees during removal.

5. Fire Prevention:

- Protecting the forest from future fire incidents is vital to reduce abiotic stresses that can exacerbate pest and disease outbreaks.

19.3 Conclusion

The drying of Deodar trees in the Jhungi Forest Range has been linked to both biotic and abiotic factors, with fungal infections, root rot, and pest infestations playing a significant role in the decline. Proactive management, including the use of biological and chemical treatments, silvicultural practices, and pest control measures, has shown promising results in mitigating the damage. The follow-up treatments and recovery observations suggest that with proper management, the health of *Cedrus deodara* trees in the region can be restored, contributing to the sustainability of the forest ecosystem in the Suket Forest Division.

CHAPTER 20

ECOTOURISM (OVERLAPPING) WORKING CIRCLE

20.1 General Constitution: ‘Eco-tourism’, in a comprehensive sense, means venturing into and enjoying nature in such a way as to assure that negative impacts on the cultural and natural environment are minimized and mitigated. It is, therefore, ‘responsible’ tourism, which, besides being ecologically and culturally sensitive, helps the local communities in realizing social and economic benefits. Ecotourism represents a pivotal strategy for harmonizing environmental conservation with socio-economic development. This chapter explores into the identification of potential ecotourism destinations within the division, emphasizing the dual objectives of promoting sustainable development and generating livelihoods for local communities. By focusing on capacity building and effective management of ecotourism assets, we aim to create a model of ecotourism that not only conserves natural resources but also empowers stakeholders through sustainable economic opportunities. The working circle is focused on identifying a range of ecotourism destinations with strong potential for sustainable development. This chapter will outline the strategies and actions for the sustainable development of ecotourism within the Suket Forest Division, emphasizing the importance of conservation and community involvement.

20.2 Special Objectives of Management:-

- 1. Sustainable Development:** Promote tourism practices that ensure long-term environmental and economic sustainability.
- 2. Biodiversity Conservation:** Protect and conserve the diverse wildlife and natural habitats within the Suket Forest Division.
- 3. Community Involvement:** Empower local communities through active participation and capacity building in ecotourism activities.
- 4. Economic Empowerment:** Create income-generating opportunities for local stakeholders through ecotourism ventures.
- 5. Capacity Building:** Enhance local stakeholders' skills in managing ecotourism assets effectively.

6. Environmental Education: Increase awareness about environmental conservation among tourists and locals

20.3 Guidelines on sustainable Eco tourism in Forest and Wildlife

Areas: MoEFCC vide its letter no. F.No. 1-57/2014 WL (part-8) dated 29.10.2021 has issued “Guidelines for sustainable Ecotourism in forest and wildlife areas-2021”. In these guidelines it is mentioned that

“Ecotourism shall be promoted on the basis of science-based planning. The plan shall form part of the duly approved Working Plan or Management Plan or Conservation Plan of the forest or wildlife area as the case may be, and shall include the carrying capacity analysis-based description of the eco-tourism site, time, duration, route, mode of travel and number of persons for visitations, and any support infrastructure needed”

MoEFCC vide its letter no. File No.5-2/2017-FC-Part (1) dated 25.10.2021 has also clarified and amended the Para 11.10 of the Handbook of FCA, which now shall read as

"Development/construction of facilities which are not of permanent nature, in forest areas for the purpose of ecotourism by Government authorities shall not be considered as a non-forestry activity for the purpose of Forest (Conservation) Act, 1980."

Recently the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 has provided vide amendment to Section 2 of the principal act that breaking or clearing of any forestland or portion thereof for

(vii) eco-tourism facilities included in the Forest Working Plan or Wildlife Management Plan or Tiger Conservation Plan or Working Scheme of that area;

will not be a non-forestry activity and will not attract provisions of FCA, 1980.

Considering the need for a participatory approach for the conservation of wildlife and its habitats, the guidelines emphasize the engagement of local communities in a manner that enriches local economies and encourages sustainable use of Indigenous material through financially viable value chains to help local communities become independent and promotes partnership among stakeholders in the development of ecotourism as well as equitable sharing of benefits with local communities.

20.4 Ecotourism in Himachal Pradesh: Himachal Pradesh, renowned for its stunning landscapes and rich biodiversity, offers immense potential for ecotourism. The state's diverse ecosystems, ranging from lush forests to alpine meadows, provide unique opportunities for sustainable tourism that emphasizes conservation and community

engagement. By promoting responsible travel practices, ecotourism in Himachal Pradesh aims to preserve the natural environment, support local economies, and educate visitors on the importance of protecting these pristine areas. The integration of ecotourism within the Suket Forest Division exemplifies this commitment, fostering a model that balances ecological integrity with economic development and cultural preservation.

Himachal Pradesh Forest Department formulated the Eco-tourism Policy during 2001 which was subsequently revised in 2005. A re-revised Draft Ecotourism Policy was also proposed in the year 2017. The central theme is to decongest and disperse over flowing city tourist destinations and bring the tourists closer to nature and ensure adequate economic return to the State and livelihood opportunities to the local communities. To fulfill this objective H.P. Ecotourism Society has been constituted with its Headquarters at Aranya Bhawan Talland Shimla (H.P.). It is a registered Society under the Societies Registration Act. The Society's apex decision-making body is the Governing body headed by the Hon'ble Chief Minister, Himachal Pradesh and the Principal Secretary (Forests) as its Member Secretary. The affairs of the Society are administered by an Executive Committee headed by the Principal Secretary (Forests) and CCF Eco-tourism as its member Secretary.

20.5 Eco-tourism in Suket Forest Division: The Suket Forest Division in the Mandi district of Himachal Pradesh, stands as a promising destination for ecotourism. Renowned for its dense forests, diverse wildlife, and tranquil landscapes, this region offers significant potential for sustainable tourism. Ecotourism initiatives here are designed to promote the conservation of natural resources while generating economic benefits for local communities. By fostering responsible travel and a deep respect for the environment, ecotourism in the Suket Forest Division aims to achieve a balanced approach to nature conservation and socio-economic development.

Various sites were identified for the ecotourism purpose in the Suket Forest Division. Over centuries, Suket's rulers and communities have maintained a harmonious relationship with their environment, fostering practices that sustainably utilized and protected the region's natural wealth. Below are photographs depicting the stunning landscapes and ecotourism sites found throughout the Suket Forest Division. They serve to highlight the allure of Suket's natural environment and underscore the importance of preserving its ecological integrity for future generations to appreciate.



a



b

Image a) showing the trek route of Bada Dev Kamrunag temple to Maa Shikari devi temple. b) Mata Murari temple



c





Nature's beauty at its finest, lush green forests of Jhungi range

12.6 Potential Eco-tourism sites in Suket Forest Division:-

The following ecotourism sites has been identified in the Suket Forest Division These sites not only provide scenic landscapes and unique wildlife encounters but also emphasize the importance of sustainable tourism and conservation. Below is a curated list of key ecotourism destinations within the Suket Forest Division, each contributing to the area's ecological and cultural richness.

Table 20.1 Ecotourism Sites identified under Suket Forest Division

Sr NO	Name of Site	Range	Block	Beat	Location	Potential /Description
1	Naina Devi	Sarkaghat	Durgapur	Kaldoo	31.640 652 76.816 75	Naina Devi Temple is situated in Sarkidhar of Mandi distt of Himachal Pradesh. SAR KI DHAR is 12 km away from Rewalsar. It is a beautiful place and is known for its seven lakes which are known as SAAT SAR.
2	Murahdhar	Sarkaghat	Thona	Thona	31.730 171	The site features a picturesque Dhar with dense

					76.829 21	forest cover. At the summit lies a temple dedicated to Murah Mata. This location presents an opportunity for the development of a trekking route, enhancing recreational activities for visitors.
3	Murari Devi	Baldwara	Leda	Bairkot	31°50' 46.74" 76°81' 79.13"	This Temple is in the west of Sunder Nagar on the top of a sacred hill named Murari Dhar also known as Sikandara Ri Dhar (Ancient Name). It is believed that this temple was founded by Pandvas during their “AGYATWAAS”.
4	Baba Bajrot	Baldwara	Goverta	Goverta	31°37' 39.74" 76°48' 17"	It is a famous temple located in the Govertha block of Suket forest division.
5	Dabru dawar	Jhungi	Jhungi	Jhungi / Dharwar	Link road from main road sunder nagar to Karso g near Jachh (95 Km from Distt. Headq uarter	The Dabru-Dwar, at an altitude of around 3,500 meters above sea level, features lush green landscapes with coniferous trees such as fir, spruce, deodar, Rakahal, and Kharsu. Located in the middle Himalayan range, the valley is covered with snow from winter until spring. It is a habitat rich in diverse flora and fauna, including many medicinal plant species. The peaceful and beautiful surroundings make it an excellent spot for tourists.
6	Trek Pandar to Kamroon ag , Pandar to Dawarlu, Pandar to Feshi Dhar	Jhungi	Pandar	Pandar, Kathiuni, Jaral	Main road sunder nagar to Karso g 75 km from the distt. Headq	The Pandar area, ranging from approximately 2,500 to 3,500 meters above sea level, is inhabited by peaceful and hardworking people. Several trekking routes originate from this valley, including Pandar to Kanoonag Temple (10 km), Pandar to Dasarlu Temple (3 km), and Pandar to Feshidhar (15 km). These

					uarter	trails are tranquil and nature-friendly, offering diverse flora and fauna that delight tourists. In winter, the area is covered with snow, while the summer climate is very pleasant. The Mahamaya Temple is a significant holy site in the valley. Additionally, many pilgrims visit the famous Kamrunag Temple in Mandi district, attracting visitors from various locations every year
7	Nihri to Mundalidhar	Jhungi	Nihri	Reagi, Kanas	Link road from pandar to Tattapani (90 km from distt. Hqr)	The trek from Nihri to Mundli is approximately 9 km long. Mundli Dhar, situated at an elevation of 2,500 meters above sea level, is a peaceful site in the area. This location is home to the Sheetla Mata Temple, which attracts many pilgrims each year.
8	Kamrunag	Jai Devi	Rohanda	Rohanda	31.473 10 77.049 75	Bada Dev Kamrunag ji Situated at a height of 3,334 Mtr. Kamrunag is known for the lake and the temple besides the lake. View of Dhauladhar Range and Balh Valley adds to the scenic beauty of the spot where the lake and pent roof temple of Dev Kamrunag is surrounded by thick forests of deodar. As per tradition, Kamrunag is the King Yaksha of Mahabhart and was worshiped by Pandavas. There is a tradition of offering gold, silver and coins in the lake by devotees on the fulfillment of their wishes by Dev Kamrunag. It is not possible to estimate the quantity of gold, silver and coins of other metal that

						lie at the bottom of the lake. For nature lovers, visit to Kamrunag is a visit to paradise.
9	Kulhada-Mahadev	Suket	Sadar	Traimbri	31.521 357 76.897 776 Elv. 1164m	The trek to the temple starts from place Bari near the Mahamaya Temple and after travelling through steep slop for 4 Km one can reach to the temple. This also provide the scenic view of whole sundernagar town. The mythology associates this temple with story of lord Shiva and Bhashmasur.

20.6 Monitoring Plan for Sustainable Ecotourism: To ensure that the ecotourism sites within the Suket Forest Division remain sustainable and continue to benefit both the environment and local communities, a comprehensive monitoring plan will be implemented. This plan involves active consultation and collaboration with local residents, stakeholders, and environmental experts. The key components of the monitoring plan are as follows:

1. **Community Involvement:** Engage local communities in regular consultations to gather their insights and incorporate their traditional knowledge into conservation efforts. Encourage local participation in monitoring activities and decision-making processes.
2. **Visitor Management and Carrying Capacity:** Implement a visitor management system to regulate the number of tourists and minimize ecological footprints. Establish and monitor the carrying capacity of each ecotourism site to prevent overuse and degradation. Develop guidelines for responsible tourism practices and educate visitors on the importance of preserving natural habitats.
3. **Capacity Building:** Provide training programs for local stakeholders to enhance their skills in sustainable tourism management, eco-guiding, and conservation techniques. Empower communities to take active roles in protecting their natural resources.
4. **Waste Management:** Develop and enforce effective waste management

practices to ensure minimal pollution and degradation of natural sites. Promote recycling and proper disposal of waste among tourists and local businesses.

5. **Infrastructure Development:** Ensure that all tourism infrastructure, such as trails, accommodations, and facilities, adheres to eco-friendly standards. Regularly assess and maintain infrastructure to prevent environmental harm.

6. **Regular Reporting:** Create a system for regular reporting and review of the monitoring plan's outcomes. Share findings with local communities, stakeholders, and the broader public to maintain transparency and accountability.

20.7 Himachal Pradesh Eco-tourism society (HPECOSOC): The Forest Department of Himachal Pradesh framed an Eco-tourism policy during 2005 to enable tourist to experience this national heritage. The policy needed revision mainly due to the procedural requirements of obtaining clearance of Eco-tourism sites under Forest Conservation Act, 1980 as per guidelines of the Ministry of Environment, Forest & Climate Change (MoEF&CC), Government of India. Some changes in the existing policy document have also been necessitated in the context of the evolving understanding of Eco-Tourism concepts and principles. The Revised Eco-Tourism Policy 2016 aims at bringing the wilderness and virgin ecosystems of Himachal Pradesh closer to visitors and at the same time ensure adequate safeguards and systems for the protection and conservation of these natural resources. By involving local communities, the policy would help in increased livelihood opportunities as well as their involvement in awareness building, protection and conservation. It also envisages generation of financial returns which can be ploughed back into proper up keep and maintenance of the environment. It shall also promote greater understanding and appreciation for natural and cultural heritage.

Himachal Pradesh Eco-tourism Society (HPECOSOC) will work with the ecotourism societies at Circle/Divisional level Societies to facilitate ecotourism activities in the state. Further Circle level eco-tourism Society (ECOSOC) will be main authority to take ground level decision through their general house on the basis of proposals/ideas received from local community & divisional level management units which shall be final & binding. Further, for all new ecotourism activities proposed in future, Circle level eco-tourism Society (ECOSOC) will be main authority to permit such activities

in accordance with the policy of state government and Government of India.

Presently, there are two rest houses within the Suket Forest Division that fall under the ambit of HP Ecotourism Society: Forest Rest House Jhungi and Forest Rest House Murari Devi. While Forest Rest House Jhungi is operational and well-maintained, Forest Rest House Murari Devi is currently in poor condition and requires significant repairs to meet ecotourism standards. Efforts are underway to restore and enhance this facility to ensure it can adequately serve visitors and support sustainable tourism initiatives.

20.8 FCA Guidelines on Ecotourism

In conclusion, the eco-tourism sites identified within the Suket Forest Division hold immense potential to contribute to the promotion of eco-tourism in MANDI district and in Himachal Pradesh as whole. These sites can be utilized in accordance with the Himachal Pradesh Eco-Tourism Policy, 2024, ensuring sustainable development and community participation. Furthermore, as per the recent amendment to the Forest (Conservation) Act, 1980, these eco-tourism sites will be kept outside the purview of the Act, provided they adhere to the approved eco-tourism policy and guidelines. This approach will not only bolster eco-tourism initiatives in the state but also ensure the conservation of the region's natural and cultural heritage.

The chapter includes the major potential eco-tourism sites identified within the Suket Forest Division. However, if during the implementation period of the working plan, any other site emerges as a significant eco-tourism attraction, it may also be incorporated into the plan.

Chapter 21

MISCELLANEOUS REGULATIONS

21.1 PETTY FELLING: The following kinds of trees may be marked for petty felling:

- (i) Trees required for scientific investigations at the Research Circle, FRI, Dehradun.
- (ii) Trees required to be felled for establishing new nurseries, extension, or alteration of nurseries.
- (iii) Trees required for establishing new fire-lines.
- (iv) Trees required to be felled that are dangerous to human life and property. The petty fellings will be shown in the Control forms if the trees which count towards yield are felled. The trees that do not count towards yield will not appear in the control forms and their felling shall be regulated by the Conservator of Forests/Chief Conservator of Forests, Mandi Circle.

21.2 RIGHTS AND CONCESSIONS:

(a) Right with permission

- 1. Timber trees for building.
- 2. Trees for agricultural implements.
- 3. Fuel (Dry or Green) for marriage or death ceremonies.
- 4. Wood for charcoal.
- 5. Grass on payment of fixed charges.
- 6. Green leaves for fodder on payment of fixed charges.
- 7. Thorny shrubs for fencing.

(b) Rights for the exercise of which no permission is necessary

- 1. Dry wood for daily domestic use collected by hand.
- 2. Fuel for burning the dead.
- 3. Grass and leaves for fodder removed from outside the ghasnis.

4. Dry fallen leaves, chil needless and green basuti for compost.
5. Leaves for tanning.
6. Earth for making pots and plastering the houses.
7. Honey collection.

21.3 RESEARCH PLOTS: At present there is no research plot in this division.

21.4 CONSTRUCTION OF ROADS/LINK ROADS:

Road:-The construction of large number of roads has already been under taken by P.W.D. department in the tract dealt within under FCA and FRA.

Path:- Number of bridle and inspection paths covering all important forests has been constructed in the past. The existing roads and paths are detailed in Annexures. 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.

Buildings:- Buildings have been constructed in the past. The existing buildings are detailed in Annexures.

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